TRAFFIC IMPACT ANALYSIS

Matthews Multi-family Development Traffic Study in Matthews, NC

Prepared For:
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Executive Summary

This traffic study is to review impacts of the planned Mathews Multi-Family Development on the existing roadway network within the study area. The site is in southeastern Mecklenburg County in Matthews, NC, off NC 51 (Mathews Township Parkway). The project site is located in the southwest quadrant of the stop-controlled intersection of Northeast Parkway at Overcash Drive. See Figure 1 for site vicinity map.

The first portion of the analysis will include 2020 Existing conditions, 2023 No-Build, 2023 Build, and 2023 Build mitigated (as necessary). For the build-out year of 2023, the impact area for the analysis includes the following intersections:

- Northeast Parkway and NC 51 (Mathews Township Parkway) - signalized
- Northeast Parkway and Mathews Corners Shopping Center - unsignalized
- Northeast Parkway and Overcash Drive - unsignalized
- Site access A (Primary entrance on Overcash Drive) - unsignalized

The study area is adjacent to TIP project U-2509A, which includes the extension of Northeast Parkway from Overcash Drive to the intersection of Mathews-Mint Hill Rd at Moore Road. 2045 Future No-Build and Build scenarios were analyzed to show any potential impacts to the TIP project U-2509A. Under the build scenario, additional intersections were considered. These intersections include:

- Site access B (Secondary entrance on Northeast Parkway) – right-in, right-out
- Northeast Parkway and Golden Corral access - unsignalized
- Northeast Parkway/Moore Road and Mathews-Mint Hill Road - signalized

Because of COVID (resulting in the unstable traffic patterns) and the proposed TIP project (U-2509A) that connects Northeast Parkway between NC 51 and Mathews-Mint Hill Road on a new alignment, DRMP has proposed the use of the project forecast for the base traffic volumes for this TIA.

Based on the scoping document for this project, the agreed upon trip generation and trip distributions were used. Trip generation was calculated using the trip generation rates developed for Mathews Multi-Family Development.

After reviewing the operational analysis for the 2023 Build scenario, no improvements were necessary to mitigate the impacts of the additional site traffic on the existing roadway network.

After reviewing the operational analysis for the 2045 Build scenarios, the following recommendations are made for mitigation measures based on the information in this report:

- Northeast Parkway at Matthews Corners
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- Addition of southbound right turn bay with a storage length of 100’.
  - Northeast Parkway at Overcash Drive
    - Addition of eastbound right turn bay with a storage length of 100’.

Since the site traffic does not impact the right-turn lane into Matthews Corners, it is our recommendation that this be considered as a part of the U-2509A project.

The eastbound right turn lane on Overcash Drive at Northeast Parkway would be the responsibility of the developer.

See Figure 17 for a graphical representation of this information.
1.0 INTRODUCTION

This traffic study is to review impacts of the rezoning of the site from a single-family residential use to a higher density planned Mathew Multi-Family use on the existing roadway network within the study area. The site is in southeastern Mecklenburg County in Matthews, NC, off NC 51 (Mathews Township Parkway). The project site is located in the southwest quadrant of the stop-controlled intersection of Northeast Parkway at Overcash Drive. See Figure 1 for site vicinity map.

The first portion of the analysis will include 2020 Existing conditions, 2023 No-Build, 2023 Build, and 2023 Build mitigated. For the build-out year of 2023, the impact area for the analysis includes the following intersections:

- Northeast Parkway and NC 51 (Mathews Township Parkway) - signalized
- Northeast Parkway and Mathews Corners Shopping Center - unsignalized
- Northeast Parkway and Overcash Drive - unsignalized
- Site access A (Primary entrance on Overcash Drive) - unsignalized

The study area is adjacent to TIP project U-2509A, which includes the extension of Northeast Parkway to the intersection of Mathews-Mint Hill Rd at Moore Road. 2045 Future No-Build and Build scenarios were analyzed to show any potential impacts to TIP project U-2509A. Under these scenarios, additional intersections were considered. These intersections include:

- Site access B (Secondary entrance on Northeast Parkway) – right-in, right-out
- Northeast Parkway and Golden Corral access - unsignalized
- Northeast Parkway/Moore Road and Mathews-Mint Hill Road - signalized

For this report, Northeast Parkway will be considered the north-south roadway.

2.0 SCENARIOS

Our site is along Northeast Parkway which is part of TIP project U-2509A. Therefore, the study will address the Build-out year of the proposed site in 2023, but also look at the impacts of additional traffic due to rezoning on TIP project U-2509A in the design year 2045. The traffic capacity analysis will review performance of the following scenarios:

- Year 2020 Existing
- Year 2023 No-Build
- Year 2023 Build
- Year 2023 Build (mitigated) – as necessary
- Year 2045 No-Build (Options 1 & 2)
- Year 2045 Build (Options 1 & 2)
- Year 2045 Build (mitigated) – as necessary
2.1 Year 2020 Existing

The Year 2020 Existing scenario was analyzed to provide an assessment of baseline conditions.

Northeast Parkway is a two-way, two-lane minor arterial road with a posted speed limit of 35 miles per hour at the intersection at Overcash Drive. Within the study area, it provides access to the Mathews Corners Shopping Center which is further north of this proposed development location. In addition to the shopping center, Northeast Parkway also provides access to residential Fountain Apartments (which will not be analyzed).

NC 51 (Mathews Township Parkway) is a two-way, four-lane divided urban arterial with a posted speed limit of 45 miles per hour. NC 51 (Mathews Township Parkway) connects to US 74 (E. Independent Boulevard) providing access for surrounding residential apartments, residential communities, stores, shopping centers, and a shopping mall to an Interstate Highway.

See Figure 2 for 2020 existing lane configurations.

2.2 Year 2023 No-Build Conditions

To determine appropriate 2023 No-Build conditions, projects in and near the study area were reviewed to see if existing geometry was impacted. Based on the approved NCDOT Scoping checklist, there are two projects that impact our study area. The first are improvements at Matthews-Mint Hill Rd and Moore Rd based on the Bainbridge residential development. These impacts do not impact our 2023 study area but will be accounted for in the 2045 scenarios.

The other project in the area is TIP U-2509 which will add routes parallel to and along US 74 from west of Idlewild Road to I-485 under U-2509A and then add express lanes to US 74 under U-2509B. Due to the uncertainty of the State TIP program, it is unclear when U-2059A will be built. Currently the project is scheduled for Right of Way in 2021 and construction year of 2022. Due to the uncertainty of when construction will be started, we are assuming worse case that it will not have begun by 2023 to review impacts of the change in site rezoning. The U-2509A project will be considered for the 2045 scenarios.

See Appendix K for the approved NCDOT Scoping Checklist.

2.3 Year 2023 Build Conditions

For the site build conditions, there are two proposed driveways for the Mathews Multi-Family Development. Per the proposed site plan, the first access is located along Overcash Drive approximately 230’ east of the intersection with Northeast Parkway. The second access is proposed along Northeast Parkway approximately 300’ south of Overcash Drive. Due to the timing of the U-2509A project, the second access will not be connected to the
roadway network until the roadway extension is built. The only site access analyzed under this scenario will be access A along Overcash Drive. The proposed site access is assumed to be two-way, two-lane road at an unsignalized intersection with a speed limit of 25 mph. See Figure 18 for the site plan.

2.4 Year 2045 No-Build Conditions

For the 2045 no-build conditions, the proposed geometry for the U-2509A project will be used. The plans are currently at 25% and are addressing overall project concerns and not necessarily all the details that will be flushed out during the overall design process. Therefore, based on discussions with Stuart Basham, Division 10 Planning Engineer, additional lanes were added to the 25% plans that were supplied.

- Stuart has requested that a dual left for southbound Northeast Parkway at NC 51 be added to the design to address existing operational concerns.
- Based on our discussion, he agreed that a turn lane for southbound Northeast Parkway at the Golden Corral driveway median break should be added for u-turn movements due to the median along the corridor under the project.
- The Bainbridge development will also impact the lane configuration shown. Once that development is completed, the existing conditions will be verified and incorporated into the plans. Based on the Bainbridge plans, the lanes for Northeast Parkway at Matthews-Mint Hill Road will be one exclusive left, one through lane, and one exclusive right turn lane.

There are two additional intersections to be analyzed along the Northeast Parkway corridor in the 2045 No-Build scenario compared to the 2023 Build scenario. Per the proposed U-2509A design, the additional intersections included are:

1. Entrance to Golden Corral/median break, a stop-controlled driveway; and
2. Mathews-Mint Hill Rd at Northeast Parkway and Moore Road, existing stop-controlled intersection which will be upgraded to a signal at the completion of the Bainbridge development.

Northeast Parkway will maintain a speed limit of 35 mph. See Appendix A for the U-2509A 25% plans.

See Figure 9 for 2045 anticipated lane configuration.

