2017-663
5/31/2017

DESIGN RESOURCE GROUP

TRAFFIC IMPACT ANALYSIS

DRAFT

MATTHEWS NORTHEAST PARKWAY

Matthews-Mint Hill Road & Moore Road
Matthews, North Carolina

Zoning Application #TBD

for

The Bainbridge Companies LLC

May 2017

365-026 (C-2165)

2459 Wilkinson Boulevard, Suite 200
Charlotte, NC 28208

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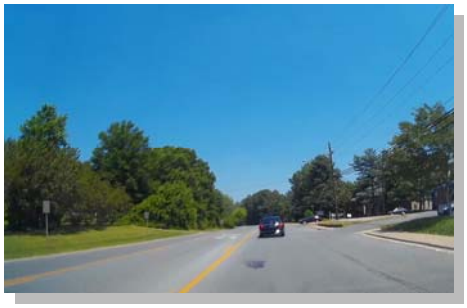
EXECUTIVE SUMMARY

The Bainbridge Companies LLC proposes to rezone (Zoning Application #TBD) approximately 27 acres (currently containing one single family home and 23 mobile homes) in order to construct a maximum of 350 multi-family units. The site is located on the north side of Matthews-Mint Hill Road (opposite Moore Road) in Matthews, NC. The site is expected to be fully developed in 2019.



Matthews-Mint Hill Road Facing East Along Site

This report provides analysis of the traffic operations within the area of influence, according to the standards set by the North Carolina Department of Transportation's (NCDOT) "Policy on Street and Driveway Access to North Carolina Highways, Chapter 4 Part C" and the Town of Matthews procedures (which follows NCDOT's guidelines). It provides intersection improvements needed for mitigating traffic impacts. This study evaluates the following scenarios:

- 2017 Existing Conditions
- 2019 No Build
- 2019 Build Scenario "A" – with the completion of Northeast Parkway to Matthews-Mint Hill Road (which includes an alternative analysis with the intersection of Matthews-Mint Hill Road & Moore Road/Proposed Northeast Parkway Extension as a 1-lane roundabout (per Matthews/NCDOT)
- 2019 Build Scenario "B" – without the completion of Northeast Parkway to Matthews-Mint Hill Road

The area of influence of the study site as indicated by NCDOT and the Town of Matthews staff includes the following three existing intersections:

1. Matthews Township Parkway (NC 51) & Northeast Parkway (signalized)
2. Matthews-Mint Hill Road & Moore Road (unsignalized)
3. US 74 (Independence Boulevard) & Matthews-Mint Hill Road (signalized)

According to the site plan, access to the development will occur via two full movement locations on a new section of roadway opposite Moore Road (Northeast Parkway Extension).

The existing development trip generation results indicate that the site currently generates a total of 29 AM peak hour trips and 17 PM peak hour trips; the proposed buildout trip generation results indicate that the multi-family development is expected to generate 175 AM peak hour trips and 210 PM peak hour trips. This equates to a difference of 146 additional AM peak hour trips and 193 additional PM peak hour trips. For purposes of the report, no reduction was applied to the difference between existing and proposed trips, therefore, the analysis is based on "worst case" in terms of site traffic.

One nearby approved (offsite) development was included in the 2019 analyses:

- Matthews Corners – an increase of 30,610 SF to the existing shopping center located on the southwest quadrant of Matthews Township Parkway & Northeast Parkway. The site expansion is expected to generate an additional 55 AM peak hour trips and 239 PM peak hour trips.

Currently, the signalized intersection of NC 51 & Northeast Parkway operates at a LOS "D" or better during both peak hours; the signalized intersection of US 74 & Matthews-Mint Hill Road operates at a LOS "F" in both peak hours. The unsignalized intersection of Matthews-Mint Hill Road & Moore Road operates at a LOS "E" in the AM peak hour and a LOS "C" in the PM peak hour. Typically, an intersection is said to be operating at capacity at a volume-to-capacity (v/c) ratio of 1.00 and acceptable at a LOS "D" or better.

With the results of our analyses (specifics are described in the Traffic Analysis section of this report) we suggest the following improvements/modifications at the study intersections and proposed accesses:

2019 Build Scenario "A" (Northeast Parkway Extension) Suggested Recommendations:

If the developer and/or others constructs the Northeast Parkway Extension we recommend continuing the one travel lane in each direction, with painted out median or appropriate turn lanes between the existing termination point of Northeast Parkway and Matthews-Mint Hill Road (three-lane section [70-foot R-O-W]).

2. Matthews-Mint Hill Road & Moore Road/Northeast Parkway Extension (unsignalized)

We recommend the following modifications to the intersection:

- Re-mark the eastbound TWLTL on Matthews-Mint Hill Road with 100 feet of storage
- Re-mark the eastbound travel lanes on Matthews-Mint Hill Road for a thru lane and a combined thru-right lane
- Modify the existing northbound right turn lane on Moore Road to a combined thru-right lane and extend it from 50 to 100 feet with an appropriate bay taper
- Construct the Northeast Parkway Extension with one ingress lane and separate left (100 feet of storage), a pocket thru (100 feet of storage), and right (termination lane) turn lanes
- Install standard (MUTCD R10-7) "Do Not Block Intersection" signs on Matthews-Mint Hill Road on both sides of Moore Road

2a. Matthews-Mint Hill Road & Moore Road/Northeast Parkway Extension (1-lane roundabout)

An alternative to the intersection configuration described above is a 1-lane roundabout (per Matthews/NCDOT). **It should be at the Town of Matthews's/NCDOT's discretion as to whether the possibility of a 1-lane roundabout be constructed at this intersection and its relation to the future US 74 jughandle connector intersection to the west and its potential signalization.**

3. US 74 (Independence Boulevard) & Matthews-Mint Hill Road (signalized)

- Extend the existing westbound right turn lane storage on Matthews-Mint Hill Road from 315 feet to 800 feet with a short bay taper (to the proposed Northeast Parkway Extension). It should be noted that in the No Build scenario the calculated queue length is approximately 650 feet; therefore, we feel the developer should only be responsible for the cost of extending the right turn lane storage 150 feet.
- The future US 74 Widening/Express Lane Project (NCDOT TIP #U-2509B currently under design, with construction tentatively beginning in 2022) will grade separate this intersection, therefore, the cost of the project based on its short usable life should be evaluated further.

2019 Build Scenario "B" (No Northeast Parkway Ext.) Suggested Recommendations:

2. Matthews-Mint Hill Road & Moore Road/Proposed Access (unsignalized)

- We recommend the same modifications to the intersection as discussed in the 2019 Build Scenario "A" section for this intersection.

3. US 74 (Independence Boulevard) & Matthews-Mint Hill Road (signalized)

- The same westbound right turn lane extension on Matthews-Mint Hill Road as discussed in the 2019 Build Scenario "A" section for this intersection.

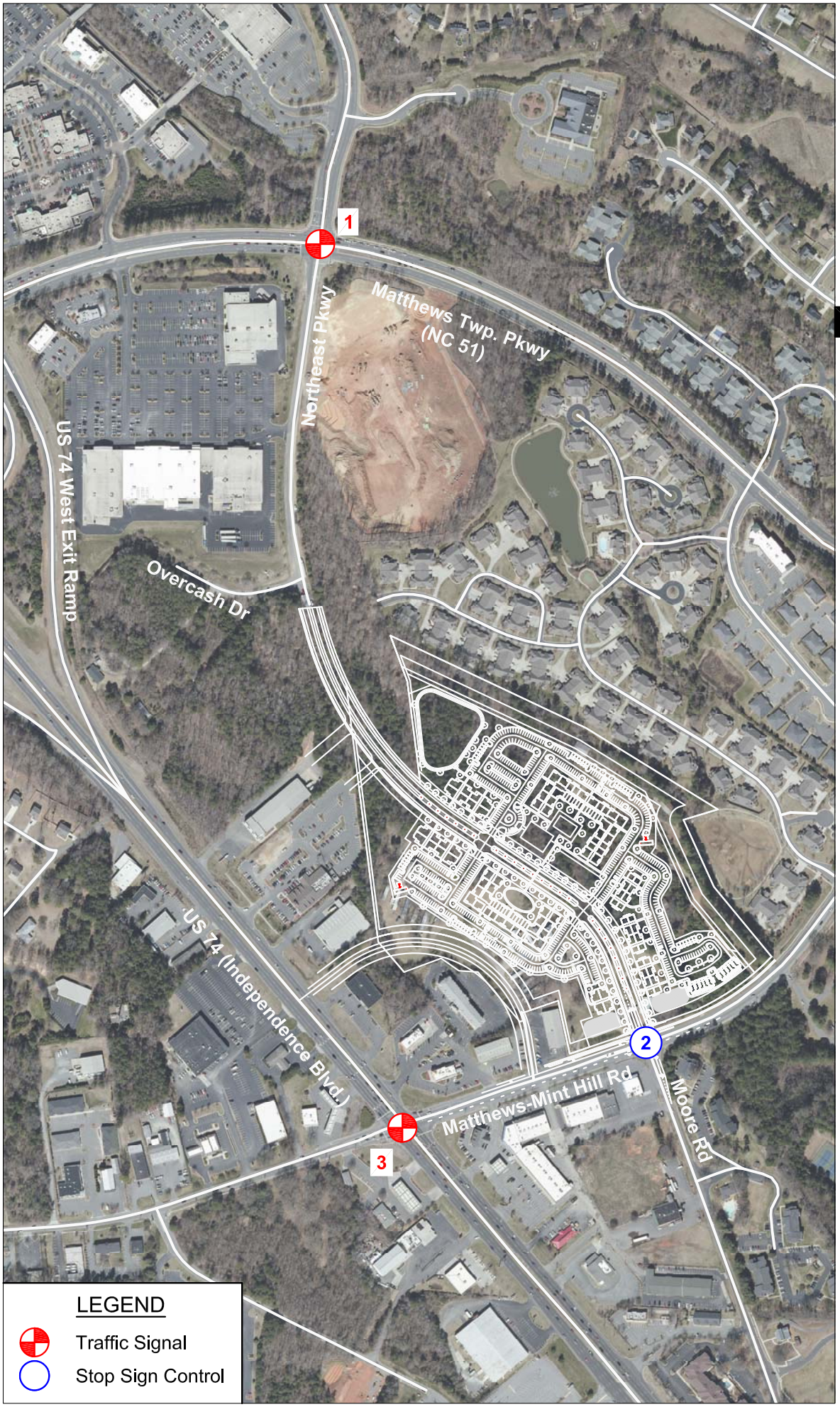
The proposed Matthews Northeast Parkway multi-family development is not expected to create extensive roadway/intersection issues, especially given the minor amount of additional traffic associated with project.

PROPOSED DEVELOPMENT

The Bainbridge Companies LLC proposes to rezone (Zoning Application #TBD) approximately 27 acres (currently containing a few single family homes and mobile homes) in order to construct a maximum of 350 multi-family units. The site is located on the north side of Matthews-Mint Hill Road (opposite Moore Road) in Matthews, NC (see Figure 1). The site is expected to be fully developed in 2019.

Matthews-Mint Hill Road Facing West Along Site

According to the site plan, access to the development will occur via two full movement locations on a new section of roadway opposite Moore Road (Northeast Parkway Extension) (see Schematic Site Plan).



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CARY, NC 27513
919-451-2093

AREA of INFLUENCE MAP

0 250 500
SCALE: 1" = 500'
N

PROJECT #: 365-026
DRAWN BY: MWW
CHECKED BY: REG

APRIL 2017

REVISIONS:

Figure 1

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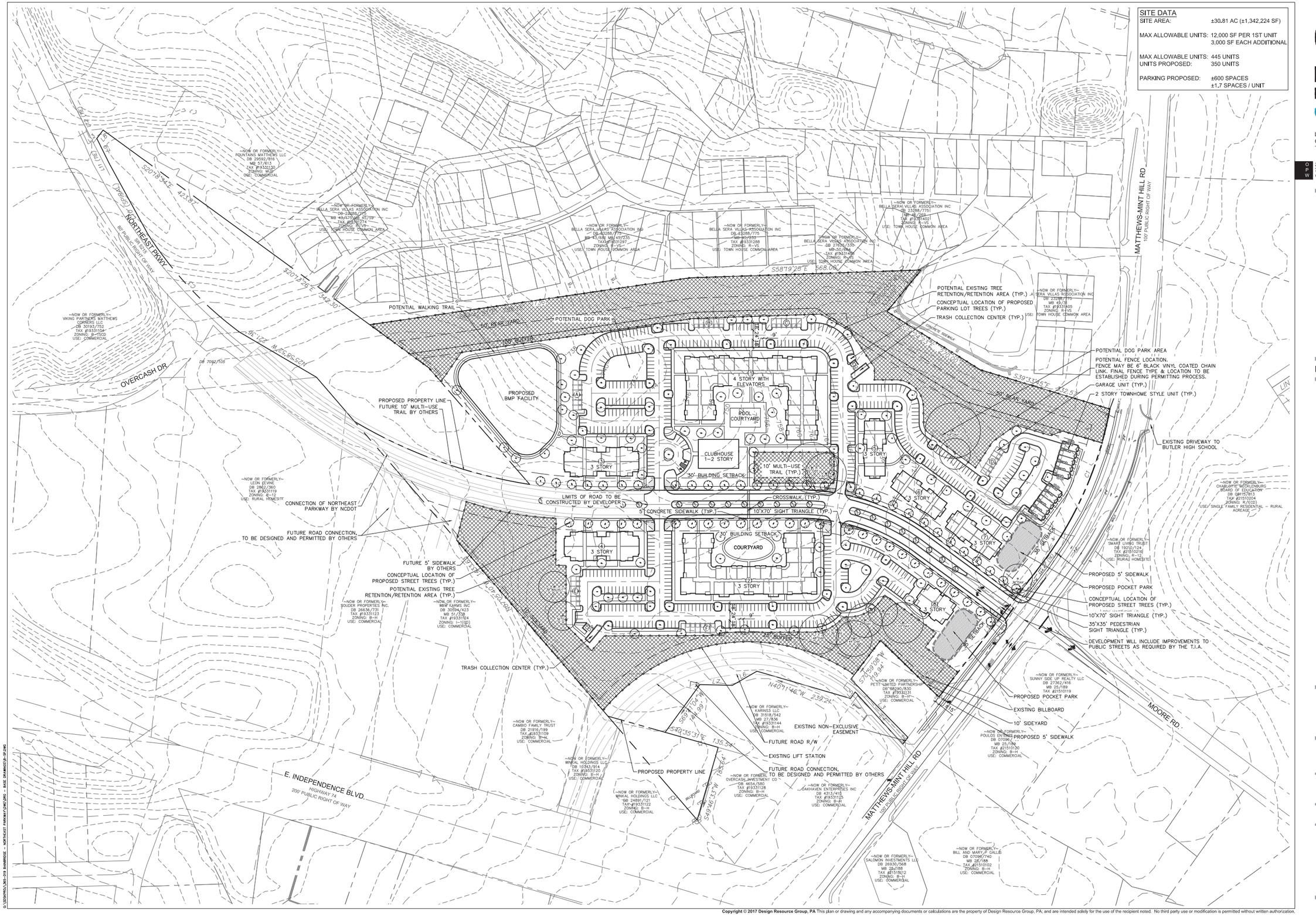

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REZONING PETITION
FOR PUBLIC HEARING
2017-XXX

REZONING DOCUMENTS

BAINBRIDGE NORTHEAST PKWY

MATTHEWS, NORTH CAROLINA

BAINBRIDGE COMMUNITIES ACQUISITION, LLC
401 HARRISON BLVD., SUITE 320
CARY, NC 27513
919.462.1275

SCHEMATIC SITE PLAN

SCALE: 1" = 100'

PROJECT #:	365-019
DRAWN BY:	SVK
CHECKED BY:	THH

MAY 26, 2017

REVISIONS:

RZ1.00

AREA CONDITIONS

The area of influence of the study site as indicated by NCDOT and the Town of Matthews staff includes the following three existing intersections:

1. Matthews Township Parkway (NC 51) & Northeast Parkway (signalized)
2. Matthews-Mint Hill Road & Moore Road (unsignalized)
3. US 74 (Independence Boulevard) & Matthews-Mint Hill Road (signalized)

Matthews-Mint Hill Road Facing West Toward Moore Road

Moore Road Facing North Toward Matthews-Mint Hill Road

As indicated on the most current Charlotte Regional Transportation Planning Organization (CRTPO) Thoroughfare Plan, Matthews-Mint Hill Road is a major thoroughfare (a major collector NCDOT functional classification) with a posted speed limit of 35 mph (located on the south side of the site). Matthews-Mint Hill Road is a two-lane roadway (one lane in each direction - with appropriate left turn lanes or two-way left-turn lane and occasional right turn lanes. A 2nd (unmarked) narrow eastbound thru lane is present commencing at US 74 and terminating as a right turn lane at the westernmost access for Butler High School – we recommend new pavement markings to create two distinctive travel lanes in this roadway section. The roadway includes curb/gutter and sidewalk on the south side.

Sight distance to the west on Matthews-Mint Hill Road at the proposed access location is adequate, meeting or exceeding normal NCDOT requirements for a 35-mph posted roadway (40 mph design speed = 400 feet of sight distance). Due to existing trees/shrubs east of the proposed site access, sight distance to the east on Matthews-Mint Hill Road at the proposed access location is currently slightly deficient. However, with the construction of the required sidewalk, etc. along the site's frontage it is assumed the sight distance will exceed the normal NCDOT requirement of 400 feet.

According to the CRTPO Thoroughfare Plan, Northeast Parkway is a minor thoroughfare, with a posted speed limit of 35 mph. On the north side of Matthews Township Parkway, Northeast Parkway is a two-way median-divided roadway four lanes wide (two lanes in each direction) with appropriate left turn lanes – curb/gutter, planting strip, and sidewalk is present on both sides. On the south side of Matthews Township Parkway, Northeast Parkway is a two-way roadway two lanes wide (one lane in each direction) with a northbound left turn lane with 240 feet of storage – curb/gutter, planting strip, and sidewalk is present on the east side. Northeast Parkway currently dead ends to the south. This report provides intersection analyses with and without this roadway extending to the south to Matthews-Mint Hill Road.

A future NCDOT roadway project is planned in the vicinity of the proposed Matthews Northeast Parkway - US 74 Widening/Express Lane Project (NCDOT TIP #U-2509B currently under design, with construction tentatively beginning in 2022) (a copy of the transportation projects in Matthews is located in the Appendix), and is expected to include:

- The extension of Northeast Parkway to the south to Matthews-Mint Hill Road
- Grade separation of the existing signalized intersection of US 74 & Matthews-Mint Hill Road, which will include jughandle ramps

Morning (6:00-9:00 AM) and afternoon (4:00-7:00 PM) peak period turning movement counts were conducted at the three existing intersections on Thursday April 20, 2017 (while school was in session).

In addition to the intersection turning movement counts, NCDOT is the source for average annual two-way daily traffic (AADT) volumes within the area of influence. The AADT volumes are depicted in Table 1.

Table 1: Average Annual Daily Traffic Volumes (veh. per day)

Roadway	AADT (Year)
Matthews-Mint Hill Rd. east of site	7,000 (2014)
Matthews-Mint Hill Rd. west of US 74	11,000 (2014)
Matthews Twp. Pkwy. West of Northeast Pkwy.	24,000 (2014)
US 74 north of Matthews-Mint Hill Rd.	58,000 (2015)
US 74 south of Matthews-Mint Hill Rd.	62,000 (2015)

Per the request of Matthews staff, field observations were conducted at the intersection of Matthews-Mint Hill Road & Moore Road during the morning arrival and afternoon dismissal times for Butler High School (7:15 AM – 2:15 PM). Copies of the intersection investigation aerial worksheets (with each movement's coinciding maximum queue lengths) are located in the Appendix.

It should be noted that the following conditions were witnessed:

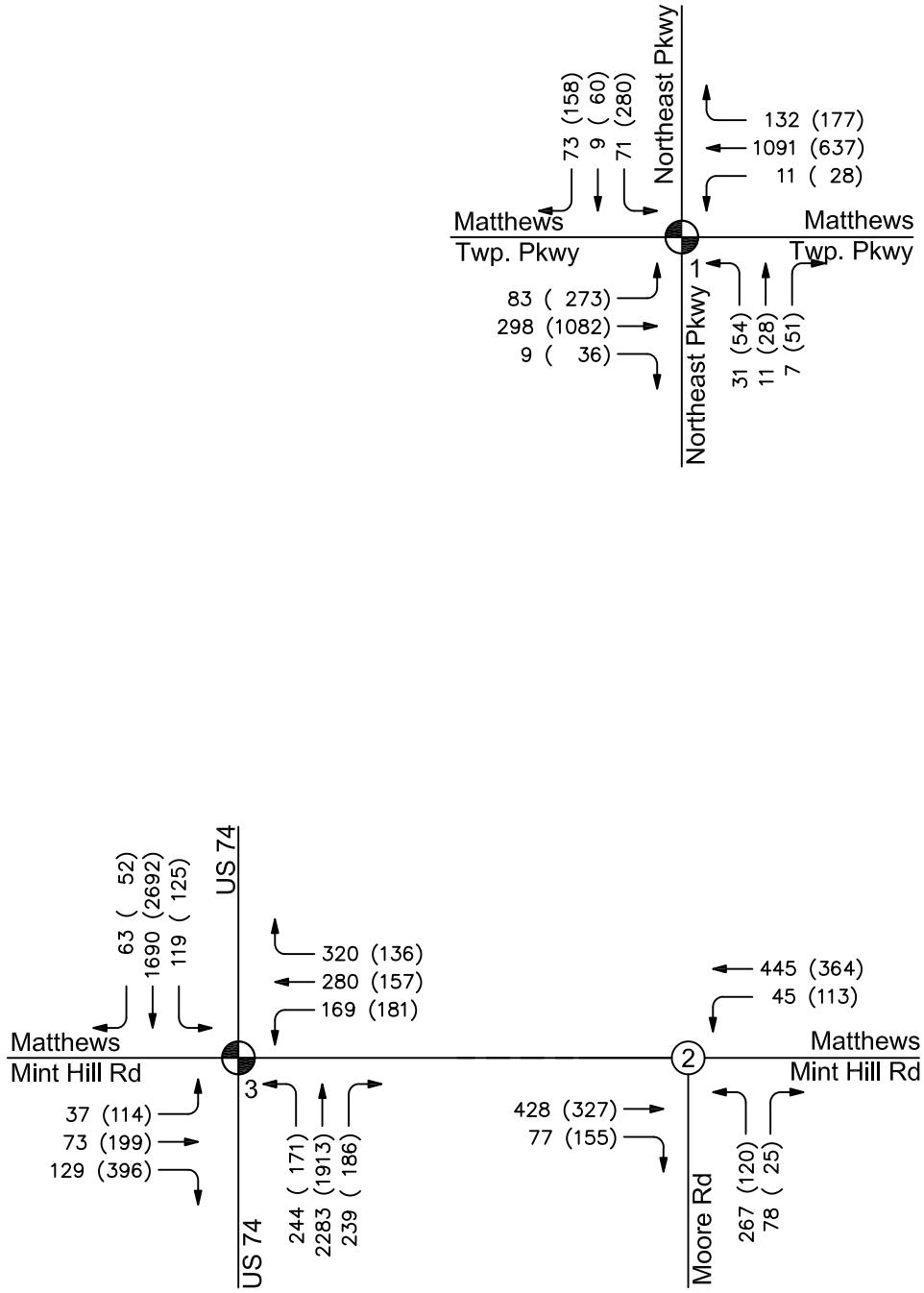
- The AM arrival peak is considerably more congested than the PM dismissal peak.
- The distance on Matthews-Mint Hill Road between the westernmost Butler High School driveway (where an officer directed traffic during both school peak times) and Moore Road is approximately 550 feet – the eastbound vehicle queue witnessed during the AM arrival time was approximately 400 feet west of Moore Road (a maximum queue of approximately 950 feet).
- The westbound vehicle queue on Matthews-Mint Hill Road from US 74 witnessed during the AM arrival time was approximately 300 feet east of Moore Road (a maximum queue of approximately 1,200 feet). Westbound traffic during both peak times were seen using the TWLTL immediately west of Moore Road as a 2nd travel lane to US 74.
- The northbound vehicle queue on Moore Road from Matthews-Mint Hill Road witnessed during the AM arrival time was at least 25 vehicles in length (a minimum of approximately 500 feet).

Based on the existing field observations we recommend the following:

- Eastbound Matthews-Mint Hill Road between US 74 and the westernmost Butler High School driveway has sufficient width for two travel lanes, however, the pavement is unmarked (which indirectly assumes a single eastbound travel lane). We suggest marking the pavement with two eastbound travel lanes in this section – with the outer lane terminating as a right turn lane at Butler High School. For purposes of this report the analyses assumed two eastbound travel lanes on Matthews-Mint Hill Road in this roadway section.
- Appropriate standard (MUTCD R10-7) "Do Not Block Intersection" signs should be installed on Matthews-Mint Hill Road on both sides of Moore Road.

Figure 2 shows the 2017 existing traffic volumes for the AM and PM peak hours. Figure 3 illustrates the directional distribution for the site traffic for the two development scenarios (with and without the Northeast Parkway Extension); these directional distribution percentages were approved by Matthews/NCDOT.

-Counts Collected
Thursday April 20, 2017



LEGEND

Traffic Signal

Stop Sign Control

Directional Movement

VOLUMES: AM (PM)

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2017 EXISTING PEAK HOUR TRAFFIC VOLUMES

0 NTS N

SCALE: NTS

PROJECT #: 365-026
DRAWN BY: MWW
CHECKED BY: REG

MAY 2017

REVISIONS:

Figure 2

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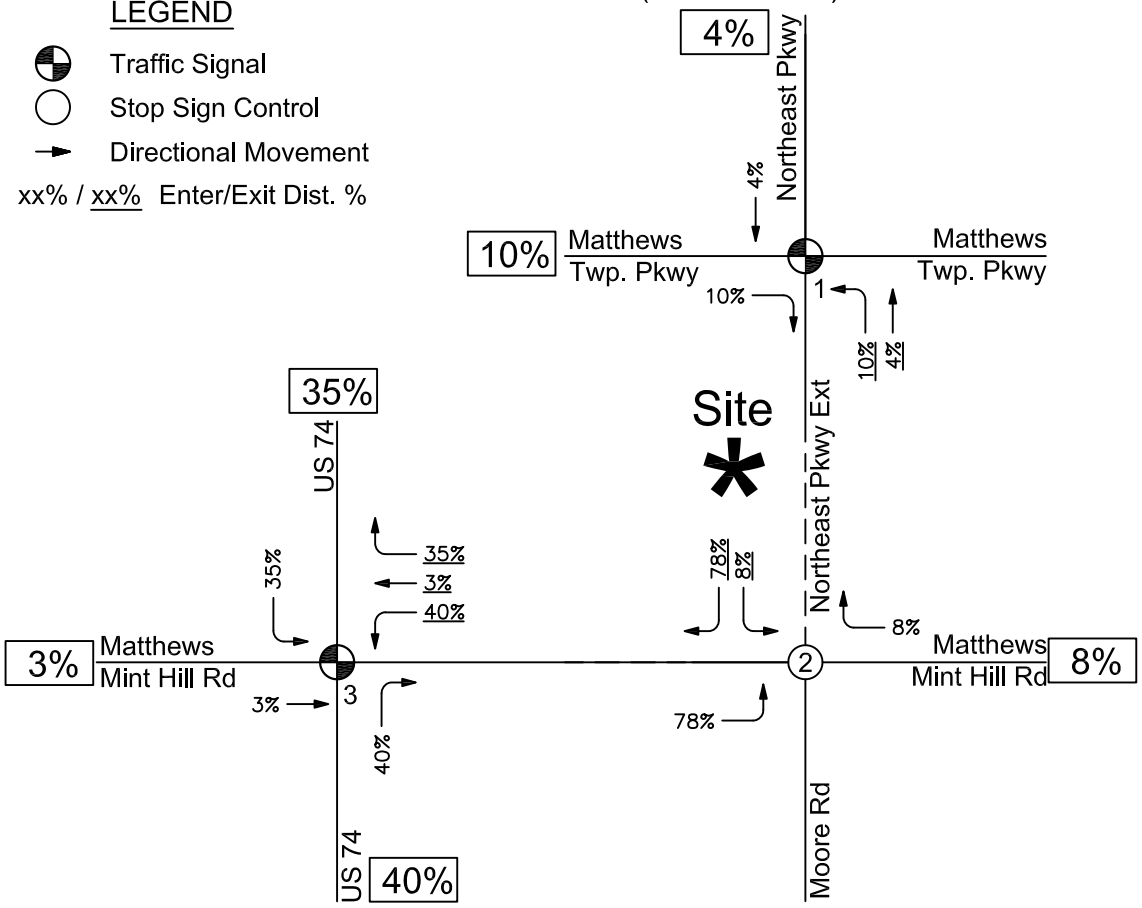
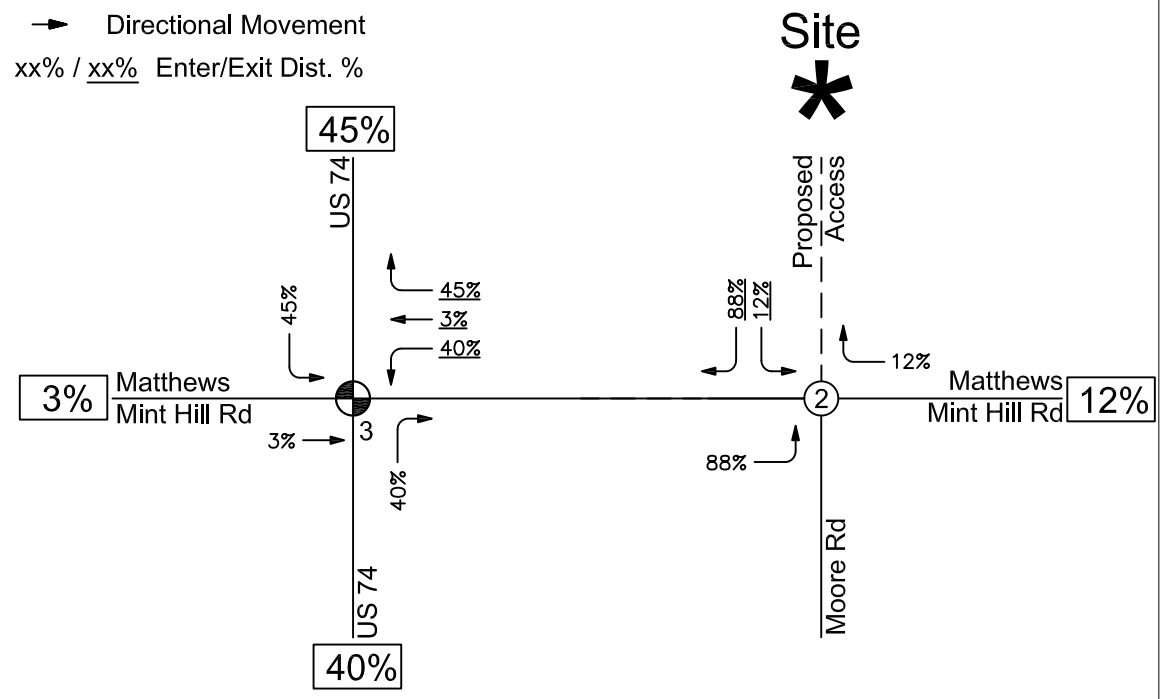
SITE DIRECTIONAL DISTRIBUTION WITH NORTHEAST PARKWAY EXTENSION (SCENARIO A)



SITE DIRECTIONAL DISTRIBUTION WITHOUT NORTHEAST PARKWAY EXTENSION (SCENARIO B)



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SITE DIRECTIONAL DISTRIBUTION BY SCENARIO

0 NTS N
SCALE: NTS

PROJECT #: 365-026
DRAWN BY: MWW
CHECKED BY: REG

MAY 2017

REVISIONS:

Figure 3

PROJECTED TRAFFIC

The projected background traffic volumes used in the analyses were developed from existing (year 2017) peak-hour-turning-movement-count data. These volumes were increased using a 2 percent per year growth rate to obtain 2019 background volumes, which was approved by NCDOT/Matthews.

