

DIN 01606

Erwin Road Traffic Simulation Report

Durham-Orange Light Rail Transit Project



July 24, 2015

The NEPA Preferred Alternative for the D-O LRT Project would generally follow NC 54, I-40, US 15-501, and the North Carolina Railroad (NCRR) Corridor in downtown Durham and east Durham. The alignment would begin at UNC Hospitals, parallel Fordham Boulevard, proceed east on NC 54, travel north on I-40, parallel US 15-501 before it turns east toward the Duke University campus along Erwin Road, and then follow the NCRR Corridor parallel to NC 147 through downtown Durham, before reaching its eastern terminus near Alston Avenue. The alignment would consist of at-grade alignment, fill and cut sections, and elevated structures. In two sections of the alignment, Little Creek and New Hope Creek, multiple Light Rail Alternatives are evaluated in the DEIS.

This technical report contains information for all alternatives analyzed in the DEIS. However, pursuant to MAP 21, the Moving Ahead for Progress in the 21st Century Act (P.L. 112-141), a NEPA Preferred Alternative has been developed, which recommends C2A in the Little Creek section of the alignment, NHC 2 in the New Hope Creek section of the alignment, the Trent/Flowers Drive station, and the Farrington Road Rail Operations and Maintenance Facility.



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List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AA	Alternatives Analysis
AM	Ante meridian/before noon
DEIS	Draft Environmental Impact Statement
D-O	Durham-Orange
D-O LRT	Durham-Orange Light Rail Transit
DTCC	Durham Technical Community College
EB	Eastbound
FHWA	Federal Highway Administration
I-40	Interstate 40
INRIX	A mobile computer application that pertains to road traffic
LOS	Level of Service
LPA	Locally Preferred Alternative
LRT	light rail transit
MOE	Measures of Effectiveness
NB	Northbound
NC	North Carolina
NCCU	North Carolina Central University
NCDOT	North Carolina Department of Transportation
NCRR	North Carolina Railroad
NHC	New Hope Creek
PM	Post meridian/after noon
ROMF	rail operations maintenance facility
SB	Southbound
TRM	Triangle Regional Model
UNC	University of North Carolina
US	United States
VA	Veteran Affairs
WB	Westbound

1. Executive Summary

The studied section in this Erwin Road Traffic Simulation Report is a corridor, approximately 1.5 miles long that runs along Erwin Road within Durham city limits. The Erwin Road segment study area extends from Cameron Boulevard (NC 751) in the southwest through Anderson Street in the northeast. It also includes the intersections of Elba Street and Fulton Street, Elba Street and Trent Drive, and Main Street and Anderson Street.

Erwin Road is a five-lane facility under NCDOT jurisdiction with a center two-way left-turn lane. Two LRT stations are proposed along this section of the LRT project. The westernmost station would be located at the intersection with LaSalle Street. There are two possible locations for the second station in the vicinity of Duke and VA Medical Centers. The first station alternative is located between the intersections of Trent Drive and Flowers Drive and the second is located just east of the intersection with Duke Eye Center/VA Hospital Drive. In the analysis, they are referred to as the Trent/Flowers Station Alternative and the Duke Eye Center Station Alternative.

All of the intersections within the Erwin Road corridor include a state-maintained roadway and therefore the NCDOT Traffic Impact Criteria have been applied. During the analysis, roadway modifications to improve traffic operations were incorporated into the LRT Alternatives analysis models. The recommended modifications proposed as part of the LRT Alternatives are presented in Table ES-1. These modifications are the same for both LRT Alternatives with exception of the westbound dedicated right turn lane at Duke Eye Center which applies only to the Trent/Flowers Station Alternative.

Traffic analysis was conducted using Vissim. The following scenarios were analyzed in this report:

- Existing Conditions
- 2040 No-Build Conditions
- Build LRT Conditions with station at Trent/Flowers alignment (Alternative 1)
- Build LRT Conditions with station at Duke Eye Center alignment (Alternative 2)

The overall intersection results of the No-Build versus Build LRT Alternatives Vissim analysis are shown in Table ES-2. The LRT Alternatives analysis results include the modifications presented in Table ES-1.