2.5 Year 2045 Build Conditions

There is one additional site access that will be added to the 2045 Build conditions. Access B for the Mathews Multi-Family apartment is a proposed stop-controlled right-in/right-out, located approximately 300’ south of Overcash Drive along Northeast Parkway.
Based on the current U-2509 lane configuration, Overcash Drive is a right-in, right-out intersection. The Town of Matthews has requested that this intersection also be analyzed as a full movement intersection. Therefore, 2045 No-build and Build will each have two scenarios – without and with the full movement at Overcash Drive. The scenarios will be called 2045 Option 1 and 2045 Option 2, respectively.

For the full movement intersection, sight distance was evaluated based on the available documentation. Horizontal sight distance for Northeast Parkway at 35 mph is adequate. Based on the apparent grades at this the existing intersection, the vertical sight distance is not anticipated to be an issue.

3.0 TRAFFIC VOLUMES AND CHARACTERISTICS

Due to the COVID pandemic (resulting in the unstable traffic patterns) and the proposed TIP project (U-2509A) that connects Northeast Parkway between NC 51 and Mathews-Mint Hill Road on a new alignment, it was agreed that the U-2509 project forecast would be used as for the base traffic volumes for this TIA. See Appendix B for the forecast. The full traffic forecast report with background data can be made available on request.

3.1 2020 & 2023 Estimated Traffic Volumes

The NCDOT TES – intersection analysis Utility (IAU) spreadsheet was used to interpolate peak hour volumes based on the U-2509 traffic forecast numbers. Values from the 2018 and 2045 No-Build Scenarios were used to generate existing/background volumes for the intersection of NC 51 (Mathews Township Parkway) at Northeast Parkway for the 2020 and 2023 scenarios. See IAU information in Appendix C.

The other existing intersections to be analyzed in the 2020 and 2023 scenarios were not included on the U-2509 forecast. Roadways and drives with volumes less than 1000 AADT are typically not included.

Using the Trip Generation Manual and engineering judgement, volumes for the additional intersections were estimated. Using the forecast data for NC 51 (Mathews Township Parkway) at Northeast Parkway as fixed values, the land uses along Northeast Parkway south of NC 51 were reviewed. Northeast Parkway is currently a dead-end road and the only traffic generators along this section of Northeast Parkway are Fountain Apartments, Matthews Corners shopping center and two residences off Overcash Drive.

For the AM peak, based on the store hours and alternate accesses to the generators, 80% of the trips on northbound Northeast Parkway were allocated to the Fountain Apartment entrance. The remaining trips were allocated to the shopping center entrance. This proportion gave the shopping center volumes close in value to the 2018 Target volumes from the development of the U-2509 forecast.
Assuming the proportions for AM were appropriate, this indicated that the average Trip Generation values for this particular apartment complex were low. The PM trips were proportioned in a similar manner to the AM trips to compute the estimated trips for the PM peak for the two driveways along existing Northeast Parkway. Trip Generation is included for both of these properties in Appendix C.

2020 and 2023 estimated peak background traffic volumes can be seen in Figures 3 and 4, respectively.

3.2 2023 Build Conditions Traffic Volumes

Based on the scoping document for this project, the agreed upon 2023 trip generation and trip distribution were used. These values, discussed in section 3.5, were added to the existing/background traffic that was described in section 3.1.

3.3 2045 No-Build Conditions Traffic Volumes

The 2045 AM and PM peak hour traffic for the following intersections were taken directly from the U-2509 Traffic Forecast.

- Northeast Parkway and NC 51 (Mathews Township Parkway) - signalized
- Northeast Parkway and Mathews-Mint Hill Road – signalized

The forecast is looking at the overall system for traffic projections. As mentioned previously, the remaining intersections being analyzed were not reported on the final forecast. These values were estimated using a similar method to what was used to estimate the 2020 and 2023 volumes, with some additional steps.

The forecast data for the two intersections that were in the forecast were set as known values.

The forecast includes development nodes. These development nodes are groups of land uses added together to estimate traffic. The Matthews Corners development is represented by node 50, the area around Bainbridge is represented by node 57 and the businesses between US 74 and Northeast Parkway between NC 51 and Matthews-Mint Hill Road are considered node 54.

The data was broken down by the three development nodes that are along Northeast Parkway in-between NC 51 and Matthews Mint Hill Road. There are AADTs listed beside each node, but due to the land uses, standard directional D and K factors do not apply. To be consistent with the forecast, the inbound and outbound volumes with the associated nodes were taken from the OD study for the 7 AM and 5 PM peak hours.

These volumes were assigned to directional movements based on the OD data and the limits of the volumes at each end of the network. Based on these assignments, there were still some discrepancies in the overall network. Some of the discrepancies can be accounted for due to 4.77 acres of undeveloped land on the east side of Northeast
Matthews Multifamily Development TIA

Parkway that has frontage along Northeast Parkway from Bainbridge to Matthews Corners. Review of the target volumes verses the estimated volumes for 2045 also show some variation. If this variation was over 25%, the volumes for that movement (broken down inbound and outbound by peak hour) was adjusted to reflect a value in between the estimate and the target. Some of the additional discrepancies were between node 139 (the existing end of Northeast Parkway) and NC 51. In this area, for consistency with the 2020/2023 volumes, the same values for the Fountains apartment complex were used. Reviewing the shopping center’s target values verses estimate as well as the trip generation, it was determined that the trips assigned to Matthews corners was likely low and would increase. This would help balance the overall network in this area.

Once the network within our study area was estimated based on the development node data, that data was split into the actual roads and driveways that the development node represents. Based on the U-2509A concept plans, the area represented by node 54 includes Overcash Drive, a driveway to “Paintball Central” as shown on the U-2509A plans, and a drive that leads to both Golden Corral and Aaron’s furniture rental.

Trip generation for the land uses were estimated for each road/drive and then assigned trips to each based on the trip generation. The trip generation estimates were close to overall trips assigned to node 54. There is undeveloped land accessed by the drive to Golden Corral, therefore any additional trips needed to balance this internal network to the larger network were added to that parcel. Once the values were assigned to each roadway/drive they were assigned to the network for the two options that are being evaluated for 2045. Option 1 has right-in, right-out for both Overcash Drive as well as the Paintball Central driveway. Option 2 maintains the right-in, right-out at the Paintball Central’s driveway, but allows full movement access at Overcash Drive.

See Figures 10 and 11 for 2045 Peak Background Traffic for the two alternatives, Option 1 and Option 2.

All of the calculations and background documentation for deriving these values can be found in Appendix C.

3.4 2045 Build Conditions Traffic Volumes

Based on the scoping document for this project, the agreed upon 2045 trip generation and trip distribution were used. These values, discussed in section 3.5, were added to the existing/background traffic that was described in section 3.3.

3.5 Trip Generation

Trip generation can be defined as the estimation of the number of vehicular traffic (entering and exiting) from a site because of the development of the site. Trip generation for the proposed site was estimated based on the guidelines and methodology published

3.5.1 2023 Trip Generation

Trip generation was calculated using the trip generation rates developed for Multifamily Housing (Low-Rise) (Land Use Code 220) and Multifamily Housing (Mid-Rise) (Land Use Code 221). A summary of the 2023 trip generation volumes for AM and PM can be seen below in Table 3-1.

The fitted curve equation was used to calculate the number of daily trips for the AM and PM peak trips for the Multifamily housing complex. The number of units was obtained from data given by client which was used to calculate traffic generated during the AM and PM peak hours as applicable to ITE’s “Trip Generation Manual” 10th Edition.

Table 3-1: 2023 Trip Generation Summary

<table>
<thead>
<tr>
<th>ITE LUC</th>
<th>Proposed Land Use</th>
<th>Units</th>
<th>Daily</th>
<th>Daily Entering</th>
<th>Daily Exiting</th>
<th>AM</th>
<th>AM Entering</th>
<th>AM Exiting</th>
<th>PM</th>
<th>PM Entering</th>
<th>PM Exiting</th>
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</thead>
<tbody>
<tr>
<td>220</td>
<td>Low-Rise MFH</td>
<td>25</td>
<td>148</td>
<td>14</td>
<td>21</td>
<td>13</td>
<td>3</td>
<td>10</td>
<td>17</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>221</td>
<td>Mid-Rise MFH</td>
<td>187</td>
<td>1017</td>
<td>65</td>
<td>79</td>
<td>63</td>
<td>16</td>
<td>47</td>
<td>81</td>
<td>49</td>
<td>32</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>212</td>
<td>1165</td>
<td>79</td>
<td>100</td>
<td>76</td>
<td>19</td>
<td>57</td>
<td>98</td>
<td>60</td>
<td>38</td>
</tr>
</tbody>
</table>

3.5.2 2023 Trip Distribution and Assignment

The no-build and build traffic forecasts were used as a basis for the trip distributions. The 2023 distributions were also compared to existing traffic counts taken at NC 51 at Northeast Parkway from 2017 and 2018. The calculations and comparison of the information from various sources are located in Appendix E. The 2023 trip distributions are illustrated in Figure 5. It is estimated in the 2023 distribution that:

- 41% of trips generated will travel to/from the west on NC 51 (Mathews Township Parkway)
- 28% of trips generated will travel to/from the east on NC 51 (Mathews Township Parkway)
- 31% of trips generated will travel to/from the north on Northeast Parkway

The total traffic volumes for 2023 build conditions were determined by adding the 2023 background traffic to the site traffic. The 2023 proposed site trip assignments can be seen in Figure 6. See Figure 7 for 2023 Peak Build Traffic Volumes.
3.5.3 2045 Trip Generation

Trip generation for 2045 was calculated using the trip generation rates developed for Multifamily Housing (Low-Rise) (Land Use Code 220) and Multifamily Housing (Mid-Rise) (Land Use Code 221) for 2023. However, because this is a rezoning analysis, the trips from the current zoning are already accounted for in the 2045 traffic forecast. Therefore, additional site trips are the differential between the proposed site trips (as shown for 2023) and the site trips generated by the existing zoning on the same property.

