

MEMORANDUM

TO:	Joe Milazzo II, PE – RTA Executive Director
FROM:	Larry Green, PE, PTOE
DATE:	December 14, 2023
SUBJECT:	US 1 Corridor (I-540 to Wake County/Franklin County Line)

NCDOT has a proposal to upgrade the US 1 corridor to a freeway between I-540 and the Wake/Franklin county line.

The purpose of this memorandum is to summarize estimated travel times for southbound US 1 vehicles from the Wake County/Franklin County line to I-540 during the AM peak period; and for northbound US 1 vehicles from I-540 to the Wake County/Franklin County line during the PM peak period for the following scenarios:

- Existing Conditions
- Year 2035 No-Build Conditions (Existing Infrastructure)
- Year 2035 Build Condition (Freeway Section throughout corridor)
- Year 2035 Build Condition (Alternative route using adjacent Service Road)

Shown below are the findings of each scenario and basis of each finding:

Existing Conditions and Context

Wake County is the most populous county in the region and state, and Franklin County has the highest population growth rate in the metropolitan Triangle. As a result of this growth, traffic and congestion has steadily increased along the US 1 corridor. In addition to overall traffic volumes, the duration of the peak period has steadily increased over the past few years. As growth continues in northern Wake and Franklin counties, the expansion of the peak periods into more portions of the day along the US 1 corridor will only continue.

Based upon estimations in Google Maps and Waze the average time to travel southbound along US 1 during the AM peak period and travel northbound during the PM peak period through the study section along US 1 between I-540 and the Wake County/Franklin County line varied between 15-45 minutes on a daily basis. Therefore, for purposes of comparison, a travel time of 30 minutes was assumed during each peak time period.



Year 2035 No-Build Conditions

In order to estimate delays along the US 1 corridor in the Year 2035 if no improvements are constructed along the US 1 corridor, Wetherill Engineering utilized 2 sources. First, a report along the entire US 1 corridor prepared by RS&H was examined and a report prepared by Exult Engineering that focused on the US 1 at Main Street/Falls of Neuse Road and US 1 at Burlington Mill Road intersection was examined. A total of eleven (11) signalized intersections currently exist along the corridor.

First, detailed delay analyses were conducted by Exult Engineering at the US 1 at Main Street/Falls of Neuse Road and the US 1 at Burlington Mill Road intersection. Therefore, the average peak period delays along US 1 were utilized directly from this report. In addition, it was determined that the projected US 1 traffic exceeded theoretical capacity at the US 1 at Durant Road/Perry Creek Road and US 1 at Purnell Road/Harris Road at similar levels as the US 1 at Main Street/Falls of Neuse Road intersection. Therefore, it was assumed that US 1 delays at Durant Road/Perry Creek Road and Purnell Road/Harris Road would be like the US 1 delays at Main Street/Falls of Neuse Road. Thus, specific US 1 delays at four (4) intersections were established during the peak AM/PM periods. US 1 delays at the other seven (7) intersections were assumed to be operating at the LOS "E"/LOS "F" threshold since the projected average daily traffic volumes were at capacity. For these locations, a US 1 delay of 90 seconds per intersection was assumed.

Below is a summary of the findings for the Year 2035 No-Build Scenario for US 1 delays in the peak direction (southbound AM/northbound PM):

US 1 at Durant Road/Perry Creek Road = 405 seconds of delay US 1 at Burlington Mills Road = 716 seconds of delay US 1 at Main Street/Falls of Neuse Road = 405 seconds of delay US 1 at Purnell Road/Harris Road = 405 seconds of delay Other 7 signalized intersections (90 seconds delay per intersection x 7 intersections) = 630 seconds of delay

2,561 seconds = 43 minutes intersection delay

10 miles of corridor @ 30 MPH travel speed between intersection = 20 minutes travel time

Total Year 2035 No-Build Corridor Travel Time = 63 minutes



Year 2035 Build Condition (Freeway Section)

Upon completion of the upgrade of US 1 to a freeway, there will be no traffic signals, no left turns, and no driveways. For the same number of travel lanes, a signalized roadway will reach capacity and breakdown conditions at much lower volumes than a freeway (e.g., a superstreet has about 65% of freeway capacity on a per-lane basis). A 4-lane freeway actually has slightly more capacity, and slightly less travel time and delay, than a 6-lane superstreet, under typical assumptions.

10 miles of corridor @ 65 MPH travel speed = 9.2 minutes travel time

Year 2035 Build Condition (Service Road Routing)

Concurrently with the construction of the proposed freeway, a service road would be provided beginning near the I-540/Triangle Town Boulevard interchange to the Wake County/Franklin County line along US 1 in order to maintain access to properties. This service road will also provide motorists with an option to avoid the freeway for all or part of their journey. The Service Road will traverse either along the east side or west side of US 1. Due to the somewhat circuitous nature of the service road, the length of the Service Road to travel through the study area is approximately 12 miles (as opposed to 10 miles directly along the freeway). Since traffic will be significantly less along the service road, the intersections will likely operate at good levels of service. We have assumed that each intersection will experience an average delay of 30 seconds.

A total of sixteen (16) signalized intersections will be located along the corridor over the 12 miles. It will also be assumed that vehicles will travel at 35 MPH between the signalized intersections. Based upon the above assumptions, the following travel times were estimated:

- 16 intersections @ 30 seconds delay per intersection = 8 minutes
- 12 miles of roadway @ 35 MPH = 20.6 minutes

Total Service Road Travel Time = 8 minutes + 20.6 minutes = 28.6 minutes



<u>Summary</u>

Existing 2023 Travel Times = 30 minutes Year 2035 No-Build Travel Times = 63 minutes Year 2035 Build Travel Times (Freeway) = 9.2 minutes Year 2035 Build Travel Times (Service Road) = 28.6 minutes

Upgrading US 1 to a multimodal freeway will provide added capacity, a higher speed limit, and the elimination of all traffic signals for the entire ten-mile corridor. As a result, the US 1 freeway improvement option will result in projected future travel times of less than 10 minutes, versus projected future travel times of over 1 hour along an unimproved mainline US 1 corridor with no freeway option available (i.e., a "no build" scenario).

If motorists were to choose to utilize the future service road network rather than the adjacent freeway for their entire trip, future projected travel times will be around 30 minutes; i.e., much longer than along the freeway, but still significantly lower than a 1 hour+ projected future peak period travel time along US 1 without a freeway option available. This future travel time via service road would be similar to, although likely more reliable than, the travel time that travelers often experience during peak periods today.