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Table ES-1: LRT Alternatives Proposed Roadway Modifications

Erwin Road Segment	
Cameron Boulevard at Erwin Road	Increase the length of northbound Cameron Blvd right turn bay
	Add two exclusive southbound Cameron Blvd left turn bays onto Erwin Rd
	Increase the length of westbound Erwin Rd right turn bay
Center for Living at Erwin Road	Prohibit outbound left turns from Duke Center for Living onto eastbound Erwin Rd
	Add traffic signal to control eastbound Erwin Rd left turn into the Duke Center for Living
Morreene Road/Towerview Road at Erwin Road	Add dedicated westbound Erwin Rd right turn bay
	Eliminate on-street parking spaces to provide two northbound Towerview Rd approach lanes
Lambeth Circle at Erwin Road	Convert to right-in/right-out
LaSalle Street at Erwin Road	Restripe to provide two southbound LaSalle St left turn lanes and one southbound LaSalle St through/right shared lane
Downing Street at Erwin Road	Prohibit left turns from Downing Street onto eastbound Erwin Rd and add a signal to control eastbound left turns from Erwin Rd onto Downing St.
Douglas Street/Research Drive at Erwin Road	Restripe to provide dedicated right, through and left turn lanes on both north and southbound Douglas St/Research Dr approaches
Duke Eye Center Drive at Erwin Road	Add dedicated westbound Erwin Rd right turn bay (Trent/Flowers Station Alternative only)
	Increase dedicated eastbound Erwin Rd right turn bay
Fulton Street at Erwin Road	Remove dedicated westbound Erwin Rd right turn lane
Emergency Drive at Erwin Road	Prohibit eastbound Erwin Rd left turn and restripe northbound to provide exclusive left turn lane
Trent Drive at Erwin Road	Add second dedicated eastbound Erwin Rd left turn bay
	Restripe (Trent) north leg of intersection to accommodate one southbound through lane and one dedicated left turn, and two northbound receiving lanes
	Add dedicated southbound Trent Dr right turn bay
Flowers Drive at Erwin Road	Prohibit southbound Flowers Drive left turn onto eastbound Erwin Rd
	Add traffic signal to control eastbound Erwin Rd left turn onto northbound Flowers Dr
Anderson Street at Erwin Road	Add second eastbound Erwin Rd left turn bay
	Restripe (Anderson St) north leg of intersection to accommodate a southbound left/through shared lane, a southbound dedicated right turn, and two northbound receiving lanes
NC 147 Off-On Ramps/Trent Drive/Elba Street	Replace existing stop controlled intersection with a roundabout with two-lane approaches

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Table ES-2: Vissim Overall Intersection Analysis Summary – 2040 LRT Alts vs 2040 No-Build

Intersection	No-Build		Trent/Flowers Alt.		Duke Eye Center Alt.	
	AM	PM	AM	PM	AM	PM
Cameron Boulevard (NC 751) and Erwin Road	D	D	C	D	C	D
Morreene Road/Towerview Road and Erwin Road	D	E	D	E	D	E
LaSalle Street and Erwin Road	C	C	D	D	D	D
Douglas Street/Research Drive and Erwin Road	C	C	C	C	C	C
Eye Center Drive and Erwin Road	A	B	B	B	B	B
Fulton Street and Erwin Road	D	C	C	C	C	C
Fulton Street and Elba Street	C	C	C	C	C	C
Trent Drive and Erwin Road	C	D	D	C	D	C
Anderson Street and Erwin Road	C	E	D	E	D	E
NC147 Off-On Ramps/Trent Drive/Elba Street (Roundabout)	C	A	B	A	B	A
Anderson Street/15th Street/Main Street	D	D	D	D	D	D
Emergency Drive and Erwin Road	A	B	B	B	B	B
Flowers Drive and Erwin Road (Unsignalized)	A	B	—	—	—	—

The Vissim results for the 2040 Build Alternatives indicate that all intersections would operate at LOS E or better during both peak hours and the majority of overall intersections will satisfy NCDOT criteria with the modifications proposed in Table ES-1. The following intersections would exceed the LOS threshold under both LRT Alternatives:

- Erwin Road and LaSalle Street (AM and PM peak hours)
- Erwin Road and Morreene Road/Towerview Road (AM peak hour)

As part of the traffic simulation analysis, traffic impacts associated with the implementation of the LRT were identified in the forms of delay, LOS, and queues. All locations showing impacts were investigated to determine the significance of the impact and whether there was a feasible roadway modification to eliminate or reduce the impact. Table ES-1 indicates the series of improvement measures that were proposed and analyzed in an effort to mitigate traffic impacts resulting from the LRT condition. These proposed mitigations eliminated a majority of the initial traffic impacts. The remaining traffic impacts along Erwin Road are not expected to significantly deteriorate traffic operations. Only the intersection of Erwin Road and LaSalle Street would experience an overall degradation in LOS from LOS C to LOS D. The intersection of Erwin Road and Morreene Road/Towerview Road also experiences an overall increase in delay greater than 25% in the AM peak hour; however, the LOS would remain at LOS D.

Although the maximum queues on the Erwin Road approaches may exceed the storage space for a particular turn bay, the maximum queue is generally contained within the adjacent through lane storage space without reaching the upstream signalized intersections. The maximum queue events represent the absolute farthest extent of the queue for a particular movement, which are infrequent occurrences. For those movements that report maximum queues exceeding the available storage space, the respective average queues would be contained within their storage space. Given the limited impact on traffic operations and the lack of additional practical modifications to the roadway at these locations, no further modifications are recommended to the LRT Alternative designs beyond those proposed in Table ES-1.