The existing zoning is R-12, which has a density of 3.63 single family homes per acre. Per the scoping documents, 75% of the total acres of land is the assumption for what could have been developed. This calculates to 28 units at 3.63 units per acre. Trip Generation for Land use code 210 (Single Family Detached Housing) was used to estimate trips that should already be accounted for in the 2045 traffic forecast. A summary of the 2045 trip generation volumes for AM and PM can be seen below in Table 3-2.

Table 3-2: 2045 Trip Generation Summary

<table>
<thead>
<tr>
<th>ITE LUC</th>
<th>Proposed Land Use</th>
<th>Units</th>
<th>Daily</th>
<th>AM Entering</th>
<th>AM Exiting</th>
<th>PM Entering</th>
<th>PM Exiting</th>
</tr>
</thead>
<tbody>
<tr>
<td>220 +221</td>
<td>Low-Rise MFH + Mid-Rise MFH</td>
<td>212</td>
<td>1165</td>
<td>76</td>
<td>19</td>
<td>57</td>
<td>98</td>
</tr>
<tr>
<td>210</td>
<td>Single Family Detached Housing</td>
<td>28</td>
<td>322</td>
<td>25</td>
<td>6</td>
<td>19</td>
<td>30</td>
</tr>
</tbody>
</table>

Total Difference in Trips 843  51  13  38  68  41  27

3.5.4 2045 Trip Distribution and Assignment

As noted in the 2045 TIP Build Conditions, there will be two options analyzed for this project. The first option will mirror the intersection configuration on the U-2509 plans for Overcash Drive. The second option will convert this intersection to a full movement intersection. The distribution of trips to/from the external destinations are consistent, however, the internal site trips vary based on the intersection configuration. It is estimated in the 2045 distribution that the:

- 48% of trips in Option 1 and 75% of trips in Option 2 generated from site will travel to/from Access A on Overcash Drive
- 52% of trips in Option 1 and 25% of trips in Option 2 generated from site will travel to/from Access B on Northeast Parkway
- 34% of trips generated will travel to/from the west on NC 51 (Mathews Township Parkway)
- 19% of trips generated will travel to/from the east on NC 51 (Mathews Township Parkway)
12% of trips generated will travel to/from the north on Northeast Parkway
18% of trips generated will travel to/from the west on Mathews-Mint Hill Rd
15% of trips generated will travel to/from the east on Mathews-Mint Hill Rd
2% of trips generated will travel to/from the south on Moore Rd

The total traffic volumes for 2045 build conditions were determined by adding the 2045 background traffic to the site traffic. The 2045 proposed site trip assignments can be seen in Figures 13 and 14 for Options 1 and 2, respectively. See Figures 15 and 16 for 2045 Build Traffic Volumes, Options 1 and 2.

4.0 TRAFFIC ANALYSIS ELEMENTS AND METHODOLOGY

The traffic operation analysis was performed in accordance with the NCDOT Congestion Management’s Capacity Analysis Guidelines (July 2015). Synchro Version 10 was used to determine the level of service (LOS), corresponding delay, and capacity at the stop-controlled intersections. For the stop-controlled intersections, the intersection LOS, corresponding delay, and volume to capacity (v/c) ratio represent the characteristics of the worst performing stop-controlled or yield movement from the HCM Unsignalized Report.

Several of the 2045 study intersections allow for unsignalized u-turn movements. Synchro does not analyze unsignalized u-turn movements, so in order to get a level of service and delay, two separate files were used. In the first file, the u-turn volumes were added to the left turn volumes in left turn/u-turn lanes and were coded as left turns into a hidden link for u-turn lanes. Gap acceptance was increased to 5.7 seconds when a u-turn only movement was coded as a left turn or when the majority of the movement was u-turning vehicles. The gap acceptance was not modified when the majority of the traffic is making the left turn. These files were used to get the level of service and delay. The second file was used for SimTraffic, which models unsignalized u-turn movements. In these files, the unsignalized u-turns were coded how they will operate in reality. These files were used to get queuing information. All Synchro reports for SimTraffic analysis can be found in Appendix G.

Unsignalized locations with poor LOS (lower than a D) were evaluated for potential need for signalization in the future. Intersections with a LOS of E or F were reviewed for volumes, v/c ratio and queueing issues to determine if the location needed to be monitored for future signalization. Locations with volumes, v/c ratio and queueing that was deemed acceptable by engineering judgement were not signalized for the analysis. The criteria for volumes was based on the M.U.T.C.D. Peak Hour Warrant.

Per the Traffic Impact Study Guidelines in the Policy on Street and Driveway Access to North Carolina Highways, this report shall identify mitigation improvements to the roadway network if:
The total average delay at an intersection or individual approach increases by 25% or greater, while maintaining the same LOS,

- The LOS degrades by at least one level,

- Or LOS is “F”.

These guidelines will be applied to the 2023 and 2045 build analyses.

Additionally, Per the Traffic Impact Study Guidelines in the Policy on Street and Driveway Access to North Carolina Highways, left and right turn taper shall be considered:

- In accordance with G.S. 136-18(29), the average daily traffic meets or exceeds 4,000 vehicles per day on any secondary route (the average daily traffic should include both the existing traffic plus traffic generated by the proposed development);
- Any US or NC route is being accessed;
- The District engineer determines that such treatment is necessary to avoid congestion or unsafe conditions on the state-maintained roadway;
- Or the TIS identifies a need for an auxiliary lane or taper.

To assist in the development of the recommended intersection geometry improvements, a queue analysis was performed for the 2023 and 2045 Build conditions. Storage lane lengths were determined by the higher of the Synchro 95th percentile queue length and the SimTraffic maximum queue length for intersections. Based on NCDOT guidelines, proposed storage lengths were rounded up to the nearest 25 feet with one hundred feet as the minimum distance reported.

5.0 TRAFFIC OPERATIONS ANALYSIS

Traffic operations analyses for 2020 Existing, 2023 No-Build, 2023 Build, 2045 No-Build (TIP Build), 2045 Build and 2045 Build (mitigated) were performed to determine LOS, delay, and v/c ratios.

The improvements being made by the US 74 Express Lanes project as well as all improvements associated with the Bainbridge development are included in the 2045 No-Build and 2045 Build analyses.

All Synchro reports can be found in Appendix D.

5.1 Year 2020 Existing Analysis

A traffic operations analysis of the existing conditions was performed to assess current conditions. The existing LOS, delay, and v/c ratios are shown in Table 5-1.
Matthews Multifamily Development TIA

Table 5-1: 2020 Existing Conditions Analysis Results

<table>
<thead>
<tr>
<th>Node</th>
<th>Intersection</th>
<th>MOE</th>
<th>Total</th>
<th>Eastbound</th>
<th>Westbound</th>
<th>Northbound</th>
<th>Southbound</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>R</td>
<td>L</td>
</tr>
<tr>
<td>10</td>
<td>NC 51 (Mathews Township Parkway) at Northeast Parkway SIGNALIZED</td>
<td>LOS</td>
<td>D</td>
<td>E</td>
<td>B</td>
<td>F</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay</td>
<td>37.4</td>
<td>72.2</td>
<td>18.9</td>
<td>80.5</td>
<td>35.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V/c</td>
<td>0.83</td>
<td>0.57</td>
<td>0.36</td>
<td>0.47</td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.72</td>
<td>0.51</td>
<td>0.72</td>
<td>0.35</td>
<td>0.53</td>
</tr>
</tbody>
</table>

| 20   | Northeast Parkway at Matthews Corners UNSIGNALIZED | LOS | A | A | - | A | - | - | - | - | - | - | - | - |
|      |              | Delay | 8.8 | 8.8 | - | 3.7 | - | - | 0.0 |
|      |              | V/c | 0.04 | 0.04 | - | 0.00 | - | - | 0.02 |
|      |              |       | 0.06 | 0.06 | - | 0.00 | - | - | 0.02 |

| 30   | Northeast Parkway at Overcash Drive UNSIGNALIZED | LOS | A | A | - | A | - | - | - | - | - | - | - | - |
|      |              | Delay | 8.5 | 8.5 | - | 3.6 | - | - | 0.0 |
|      |              | V/c | 0.01 | 0.01 | - | 0.00 | - | - | 0.00 |
|      |              |       | 0.01 | 0.01 | - | 0.00 | - | - | 0.00 |

The current signalized intersection at NC 51 (Mathews Township Parkway) and Northeast Parkway operates at an overall LOS D during the AM, PM peaks. Both of the unsignalized intersections are operating at a LOS of A during AM and PM peaks. Review of the traffic counts and operational analysis show that the unsignalized intersection are operating well below capacity.