The daily and peak-hour-trip-generation data for the site is presented in Table 2. The values for the trips generated by the residential land use are obtained from the Institute of Transportation Engineers, Trip Generation Manual, 9th Edition, 2012.

Table 2: Site Trip Generation

Land Use [ITE Code]			Weekday Daily	AM Peak Hour			PM Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total
Existing Development to be Razed									
Single-Family [210]	1	DU	15	3	7	10	1	1	2
Mobile Home [240]	23	DUs	358	4	15	19	9	6	15
Existing Development to be Razed Total Trips			**373**	**7**	**22**	**29**	**10**	**7**	**17**
Proposed Development									
Multifamily [220]	350	DUs	**2,245**	**35**	**140**	**175**	**137**	**73**	**210**
Difference Between Proposed Development & Existing Development to be Razed			**1,872**	**28**	**118**	**146**	**127**	**66**	**193**

References: Trip Generation, 9th Edition, Institute of Transportation Engineers, Washington, DC. 2012.

The existing development trip generation results indicate that the site currently generates a total of 29 AM peak hour trips and 17 PM peak hour trips; the proposed buildout trip generation results indicate that the multi-family development is expected to generate 175 AM peak hour trips and 210 PM peak hour trips. This equates to a difference of 146 additional AM peak hour trips and 193 additional PM peak hour trips. For purposes of the report, no reduction was applied to the difference between existing and proposed trips, therefore, the analysis is based on “worst case” in terms of site traffic.

One nearby approved (offsite) development was included in the 2019 analyses (see Table 3):

- Matthews Corners – an increase of 30,610 SF to the existing shopping center located on the southwest quadrant of Matthews Township Parkway & Northeast Parkway. The site expansion is expected to generate an additional 55 AM peak hour trips and 239 PM peak hour trips.

Table 3: Offsite Trip Generation

Land Use [ITE Code 820]			Weekday Daily	AM Peak Hour			PM Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total
Existing Development (Currently Generating Trips)									
Retail	128,349	SF	**7,987**	**113**	**69**	**182**	**340**	**368**	**708**
Total Proposed Development									
Retail *	198,069	SF	**10,589**	**147**	**90**	**237**	**455**	**492**	**947**
Difference Between Total Prop. Dev. & Existing Operating Dev. - Total Trips for Prop. 69,720 SF Retail			**2,602**	**34**	**21**	**55**	**115**	**124**	**239**

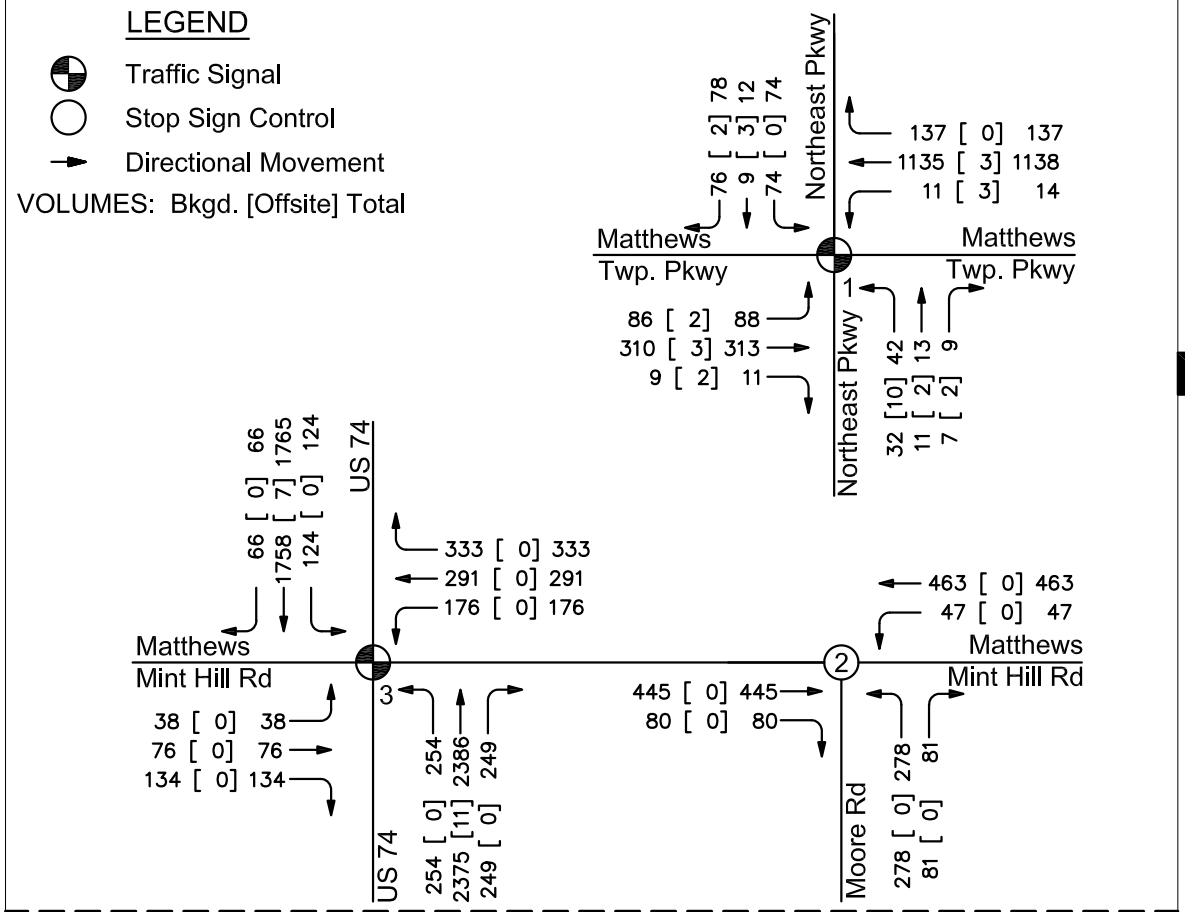
References:
DRG February 2017 "Matthews Corners TIA"
* Total existing development = 167,459 SF, of which 39,110 SF of retail is vacant and will be razed. The site will include 69,720 SF of new retail space. **Therefore, 198,069 - 128,349 - 39,110 = 30,610**

The trip assignments for the 2019 morning and afternoon peak hour traffic volumes are presented in Figures 4 thru 6 (depending on scenario). The background traffic is indicated to the far left of the movement arrows, followed by the offsite traffic in brackets, and the site traffic in parentheses. The two or three volumes (depending on scenario) are added to obtain the projected total traffic for that movement: Background + [Offsite] + (Site) = Total.

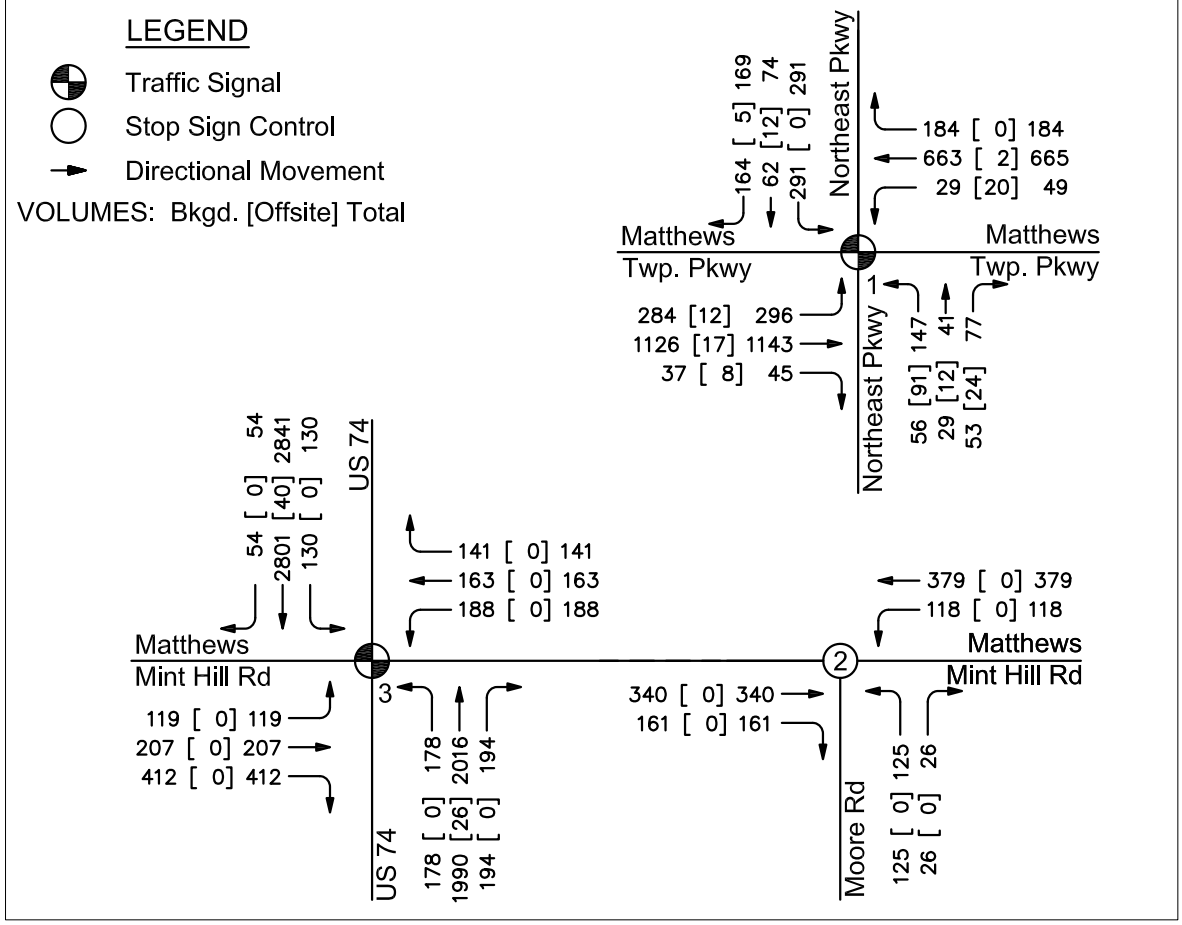
It should be noted that for the 2019 Build Scenario "A", the background volumes were modified slightly to account for the new Northeast Parkway Extension between Matthews Township Parkway and Matthews-Mint Hill Road. The following percentages were shifted accordingly:

- 3% of the southbound left turn movements and 5% of the right turn movements on Northeast Parkway at Matthews Township Parkway were shifted to the southbound thru movement traffic volume toward Matthews-Mint Hill Road
- 5% of the northbound left turn movements on Moore Road were shifted to the new thru movement traffic volume toward Matthews Township Parkway

2019 NO BUILD AM PEAK HOUR TRAFFIC VOLUMES



2019 NO BUILD PM PEAK HOUR TRAFFIC VOLUMES



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2019 NO BUILD PEAK HOUR TRAFFIC VOLUMES

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SCALE: NTS

PROJECT #: 365-026
DRAWN BY: MWW
CHECKED BY: REG

MAY 2017

REVISIONS:

Figure 4

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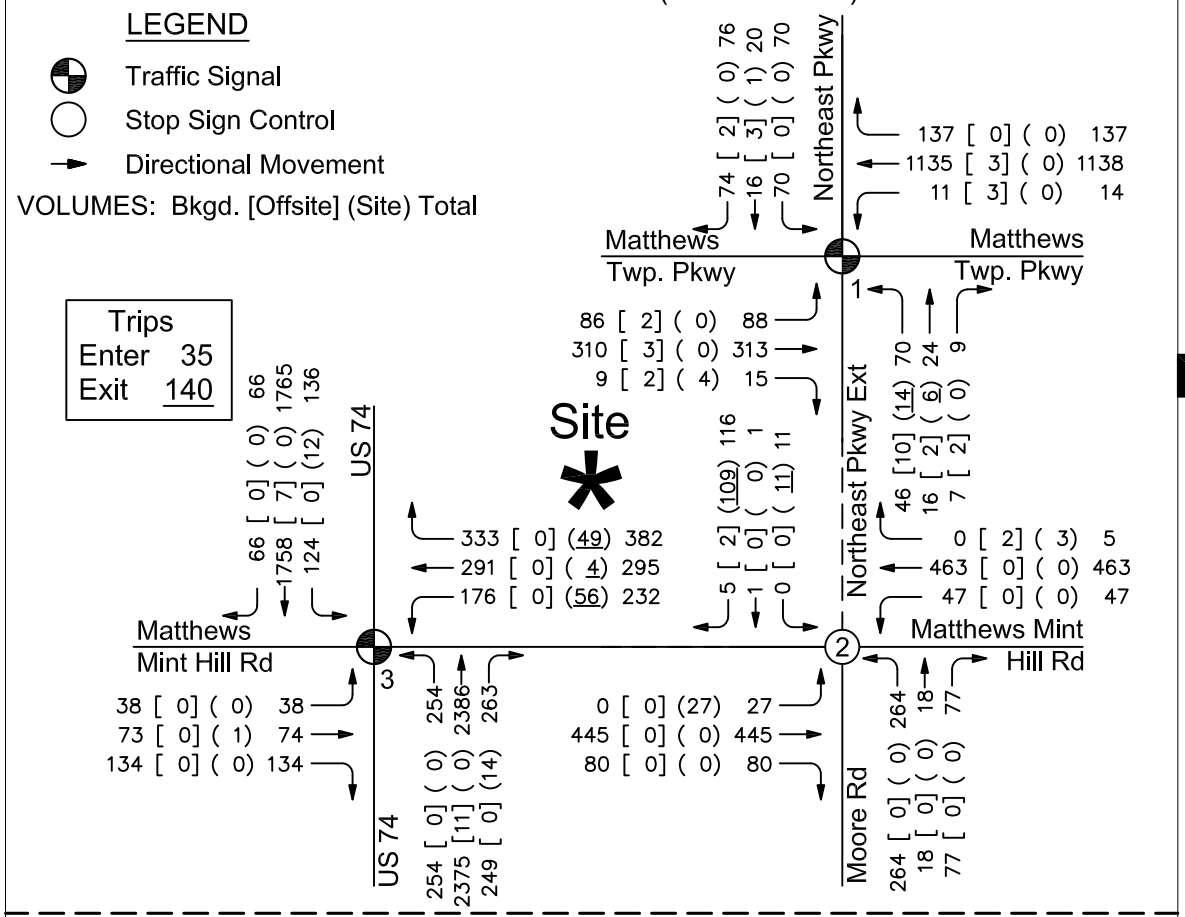
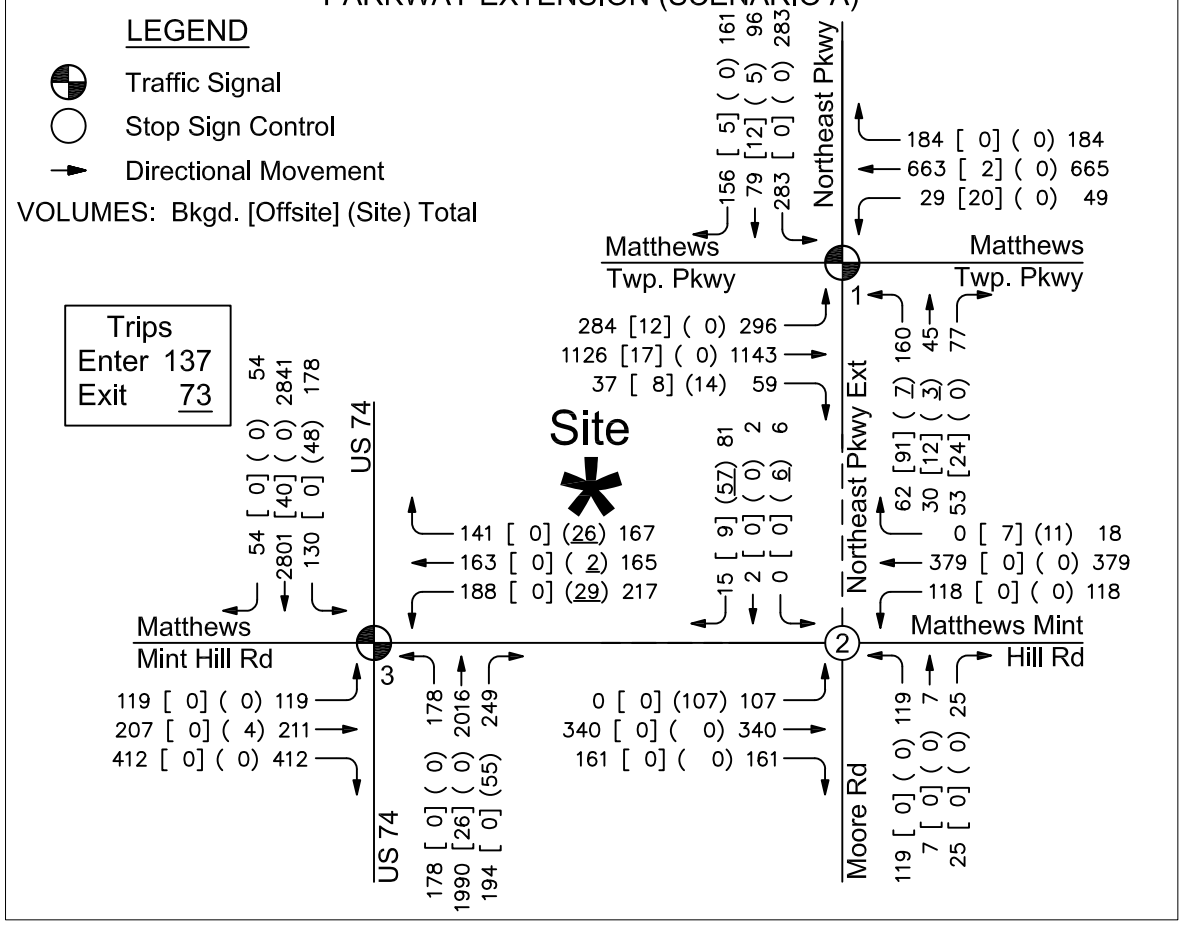
2019 BUILD AM PEAK HOUR TRAFFIC VOLUMES WITH NORTHEAST PARKWAY EXTENSION (SCENARIO A)



2019 BUILD PM PEAK HOUR TRAFFIC VOLUMES WITH NORTHEAST PARKWAY EXTENSION (SCENARIO A)



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2019 BUILD PEAK HOUR TRAFFIC VOLUMES (SCENARIO A)

0 NTS N
SCALE: NTS

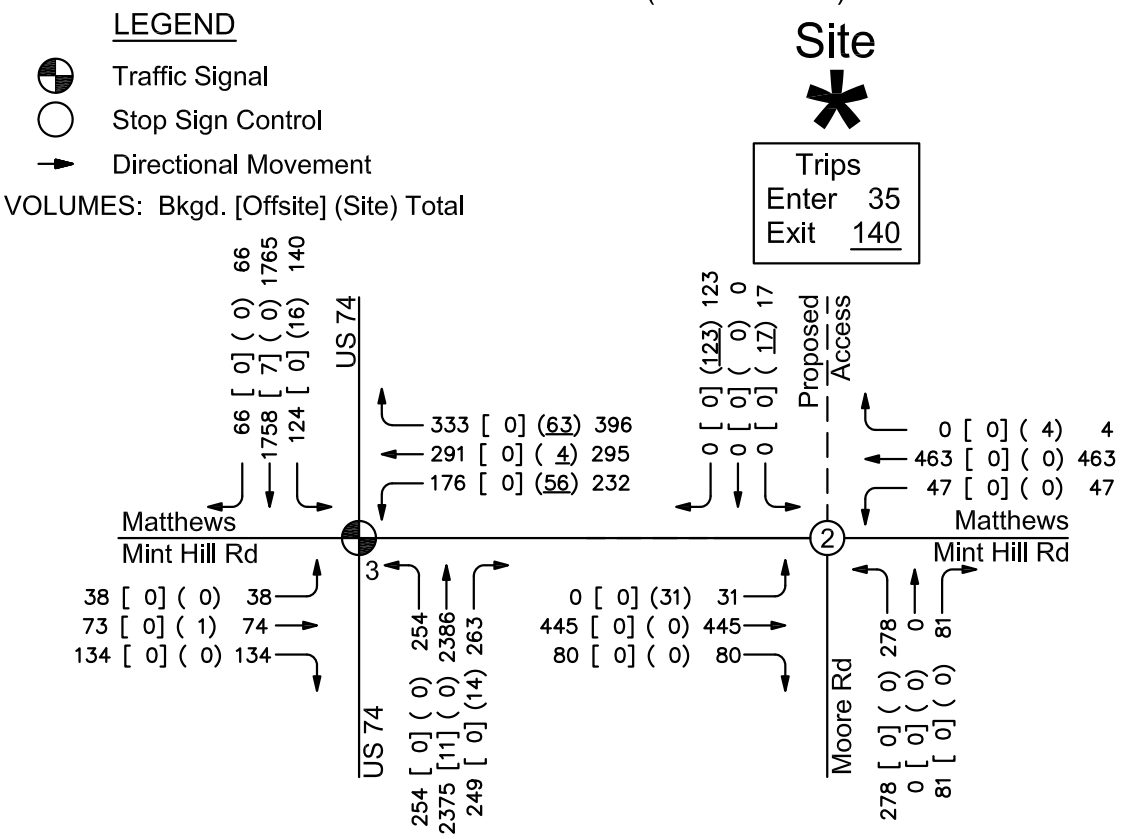
PROJECT #: 365-026
DRAWN BY: MWW
CHECKED BY: REG

MAY 2017

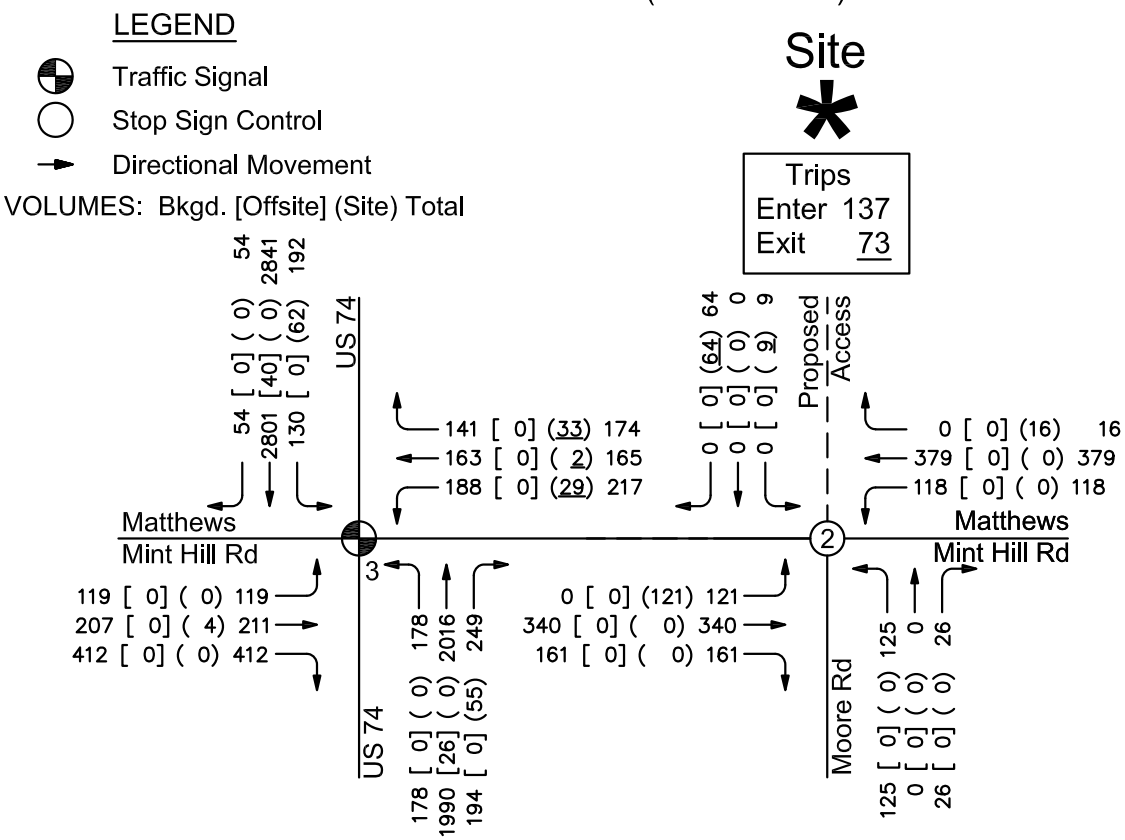
REVISIONS:

Figure 5

2019 BUILD AM PEAK HOUR TRAFFIC VOLUMES WITHOUT NORTHEAST PARKWAY EXTENSION (SCENARIO B)



2019 BUILD PM PEAK HOUR TRAFFIC VOLUMES WITHOUT NORTHEAST PARKWAY EXTENSION (SCENARIO B)



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MATTHEWS, NC

THE BAINBRIDGE COMPANIES
401 HARRISON OAKS BLVD SUITE 320
CARY, NC 27513
919-451-2093

2019 BUILD PEAK HOUR TRAFFIC VOLUMES (SCENARIO B)

0 NTS N
SCALE: NTS

PROJECT #: 365-026
DRAWN BY: MWW
CHECKED BY: REG

MAY 2017

REVISIONS:

Figure 6

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TRAFFIC ANALYSIS

The intersection identified within the area of influence was analyzed to identify the traffic impact that the site development has under the build scenario. The traffic analysis is based on the LOS analysis at the identified intersections. The intersections were analyzed assuming buildout of the site in 2019.

LOS is a qualitative measurement of traffic operations. It is a measure of delay time. The Transportation Research Board's Highway Capacity Manual[1] (HCM) defines six levels of service for intersections with LOS "A" representing the best operating condition and LOS "F" the worst. The table below gives the criteria for both signalized and unsignalized intersections.

Intersection LOS	Signalized Intersection Control Delay per Vehicle (sec/vehicle)	Unsignalized Intersection Control Delay per Vehicle (sec/vehicle)
A	≤10.0	≤ 10.0
B	> 10.0 and ≤ 20.0	> 10.0 and ≤ 15.0
C	> 20.0 and ≤ 35.0	> 15.0 and ≤ 25.0
D	> 35.0 and ≤ 55.0	> 25.0 and ≤ 35.0
E	> 55.0 and ≤ 80.0	> 35.0 and ≤ 50.0
F	>80.0	> 50.0

SYNCHRO 9.1 was the software tool used in determining the delay, capacity and corresponding level of service at the study intersection. The intersection worksheet reports are provided in the Appendix.

This report provides analysis of the traffic operations within the area of influence, according to the standards set by the North Carolina Department of Transportation's (NCDOT) "Policy on Street and Driveway Access to North Carolina Highways, Chapter 4 Part C" and the Town of Matthews procedures (which follows NCDOT's guidelines). It provides intersection improvements needed for mitigating traffic impacts. This study evaluates the following scenarios:

- 2017 Existing Conditions
- 2019 No Build
- 2019 Build Scenario "A" – with the completion of Northeast Parkway to Matthews-Mint Hill Road (which includes an alternative analysis with the intersection of Matthews-Mint Hill Road & Moore Road/Proposed Northeast Parkway Extension as a 1-lane roundabout (per Matthews/NCDOT)
- 2019 Build Scenario "B" – without the completion of Northeast Parkway to Matthews-Mint Hill Road

Currently, the signalized intersection of NC 51 & Northeast Parkway operates at a LOS "D" or better during both peak hours; the signalized intersection of US 74 & Matthews-Mint Hill Road operates at a LOS "F" in both peak hours. The unsignalized intersection of Matthews-Mint Hill Road & Moore Road operates at a LOS "E" in the AM peak hour and a LOS "C" in the PM peak hour. Typically, an intersection is said to be operating at capacity at a volume-to-capacity (v/c) ratio of 1.00 and acceptable at a LOS "D" or better. The results of the analysis scenarios are presented in Table 4.

[1] National Research Council. Transportation Research Board. Highway Capacity Manual 6th Ed., Washington, DC. 2016.

Table 4: Levels of Service

Intersection	Intersection/ Approach	AM Peak			PM Peak		
		Delay (sec/veh)	Capacity (v/c)	LOS	Delay (sec/veh)	Capacity (v/c)	LOS
2017 Existing Conditions							
1. NC 51 & Northeast Pkwy.		***23.2***	***0.58***	***C***	***40.5***	***0.82***	***D***
2. Matthews-Mint Hill Rd. & Moore Rd.		***35.8***	***384/482***	***E***	***18.3***	***161/449***	***C***
3. US 74 & Matthews-Mint Hill Rd.		***107.7***	***1.81***	***F***	***95.5***	***1.26***	***F***
2019 No Build							
1. NC 51 & Northeast Pkwy.	***Intersection***	***22.3***	***0.64***	***C***	***46.5***	***0.85***	***D***
	Northbound	52.6	-	D	73.1	-	E
	Southbound	54.3	-	D	56.3	-	E
	Eastbound	17.9	-	B	41.5	-	D
	Westbound	18.1	-	B	41.0	-	D
2. Matthews-Mint Hill Rd. & Moore Rd.	***Intersection***	***46.1***	***399/459***	***E***	***19.5***	***168/430***	***C***
	Northbound	46.1	-	E	19.5	-	C
	Eastbound	0.0	-	A	0.0	-	A
	Westbound	0.8	-	A	2.2	-	A
3. US 74 & Matthews-Mint Hill Rd.	***Intersection***	***89.7***	***1.19***	***F***	***104.7***	***1.20***	***F***
	Northbound	111.1	-	F	84.4	-	F
	Southbound	46.8	-	D	107.0	-	F
	Eastbound	88.9	-	F	160.4	-	F
	Westbound	117.5	-	F	105.0	-	F
2019 Build Scenario "A" (with Northeast Pkwy. Extension)							
1. NC 51 & Northeast Pkwy.	***Intersection***	***23.8***	***0.65***	***C***	***46.7***	***0.84***	***D***
	Northbound	54.8	-	D	74.3	-	E
	Southbound	54.7	-	D	55.8	-	E
	Eastbound	18.7	-	B	41.6	-	D
	Westbound	19.0	-	B	40.9	-	D
2a. Matthews-Mint Hill Rd. & Moore Rd./Northeast Pkwy. Ext. [1]	***Intersection***	*******	***293/207***	***F***	***114.5***	***132/132***	***F***
	Northbound	*	-	F	114.5	-	F
	Southbound	14.8	-	B	13.3	-	B
	Eastbound	0.4	-	A	1.5	-	A
	Westbound	0.8	-	A	2.1	-	A
2b. Matthews-Mint Hill Rd. & Moore Rd./Northeast Pkwy. Ext. (1-Lane Roundabout)	***Intersection***	***1.7***	***0.55***	***A***	***1.7***	***0.55***	A
	Northbound	3.5	-	A	2.6	-	A
	Southbound	5.8	-	A	3.7	-	A
	Eastbound	0.5	-	A	1.1	-	A
	Westbound	2.7	-	A	1.8	-	A
2c. Matthews-Mint Hill Rd. & Moore Rd./Northeast Pkwy. Ext. [1] (Traffic Signal Test)	***Intersection***	***28.7***	***0.74***	***C***	***24.6***	***0.62***	***C***
	Northbound	34.0	-	C	31.8	-	C
	Southbound	46.1	-	D	29.0	-	C
	Eastbound	18.4	-	B	20.9	-	C
	Westbound	31.6	-	C	26.0	-	C
3. US 74 & Matthews-Mint Hill Rd.	***Intersection***	***94.9***	***1.20***	***F***	***107.9***	***1.23***	***F***
	Northbound	114.4	-	F	82.7	-	F
	Southbound	50.5	-	D	112.1	-	F
	Eastbound	90.6	-	F	162.5	-	F
	Westbound	130.0	-	F	122.5	-	F

Table 4: Levels of Service (cont.)