The expected average queues would be accommodated by the available storage at all locations except for northbound Towerview Road right turn to eastbound Erwin Road in the PM peak hour under Alternative 1, however, this excess queue as well as the maximum queue would be contained by the overall northbound approach and additional widening is not recommended.

Common to both LRT Alternatives, the southbound Anderson Street approach at Erwin Road may experience maximum queues that could spill back to the at-grade railroad crossing; however, the No-Build is also expected to have maximum queue lengths that extend upstream across the tracks and onto Main Street. To ensure the safe operations of the D-O LRT and the railroad crossing, the signal and gate operations along Anderson Street will be further refined during the Engineering phase of the project. The second challenge to be addressed is the potential maximum queue that originates at the westbound Elba Drive left turn to southbound Fulton Street. Under certain circumstances, this queue can combine with the upstream queue at the westbound Elba Drive left turn to the Duke Medical Center Parking Deck that can result in a maximum length that extends beyond the roundabout at Trent Drive and Elba Drive/NC 147 On/Off-Ramps and could potentially reach the NC 147 off-ramp. Under the Build Alternatives, the westbound Elba Drive left turning vehicles are frequently not afforded sufficient vehicle gaps between the opposing eastbound Elba Drive through vehicles at this unsignalized intersection, which causes the westbound left lane to queue while waiting for acceptable gaps. This is an unlikely event, however to mitigate this compounded maximum queue, the intersection of Elba Drive and the Duke Medical Center Parking Deck should be investigated further during the Engineering Phase to determine if traffic can be rerouted from this parking deck entrance or if the intersection at Elba Street with the parking deck entrance may require signalization to regularly stop eastbound traffic to allow the westbound left turning traffic to enter the garage unopposed and potentially clear the westbound left turn queue.

As noted previously, substantial modifications to the roadway are incorporated into the design including additional turn bays and restriping of intersection approaches to accommodate additional receiving lanes, and additional roadway expansion is not recommended. Additional traffic analysis will be completed during the Engineering phase of the project and the proposed roadway modifications may be refined. Other non-geometric mitigation strategies will also be explored by Triangle Transit and coordinated with the City of Durham, NCDOT, and major institutional stakeholders along Erwin Road, including evaluation, development, and enhancement of Travel Demand Management programs to encourage further mode shifts from driving to transit and non-motorized travel in the station areas.

2. Introduction

Through the Alternatives Analysis (AA) process completed in April 2012 prior to preliminary design, which included extensive public outreach, a Locally Preferred Alternative (LPA) was selected to address the purpose and need of the Durham-Orange (D-O) Corridor. The proposed project is a 17.1 mile double-track light rail transit (LRT) line with 17 proposed stations that will greatly expand transit service in Durham and Orange Counties. The Durham-Orange Light Rail Transit (D-O LRT) project extends from its western terminus at the University of North Carolina at Chapel Hill (UNC) at the UNC Hospitals Station to the eastern terminus in Durham at the Alston Avenue Station. The proposed D-O LRT Project improves public transportation access to a range of educational, medical, employment, and other important activity centers, in the D-O Corridor including: UNC; UNC Hospitals; the William and Ida Friday Center for Continuing Education; Duke University; Durham Veterans Affairs (VA) Medical Center and Duke University Medical Center (DUMC); downtown and east Durham.

2.1 Description of the Proposed D-O LRT

The proposed D-O LRT alignment generally follows North Carolina (NC) Highway 54 (NC 54), Interstate 40 (I-40), United States (US) 15-501, and parallel to North Carolina Railroad (NCR) Corridor in downtown Durham and east Durham. The proposed alignment begins in Chapel Hill at UNC Hospitals, parallels Fordham Boulevard, proceeds eastward adjacent to NC 54, travels north along I-40, parallels US 15-501 before it turns east towards Duke University and runs within Erwin Road, and then follows the NCR Corridor that parallels NC Highway 147 (NC 147) through downtown Durham, before reaching its eastern terminus in Durham near Alston Avenue. A total of 17 stations are planned, and approximately 5,000 parking spaces along the D-O LRT alignment will be provided. In addition, a rail operations and maintenance facility (ROMF) will be constructed to accommodate the D-O LRT fleet.

Bus routes will be modified to feed into the D-O LRT stations and headways will be adjusted to provide more frequent service and minimize transfer waiting times. These services will also connect LRT passengers with other area transportation hubs, including park-and-ride lots and transfer centers.