5.2 Year 2023 No-Build Analysis

The results of the 2023 No-Build Analysis were used as the baseline to compare the impacts of the Build traffic volumes. For the 2023 No-Build scenario, the LOS, delay, and v/c ratios are shown in Table 5-2. 2023 Peak Background traffic for this scenario is shown on Figure 4.
The future condition of the existing signalized intersection at NC 51 (Matthews Township Parkway) and Northeast Parkway operates at an overall LOS D during AM and PM peaks. The remaining study unsignalized intersections operate at LOS of A for both AM and PM peaks.

5.3 Year 2023 Build Analysis

5.3.1 2023 Build Operational Analysis

Traffic operations analysis for the 2023 Build Analysis was performed to assess anticipated conditions. The results of the analysis can be seen in Table 5-3. The trips generated and attracted to the Matthews Multi-Family Development for the individual peak hour movements can be seen in Table 3-1. The site volumes added to the three intersections can be seen in Figure 6. The 2023 build peak volumes used for this analysis can be seen in Figure 7.

Table 5-2: 2023 No-Build Analysis Results

<table>
<thead>
<tr>
<th>Node</th>
<th>Intersection</th>
<th>MOE</th>
<th>Total</th>
<th>Eastbound</th>
<th>Westbound</th>
<th>Northbound</th>
<th>Southbound</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>R</td>
<td>L</td>
</tr>
<tr>
<td>10</td>
<td>NC 51 (Matthews Township Parkway) at Northeast Parkway</td>
<td>LOS</td>
<td>A</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>SIGNALIZED</td>
<td>Delay (Sec)</td>
<td>9.0</td>
<td>9.0</td>
<td>-</td>
<td>3.7</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>V/c</td>
<td>0.04</td>
<td>0.04</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.00</td>
</tr>
<tr>
<td>20</td>
<td>Northeast Parkway at Mathews Corners</td>
<td>UNSIGNALIZED</td>
<td>A</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>LOS</td>
<td>Delay (Sec)</td>
<td>8.5</td>
<td>8.5</td>
<td>-</td>
<td>3.6</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>V/c</td>
<td>0.01</td>
<td>0.01</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.00</td>
</tr>
<tr>
<td>30</td>
<td>Northeast Parkway at Overcash Drive</td>
<td>UNSIGNALIZED</td>
<td>A</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>LOS</td>
<td>Delay (Sec)</td>
<td>8.5</td>
<td>8.5</td>
<td>-</td>
<td>3.6</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>V/c</td>
<td>0.01</td>
<td>0.01</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.00</td>
</tr>
</tbody>
</table>

AM PM
The analysis results show that with the additional of the site traffic, all of the intersections are working at acceptable levels of service.

In Table 5-4 the 2023 No-Build is compared to the 2023 Build Analysis Results. This compares the measures of effectiveness for the overall intersection as well as for each approach. When the overall intersection or a specific approach has degraded by a level of service or when delay increased by over 25% of the 2023 No-Build results, the values are shown in red. This information shows any intersections that may need to have improvements (mitigations) to keep the roadway network performing at acceptable levels.
Matthews Multifamily Development TIA

**Table 5-4: 2023 No-Build – 2023 Build Analysis Results Comparison**

<table>
<thead>
<tr>
<th>Node</th>
<th>Intersection Description</th>
<th>MOE</th>
<th>2023 No-Build</th>
<th>2023 Build</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Overall EB</td>
<td>WB</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>D</td>
<td>C</td>
</tr>
<tr>
<td>10</td>
<td>NC 51 (Mathews Township Parkway) at Northeast Parkway SIGNALIZED</td>
<td>LOS</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay (Sec)</td>
<td>35.3</td>
<td>26.5</td>
</tr>
<tr>
<td>20</td>
<td>Northeast Parkway at Mathews Corners SIGNALIZED</td>
<td>LOS</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay (Sec)</td>
<td>8.8</td>
<td>8.8</td>
</tr>
<tr>
<td>30</td>
<td>Northeast Parkway at Overcash Drive UNSIGNALIZED</td>
<td>LOS</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay (Sec)</td>
<td>8.5</td>
<td>8.5</td>
</tr>
</tbody>
</table>

The comparison above indicates that with site traffic, there is no need for any mitigation.

**5.3.2 2023 Build Operational Analysis - Mitigated**

Based on the results of the 2023 Build analysis and the guidelines for mitigation measures in the Policy on Street and Driveway Access to North Carolina Highways, no mitigation is necessary.

In addition to the Synchro analysis review, consideration for the left and right turn lanes on Northeast Parkway was reviewed. This additional review was due to the volume on Northeast Parkway being over 4000 AADT. Therefore, volumes for left and right turns from Northeast Parkway onto Overcash Drive were analyzed. Based on the “Warrant for left and right-turn lanes” graph from *The Policy on Street And Driveway Access to North Carolina Highways*, separate turn lanes were not warranted in 2023 Build conditions. The volumes in our turn lanes did not meet minimum criteria for a turn lane.

**5.3.3 2023 Lane Length Queue Analysis**

Queue analyses were performed for the recommended configuration of the 2023 Build scenario to determine if the length of any of the existing turn bays need to be increased due to site traffic or if proposed turn bays are of adequate length.

Queue analysis compares the existing storage and number of lanes to the proposed storage and number of lanes, the 95th percentile queue as reported from Synchro, and the maximum queue reported by SimTraffic. The proposed storage length for the turn bays is based on the highest value from either the 95th percentile queue from Synchro or the maximum queue from SimTraffic, rounded up to the nearest 25 feet, with a minimum of 100 feet. Per Congestion Management guidelines, a default taper length of 100 feet was used. The queuing results can be seen in Table 5-5. SimTraffic reports can be seen in Appendix H. Any queue length that is longer than the existing storage bay is highlighted in yellow.
Table 5-5: 2023 Lane Queue Analysis Results

<table>
<thead>
<tr>
<th>Approach/Movement</th>
<th>Existing Number of Lanes</th>
<th>Existing Storage Length (ft)</th>
<th>Proposed Number of Lanes</th>
<th>Synchro/HCS 95th Queue (ft)</th>
<th>SimTraffic Max Queue (ft)</th>
<th>Proposed Storage Length (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC 51 (Mathews Township Parkway) at Northeast Parkway</td>
<td>L</td>
<td>2</td>
<td>#121</td>
<td>153/169</td>
<td>106/375**</td>
<td>175</td>
</tr>
<tr>
<td>EB NC 51 (Matthews Township Parkway)</td>
<td>L</td>
<td>1</td>
<td>#154</td>
<td>720</td>
<td>117</td>
<td>250</td>
</tr>
<tr>
<td>WB NC 51 (Matthews Township Parkway)</td>
<td>L</td>
<td>1</td>
<td>#121</td>
<td>196</td>
<td>199</td>
<td>75**</td>
</tr>
</tbody>
</table>

# 95th percentile volume exceeds capacity, queue may be longer.
* Volume for 95th percentile queue is metered by upstream signal
xxx* value is based on queue blocked by adjacent thru, not realistic
xxx** work done by future TIP would correct

Based on the queue analysis, the southbound left turn lane on Northeast Parkway is not long enough. This is a known deficiency and is being rectified under the U-2509A project. Currently the through volume is minimal (48 during AM peak and 82 during the PM peak) and based on SimTraffic simulation, during the AM peak, this does not impact overall operations. During the PM peak, the through cars do get stopped behind the left turning queue but are able to clear each cycle. The storage length of both the eastbound and westbound lefts on NC 51 show a need for additional storage. However, SimTraffic shows that these queues are based on cars not being able to access the turn lanes due to high volumes in the adjacent thru lane, therefore extending the lane is not recommended.

5.4 Year 2045 No-Build Analysis

The results of the 2045 No-Build Analysis for both Option 1 and Option 2 were used as the baseline to compare the impacts of the 2045 Build traffic volumes. For the 2045 No-Build scenario, the LOS, delay, and v/c ratios are shown in Tables 5-6 and 5-7. 2045 Peak Background traffic for these scenarios are shown on Figures 10 and 11.

