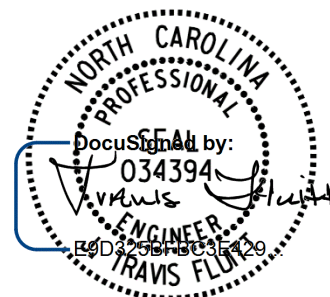


MEMORANDUM

To: Liz Palermo, Town of Wake Forest
From: Travis Fluitt, PE, Kimley-Horn and Associates
Date: February 14, 2023
Subject: **Burlington Mills Residential - TIA Addendum**



2/14/2023

Based on discussions with the Town of Wake Forest, Kimley-Horn has prepared an addendum to the *Burlington Mills Residential TIA* dated September 30, 2022. This addendum provides updated build-out (2024) traffic scenarios with three proposed improvements. These improved scenarios include adjusted signal timings, dual southbound left-turn lanes, and converting the intersection of US 1 at Burlington Mills Road to a through-cut intersection, which prohibits through-movements on the side streets (i.e. crossing US 1 in this case). This analysis considered both levels of service and delays as well as the Town of Wake Forest's (Town) Uniform Development Ordinance (UDO) requirements for the volume-to-capacity (v/c) ratio thresholds at the intersection of US 1 at Burlington Mills Road.

Capacity Analysis

At the request of the Town, the build-out (2024) traffic volumes were analyzed with additional improvements. The v/c ratio thresholds outlined in the Town's UDO were used to determine the improvement scenario with the least amount of impact. The intersection of US 1 at Burlington Mills Road currently has a maximum v/c ratio of 0.95 in the AM peak hour and 1.17 in the PM peak hour. Per **Table 1** below, the allowable increase in v/c ratio from the background to build-out conditions is 0.02.

Table 1: V/C Threshold Table, per Town of Wake Forest

| <i>Existing V/C</i> | <i>Allowable Increase in V/C by Development</i> |
|---------------------|---|
| 0.00-0.60 | 0.10 |
| 0.61-0.70 | 0.07 |
| 0.71-0.80 | 0.05 |
| 0.81-0.90 | 0.03 |
| 0.91-1.00+ | 0.02 |

It should be noted that the site traffic volumes from the original study were used in this analysis. For the through-cut improvement analysis scenario, through traffic on the eastbound and westbound approaches were rerouted as right-turns and then to the appropriate U-turn locations along US 1 and are expected to use the northbound or southbound right-turn lane to reach their destination across US 1. The eastbound and westbound through-movements at their intersection are very low (16 combined AM and 22 combined PM). Therefore, the prohibition of these movements is not expected to be a major inconvenience to the motoring public.

Table 2 summarizes the level of service at the intersection of US 1 at Burlington Mills Road for the build-out (2024) traffic conditions for each improvement scenario. The attached **Table 3** summarizes the v/c ratios for the build-out (2024) traffic conditions for each improvement scenario.

Recommendations

Based on the update analyses presented herein, to meet the v/c ratio threshold outlined in the Town's UDO, the following improvement is recommended:

Capital Boulevard at Burlington Mills Road

- Modify traffic signal timings

All three improvement scenarios are expected to satisfy the v/c ratio for the overall intersection of US 1 at Burlington Mills Road under build-out (2024) traffic conditions; however, all improvement scenarios have specific movements that exceed the allowable increase in the v/c ratio. While overall delays are expected to improve from background to build-out traffic conditions with a through-cut configuration or dual southbound left-turn lanes at this intersection, signal timing adjustments are expected to have the least amount of impact at the minor-street westbound approach of Burlington Mills Road.

With signal timing modifications, the overall v/c ratio of the intersection is expected to be within the allowable 0.02 threshold as outlined in the Town's UDO. The v/c ratio is expected to increase by 0.02 during the AM peak hour and decrease by 0.01 during the PM peak hour from background to build-out traffic conditions with this improvement.

All other study intersections are expected to meet the v/c ratio threshold defined by the Town.