2.2 Proposed Project Alternatives

The Draft Environmental Impact Statement (DEIS) will examine the potential environmental impacts of the LRT alternative as well as a small number of alignment, station, and ROMF siting Alternatives, including the following:

- Crossing of Little Creek between the Friday Center and the proposed Leigh Village Development (i.e., Alternatives C1, C1A, C2, C2A and associated station location)
- Crossing of New Hope Creek (NHC) and Sandy Creek between Patterson Place and South Square (i.e., NHC LPA and NHC Alternatives 1 and 2 and associated station locations)
- Station Alternatives at Duke and Durham VA Medical Centers
- Five proposed locations for the ROMF

In addition to the LRT, the DEIS will consider a No-Build alternative, which includes the existing and programmed transportation network improvements, with the exception of planned rail improvements and associated bus network modifications.

2.3 Purpose of Erwin Road Traffic Simulation Report

The roadway network is a critical element of the transportation network, serving as a means to safely move people and goods and to support the economic development of an area. In an effort to balance safety and mobility with economic development and access, many owners of public roads have developed standards for determining the impacts of development on the roadway network and the level to which those impacts must be mitigated. The standards and mitigation levels governing projects in Durham and Orange Counties of North Carolina have been identified in the *Traffic Analysis Methodology Report* included in Appendix A. The NCDOT Traffic Impact Criteria apply for all intersections within this Erwin Road study area.

The purpose of this technical memorandum is to analyze the traffic operations for the Erwin Road section of the proposed D-O LRT in light of the policies identified in the *Traffic Analysis Methodology Report*. The proposed D-O LRT project would integrate LRT into the median of Erwin Road.

The goal of the study is to provide decision makers with an evaluation of the ability of the transportation system to accommodate the future travel demand and to help determine which roadway network modifications are necessary to accommodate that demand. As noted previously, modifications to the roadway network will be included in this evaluation to determine if reasonable improvements can be made to accommodate the forecasted traffic volumes for 2040 in accordance with the guiding policies. This study will also aim to determine which projects are necessary to accommodate the background growth in traffic and which are necessary to mitigate additional impacts caused by the proposed D-O LRT project.

2.4 Erwin Road Traffic Simulation Description

This report describes the approach and summarizes the findings and results of the traffic analysis conducted on the Erwin Road section of the D-O LRT alignment. The studied section in this report is a corridor, approximately 1.5 miles long that runs along Erwin Road within Durham city limits. The Erwin Road segment study area extends from Cameron Boulevard (NC 751) in the southwest through Anderson Street in the northeast. It also includes portions of 15th Street, Main Street, Trent Drive, Fulton Street, and Elba Street. Preliminary designs were developed for the proposed D-O LRT alignment running in the median of Erwin Road and are included in the *Basis for Engineering Design* plans in Appendix B. The traffic analysis evaluated both AM and PM peak hour traffic volumes with introduction of the proposed D-O LRT with LRT operating with 10 minute peak period frequency and 20 seconds of dwell time at each station for passenger boarding and alighting.

For the purpose of this analysis, it was assumed that traffic signals along Erwin Road will be programmed to operate with traffic signal preemption. Traffic signal preemption takes place when normal traffic signal operations are interrupted to allow trains to travel through a signalized intersection with minimal delay. Transit signal preemption was used for this analysis because it provided the greatest travel time savings to the LRVs by providing reliable along Erwin Road and provides the most conservative (worst case) analysis of operations of general traffic. It changes signal phasing at the intersections crossed by D-O LRT by stopping conflicting traffic. A traffic signal phase is the combination of movements running together at the same time. Triangle Transit will work with NCDOT and the City of Durham to develop signal plans for each intersection during the Engineering phase of the D-O LRT project. The signal plans will incorporate signal preemption or transit signal priority. The difference

between signal priority and signal preemption is that signal priority modifies the normal signal operation process to better accommodate transit vehicles, while preemption interrupts the normal process for special routine events such as an approaching train. Transit signal priority extends the signal phase for the LRT and any non-conflicting vehicular phase(s), e.g. green or red light will only be lengthened or shortened by 15 seconds. This method of operation is not preferred by Triangle Transit since it would severely compromise the travel time reliability of the light rail operations which would have a negative impact on ridership.

In the case of Erwin Road, the proposed D-O LRT alignment is located in the median. As a result, when trains approach an intersection the normal traffic signal timing will be altered to allow the train to proceed with minimal or no delay. While the train is in the intersection, vehicular and pedestrian traffic crossing the tracks are stopped, however, traffic traveling parallel to the tracks can proceed. This may be accomplished by lengthening or shortening the traffic signal phases, typically by no more than 30 to 45 seconds. Along roadways with LRT running in the median, a common change to the traffic signal phasing is to switch left turning movements from leading, before opposing traffic, to lagging, after opposing traffic. Any difference in signal phase length as a result of the passing train is made up within one traffic signal cycle after the train passes. A traffic signal cycle comprises all of the signal phases that a particular traffic signal will display before a signal phase is repeated. Along Erwin Road, traffic signal cycles are generally two minutes long in the existing conditions.