The intersections of Northeast Parkway at NC 51 (Matthews Township Road) and Northeast Parkway/Moore Road at Matthews-Mint Hill Road were also analyzed under the U-2509 project. The results of that analysis vary from the following results. I spoke with Sarah Wicklund who did the U-2509 analysis. Due to the purpose and need for U-2509, that analysis used protected/permitted phasing and allowed right turns on red. The use of permitted phasing as well as using different models (Transmodeler verses Synchro) accounts for the variation in the resulting LOS. To be consistent with Congestion Management Guidelines for TIAs, the analyses below use protected only phasing and does not allow right turn on red.
The results of the 2045 No-Build Analysis for Option 1 indicate LOS of D or better for all intersections during both peaks except for NC 51 (Matthews Township Parkway) at Northeast Parkway during the PM peak, which operates at a LOS E.
The results of the 2045 No-Build Analysis for Option 2 indicate LOS of D or better for all intersections during both peaks except for NC 51 (Matthews Township Parkway) at Northeast Parkway during the PM peak, which operates at a LOS E.

### 5.5 Year 2045 Build Analysis

#### 5.5.1 2045 Build Operational Analysis

Traffic operations analyses for the 2045 Build Analysis were performed to assess anticipated conditions under 2 scenarios; Option 1 and Option 2. The results of the analysis can be seen in Tables 5-8 and 5-9. The additional trips generated due to rezoning for the Matthews Multi-Family Development for the individual peak hour movements can be seen in Table 3-2. The trip distribution for the site trips can see seen in Figure 12 for both Option 1 and Option 2. The trip assignment for these volumes on the study intersections can be seen in Figures 13 and 14. The 2045 build peak volumes used for this analysis can be seen in Figures 15 and 16.
**Table 5-8: 2045 RIRO w/ U-Turn Build Option 1 Analysis Results**

<table>
<thead>
<tr>
<th>Node</th>
<th>Intersection</th>
<th>MOE</th>
<th>Total</th>
<th>Eastbound</th>
<th>Westbound</th>
<th>Northbound</th>
<th>Southbound</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>U</td>
<td>L</td>
<td>T</td>
<td>R</td>
</tr>
<tr>
<td>10</td>
<td>NC 51 (Mathews Township Parkway) at Northeast Parkway SIGNALIZED</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>B</td>
<td>E</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>F</td>
<td>C</td>
<td>-</td>
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<tr>
<td></td>
<td></td>
<td>Delay</td>
<td>37.5</td>
<td>53.7</td>
<td>15.1</td>
<td>53.7</td>
<td>35.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V/c</td>
<td>63.9</td>
<td>69.1</td>
<td>65.6</td>
<td>112.4</td>
<td>23.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.17</td>
<td>0.42</td>
<td>1.05</td>
<td>0.83</td>
<td>0.66</td>
<td>-</td>
</tr>
<tr>
<td>20</td>
<td>Northeast Parkway at Mathews Corners UNSIGNALIZED</td>
<td>B</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay</td>
<td>12</td>
<td>12.0</td>
<td>-</td>
<td>8.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V/c</td>
<td>0.12</td>
<td>0.12</td>
<td>-</td>
<td>0.08</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.58</td>
<td>0.58</td>
<td>-</td>
<td>0.13</td>
<td>0.13</td>
<td>-</td>
</tr>
<tr>
<td>30</td>
<td>Northeast Parkway at Overpass Drive RIRO UNSIGNALIZED</td>
<td>A</td>
<td>-</td>
<td>A</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay</td>
<td>9.2</td>
<td>9.2</td>
<td>-</td>
<td>0.0</td>
<td>0.0</td>
</tr>
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<td></td>
<td></td>
<td>V/c</td>
<td>0.07</td>
<td>0.07</td>
<td>-</td>
<td>0.08</td>
<td>0.09</td>
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<td>0.07</td>
<td>-</td>
<td>0.18</td>
<td>0.13</td>
<td>-</td>
</tr>
<tr>
<td>35</td>
<td>Extended Northeast Parkway at Site Access B RIRO UNSIGNALIZED</td>
<td>A</td>
<td>-</td>
<td>A</td>
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<td>-</td>
<td>0.0</td>
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</tr>
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<td></td>
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<td>V/c</td>
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<td>0.02</td>
<td>-</td>
<td>0.09</td>
<td>0.09</td>
</tr>
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<td></td>
<td></td>
<td>0.02</td>
<td>0.02</td>
<td>-</td>
<td>0.18</td>
<td>0.10</td>
<td>-</td>
</tr>
<tr>
<td>40</td>
<td>Extended Northeast Parkway at Golden Corral Driveway UNSIGNALIZED</td>
<td>B</td>
<td>-</td>
<td>B</td>
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<td></td>
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<td>C</td>
<td>-</td>
<td>C</td>
<td>-</td>
<td>A</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay</td>
<td>10.0</td>
<td>10.0</td>
<td>-</td>
<td>7.4</td>
<td>0.0</td>
</tr>
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<td></td>
<td></td>
<td>V/c</td>
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<td>-</td>
<td>7.6</td>
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</tr>
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<td>-</td>
<td>0.07</td>
<td>0.07</td>
<td>-</td>
</tr>
<tr>
<td>50</td>
<td>Mathews-Mint Hill Road at Moore Road/ Northeast Parkway SIGNALIZED</td>
<td>D</td>
<td>-</td>
<td>E</td>
<td>D</td>
<td>C</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>-</td>
<td>D</td>
<td>C</td>
<td>E</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay</td>
<td>40.2</td>
<td>58.6</td>
<td>35.0</td>
<td>58.8</td>
<td>27.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V/c</td>
<td>31.2</td>
<td>53.9</td>
<td>21.8</td>
<td>56.7</td>
<td>19.7</td>
</tr>
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<td></td>
<td></td>
<td>0.59</td>
<td>0.44</td>
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<td>0.53</td>
<td>0.24</td>
<td>-</td>
</tr>
<tr>
<td>60</td>
<td>Proposed Site Access A at Overpass Drive UNSIGNALIZED</td>
<td>A</td>
<td>-</td>
<td>-</td>
<td>A</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay</td>
<td>8.6</td>
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<td>1.9</td>
<td>-</td>
<td>8.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V/c</td>
<td>0.04</td>
<td>0.02</td>
<td>0.01</td>
<td>-</td>
<td>0.04</td>
</tr>
<tr>
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<td>0.03</td>
<td>0.02</td>
<td>0.03</td>
<td>-</td>
<td>0.03</td>
<td>-</td>
</tr>
</tbody>
</table>

**AM PM**

.dr indicates that this is a Defacto right turn lane

The results of the 2045 Build Analysis for Option 1 indicates that the LOS of D or better for all intersections during both peaks except for NC 51 at Northeast Parkway during the PM peak is maintained.
The results of the 2045 Build Analysis for Option 2 indicate that the LOS of D or better for all intersections during both peaks except for NC 51 at Northeast Parkway during the PM peak is maintained.

In Tables 5-10 and 5-11 the 2045 No-Build is compared to the 2045 Build Analysis Results for Option 1 and Option 2, respectively. This compares the measures of effectiveness for the overall intersection as well as for each approach. The red values indicate when the overall intersection or a specific approach has degraded by a level of service or when delay increased by over 25% compared to the 2045 No-Build results. This information shows any intersections that may need to have improvements (mitigations) to keep the roadway network performing at acceptable levels.
Matthews Multifamily Development TIA

Table 5-10: 2045 No-build – 2045 Build Option 1 Analysis Results Comparison

<table>
<thead>
<tr>
<th>Node</th>
<th>Intersection</th>
<th>MOE</th>
<th>2045 No-build - Option 1</th>
<th>2045 Build - Option 1</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td>Overall</td>
<td>EB</td>
</tr>
<tr>
<td>10</td>
<td>NC 51 (Mathews Township Parkway) at Northeast Parkway SIGNALIZED</td>
<td>LOS</td>
<td>D  B  C  F  E</td>
<td>D  B  D  F  E</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>35.8</td>
<td>17.2</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>61.2</td>
<td>63.0</td>
</tr>
<tr>
<td>20</td>
<td>Northeast Parkway at Matthews Corners UNSIGNALIZED</td>
<td>LOS</td>
<td>B  B  -  A  -</td>
<td>B  B  -  A  -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>11.6</td>
<td>11.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>21.8</td>
<td>21.8</td>
</tr>
<tr>
<td>30</td>
<td>Northeast Parkway at Overcash Drive UNSIGNALIZED</td>
<td>LOS</td>
<td>A  A  -  -  -</td>
<td>A  A  -  -  -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>9.0</td>
<td>9.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>9.2</td>
<td>9.2</td>
</tr>
<tr>
<td>40</td>
<td>Extended Northeast Pkwy at Golden Corral Dr UNSIGNALIZED</td>
<td>LOS</td>
<td>A  A  -  A  A</td>
<td>B  B  -  A  A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>9.6</td>
<td>9.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>14.2</td>
<td>14.2</td>
</tr>
<tr>
<td>50</td>
<td>Mathews-Mint Hill Rd at Moore Rd/ Northeast Parkway SIGNALIZED</td>
<td>LOS</td>
<td>D  D  D  D  D</td>
<td>D  D  D  D  D</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>39.9</td>
<td>37.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>32.8</td>
<td>25.9</td>
</tr>
</tbody>
</table>

Comparing 2045 Option 1 No-build verses Build, there is a drop in the overall level of service for two of the intersections. Northeast Parkway at Matthews Corners drops one LOS grade only in the PM peak. The intersection of Northeast Parkway at Golden Corral driveway drops one LOS grade during both the AM and PM peak. There is also a drop in the level of service for the westbound approach of the intersection of NC 51 (Mathews Township Parkway) at Northeast Parkway. This decrease in LOS is associated with a 1.9 second increase in delay for that approach. If this Option is chosen, it requires mitigation. Mitigation for this will be addressed in the following section of this report.