Intersection	Intersection/ Approach	AM Peak			PM Peak		
		Delay (sec/veh)	Capacity (v/c)	LOS	Delay (sec/veh)	Capacity (v/c)	LOS
2019 Build Scenario "B" (No Northeast Pkwy. Extension)							
2a. Matthews-Mint Hill Rd. & Moore Rd./Proposed Access [1]	***Intersection***	*******	***309/157***	***F***	***125.9***	***139/134***	***F***
	Northbound	*	-	F	125.9	-	F
	Southbound	15.0	-	C	13.7	-	B
	Eastbound	0.5	-	A	1.7	-	A
	Westbound	0.8	-	A	2.1	-	A
3. US 74 & Matthews-Mint Hill Rd.	***Intersection***	***95.9***	***1.23***	***F***	***108.9***	***1.32***	***F***
	Northbound	114.4	-	F	82.7	-	F
	Southbound	51.7	-	D	114.4	-	F
	Eastbound	90.6	-	F	162.5	-	F
	Westbound	133.8	-	F	122.0	-	F

* Results are not meaningful (i.e. delay >180 sec. and/or v/c >1.50)

[1] Laneage includes an EB left turn lane on Matthews-Mint Hill Rd. (TWLTL re-mark), modifying NB right turn lane on Moore Rd. to comb. thru-right lane. Northeast Pkwy. Ext./Proposed Access includes 1 receiving lane + 3 exit lanes (left, short thru, + right lane)

Tables 5 shows the 2019 maximum queue lengths calculated by SimTraffic 9, a traffic simulation software application for unsignalized and signalized intersections, or the calculated 95th % queue in Synchro 9, - whichever produced the higher length. It should be noted that due to reported excessive vehicle queues at some of the intersections (i.e. extensive lengths due to significant traffic volumes in adjacent lanes or cross-street, especially at the unsignalized intersection), unreasonable results were calculated for some of the movements (a software issue according to previous discussions with Trafficware on other projects); therefore, the average queues were reported accordingly.

Table 5: 2019 Vehicle Queue Lengths

Intersection/Approach		Exist. (Prop.) Storage		AM Peak Queue Length (ft)			PM Peak Queue Length (ft)		
		Left	Right	Left	Thru	Right	Left	Thru	Right
2019 No Build									
1. NC 51 & Northeast Pkwy.	NB	240’	-	116’	53’		210’	205’	
	SB	100’	Term.	#166’	96’	166’	#409’	412’	266’
	EB	175’/225’	-	122’x2	87’x2		#312’x2	642’x2	
	WB	150’	-	45’	458’x2		129’	464’x2	
2. Matthews-Mint Hill Rd. & Moore Rd.	NB	Term.	50’	&>1000’	-	#75’	&238’	-	#75’
	EB	TWLTL	-	-	0’x2		-	0’x2	
	WB	135’+TWLTL	-	137’	240’	-	134’	766’	-
3. US 74 & Matthews-Mint Hill Rd.	NB	400’	Term.	#650’	>1000’x2	>1000’	#650’	>1000’x2	201’
	SB	450’	-	449’	785’x3		#640’	>1000’x3	
	EB	125’	450’	115’	222’	216’	#261’	>1000’	#859’
	WB	260’+TWLTL	315’	345’	#>1000’	#654’	437’	#>1000’	#475’
2019 Build Scenario “A” (with Northeast Pkwy. Extension)									
1. NC 51 & Northeast Pkwy.	NB	240’	-	184’	74’		#258’	233’	
	SB	100’	Term.	#147’	94’	159’	#393’	421’	181’
	EB	175’/225’	-	68’x2	107’x2		#282’x2	655’x2	
	WB	150’	-	35’	528’x2		#192’	464’x2	
2. Matthews-Mint Hill Rd. & Moore Rd./Northeast Pkwy. Extension [1]	NB	Term.	(100’)	&>1000’	#75’		&350’	#75’	
	SB	(100’)	(Term.)	31’	29’	&256’	31’	31’	173’
	EB	(100’) +TWLTL	-	45’	0’x2		96’	0’x2	
	WB	135’+TWLTL	-	134’	623’		118’	385’	
3. US 74 & Matthews-Mint Hill Rd.	NB	400’	Term.	#650’	>1000’x2	>1000’	#650’	>1000’x2	580’
	SB	450’	-	374’	785’x3		#640’	>1000’x3	
	EB	125’	450’	118’	214’	238’	#261’	>1000’	#590’
	WB	260’+TWLTL	315’	514’	#>1000’	#794’	522’	#>1000’	#475’
2019 Build Scenario “A” (with Northeast Pkwy. Extension) 1-Lane Roundabout									
2. Matthews-Mint Hill Rd. & Moore Rd. (1-Lane RAB)	NB	-	-	74’			27’		
	SB	-	-	38’			20’		
	EB	-	-	95’			117’		
	WB	-	-	118’			93’		
2019 Build Scenario “B” (No Northeast Pkwy. Extension)									
2. Matthews-Mint Hill Rd. & Moore Rd./Northeast Pkwy. Extension [1]	NB	Term.	(100’)	&>1000’	#75’		&396’	#75’	
	SB	(100’)	(Term.)	31’	31’	200’	50’	31’	244’
	EB	(100’) +TWLTL	-	28’	0’x2		90’	0’x2	
	WB	135’+TWLTL	-	134’	291’		134’	726’	
3. US 74 & Matthews-Mint Hill Rd.	NB	400’	Term.	#650’	>1000’x2	>1000’	#650’	>1000’x2	547’
	SB	450’	-	#625’’	785’x3		#640’	>1000’x3	
	EB	125’	450’	224’	325’	291’	#261’	>1000’	#859’
	WB	260’+TWLTL	315’	514’	#>1000’	#835’	522’	#>1000’	#475’

[#] Queue extends into adjacent thru lane

[&] Avg. queue reported due to extensive queues on major leg of int. (Matthews-Mint Hill Rd.)

[1] Laneage includes an EB left turn lane on Matthews-Mint Hill Rd. (TWLTL re-mark), modifying NB right turn lane on Moore Rd. to comb. thru-right lane. Northeast Pkwy. Ext./Proposed Access includes 1 receiving lane + 3 exit lanes (left, short thru, + right lane)

2019 Build Scenario "A" (with Northeast Parkway Extension) Results/Suggested Recommendations:

When comparing the results of the 2019 No Build traffic and the 2019 Build Scenario "A" traffic, the two signalized study intersections are within the allowable parameters during both of the peak hours. The unsignalized intersection of Mathews-Mint Hill Road & Moore Road exceeds the allowable parameters in both peak hours due to the inclusion of the fourth leg to the intersection.

ANALYSIS REQUIREMENTS - In order to determine the mitigation responsibility of the developer, this study compares 2019 Build results to the 2019 No Build results.

Chapter 5, Section J of the *July 2003 NCDOT Policy on Street and Driveway Access to North Carolina Highways,* the applicant shall be required to identify mitigation improvements to the roadway network if at least one of the following conditions exists when comparing base network conditions to project conditions:

- *The total average delay at an intersection or an individual approach increases by 25% or greater, while maintaining the same level of service,*
- *The Level of Service (LOS) degrades by at least one level at an intersection or an individual approach,*
- *Or the Level of Service is "F" for an intersection or an individual approach.*

This section of the access policy also states that, *mitigation improvements shall be identified when the analysis indicates that the 95th percentile queue exceeds the storage capacity of the existing lane.*

1. Matthews Township Parkway (NC 51) & Northeast Parkway (signalized)

When comparing the impact of the 2019 Build Scenario "A" to the 2019 No Build conditions the intersection LOS remains a "C" in the AM peak hour and a "D" in the PM peak hour (all of the approaches remained the same LOS and were within the allowable increase in delay during both peak hours). The increase in intersection delay between the No Build and Build scenario is 7% in the AM peak hour and less than 1% in the PM peak hour. **Based on the results no roadway improvements should be deemed necessary.**

Two of the four legs of the intersection already include pedestrian amenities such as crosswalks, pedestrian signal heads and pushbuttons. Due to the lack of sidewalk on either leg of the southwest quadrant of the intersection we suggest leaving these south and west legs of the intersection as is.

2. Matthews-Mint Hill Road & Moore Road/Northeast Parkway Extension (unsignalized)

When comparing the impact of the 2019 Build Scenario "A" to the 2019 No Build conditions the intersection LOS drops from "E" to "F" in the AM peak hour and drops from "C" to "F" in the PM peak hour (due to the inclusion of the 4th leg to the intersection). We recommend the following modifications to the intersection:

- Re-mark the eastbound TWLTL on Matthews-Mint Hill Road with 100 feet of storage
- Re-mark the eastbound travel lanes on Matthews-Mint Hill Road for a thru lane and a combined thru-right lane
- Modify the existing northbound right turn lane on Moore Road to a combined thru-right lane and extend it from 50 to 100 feet with an appropriate bay taper
- Construct the Northeast Parkway Extension with one ingress lane and separate left (100 feet of storage), a pocket thru lane (100 feet of storage), and right (termination lane) turn lanes
- Install standard (MUTCD R10-7) "Do Not Block Intersection" signs on Matthews-Mint Hill Road on both sides of Moore Road

Even though the intersection LOS is an "F" in both peak hours (due to the inclusion of the 4th leg to the intersection) we feel this intersection configuration is acceptable as is.

A test improvement (for informational purposes only) includes the introduction of a traffic signal to the intersection. With this test improvement in place, the intersection LOS is a "C" in both peak hours. **It should be at the Town of Matthews's/NCDOT's discretion after the multi-family and Northeast Parkway Extension projects are constructed to evaluate whether the possibility of a traffic signal is a viable improvement.**

2a. Matthews-Mint Hill Road & Moore Road/Northeast Parkway Extension (1-lane roundabout)

With the modification of the intersection to a 1-lane roundabout on all four legs the intersection LOS is an "A" in both peak hours. **It should be at the Town of Matthews's/NCDOT's discretion as to whether the possibility of a 1-lane roundabout be constructed at this intersection and its relation to the future US 74 jughandle connector intersection to the west and its potential signalization.**

3. US 74 (Independence Boulevard) & Matthews-Mint Hill Road (signalized)

When comparing the impact of the 2019 Build Scenario "A" to the 2019 No Build conditions the intersection LOS remains an "F" in both peak hours (all of the approaches remained the same LOS and were within the allowable increase in delay during both peak hours). The increase in intersection delay between the No Build and Build scenario is 6% in the AM peak hour and 3% in the PM peak hour. **Based on the results no roadway improvements should be deemed necessary, however, due to excessive vehicle queues we suggest the following:**

- Extend the existing westbound right turn lane storage on Matthews-Mint Hill Road from 315 feet to 800 feet with a short bay taper (to the proposed Northeast Parkway Extension). It should be noted that in the No Build scenario the calculated queue length is approximately 650 feet; therefore, we feel the developer should only be responsible for the cost of extending the right turn lane storage 150 feet.
- The future US 74 Widening/Express Lane Project (NCDOT TIP #U-2509B currently under design, with construction tentatively beginning in 2022) will grade separate this intersection, therefore, the cost of the project based on its short usable life should be evaluated further.

2019 Build Scenario "B" (No Northeast Parkway Extension) Results/Suggested Recommendations:

2. Matthews-Mint Hill Road & Moore Road/Proposed Access (unsignalized)

When comparing the impact of the 2019 Build Scenario "B" to the 2019 No Build conditions (with the same intersection configuration as discussed in the Scenario "A" section for this intersection) the LOS drops from "E" to "F" in the AM peak hour and drops from "C" to "F" in the PM peak hour (due to the inclusion of the 4th leg to the intersection).

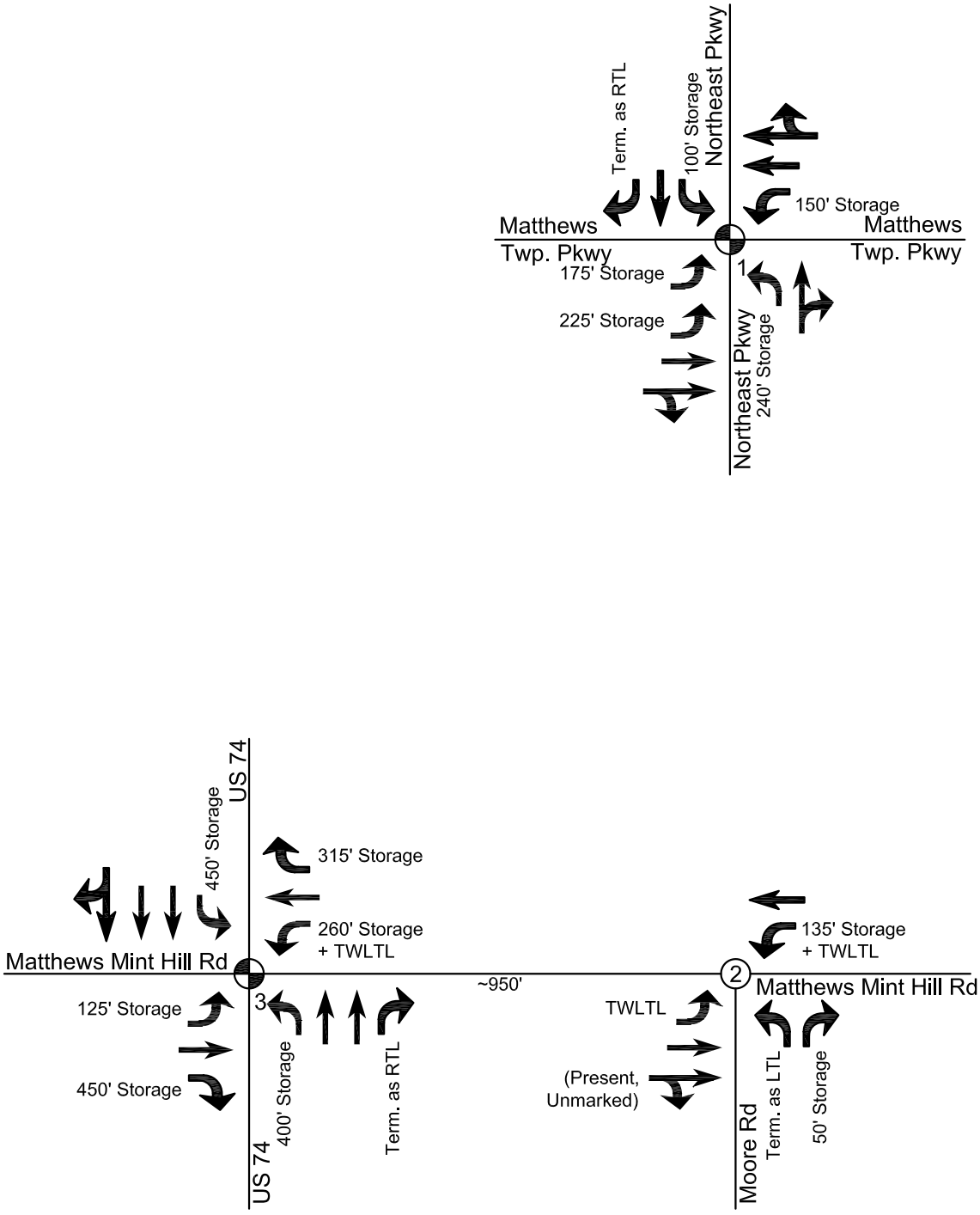
Even though the intersection LOS is an "F" in both peak hours (due to the inclusion of the 4th leg to the intersection) we feel this intersection configuration is acceptable as is.

3. US 74 (Independence Boulevard) & Matthews-Mint Hill Road (signalized)

When comparing the impact of the 2019 Build Scenario "B" to the 2019 No Build conditions the intersection LOS remains an "F" in both peak hours (all of the approaches remained the same LOS and were within the allowable increase in delay during both peak hours). The increase in intersection delay between the No Build and Build scenario is 7% in the AM peak hour and 4% in the PM peak hour. **Based on the results no roadway improvements should be deemed necessary, however, due to excessive vehicle queues we suggest the following:**

- The same westbound right turn lane extension on Matthews-Mint Hill Road as discussed in the 2019 Build Scenario "A" section for this intersection.

The existing and suggested laneage is shown on Figures 7 and 8. Figure 9 illustrates the suggested improvements conceptually (with and without a 1-lane roundabout at intersection #2).



LEGEND

- Traffic Signal
- Stop Sign Control
- Existing Laneage

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CARY, NC 27513
919-451-2093

EXISTING LANEAGE

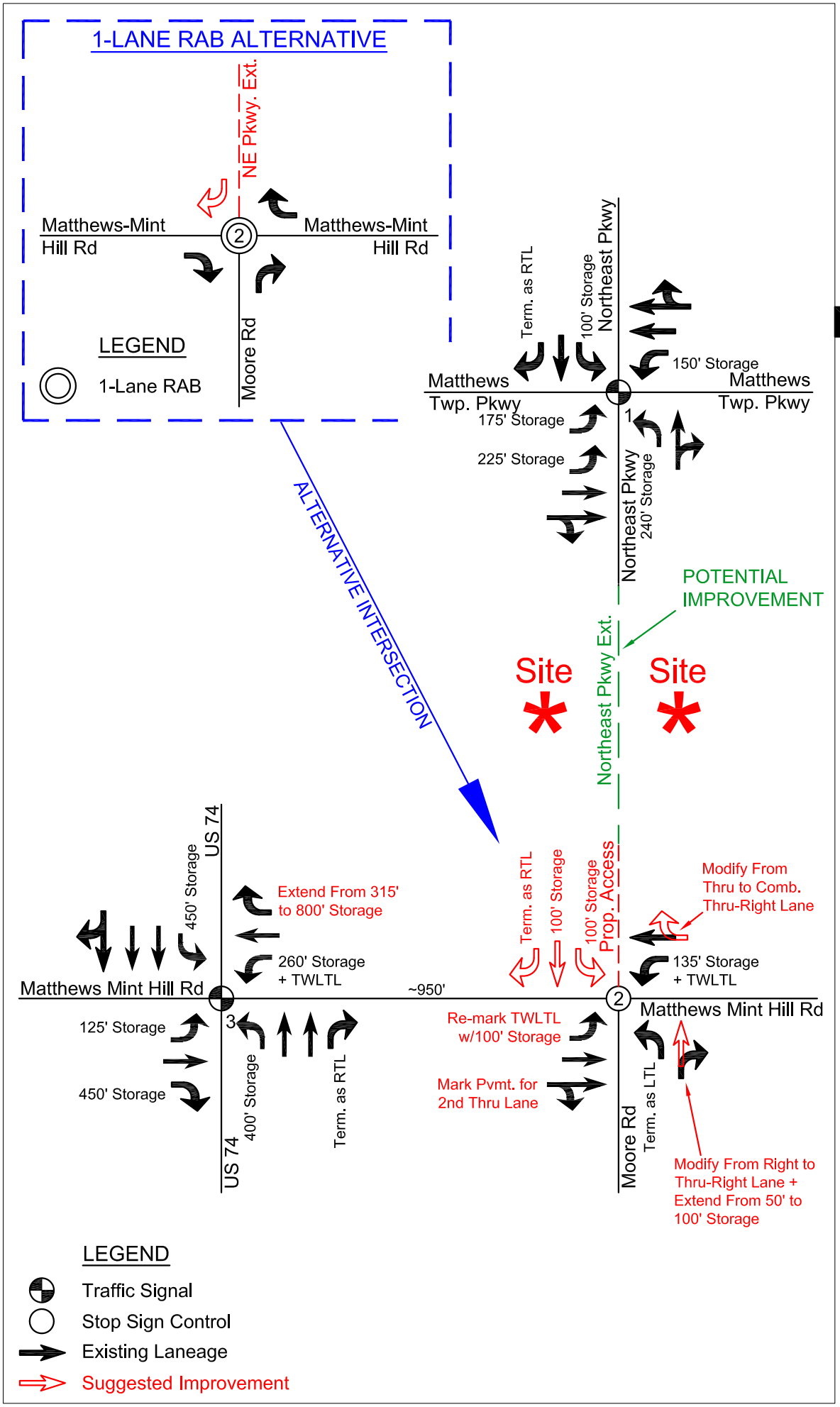
0 NTS N
SCALE: NTS

PROJECT #: 365-026
DRAWN BY: MWW
CHECKED BY: REG

MAY 2017

REVISIONS:

Figure 7



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401 HARRISON OAKS BLVD SUITE 320
CARY, NC 27513
919-451-2093

SUGGESTED LANEAGE

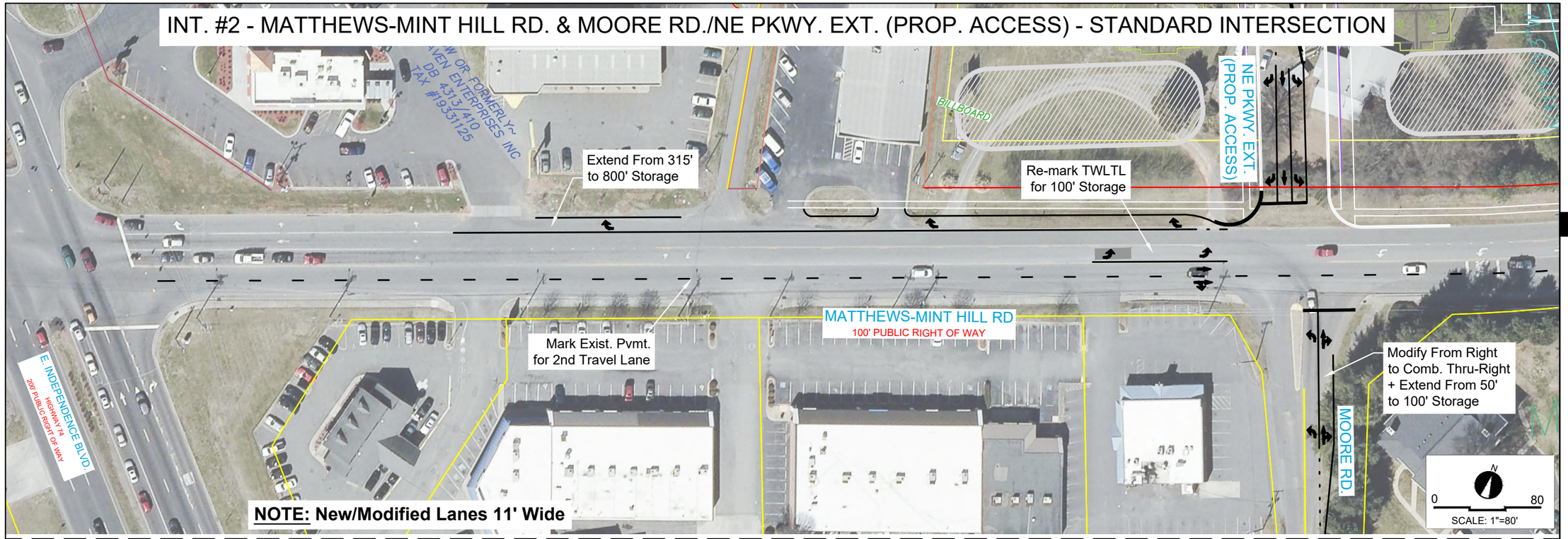
0 NTS N
SCALE: NTS

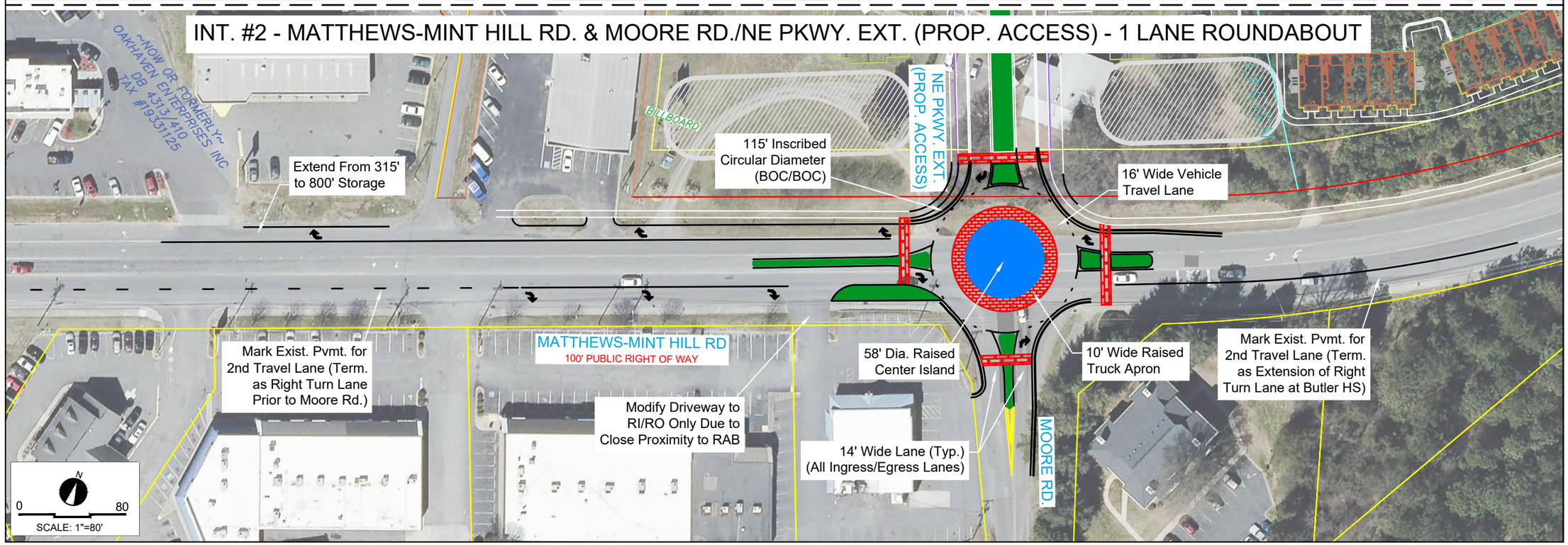
PROJECT #: 365-026
DRAWN BY: MWW
CHECKED BY: REG

MAY 2017

REVISIONS:

Figure 8





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SUGGESTED CONCEPTUAL IMPROVEMENTS

PROJECT #: 365-026
DRAWN BY: JCZ
CHECKED BY: REG

MAY 2017

REVISIONS:

Figure 9

CONCLUSION

In conclusion, the proposed Matthews Northeast Parkway multi-family development is not expected to create extensive roadway/intersection issues, especially given the minor amount of additional traffic associated with project.

The suggested mitigation for the study intersections are illustrated in detail conceptually on Figure 9.

