

Appendix E

Traffic Capacity Analysis Notes

General Notes

Assumed if a TWLTL exists leading up to a left-turn lane, the actual striped length of the turn bay may be adjusted to account for vehicles using the TWLTL as storage. A maximum of 600 feet should be used as the storage length if there is room. If the TWLWL ends before 600 feet, the full length of the TWLWL should be used as the storage length. If there is another intersection within 1200 feet that shares the TWLWL, each intersection will use half of the distance between intersections as the length of the left-turn storage. For instance, if a TWLTL exists between two intersections 800 feet apart, each left-turn lane will receive 400 feet of storage.

The link speed for superstreet u-turns and directional left-turns are assumed to be 35 mph.

Any lane group at an intersection that has a forecast volume of 0 but the movement is allowed will be input as 1 vehicle in order to derive LOS.

All intersections were originally coded to operate as actuated within a coordinated system, which improves vehicle traffic progression through a series of traffic signals. According to the HCM 2000, actuated traffic signals affect the timing on all approaches to an intersection as a result of being influenced by vehicle detectors. This allows for phases to be shortened with low demand. Semi-actuated traffic signals typically only have vehicle detectors on the minor streets. As a result, semi-actuation allows for any unused green time from the minor streets to be reassigned to other phases. Upon optimizing the network cycle lengths, intersections were allowed to operate as semi-actuated and uncoordinated in order to optimize the operations of the entire corridor being analyzed.

Manning/UNC Chapel Hill Sub-area

Intersection 1 – Manning Drive at East Drive/Gravelly Drive

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

No change in intersection configuration due to LRT improvements

Intersection 2 – Mason Farm Road at East Drive/Dogwood Deck Entrance

Intersection assumed to be signalized by 2035

Assumed pedestrian phasing for all legs

Speed Limit on Dogwood Deck Entrance assumed to be 10 mph

No change in intersection due to LRT improvements

Intersection 2(01) – Mason Farm Road at Dogwood Deck Exit

Intersection assumed to be remain unsignalized by 2035

No change in intersection due to LRT improvements

Intersection 3 – Manning Drive at Hibbard Drive/Emergency Room Drive

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

No change in intersection configuration due to LRT improvements

Intersection 4 – US 15-501 (Fordham Boulevard) at Manning Drive

Assumed no change in intersection configuration by 2035

Assumed no pedestrian phasing

No change in intersection configuration due to LRT improvements

Intersection 5 – US 15-501 (Fordham Boulevard) at Old Mason Farm Road

Assumed no change in intersection configuration by 2035

Assumed no pedestrian phasing

No change in intersection configuration due to LRT improvements

Meadowmont/Leigh Village Sub-area

Intersection 6 – NC 54 at Hamilton Road

Assumed that the Short-term and Mid-term Improvements from the NC 54/I-40 Corridor Study (Draft – August 2010) would be in place (See Appendix G)

- Assumed 450-foot EB LT storage per Short-term Improvements

Assumed pedestrian phasing for all legs

No change in intersection due to LRT improvements

Intersection 7 - NC 54 WB at Rogerson Drive

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for both legs

Rogerson Drive does not have a signal head and is only controlled by a stop sign. The pedestrian crossing, however, is actuated by pedestrian push buttons. Therefore, in order to capture the delay associated with the pedestrian crossing; this intersection was analyzed as signalized with the Rogerson Drive movement coded to represent stop sign control.

No change in intersection due to LRT improvements

Intersection 701 - NC 54 EB at Environ Way

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for both legs

Assumed that the speed on Environ Way is 15 mph

No change in intersection due to LRT improvements

Intersection 8 - NC 54 at Finley Golf Course Road/Burning Tree Drive

Assumed that the lane configurations for Burning Tree Drive and Finley Golf Course Road will be modified by 2035 to eliminate the split phasing

Assumed pedestrian phasing for all legs

- NB Finley Golf Course Rd. will be restriped to show an exclusive left turn lane and a shared thru-right lane.
- SB Burning Tree Dr. will be widened to accommodate an exclusive left turn lane with 200 feet of storage and a shared thru-right lane.

No change in intersection due to LRT improvements

Intersection 9 - NC 54 at W. Barbee Chapel Road/The Exchange

Assumed no change in intersection configuration by 2035

Assumed that all legs will include crosswalks and pedestrian phasing by 2035

Assumed that the link speed on The Exchange is 10 mph

No change in intersection due to LRT improvements

Intersection 102 - NC 54 EB at U-Turn West of Meadowmont Ln.

Assumed that the Short-term and Mid-term Improvements from the NC 54/I-40 Corridor Study (Draft – August 2010) would be in place (See Appendix G)

- 350-foot U-Turn storage per Mid-term Improvements

No change in intersection due to LRT improvements

Intersection 10 - NC 54 WB at Meadowmont Lane

Assumed that the Short-term and Mid-term Improvements from the NC 54/I-40 Corridor Study (Draft – August 2010) would be in place, including pedestrian accommodations/phasing (See Appendix G)

- 350-foot EB LT storage per Mid-term Improvements
- 350-foot WB RT storage per Mid-term Improvements
- Pedestrians will cross NC 54 using the two-stage z-crossing technique with the crosswalk across WB NC 54 assumed to be 75 feet in length
- It is assumed that 3 of the 4 SB approach lanes will be restriped to allow for triple SB RT lanes per Mid-term improvements, which assumes the left-most RT lane will develop at the location the current right-most LT lane develops, which is 330 feet before the intersection.
- The crosswalk across Meadowmont Lane will be 12 feet shorter per Mid-term improvements

No change in intersection due to LRT improvements

Intersection 101 – NC 54 at Friday Center Drive

Assumed that the Short-term and Mid-term Improvements from the NC 54/I-40 Corridor Study (Draft – August 2010) would be in place, including pedestrian accommodations/phasing (See Appendix G)

- 400-foot WB LT/U-turn storage per Mid-term Improvements
- 400-foot EB RT storage per Mid-term Improvements
- NB Friday Center Dr. will merge from two lanes to one lane south of the intersection per Mid-term Improvements

- Pedestrians will cross NC 54 using the two-stage z-crossing technique with the crosswalk across EB NC 54 assumed to be 75 feet in length.
- It is assumed that pedestrians will cross Friday Center Drive via an island channelizing the NB RT free-flowing movement. The crosswalk from the SW corner of the intersection to the island is assumed to be 45 feet in length. The NB RT lane will yield to pedestrians crossing between the island and the SE corner of the intersection.