Table 5-11: 2045 No-build – 2045 Build Option 2 Analysis Results Comparison

<table>
<thead>
<tr>
<th>Node</th>
<th>Intersection</th>
<th>MOE</th>
<th>2045 No-build - Option 2</th>
<th>2045 Build - Option 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Overall</td>
<td>EB</td>
</tr>
<tr>
<td>10</td>
<td>NC 51 (Mathews Township Parkway) at Northeast Parkway SIGNALIZED</td>
<td>LOS</td>
<td>D  B  C  E  E</td>
<td>D  B  C  E  E</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>35.8</td>
<td>17.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>60.8</td>
<td>63.6</td>
</tr>
<tr>
<td>20</td>
<td>Northeast Parkway at Matthews Corners UNSIGNALIZED</td>
<td>LOS</td>
<td>B  B  -  A  -</td>
<td>B  B  -  A  -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10.4</td>
<td>10.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>17.0</td>
<td>17.0</td>
</tr>
<tr>
<td>30</td>
<td>Northeast Parkway at Overcash Drive UNSIGNALIZED</td>
<td>LOS</td>
<td>A  A  -  A  -</td>
<td>B  B  -  A  -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>9.5</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>11.0</td>
<td>11.0</td>
</tr>
<tr>
<td>40</td>
<td>Extended Northeast Pkwy at Golden Corral Dr UNSIGNALIZED</td>
<td>LOS</td>
<td>A  A  -  A  A</td>
<td>B  B  -  A  A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>9.4</td>
<td>9.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>13.0</td>
<td>13.0</td>
</tr>
<tr>
<td>50</td>
<td>Mathews-Mint Hill Rd at Moore Rd/ Northeast Parkway SIGNALIZED</td>
<td>LOS</td>
<td>D  D  D  D  D</td>
<td>D  D  D  D  D</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>39.1</td>
<td>36.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>31.9</td>
<td>24.4</td>
</tr>
</tbody>
</table>

DRMP -20-
Comparing 2045 Option 2 No-build verses Build, there is a drop in the level of service for only one the intersection, Northeast Parkway at Overcash Drive, during the AM peak. If this Option is chosen, this will require mitigation. Mitigation for this will be addressed in the following section of this report.

Table 5-12: 2045 Alternative Roundabout Analysis Results

<table>
<thead>
<tr>
<th>Node</th>
<th>Intersection</th>
<th>MOE</th>
<th>Total</th>
<th>Eastbound</th>
<th>Westbound</th>
<th>Northbound</th>
<th>Southbound</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>Mathews-Mint Hill Road at Moore Road/ Northeast Parkway ROUNDABOUT</td>
<td>LOS</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay (Sec)</td>
<td>9.6</td>
<td>5.1</td>
<td>5.1</td>
<td>9.6</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V/c</td>
<td>0.649</td>
<td>0.207</td>
<td>0.207</td>
<td>0.395</td>
<td>0.39</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.399</td>
<td>0.353</td>
<td>0.356</td>
<td>0.304</td>
<td>0.304</td>
</tr>
</tbody>
</table>

The town of Matthews requested that the intersection of Matthews-Mint Hill Road at Northeast Parkway/Moore Road be analyzed as a roundabout. The table above show that a roundabout operates at an acceptable LOS at this location. This intersection was also analyzed under the 2045 project. It is my understanding from talking with Stuart Basham and Sarah Wicklund that this location was determined to operate better in the overall Matthews-Mint Hill Road system as a signalized intersection due to long queues from the adjacent signal to the west.

5.5.2 2045 Build - Mitigation

Based on the results of the 2045 Build Option 1 and 2 analyses and the guidelines for mitigation measures in the Policy on Street and Driveway Access to North Carolina Highways, mitigation is necessary for either Option 1 or Option 2.

Mitigation measures for the two options will be compared to determine if one of the Options is clearly better.

5.5.2.1 2045 Build Option 1 - Mitigation

For Option 1, based on the Synchro analysis, there is an unacceptable increase in delay for at the following locations:

- NC 51 (Matthews Township Parkway) at Northeast Parkway
  - westbound NC 51

- Northeast Parkway at Matthews Corners driveway
  - eastbound Matthews Corners drive

- Northeast Parkway at Golden Corral driveway
  - southbound Northeast Parkway
  - eastbound Golden Corral driveway.
The addition of turn bays at unsignalized intersections is the first consideration when approach delay becomes unacceptable. Therefore, an eastbound right turn lane is proposed at each location. This improvement would not improve the southbound approach on Northeast Parkway at the Golden Corral driveway. Additional lanes or adding a signal would be necessary to improve this delay.

The delay on the westbound of NC 51 could be handled in multiple ways. If this Option is chosen, then mitigation measures for that movement will be explored.

In addition to the Synchro analysis review, consideration for the left and right turn lanes on Northeast Parkway was reviewed. This additional review was due to the volume on Northeast Parkway being over 4000 AADT. Therefore, volumes for left and right turns from Northeast Parkway at the study intersections were analyzed. Based on the “Warrant for left and right-turn lanes” graph from The Policy on Street And Driveway Access to North Carolina Highways, storage bays for the southbound right turn lanes should be considered with a minimum of 100’ full storage length at Matthews Corners and Overcash Drive intersections. See graph on Appendix J.

For the 2045 Build Option 1 conditions with site traffic based on the rezoning the following mitigation measures would be needed:

- NC 51 (Matthews Township Parkway) at Northeast Parkway
  - Mitigation to reduce delay on westbound NC 51
- Northeast Parkway at Matthews Corners
  - Addition of an eastbound right turn bay
  - Addition of southbound right turn bay
- Northeast Parkway at Overcash Drive
  - Addition of southbound right turn bay
- Northeast Parkway at Golden Corral driveway
  - Addition of an eastbound right turn bay

### 2045 Build Option 2 - Mitigation

For Option 2, based on the Synchro analysis, there is an unacceptable increase in delay for the following locations:

- Northeast Parkway at Overcash Drive
  - eastbound Overcash Drive

The addition of turn bays at unsignalized intersections is the first consideration when approach delay becomes unacceptable. Therefore, an eastbound right turn lane is proposed for Overcash Drive.

In addition to the Synchro analysis review, consideration for the left and right turn lanes on Northeast Parkway was reviewed for Option 2. This additional review was due to the
volume on Northeast Parkway being over 4000 AADT. Therefore, volumes for left and right turns from Northeast Parkway at the study intersections were analyzed. Based on the “Warrant for left and right-turn lanes” graph from *The Policy on Street And Driveway Access to North Carolina Highways*, a storage bay for the southbound right turn lane should be considered with a minimum of 100’ full storage length at the intersection with Matthews Corners. See graph on Appendix J.

For the 2045 Build Option 2 conditions with site traffic based on the rezoning the following mitigation measures would be needed:

- Northeast Parkway at Matthews Corners
  - Addition of southbound right turn bay
- Northeast Parkway at Overcash Drive
  - Addition of eastbound right turn bay

### 5.5.2.3 2045 Build (Mitigated) Operational Analysis

Based on the mitigation listed above for Options 1 and 2, Option 2 is the recommended configuration. For the unsignalized intersections along Northeast Parkway, Option 2 has better overall LOS grades (no LOS D as seen in Option 1) and has fewer mitigation measures needed to maintain acceptable levels of service with additional traffic. The mitigation measures are also along Overcash Drive which is adjacent to the study site.