APPENDIX

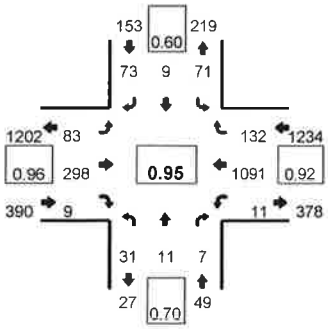
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

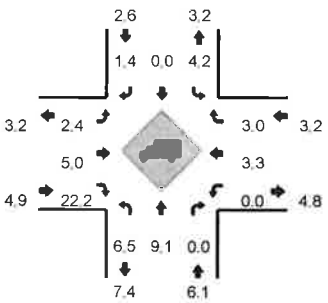
LOCATION: Northeast Pkwy -- Matthews Township Pkwy
CITY/STATE: Matthews, NC

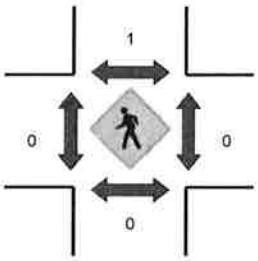
QC JOB #: 14271601
DATE: Thu, Apr 20 2017

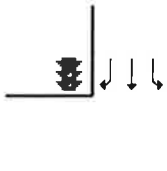
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:05 AM -- 8:20 AM

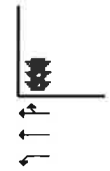


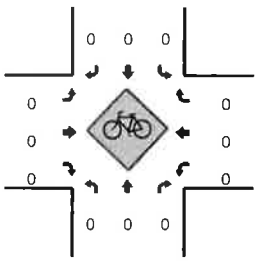
Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

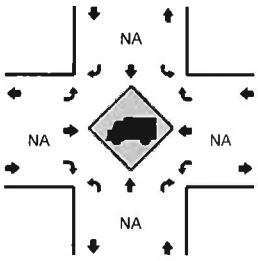


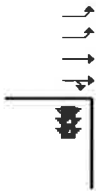


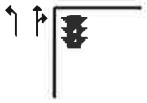


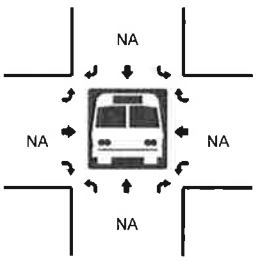












5-Min Count Period Beginning At	Northeast Pkwy (Northbound)				Northeast Pkwy (Southbound)				Matthews Township Pkwy (Eastbound)				Matthews Township Pkwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	0	0	0	22	2	17	0	2	56	0	0	0	81	11	0	192	1170
7:05 AM	2	1	1	0	11	1	7	0	0	26	0	0	0	88	8	0	145	1273
7:10 AM	2	0	1	0	8	0	2	0	5	20	1	0	0	98	12	1	150	1378
7:15 AM	1	0	0	0	1	0	4	0	1	20	0	0	0	84	7	0	118	1446
7:20 AM	3	1	1	0	7	0	9	0	3	23	1	0	0	100	9	0	157	1515
7:25 AM	10	0	0	0	1	0	13	0	1	21	0	0	0	91	6	0	143	1599
7:30 AM	6	0	0	0	1	1	10	0	3	24	0	1	1	88	10	1	146	1666
7:35 AM	5	2	0	0	12	0	10	0	2	17	2	0	1	83	8	0	142	1710
7:40 AM	4	2	0	0	4	0	8	0	4	26	2	0	0	78	8	0	136	1747
7:45 AM	5	1	1	0	3	1	5	0	12	27	0	1	1	84	10	0	151	1770
7:50 AM	2	1	0	0	6	1	9	0	6	20	0	2	2	92	14	0	155	1782
7:55 AM	1	1	2	0	7	0	1	0	5	23	2	0	0	92	11	0	145	1780
8:00 AM	4	3	0	0	5	1	6	0	4	23	1	0	0	88	7	2	144	1732
8:05 AM	4	1	0	0	5	0	7	0	5	31	3	3	1	97	12	0	169	1756
8:10 AM	1	1	1	0	3	1	4	0	6	22	0	0	0	103	17	0	159	1765
8:15 AM	1	0	0	0	8	1	3	0	8	24	0	0	1	88	17	0	151	1798
8:20 AM	2	1	0	0	7	2	8	0	7	20	0	1	1	83	7	0	139	1780
8:25 AM	5	0	1	0	9	1	7	0	4	30	2	0	1	107	3	0	170	1807
8:30 AM	1	2	0	0	11	0	6	0	9	25	0	0	1	77	8	0	140	1801
8:35 AM	0	0	2	0	3	1	9	0	2	22	0	0	1	90	14	0	144	1803
8:40 AM	5	0	0	0	4	0	8	0	8	31	1	0	0	90	12	0	159	1826
8:45 AM	3	0	0	0	4	0	2	0	7	24	0	0	1	72	17	0	130	1805
8:50 AM	3	0	1	0	7	1	8	0	6	30	0	0	0	70	11	0	137	1787
8:55 AM	3	0	0	0	8	2	4	0	6	17	0	1	1	60	16	0	118	1760

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	24	8	4	0	64	8	56	0	76	308	12	12	8	1152	184	0	1916
Heavy Trucks	0	4	0		0	0	0		0	12	0		0	36	8		60
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 4/26/2017 6:45 AM

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

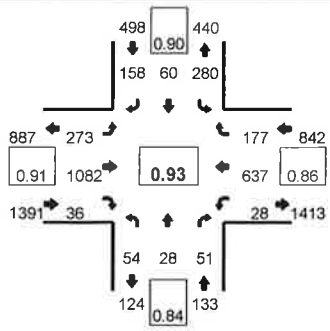
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

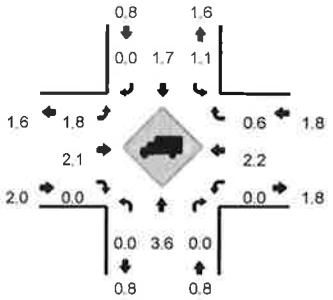
LOCATION: Northeast Pkwy -- Matthews Township Pkwy
CITY/STATE: Matthews, NC

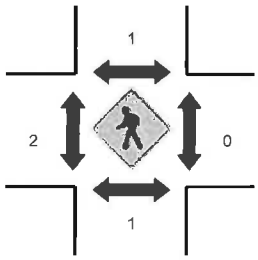
QC JOB #: 14271602
DATE: Thu, Apr 20 2017

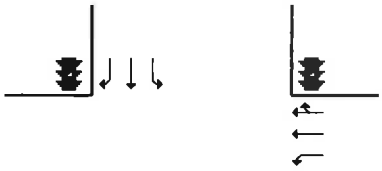
Peak-Hour: 4:50 PM -- 5:50 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

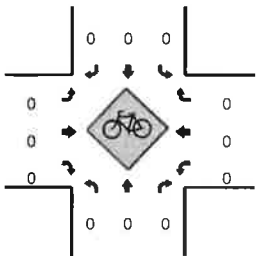


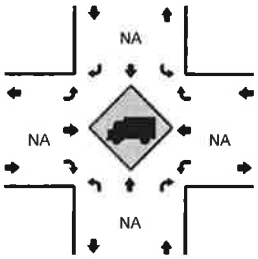
Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

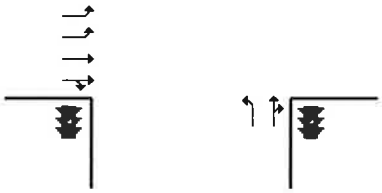


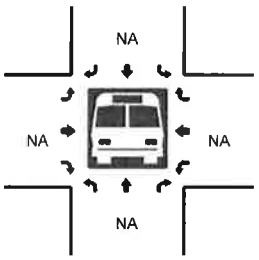












5-Min Count Period Beginning At	Northeast Pkwy (Northbound)				Northeast Pkwy (Southbound)				Matthews Township Pkwy (Eastbound)				Matthews Township Pkwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:20 PM	11	1	6	0	21	4	14	0	13	96	2	2	3	39	11	0	223	
4:25 PM	7	0	3	0	19	3	11	0	14	79	2	5	0	44	14	0	201	
4:30 PM	4	2	0	0	16	5	15	0	18	56	1	3	2	40	10	0	172	
4:35 PM	11	5	3	0	27	4	10	0	31	67	3	3	4	38	12	0	218	
4:40 PM	6	4	1	0	28	5	12	0	13	69	2	3	7	42	14	0	206	
4:45 PM	8	3	4	0	25	8	14	0	19	63	4	7	5	41	5	0	206	
4:50 PM	6	1	3	0	23	3	9	0	17	106	5	1	5	58	12	0	247	
4:55 PM	6	1	8	0	26	3	6	0	12	73	3	2	3	45	12	0	200	2411
5:00 PM	2	2	4	0	14	5	13	0	19	92	0	0	2	68	17	0	238	2490
5:05 PM	2	2	4	0	18	4	11	0	20	94	1	3	1	58	11	0	229	2516
5:10 PM	6	4	5	0	18	4	10	0	28	102	4	10	0	43	13	0	247	2607
5:15 PM	5	1	3	0	29	7	17	0	21	89	1	3	4	52	12	0	244	2631
5:20 PM	2	5	6	0	34	8	10	0	18	103	3	1	4	49	15	0	258	2666
5:25 PM	5	4	1	0	16	3	14	0	29	93	3	2	1	71	29	0	271	2736
5:30 PM	6	3	5	0	23	3	17	0	6	70	3	4	1	58	18	0	217	2781
5:35 PM	4	2	6	0	27	4	20	0	23	91	7	3	2	41	14	0	244	2807
5:40 PM	3	1	1	0	29	7	14	0	21	85	2	5	1	54	10	0	233	2834
5:45 PM	7	2	5	0	23	9	17	0	21	84	4	4	4	42	14	0	236	2864
5:50 PM	4	4	2	0	33	4	13	0	13	73	9	6	1	40	17	0	219	2836
5:55 PM	8	2	4	0	20	7	7	0	18	74	1	3	1	54	10	0	209	2845
6:00 PM	8	3	5	0	27	7	9	0	22	65	2	2	3	48	17	0	218	2825
6:05 PM	5	4	3	0	24	3	15	0	17	59	4	2	5	48	11	0	200	2796
6:10 PM	5	3	0	0	22	5	11	0	18	88	2	4	4	60	19	0	241	2790
6:15 PM	6	2	5	0	21	5	11	0	13	83	3	1	1	43	15	0	209	2755

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	48	40	40	0	316	72	164	0	272	1140	28	24	36	688	224	0	3092
Heavy Trucks	0	0	0		4	0	0		16	16	0		0	8	4		48
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 4/26/2017 6:45 AM

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

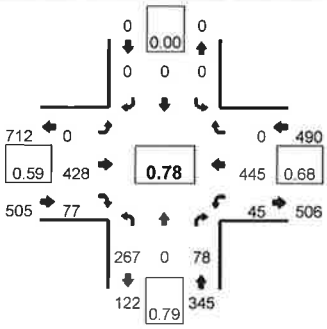
Type of peak hour being reported: Intersection Peak

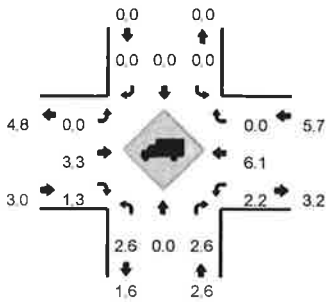
Method for determining peak hour: Total Entering Volume

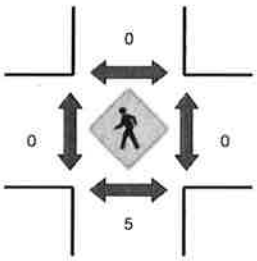
LOCATION: Moore Rd -- Matthews-Mint Hill Rd
CITY/STATE: Matthews, NC

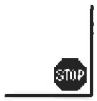
QC JOB #: 14271603
DATE: Thu, Apr 20 2017

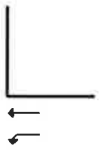
Peak-Hour: 6:45 AM -- 7:45 AM
Peak 15-Min: 6:55 AM -- 7:10 AM

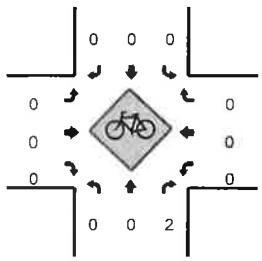


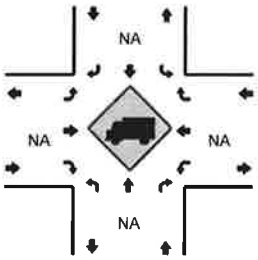


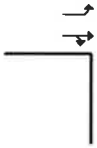


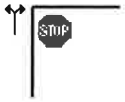


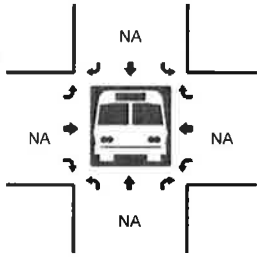












5-Min Count Period Beginning At	Moore Rd (Northbound)				Moore Rd (Southbound)				Matthews-Mint Hill Rd (Eastbound)				Matthews-Mint Hill Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:15 AM	5	0	0	0	0	0	0	0	0	5	0	0	0	11	0	0	21	
6:20 AM	6	0	1	0	0	0	0	0	0	10	1	0	1	15	0	0	34	
6:25 AM	8	0	4	0	0	0	0	0	0	19	2	0	2	20	0	0	55	
6:30 AM	11	0	4	0	0	0	0	0	0	17	3	0	1	25	0	0	61	
6:35 AM	8	0	1	0	0	0	0	0	0	23	3	0	1	19	0	0	55	
6:40 AM	9	0	3	0	0	0	0	0	0	29	6	0	2	27	0	0	76	
6:45 AM	7	0	2	0	0	0	0	0	0	49	5	0	1	38	0	0	102	
6:50 AM	12	0	4	0	0	0	0	0	0	54	6	0	4	41	0	0	121	
6:55 AM	3	0	5	0	0	0	0	0	0	56	4	0	6	48	0	0	122	717
7:00 AM	14	0	14	0	0	0	0	0	0	97	5	0	2	38	0	0	170	862
7:05 AM	12	0	15	0	0	0	0	0	0	47	3	0	2	60	0	0	139	982
7:10 AM	10	0	3	0	0	0	0	0	0	29	1	0	8	67	0	0	118	1074
7:15 AM	20	0	5	0	0	0	0	0	0	23	10	0	3	42	0	0	103	1156
7:20 AM	32	0	11	0	0	0	0	0	0	14	5	0	2	25	0	0	89	1211
7:25 AM	35	0	3	0	0	0	0	0	0	20	8	0	5	18	0	0	89	1245
7:30 AM	35	0	6	0	0	0	0	0	0	12	13	0	4	29	0	0	99	1283
7:35 AM	43	0	7	0	0	0	0	0	0	15	4	0	6	16	0	0	91	1319
7:40 AM	44	0	3	0	0	0	0	0	0	12	13	0	2	23	0	0	97	1340
7:45 AM	44	0	10	0	0	0	0	0	0	11	7	0	1	23	0	0	96	1334
7:50 AM	33	0	6	0	0	0	0	0	0	16	6	0	3	26	0	0	90	1303
7:55 AM	34	0	3	0	0	0	0	0	0	16	4	0	3	20	0	0	80	1261
8:00 AM	34	0	3	0	0	0	0	0	0	11	2	0	3	27	0	0	80	1171
8:05 AM	30	0	4	0	0	0	0	0	0	6	5	0	2	15	0	0	62	1094
8:10 AM	27	0	2	0	0	0	0	0	0	12	2	0	1	22	0	0	66	1042

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	116	0	136	0	0	0	0	0	0	800	48	0	40	584	0	0	1724
Heavy Trucks	4	0	4		0	0	0		0	8	0		0	12	0		28
Pedestrians		16				0				0				0			16
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 4/26/2017 6:45 AM

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

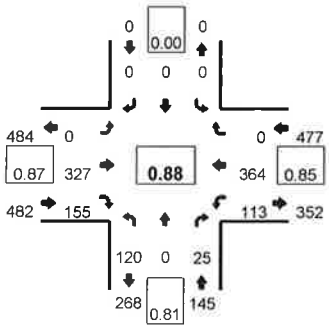
Type of peak hour being reported: Intersection Peak

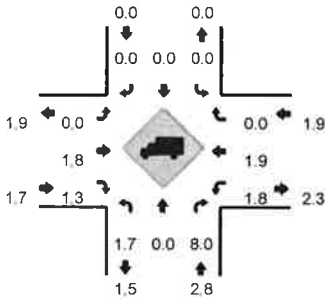
Method for determining peak hour: Total Entering Volume

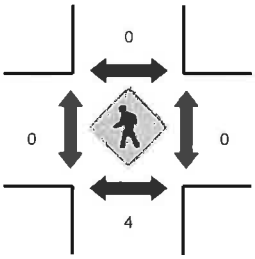
LOCATION: Moore Rd -- Matthews-Mint Hill Rd
CITY/STATE: Matthews, NC

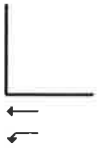
QC JOB #: 14271604
DATE: Thu, Apr 20 2017

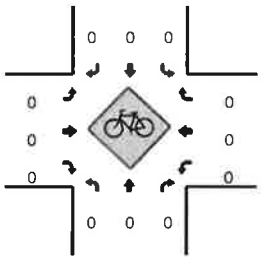
Peak-Hour: 4:55 PM -- 5:55 PM
Peak 15-Min: 5:20 PM -- 5:35 PM

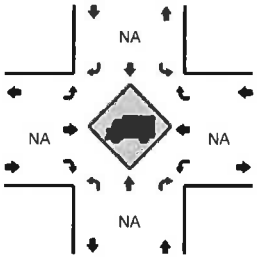


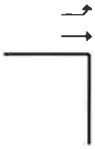


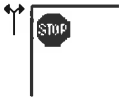


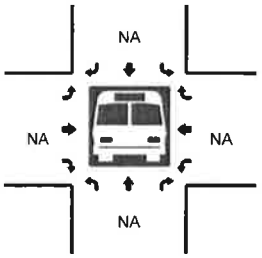












5-Min Count Period Beginning At	Moore Rd (Northbound)				Moore Rd (Southbound)				Matthews-Mint Hill Rd (Eastbound)				Matthews-Mint Hill Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:25 PM	7	0	5	0	0	0	0	0	0	28	8	0	5	22	0	0	75	
4:30 PM	12	0	3	0	0	0	0	0	0	19	7	0	6	31	0	0	78	
4:35 PM	9	0	4	0	0	0	0	0	0	26	11	0	5	23	0	0	78	
4:40 PM	6	0	2	0	0	0	0	0	0	27	8	0	7	27	0	0	77	
4:45 PM	13	0	3	0	0	0	0	0	0	29	8	0	3	30	0	0	86	
4:50 PM	4	0	2	0	0	0	0	0	0	23	13	0	4	27	0	0	73	
4:55 PM	14	0	3	0	0	0	0	0	0	21	9	0	10	24	0	0	81	938
5:00 PM	12	0	3	0	0	0	0	0	0	23	10	0	5	31	0	0	84	945
5:05 PM	6	0	2	0	0	0	0	0	0	30	12	0	10	29	0	0	89	958
5:10 PM	10	0	1	0	0	0	0	0	0	27	12	0	14	36	0	0	100	978
5:15 PM	9	0	1	0	0	0	0	0	0	34	20	0	3	29	0	0	96	1006
5:20 PM	10	0	3	0	0	0	0	0	0	29	13	0	15	39	0	0	109	1026
5:25 PM	10	0	1	0	0	0	0	0	0	24	18	0	11	35	0	0	99	1050
5:30 PM	6	0	3	0	0	0	0	0	0	39	10	0	7	40	0	0	105	1077
5:35 PM	10	0	2	0	0	0	0	0	0	27	9	0	12	24	0	0	84	1083
5:40 PM	11	0	3	0	0	0	0	0	0	23	16	0	10	29	0	0	92	1098
5:45 PM	11	0	3	0	0	0	0	0	0	27	11	0	9	30	0	0	91	1103
5:50 PM	11	0	0	0	0	0	0	0	0	23	15	0	7	18	0	0	74	1104
5:55 PM	6	0	1	0	0	0	0	0	0	18	10	0	4	28	0	0	67	1090
6:00 PM	8	0	3	0	0	0	0	0	0	22	11	0	11	38	0	0	93	1099
6:05 PM	10	0	1	0	0	0	0	0	0	18	7	0	2	24	0	0	62	1072
6:10 PM	16	0	2	0	0	0	0	0	0	18	12	0	9	56	0	0	113	1085
6:15 PM	12	0	2	0	0	0	0	0	0	18	7	0	10	34	0	0	83	1072
6:20 PM	10	0	5	0	0	0	0	0	0	21	7	0	8	35	0	0	86	1049

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	104	0	28	0	0	0	0	0	0	368	164	0	132	456	0	0	1252
Heavy Trucks	0	0	0		0	0	0		0	8	0		0	16	0		24
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 4/26/2017 6:45 AM

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

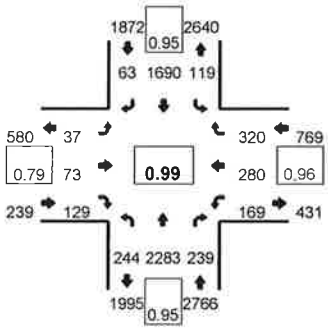
Type of peak hour being reported: Intersection Peak

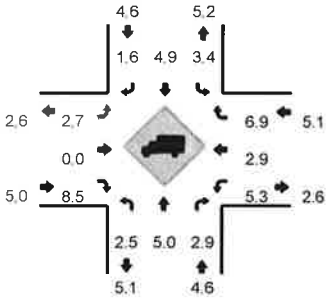
Method for determining peak hour: Total Entering Volume

LOCATION: US 74 -- Matthews-Mint Hill Rd
CITY/STATE: Matthews, NC

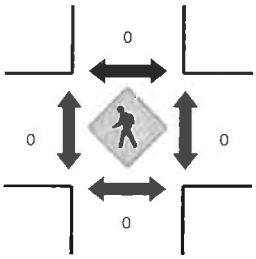
QC JOB #: 14271605
DATE: Thu, Apr 20 2017

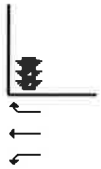
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:05 AM -- 7:20 AM

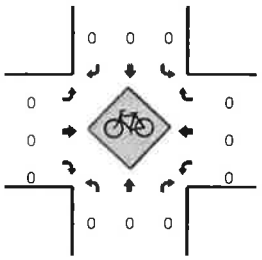


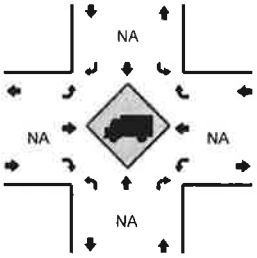


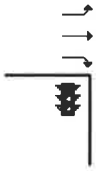
Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

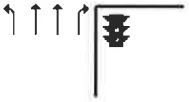


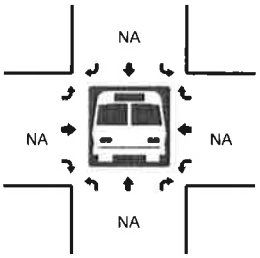












5-Min Count Period Beginning At	US 74 (Northbound)				US 74 (Southbound)				Matthews-Mint Hill Rd (Eastbound)				Matthews-Mint Hill Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	28	116	11	2	9	68	2	0	2	3	8	0	24	11	13	0	297	
6:35 AM	7	150	14	1	11	136	4	0	3	5	9	0	12	8	7	0	367	
6:40 AM	26	123	18	1	7	99	2	0	2	11	5	0	18	6	20	0	338	
6:45 AM	10	151	22	1	23	142	4	0	3	16	8	0	13	13	10	0	416	
6:50 AM	20	193	36	0	10	127	5	0	2	9	3	0	13	12	16	0	446	
6:55 AM	27	161	29	2	11	112	5	0	7	25	4	0	15	21	28	0	447	3780
7:00 AM	15	176	61	0	26	145	7	0	0	17	5	0	13	14	23	0	502	4097
7:05 AM	26	228	22	2	10	133	1	0	3	12	10	0	11	13	18	0	487	4412
7:10 AM	7	152	17	0	15	118	2	0	5	5	9	0	24	29	55	0	438	4606
7:15 AM	13	214	17	2	8	169	5	0	4	6	15	0	13	17	20	0	503	4827
7:20 AM	25	196	8	0	7	127	6	0	2	6	13	0	12	15	25	0	442	5003
7:25 AM	16	129	20	0	18	151	6	0	4	4	10	0	17	29	33	0	437	5120
7:30 AM	14	228	11	1	7	161	9	0	1	3	12	0	7	22	12	0	488	5311
7:35 AM	35	195	19	0	2	136	3	0	3	2	9	0	21	26	35	0	486	5430
7:40 AM	16	163	13	0	10	155	4	0	2	9	11	0	10	33	25	0	451	5543
7:45 AM	23	222	13	0	5	131	8	0	4	3	18	0	11	19	17	0	474	5601
7:50 AM	34	161	20	2	5	85	4	0	7	4	8	0	20	37	37	0	424	5579
7:55 AM	13	221	18	0	6	179	8	0	2	2	9	0	10	26	20	0	514	5646
8:00 AM	26	217	12	0	3	97	6	0	2	2	7	0	6	20	18	0	416	5560
8:05 AM	19	144	13	0	5	105	8	0	1	3	11	0	18	36	34	0	397	5470
8:10 AM	18	199	15	0	2	163	10	0	5	4	9	0	12	11	18	0	466	5498
8:15 AM	30	194	9	1	2	105	7	0	5	5	7	0	17	16	20	0	418	5413
8:20 AM	18	141	12	0	8	116	8	0	1	7	9	0	16	30	17	0	383	5354
8:25 AM	14	220	22	0	3	158	11	0	1	1	8	0	16	12	8	0	474	5391

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	184	2368	224	16	132	1680	32	0	48	92	136	0	192	236	372	0	5712
Heavy Trucks	4	120	0		0	52	0		4	0	8		4	16	32		240
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 4/26/2017 6:45 AM

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

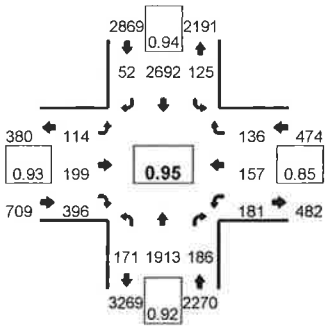
Type of peak hour being reported: Intersection Peak

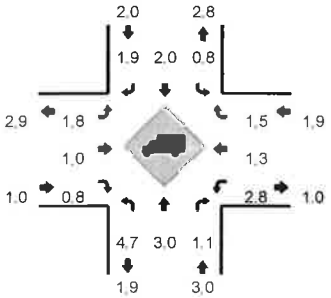
Method for determining peak hour: Total Entering Volume

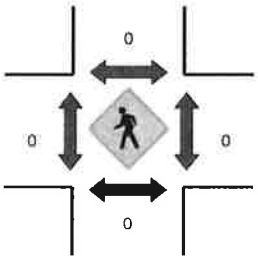
LOCATION: US 74 -- Matthews-Mint Hill Rd
CITY/STATE: Matthews, NC

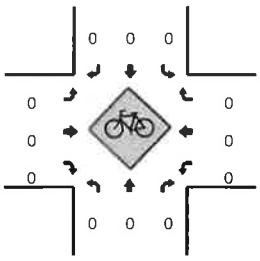
QC JOB #: 14271606
DATE: Thu, Apr 20 2017

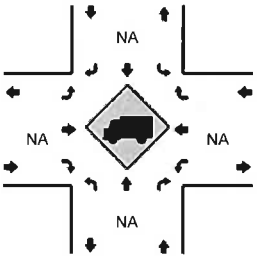
Peak-Hour: 5:05 PM -- 6:05 PM
Peak 15-Min: 5:10 PM -- 5:25 PM

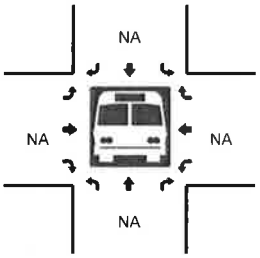












5-Min Count Period Beginning At	US 74 (Northbound)				US 74 (Southbound)				Matthews-Mint Hill Rd (Eastbound)				Matthews-Mint Hill Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:35 PM	21	130	6	0	6	155	2	3	10	24	54	0	19	19	7	0	456	
4:40 PM	9	149	20	0	4	272	7	4	8	14	30	0	11	10	9	0	547	
4:45 PM	12	109	13	0	12	191	3	3	9	16	37	0	21	12	18	0	456	
4:50 PM	13	152	14	0	2	173	3	3	7	18	43	0	9	13	11	0	461	
4:55 PM	10	157	12	0	5	240	4	3	7	12	28	0	13	7	9	0	507	5623
5:00 PM	6	106	9	0	10	163	2	5	11	14	38	0	25	19	23	0	431	5596
5:05 PM	12	165	23	0	9	230	4	1	10	12	48	0	12	9	7	0	542	5713
5:10 PM	10	165	21	0	17	275	6	2	6	15	27	0	12	8	14	0	578	5809
5:15 PM	15	133	17	0	7	180	4	2	14	25	50	0	22	21	16	0	506	5832
5:20 PM	15	205	21	0	8	268	3	1	7	12	28	0	6	7	6	0	587	5978
5:25 PM	14	154	14	0	10	237	4	1	13	12	36	0	14	11	14	0	534	6028
5:30 PM	18	163	15	0	4	158	3	4	9	24	38	0	18	27	18	0	499	6104
5:35 PM	9	166	18	0	6	269	9	4	7	15	22	0	13	9	12	0	559	6207
5:40 PM	10	120	14	0	10	236	4	3	11	20	30	0	27	18	17	0	520	6180
5:45 PM	17	166	14	0	1	199	2	5	7	21	46	0	13	7	9	0	507	6231
5:50 PM	11	171	18	0	8	265	3	1	8	14	22	0	8	7	8	0	544	6314
5:55 PM	12	115	5	0	12	156	5	2	17	21	39	0	23	17	12	0	436	6243
6:00 PM	28	190	6	0	5	219	5	2	5	8	10	0	13	16	3	0	510	6322
6:05 PM	11	174	10	0	9	246	8	7	8	10	25	0	11	11	6	0	536	6316
6:10 PM	11	136	8	0	2	142	3	2	19	19	30	0	26	24	17	0	439	6177
6:15 PM	10	196	14	0	4	233	3	0	9	11	14	0	15	12	12	0	533	6204
6:20 PM	11	158	16	0	7	191	6	8	14	9	17	0	20	8	18	0	483	6100
6:25 PM	23	155	15	0	5	157	7	2	10	13	23	0	18	32	13	0	473	6039
6:30 PM	13	194	10	0	2	218	8	2	8	5	17	0	12	10	11	0	510	6050

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	160	2012	236	0	128	2892	52	20	108	208	420	0	160	144	144	0	6684
Heavy Trucks	8	76	4		0	68	0		4	0	4		0	4	4		172
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 4/26/2017 6:45 AM

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

Exist Config Peak Growth

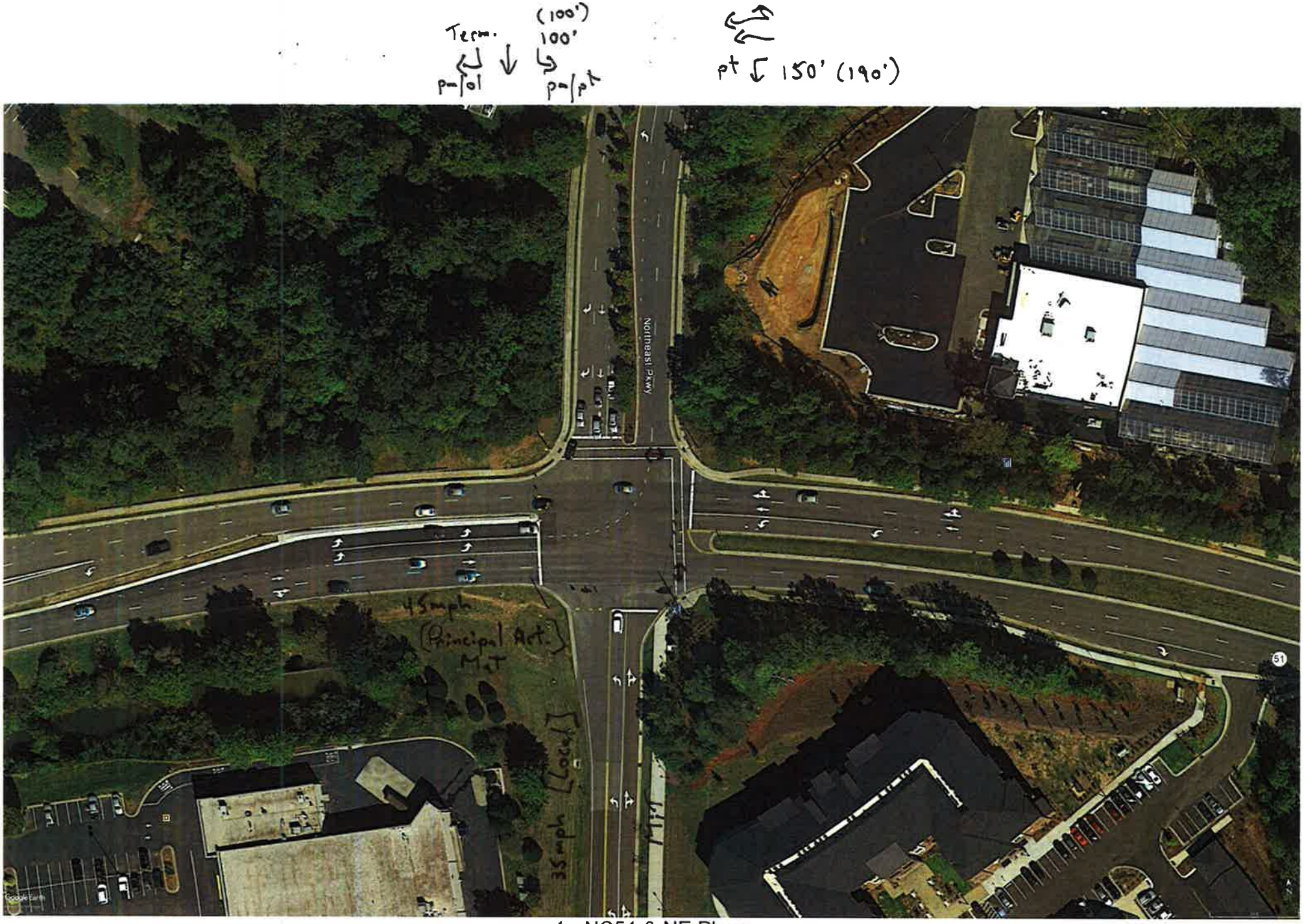
AM Peak Approach		2017 Movement Left	Thru	Right	2019 Growth: 2% per year Movement Left	Thru	Right
1. Matthews Twp Pkwy & Northeast Pkwy							
Northeast	NB	31	11	7	32	11	7
Matthews Twp	EB	83	298	9	86	310	9
Northeast	SB	71	9	73	74	9	76
Matthews Twp	WB	11	1091	132	11	1135	137
2. Matthews Mint Hill Rd & Moore Rd							
Moore	NB	267		78	278	0	81
Matthews	EB		428	77	0	445	80
	SB				0	0	0
Matthews	WB	45	445		47	463	0
3. Matthews Mint Hill Rd & US 74							
US 74	NB	244	2283	239	254	2375	249
Matthews	EB	37	73	129	38	76	134
US 74	SB	119	1690	63	124	1758	66
Matthews	WB	169	280	320	176	291	333

