

NC 54 Study Methodology – Durham

Proposed Improvement Scenarios:

Queue Jump Scenario – Represents the use of exclusive right-turn lanes on NC 54 (existing and proposed where applicable) by buses, which then proceed through the intersection before other traffic on the major street using a dedicated phase. While Synchro is limited in its ability to model transit inputs, this improvement was modeled by adding a 5-second phase to the signal (and thereby increasing the cycle length) that serves only the eastbound and westbound right-turn lanes at signalized intersections where right-turn lanes exist or are proposed (not shared lanes). Right-turns-on-red were restricted to model a situation in which a bus at the front of the queue prohibited right-turn traffic from turning on red, and leading/lagging phases were adjusted such that the major street movements led (and therefore the queue jump immediately precedes those phases).

Transit Signal Priority Scenario – Represents signal timing/phasing adjustments that extend the major-street green phase or cut short (truncate) the minor street phase to serve buses detected on the major street. While Synchro is limited in its ability to model transit inputs, this improvement was modeled by adding 5-seconds of green time to major street through movement phases and reducing a side-street movement by 5 seconds. While extensions/truncations are generally longer than 5 seconds, those are also generally restricted from occurring in successive phases. As this analysis studies that occurrence in each phase, it is expected that the analysis presents an “average” condition (not a “best case” scenario in which TSP is never implemented but also not a “worst case” in which the extension/truncation is more than 5 seconds). Leading/lagging phases were adjusted such that the major street movements led (and therefore the extension phase immediately precedes those phases).

Notes/Observations:

- Long queues on NC 54 and Farrington Road are expected to continue in the Future Year scenario. Preliminary queueing analyses indicate that, even with a 6-lane section in place on NC 54, queues are still expected to extend past Huntingridge Road.
- May wish to consider relocating/shifting bus stops due to restriping of westbound approach of NC 54 at Farrington, especially if NC 54 is widened.
- If extremely long queues continue, improving shoulder for bus use may greatly improve bus travel times. Widening NC 54 for vehicular traffic would be beneficial from a capacity perspective, but if long queues continue, transit will still be severely impacted by those queues and other implementation measures will be less effective.