Intersection 11 - Meadowmont Lane at Village Crossing

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

Assumed that the link speed on Village Crossing and Meadowmont Village Center is 10 mph

No change in intersection due to LRT improvements

Intersection 12 - Meadowmont Lane at Barbee Chapel Road

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

Intersection modifications due to LRT improvements for Alternative A:

- Added LRT phasing as Phases 9 and 10
- Assumed 45 second gate down time due to a station within 500 feet
- Increased all-red phase for Barbee Chapel Road movements to 5 seconds
- Added exclusive SB RT lane with 200 feet of storage

No change in intersection due to LRT improvements for Alternative B

Intersection 13 - Meadowmont Lane at Sprunt Street/Cedar Club

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

Intersection modifications due to LRT improvements for Alternative A:

- Added LRT phasing as Phases 9 and 10
- Assumed 45 second gate down time due to a station within 500 feet
- Increased all-red phase for Sprunt Street / Cedar Club movements to 6 seconds
- Added exclusive SB RT lane with 200 feet of storage

No change in intersection due to LRT improvements for Alternative B

Intersection 14 - Meadowmont Lane at Green Cedar Lane

Assumed no change in intersection configuration by 2035

No change in intersection due to LRT improvements

Intersection 15 - NC 54 at E. Barbee Chapel Road

Assumed that the Short-term and Mid-term Improvements from the NC 54/I-40 Corridor Study (Draft – August 2010) would be in place, including pedestrian accommodations/phasing (See Appendix G)

- SB LT lane will still develop from a TWLTL with 600 feet of usable storage
- Assumed that the current SB LT/Thru/RT lane will be restriped to show an exclusive SB RT lane
- 400-foot WB RT lane storage per Mid-term Improvements
- 400-foot storage for both the NB RT lane and the right-most NB LT lane with both developing on the right per Mid-term Improvements
- Pedestrians will cross using a single stage z-crossing from the southeast quadrant to the northwest quadrant. EB RT free-flow lane will be required to yield to the pedestrians. The crosswalk across Barbee Chapel on the north side of the intersection is assumed to be 74 feet in length, the crosswalk across Barbee Chapel on the south side of the intersection is assumed to be 78 feet in length, and the crosswalk across NC 54 is assumed to be 150 feet in length.

No change in intersection due to LRT improvements for Alternative A

Intersection modifications due to LRT improvements for Alternative B:

- Added LRT phasing as Phases 9 and 10
- Assumed 40 second gate down time due to no stations within 500 feet
- Increased all-red phase for NB East Barbee Chapel Road left-turn movement to 5 seconds and right-turn movement to 4 seconds
- The EB RT movement can no longer be free-flowing, as shown in the Mid-term improvements, due to the LRT phase

Intersection 151 - NC 54 at U-Turn East of Barbee Chapel Road

Assumed that the Short-term and Mid-term Improvements from the NC 54/I-40 Corridor Study (Draft – August 2010) would be in place (See Appendix G)

- 500-foot U-Turn storage per Mid-term Improvements

No change in intersection due to LRT improvements

Intersection 16 - NC 54 WB at Crossland Drive

Assumed that the Short-term and Mid-term Improvements from the NC 54/I-40 Corridor Study (Draft – August 2010) would be in place, including pedestrian accommodations/phasing (See Appendix G)

- 450-foot EB LT storage per Mid-term Improvements
- 100-foot WB RT storage per Mid-term Improvements
- Assumed speed on Crossland Dr. will be 25 mph.
- Assumed that the crosswalk along the north side of NC 54 will be 40 feet in length.

No change in intersection due to LRT improvements

Intersection 17 - NC 54 EB at Huntingridge Drive

Assumed that the Short-term and Mid-term Improvements from the NC 54/I-40 Corridor Study (Draft – August 2010) would be in place, including pedestrian accommodations/phasing (See Appendix G)

- 100-foot EB RT storage per Mid-term Improvements
- 500-foot WB to SB storage per Mid-term Improvements
- Assumed that the crosswalk along the south side of NC 54 will be 60 feet in length.

No change in intersection due to LRT improvements

Intersection 18 - NC 54 at Falconbridge Road/Celeste Circle

Assumed that the Short-term and Mid-term Improvements from the NC 54/I-40 Corridor Study (Draft – August 2010) would be in place, including pedestrian accommodations/phasing (See Appendix F)

- 400-foot storage for both the SB RT lane and the right-most SB LT lane with both developing on the right per Mid-term Improvements
- 100-foot EB RT storage per Mid-term Improvements
- 150-foot storage for both the NB RT lane and the right-most NB LT lane with both developing on the right per Mid-term Improvements
- Assumed that the link speed on Celeste Cr. will be 25 mph.
- Pedestrians will cross using a single stage z-crossing from the southeast quadrant to the northwest quadrant. Assumed that the crosswalks along the north and south sides of NC 54 are 80 feet in length, and the diagonal crosswalk across NC 54 is 130 feet in length.