PM Peak Approach		2017 Movement Left	Thru	Right	2019 Growth: 2% per year Movement Left	Thru	Right
1. Matthews Twp Pkwy & Northeast Pkwy							
Northeast	NB	54	28	51	56	29	53
Matthews Twp	EB	273	1082	36	284	1126	37
Northeast	SB	280	60	158	291	62	164
Matthews Twp	WB	28	637	177	29	663	184
2. Matthews Mint Hill Rd & Moore Rd							
Moore	NB	120		25	125	0	26
Matthews	EB		327	155	0	340	161
	SB				0	0	0
Matthews	WB	113	364		118	379	0
3. Matthews Mint Hill Rd & US 74							
US 74	NB	171	1913	186	178	1990	194
Matthews	EB	114	199	396	119	207	412
US 74	SB	125	2692	52	130	2801	54
Matthews	WB	181	157	136	188	163	141

Peak Growth with NE Pkwy Ext

AM Peak Approach		2017 Movement Left	Thru	Right	2019 Growth: 2% per year Movement Left	Thru	Right
1. Matthews Twp Pkwy & Northeast Pkwy							
Northeast	NB	44	15	7	46	16	7
Matthews Twp	EB	83	298	9	86	310	9
Northeast	SB	67	15	71	70	16	74
Matthews Twp	WB	11	1091	132	11	1135	137
2. Matthews Mint Hill Rd & Moore Rd							
Moore	NB	254	17	74	264	18	77
Matthews	EB		428	77	0	445	80
NE Ext	SB		1	5	0	1	5
Matthews	WB	45	445		47	463	0
3. Matthews Mint Hill Rd & US 74							
US 74	NB	244	2283	239	254	2375	249
Matthews	EB	37	73	129	38	76	134
US 74	SB	119	1690	63	124	1758	66
Matthews	WB	169	280	320	176	291	333

PM Peak Approach		2017 Movement Left	Thru	Right	2019 Growth: 2% per year Movement Left	Thru	Right
1. Matthews Twp Pkwy & Northeast Pkwy							
Northeast	NB	60	29	51	62	30	53
Matthews Twp	EB	273	1082	36	284	1126	37
Northeast	SB	272	76	150	283	79	156
Matthews Twp	WB	28	637	177	29	663	184
2. Matthews Mint Hill Rd & Moore Rd							
Moore	NB	114	7	24	119	7	25
Matthews	EB		327	155	0	340	161
NE Ext	SB		2	14	0	2	15
Matthews	WB	113	364		118	379	0
3. Matthews Mint Hill Rd & US 74							
US 74	NB	171	1913	186	178	1990	194
Matthews	EB	114	199	396	119	207	412
US 74	SB	125	2692	52	130	2801	54
Matthews	WB	181	157	136	188	163	141



1 - NC51 & NE Pkwy

1001782 - NC 51 (Matthews Township Pkwy) @ SR 5215 (Northeast Pkwy)
B - Scheduling Events 1-100
5/11/2017 11:23 AM

Event #	Event Type	Event Details	Pri LMH	Start Date MM	Start Date DD	Stop Date MM	Stop Date DD	Start Time HH	Start Time MM	Stop Time HH	Stop Time MM	DOW Enabled 1 2 3 4 5 6 7	Del When Done	Cont	Event Groups Assigned 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
1	Coordination Plan (1-66) AM	1-1	L	1	1	12	31	6	30	9	30	2 3 4 5 6	N	N	
2	Coordination Plan (1-66)	4-1	L	1	1	12	31	9	30	15	0	2 3 4 5 6	N	N	
3	Coordination Plan (1-66) PM	3-1	L	1	1	12	31	15	0	18	30	2 3 4 5 6	N	N	
4	Coordination Plan (1-66)	2-1	L	1	1	12	31	18	30	19	30	2 3 4 5 6	N	N	
5	None			0	0	0	0	0	0	0	0		N	N	
6	None			0	0	0	0	0	0	0	0		N	N	
7	Coordination Plan (1-66)	22-1	L	1	1	12	31	9	0	11	0	7	N	N	
8	Coordination Plan (1-66)	24-1	L	1	1	12	31	11	0	18	0	7	N	N	
9	Coordination Plan (1-66)	22-1	L	1	1	12	31	18	0	21	0	7	N	N	
10	None			0	0	0	0	0	0	0	0		N	N	
11	None			0	0	0	0	0	0	0	0		N	N	
12	Coordination Plan (1-66)	22-1	L	1	1	12	31	10	0	12	0	1	N	N	
13	Coordination Plan (1-66)	24-1	L	1	1	12	31	12	0	17	0	1	N	N	
14	Coordination Plan (1-66)	22-1	L	1	1	12	31	17	0	19	0	1	N	N	
15	None			0	0	0	0	0	0	0	0		N	N	
16	None			0	0	0	0	0	0	0	0		N	N	
17	Coordination Plan (1-66)	Free	H	11	22	11	28	0	0	24	0	5	N	N	
18	None			0	0	0	0	0	0	0	0		N	N	
19	Coordination Plan (1-66)	Free	H	12	25	12	25	0	0	24	0	1 2 3 4 5 6 7	N	N	
20	None			0	0	0	0	0	0	0	0		N	N	
21	None			0	0	0	0	0	0	0	0		N	N	
22	None			0	0	0	0	0	0	0	0		N	N	
23	None			0	0	0	0	0	0	0	0		N	N	
24	None			0	0	0	0	0	0	0	0		N	N	
25	None			0	0	0	0	0	0	0	0		N	N	
26	None			0	0	0	0	0	0	0	0		N	N	
27	None			0	0	0	0	0	0	0	0		N	N	
28	None			0	0	0	0	0	0	0	0		N	N	
29	None			0	0	0	0	0	0	0	0		N	N	
30	None			0	0	0	0	0	0	0	0		N	N	
31	None			0	0	0	0	0	0	0	0		N	N	
32	None			0	0	0	0	0	0	0	0		N	N	
33	None			0	0	0	0	0	0	0	0		N	N	
34	None			0	0	0	0	0	0	0	0		N	N	
35	None			0	0	0	0	0	0	0	0		N	N	
36	None			0	0	0	0	0	0	0	0		N	N	
37	None			0	0	0	0	0	0	0	0		N	N	
38	None			0	0	0	0	0	0	0	0		N	N	
39	None			0	0	0	0	0	0	0	0		N	N	
40	None			0	0	0	0	0	0	0	0		N	N	
41	None			0	0	0	0	0	0	0	0		N	N	
42	None			0	0	0	0	0	0	0	0		N	N	
43	None			0	0	0	0	0	0	0	0		N	N	
44	None			0	0	0	0	0	0	0	0		N	N	
45	None			0	0	0	0	0	0	0	0		N	N	
46	None			0	0	0	0	0	0	0	0		N	N	
47	None			0	0	0	0	0	0	0	0		N	N	
48	None			0	0	0	0	0	0	0	0		N	N	
49	None			0	0	0	0	0	0	0	0		N	N	
50	None			0	0	0	0	0	0	0	0		N	N	

1001782 - NC 51 (Matthews Township Pkwy) @ SR 5215 (Northeast Pkwy)
9 - Coordination Plan 1
5/11/2017 11:23 AM

AM

Coordination Plan # 1

Cycle length (0-999 sec)	200
Min Transition Cycle (0-999 sec)	130
Max Transition Cycle (0-999 sec)	270

Offset # or Ring:	1	2	3	4
Offsets (0-999 sec)	55	0	0	0
Act Coord Phase Min Green (0-255)	0	0	0	0

Splits (0-255 sec)

Phase	1	2	3	4	5	6	7	8
Split	0	150	0	50	15	135	20	30
Phase	9	10	11	12	13	14	15	16
Split	0	0	0	0	0	0	0	0
	WBL	EB	WBL	SB	EBL	WB	SBL	NB

Verify Plan Data

Phase/Function Settings:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coordinated Phase		2				6										
Float Force Offs																
Hold to Force Off																
Hi Priority Ped									8							
Dynamic/Backup																

Options:

	(Y/N)
Split/Timing in percent?	N
*Permissive Mode (0-4)	0
Enable Transition Permissive Mode?	N
Adjust Non-Coordinated Splits?	Y
Cycle Once per Cycle Length?	Y

*0 = Auto
1 = Open
2 = Manual
3 = Window
4 = Walk

Active Pages:

Phase Sequence Page (1-12)	1
Phase Timing Page (1-4)	1
Phase Control Page (1-4)	1
OverLap Control Page (1-4)	1
Input Page (1-4)	1
Output Page (1-4)	1

Global Manual Permissive windows:
*Applies when "Window" permissive is selected

Manual Perm 1 End Point (0-255 sec)	0
Manual Perm 2 Start Point (0-255 sec)	0
Manual Perm 2 End Point (0-255 sec)	0

Manual Permissives by Phase:
*Applies when "Manual" permissive is selected

(0-255 sec)	Vehicle Start	Vehicle Stop	Pedestrian Start	Pedestrian Stop
Phase 1	0	0	0	0
Phase 2	0	0	0	0
Phase 3	0	0	0	0
Phase 4	0	0	0	0
Phase 5	0	0	0	0
Phase 6	0	0	0	0
Phase 7	0	0	0	0
Phase 8	0	0	0	0
Phase 9	0	0	0	0
Phase 10	0	0	0	0
Phase 11	0	0	0	0
Phase 12	0	0	0	0
Phase 13	0	0	0	0
Phase 14	0	0	0	0
Phase 15	0	0	0	0
Phase 16	0	0	0	0

1001782 - NC 51 (Matthews Township Pkwy) @ SR 5215 (Northeast Pkwy)

PM

9 - Coordination Plan 3

5/11/2017 11:23 AM

Coordination Plan # 3

Cycle length (0-999 sec)	180
Min Transition Cycle (0-999 sec)	120
Max Transition Cycle (0-999 sec)	240

Offset # or Ring:	1	2	3	4
Offsets (0-999 sec)	82	0	0	0
Act Coord Phase Min Green (0-255)	0	0	0	0

Splits (0-255 sec)

Phase	1	2	3	4	5	6	7	8
Split	0	105	0	75	30	75	40	35
Phase	9	10	11	12	13	14	15	16
Split	0	0	0	0	0	0	0	0

Verify Plan Data

Phase/Function Settings:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coordinated Phase		2				6										
Float Force Offs																
Hold to Force Off																
Hi Priority Ped								8								
Dynamic/Backup																

Options:

	(Y/N)
Split/Timing in percent?	N
*Permissive Mode (0-4)	0
Enable Transition Permissive Mode?	N
Adjust Non-Coordinated Splits?	Y
Cycle Once per Cycle Length?	Y

*0 = Auto
1 = Open
2 = Manual
3 = Window
4 = Walk

Active Pages:

Phase Sequence Page (1-12)	1
Phase Timing Page (1-4)	1
Phase Control Page (1-4)	1
OverLap Control Page (1-4)	1
Input Page (1-4)	1
Output Page (1-4)	1

Global Manual Permissive windows:

*Applies when "Window" permissive is selected

Manual Perm 1 End Point (0-255 sec)	0
Manual Perm 2 Start Point (0-255 sec)	0
Manual Perm 2 End Point (0-255 sec)	0

Manual Permissives by Phase:

*Applies when "Manual" permissive is selected

(0-255 sec)	Vehicle Start	Vehicle Stop	Pedestrian Start	Pedestrian Stop
Phase 1	0	0	0	0
Phase 2	0	0	0	0
Phase 3	0	0	0	0
Phase 4	0	0	0	0
Phase 5	0	0	0	0
Phase 6	0	0	0	0
Phase 7	0	0	0	0
Phase 8	0	0	0	0
Phase 9	0	0	0	0
Phase 10	0	0	0	0
Phase 11	0	0	0	0
Phase 12	0	0	0	0
Phase 13	0	0	0	0
Phase 14	0	0	0	0
Phase 15	0	0	0	0
Phase 16	0	0	0	0

← ↓ 135' +TWLTL

2 - Matthews-Mint Hill & Moore

TWLTL
→
↱

↰ ↱
Term. 50'
(25')

* Officer @ Butler 6:45 (around bend)
* Need "Do Not Block Int." @ Moore on M-MHR
* Need to mark outer EB lane to TR

← ↱ 135' + TWLTL

* 2:20 No issues. Officer further down?
  ↳ Assume exiting school right
* 2:25 buses exit
* 2:30 Officer @ Butler, 2:35 leaves

- 550' from 1st HS driveway to Moore Rd.

2 - Matthews-Mint Hill & Moore

TWLTL → ⇄

↰ Term. ↱ 50' (25')

J.Z. 5/10/17 AM 645-745 (655-710)
J.Z. 5/10/17 PM 455-555 (520-535)

(190') 450' pt

315' (160')

pt 260' +TWLTL

3 - US74 & Matthews-Mint Hill

(100') 125' pt

(140') 450'

pt

400' (250')

pm/ol

Term.

1000239 - US 74 @ Matthews-Mint Hill Rd.
B - Scheduling Events 1-100
5/11/2017 11:21 AM

Event #	Event Type	Event Details	Pri LMH	Start Date MM	Start Date DD	Stop Date MM	Stop Date DD	Start Time HH	Start Time MM	Stop Time HH	Stop Time MM	DOW Enabled 1 2 3 4 5 6 7	Del When Done	Cont	Event Groups Assigned 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
1	Coordination Plan (1-66)	8-1	L	1	1	12	31	5	0	6	30	2 3 4 5 6	N	N	
2	Coordination Plan (1-66) AM	5-1	L	1	1	12	31	6	30	9	0	2 3 4 5 6	N	N	
3	Coordination Plan (1-66)	6-1	L	1	1	12	31	9	0	15	0	2 3 4 5 6	N	N	
4	Coordination Plan (1-66) PM	7-1	L	1	1	12	31	15	0	19	30	2 3 4 5 6	N	N	
5	Coordination Plan (1-66)	8-1	L	1	1	12	31	19	30	20	30	2 3 4 5	N	N	
6	Coordination Plan (1-66)	8-1	L	1	1	12	31	19	30	22	0	6	N	N	
7	None			0	0	0	0	0	0	0	0		N	N	
8	None			0	0	0	0	0	0	0	0		N	N	
9	None			0	0	0	0	0	0	0	0		N	N	
10	None			0	0	0	0	0	0	0	0		N	N	
11	None			0	0	0	0	0	0	0	0		N	N	
12	None			0	0	0	0	0	0	0	0		N	N	
13	None			0	0	0	0	0	0	0	0		N	N	
14	None			0	0	0	0	0	0	0	0		N	N	
15	None			0	0	0	0	0	0	0	0		N	N	
16	None			0	0	0	0	0	0	0	0		N	N	
17	None			0	0	0	0	0	0	0	0		N	N	
18	None			0	0	0	0	0	0	0	0		N	N	
19	None			0	0	0	0	0	0	0	0		N	N	
20	None			0	0	0	0	0	0	0	0		N	N	
21	None			0	0	0	0	0	0	0	0		N	N	
22	None			0	0	0	0	0	0	0	0		N	N	
23	None			0	0	0	0	0	0	0	0		N	N	
24	None			0	0	0	0	0	0	0	0		N	N	
25	None			0	0	0	0	0	0	0	0		N	N	
26	Coordination Plan (1-66)	Free	H	11	22	11	28	0	0	24	0	5	N	N	
27	Coordination Plan (1-66)	Free	H	12	25	12	25	0	0	24	0	1 2 3 4 5 6 7	N	N	
28	Coordination Plan (1-66)	Free	H	1	1	1	1	0	0	24	0	1 2 3 4 5 6 7	N	N	
29	None			0	0	0	0	0	0	0	0		N	N	
30	None			0	0	0	0	0	0	0	0		N	N	
31	None			0	0	0	0	0	0	0	0		N	N	
32	None			0	0	0	0	0	0	0	0		N	N	
33	None			0	0	0	0	0	0	0	0		N	N	
34	None			0	0	0	0	0	0	0	0		N	N	
35	None			0	0	0	0	0	0	0	0		N	N	
36	Coordination Plan (1-66)	12-1	L	1	1	12	31	8	0	10	0	7	N	N	
37	Coordination Plan (1-66)	13-1	L	1	1	12	31	10	0	11	30	7	N	N	
38	Coordination Plan (1-66)	14-1	L	1	1	12	31	11	30	17	0	7	N	N	
39	Coordination Plan (1-66)	13-1	L	1	1	12	31	17	0	19	0	7	N	N	
40	Coordination Plan (1-66)	12-1	L	1	1	12	31	19	0	21	0	7	N	N	
41	None			0	0	0	0	0	0	0	0		N	N	
42	Coordination Plan (1-66)	12-1	L	1	1	12	31	8	0	12	0	1	N	N	
43	Coordination Plan (1-66)	13-1	L	1	1	12	31	12	0	18	0	1	N	N	
44	Coordination Plan (1-66)	12-1	L	1	1	12	31	18	0	20	0	1	N	N	
45	None			0	0	0	0	0	0	0	0		N	N	
46	None			0	0	0	0	0	0	0	0		N	N	
47	Coordination Plan (1-66)	Free	H	11	15	11	15	21	0	24	0	6	N	N	
48	Coordination Plan (1-66)	Free	H	11	16	11	17	0	0	24	0	1 7	N	N	
49	None			0	0	0	0	0	0	0	0		N	N	
50	Change Phase Timing Page (1-4)	3		11	22	11	22	21	0	24	0	6	N	N	

1000239 - US 74 @ Matthews-Mint Hill Rd.
9 - Coordination Plan 5
5/11/2017 11:21 AM

AM

Coordination Plan # 5

Cycle length (0-999 sec)	220
Min Transition Cycle (0-999 sec)	140
Max Transition Cycle (0-999 sec)	300

Offset # or Ring:	1	2	3	4
Offsets (0-999 sec)	159	0	0	0
Act Coord Phase Min Green (0-255)	0	0	0	0

Splits (0-255 sec)

Phase	1	2	3	4	5	6	7	8
Split	37	125	18	40	29	133	35	23
Phase	9	10	11	12	13	14	15	16
Split	0	0	0	0	0	0	0	0
	SBL	NB	WBL	EB	NBL	SB	EBL	WB

Verify Plan Data

Phase/Function Settings:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coordinated Phase		2				6										
Float Force Offs																
Hold to Force Off																
Hi Priority Ped																
Dynamic/Backup																

Options:

	(Y/N)
Split/Timing in percent?	N
*Permissive Mode (0-4)	0
Enable Transition Permissive Mode?	N
Adjust Non-Coordinated Splits?	Y
Cycle Once per Cycle Length?	Y

*0 = Auto
1 = Open
2 = Manual
3 = Window
4 = Walk

Active Pages:

Phase Sequence Page (1-12)	2
Phase Timing Page (1-4)	2
Phase Control Page (1-4)	1
OverLap Control Page (1-4)	2
Input Page (1-4)	2
Output Page (1-4)	1

Global Manual Permissive windows:

*Applies when "Window" permissive is selected

Manual Perm 1 End Point (0-255 sec)	0
Manual Perm 2 Start Point (0-255 sec)	0
Manual Perm 2 End Point (0-255 sec)	0

Manual Permissives by Phase:

*Applies when "Manual" permissive is selected

(0-255 sec)	Vehicle Start	Vehicle Stop	Pedestrian Start	Pedestrian Stop
Phase 1	0	0	0	0
Phase 2	0	0	0	0
Phase 3	0	0	0	0
Phase 4	0	0	0	0
Phase 5	0	0	0	0
Phase 6	0	0	0	0
Phase 7	0	0	0	0
Phase 8	0	0	0	0
Phase 9	0	0	0	0
Phase 10	0	0	0	0
Phase 11	0	0	0	0
Phase 12	0	0	0	0
Phase 13	0	0	0	0
Phase 14	0	0	0	0
Phase 15	0	0	0	0
Phase 16	0	0	0	0

1000239 - US 74 @ Matthews-Mint Hill Rd.
9 - Coordination Plan 7
5/11/2017 11:21 AM

PM

Coordination Plan # 7

Cycle length (0-999 sec)	220
Min Transition Cycle (0-999 sec)	140
Max Transition Cycle (0-999 sec)	300

Offset # or Ring:	1	2	3	4
Offsets (0-999 sec)	160	0	0	0
Act Coord Phase Min Green (0-255)	0	0	0	0

Splits (0-255 sec)

Phase	1	2	3	4	5	6	7	8
Split	30	125	25	40	25	130	30	35
Phase	9	10	11	12	13	14	15	16
Split	0	0	0	0	0	0	0	0

Verify Plan Data

Phase/Function Settings:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Coordinated Phase		2				6										
Float Force Offs																
Hold to Force Off																
Hi Priority Ped																
Dynamic/Backup																

Options:

	(Y/N)
Split/Timing in percent?	N
*Permissive Mode (0-4)	0
Enable Transition Permissive Mode?	N
Adjust Non-Coordinated Splits?	Y
Cycle Once per Cycle Length?	Y

*0 = Auto
1 = Open
2 = Manual
3 = Window
4 = Walk

Active Pages:

Phase Sequence Page (1-12)	3
Phase Timing Page (1-4)	2
Phase Control Page (1-4)	1
OverLap Control Page (1-4)	2
Input Page (1-4)	2
Output Page (1-4)	1

Global Manual Permissive windows:

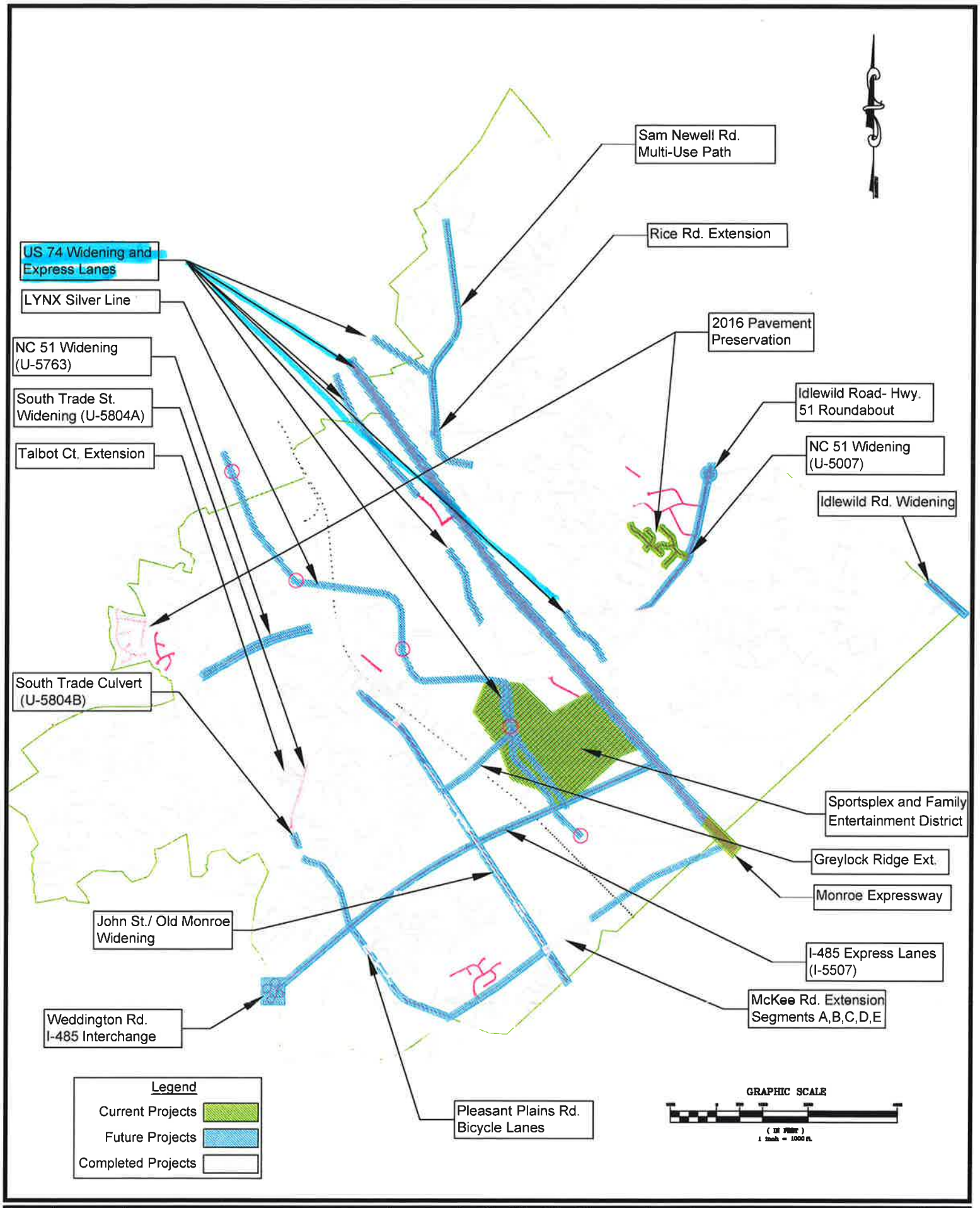
*Applies when "Window" permissive is selected

Manual Perm 1 End Point (0-255 sec)	0
Manual Perm 2 Start Point (0-255 sec)	0
Manual Perm 2 End Point (0-255 sec)	0

Manual Permissives by Phase:

*Applies when "Manual" permissive is selected

(0-255 sec)	Vehicle Start	Vehicle Stop	Pedestrian Start	Pedestrian Stop
Phase 1	0	0	0	0
Phase 2	0	0	0	0
Phase 3	0	0	0	0
Phase 4	0	0	0	0
Phase 5	0	0	0	0
Phase 6	0	0	0	0
Phase 7	0	0	0	0
Phase 8	0	0	0	0
Phase 9	0	0	0	0
Phase 10	0	0	0	0
Phase 11	0	0	0	0
Phase 12	0	0	0	0
Phase 13	0	0	0	0
Phase 14	0	0	0	0
Phase 15	0	0	0	0
Phase 16	0	0	0	0



1 of 1		Transportation Projects 2017		N.T.S.	1/24/17	CJO	CJO	REVISION	DATE	DESCRIPTION	BY
		TOWN OF MATTHEWS PUBLIC WORKS DEPARTMENT 1600 TANK TOWN RD., MATTHEWS, NC 28105	town of Matthews Public Works								

Town of Matthews Public Works

Transportation Project Status
May 18, 2017

Current as of May 18, 2017

Below is the current status of the project currently proposed or underway. Please note that all completion dates are tentative and are highly dependent on weather conditions. Portions changed since November 8, 2016 are highlighted in yellow.

Current Projects

Sportsplex- Mecklenburg County Project. Located at 1505 Tank Town Road, this project is a $32M athletic complex for field sports and includes adjoining privately held land for a Family Entertainment Complex. The project is being constructed jointly with the County. The Town of Matthews has agreed to invest $2M in the project. Phase I of this project is open and includes five multi-purpose fields, a shelter area and a playground built in tribute to the lives lost in the September 11, 2001 terrorist attack. Ultimate build-out includes 12 fields, including a stadium that sits approximately 2,700 people, with the capability of further seating expansion. Once complete, there will be a new public roadway connection between Tank Town Road and Brigman Road, named Sports Parkway. Project is substantially complete. All artificial turf fields are open for play. Natural turf fields will have to be given time to establish before being used, which is anticipated to be in conjunction with the grand opening on June 17th. Matthews received $1M from the general assembly for fiscal year 2017 to be used to expand the seating capacity for the stadium.

Monroe Expressway (R-3329/R-2559)- NCDOT project. This $840 million, 19.5 mile project is an all-toll facility from U.S. 74 east of I-485 in Mecklenburg County to U.S. 74 between Wingate and Marshville in Union County. Clearing has been completed and grading/construction is underway. They have a tentative completion date set for 2018. NCDOT has more information about the project here. CRTPO has additional information on their website.

NCDOT Resurfacing- NCDOT project. NCDOT has contracted out several resurfacing projects within Matthews. We do not yet have a timeline on when they may be done. These areas include Pineville-Matthews Road, from Sardis Road to John Street; and East John Street from Trade Street to Friendship Drive.

2016 Pavement Preservation Program- Matthews project. Several pavement preservation techniques are being used on various local roads to extend their life. Roads in Sardis Mill and Coachman Ridge had a rejuvenator, called Reclamite, applied to them. This product replaces the volatile organic compounds lost from the asphalt when it is initially placed. It also helps to reverse oxidation that has occurred in the pavement since that time. This was placed on these roads and a small section of Phillips Road on September 20, 2016.

Two weeks later, on October 4, 2016, a high density mineral bond (HA5) was placed in the Sardis Mill subdivision. This is a coating that will help protect the pavement from UV damage for up to 7 years.

Millstone Ridge will have a seal coat, GSB-88, placed on it this spring. This product is a coating that will mitigate raveling in the road and help to protect the pavement from UV damage for up to 5 years. This will take about 10 days to apply, with most of that being prep work. This product takes about 2 hours to cure before it can be driven on. Town crews are currently patching and crack sealing these roads in preparation of the application.

Railroad Parking Lot Improvements- Matthews Project. The state legislature this past session gave Matthews $94,240 to revitalize a portion of our downtown. The Board voted on September 12 to use the money toward improving the parking lot adjacent to the railroad, between North Trade Street and North Ames Street. This money supplements the $72,000 that the Board put in the CIP to make the improvements. Improvements to the parking lot include creating a 10' pedestrian path along one side of the parking lot, installing stairs from the parking lot up to Bank Street, resurfacing the parking lot, and improving landscape in the area. The estimated cost of this project is $105,000. Any remaining funds will be put toward future projects. This project is currently under construction. Parts

of it were delayed due to Hurricane Matthew. Wall repairs and landscape lighting of the existing planter are complete. Steps to Bank Street are currently complete. Seal coating the parking lot will be the week of May 22, 2017.

Downtown Sidewalk Projects- Matthews project. The Town received a $500,000 grant from the NC General Assembly toward new sidewalks. Design is underway to construct a wide sidewalk on Matthews-Mint Hill Road from the Novant Health entrance to North Trade Street. Another section of sidewalk under design is along West John Street from Ames Street to Irwin Lane. Construction on these projects is anticipated for this summer.

Reverdy Signal- Developer project. As part of the Carmel Baptist Church expansion project, they are adding a signal to Reverdy Lane at NC 51. Signal installation is anticipated for this summer with opening before the start of the next school year. Charlotte is overseeing this project.