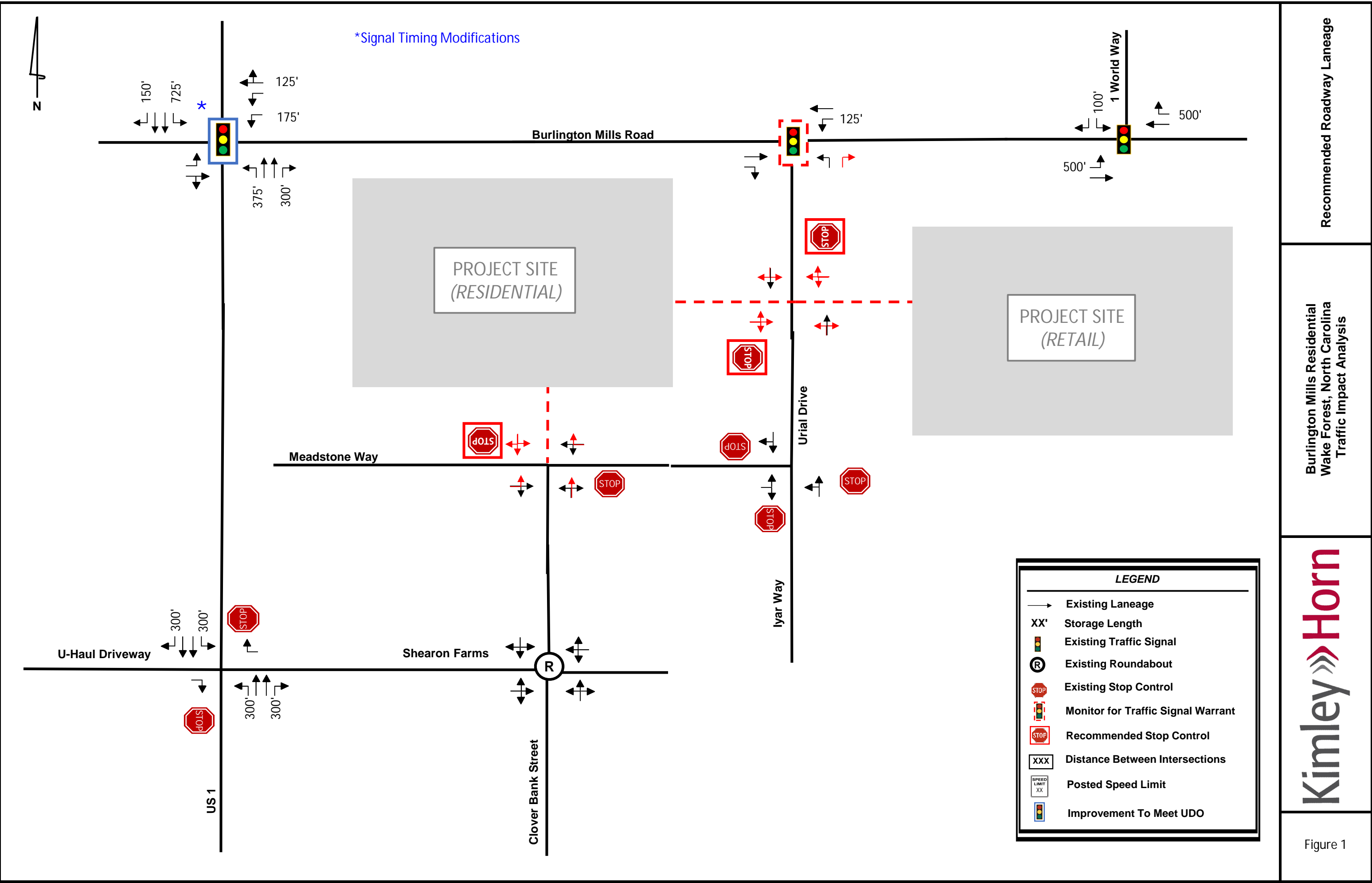
Should you have any questions or comments, please do not hesitate to contact me at (919) 653-2948 or travis.fluitt@kimley-horn.com.