No change in intersection due to LRT improvements

Gateway/Patterson Place Sub-area

Intersection 20 – Old Chapel Hill Road at Mount Moriah Road

Assumed no change in intersection configuration by 2035

No change in intersection configuration due to LRT improvements

Intersection 21 – Old Chapel Hill Road at Pope Road

Intersection configuration by 2035 is as documented in the *Alternatives Analysis Traffic Methodology Report* under the Durham-Orange Corridor Identification Number D/O-6 to be a single lane roundabout for the No-Build Analysis.

Intersection configuration modified due to LRT improvements:

- Intersection to become signalized
- Assumed pedestrian phasing for all legs
- Added LRT phasing as Phase 9
- Assumed 15 second LRT Phase to allow LRT to travel through intersection (diagonally)
- Assumed exclusive LT and RT lanes on EB Old Chapel Hill Road

- Assumed short exclusive LT lane on WB Old Chapel Hill Road
- Assumed exclusive NB LT lane and shared thru-RT lane on Pope Road
- Assumed construction of SB approach with a LT lane and a shared thru-RT lane to serve as a future entrance to the Pope Road Station park and ride

Intersection 22 – Old Chapel Hill Road and Durham Road at White Oak Road

Assumed no change in intersection configuration by 2035 for the No-Build Analysis

No change in intersection configuration due to LRT improvements

Short queues on side streets, therefore no mitigations deemed necessary

Intersection 23 – Witherspoon Boulevard at McFarland Road

Assumed no change in intersection configuration by 2035

Intersection configuration modified due to LRT improvements:

- Intersection to become signalized
- Assumed pedestrian phasing for all legs
- Assumed the intersection will operate under signal control in 2035 Build Scenario
- Added LRT phasing as Phase 9 and 10
- Assumed 45 second gate down time due to a station within 500 feet
- Increased all-red phase for Witherspoon Boulevard movements to 5 seconds
- Assumed an exclusive LT lane on EB McFarland Road
- Assumed exclusive LT and RT lanes on WB McFarland Road

Intersection 24 – SW Durham Drive at Hopedale Avenue

Assumed no change in intersection configuration by 2035

No change in intersection configuration due to LRT improvements

Due to low side-street volumes, the intersection is assumed to remain unsignalized with LRT crossing south of Hopedale Avenue.

Intersection 25 – US 15-501 at Garrett Road

Intersection configuration by 2035 is as documented in the *Alternatives Analysis Traffic Methodology Report* under the Durham-Orange Corridor Identification Number D/O-3 for the US 15-501 Widening.

- Assumed additional EB exclusive LT lane on US 15-501 (Chapel Hill Boulevard)
- Assumed third WB thru lane on US 15-501 (Chapel Hill Boulevard)

Assumed pedestrian phasing for SB, WB and EB approaches

No change in intersection configuration due to LRT improvements

Intersection 26 – Old Chapel Hill Road at Garrett Road

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all approaches

No change in intersection configuration due to LRT improvements

South Square Sub-area

Intersection 27 –University Drive at Snowcrest Trail/Ivy Creek Boulevard

Assumed no change in intersection configuration by 2035 for the No-Build Analysis

Assumed pedestrian phasing for all legs

Intersection modifications due to LRT improvements (Alternatives D3 and D1):

- Added LRT phasing as Phases 9 and 10
- Assumed 40 second gate down time due to no stations within 500 feet
- Exclusive RT lane on WB University Drive constructed with 200 feet of storage
- Increased all-red phase for Snowcrest Trail and Ivy Creek Boulevard movements to 6 seconds
- Restricted lead/lag optimization

Intersection 28 –University Drive at Larchmont Road

Assumed no change in intersection configuration by 2035

Intersection modifications due to LRT improvements (Alternatives D3 and D1):

- Intersection to become signalized in order to provide traffic movements across tracks
- Added LRT phasing as Phases 9 and 10
- Assumed 40 second gate down time due to no stations within 500 feet
- Exclusive RT lane on WB University Drive constructed with 200 feet of storage
- Existing LT-thru lane re-striped as an exclusive LT lane with 195 feet of storage
- Increased all-red phase for Larchmont Road movements to 4 seconds
- Assumed pedestrian phasing for all legs

Intersection 29 –University Drive at Martin Luther King, Jr. Parkway

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

Intersection configuration modified due to LRT improvements (Alternatives D3 and D1):

- Added LRT phasing as Phases 9 and 10
- Assumed 45 second gate down time due to station within 500 feet
- Left-most exclusive LT lane on EB University Drive striped with 325 feet of storage

- Increased all-red phase for SB Martin Luther King Jr. Parkway LT movement to 6 seconds, thru movement to 4 seconds and RT movement to 3 seconds
- Implementation of the LRT phase resulted with more than adequate green time to accommodate the WB through traffic volume, thus eliminating the need for phase 6 (which would serve the WB through movement under standard phasing without the LRT).
- Lead/lag optimization not restricted due to better coordination

Improvements assumed for 2035 Build (Alternatives D3 and D1) with Conceptual Mitigation include:

- Provide an additional SB left turn lane with 300 feet of storage, resulting in dual turn lanes. The existing storage length for the SB left turn lane should be increased to 300 feet.
- Provide an additional WB right turn lane with 250 feet of storage, resulting in dual turn lanes. The existing storage length for the WB right turn lane to should be increased to 250 feet.