Erwin Road is an existing five-lane facility with a center two-way left-turn lane. Two LRT stations are proposed for implementation along this section of the project. The westernmost of the two is located at the intersection with LaSalle Street. There are two possible locations for the second station in the vicinity of Duke and VA Medical Centers that were considered and analyzed. The first of two potential stations at the eastern end of Erwin Road is located between the intersections of Trent Drive and Flowers Drive, and the second is located just east of the intersection with Duke Eye Center Drive. In the analysis they are referred to as the Trent/Flowers Station Alternative and the Duke Eye Center Station Alternative.

The implementation of the proposed D-O LRT along the Erwin Road corridor would require the reconstruction of the roadway from Cameron Boulevard (NC 751) to east of Anderson Street with numerous specific design features to optimize the traffic operations along the corridor. This corridor was examined in a previous study conducted as part of the AA.

In order to meet NCDOT criteria, it was assumed for the purposes of this project that, at a minimum, the existing number of through lanes available for general traffic on Erwin Road would need to be maintained with the implementation of the LRT. In other words, existing lanes would not be converted for exclusive use by the LRT.

The AA study was conducted using Synchro software package. Synchro is a deterministic traffic analysis tool with limited functionality to determine the impacts of a LRT alignment as well as limited ability to determine the spill back effects of one intersection on adjacent intersections. For the purpose of this analysis for the DEIS, Vissim software was used. Vissim is a more robust traffic simulation package that can not only provide level of service (LOS) information, but can also determine the true impact to vehicular traffic due to the proposed D-O LRT. By employing Vissim, this traffic analysis was able to identify potential impacts to traffic and assist in the identification of potential mitigation strategies that revised and superseded the mitigation strategies identified in the AA.



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The following intersections were analyzed in the Vissim models and are also shown in Figure 1 on the following page:

- Erwin Road and Cameron Boulevard (NC 751) (signalized)
- Erwin Road and Morreene Road/Towerview Road (signalized)
- Erwin Road and LaSalle Street (signalized)
- Erwin Road and Douglas Street/Research Drive (signalized)
- Erwin Road and Duke Eye Center Drive (signalized)
- Erwin Road and Fulton Street (signalized)
- Fulton Street and Elba Street (signalized)
- Erwin Road and Emergency Drive (unsignalized)
- Erwin Road and Trent Drive (signalized)
- Trent Drive and Elba Street/NC 147 On/Off-Ramps (unsignalized)
- Erwin Road and Flowers Drive (unsignalized)
- Erwin Road and Anderson Street (signalized)
- Main Street and Anderson Street/15th Street (signalized)

Figure 1: Erwin Road Study Area Intersections



3. Description of Scenarios

Four scenarios were analyzed for this study. Those scenarios included an Existing Conditions scenario that was also used for model calibration, a Future Year No-Build Alternative, and two Future Year LRT Alignment Alternatives.

A brief description of the scenarios evaluated in a microscopic simulation for traffic operations follows.

3.1 2011 Base Year Scenario

The 2011 Base Year scenario simulated traffic conditions as they existed in 2011. The goal of the 2011 Base Year Scenario was to develop a calibrated model that would serve as the basis for the creation of the models for the other scenarios. As discussed in the *Traffic Analysis Methodology Report*, only speed data related to calibration was provided for this scenario; no LOS data was provided for this scenario.

The following two recent improvements along Erwin Road have already been implemented in the field and are incorporated in the Existing, No-Build and LRT Alternatives:

- The Erwin Road intersection at the Duke Eye Center/VA Medical Center has been converted to a signalized intersection.
- The Erwin Road and Fulton Street intersection has been modified to include dual left-turn lanes from eastbound Erwin Road to northbound Fulton Street.

3.2 2040 No-Build Alternative

This alternative determined what the traffic operations would be in the vicinity of the proposed D-O LRT study area if the proposed project is not constructed. The No-Build Alternative assumed no improvements other than those currently scheduled for implementation which include: an eastbound right turn lane at the intersection of Research Drive and Erwin Road, signalization of the intersection of Emergency Drive and Erwin Road and reconstruction of the southern leg of the intersection of Duke Eye Center Drive and Erwin Road. Other No-Build modifications include signal timing/phasing changes and restriping of intersection approaches to better accommodate the traffic volumes. In the 2040 No-Build Alternative, all intersections at the eastern end of Erwin Road experienced significant queuing.

3.3 2040 Build Conditions – Trent/Flowers Station Alternative

The Build Trent/Flowers Station Alternative consists of a station platform located within the median of Erwin Road between Trent Drive and Flowers Drive. This study determined what the traffic operations would be like in the vicinity of the proposed project if the light rail is constructed according to the Trent/Flowers Station Alternative. The Build analysis roadway network was developed from the No-Build network by adding the LRT and making modifications needed to meet NCDOT analysis thresholds to the greatest extent practicable. The roadway geometry and LRT alignment for the Trent/Flowers Alternative are shown in the *Basis for Engineering Design* plans in Appendix B. The roadway modifications identified as recommended mitigation measures in the Build analysis are presented in Table 1.