| Burlington Mills Road Residential Table 2 - Level of Service Summary | | | | | | | | | | | | |
|---|-------------------------|-----------|---------------------------|-----------|--------------------------|-----------|---|-----------|---|-----------|---|-----------|
| Intersection and Approach/Movement | Existing (2022) Traffic | | Background (2024) Traffic | | Build-out (2024) Traffic | | Build-out (2024) Traffic w/ Adjusted Signal Timings | | Build-out (2024) Traffic w/ Dual SB Left-Turn Lanes | | Build-out (2024) Traffic w/ Through-Cut | |
| | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM |
| Capital Boulevard at Burlington Mills Road | D (50.0) | D (45.1) | F (87.0) | E (62.3) | F (98.7) | E (68.2) | F (97.3) | E (66.3) | F (86.9) | E (57.3) | F (82.6) | E (58.9) |
| Eastbound | E (67.3) | F (105.9) | E (66.1) | F (127.5) | E (65.8) | F (149.4) | E (65.9) | F (149.4) | E (67.0) | F (131.1) | C (26.8) | D (50.3) |
| Westbound | E (69.9) | F (86.2) | E (65.6) | F (96.8) | E (65.7) | F (98.7) | E (66.0) | F (94.0) | E (71.3) | F (96.2) | F (81.5) | F (104.2) |
| Northbound | D (44.3) | C (33.0) | E (74.3) | D (48.0) | F (88.0) | D (49.8) | F (88.0) | E (55.0) | E (68.3) | D (49.9) | E (69.0) | D (45.9) |
| Southbound | D (49.0) | D (46.4) | F (103.8) | E (65.8) | F (117.9) | E (77.1) | F (114.6) | E (67.8) | F (107.5) | D (50.9) | F (94.9) | E (59.1) |

| Burlington Mills Road Residential Table 3: V/C Ratio Comparison | | | | | | | | | | | | |
|--|-------------------------|------|---------------------------|------|--------------------------|------|--|------|--|------|--|------|
| Intersection and Approach/Movement | Existing (2022) Traffic | | Background (2024) Traffic | | Build-out (2024) Traffic | | Build-out (2024) Traffic w/ Adjusted Signal Timings | | Build-out (2024) Traffic w/ Dual SB Left-Turn Lanes | | Build-out (2024) Traffic w/ Through-Cut | |
| | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM | AM | PM |
| Capital Boulevard at Burlington Mills Road | 0.95 | 1.17 | 1.13 | 1.39 | 1.16 | 1.56 | 1.15 | 1.38 | 1.14 | 0.95 | 1.11 | 1.33 |
| Eastbound Left | 0.02 | 0.40 | 0.02 | 0.67 | 0.03 | 0.84 | 0.03 | 0.84 | 0.03 | 0.70 | 0.04 | 0.11 |
| Eastbound Through/Right* | 0.18 | 0.38 | 0.18 | 0.41 | 0.18 | 0.41 | 0.18 | 0.41 | 0.18 | 0.39 | 0.05 | 0.08 |
| Westbound Left | 0.71 | 0.64 | 0.71 | 0.72 | 0.72 | 0.73 | 0.73 | 0.73 | 0.75 | 0.71 | 0.77 | 0.77 |
| Westbound Through/Right* | 0.43 | 0.66 | 0.46 | 0.82 | 0.50 | 0.84 | 0.50 | 0.80 | 0.54 | 0.82 | 0.45 | 0.69 |
| Northbound Left | 0.44 | 0.51 | 0.43 | 0.54 | 0.53 | 0.60 | 0.56 | 0.60 | 0.55 | 0.64 | 0.53 | 0.60 |
| Northbound Through | 0.86 | 0.80 | 1.06 | 0.94 | 1.10 | 0.95 | 1.10 | 0.97 | 1.04 | 0.95 | 1.04 | 0.93 |
| Northbound Right | 0.22 | 0.27 | 0.32 | 0.33 | 0.32 | 0.33 | 0.32 | 0.34 | 0.31 | 0.33 | 0.31 | 0.34 |
| Southbound Left | 0.63 | 1.17 | 0.85 | 1.39 | 0.89 | 1.56 | 0.89 | 1.38 | 0.54 | 0.84 | 0.89 | 1.33 |
| Southbound Through | 0.95 | 0.70 | 1.13 | 0.83 | 1.16 | 0.83 | 1.15 | 0.83 | 1.14 | 0.83 | 1.11 | 0.80 |
| Southbound Right | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 |

*Right-turn V/C ratio reported in scenario with through-cut as through movement is not allowed with this intersection configuration

Note: Improved scenarios include recommended traffic signal at



Recommended Roadway Laneage

Burlington Mills Residential
Wake Forest, North Carolina
Traffic Impact Analysis



Figure 1