Intersection 30 –University Drive at Lyckan Parkway

Assumed no change in intersection configuration by 2035

Intersection configuration modified due to LRT improvements (Alternatives D3 and D1):

- Intersection to become signalized in order to provide traffic movements across tracks
- Added LRT phasing as Phases 9 and 10
- Assumed 45 second gate down time due to station within 500 feet
- Exclusive RT lane on WB University Drive constructed with 200 feet of storage
- Exclusive LT lane on EB University Drive striped with 275 feet of storage
- Increased all-red phase for Lyckan Parkway approach movements to 5 seconds
- Assumed pedestrian phasing for all legs

Intersection 31 –University Drive at Westgate Drive

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

Intersection configuration modified due to LRT improvements (Alternatives D3 and D1):

- Added LRT phasing as Phases 9 and 10
- Assumed 40 second gate down time due to no stations within 500 feet
- Exclusive RT lane on WB University Drive constructed with 225 feet of storage
- Exclusive LT lane on EB University Drive striped with 375 feet of storage
- Increased all-red phase for SB Westgate Drive LT movement to 4 seconds and thru and RT movements to 3 seconds
- Restricted lead/lag optimization

Intersection 32 –University Drive at Westgate Shopping Center

Assumed no change in intersection configuration by 2035

Assumed SB approach on Westgate Shopping Center has 2 lanes: a 200-foot exclusive left-turn lane, and a continuous shared thru/right-turn lane.

Assumed Westgate Shopping Center has a speed of 15 mph

Intersection configuration modified due to LRT improvements:

- Alternative D3
 - Intersection to become signalized in order to provide traffic movements across tracks
 - Added LRT phasing as Phases 9 and 10
 - Assumed 45 second gate down time due to station within 500 feet
 - Exclusive RT lane on WB University Drive constructed with 200 feet of storage
 - Increased all-red phase for Westgate Shopping Center movements to 4 seconds
 - Lead/lag optimization not restricted due to better coordination
 - Assumed pedestrian phasing for all legs
- Alternative D1
 - Intersection to become signalized in order to provide traffic movements across tracks
 - Added LRT phasing as Phases 9 and 10
 - Assumed 45 second gate down time due to station within 500 feet
 - Exclusive RT lane on WB University Drive constructed with 200 feet of storage
 - Assumed SB approach on Westgate Shopping Center would be reduced to one shared LT-thru-RT lane in order to make room for LRT tracks
 - Increased all-red phase for Westgate Shopping Center movements to 7 seconds
 - Lead/lag optimization not restricted due to better coordination
 - Assumed pedestrian phasing for all legs

Intersection 33 –University Drive at Shannon Road

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

Intersection configuration modified due to LRT improvements (Alternative D3):

- Added LRT phasing as Phases 9 and 10
- Assumed 40 second gate down time due to no stations within 500 feet
- Exclusive RT lane on WB University Drive constructed with 200 feet of storage
- Increased all-red phase for SB Shannon Road LT movement to 4 seconds and thru and RT movements to 3 seconds

- Restricted lead/lag optimization

No change in intersection due to LRT improvements for Alternative D1

Improvements assumed for 2035 Build (Alternatives D3 and D1) with Conceptual Mitigation include:

- Restripe NB approach to provide one exclusive left turn lane, one exclusive thru lane, and one exclusive right turn lane

Intersection 34 –Westgate Drive at Westgate Shopping Center

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

No change in intersection due to LRT improvements

Intersection 35 –US 15-501 Business at Westgate Drive

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

No change in intersection due to LRT improvements

Improvements assumed for 2035 Build (Alternatives D1) with Conceptual Mitigation include:

- Provide an additional EB right turn lane.

Intersection 36 –Shannon Road at Mayfair Street and Westgate Shopping Center

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

No change in intersection due to LRT improvements

Intersection 37 –US 15-501 Business at Shannon Road

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for the WB approach and the NB approach

Assumed no U-turn traffic for EB US 15-501 Business due to no traffic needing to make a U-turn at this location. Therefore, the EB U-turn lane was removed from the analysis.

No change in intersection due to LRT improvements

Intersection 38 –US 15-501 at Tower Boulevard and Westgate Shopping Center

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

No change in intersection due to LRT improvements

Intersection 39 –Tower Boulevard at US 15-501 Ramps

Assumed no change in intersection configuration by 2035

Assumed that this intersection will be signalized by 2035

Assumed pedestrian phasing for all legs

No change in intersection due to LRT improvements

Intersection 40 –Pickett Road at Tower Boulevard

Assumed no change in intersection configuration by 2035

Assumed to remain unsignalized by 2035

Intersection configuration modified due to LRT improvements (Alternative D3):

- Intersection to become signalized in order to provide traffic movements across tracks
- Added LRT phasing as Phase 9
- Assumed 40 second gate down time due to no stations within 500 feet
- Exclusive RT lane on NB Tower Boulevard constructed with 200 feet of storage
- Increased all-red phase for WB Pickett Road LT movement to 5 seconds and thru movement to 3 seconds
- Assumed pedestrian phasing for all legs

No change in intersection due to LRT improvements for Alternative D1

Intersection 41 –Pickett Road at Petty Road/Western Bypass

Assumed no change in intersection configuration by 2035

Assumed no pedestrian phasing

No change in intersection due to LRT improvements for Alternative D3

Intersection configuration modified due to LRT improvements (Alternative D1):

- Added LRT phasing as Phases 9 and 10
- Assumed 40 second gate down time due to no stations within 500 feet
- Exclusive RT lane on SB Western Bypass constructed with 200 feet of storage
- Exclusive LT lane on NB Petty Road constructed with 200 feet of storage
- Increased all-red phase for Pickett Road movements to 5 seconds

Cornwallis Road Sub-area

Intersection 42 – West Cornwallis Road at US 15-501 SB Ramps

Assumed no change in intersection configuration by 2035

Assumed no pedestrian phasing

No change in intersection configuration due to LRT improvements

Intersection 43 – West Cornwallis Road at US 15-501 NB Ramps

Assumed no change in intersection configuration by 2035 for No-Build analysis

Assumed no pedestrian phasing

Intersection modifications due to LRT improvements:

- Added LRT phasing as Phase 9
- Assumed 40 second gate down time due to no stations within 500 feet
- Assumed an NB exclusive RT lane on US 15-501 BYP NB Ramps with 150 feet storage
- Increased all-red phase for US 15-501 NB Ramps approach movements to 5 seconds

Intersection 44 – West Cornwallis Road at Western Bypass

Assumed no change in intersection configuration by 2035

No change in intersection configuration due to LRT improvements

Erwin Road/Duke Sub-area

The build analysis for this sub-area is based on the conceptual design plans.