Therefore, Option 2 (full access) with mitigation was analyzed. The results of these mitigation measures on the operational analysis are shown below.
### Table 5-13: 2045 Build Option 2 (Mitigated) Analysis Results

<table>
<thead>
<tr>
<th>Node</th>
<th>Intersection</th>
<th>MOE</th>
<th>Total</th>
<th>Eastbound</th>
<th>Westbound</th>
<th>Northbound</th>
<th>Southbound</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>R</td>
<td>L</td>
</tr>
<tr>
<td>10</td>
<td>NC 51 (Mathews Township Parkway) at Northeast Parkerway SIGNALIZED</td>
<td>LOS</td>
<td>D</td>
<td>E</td>
<td>B</td>
<td>E</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay (Sec)</td>
<td>36.9</td>
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<td>15.8</td>
<td>75.0</td>
<td>31.7</td>
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<td></td>
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<td>V/c</td>
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<td>0.32</td>
<td>0.46</td>
<td>0.88</td>
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<tr>
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<td>0.42</td>
<td>1.05</td>
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<tr>
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<td>-</td>
<td>A</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay (Sec)</td>
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<td>10.3</td>
<td>-</td>
<td>-</td>
<td>7.6</td>
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<tr>
<td></td>
<td></td>
<td>V/c</td>
<td>0.40</td>
<td>-</td>
<td>0.40</td>
<td>-</td>
<td>0.05</td>
</tr>
<tr>
<td>30</td>
<td>Northeast Parkway at Overcash Drive UNSIGNALIZED</td>
<td>LOS</td>
<td>B</td>
<td>-</td>
<td>A</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay (Sec)</td>
<td>12.5</td>
<td>12.5</td>
<td>-</td>
<td>9</td>
<td>7.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V/c</td>
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<td>-</td>
<td>0.07</td>
<td>-</td>
<td>0.05</td>
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<tr>
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<td>Extended Northeast Parkway at Site Access 2 RIRO UNSIGNALIZED</td>
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<td>A</td>
<td>-</td>
<td>A</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay (Sec)</td>
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<td>-</td>
<td>8.9</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V/c</td>
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<td>-</td>
<td>0.01</td>
<td>-</td>
<td>0.06</td>
</tr>
<tr>
<td>40</td>
<td>Extended Northeast Parkway at Golden Corral Driveway UNSIGNALIZED</td>
<td>LOS</td>
<td>A</td>
<td>-</td>
<td>A</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay (Sec)</td>
<td>9.5</td>
<td>-</td>
<td>9.5</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V/c</td>
<td>0.21</td>
<td>-</td>
<td>0.21</td>
<td>-</td>
<td>0.05</td>
</tr>
<tr>
<td>50</td>
<td>Mathews-Mint Hill Road at Moore Road/ Northeast Parkway SIGNALIZED</td>
<td>LOS</td>
<td>D</td>
<td>-</td>
<td>E</td>
<td>C</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay (Sec)</td>
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<td>0.44</td>
<td>0.35</td>
<td>0.63</td>
<td>0.24</td>
</tr>
</tbody>
</table>

**AM PM**

..dr indicates that this is a Defacto right turn lane

The comparison of the above results with the 2045 No-Build option 2 scenario can be seen in Table 5-14. The same criteria that was considered for the original Build scenario must be met.
Table 5-14: 2045 No-Build – 2045 Build Option 2 (Mitigated) Analysis Results Comparison

<table>
<thead>
<tr>
<th>Node</th>
<th>Intersection</th>
<th>MOE</th>
<th>2045 No-Build – Option 2</th>
<th>2045 Build – Option 2 (Mitigated)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LOS</td>
<td>Overall EB</td>
<td>WB</td>
</tr>
<tr>
<td>10</td>
<td>NC 51 (Mathews Township Parkway) at Northeast Parkway</td>
<td>SIGNALIZED</td>
<td>D</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay (Sec)</td>
<td>35.8</td>
<td>17.2</td>
</tr>
<tr>
<td>20</td>
<td>Northeast Parkway at Mathews Corners</td>
<td>UNSIGNALIZED</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay (Sec)</td>
<td>10.4</td>
<td>10.4</td>
</tr>
<tr>
<td>30</td>
<td>Northeast Parkway at Overcash Drive</td>
<td>UNSIGNALIZED</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay (Sec)</td>
<td>11.0</td>
<td>11.0</td>
</tr>
<tr>
<td>40</td>
<td>Extended Northeast Pkwy at Golden Corral Dr</td>
<td>UNSIGNALIZED</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay (Sec)</td>
<td>9.4</td>
<td>9.4</td>
</tr>
<tr>
<td>50</td>
<td>Mathews-Mint Hill Rd at Moore Rd/ Northeast Parkway</td>
<td>SIGNALIZED</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delay (Sec)</td>
<td>39.1</td>
<td>36.4</td>
</tr>
</tbody>
</table>

Based on the above comparison, the results from the 2045 Build Option 2 mitigated condition meet all requirements from the Policy on Street and Driveway Access to North Carolina Highways.

5.5.3 2045 Lane Length Queue Analysis

Queue analyses were performed for the for the 2045 Build Option 2 mitigated scenario to determine the length of the proposed turn bays. Due to some challenges at the existing intersections, existing queue lengths are also reported for 2045 No-Build conditions to be able to indicate if an existing queueing issue is due to site traffic or was already an issue.

The queuing results can be seen in Table 5-15 for No-build conditions and Table 5-16 for Build Mitigated conditions. Any queue length that is longer than the existing storage bay is highlighted in yellow. Also note that both northbound Moore Road and southbound Northeast Parkway have unusual lane configurations in that the through or through-right movement is set as the movement with storage instead the corresponding right or left turn lanes. This was done to account for the heavy movement towards US 74 and light through volumes. These movements are highlighted in blue in the following table.

Synchro and SimTraffic reports can be seen in Appendices F and H, respectively.
Matthews Multifamily Development TIA

Table 5-15: 2045 Full Access No-Build Lane Queue Analysis Results

<table>
<thead>
<tr>
<th>Approach/Movement</th>
<th>Existing Lanes</th>
<th>Existing Storage Length (ft)</th>
<th>Synchro/HCS 95th Queue (ft)</th>
<th>SimTraffic Max Queue (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of</td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
</tr>
<tr>
<td><strong>NC 51 (Matthews Township Parkway) at Northeast Parkway</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EB NC 51 (Matthews Township Parkway)</td>
<td>L/ 1</td>
<td>2</td>
<td>175</td>
<td>35</td>
</tr>
<tr>
<td>WB NC 51 (Matthews Township Parkway)</td>
<td>L</td>
<td>1</td>
<td>150</td>
<td>83</td>
</tr>
<tr>
<td>NB Northeast Parkway</td>
<td>L</td>
<td>1</td>
<td>325</td>
<td>#265</td>
</tr>
<tr>
<td>SB Northeast Parkway</td>
<td>L</td>
<td>2</td>
<td>225/75</td>
<td>#111</td>
</tr>
</tbody>
</table>

Mathews-Mint Hill Road at Northeast Parkway

| EB Matthews-Mint Hill Road             | L              | 1  | 150 | 79  | 120 | 92 | 154 |
| WB Matthews-Mint Hill Road            | L              | 1  | 150 | 191 | 144 | 149 | 135 |
| NB Northeast Parkway                  | TR             | 1  | 100 | 77  | 145 | 200 | 200 |
| SB Northeast Parkway                  | L              | 1  | 100 | m37 | 45  | 71  | 67  |
| SB Northeast Parkway                  | T              | 1  | 100 | m12 | 23  | 27  | 48  |

# 95th percentile volume exceeds capacity, queue may be longer.

m Volume for 95th percentile queue is metered by upstream signal

xxx* value is based on queue blocked by adjacent thru, not realistic

xxx** work done by future TIP would correct

Based on the 2045 No-Build queue analysis, several existing lanes need to be reviewed.

**NC 51 (Matthews Township Parkway) at Northeast Parkway**

For the intersection of NC 51 (Matthews Township Parkway) at Northeast Parkway, all of the storage bays report issues. For the eastbound and westbound left turns on NC 51, this is a result of the turning traffic not being able to access the turn lane due to high volumes in the adjacent thru lane, therefore extending the lane is not recommended.

The southbound left turn lane on Northeast Parkway experiences queues that block the existing through lane in 2020. This is a known deficiency and is being rectified under the U-2509A project. This extension should be examined closely based on the queue analysis for 2045 No-Build results. Maximizing the length of the left turns within the existing curb and gutter section does not appear to be enough storage for this movement.

The northbound left on Northeast Parkway also indicates deficiencies in storage capacity. This also should be reviewed under the U-2509A project.

**Matthews-Mint Hill Road at Northeast Parkway/Moore Road**

For the intersection of Matthews-Mint Hill Road at Northeast Parkway/Moore Road, three of the existing/proposed storage bays report issues. The eastbound left turn off of Matthews-Mint Hill Road only indicates a need for an additional five feet of storage. The westbound left turn off of Matthews-Mint Hill Road indicates a need for and additional 41 feet of storage. Based on the proposed configuration, this storage can be seen in the
Matthews Multifamily Development TIA

existing two-way left turn lane. There are not any proposed driveways for 554’ back from the intersection, therefore this movement does not warrant any improvements.