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The northbound exclusive right turn lane on Anderson Street at Erwin Road identified in the AA is not included in the design, as the addition of dual left-turn lanes on eastbound Erwin Road alleviates the need for this improvement to satisfy the criteria.

3.4 2040 Build Conditions – Duke Eye Center Station Alternative

The 2040 Build Duke Eye Center Station Alternative is similar to the 2040 Build Trent/Flowers Station Alternative, but differs by replacing the proposed station between Trent Drive and Flowers Drive with a proposed station just east of Duke Eye Center Drive. The roadway geometry and LRT alignment for the Eye Care Center Alternative are shown in the *Basis for Engineering Design* plans in Appendix B. Proposed roadway modifications included in Table 1 would also be applied to the Duke Eye Center Alternative except where noted.

In terms of the LRT's signal operation, for the purpose of this analysis it was assumed that traffic signals along Erwin Road will be programmed to operate with traffic signal preemption. Traffic signal preemption takes place when traffic signal timing is interrupted to allow trains to remain on schedule. In the case of the Erwin Road corridor, it is assumed the normal traffic signal timing is altered to allow the train to proceed uninhibited. While the train is in the intersection, all conflicting movements must stop although traffic traveling parallel to the tracks can proceed with the train. Any difference in signal phase length as a result of the passing train is made up within one traffic signal cycle after the train passes.

Table 1: Build LRT Alternatives Proposed Roadway Modifications

Erwin Road Segment	
Cameron Boulevard at Erwin Road	Increase the length of northbound Cameron Blvd right turn bay
	Add two exclusive southbound Cameron Blvd left turn bays onto Erwin Rd
	Increase the length of westbound Erwin Rd right turn bay
Center for Living at Erwin Road	Prohibit outbound left turns from Duke Center for Living onto eastbound Erwin Rd
	Add traffic signal to control eastbound Erwin Rd left turn into the Duke Center for Living
Morreene Road/Towerview Road at Erwin Road	Add dedicated westbound Erwin Rd right turn bay
	Eliminate on-street parking spaces to provide two northbound Towerview Rd approach lanes
Lambeth Circle at Erwin Road	Convert to right-in/right-out
LaSalle Street at Erwin Road	Restripe to provide two southbound LaSalle St left turn lanes and one southbound LaSalle St through/right shared lane
Downing Street at Erwin Road	Prohibit left turns from Downing Street onto eastbound Erwin Rd and add a signal to control eastbound left turns from Erwin Rd onto Downing St.
Douglas Street/Research Drive at Erwin Road	Restripe to provide dedicated right, through and left turn lanes on both north and southbound Douglas St/Research Dr approaches
Duke Eye Center Drive at Erwin Road	Add dedicated westbound Erwin Rd right turn bay (Trent/Flowers Station Alternative only)
	Increase dedicated eastbound Erwin Rd right turn bay
Fulton Street at Erwin Road	Remove dedicated westbound Erwin Rd right turn lane
Emergency Drive at Erwin Road	Prohibit eastbound Erwin Rd left turn and restripe northbound to provide exclusive left turn lane
Trent Drive at Erwin Road	Add second dedicated eastbound Erwin Rd left turn bay
	Restripe (Trent) north leg of intersection to accommodate one southbound through lane and one dedicated left turn, and two northbound receiving lanes
	Add dedicated southbound Trent Dr right turn bay
Flowers Drive at Erwin Road	Prohibit southbound Flowers Drive left turn onto eastbound Erwin Rd
	Add traffic signal to control eastbound Erwin Rd left turn onto northbound Flowers Dr
Anderson Street at Erwin Road	Add second eastbound Erwin Rd left turn bay
	Restripe (Anderson St) north leg of intersection to accommodate a southbound left/through shared lane, a southbound dedicated right turn, and two northbound receiving lanes
NC 147 Off-On Ramps/Trent Drive/Elba Street	Replace existing stop controlled intersection with a roundabout with two-lane approaches

4. Methodology

The use of microscopic simulation was completed using Vissim (version 5.4). Vissim is a microscopic, behavior-based multi-purpose traffic simulation program. For many engineering disciplines, simulation has become an indispensable instrument for the optimization of complex technical systems. This is also true for transportation planning and traffic engineering, where simulation is an invaluable and cost-reducing tool. The microscopic simulation model was developed for the studied section of the project and was based on a calibrated base model for the area.

The methodology for microscopic simulation begins with a base model developed from data collected for the transportation network. The base model is then calibrated against data measured in the field to arrive at a calibrated base model. Once the base model is calibrated future year alternatives can be developed and results compared. The concept of Highway Capacity Manual's (HCM) Level of Service was adopted here for the purpose of simply categorizing the delays. Please note that the calculation methods of HCM delay and Vissim delay are different, as Vissim delay includes control delay as well as queue delay, whereas, HCM includes control delay only, The LOS grades are based on Vissim delays, which will provide a more conservative result than the typical HCM delays.