Intersection 45 –Erwin Road at NC 751 (Cameron Boulevard)

Assumed no change in intersection configuration by 2035 for no-build and build analyses

Assumed no pedestrian phasing

Intersection modifications due to LRT improvements:

- Added LRT phasing as Phase 9
- Assumed 40 second gate down time due to no stations within 500 feet
- Increased all-red phase for WB NC 751 approach movements to 3 seconds

Improvements assumed for 2035 Build with Conceptual Mitigation include:

- Add dual exclusive EB left turn lanes, resulting with no turn lanes shared with the EB through lanes
- EB approach changed from split phasing to protected EB left turn
- Restripe existing SB approach resulting with single left turn and dual right turn lanes

Intersection 46 – Erwin Road at Morreene Road/Towerview Drive

Assumed no change in intersection configuration by 2035 for no-build analysis

Assumed pedestrian phasing for all legs

Intersection modifications due to LRT improvements:

- Added LRT phasing as Phase 9
- Assumed 15 second LRT Phase to allow LRT to transition from side running to median running
- Restricted lead/lag optimization
- SB Erwin Road LT storage lane defined and striped with a storage length of 600 feet due to median development required for LRT

- It is assumed that the pedestrian phase running along the west side of Erwin Road would begin during LRT phase 9 and carry over to thru phase 6. Because the LRT phase is 15 seconds, the required minimum time shown for pedestrian phase 6 can be reduced by 15 seconds in order to best represent the actual pedestrian phasing.
- It is assumed that pedestrians would cross Erwin Road's SB approach in 2 stages, with a refuge area in the median of Erwin Road

Intersection 47 – Erwin Road at LaSalle Street

Intersection configuration assumed by 2035 as documented in the *Alternatives Analysis Traffic Methodology Report* under the Durham-Orange Corridor Identification Number D/O-5 for the Duke University Health Systems Improvements.

- Exclusive RT lane on EB LaSalle Street constructed with 150 feet of storage

Assumed pedestrian phasing for all legs

Intersection modifications due to LRT improvements:

- Added LRT phasing as Phases 9 and 10
- Assumed 15 second LRT Phase to allow LRT to travel through intersection (median running)
- Restricted lead/lag optimization
- EB Erwin Road LT storage lane defined and striped with a storage length of 600 feet due to median development required for LRT
- WB Erwin Road LT storage lane defined and striped with a storage length of 500 feet due to median development required for LRT
- It is assumed that the pedestrian phases running along Erwin Road would begin during LRT phases 9 and 10 and carry over to thru phases 2 and 6, respectively. Because the LRT phase is 15 seconds, the required minimum time shown for pedestrian phase 6 can be reduced by 15 seconds in order to best represent the actual pedestrian phasing.
- It is assumed that pedestrians would cross Erwin Road in 2 stages, with a refuge area in the median of Erwin Road

Intersection 48 – Erwin Road at Douglas Street/Research Drive

Intersection configuration assumed by 2035 as documented in the *Alternatives Analysis Traffic Methodology Report* under the Durham-Orange Corridor Identification Number D/O-5 for the Duke University Health Systems Improvements.

- NB Research Drive restriped to provide an exclusive LT lane, shared left-thru lane, and exclusive RT lane. It is assumed that the new storage lengths will match the existing lengths for the current lane configuration.

Assumed pedestrian phasing for all legs

Intersection modifications due to LRT improvements:

- Added LRT phasing as Phases 9 and 10
- Assumed 15 second LRT Phase to allow LRT to travel through intersection (median running)

- Restricted lead/lag optimization
- EB LT storage lane defined and striped with 500 feet of storage due to median development required for LRT
- WB LT storage lane defined and striped with 500 feet of storage due to median development required for LRT
- It is assumed that the pedestrian phases running alongside Erwin Road would begin during LRT phases 9 and 10 and carry over to thru phases 2 and 6, respectively. Because the LRT phases are 15 seconds each and run concurrent with each other, the required minimum time shown for pedestrian phases 2 and 6 can be reduced by 15 seconds in order to best represent the actual pedestrian phasing.
- It is assumed that pedestrians would cross Erwin Road in 2 stages, with a refuge area in the median of Erwin Road

Intersection 49 – Erwin Road at Eye Care Center/VA Medical Center

Intersection configuration assumed by 2035 as documented in the *Alternatives Analysis Traffic Methodology Report* under the Durham-Orange Corridor Identification Number D/O-5 for the Duke University Health Systems Improvements.

- Signal installed at intersection
- Exclusive LT lane on NB Eye Care Center constructed. It is assumed that there will be 140 feet of storage for this lane.
- SB Durham VA Medical Center restriped to provide an exclusive LT lane. It is assumed that there will be 50 feet of storage for this lane.

Assumed pedestrian phasing for all legs

Intersection modifications due to LRT improvements:

- Added LRT phasing as Phases 9 and 10
- Assumed 15 second LRT Phase to allow LRT to travel through intersection (median running)
- Restricted lead/lag optimization
- It is assumed that the pedestrian phases running alongside Erwin Road would begin during LRT phases 9 and 10 and carry over to thru phases 2 and 6, respectively. Because the LRT phases are 15 seconds each and run concurrent with each other, the required minimum time shown for pedestrian phases 2 and 6 can be reduced by 15 seconds in order to best represent the actual pedestrian phasing.
- It is assumed that pedestrians would cross Erwin Road in 2 stages, with a refuge area in the median of Erwin Road

Intersection 50 – Erwin Road at Fulton Street

Intersection configuration assumed by 2035 as documented in the *Alternatives Analysis Traffic Methodology Report* under the Durham-Orange Corridor Identification Number D/O-5 for the Duke University Health Systems Improvements.