Fullwood Signal- Developer project. As part of the Plantation Estates expansion, they are installing a signal on Fullwood Lane at their new entrance. Signal activation is anticipated for this summer. Matthews is overseeing this project.

McKee Road Improvements- Developer project. As part of the Erickson Community development on McKee Road, they were required to add turn lanes at the intersection of Pleasant Plains Road. NCDOT is overseeing this project.

Future Projects

Idlewild and Hwy. 51 Roundabout (U-5115)- NCDOT project. Construction was planned to start in June 2016, but has been delayed due to issues with acquiring right-of-way. All rights-of-way have been purchased and utilities are currently being moved. Construction is planned to begin in June 12, 2017 and will require the closing of the intersection from July 7 through August 28. Detour routes have not yet been determined. It was designed to accommodate the future widening of NC 51 (U-5007). Construction estimates are around $1.6M. Matthews and Mint Hill are responsible for a combined 20% match ($80k each), plus the cost of additional amenities such as lighting, gateway signs, etc. More information on roundabouts can be found in this NCDOT brochure.

South Trade Street Culvert (U-5804B)- NCDOT Project. This project will widen South Trade Street to 4 lanes between Chaphyn Lane and Weddington Road and lengthen the culvert under South Trade Street in this area. Due to the new flood plain maps being released and the CLOMAR expiration, this project had to go back through environmental review process. The project is currently in the right-of-way acquisition stage. It is anticipated that construction on this project will begin in the fall of 2017. Current cost estimate for the culvert is $1.5M. This is an NCDOT project.

South Trade Street Greenway/Tunnel (EB-5829)- Mecklenburg County Project. An additional project will build a pedestrian tunnel and greenway connection under South Trade Street, adjacent to the culvert. STP-DA funding for the pedestrian tunnel and associated greenway path was approved by the CRTPO at its August 2016 meeting. The pedestrian tunnel and greenway will be constructed separately from the culvert widening, but should only cause minimal traffic delays. The cost for the new 14' tunnel and greenway is estimated at $1.1M, and will be funded by NCDOT and Mecklenburg County.

Weddington Road/I-485 Interchange (R-0211EC)- NCDOT project. This will add an interchange at Weddington Road and I-485 and will also improve a section of Weddington Road. Due to additional funding from HB 97 in the TIP, the project is now funded fully from the TIP and will be built as part of the I-485 Express Lanes (I-5507) project (see below for more information). Design and construction may begin as early as 2017 or as late as 2019, depending on the contractor's direction of operation. Project estimate is $20M. Town is responsible for sidewalk costs, estimated at $200k. More information about the project can be found on the CRTPO website.

I-485 Express Lanes (I-5507)- NCDOT project. New express lane in each direction from I-77 to US 74. ROW and construction in 2017. Completion in FY 2019. Project estimate is $203M. This project now includes adding the Weddington Road Interchange (R-0211EC) and enhancements to the John Street interchange and will add an additional auxiliary lane in each direction from Weddington Road to John Street. NCDOT has more information about the project here.

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I-485 Pavement Rehabilitation NCDOT project between Idlewild Road and U.S. 74 - Two projects **(I-5748 and I-5827)** propose to resurface both directions of I-485 in this area. The first project is funded for FY 16 for $500,000 and has been completed. The second is funded for FY 19 for $3 million.

Sam Newell Road Intersection Improvements- NCDOT project will add an additional lane on Sam Newell Road/North Trade Street on both approaches to NC51. They will also add an addition left turn lane onto North Trade Street from Hwy. 51. This project is estimated at $600k and will likely be funded with Congestion Mitigation Air Quality (CMAQ) money.

Sam Newell Road Multi-Use Path- Rice Road to Crown Point Elementary (EB-5783)- Matthews project. Design will begin in 2017. Project estimate is $1.3M, with the Town contributing $400k. Construction with STBG-DA funding likely in 2021 or 2022.

Pleasant Plains Road Multi-Use Path- Trade St. to McKee Rd. (EB-5779)- Matthews project. Design in 2019. Construction not yet funded. Project estimate has recently been updated to $1.9M. Tthe Town will contribute 20% of the project costs.

NC 51 Widening- Sardis Road to E. John St./Monroe Rd. (U-5763)- NCDOT project. This project will widen NC 51 from four to six lanes, including a median and a multi-use path on one side and sidewalk on the other. It is in the planning stages. ROW in 2018 and construction in 2020. Project estimate is $3.9M. The Town is responsible for the cost for the multi-use path and for sidewalk where there currently isn't any.

US 74 Widening and Express Lanes (U-2509A,B)- NCDOT project. This project is broken into two segments. Segment A proposes express lanes between Conference Drive and Sardis Road North. Segment B proposes express lanes between Sardis Road North and I-485. Additional general purpose lanes will likely be added as part of the project. The project may also include completing the unfinished portions of Krefeld Drive/Northeast Parkway and Independence Pointe Parkway. NCDOT has more information about the project here. The project is currently in the planning stages. ROW date is 2020. Construction date is 2022-2025. Project estimate for section B is $207M, with the total project estimate of $406M.

An additional project (**U-5526**) proposes to add express lanes on U.S. 74 from I-277 to Wallace Lane, with construction starting in FY 2017. More information about the $17.5 million project can be found here. There is a possibility that construction of U-5526 and U-2509B may be combined for economies of scale.

The most current version of the plans can be downloaded here: Sheet 1, Sheet 2.

Idlewild Road Widening (U-4913)- NCDOT project. Widen Idlewild Road from I-485 to Stevens Mill Road. ROW in 2020, construction in 2022. Project estimate is $7M.

Rice Road Extension is a project to extend existing Rice Road across Sam Newell Road to the existing Rice Road Extension, which intersects Independence Boulevard. NCDOT has committed to installing a traffic signal at the Rice Road and Sam Newell Drive intersection once this project is completed. This project is estimated to cost approximately $350k. Funds for this project have not yet been identified, but may be included as part of the U-2509B project.

John Street / Old Monroe Road Widening (U-4714)- NCDOT project. This project is likely to be a 4-lane median divided facility with a multi-use path along the majority of the section through Matthews. This widening project is divided into three segments. Section A is from its intersection with Trade Street in downtown Matthews to I-485. Section B is from I-485 to Waxhaw Indian Trail Road. Section C is from Waxhaw Indian Trail Road to Wesley Chapel-Stouts Road. The current design shows a superstreet section until it's terminus at Trade Street. The most recent schedule shows right-of-way acquisitions FY 2019, and construction in FY 2021-23. The total cost for building these segments is $87.5M. NCDOT has prepared a flyer to help explain the design concept for the roadway. More information on the project can be found here at the NCDOT website.

Since the project is receiving federal funds, it is required to have an Environmental Assessment (EA). As part of the EA, the design team held a Charrette session for initial public input on August 27 through 29, 2013 and later public hearings.

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John Street Widening Public Hearing Map A
John Street Widening Public Hearing Map B

The EA was approved in July 2016. The Town sent our U-4714 EA Comments to NCDOT on November 11, 2016.

The Town then hired a consultant to help determine how the roadway design might be modified in order to: mitigate speeds through the area; increase bicycle and pedestrian accessibility along and across the corridor; aesthetic treatments for median area; and possible alternative intersection alternatives. The consultant's contract is currently on hold until the larger aspects of the design can be determined.

A public meeting for input on the design was held in the Town Hall Hood Room on January 31, 2017. Please see the John Street Handout for information on this corridor and to provide input to staff on your thoughts regarding aesthetics and pedestrian safety options.

The consultant presented the results of the public input session and additional project information to the Transportation Advisory Committee (TAC) on February 13, 2017. Please see East John Street Widening Presentation to TAC 2-16-17.

Town staff presented the Board various alternatives to the current design at their Planning Conference on February 24, 2017. Please see U-4714 Planning Conference Presentation. On March 24, 2017, the Town Board passed a Resolution regarding East John Street, which was sent to NCDOT. NCDOT responded to the Town and agreed to meet to work through various options that might be implemented with the project to meet the project and Town's needs.

The Town also has started a dedicated web page for this project:
http://www.matthewsnc.gov/newsview.aspx?nid=5994

NC 51 Widening- Matthews Township Parkway to Lawyers Road (U-5007)- NCDOT project to widen to multi-lanes. ROW in 2022, construction in 2024. Budget is $35.7M.

McKee Road Extension (U-4713)- This project is broken into several segments.

Segment A (U-4713A) of this proposed Matthews project will extend McKee Road 4,000 feet from its existing terminus at Pleasant Plains Road to John Street. The Town Board voted at its April 25, 2016 meeting to obligate $2M toward this project to increase the probability of it being funded in the TIP as part of the P4.0 process. The money will come from the $3M the Town is receiving at the first building permit of Erickson's Windsor Run project. The project is funded in the current Draft TIP.Construction estimate is $9.8M. At Matthews' request, NCDOT accelerated the schedule for this section of roadway. Right-of-Way acquisition will be in 2019 and construction in 2020.

Segment B of the project was completed in September 2016 (see below for more information).

Segments C, D and E are proposed to further extend McKee Road to Independence Boulevard. Section C, which takes the roadway over the CSX rail line is currently unfunded. Section D will likely be built with the development of the adjacent property. Section E is being built as part of the NCDOT Monroe Expressway project (R-3329/R-2559).

Greylock Ridge Road Extension- This proposed 2,200 foot long road will connect John Street to the Sportsplex and Family Entertainment District. The preliminary design for the roadway is done. Estimated cost is $4.6M. The Town is voted to purchase a portion of the right-of-way needed for the road. No funding has been identified to finalize plans or move toward construction.

North Ames Street Widening- Widen North Ames Street from West Matthews Street to North Ames Street. Estimated cost is $387k. No funding has been identified to finalize plans or move toward construction.

West Charles Street Widening- Widen West Charles Street from existing widening to Matthews Township Parkway. Preliminary plans have been done. Estimated cost is $918k. No funding has been identified to finalize plans or move toward construction.

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LYNX Silver Line is a proposed CATS project that will build a rail line between uptown Charlotte and the Matthews area. CATS is currently conducting a rail alternative analysis and transit study, which extends 13.5 miles from Charlotte's City Center to the border of Mecklenburg and Union Counties, including the town of Matthews. The study will define a fixed-rail guideway alignment, provide an interim bus transit strategy that utilized the future Independence Boulevard managed lanes, and develop land development strategies to protect and preserve the fixed guideway alignment.

The Metropolitan Transit Commission (MTC) voted to approve the LYNX Silver Line Locally Preferred Alternative (LPA) at their November 2016 meeting and adopted it into the 2030 Transit System Plan. The Charlotte Regional Transportation Planning Organization (CRTPO) voted to include it in the region's Long Range Transportation Plan at their January 18, 2017 meeting.

More information about the study, including maps and a survey for public input can be found at the LYNX Silver Line Web Page.

Completed Projects

South Trade Street Widening (U-5804A)- Matthews Project. The contract was awarded to Sealand Contractors Corporation for $4.2M. The original completion date was March 19, 2016. This was delayed by utility relocations and other issues. Except for minor repairs, the project is complete and is open to traffic. This is a Town-funded project on an NCDOT road. However, additional work on South Trade Street and Fullwood Lane will continue through several projects over the next year- Plantation Village, Fullwood Station and the South Trade Street Culvert Extension (U-5804B).

Matthews-Mint Hill Road Superstreet (U-5511) near Butler High School – Matthews Project. The contract was awarded to J.T. Russell for $675k. The Town has committed to $240k of this plus half of any overruns. The remainder of the funding is from a Federal grant given to the Town. Please note that the multi-use path shown on the conceptual drawing was not able to be constructed due to limited funding. The contractor has installed the storm drainage and begun widening and curb and gutter on the both sides of the road. The project is complete except for punch list items. The Town and NCDOT are working together to add in a new crosswalk across Hwy. 51 at Phillips Road.

2015 Resurfacing- The contract of this Matthews project was awarded to Trull Contracting, LLC for $716,410.75. The contractor has completed the full-depth reclamation (FDR) and paving in Matthews Estate, West Matthews Street, Oscar Drive area, Independence Pointe Parkway and Windsor Square Drive. Brigman Road was added to the contract for approximately $73,000 as it will tie into the new entrance to the Sportsplex and was in poor condition and has been completed. This is a Town-funded project. This project is complete.

Charles Buckley Way- Matthews project. Contract was awarded to Sealand Contractors Corporation for $433,213.07. Our Landscaping Division installed trees and shrubbery. Except for a culvert crossing under John Street and repairing the crosswalk markings, this 500 LF project is complete and is currently open to traffic. This is a Town-funded project.

McKee Road Segment B, Campus Ridge Road Relocation (U-4713B)- Matthews project extended McKee Road 1,500 feet from John Street to existing Campus Ridge Road. Contract was awarded to Blythe Development at the June 8, 2015 Board Meeting. The total construction cost was $1.7M, with the Town contributing $361,456 toward construction and construction oversight. Project was completed in September 2016.

Talbot Court Extension- Development Project. This extension is being constructed as part of the Plantation Village project. Its completion was tied to the first building C/O for Plantation Village. Construction of the road started in March and is open for traffic. This is a privately funded roadway and has been turned over to the Town for maintenance.

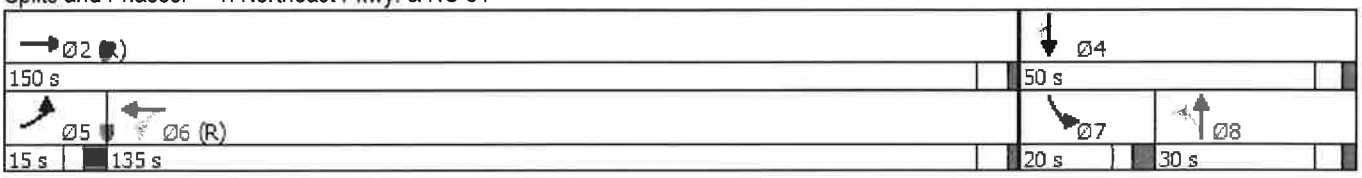
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	298	9	11	1091	132	31	11	7	71	9	73
Future Volume (vph)	83	298	9	11	1091	132	31	11	7	71	9	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	150		0	240		0	100		0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	150			190			90			100		
Satd. Flow (prot)	3433	3525	0	1770	3483	0	1770	1751	0	1770	1863	1583
Flt Permitted	0.950			0.547			0.751			0.950		
Satd. Flow (perm)	3433	3525	0	1019	3483	0	1399	1751	0	1770	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			13			8				81
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1946			1736			1610			1756	
Travel Time (s)		29.5			26.3			31.4			34.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	92	341	0	12	1359	0	34	20	0	79	10	81
Turn Type	Prot	NA		Perm	NA		Perm	NA		Prot	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases				6			8					4
Detector Phase	5	2		6	6		8	8		7	4	4
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.4	18.5		35.5	35.5		13.5	13.5		13.3	13.5	13.5
Total Split (s)	15.0	150.0		135.0	135.0		30.0	30.0		20.0	50.0	50.0
Total Split (%)	7.5%	75.0%		67.5%	67.5%		15.0%	15.0%		10.0%	25.0%	25.0%
Yellow Time (s)	3.0	4.7		4.7	4.7		4.0	4.0		3.0	4.0	4.0
All-Red Time (s)	3.4	1.8		1.8	1.8		2.5	2.5		3.3	2.5	2.5
Lost Time Adjust (s)	-1.4	-1.5		-1.5	-1.5		-1.5	-1.5		-1.3	-1.5	-1.5
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	None	C-Min		C-Min	C-Min		None	None		None	None	None
Act Effct Green (s)	12.1	160.2		143.1	143.1		12.0	12.0		15.5	29.8	29.8
Actuated g/C Ratio	0.06	0.80		0.72	0.72		0.06	0.06		0.08	0.15	0.15
v/c Ratio	0.44	0.12		0.02	0.54		0.40	0.18		0.58	0.04	0.27
Control Delay	97.0	5.2		11.5	15.7		103.8	63.9		104.7	66.6	13.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	97.0	5.2		11.5	15.7		103.8	63.9		104.7	66.6	13.3
LOS	F	A		B	B		F	E		F	E	B
Approach Delay		24.7			15.6			89.0			58.9	
Approach LOS		C			B			F			E	
Queue Length 50th (ft)	61	49		5	429		44	15		103	11	0
Queue Length 95th (ft)	95	80		15	599		88	48		164	31	53
Internal Link Dist (ft)		1866			1656			1530			1676	
Turn Bay Length (ft)	200			150			240			100		
Base Capacity (vph)	210	2823		731	2503		174	225		148	419	418
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.44	0.12		0.02	0.54		0.20	0.09		0.53	0.02	0.19

Intersection Summary

Area Type: Other
Cycle Length: 200
Actuated Cycle Length: 200
Offset: 55 (28%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 23.2 — Intersection LOS: C
Intersection Capacity Utilization 58.5% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: Northeast Pkwy. & NC 51



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	428	77	45	445	267	78
Future Volume (vph)	428	77	45	445	267	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	135		0	50
Storage Lanes		0	1		1	1
Taper Length (ft)			0		25	
Satd. Flow (prot)	3458	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	3458	0	1770	1863	1770	1583
Link Speed (mph)	35			35	35	
Link Distance (ft)	936			1955	1452	
Travel Time (s)	18.2			38.1	28.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	562	0	50	494	297	87
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 44.9% ICU Level of Service A
Analysis Period (min) 15

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	428	77	45	445	267	78
Future Volume (Veh/h)	428	77	45	445	267	78
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	476	86	50	494	297	87
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	936					
pX, platoon unblocked						
vC, conflicting volume			562		1113	281
vC1, stage 1 conf vol					519	
vC2, stage 2 conf vol					594	
vCu, unblocked vol			562		1113	281
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			95		26	88
cM capacity (veh/h)			1005		401	716

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	317	245	50	494	384
Volume Left	0	0	50	0	297
Volume Right	0	86	0	0	87
cSH	1700	1700	1005	1700	482
Volume to Capacity	0.19	0.14	0.05	0.29	0.80
Queue Length 95th (ft)	0	0	4	0	184
Control Delay (s)	0.0	0.0	8.8	0.0	35.8
Lane LOS			A		E
Approach Delay (s)	0.0		0.8		35.8
Approach LOS					E

Intersection Summary			
Average Delay	9.5		
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	73	129	169	280	320	244	2283	239	119	1690	63
Future Volume (vph)	37	73	129	169	280	320	244	2283	239	119	1690	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		450	260		315	400		0	450		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	100			0			250			190		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	5060	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	5060	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			143			252			124		4	
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		1652			936			1950			1993	
Travel Time (s)		32.2			18.2			29.5			30.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	81	143	188	311	356	271	2537	266	132	1948	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4			8			2			
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	12.0	7.0	7.0	12.0	
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	19.0	14.0	14.0	19.0	
Total Split (s)	35.0	40.0	40.0	18.0	23.0	23.0	29.0	125.0	18.0	37.0	133.0	
Total Split (%)	15.9%	18.2%	18.2%	8.2%	10.5%	10.5%	13.2%	56.8%	8.2%	16.8%	60.5%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	
Act Effct Green (s)	12.6	35.0	35.0	13.0	38.2	38.2	24.0	128.3	146.3	23.7	128.0	
Actuated g/C Ratio	0.06	0.16	0.16	0.06	0.17	0.17	0.11	0.58	0.66	0.11	0.58	
v/c Ratio	0.41	0.27	0.38	1.81	0.96	0.74	1.40	1.23	0.24	0.69	0.66	
Control Delay	111.0	84.2	12.8	445.3	126.5	35.3	271.7	147.0	8.4	112.8	32.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	111.0	84.2	12.8	445.3	126.5	35.3	271.7	147.0	8.4	112.8	32.6	
LOS	F	F	B	F	F	D	F	F	A	F	C	
Approach Delay		49.8			158.6			146.0			37.7	
Approach LOS		D			F			F			D	
Queue Length 50th (ft)	59	105	0	~407	~482	153	~524	~2376	74	189	691	
Queue Length 95th (ft)	109	170	76	#596	#756	304	#740	#2545	135	266	732	
Internal Link Dist (ft)		1572			856			1870			1913	
Turn Bay Length (ft)	125		450	260		315	400			450		
Base Capacity (vph)	241	296	372	104	323	482	193	2064	1094	257	2945	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.17	0.27	0.38	1.81	0.96	0.74	1.40	1.23	0.24	0.51	0.66	

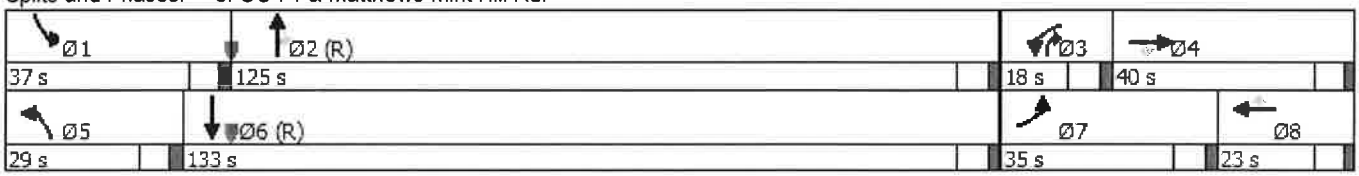
Intersection Summary

Area Type: Other
Cycle Length: 220
Actuated Cycle Length: 220
Offset: 159 (72%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.81
Intersection Signal Delay: 107.7 Intersection LOS: F
Intersection Capacity Utilization 106.9% ICU Level of Service G
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: 3: US 74 & Matthews-Mint Hill Rd.



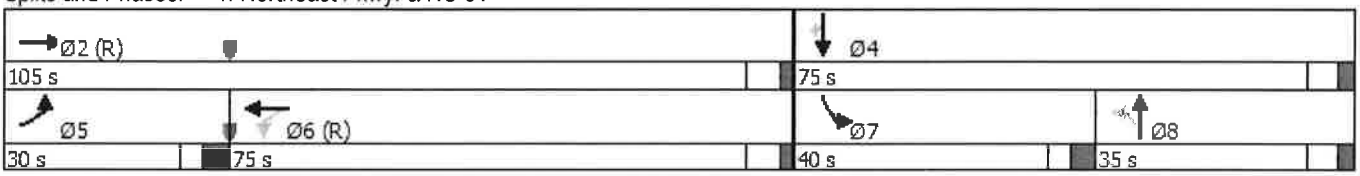
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	273	1082	36	28	637	177	54	28	51	280	60	158
Future Volume (vph)	273	1082	36	28	637	177	54	28	51	280	60	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	150		0	240		0	100		0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	150			190			90			100		
Satd. Flow (prot)	3433	3522	0	1770	3422	0	1770	1682	0	1770	1863	1583
Flt Permitted	0.950			0.207			0.713			0.950		
Satd. Flow (perm)	3433	3522	0	386	3422	0	1328	1682	0	1770	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			23			44				176
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1946			1736			1610			1756	
Travel Time (s)		29.5			26.3			31.4			34.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	303	1242	0	31	905	0	60	88	0	311	67	176
Turn Type	Prot	NA		Perm	NA		Perm	NA		Prot	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases				6			8					4
Detector Phase	5	2		6	6		8	8		7	4	4
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.4	18.5		35.5	35.5		13.5	13.5		13.3	13.5	13.5
Total Split (s)	30.0	105.0		75.0	75.0		35.0	35.0		40.0	75.0	75.0
Total Split (%)	16.7%	58.3%		41.7%	41.7%		19.4%	19.4%		22.2%	41.7%	41.7%
Yellow Time (s)	3.0	4.7		4.7	4.7		4.0	4.0		3.0	4.0	4.0
All-Red Time (s)	3.4	1.8		1.8	1.8		2.5	2.5		3.3	2.5	2.5
Lost Time Adjust (s)	-1.4	-1.5		-1.5	-1.5		-1.5	-1.5		-1.3	-1.5	-1.5
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	None	C-Min		C-Min	C-Min		None	None		None	None	None
Act Effct Green (s)	22.5	111.5		84.0	84.0		15.0	15.0		38.5	58.5	58.5
Actuated g/C Ratio	0.12	0.62		0.47	0.47		0.08	0.08		0.21	0.32	0.32
v/c Ratio	0.71	0.57		0.17	0.56		0.55	0.49		0.82	0.11	0.28
Control Delay	84.6	22.5		36.8	37.4		96.1	49.0		85.3	40.5	5.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	84.6	22.5		36.8	37.4		96.1	49.0		85.3	40.5	5.6
LOS	F	C		D	D		F	D		F	D	A
Approach Delay		34.7			37.4			68.1			54.5	
Approach LOS		C			D			E			D	
Queue Length 50th (ft)	180	449		22	401		69	50		350	55	0
Queue Length 95th (ft)	229	578		57	539		121	111		467	89	55
Internal Link Dist (ft)		1866			1656			1530			1676	
Turn Bay Length (ft)	200			150			240			100		
Base Capacity (vph)	486	2182		180	1612		221	317		387	724	723
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.62	0.57		0.17	0.56		0.27	0.28		0.80	0.09	0.24

Intersection Summary

Area Type: Other
Cycle Length: 180
Actuated Cycle Length: 180
Offset: 82 (46%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 40.5 — Intersection LOS: D
Intersection Capacity Utilization 75.7% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: Northeast Pkwy. & NC 51



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	327	155	113	364	120	25
Future Volume (vph)	327	155	113	364	120	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	135		0	50
Storage Lanes		0	1		1	1
Taper Length (ft)			0		25	
Satd. Flow (prot)	3369	0	1770	1863	1770	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	3369	0	1770	1863	1770	1583
Link Speed (mph)	35			35	35	
Link Distance (ft)	936			1955	1452	
Travel Time (s)	18.2			38.1	28.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	535	0	126	404	133	28
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 36.9% ICU Level of Service A
Analysis Period (min) 15

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	327	155	113	364	120	25
Future Volume (Veh/h)	327	155	113	364	120	25
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	363	172	126	404	133	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	936					
pX, platoon unblocked						
vC, conflicting volume			535		1105	268
vC1, stage 1 conf vol					449	
vC2, stage 2 conf vol					656	
vCu, unblocked vol			535		1105	268
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			88		64	96
cM capacity (veh/h)			1029		371	731

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	242	293	126	404	161
Volume Left	0	0	126	0	133
Volume Right	0	172	0	0	28
cSH	1700	1700	1029	1700	449
Volume to Capacity	0.14	0.17	0.12	0.24	0.36
Queue Length 95th (ft)	0	0	10	0	40
Control Delay (s)	0.0	0.0	9.0	0.0	18.3
Lane LOS			A		C
Approach Delay (s)	0.0		2.1		18.3
Approach LOS					C

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	199	396	181	157	136	171	1913	186	125	2692	52
Future Volume (vph)	114	199	396	181	157	136	171	1913	186	125	2692	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		450	260		315	400		0	450		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	100			0			250			190		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	5070	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	5070	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			134			151			98		2	
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		1652			936			1950			1993	
Travel Time (s)		32.2			18.2			29.5			30.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	127	221	440	201	174	151	190	2126	207	139	3049	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4			8			2			
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	12.0	7.0	7.0	12.0	
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	19.0	14.0	14.0	19.0	
Total Split (s)	30.0	40.0	40.0	25.0	35.0	35.0	25.0	125.0	25.0	30.0	130.0	
Total Split (%)	13.6%	18.2%	18.2%	11.4%	15.9%	15.9%	11.4%	56.8%	11.4%	13.6%	59.1%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	
Act Effct Green (s)	21.8	35.0	35.0	20.0	33.2	33.2	20.0	122.4	147.4	22.6	125.0	
Actuated g/C Ratio	0.10	0.16	0.16	0.09	0.15	0.15	0.09	0.56	0.67	0.10	0.57	
v/c Ratio	0.73	0.75	1.21	1.26	0.62	0.41	1.19	1.08	0.19	0.77	1.06	
Control Delay	118.9	104.6	164.9	227.9	99.0	13.5	207.6	90.9	7.6	122.1	80.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	118.9	104.6	164.9	227.9	99.0	13.5	207.6	90.9	7.6	122.1	80.0	
LOS	F	F	F	F	F	B	F	F	A	F	E	
Approach Delay		140.6			123.7			92.9			81.8	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	182	312	~603	~362	243	0	~329	~1826	56	199	~1768	
Queue Length 95th (ft)	266	424	#852	#557	345	80	#521	#1934	97	288	#1796	
Internal Link Dist (ft)		1572			856			1870			1913	
Turn Bay Length (ft)	125		450	260		315	400			450		
Base Capacity (vph)	201	296	364	160	281	367	160	1969	1093	201	2881	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.63	0.75	1.21	1.26	0.62	0.41	1.19	1.08	0.19	0.69	1.06	

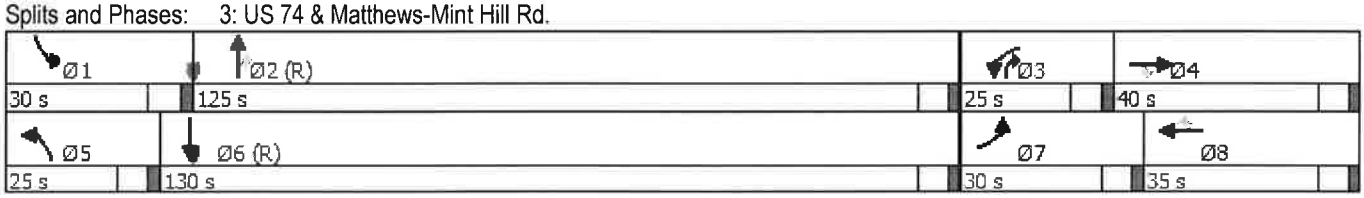
Intersection Summary

Area Type: Other
Cycle Length: 220
Actuated Cycle Length: 220
Offset: 160 (73%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.26
Intersection Signal Delay: 95.5 Intersection LOS: F
Intersection Capacity Utilization 100.2% ICU Level of Service G
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: 3: US 74 & Matthews-Mint Hill Rd.



Intersection: 1: Northeast Pkwy. & NC 51

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	L	T	TR	L	T	TR	L	TR	L	T	R
Maximum Queue (ft)	115	128	107	61	45	319	310	116	53	166	96	166
Average Queue (ft)	21	54	30	19	12	182	177	42	18	58	21	62
95th Queue (ft)	66	107	72	51	35	295	304	91	49	126	65	136
Link Distance (ft)			1900	1900		1690	1690		1558		1704	1704
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200	200			150			240		100		
Storage Blk Time (%)						12				4	1	
Queuing Penalty (veh)						2				1	1	

Intersection: 2: Moore Rd. & Matthews-Mint Hill Rd.