Northbound Moore Road has an unusual configuration as mentioned previously. The storage bay for the northbound through-right movement is indicating storage capacity issues. This northbound left should be examined under the U-2509 project for potential improvements.

Table 5-16: 2045 Full Access Build Mitigated Lane Queue Analysis Results

<table>
<thead>
<tr>
<th>Approach/Movement</th>
<th>Existing Number of Lanes</th>
<th>Existing Storage Length (ft)</th>
<th>Proposed Number of Lanes</th>
<th>Synchro/HCS 95th Queue (ft)</th>
<th>SimTraffic Max Queue (ft)</th>
<th>Proposed Storage Length (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC 51 (Mathews Township Parkway) at Northeast Parkway</td>
<td>U/L</td>
<td>2</td>
<td>175</td>
<td>2</td>
<td>40</td>
<td>72</td>
</tr>
<tr>
<td>WB NC 51 (Mathews Township Parkway)</td>
<td>L</td>
<td>1</td>
<td>150</td>
<td>1</td>
<td>#191*</td>
<td>349*</td>
</tr>
<tr>
<td>NB Northeast Parkway</td>
<td>L</td>
<td>1</td>
<td>325</td>
<td>1</td>
<td>#293</td>
<td>#352</td>
</tr>
<tr>
<td>SB Northeast Parkway</td>
<td>L</td>
<td>2</td>
<td>225/75</td>
<td>2</td>
<td>#140</td>
<td>#317</td>
</tr>
<tr>
<td>Northeast Parkway at Matthews Corners</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NB Northeast Parkway</td>
<td>L</td>
<td>1</td>
<td>150</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>SB Northeast Parkway</td>
<td>R</td>
<td>1</td>
<td>100</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Northeast Parkway at Overcash Drive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EB Overcash Drive</td>
<td>R</td>
<td>1</td>
<td>100</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>NB Northeast Parkway</td>
<td>U/L</td>
<td>1</td>
<td>100</td>
<td>1</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Northeast Parkway at Access B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SB Northeast Parkway</td>
<td>R</td>
<td>1</td>
<td>50</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Northeast Parkway at Golden Corral</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NB Northeast Parkway</td>
<td>L</td>
<td>1</td>
<td>150</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>SB Northeast Parkway</td>
<td>U</td>
<td>1</td>
<td>100</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

# 95th percentile volume exceeds capacity, queue may be longer.

m Volume for 95th percentile queue is metered by upstream signal

xxx* value is based on queue blocked by adjacent thru, not realistic
xxx** work done by future TIP would correct

Based on the queue analysis for the 2045 Full Access Build Mitigated scenario, the deficiencies shown are equal or less than the deficiencies shown in the No-Build scenario for the movements that have been determined to have storage issues (ie, not blocked by adjacent traffic). Based on this information, there are no additional recommendations for mitigation based on the queue analysis.

Table 5-17 lists the recommendations for the new lanes as well as turn bay improvements under this project. See Figure 17 for a graphical representation of this information.
6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Operational analyses were performed in two portions to assess the proposed development along Northeast Parkway. First, the existing condition up through build-out year of the site was done by analyzing 2020 Existing, 2023 No-Build and 2023 Build conditions. A second analysis was performed to determine the impacts of the rezoning of the site on the upcoming TIP project U-2509. The design year for U-2509 is 2045. Therefore, 2045 No-Build and 2045 Build were analyzed for two options. Option 1 maintains RIRO for Overcash Drive as shown in the 25% plans for U-2509. Option 2 allows full access at Overcash Drive. Based on the analysis, for the 2045 Build scenario improvements to two of the intersections in the study are necessary to maintain acceptable levels of service.

6.2 Recommendations

The following recommendations are made for mitigation measures based on the information in this report:

- Northeast Parkway at Matthews Corners
  - Addition of southbound right turn bay with a storage length of 100’.
- Northeast Parkway at Overcash Drive
  - Addition of eastbound right turn bay with a storage length of 100’.

Since the site traffic does not impact the right-turn lane into Matthews Corners, it is our recommendation that this be considered as a part of the U-2509A project.

The eastbound right turn lane on Overcash Drive at Northeast Parkway would be the responsibility of the developer.

See Figure 17 for a graphical representation of this information.
Figure 2

2020 Existing Lane Configuration

Legend:
- Existing Full Lane
- Existing Turn Bay
- Existing Storage Length
- Proposed Full Lane
- Proposed Turn Bay
- Mitigated Storage Length

Mathews Multi-Family Development
Matthews, NC

Plans Prepared By:

Scale: Not to Scale

Figure 2
Figure 4

Traffic (No-Build)

Background

2023 Peak

Mathews
Multi-Family
Development
Matthews, NC

LEGEND

Stop-Controlled
Existing Signal

Movement per approach

*Min volumes per CM guidelines

XX AM
(XX) PM

Scale: Not to Scale

Figure 4
Mathews Multi-Family Development
Matthews, NC

2023 Proposed Trip Distribution
Scale: Not to Scale
Figure 5

Proposed Site

Existing Signal
Stop-controlled
Note: Volumes may be greater than Trip Generation due to rounding.
Figure 7

**Legend**

- **Street Names**: Matthews Township Pkwy, Matthews Corners, Overcash Drive
- **Future Extension**
- **Proposed Site**

**Vehicles per Approach**:
- 10
- 20
- 30
- 60

**Traffic Volumes (Build)**

<table>
<thead>
<tr>
<th>Approach</th>
<th>Movement</th>
<th>Volume (Build)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overcash Drive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matthews Corners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northeast Parkway</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note**: Min volumes per CM guidelines

**Mathews Multi-Family Development**

- Matthews, NC

2023 Peak Traffic Volume (Build)

**Plans Prepared By**

- DRMP
  - 8000 Regency Parkway, Suite 110
  - Matthews, NC
  - NC License No: D-2215
  - (919) 650-1038

**Scale**: Not to Scale

**Figure 7**
No Recommended Lane Configuration Modifications
Figure 9

Future Northeast Parkway

Northwest Parkway

Golden Corral

Future Northeast Parkway

Northeast Parkway

Matthews-Mint Hill Rd

Moore Road

LEGEND

Existing Full Lane
Existing Turn Bay
XXX Existing Storage Length
Proposed Full Lane
Proposed Turn Bay
XXX Mitigated Storage Length

Plan Prepared By:

Mathews Multi-Family Development Matthews, NC

2045 Anticipated Lane Configuration

Scale: Not to Scale

DocuSign Envelope ID: E87CB072-015C-42E9-8958-980A4A6E67C5
Option 1 is RIRO from Overcash Dr
Option 2 is full access from Overcash Dr
Proposed Site

Note: Volumes may be greater than Trip Generation due to rounding.

LEGEND

- **Stop-Controlled**
- **Existing Signal**

Movement per approach

*Min volumes per CM guidelines

**PLANS PREPARED BY:**

**DRMP**

**Mathews Multi-Family Development**

**Matthews, NC**

**2045 Proposed Trip Assignments (Option 1)**
**Proposed Site**

**Figure 14**

**Legend**
- XX AM (XX PM): Stop-Controlled
- Existing Signal
- Movement per approach

**Note:** Volumes may be greater than Trip Generation due to rounding.

**Plans Prepared By:**
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Cary, NC 27518
NC License No. C-2213 (919) 650-1038

**Mathews Multi-Family Development**
Matthews, NC

**2045 Proposed Trip Assignments (Option 2)**

**Scale:** Not to Scale

**Figure 14**
Plans Prepared By:
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Cary, NC 27518
8000 Regency Parkway, Suite 110
DRMP, Inc.

Site
Proposed
Matthews, NC
Development
Multi-Family
Mathews
Northeast Parkway
NC 51 (Matthews Township Pkwy)
Corral
Golden Corners
Matthews
Dr
Oversash
Moore Road
Matthews-Mint Hill Rd
Future Northeast Parkway

LEGEND

XX AM (XX) PM
Stop-Controlled
Existing Signal
Movement per approach
*Min volumes per CM guidelines

Mathews Multi-Family Development
Matthews, NC
2045 Peak Traffic Volume (Build)
(Option 1)

Scale: Not to Scale  Figure 15
CONCEPTUAL DEVELOPMENT SUMMARY:

TOTAL SITE AREA: +/- 10.5 ACRES

APARTMENTS: +/- 216 TOTAL UNITS
1,050 NSF/UNIT AVG | 228,800 NRSF TOTAL

TOWNHOMES: 25 UNITS

4-STORY FLATS: 187 UNITS

CARRIAGE BLDGS: 4 UNITS

LEASING & AMENITIES: 8,000 SF

PARKING: 358 TOTAL SPACES
306 SURFACE SPACES + 52 GARAGE SPACES
PARKING RATIO: 1.66 SPACES/UNIT