The methodology for microscopic simulation begins with a base model developed and calibrated to counts and other vehicle probe data measured in the field. Once the base model is calibrated, future year alternatives can be developed and analyzed for impact study. As in real-life operations, microscopic simulation models are constrained to the capacity of a given roadway, and as such the model can only load traffic up to the capacity of a facility, with excess vehicles being denied entry and queue up outside the model network. This can happen for future scenarios when demand has been forecasted to outgrow the capacity of the existing roadways.

4.1 Measures of Effectiveness

Measures of effectiveness (MOE) are system performance statistics that best characterize the degree to which a particular alternative meets the project objectives. The MOEs for microscopic simulation can be abundant due to the nature of the analysis. The primary MOEs for urban arterials are typically average speed and vehicle density for individual segments as well as average travel time and speed for individual origin-destination pairs within the network. On an overall network level, MOEs such as average system speed, average system delay, and number of stops can provide overall indications of the operations of a network.

As discussed in the *Traffic Analysis Methodology Report*, corridor-level MOEs including average speed and travel time were used as the method for calibrating the base year model. Control delay, which is utilized to determine intersection LOS, and queuing were the MOEs for the future year models.

The acceptable levels for the future year MOEs were enumerated in the *Traffic Analysis Methodology Report*. Both NCDOT and City of Durham have established guidelines that specify when chosen MOEs meet the required thresholds.

The NCDOT's "Policy on Street and Driveway Access to North Carolina Highways" states that when comparing base network conditions to project conditions, improvements to the roadway network shall be identified if at least one of the following conditions exist:

- The total average delay at an intersection or an individual approach increases by 25% or greater, while maintaining the same Level of Service
- The Level of Service degrades by at least one level
- Or Level of Service is F
- For turning lanes, mitigation improvements shall be identified when the analysis indicates that the 95th percentile queue exceeds the storage capacity of the existing lane.

For the purposes of this analysis, traffic impacts were considered significant if the Build Alternative delay was at or above a middle LOS D or 45.0 seconds or greater for a signalized intersection. Those overall intersections or movements that reported delays greater than 45.0 seconds and experienced an LOS degradation or increase in delay greater than 25% compared to the No-Build were highlighted in the Vissim LOS tables with orange. For those intersections or movements that reported a Build LOS better than middle D or less than 45.0 seconds, the impacts were not considered as significant and were highlighted with yellow.

To be considered a queue impact, the maximum queue length for any Build movement would exceed both the respective No-Build movement's maximum queue length and the build movement storage length by 10 feet.

Based on the locations of intersections along the Erwin Road segment, NCDOT's criteria are applied for traffic impact analysis.

4.2 Network Development

4.2.1 Geometry

The basis for developing the geometric data was a combination of aerial photographs and contour maps. Aerial photography was used as a background to digitize the network into the simulation model. The three-dimensional attributes and grades were determined based on a contour map of the study area.

The geometry in the 2011 Base Year network and the 2040 No-Build network are based on the current geometry of Erwin Road. The network was created using aerials from NC OneMap, Google Maps, field verification, and contour maps from the North Carolina Department of Transportation (NCDOT).

4.2.2 Traffic Control

Signal and coordination plans were obtained from NCDOT for the nine signals included in the study area. These plans were used to input timing, phasing, and detectors for the following intersections in the base year:

- Cameron Boulevard at Erwin Road
- Morreene Road/Towerview Road at Erwin Road
- LaSalle Street at Erwin Road
- Douglas Street/Research Drive at Erwin Road

- Fulton Street at Erwin Road
- Elba Street at Fulton Street
- Trent Drive at Erwin Road
- Anderson Street at Erwin Road
- Anderson Street/Fifteenth Street at Main Street

Field verification of the signal timings were performed by timing each signal phase and recording videos at each intersection. The existing signal timing plans and signal design files are located in Appendix C. For the future signal timings, minimum green times, yellow and all-red clearance intervals were based on build intersection geometry, the Institute of Transportation Engineers' pedestrian phasing formula, and recommended traffic settings documented in the NCDOT Congestion Management Capacity Analysis Guidelines. The signalized intersections for the future year networks were input into Synchro for optimization prior to being input into Vissim. The future year signal timings utilized the base year timings, which were re-optimized based on the 2040 forecasted traffic volumes and build geometry. The future year signalized intersections include the previously listed intersections. Cycle lengths, splits and offsets were optimized in Synchro for the study signalized intersections in the network prior to being input into Vissim where they were refined.