Movement	WB	WB	NB	NB
Directions Served	L	T	L	R
Maximum Queue (ft)	134	240	1445	75
Average Queue (ft)	19	61	1198	57
95th Queue (ft)	63	191	1663	110
Link Distance (ft)		1922	1406	
Upstream Blk Time (%)			41	
Queuing Penalty (veh)			0	
Storage Bay Dist (ft)	135			50
Storage Blk Time (%)	0	5	96	2
Queuing Penalty (veh)	0	2	78	5

Intersection: 3: US 74 & Matthews-Mint Hill Rd.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	115	222	204	260	861	475	650	1956	1967	1956	449	462
Average Queue (ft)	47	119	105	238	769	423	460	1927	1925	1923	210	328
95th Queue (ft)	101	186	183	303	960	588	828	1947	1945	1943	403	441
Link Distance (ft)		1594			845			1904	1904	1904		1947
Upstream Blk Time (%)					12			74	76	55		
Queuing Penalty (veh)					89			0	0	0		
Storage Bay Dist (ft)	125		450	260		315	400				450	
Storage Blk Time (%)	0	20		23	45	35	0	36			2	0
Queuing Penalty (veh)	0	34		141	229	163	3	92			14	0

Intersection: 3: US 74 & Matthews-Mint Hill Rd.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	429	405
Average Queue (ft)	312	282
95th Queue (ft)	425	402
Link Distance (ft)	1947	1947
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 853

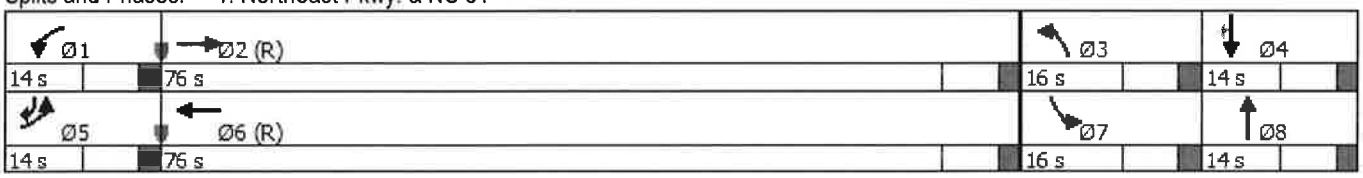
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	313	11	14	1138	137	42	13	9	74	12	78
Future Volume (vph)	88	313	11	14	1138	137	42	13	9	74	12	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	11	11	12	12	12
Storage Length (ft)	200		0	150		0	240		0	100		0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	150			190			90			100		
Satd. Flow (prot)	3433	3522	0	1770	3483	0	1711	1687	0	1770	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3522	0	1770	3483	0	1711	1687	0	1770	1863	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1946			1736			1610			1756	
Travel Time (s)		29.5			26.3			31.4			34.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	360	0	16	1416	0	47	24	0	82	13	87
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases												4
Detector Phase	5	2		1	6		3	8		7	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	14.0	19.0		14.0	19.0		14.0	14.0		14.0	14.0	14.0
Total Split (s)	14.0	76.0		14.0	76.0		16.0	14.0		16.0	14.0	14.0
Total Split (%)	11.7%	63.3%		11.7%	63.3%		13.3%	11.7%		13.3%	11.7%	11.7%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	None
Act Effct Green (s)	11.1	87.7		9.1	76.2		14.1	9.2		11.8	9.7	17.5
Actuated g/C Ratio	0.09	0.73		0.08	0.64		0.12	0.08		0.10	0.08	0.15
v/c Ratio	0.31	0.14		0.12	0.64		0.23	0.19		0.47	0.09	0.38
Control Delay	53.8	8.1		54.1	17.7		51.2	55.5		60.3	52.2	49.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	53.8	8.1		54.1	17.7		51.2	55.5		60.3	52.2	49.0
LOS	D	A		D	B		D	E		E	D	D
Approach Delay		17.9			18.1			52.6			54.3	
Approach LOS		B			B			D			D	
Queue Length 50th (ft)	36	45		12	434		29	18		60	10	64
Queue Length 95th (ft)	66	87		35	458		74	46		115	31	108
Internal Link Dist (ft)		1866			1656			1530			1676	
Turn Bay Length (ft)	200			150			240			100		
Base Capacity (vph)	318	2605		133	2297		206	129		180	151	230

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.31	0.14		0.12	0.62		0.23	0.19		0.46	0.09	0.38

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 22.3 — Intersection LOS: C
Intersection Capacity Utilization 60.0% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: Northeast Pkwy. & NC 51



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	445	80	47	463	278	81
Future Volume (vph)	445	80	47	463	278	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	12
Storage Length (ft)		0	135		0	50
Storage Lanes		0	1		1	1
Taper Length (ft)			0		25	
Satd. Flow (prot)	3458	0	1770	1863	1652	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	3458	0	1770	1863	1652	1583
Link Speed (mph)	35			35	35	
Link Distance (ft)	936			1955	1452	
Travel Time (s)	18.2			38.1	28.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	583	0	52	514	309	90
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 46.4% ICU Level of Service A
Analysis Period (min) 15

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	445	80	47	463	278	81
Future Volume (Veh/h)	445	80	47	463	278	81
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	494	89	52	514	309	90
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	936					
pX, platoon unblocked						
vC, conflicting volume			583		1156	292
vC1, stage 1 conf vol					538	
vC2, stage 2 conf vol					618	
vCu, unblocked vol			583		1156	292
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			95		20	87
cM capacity (veh/h)			987		388	705

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	329	254	52	514	399
Volume Left	0	0	52	0	309
Volume Right	0	89	0	0	90
cSH	1700	1700	987	1700	459
Volume to Capacity	0.19	0.15	0.05	0.30	0.87
Queue Length 95th (ft)	0	0	4	0	226
Control Delay (s)	0.0	0.0	8.8	0.0	46.1
Lane LOS			A		E
Approach Delay (s)	0.0		0.8		46.1
Approach LOS					E

Intersection Summary			
Average Delay	12.2		
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	76	134	176	291	333	254	2386	249	124	1765	66
Future Volume (vph)	38	76	134	176	291	333	254	2386	249	124	1765	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		450	260		315	400		0	450		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	100			0			250			190		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	5060	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	5060	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		1652			936			1950			1993	
Travel Time (s)		32.2			18.2			29.5			30.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	84	149	196	323	370	282	2651	277	138	2034	0
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	12.0	7.0	7.0	12.0	
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	19.0	14.0	14.0	19.0	
Total Split (s)	14.0	14.0	40.0	31.0	31.0	18.0	40.0	117.0	31.0	18.0	95.0	
Total Split (%)	7.8%	7.8%	22.2%	17.2%	17.2%	10.0%	22.2%	65.0%	17.2%	10.0%	52.8%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	
Act Effct Green (s)	9.0	9.3	47.1	24.2	27.5	45.5	32.7	112.0	141.3	13.0	92.3	
Actuated g/C Ratio	0.05	0.05	0.26	0.14	0.15	0.25	0.18	0.63	0.79	0.07	0.52	
v/c Ratio	0.47	0.87	0.36	0.82	1.13	0.92	0.87	1.19	0.22	1.08	0.78	
Control Delay	100.8	141.1	56.1	100.5	155.8	93.0	96.3	123.7	5.2	174.7	38.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	100.8	141.1	56.1	100.5	155.8	93.0	96.3	123.7	5.2	174.7	38.2	
LOS	F	F	E	F	F	F	F	F	A	F	D	
Approach Delay		88.9			117.5			111.1			46.8	
Approach LOS		F			F			F			D	
Queue Length 50th (ft)	49	101	143	227	~461	436	324	~1994	72	~181	726	
Queue Length 95th (ft)	97	#219	216	#345	#674	#654	#472	#2092	100	#338	785	
Internal Link Dist (ft)		1572			856			1870			1913	
Turn Bay Length (ft)	125		450	260		315	400			450		
Base Capacity (vph)	89	97	437	257	286	402	347	2219	1267	128	2614	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.47	0.87	0.34	0.76	1.13	0.92	0.81	1.19	0.22	1.08	0.78	

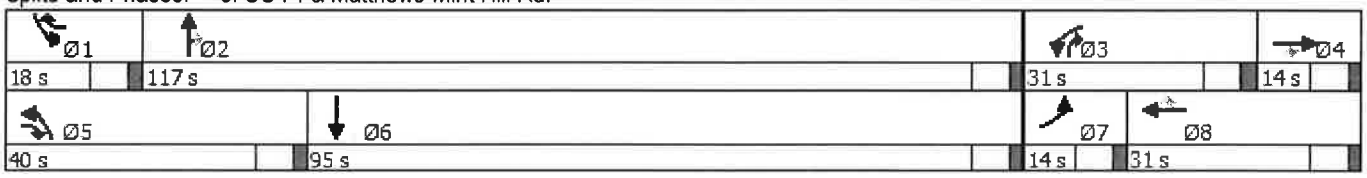
Intersection Summary

Area Type: Other
Cycle Length: 180
Actuated Cycle Length: 178.6
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.19
Intersection Signal Delay: 89.7 — Intersection LOS: F
Intersection Capacity Utilization 110.6% — ICU Level of Service H
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: 3: US 74 & Matthews-Mint Hill Rd.



Intersection: 1: Northeast Pkwy. & NC 51

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	L	T	TR	L	T	TR	L	TR	L	T	R
Maximum Queue (ft)	274	350	420	431	129	349	371	202	205	200	412	266
Average Queue (ft)	119	170	265	275	37	228	225	117	112	164	178	104
95th Queue (ft)	203	322	388	404	80	323	314	177	181	237	353	195
Link Distance (ft)			1900	1900		1690	1690		1558		1704	1704
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200	200			150			240		100		
Storage Blk Time (%)	1	2	20			24				47	5	
Queuing Penalty (veh)	6	9	59			12				34	15	

Intersection: 2: Moore Rd. & Matthews-Mint Hill Rd.

Movement	EB	WB	WB	NB	NB
Directions Served	TR	L	T	L	R
Maximum Queue (ft)	51	134	766	651	75
Average Queue (ft)	5	53	139	238	26
95th Queue (ft)	25	138	510	604	75
Link Distance (ft)	845		1922	1406	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		135			50
Storage Blk Time (%)		0	16	58	1
Queuing Penalty (veh)		1	19	15	1

Intersection: 3: US 74 & Matthews-Mint Hill Rd.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	225	1646	590	260	859	475	650	922	918	201	640	1999
Average Queue (ft)	158	1594	583	257	715	317	419	670	671	58	462	1825
95th Queue (ft)	275	1733	621	263	996	642	743	948	938	141	876	2213
Link Distance (ft)		1594			845			1904	1904	1904		1947
Upstream Blk Time (%)		72			19							33
Queuing Penalty (veh)		0			95							0
Storage Bay Dist (ft)	125		450	260		315	400				450	
Storage Blk Time (%)	22	83	88	78	29		13	30				45
Queuing Penalty (veh)	138	439	288	237	94		128	53				58

Intersection: 3: US 74 & Matthews-Mint Hill Rd.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	1981	2010
Average Queue (ft)	1804	1747
95th Queue (ft)	2188	2189
Link Distance (ft)	1947	1947
Upstream Blk Time (%)	24	20
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1701

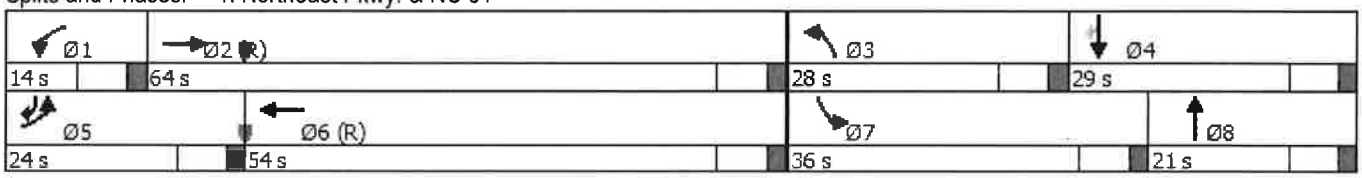
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	296	1143	45	49	665	184	147	41	77	291	74	169
Future Volume (vph)	296	1143	45	49	665	184	147	41	77	291	74	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	11	11	12	12	12
Storage Length (ft)	200		0	150		0	240		0	100		0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	150			190			90			100		
Satd. Flow (prot)	3433	3518	0	1770	3426	0	1711	1624	0	1770	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3518	0	1770	3426	0	1711	1624	0	1770	1863	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1946			1736			1610			1756	
Travel Time (s)		29.5			26.3			31.4			34.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	329	1320	0	54	943	0	163	132	0	323	82	188
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases												4
Detector Phase	5	2		1	6		3	8		7	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	14.0	19.0		14.0	19.0		14.0	14.0		14.0	14.0	14.0
Total Split (s)	24.0	64.0		14.0	54.0		28.0	21.0		36.0	29.0	24.0
Total Split (%)	17.8%	47.4%		10.4%	40.0%		20.7%	15.6%		26.7%	21.5%	17.8%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	None
Act Effct Green (s)	18.1	64.3		9.2	52.6		19.3	15.3		29.0	25.0	48.1
Actuated g/C Ratio	0.13	0.48		0.07	0.39		0.14	0.11		0.21	0.19	0.36
v/c Ratio	0.71	0.79		0.45	0.71		0.67	0.72		0.85	0.24	0.33
Control Delay	65.1	35.6		72.8	39.2		67.8	79.7		71.3	49.1	33.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	65.1	35.6		72.8	39.2		67.8	79.7		71.3	49.1	33.6
LOS	E	D		E	D		E	E		E	D	C
Approach Delay		41.5			41.0			73.1			56.3	
Approach LOS		D			D			E			E	
Queue Length 50th (ft)	143	540		46	380		136	113		269	61	116
Queue Length 95th (ft)	196	642		92	464		210	#202		#409	113	187
Internal Link Dist (ft)		1866			1656			1530			1676	
Turn Bay Length (ft)	200			150			240			100		
Base Capacity (vph)	483	1675		121	1333		291	192		406	349	573

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.68	0.79		0.45	0.71		0.56	0.69		0.80	0.23	0.33

Intersection Summary

Area Type: Other
Cycle Length: 135
Actuated Cycle Length: 135
Offset: 24 (18%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 46.5 Intersection LOS: D
Intersection Capacity Utilization 74.1% 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: Northeast Pkwy. & NC 51



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	340	161	118	379	125	26
Future Volume (vph)	340	161	118	379	125	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	12
Storage Length (ft)		0	135		0	50
Storage Lanes		0	1		1	1
Taper Length (ft)			0		25	
Satd. Flow (prot)	3369	0	1770	1863	1652	1583
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	3369	0	1770	1863	1652	1583
Link Speed (mph)	35			35	35	
Link Distance (ft)	936			1955	1452	
Travel Time (s)	18.2			38.1	28.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	557	0	131	421	139	29
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 38.0% ICU Level of Service A
Analysis Period (min) 15

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	340	161	118	379	125	26
Future Volume (Veh/h)	340	161	118	379	125	26
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	378	179	131	421	139	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (ft)	936					
pX, platoon unblocked						
vC, conflicting volume			557		1150	278
vC1, stage 1 conf vol					468	
vC2, stage 2 conf vol					683	
vCu, unblocked vol			557		1150	278
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			87		61	96
cM capacity (veh/h)			1010		356	719

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	252	305	131	421	168
Volume Left	0	0	131	0	139
Volume Right	0	179	0	0	29
cSH	1700	1700	1010	1700	430
Volume to Capacity	0.15	0.18	0.13	0.25	0.39
Queue Length 95th (ft)	0	0	11	0	46
Control Delay (s)	0.0	0.0	9.1	0.0	19.5
Lane LOS			A		C
Approach Delay (s)	0.0		2.2		19.5
Approach LOS					C

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	38.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	207	412	188	163	141	178	2016	194	130	2841	54
Future Volume (vph)	119	207	412	188	163	141	178	2016	194	130	2841	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		450	260		315	400		0	450		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	100			0			250			190		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	5070	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	5070	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		1652			936			1950			1993	
Travel Time (s)		32.2			18.2			29.5			30.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	230	458	209	181	157	198	2240	216	144	3217	0
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	12.0	7.0	7.0	12.0	
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	19.0	14.0	14.0	19.0	
Total Split (s)	22.0	23.0	25.0	25.0	26.0	21.0	25.0	106.0	25.0	21.0	102.0	
Total Split (%)	12.6%	13.1%	14.3%	14.3%	14.9%	12.0%	14.3%	60.6%	14.3%	12.0%	58.3%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	
Act Effct Green (s)	16.5	18.0	43.0	20.0	21.5	42.5	20.0	101.0	126.0	16.0	97.0	
Actuated g/C Ratio	0.09	0.10	0.25	0.11	0.12	0.24	0.11	0.58	0.72	0.09	0.55	
v/c Ratio	0.80	1.20	1.18	1.03	0.79	0.41	0.98	1.10	0.19	0.89	1.14	
Control Delay	108.3	192.6	159.3	144.7	98.3	59.8	133.1	87.4	8.4	124.2	106.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	108.3	192.6	159.3	144.7	98.3	59.8	133.1	87.4	8.4	124.2	106.3	
LOS	F	F	F	F	F	E	F	F	A	F	F	
Approach Delay		160.4			105.0			84.4			107.0	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	151	~319	~626	~256	206	154	231	~1523	75	167	~1576	
Queue Length 95th (ft)	#261	#506	#859	#437	#336	231	#408	#1641	107	#309	#1628	
Internal Link Dist (ft)		1572			856			1870			1913	
Turn Bay Length (ft)	125		450	260		315	400			450		
Base Capacity (vph)	171	191	388	202	228	384	202	2042	1139	161	2810	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.77	1.20	1.18	1.03	0.79	0.41	0.98	1.10	0.19	0.89	1.14	

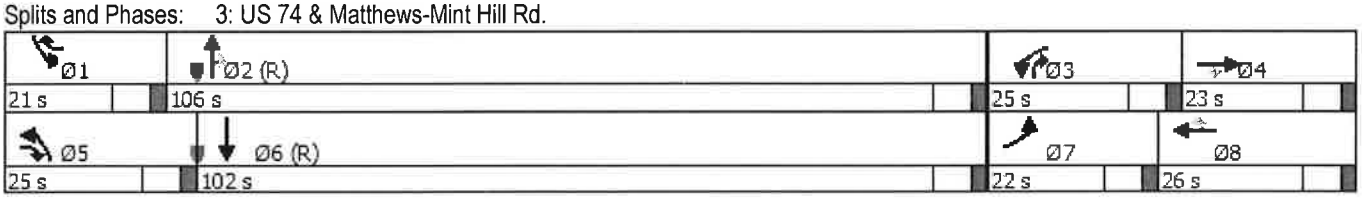
Intersection Summary

Area Type: Other
Cycle Length: 175
Actuated Cycle Length: 175
Offset: 25 (14%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.20
Intersection Signal Delay: 104.7 Intersection LOS: F
Intersection Capacity Utilization 104.5% ICU Level of Service G
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: 3: US 74 & Matthews-Mint Hill Rd.



Intersection: 1: Northeast Pkwy. & NC 51

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	L	T	TR	L	T	TR	L	TR	L	T	R
Maximum Queue (ft)	49	87	132	81	26	292	310	184	74	147	94	159
Average Queue (ft)	24	40	33	19	8	188	188	63	26	57	26	70
95th Queue (ft)	46	79	85	55	27	289	302	141	63	119	69	128
Link Distance (ft)			1900	1900		1690	1690		1530		1704	1704
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200	200			150			240		100		
Storage Blk Time (%)						12				4	1	
Queuing Penalty (veh)						2				1	1	

Intersection: 2: Moore Rd./NE Pkwy. Ext. & Matthews-Mint Hill Rd.

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	T	R
Maximum Queue (ft)	45	13	134	623	1440	75	31	29	776
Average Queue (ft)	12	0	35	185	1290	36	6	2	256
95th Queue (ft)	34	4	114	431	1711	96	25	14	667
Link Distance (ft)		834		1921	1406				1746
Upstream Blk Time (%)					72				
Queuing Penalty (veh)					0				
Storage Bay Dist (ft)	150		135			50	100	100	
Storage Blk Time (%)			0	18	99	1			54
Queuing Penalty (veh)			0	9	95	2			8

Intersection: 3: US 74 & Matthews-Mint Hill Rd.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	118	182	238	260	853	475	650	1956	1956	1943	328	498
Average Queue (ft)	59	88	104	214	832	472	486	1809	1811	1740	253	324
95th Queue (ft)	102	155	191	320	872	482	827	2352	2347	2533	324	493
Link Distance (ft)		1594			834			1904	1904	1904		1947
Upstream Blk Time (%)					29			64	64	48		
Queuing Penalty (veh)					245			0	0	0		
Storage Bay Dist (ft)	125		450	260		315	400				450	
Storage Blk Time (%)	0	5		23	34	62	0	37				1
Queuing Penalty (veh)	0	9		156	211	324	1	93				2

Intersection: 3: US 74 & Matthews-Mint Hill Rd.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	478	501
Average Queue (ft)	319	274
95th Queue (ft)	466	445
Link Distance (ft)	1947	1947
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1159

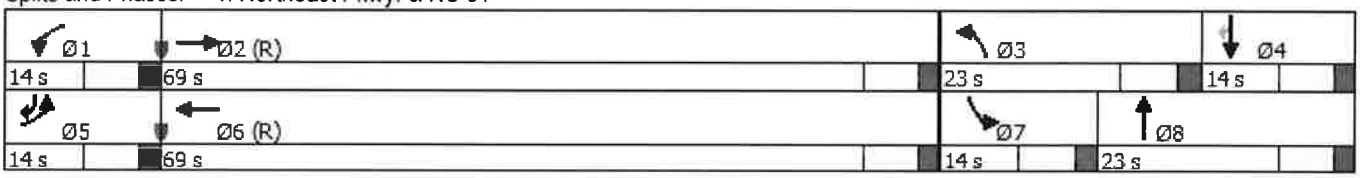
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	313	15	14	1138	137	70	24	9	70	20	76
Future Volume (vph)	88	313	15	14	1138	137	70	24	9	70	20	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	11	11	12	12	12
Storage Length (ft)	200		0	150		0	240		0	100		0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	150			190			90			100		
Satd. Flow (prot)	3433	3514	0	1770	3483	0	1711	1727	0	1770	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3514	0	1770	3483	0	1711	1727	0	1770	1863	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1946			1736			1610			1756	
Travel Time (s)		29.5			26.3			31.4			34.2	
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
Mid-Block Traffic (%)		0%			0%			45%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	365	0	16	1416	0	78	37	0	78	22	84
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases												4
Detector Phase	5	2		1	6		3	8		7	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	14.0	19.0		14.0	19.0		14.0	14.0		14.0	14.0	14.0
Total Split (s)	14.0	69.0		14.0	69.0		23.0	23.0		14.0	14.0	14.0
Total Split (%)	11.7%	57.5%		11.7%	57.5%		19.2%	19.2%		11.7%	11.7%	11.7%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	None
Act Effct Green (s)	10.5	86.4		9.1	75.6		12.9	11.9		10.5	9.5	19.4
Actuated g/C Ratio	0.09	0.72		0.08	0.63		0.11	0.10		0.09	0.08	0.16
v/c Ratio	0.33	0.14		0.12	0.65		0.43	0.22		0.51	0.15	0.33
Control Delay	54.8	9.0		54.1	18.6		56.5	51.1		64.5	53.9	45.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	54.8	9.0		54.1	18.6		56.5	51.1		64.5	53.9	45.9
LOS	D	A		D	B		E	D		E	D	D
Approach Delay		18.7			19.0			54.8			54.7	
Approach LOS		B			B			D			D	
Queue Length 50th (ft)	37	47		12	414		57	27		57	16	54
Queue Length 95th (ft)	66	102		35	528		104	58		#122	43	104
Internal Link Dist (ft)		1866			1656			1530			1676	
Turn Bay Length (ft)	200			150			240			100		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	299	2529		133	2193		256	259		154	147	255
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.33	0.14		0.12	0.65		0.30	0.14		0.51	0.15	0.33

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 23.8 Intersection LOS: C
Intersection Capacity Utilization 60.0% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Northeast Pkwy. & NC 51



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	445	80	47	463	5	264	18	77	11	4	116
Future Volume (vph)	27	445	80	47	463	5	264	18	77	11	4	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	10	10	12	11	11	11
Storage Length (ft)	150		0	135		0	0		50	100		0
Storage Lanes	1		0	1		0	1		1	2		1
Taper Length (ft)	25			0			25			100		
Satd. Flow (prot)	1770	3458	0	1770	1859	0	1652	1526	0	1711	1801	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3458	0	1770	1859	0	1652	1526	0	1711	1801	1531
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		936			1955			1452			1808	
Travel Time (s)		18.2			38.1			28.3			35.2	
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
Mid-Block Traffic (%)		0%			0%			0%			60%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	583	0	52	520	0	293	106	0	12	4	129
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 59.3% ICU Level of Service B
Analysis Period (min) 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	445	80	47	463	5	264	18	77	11	4	116
Future Volume (Veh/h)	27	445	80	47	463	5	264	18	77	11	4	116
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	30	494	89	52	514	6	293	20	86	12	4	129
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)		936										
pX, platoon unblocked												
vC, conflicting volume	520			583			1348	1222	292	1024	1264	517
vC1, stage 1 conf vol							598	598		621	621	
vC2, stage 2 conf vol							749	624		403	643	
vCu, unblocked vol	520			583			1348	1222	292	1024	1264	517
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			95			0	94	88	96	99	74
cM capacity (veh/h)	1042			987			207	343	705	326	326	503

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	30	329	254	52	520	293	106	12	4	129
Volume Left	30	0	0	52	0	293	0	12	0	0
Volume Right	0	0	89	0	6	0	86	0	0	129
cSH	1042	1700	1700	987	1700	207	588	326	326	503
Volume to Capacity	0.03	0.19	0.15	0.05	0.31	1.42	0.18	0.04	0.01	0.26
Queue Length 95th (ft)	2	0	0	4	0	430	16	3	1	25
Control Delay (s)	8.6	0.0	0.0	8.8	0.0	257.6	12.5	16.5	16.2	14.6
Lane LOS	A			A		F	B	C	C	B
Approach Delay (s)	0.4			0.8		192.5		14.8		
Approach LOS						F		B		

Intersection Summary			
Average Delay	46.1		
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

MOVEMENT SUMMARY

Site: 2 [2019 AM Build Scenario "A"]

Matthews-Mint Hill Rd. & Moore Rd./NE Pkwy. Ext.
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Moore Rd.											
3	L2	293	2.0	0.435	3.5	LOS A	2.9	74.3	0.72	0.64	24.2
8	T1	20	2.0	0.435	3.5	LOS A	2.9	74.3	0.72	0.64	23.8
18	R2	86	2.0	0.435	3.5	LOS A	2.9	74.3	0.72	0.64	23.3
Approach		399	2.0	0.435	3.5	LOS A	2.9	74.3	0.72	0.64	23.9
East: Matthews-Mint Hill Rd.											
1	L2	52	0.0	0.554	2.7	LOS A	4.6	117.5	0.72	0.51	24.9
6	T1	514	2.0	0.554	2.8	LOS A	4.6	117.5	0.72	0.51	24.5
16	R2	6	2.0	0.554	2.8	LOS A	4.6	117.5	0.72	0.51	24.0
Approach		572	1.8	0.554	2.7	LOS A	4.6	117.5	0.72	0.51	24.5
North: Northeast Pkwy. Ex.											
7	L2	12	2.0	0.226	5.8	LOS A	1.5	38.1	0.83	0.75	24.2
4	T1	4	0.0	0.226	5.7	LOS A	1.5	38.1	0.83	0.75	23.9
14	R2	129	2.0	0.226	5.8	LOS A	1.5	38.1	0.83	0.75	23.3
Approach		146	1.9	0.226	5.8	LOS A	1.5	38.1	0.83	0.75	23.4
West: Matthews-Mint Hill Rd.											
5	L2	30	2.0	0.466	0.5	LOS A	3.7	94.8	0.32	0.11	25.6
2	T1	494	2.0	0.466	0.5	LOS A	3.7	94.8	0.32	0.11	25.2
12	R2	89	0.0	0.466	0.5	LOS A	3.7	94.8	0.32	0.11	24.6
Approach		613	1.7	0.466	0.5	LOS A	3.7	94.8	0.32	0.11	25.1
All Vehicles		1730	1.8	0.554	2.4	LOS A	4.6	117.5	0.59	0.42	24.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option is selected.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

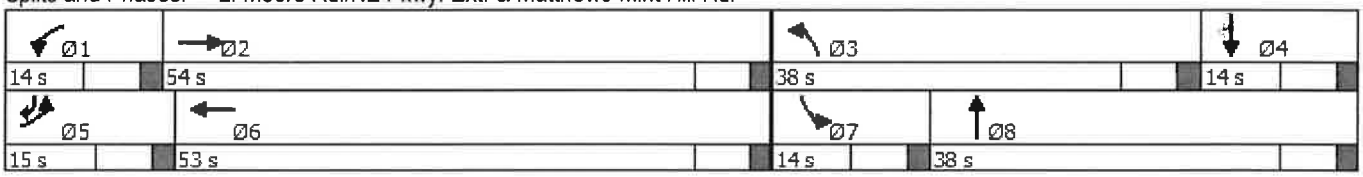
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	445	80	47	463	5	264	18	77	11	4	116
Future Volume (vph)	27	445	80	47	463	5	264	18	77	11	4	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	10	10	12	11	11	11
Storage Length (ft)	150		0	135		0	0		50	100		0
Storage Lanes	1		0	1		0	1		1	2		1
Taper Length (ft)	25			0			25			100		
Satd. Flow (prot)	1770	3458	0	1770	1859	0	1652	1526	0	1711	1801	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3458	0	1770	1859	0	1652	1526	0	1711	1801	1531
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		936			1955			1452			1808	
Travel Time (s)		18.2			38.1			28.3			35.2	
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
Mid-Block Traffic (%)		0%			0%			0%			60%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	583	0	52	520	0	293	106	0	12	4	129
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases												4
Detector Phase	5	2		1	6		3	8		7	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	14.0	17.0		14.0	17.0		14.0	17.0		14.0	14.0	14.0
Total Split (s)	15.0	54.0		14.0	53.0		38.0	38.0		14.0	14.0	15.0
Total Split (%)	12.5%	45.0%		11.7%	44.2%		31.7%	31.7%		11.7%	11.7%	12.5%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	10.5	39.4		9.6	31.0		22.5	22.5		9.6	9.6	12.4
Actuated g/C Ratio	0.13	0.48		0.12	0.38		0.27	0.27		0.12	0.12	0.15
v/c Ratio	0.13	0.35		0.25	0.74		0.65	0.25		0.06	0.02	0.56
Control Delay	42.3	17.2		44.7	30.2		36.1	28.3		43.8	44.0	46.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	42.3	17.2		44.7	30.2		36.1	28.3		43.8	44.0	46.3
LOS	D	B		D	C		D	C		D	D	D
Approach Delay		18.4			31.6			34.0			46.1	
Approach LOS		B			C			C			D	
Queue Length 50th (ft)	13	102		23	205		122	39		5	2	60
Queue Length 95th (ft)	53	216		81	461		299	114		29	15	150
Internal Link Dist (ft)		856			1875			1372			1728	
Turn Bay Length (ft)	150			135						100		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	230	2205		207	1161		709	655		200	211	234
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.13	0.26		0.25	0.45		0.41	0.16		0.06	0.02	0.55

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 81.9
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 28.7 Intersection LOS: C
Intersection Capacity Utilization 64.3% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: Moore Rd./NE Pkwy. Ext. & Matthews-Mint Hill Rd.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	74	134	232	295	382	254	2386	263	136	1765	66
Future Volume (vph)	38	74	134	232	295	382	254	2386	263	136	1765	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		450	260		315	400		0	450		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	100			0			250			190		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	5060	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	5060	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		1652			936			1950			1993	
Travel Time (s)		32.2			18.2			29.5			30.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	82	149	258	328	424	282	2651	292	151	2034	0
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	12.0	7.0	7.0	12.0	
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	19.0	14.0	14.0	19.0	
Total Split (s)	14.0	14.0	40.0	31.0	31.0	18.0	40.0	117.0	31.0	18.0	95.0	
Total Split (%)	7.8%	7.8%	22.2%	17.2%	17.2%	10.0%	22.2%	65.0%	17.2%	10.0%	52.8%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	
Act Effct Green (s)	9.0	9.0	46.9	26.0	28.8	46.8	32.9	112.0	143.0	13.0	92.1	
Actuated g/C Ratio	0.05	0.05	0.26	0.14	0.16	0.26	0.18	0.62	0.79	0.07	0.51	
v/c Ratio	0.48	0.88	0.36	1.01	1.10	1.03	0.87	1.20	0.23	1.19	0.79	
Control Delay	101.3	146.7	56.6	132.8	146.7	115.3	96.9	128.2	5.2	204.9	39.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	101.3	146.7	56.6	132.8	146.7	115.3	96.9	128.2	5.2	204.9	39.0	
LOS	F	F	E	F	F	F	F	F	A	F	D	
Approach Delay		90.6			130.0			114.4			50.5	
Approach LOS		F			F			F			D	
Queue Length 50th (ft)	49	98	143	~314	~473	~564	324	~1994	77	~213	726	
Queue Length 95th (ft)	97	#214	216	#514	#686	#794	#472	#2092	106	#374	785	
Internal Link Dist (ft)		1572			856			1870			1913	
Turn Bay Length (ft)	125		450	260		315	400			450		
Base Capacity (vph)	88	93	430	255	298	411	344	2202	1257	127	2588	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.48	0.88	0.35	1.01	1.10	1.03	0.82	1.20	0.23	1.19	0.79	

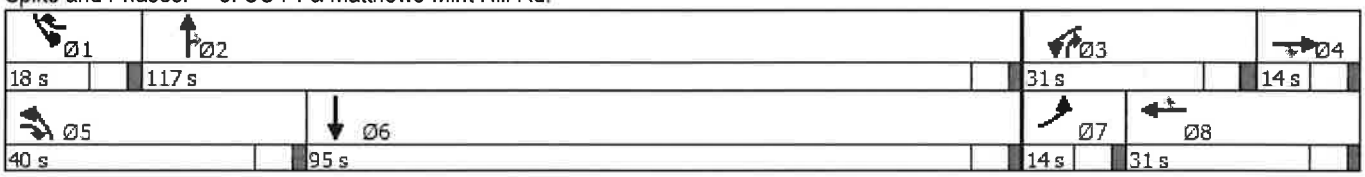
Intersection Summary

Area Type: Other
Cycle Length: 180
Actuated Cycle Length: 180
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.20
Intersection Signal Delay: 94.9 Intersection LOS: F
Intersection Capacity Utilization 111.5% ICU Level of Service H
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: 3: US 74 & Matthews-Mint Hill Rd.