- Second exclusive LT lane on EB Erwin Road constructed. It is assumed that both LT lanes will have 400 feet of storage.

Assumed pedestrian phasing for all legs

Intersection modifications due to LRT improvements:

- Added LRT phasing as Phases 9 and 10
- Assumed 15 second LRT Phase to allow LRT to travel through intersection (median running)
- Restricted lead/lag optimization
- Exclusive RT lane on WB Erwin Road removed in order to provide room for the EB dual-left turn lanes to remain in place after construction of the LRT, resulting in an exclusive LT, an exclusive thru, and a shared thru-RT on WB Erwin Road
- It is assumed that the pedestrian phases running alongside Erwin Road would begin during phases 2 and 6 and carry over through LRT phases 9 and 10, respectively. Because the LRT phases are 15 seconds each and run concurrent with each other, the required minimum time shown for pedestrian phases 2 and 6 can be reduced by 15 seconds in order to best represent the actual pedestrian phasing.
- It is assumed that pedestrians would cross Erwin Road in 2 stages, with a refuge area in the median of Erwin Road

Intersection 51 –Fulton Street at Elba Street /VA Medical Center

Intersection configuration assumed by 2035 as documented in the *Alternatives Analysis Traffic Methodology Report* under the Durham-Orange Corridor Identification Number D/O-5 for the Duke University Health Systems Improvements.

- Exclusive RT lane on NB Fulton Street constructed with 130 feet of storage

Assumed pedestrian phasing for all legs

No Intersection modifications due to LRT improvements

Intersection 52 – Erwin Road at Emergency Drive

Assumed no change in intersection configuration by 2035 for no-build analysis

Assumed no pedestrian phasing

Intersection modifications due to LRT improvements:

- Intersection to become signalized in order to provide traffic movements across tracks
- Assumed 150-foot LT storage lengths for EB and WB Erwin Road
- Added LRT phasing as Phases 9 and 10
- Assumed 15 second LRT Phase to allow LRT to travel through intersection (median running)
- Restricted lead/lag optimization
- It is assumed that pedestrian phasing would be added for all thru movements

- It is assumed that the pedestrian phases running alongside Erwin Road would begin during LRT phases 9 and 10 and carry over to thru phases 2 and 6, respectively. Because the LRT phases are 15 seconds each and run concurrent with each other, the required minimum time shown for pedestrian phases 2 and 6 can be reduced by 15 seconds in order to best represent the actual pedestrian phasing.
- It is assumed that pedestrians would cross Erwin Road in 2 stages, with a refuge area in the median of Erwin Road

Intersection 53 –Trent Drive at Elba Street/NC 147 ramp

Assumed no change in intersection configuration by 2035 for the build and no-build analysis

Due to limitations in the Synchro software and HCM analysis methodologies, the free flow NB right turn lane volumes were set to zero as they do not affect the unsignalized intersection of Elba Street and the NC 147 ramp.

Intersection assumed to remain unsignalized by 2035

No Intersection modifications due to LRT improvements

Intersection 54 –Erwin Road at Trent Drive

Intersection configuration assumed by 2035 as documented in the *Alternatives Analysis Traffic Methodology Report* under the Durham-Orange Corridor Identification Number D/O-5 for the Duke University Health Systems Improvements.

- SB Trent Drive restriped to provide in exclusive LT lane with at least 200 feet of storage. It is assumed that 250 feet will be provided because there is room to do so. The remaining two lanes will be an exclusive thru lane, and an exclusive RT lane.
- Second exclusive LT lane on NB Trent Drive constructed. It is assumed that there will be 325 feet of storage for this lane.

Assumed pedestrian phasing for all legs

Intersection modifications due to LRT improvements:

- Added LRT phasing as Phases 9 and 10
- Assumed 15 second LRT Phase to allow LRT to travel through intersection (median running)
- Restricted lead/lag optimization
- It is assumed that the pedestrian phases running alongside Erwin Road would begin during LRT phases 9 and 10 and carry over to thru phases 2 and 6, respectively. Because the LRT phases are 15 seconds each and run concurrent with each other, the required minimum time shown for pedestrian phases 2 and 6 can be reduced by 15 seconds in order to best represent the actual pedestrian phasing.
- It is assumed that pedestrians would cross Erwin Road in 2 stages, with a refuge area in the median of Erwin Road
- Add an exclusive EB and WB right turn lanes with 200 feet of storage each, which will also result with the EB right turn movement to overlap with the NB left turn phase

Intersection 55 –Erwin Road at Flowers Drive

Assumed no change in intersection configuration by 2035 for the no-build analysis

Intersection assumed to remain unsignalized by 2035

Intersection modifications due to LRT improvements:

- Assumed median closure and Flowers Drive and the opposing driveway becoming right-in/right-out only

Intersection 56 –Erwin Road at Anderson Street

Assumed no change in intersection configuration by 2035 for the no-build analysis

Assumed pedestrian phasing for three of the legs

Intersection modifications due to LRT improvements:

- Added LRT phasing as Phase 9
- Assumed 15 second LRT Phase to allow LRT to transition from median running to roadside
- Restricted lead/lag optimization
- It is assumed that the pedestrian phase running along the south side of Erwin Road would begin during LRT phase 9 and carry over to thru phase 2. Because the LRT phase is 15 seconds the required minimum time shown for pedestrian phase 2 can be reduced by 15 seconds in order to best represent the actual pedestrian phasing.
- It is assumed that pedestrians would cross the EB approach of Erwin Road in 2 stages, with a refuge area in the median of Erwin Road
- Restripe SB exclusive left turn lane, exclusive through lane and exclusive right turn lane to a shared left/through lane and exclusive right turn lane.
- Add an additional exclusive EB left turn lane
- The above restriping will result with two NB receiving lanes to accommodate the additional exclusive EB left turn lane
- Added an exclusive NB right turn lane with 200 feet of storage, resulting with exclusive lanes for: NB left, NB through, and NB right movements

Intersection 57 –Anderson Street/15th Street at Main Street

Assumed no change in intersection configuration by 2035 for build and no-build analyses

Assumed pedestrian phasing for three of the legs

No Intersection modifications due to LRT improvements

Assumed 5 second all red time for NB approach at rail crossing

Downtown Durham Sub-area

Intersection 58 – Main Street at Ninth Street

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all approaches

Improvements assumed for 2035 Build with Conceptual Mitigation include:

- Restripe existing NB approach from an exclusive left and a shared thru-right lane to a shared left-thru and exclusive right turn lane.

Intersection 59 – Ninth Street and Erwin Road at Pettigrew Street

Assumed no change in intersection configuration by 2035 for the No-Build analysis

Intersection configuration modified due to LRT improvements:

- Assumed construction of EB approach with exclusive LT and shared thru-RT lanes to serve as a future entrance to Ninth Street Station park and ride
- Assumed exclusive LT and shared thru-RT lanes on WB approach

Intersection 60 – Main Street at Broad Street and Swift Avenue

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

Reported intersection delay based on a weighted average of non-train and preempted train events.

Intersection modifications due to LRT improvements:

- No-Build/Build assumed 25 second clearance phase (Phase 9) and 205 second freight phase (Phase 10)
- No-Build/Build assumed 25 second clearance phase (Phase 9) and 45 second passenger rail phase (Phase 10)
- Build assumed 25 second clearance phase (Phase 9) and 40 second LRT phase (Phase 10)

Improvements assumed for LRT improvements include:

- Add an EB RT lane

Intersection 61 – Pettigrew Street and Swift Avenue

Assumed no change in intersection configuration by 2035

No change in intersection configuration due to LRT improvements

Due to low side street volumes, this intersection is assumed to remain unsignalized with LRT operating as an adjacent crossing that utilizes preemption control from Main Street at Swift Avenue and Broad Street intersection.

Improvements assumed for 2035 Build with Conceptual Mitigation include:

- Add a WB LT lane, possibly via restriping

Intersection 62 – Buchanan Boulevard at Main Street

As a result of a short downstream lane drop as well as to account for a through lane blockage due to spillback from a railroad crossing, the outside eastbound lane was analyzed as a single right-turn lane rather than a shared through-right turn for all scenarios

Assumed pedestrian phasing for all legs

Reported intersection delay based on a weighted average of non-train and preempted train events.
Intersection modifications due to LRT improvements:

- No-Build/Build assumed 25 second clearance phase (Phase 9) and 205 second freight phase (Phase 10)
- No-Build/Build assumed 25 second clearance phase (Phase 9) and 60 second passenger rail phase (Phase 10)
- Build assumed 25 second clearance phase (Phase 9) and 45 second LRT phase (Phase 10)

Improvements assumed for LRT improvements include:

- Add an EB RT lane

Intersection 63 – Chapel Hill Street at Duke Street

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all approaches

No change in intersection configuration due to LRT improvements

Intersection 64 – Duke Street at Memorial Street

Assumed no change in intersection configuration by 2035 for the No-Build analysis

One vehicle trip added to any movements with no forecasted traffic volume

Intersection configuration modified due to LRT improvements

- Assumed construction of WB approach with shared thru-RT lane to serve as a future entrance to Durham Multi-Modal Station park and ride

Intersection 65 – Duke Street at Peabody Street

Assumed no change in intersection configuration by 2035

No change in intersection configuration due to LRT improvements

Intersection 66 – Duke Street at Main Street

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all approaches

No change in intersection configuration due to LRT improvements

Intersection 67 – Chapel Hill Street at Willard Street

Assumed no change in intersection configuration by 2035 for the No-Build analysis

Intersection configuration modified due to LRT improvements

- Signalization
- Assumed construction of SB approach with exclusive LT and shared thru-RT lanes as entrance to Durham Multi-modal Station park and ride

Assumed pedestrian phasing for all approaches

Intersection 68 – Chapel Hill Street at W Pettigrew Street

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for EB and NB approaches

No change in intersection configuration due to LRT improvements

Intersection 69 – Corcoran Street at Main Street

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all approaches

No change in intersection configuration due to LRT improvements

Assumed CBD area type

Intersection 70 – Corcoran Street at Ramseur Street

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

Assumed CBD area type

Reported intersection delay based on a weighted average of non-train and preempted train events.
Intersection modifications due to LRT improvements:

- No-Build/Build assumed 25 second clearance phase (Phase 11) and 205 second freight phase (Phase 12)
- No-Build/Build assumed 25 second clearance phase (Phase 11) and 45 second passenger rail phase (Phase 12)
- Build assumed 25 second clearance phase (Phase 11) and 40 second LRT phase (Phase 12)

Improvements assumed for 2035 Build with Conceptual Mitigation include:

- Remove on-street parking and restripe as a third EB through lane

Intersection 71 – Corcoran Street at Blackwell Street at West Pettigrew Street

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

Assumed CBD area type

Reported intersection delay based on a weighted average of non-train and preempted train events.
Intersection modifications due to LRT improvements:

- No-Build/Build assumed 25 second clearance phase (Phase 11) and 205 second freight phase (Phase 12)
- No-Build/Build assumed 25 second clearance phase (Phase 11) and 45 second passenger rail phase (Phase 12)
- Build assumed 25 second clearance phase (Phase 11) and 40 second LRT phase (Phase 12)

Improvements assumed for 2035 Build with Conceptual Mitigation include:

- Add a NB RT lane

Intersection 72 – Mangum Street at Main Street

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all approaches

No change in intersection configuration due to LRT improvements

Intersection assumed to be in CBD

Intersection 73 – Mangum Street at Ramseur Street

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

Assumed CBD area type

Reported intersection delay based on a weighted average of non-train and preempted train events.
Intersection modifications due to LRT improvements:

- No-Build/Build assumed 25 second clearance phase (Phase 11) and 205 second freight phase (Phase 12)
- No-Build/Build assumed 25 second clearance phase (Phase 11) and 45 second passenger rail phase (Phase 12)
- Build assumed 25 second clearance phase (Phase 11) and 40 second LRT phase (Phase 12)

Improvements assumed for 2035 Build with Conceptual Mitigation include:

- Restripe EB approach to dual through lanes and dual right-turn lanes

Intersection 74 – Mangum Street at West Pettigrew Street

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

Assumed CBD area type

Reported intersection delay based on a weighted average of non-train and preempted train events.
Intersection modifications due to LRT improvements:

- No-Build/Build assumed 25 second clearance phase (Phase 11) and 205 second freight phase (Phase 12)

- No-Build/Build assumed 25 second clearance phase (Phase 11) and 45 second passenger rail phase (Phase 12)
- Build assumed 25 second clearance phase (Phase 11) and 40 second LRT phase (Phase 12)

Improvements assumed for 2035 Build with Conceptual Mitigation include:

- Add an EB RT lane

Intersection 75 – Dillard Street at East Pettigrew Street

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

Reported intersection delay based on a weighted average of non-train and preempted train events.
Intersection modifications due to LRT improvements:

- No-Build/Build assumed 25 second clearance phase (Phase 9) and 205 second freight phase (Phase 10)
- No-Build/Build assumed 25 second clearance phase (Phase 9) and 60 second passenger rail phase (Phase 10)
- Build assumed 25 second clearance phase (Phase 9) and 45 second LRT phase (Phase 10)

Intersection configuration modified due to LRT improvements:

- Add a NB RT lane

Intersection 76 – Fayetteville Street at East Pettigrew Street

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

Reported intersection delay based on a weighted average of non-train and preempted train events.
Intersection modifications due to LRT improvements:

- No-Build/Build assumed 25 second clearance phase (Phase 9) and 205 second freight phase (Phase 10)
- No-Build/Build assumed 25 second clearance phase (Phase 9) and 60 second passenger rail phase (Phase 10)
- Build assumed 25 second clearance phase (Phase 9) and 45 second LRT phase (Phase 10)

Intersection configuration modified due to LRT improvements:

- Add a NB RT lane via restriping

Intersection 77 – Fayetteville Street at Jackie Robinson Drive and NC 147 NB Ramps

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

Reported intersection delay based on a weighted average of non-train and preempted train events.
Intersection modifications due to LRT improvements:

- No-Build/Build assumed 25 second clearance phase (Phase 9) and 205 second freight phase (Phase 10)
- No-Build/Build assumed 25 second clearance phase (Phase 9) and 60 second passenger rail phase (Phase 10)
- Build assumed 25 second clearance phase (Phase 9) and 45 second LRT phase (Phase 10)

Improvements assumed for 2035 Build with Conceptual Mitigation include:

- Add a NB RT lane and restripe existing lanes as a LT and LRT lane on Jackie Robinson Drive

Intersection 78 – Fayetteville Street at NC 147 SB Ramps

Assumed no change in intersection configuration by 2035

No change in intersection configuration due to LRT improvements

Intersection 79 – Grant Street at East Pettigrew Street

Assumed no change in intersection configuration by 2035

Assumed pedestrian phasing for all legs

Reported intersection delay based on a weighted average of non-train and preempted train events.

Intersection modifications due to LRT improvements:

- No-Build/Build assumed 25 second clearance phase (Phase 9) and 205 second freight phase (Phase 10)
- No-Build/Build assumed 25 second clearance phase (Phase 9) and 45 second passenger rail phase (Phase 10)
- Build assumed 25 second clearance phase (Phase 9) and 40 second LRT phase (Phase 10)

Improvements assumed for LRT improvements include:

- Restripe existing WB left and a shared thru-right lane to provide a shared left-thru and right turn lane.
- Restripe existing EB shared left-thru and right turn lane to provide a left and a shared thru-right lane.

Intersection 80 – East Pettigrew Street at Chatham Place/Gann Street

Assumed no change in intersection configuration by 2035

No change in intersection configuration due to LRT improvements

Intersection 81 – NC 55 (Alston Avenue) at Chatham Place/Gann Street

Intersection configuration by 2035 is as documented in the *Alternatives Analysis Traffic Methodology Report* under the Durham-Orange Corridor Identification Number D/O-1 for the Alston Avenue Widening.

- Assumed construction of an additional NB thru lane on Alston Avenue

Intersection 82 – NC 55 (Alston Avenue) at Angier Avenue

Intersection configuration by 2035 is as documented in the *Alternatives Analysis Traffic Methodology Report* under the Durham-Orange Corridor Identification Number D/O-1 for the Alston Avenue Widening.

- Assumed construction of an additional NB thru and exclusive right-turn lane on Alston Avenue
- Assumed construction of an additional SB thru lane on Alston Avenue. The SB departure lane will be widened to accept two lanes of traffic

Assumed pedestrian phasing for all approaches

No change in intersection configuration due to LRT improvements