Intersection: 1: Northeast Pkwy. & NC 51

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	L	T	TR	L	T	TR	L	TR	L	T	R
Maximum Queue (ft)	214	349	459	451	192	384	361	258	233	200	421	181
Average Queue (ft)	109	156	272	275	48	237	230	128	106	176	193	98
95th Queue (ft)	186	288	398	398	129	334	322	223	191	227	384	172
Link Distance (ft)			1900	1900		1690	1690		1530		1704	1704
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200	200			150			240		100		
Storage Blk Time (%)	0	1	19			27		1	0	47	11	
Queuing Penalty (veh)	1	5	58			13		2	0	45	30	

Intersection: 2: Moore Rd./NE Pkwy. Ext. & Matthews-Mint Hill Rd.

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	T	R
Maximum Queue (ft)	96	20	118	385	728	75	31	31	173
Average Queue (ft)	24	3	51	98	350	27	4	3	63
95th Queue (ft)	64	14	124	354	1038	79	21	16	160
Link Distance (ft)		834		1921	1406				1746
Upstream Blk Time (%)					4				
Queuing Penalty (veh)					0				
Storage Bay Dist (ft)	150		135			50	100	100	
Storage Blk Time (%)	0		0	10	61	0			11
Queuing Penalty (veh)	0		1	11	20	1			1

Intersection: 3: US 74 & Matthews-Mint Hill Rd.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	225	1646	590	260	809	475	650	1932	1884	1611	640	1840
Average Queue (ft)	153	1529	586	242	571	278	490	1339	1323	580	575	1348
95th Queue (ft)	278	1909	619	298	1048	588	820	1991	1966	1721	776	1993
Link Distance (ft)		1594			834			1904	1904	1904		1947
Upstream Blk Time (%)		69			17			10	9	4		4
Queuing Penalty (veh)		0			99			0	0	0		0
Storage Bay Dist (ft)	125		450	260		315	400				450	
Storage Blk Time (%)	18	81	76	54	20		9	41			36	40
Queuing Penalty (veh)	114	429	250	178	78		89	72			338	71

Intersection: 3: US 74 & Matthews-Mint Hill Rd.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	1808	1753
Average Queue (ft)	1325	1261
95th Queue (ft)	1953	1849
Link Distance (ft)	1947	1947
Upstream Blk Time (%)	2	1
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1906

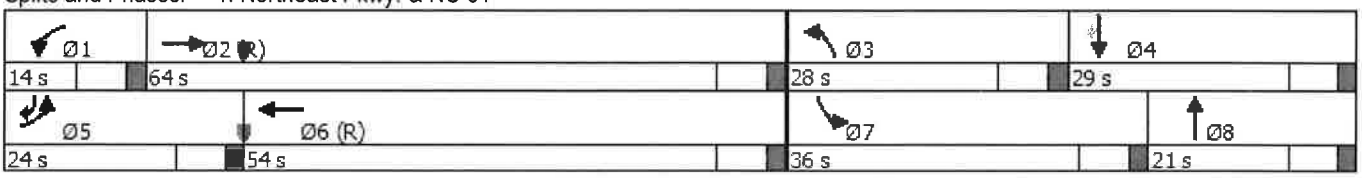
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	296	1143	59	49	665	184	160	45	77	283	96	161
Future Volume (vph)	296	1143	59	49	665	184	160	45	77	283	96	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	11	11	12	12	12
Storage Length (ft)	200		0	150		0	240		0	100		0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	150			190			90			100		
Satd. Flow (prot)	3433	3514	0	1770	3426	0	1711	1630	0	1770	1863	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3514	0	1770	3426	0	1711	1630	0	1770	1863	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		1946			1736			1610			1756	
Travel Time (s)		29.5			26.3			31.4			34.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	329	1336	0	54	943	0	178	136	0	314	107	179
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases												4
Detector Phase	5	2		1	6		3	8		7	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	14.0	19.0		14.0	19.0		14.0	14.0		14.0	14.0	14.0
Total Split (s)	24.0	64.0		14.0	54.0		28.0	21.0		36.0	29.0	24.0
Total Split (%)	17.8%	47.4%		10.4%	40.0%		20.7%	15.6%		26.7%	21.5%	17.8%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	C-Min		None	C-Min		None	None		None	None	None
Act Effct Green (s)	18.1	64.5		9.2	52.7		20.0	15.4		28.7	24.1	47.3
Actuated g/C Ratio	0.13	0.48		0.07	0.39		0.15	0.11		0.21	0.18	0.35
v/c Ratio	0.71	0.80		0.45	0.70		0.70	0.74		0.84	0.32	0.32
Control Delay	65.1	35.9		72.8	39.1		69.6	80.5		70.0	51.2	33.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	65.1	35.9		72.8	39.1		69.6	80.5		70.0	51.2	33.8
LOS	E	D		E	D		E	F		E	D	C
Approach Delay		41.6			40.9			74.3			55.8	
Approach LOS		D			D			E			E	
Queue Length 50th (ft)	143	552		46	380		149	117		260	81	111
Queue Length 95th (ft)	196	655		92	464		228	#210		#393	142	178
Internal Link Dist (ft)		1866			1656			1530			1676	
Turn Bay Length (ft)	200			150			240			100		
Base Capacity (vph)	483	1678		121	1338		291	194		406	341	563

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.68	0.80		0.45	0.70		0.61	0.70		0.77	0.31	0.32

Intersection Summary

Area Type: Other
Cycle Length: 135
Actuated Cycle Length: 135
Offset: 24 (18%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 46.7 Intersection LOS: D
Intersection Capacity Utilization 78.7% 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: Northeast Pkwy. & NC 51



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	340	161	118	379	18	119	7	25	6	4	81
Future Volume (vph)	107	340	161	118	379	18	119	7	25	6	4	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	10	10	12	11	11	11
Storage Length (ft)	150		0	135		0	0		50	100		0
Storage Lanes	1		0	1		0	1		1	2		1
Taper Length (ft)	25			0			25			100		
Satd. Flow (prot)	1770	3369	0	1770	1850	0	1652	1535	0	1711	1801	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3369	0	1770	1850	0	1652	1535	0	1711	1801	1531
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		936			1955			1452			1808	
Travel Time (s)		18.2			38.1			28.3			35.2	
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
Mid-Block Traffic (%)		0%			0%			0%			60%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	557	0	131	441	0	132	36	0	7	4	90
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 50.2% ICU Level of Service A
Analysis Period (min) 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	107	340	161	118	379	18	119	7	25	6	4	81
Future Volume (Veh/h)	107	340	161	118	379	18	119	7	25	6	4	81
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	119	378	179	131	421	20	132	8	28	7	4	90
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)		936										
pX, platoon unblocked												
vC, conflicting volume	441			557			1480	1408	278	1152	1488	431
vC1, stage 1 conf vol							706	706		693	693	
vC2, stage 2 conf vol							775	703		459	795	
vCu, unblocked vol	441			557			1480	1408	278	1152	1488	431
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			87			0	97	96	97	98	84
cM capacity (veh/h)	1115			1010			132	231	719	260	204	573

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	119	252	305	131	441	132	36	7	4	90
Volume Left	119	0	0	131	0	132	0	7	0	0
Volume Right	0	0	179	0	20	0	28	0	0	90
cSH	1115	1700	1700	1010	1700	132	490	260	204	573
Volume to Capacity	0.11	0.15	0.18	0.13	0.26	1.00	0.07	0.03	0.02	0.16
Queue Length 95th (ft)	9	0	0	11	0	175	6	2	1	14
Control Delay (s)	8.6	0.0	0.0	9.1	0.0	142.2	12.9	19.2	23.0	12.5
Lane LOS	A			A		F	B	C	C	B
Approach Delay (s)	1.5			2.1		114.5		13.3		
Approach LOS						F		B		

Intersection Summary			
Average Delay	15.0		
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

LANE SUMMARY

Site: 2 [2019 PM Build Scenario "A"]

Matthews-Mint Hill Rd. & Moore Rd./NE Pkwy. Ext.
Roundabout

Lane Use and Performance	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Moore Rd.													
Lane 1[d]	168	2.0	917	0.183	100	2.6	LOS A	1.1	27.3	Full	1600	0.0	0.0
Approach	168	2.0		0.183		2.6	LOS A	1.1	27.3				
East: Matthews-Mint Hill Rd.													
Lane 1[d]	572	1.5	1137	0.503	100	1.8	LOS A	3.7	92.6	Full	1600	0.0	0.0
Approach	572	1.5		0.503		1.8	LOS A	3.7	92.6				
North: Northeast Pkwy. Ex.													
Lane 1[d]	101	1.9	782	0.129	100	3.7	LOS A	0.8	19.8	Full	1600	0.0	0.0
Approach	101	1.9		0.129		3.7	LOS A	0.8	19.8				
West: Matthews-Mint Hill Rd.													
Lane 1[d]	676	1.5	1238	0.546	100	1.1	LOS A	4.6	116.8	Full	1600	0.0	0.0
Approach	676	1.5		0.546		1.1	LOS A	4.6	116.8				
Intersection	1517	1.6		0.546		1.7	LOS A	4.6	116.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option is selected.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	340	161	118	379	18	119	7	25	6	4	81
Future Volume (vph)	107	340	161	118	379	18	119	7	25	6	4	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	10	10	12	11	11	11
Storage Length (ft)	150		0	135		0	0		50	100		0
Storage Lanes	1		0	1		0	1		1	2		1
Taper Length (ft)	25			0			25			100		
Satd. Flow (prot)	1770	3369	0	1770	1850	0	1652	1535	0	1711	1801	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3369	0	1770	1850	0	1652	1535	0	1711	1801	1531
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		936			1955			1452			1808	
Travel Time (s)		18.2			38.1			28.3			35.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	557	0	131	441	0	132	36	0	7	4	90
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases												4
Detector Phase	5	2		1	6		3	8		7	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	14.0	17.0		14.0	17.0		14.0	14.0		14.0	14.0	14.0
Total Split (s)	23.0	55.0		25.0	57.0		26.0	26.0		14.0	14.0	23.0
Total Split (%)	19.2%	45.8%		20.8%	47.5%		21.7%	21.7%		11.7%	11.7%	19.2%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	13.5	32.9		14.1	25.9		14.5	14.4		10.4	10.4	15.2
Actuated g/C Ratio	0.20	0.49		0.21	0.38		0.22	0.21		0.15	0.15	0.23
v/c Ratio	0.34	0.34		0.36	0.62		0.37	0.11		0.03	0.01	0.26
Control Delay	33.1	18.3		32.4	24.1		32.4	29.6		37.7	38.2	28.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	33.1	18.3		32.4	24.1		32.4	29.6		37.7	38.2	28.0
LOS	C	B		C	C		C	C		D	D	C
Approach Delay		20.9			26.0			31.8			29.0	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	40	84		44	138		44	11		2	1	30
Queue Length 95th (ft)	135	206		143	358		144	51		20	14	90
Internal Link Dist (ft)		856			1875			1372			1728	
Turn Bay Length (ft)	150			135						100		
Base Capacity (vph)	546	2570		606	1453		594	552		263	277	511

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.22	0.22		0.22	0.30		0.22	0.07		0.03	0.01	0.18

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 67.4
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 24.6 Intersection LOS: C
Intersection Capacity Utilization 52.7% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Moore Rd./NE Pkwy. Ext. & Matthews-Mint Hill Rd.

Ø1	Ø2	Ø3	Ø4
25 s	55 s	26 s	14 s

Ø5	Ø6	Ø7	Ø8
23 s	57 s	14 s	26 s

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	211	412	217	165	167	178	2016	249	178	2841	54
Future Volume (vph)	119	211	412	217	165	167	178	2016	249	178	2841	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		450	260		315	400		0	450		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	100			0			250			190		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	5070	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	5070	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		1652			936			1950			1993	
Travel Time (s)		32.2			18.2			29.5			30.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	234	458	241	183	186	198	2240	277	198	3217	0
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	12.0	7.0	7.0	12.0	
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	19.0	14.0	14.0	19.0	
Total Split (s)	22.0	23.0	25.0	25.0	26.0	21.0	25.0	106.0	25.0	21.0	102.0	
Total Split (%)	12.6%	13.1%	14.3%	14.3%	14.9%	12.0%	14.3%	60.6%	14.3%	12.0%	58.3%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	
Act Effct Green (s)	16.5	18.0	43.0	20.0	21.5	42.5	20.0	101.0	126.0	16.0	97.0	
Actuated g/C Ratio	0.09	0.10	0.25	0.11	0.12	0.24	0.11	0.58	0.72	0.09	0.55	
v/c Ratio	0.80	1.23	1.18	1.19	0.80	0.48	0.98	1.10	0.24	1.23	1.14	
Control Delay	108.3	199.2	159.3	186.8	99.2	62.1	133.1	87.4	8.9	206.6	106.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	108.3	199.2	159.3	186.8	99.2	62.1	133.1	87.4	8.9	206.6	106.3	
LOS	F	F	F	F	F	E	F	F	A	F	F	
Approach Delay		162.5			122.5			82.7			112.1	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	151	~328	~626	~332	209	186	231	~1523	100	~278	~1576	
Queue Length 95th (ft)	#261	#516	#859	#522	#343	273	#408	#1641	140	#456	#1628	
Internal Link Dist (ft)		1572			856			1870			1913	
Turn Bay Length (ft)	125		450	260		315	400			450		
Base Capacity (vph)	171	191	388	202	228	384	202	2042	1139	161	2810	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.77	1.23	1.18	1.19	0.80	0.48	0.98	1.10	0.24	1.23	1.14	

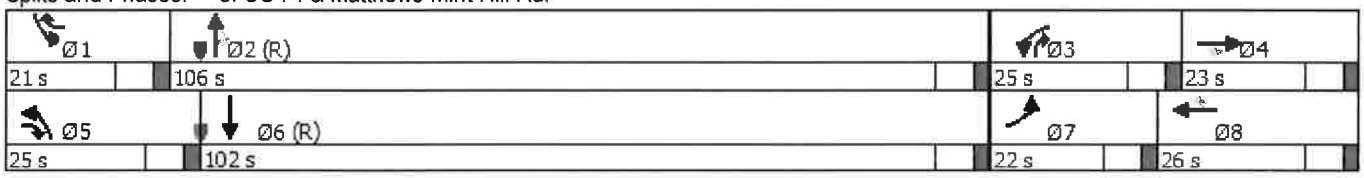
Intersection Summary

Area Type: Other
Cycle Length: 175
Actuated Cycle Length: 175
Offset: 25 (14%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.23
Intersection Signal Delay: 107.9 Intersection LOS: F
Intersection Capacity Utilization 106.1% ICU Level of Service G
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: 3: US 74 & Matthews-Mint Hill Rd.



Intersection: 2: Moore Rd./Prop. Access & Matthews-Mint Hill Rd.

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	T	R
Maximum Queue (ft)	28	13	134	291	1440	75	31	31	200
Average Queue (ft)	7	1	27	83	1422	47	13	3	79
95th Queue (ft)	25	6	94	206	1430	107	38	15	152
Link Distance (ft)		834		1921	1406				1774
Upstream Blk Time (%)					97				
Queuing Penalty (veh)					0				
Storage Bay Dist (ft)	150		135			50	100	100	
Storage Blk Time (%)			0	5	99	1			19
Queuing Penalty (veh)			0	2	84	3			4

Intersection: 3: US 74 & Matthews-Mint Hill Rd.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	224	325	291	260	849	475	650	1956	1967	1967	625	657
Average Queue (ft)	47	136	148	226	823	414	475	1919	1921	1908	344	386
95th Queue (ft)	140	242	246	318	918	588	836	1991	2000	2040	619	604
Link Distance (ft)		1594			834			1904	1904	1904		1947
Upstream Blk Time (%)					17			74	75	51		
Queuing Penalty (veh)					143			0	0	0		
Storage Bay Dist (ft)	125		450	260		315	400				450	
Storage Blk Time (%)	0	24		26	40	25	1	37			25	0
Queuing Penalty (veh)	0	41		178	253	132	6	94			148	0

Intersection: 3: US 74 & Matthews-Mint Hill Rd.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	664	390
Average Queue (ft)	331	284
95th Queue (ft)	499	394
Link Distance (ft)	1947	1947
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1088

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	445	80	47	463	4	278	4	81	17	4	123
Future Volume (vph)	31	445	80	47	463	4	278	4	81	17	4	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	10	10	12	11	11	11
Storage Length (ft)	150		0	135		0	0		50	100		0
Storage Lanes	1		0	1		0	1		1	2		1
Taper Length (ft)	25			0			25			100		
Satd. Flow (prot)	1770	3458	0	1770	1861	0	1652	1488	0	1711	1801	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3458	0	1770	1861	0	1652	1488	0	1711	1801	1531
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		936			1955			1452			1808	
Travel Time (s)		18.2			38.1			28.3			35.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	583	0	52	518	0	309	94	0	19	4	137
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 60.0% ICU Level of Service B
Analysis Period (min) 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	445	80	47	463	4	278	4	81	17	4	123
Future Volume (Veh/h)	31	445	80	47	463	4	278	4	81	17	4	123
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	34	494	89	52	514	4	309	4	90	19	4	137
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)		936										
pX, platoon unblocked												
vC, conflicting volume	518			583			1364	1228	292	1027	1271	516
vC1, stage 1 conf vol							606	606		620	620	
vC2, stage 2 conf vol							757	622		407	651	
vCu, unblocked vol	518			583			1364	1228	292	1027	1271	516
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			95			0	99	87	94	99	73
cM capacity (veh/h)	1044			987			197	339	705	330	323	504

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	34	329	254	52	518	309	94	19	4	137
Volume Left	34	0	0	52	0	309	0	19	0	0
Volume Right	0	0	89	0	4	0	90	0	0	137
cSH	1044	1700	1700	987	1700	197	674	330	323	504
Volume to Capacity	0.03	0.19	0.15	0.05	0.30	1.57	0.14	0.06	0.01	0.27
Queue Length 95th (ft)	3	0	0	4	0	497	12	5	1	27
Control Delay (s)	8.6	0.0	0.0	8.8	0.0	323.0	11.2	16.6	16.3	14.8
Lane LOS	A			A		F	B	C	C	B
Approach Delay (s)	0.5			0.8		250.3		15.0		
Approach LOS						F		C		

Intersection Summary			
Average Delay	59.4		
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	74	134	232	295	396	254	2386	263	140	1765	66
Future Volume (vph)	38	74	134	232	295	396	254	2386	263	140	1765	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		450	260		315	400		0	450		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	100			0			250			190		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	5060	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	5060	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		1652			936			1950			1993	
Travel Time (s)		32.2			18.2			29.5			30.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	82	149	258	328	440	282	2651	292	156	2034	0
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	12.0	7.0	7.0	12.0	
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	19.0	14.0	14.0	19.0	
Total Split (s)	14.0	14.0	40.0	31.0	31.0	18.0	40.0	117.0	31.0	18.0	95.0	
Total Split (%)	7.8%	7.8%	22.2%	17.2%	17.2%	10.0%	22.2%	65.0%	17.2%	10.0%	52.8%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	
Act Effct Green (s)	9.0	9.0	46.9	26.0	28.8	46.8	32.9	112.0	143.0	13.0	92.1	
Actuated g/C Ratio	0.05	0.05	0.26	0.14	0.16	0.26	0.18	0.62	0.79	0.07	0.51	
v/c Ratio	0.48	0.88	0.36	1.01	1.10	1.07	0.87	1.20	0.23	1.23	0.79	
Control Delay	101.3	146.7	56.6	132.8	146.7	124.8	96.9	128.2	5.2	216.9	39.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	101.3	146.7	56.6	132.8	146.7	124.8	96.9	128.2	5.2	216.9	39.0	
LOS	F	F	E	F	F	F	F	F	A	F	D	
Approach Delay		90.6			133.8			114.4			51.7	
Approach LOS		F			F			F			D	
Queue Length 50th (ft)	49	98	143	~314	~473	~603	324	~1994	77	~225	726	
Queue Length 95th (ft)	97	#214	216	#514	#686	#835	#472	#2092	106	#389	785	
Internal Link Dist (ft)		1572			856			1870			1913	
Turn Bay Length (ft)	125		450	260		315	400			450		
Base Capacity (vph)	88	93	430	255	298	411	344	2202	1257	127	2588	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.48	0.88	0.35	1.01	1.10	1.07	0.82	1.20	0.23	1.23	0.79	

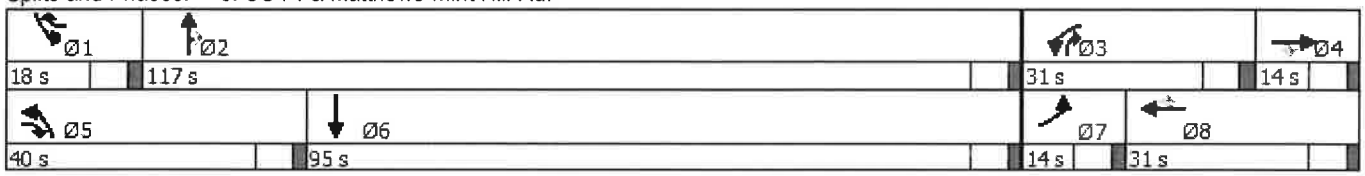
Intersection Summary

Area Type: Other
Cycle Length: 180
Actuated Cycle Length: 180
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.23
Intersection Signal Delay: 95.9 Intersection LOS: F
Intersection Capacity Utilization 111.7% ICU Level of Service H
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: 3: US 74 & Matthews-Mint Hill Rd.



Intersection: 2: Moore Rd./Prop. Access & Matthews-Mint Hill Rd.

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	T	R
Maximum Queue (ft)	90	47	134	726	1300	75	50	31	244
Average Queue (ft)	32	4	48	171	396	23	12	2	73
95th Queue (ft)	71	19	124	536	1078	69	37	15	185
Link Distance (ft)		834		1921	1406				1774
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	150		135			50	100	100	
Storage Blk Time (%)			0	20	67	0			28
Queuing Penalty (veh)			1	23	20	0			4

Intersection: 3: US 74 & Matthews-Mint Hill Rd.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	225	1646	590	260	845	475	650	1312	1280	547	640	1999
Average Queue (ft)	152	1373	578	242	579	243	372	965	967	74	582	1899
95th Queue (ft)	291	2025	636	306	1076	564	733	1285	1239	236	736	2182
Link Distance (ft)		1594			834			1904	1904	1904		1947
Upstream Blk Time (%)		51			24							48
Queuing Penalty (veh)		0			138							0
Storage Bay Dist (ft)	125		450	260		315	400				450	
Storage Blk Time (%)	25	87	66	53	14			39			43	45
Queuing Penalty (veh)	157	464	219	180	56			70			404	86

Intersection: 3: US 74 & Matthews-Mint Hill Rd.

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	1981	1986
Average Queue (ft)	1880	1857
95th Queue (ft)	2187	2183
Link Distance (ft)	1947	1947
Upstream Blk Time (%)	38	34
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1822

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	340	161	118	379	16	125	4	26	9	4	64
Future Volume (vph)	121	340	161	118	379	16	125	4	26	9	4	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	10	10	12	11	11	11
Storage Length (ft)	150		0	135		0	0		50	100		0
Storage Lanes	1		0	1		0	1		1	2		1
Taper Length (ft)	25			0			25			100		
Satd. Flow (prot)	1770	3369	0	1770	1852	0	1652	1509	0	1711	1801	1531
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3369	0	1770	1852	0	1652	1509	0	1711	1801	1531
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		936			1955			1452			1808	
Travel Time (s)		18.2			38.1			28.3			35.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	134	557	0	131	439	0	139	33	0	10	4	71
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 51.2% ICU Level of Service A
Analysis Period (min) 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	121	340	161	118	379	16	125	4	26	9	4	64
Future Volume (Veh/h)	121	340	161	118	379	16	125	4	26	9	4	64
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	134	378	179	131	421	18	139	4	29	10	4	71
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (ft)		936										
pX, platoon unblocked												
vC, conflicting volume	439			557			1492	1436	278	1180	1517	430
vC1, stage 1 conf vol							736	736		692	692	
vC2, stage 2 conf vol							756	701		488	825	
vCu, unblocked vol	439			557			1492	1436	278	1180	1517	430
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	88			87			0	98	96	96	98	88
cM capacity (veh/h)	1117			1010			134	219	719	250	191	573

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	134	252	305	131	439	139	33	10	4	71
Volume Left	134	0	0	131	0	139	0	10	0	0
Volume Right	0	0	179	0	18	0	29	0	0	71
cSH	1117	1700	1700	1010	1700	134	563	250	191	573
Volume to Capacity	0.12	0.15	0.18	0.13	0.26	1.04	0.06	0.04	0.02	0.12
Queue Length 95th (ft)	10	0	0	11	0	189	5	3	2	11
Control Delay (s)	8.7	0.0	0.0	9.1	0.0	153.0	11.8	20.0	24.2	12.2
Lane LOS	A			A		F	B	C	C	B
Approach Delay (s)	1.7			2.1		125.9		13.7		
Approach LOS						F		B		

Intersection Summary			
Average Delay	16.6		
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

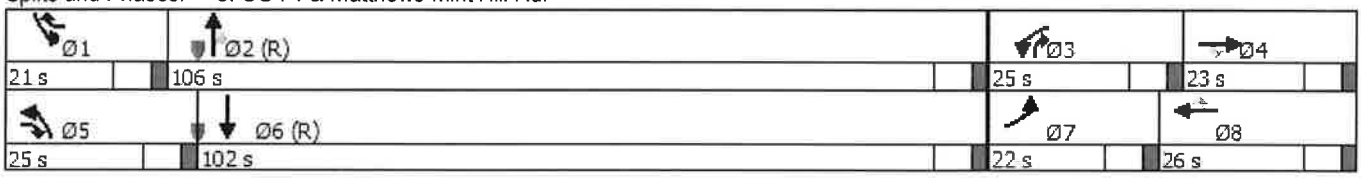
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	211	412	217	165	174	178	2016	249	192	2841	54
Future Volume (vph)	119	211	412	217	165	174	178	2016	249	192	2841	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		450	260		315	400		0	450		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	100			0			250			190		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	5070	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	5070	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		1652			936			1950			1993	
Travel Time (s)		32.2			18.2			29.5			30.2	
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
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	234	458	241	183	193	198	2240	277	213	3217	0
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			
Detector Phase	7	4	5	3	8	1	5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	12.0	7.0	7.0	12.0	
Minimum Split (s)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	19.0	14.0	14.0	19.0	
Total Split (s)	22.0	23.0	25.0	25.0	26.0	21.0	25.0	106.0	25.0	21.0	102.0	
Total Split (%)	12.6%	13.1%	14.3%	14.3%	14.9%	12.0%	14.3%	60.6%	14.3%	12.0%	58.3%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Min	None	None	C-Min	
Act Effct Green (s)	16.5	18.0	43.0	20.0	21.5	42.5	20.0	101.0	126.0	16.0	97.0	
Actuated g/C Ratio	0.09	0.10	0.25	0.11	0.12	0.24	0.11	0.58	0.72	0.09	0.55	
v/c Ratio	0.80	1.23	1.18	1.19	0.80	0.50	0.98	1.10	0.24	1.32	1.14	
Control Delay	108.3	199.2	159.3	186.8	99.2	62.7	133.1	87.4	8.9	237.8	106.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	108.3	199.2	159.3	186.8	99.2	62.7	133.1	87.4	8.9	237.8	106.3	
LOS	F	F	F	F	F	E	F	F	A	F	F	
Approach Delay		162.5			122.0			82.7			114.4	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	151	~328	~626	~332	209	194	231	~1523	100	~314	~1576	
Queue Length 95th (ft)	#261	#516	#859	#522	#343	283	#408	#1641	140	#497	#1628	
Internal Link Dist (ft)		1572			856			1870			1913	
Turn Bay Length (ft)	125		450	260		315	400			450		
Base Capacity (vph)	171	191	388	202	228	384	202	2042	1139	161	2810	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.77	1.23	1.18	1.19	0.80	0.50	0.98	1.10	0.24	1.32	1.14	

Intersection Summary

Area Type: Other
Cycle Length: 175
Actuated Cycle Length: 175
Offset: 25 (14%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.32
Intersection Signal Delay: 108.9 Intersection LOS: F
Intersection Capacity Utilization 106.2% ICU Level of Service G
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: 3: US 74 & Matthews-Mint Hill Rd.