4.2.3 Speed Data

The average speed data in the area were collected using the floating car technique during off-peak periods with low volumes. This data was used to develop desired speed distributions for the network. Weekday peak periods speed data was collected from INRIX (a mobile application pertaining to road traffic). This data was used to determine the average speed during the peak periods from the approximate time the initial count data was collected. This data was used in calibration of the model. The desired speed distribution for turning vehicles at intersections was assumed to be 12.6 mph with a standard deviation of 1.2 mph for right turns and 21 mph with a standard deviation of 2 mph for left turns. The speed distributions used for Erwin Road was based on a 35 mph posted speed with a range of 32 to 48 mph in Vissim.

4.2.4 Driving Behavior Parameters

The driver behavior parameters were used to guide vehicles through the network during the simulation models. Both the car-following and lane-change models in Vissim use an extensive range of parameters. Some of these may be adapted by the user to change basic driving behavior. Vissim uses five driving behavior models, of which only one was used in the base model; Urban (motorized). The Urban (motorized) parameters were used to model the surface streets within the network and were based on the Wiedemann 74 model. The Wiedemann 74 model includes three parameters which can be calibrated based on the data collected. Default values were used in developing the base model and any modifications made to the parameters were documented in the calibration section of this report.

4.2.5 Estimated Traffic Volumes

Simulation models are capable of using unbalanced input volumes and their own internal algorithms to balance the network; however using this method of traffic volume input can produce inaccuracies in

actual processed volumes at particular locations. To accurately model the network, the volumes were developed into a balanced network. The traffic volumes for the proposed project were based on peak hour count data that was balanced along Erwin Road by adjusting through volumes and adding sink and source nodes to correspond to mid-block locations that could serve as origins and destinations of traffic. These locations included parking lots for commercial establishments as well as parking areas for residential development along the corridor.

Volumes for the 2011 Existing, the 2040 No-Build Alternative and the 2040 Build Alternatives were created using the count data and the Triangle Regional Model (TRM) v5 as outlined in the *Traffic Analysis Methodology Report*. The balanced peak hour volumes for all scenarios are shown in Appendix D. In general, the 2040 Build Alternative traffic volumes were lower than those in the No-Build Alternative by between 10 and 20 vehicles along major approaches.

Construction of the D-O LRT will result in the redistribution of certain volumes. For both LRT Build Alternatives, the No-Build left-turning traffic entering and exiting Lambeth Circle was shifted to LaSalle Street and the No-Build left-turning traffic entering and exiting Hock Plaza was reassigned to Douglas Street. These volume reassignments reflect the proposed construction of center medians in this area as well as the existing access between developments and public roadways to the north of Erwin Road. Additionally, right-turning traffic from westbound Erwin Road to northbound Fulton Street was shifted to Trent Drive and Elba Street to utilize the proposed roundabout. Since the right-turn movement was not prohibited at the Erwin Road and Fulton Street intersection some volume estimated in the No-Build conditions remained in the Build Alternatives.

4.2.6 Simulation Settings and Repetitions

Each simulation was run for one hour, with 15 minutes of start-up time for the network to load traffic before output recording was started.

The number of simulation runs was based on the process described in Appendix B of the Federal Highway Administration (FHWA) Traffic Analysis Toolbox Volume III. The average speed of each simulation run was used as a basis for determining the number of required repetitions, with a confidence level of 95% and a confidence interval of 5 mph. It was calculated that each alternative would need to be run with 16 random seeds for both the AM and PM peak hours.

4.2.7 Output

The output data was extracted from the model using the Travel Time evaluation, and the Intersection Node modules. The Travel Time evaluation provided average travel times for the corridor used for calibration of the 2011 Existing model. The Intersection Node module provided movement and intersection delay data which was utilized to determine the intersection LOS for the future year analysis models.

4.2.8 Base Year Calibration

The base year model was calibrated by comparing modeled travel times versus historic INRIX speed data as described in the *Traffic Analysis Methodology Report*. INRIX speed data is collected by utilizing vehicle probes that collect and transmit the locations of probe vehicles within the network. Historic data was extracted for Erwin Road within the study area for AM and PM peak one hour periods during all weekdays



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for the month of May in 2011. The average speed and corresponding travel time for each direction along Erwin Road was determined from the data. It should be noted that INRIX speed data is composed of link-based speeds (as opposed to spot speeds taken at a fixed point); therefore, the model network was developed to match the same extents as the INRIX speed data. For this study this included the Erwin Road segments between the Cameron Boulevard (NC 751) intersection and the Anderson Street intersection.

For the calibration effort, the average travel time was determined by averaging a statistically adequate number (see section 5.1) of model runs. Speed calibration targets of +/- 2.5 mph (desirable) and +/- 5 mph (acceptable) were set as described in the *Traffic Analysis Methodology Report*.

Calibrating the base year model to replicate the current existing conditions required the following changes in driving behavior factors:

- Lane change – Changed the safety distance reduction factor to 0.5 for Urban (default value is 0.6)
- Turned on cooperative lane changing
- Adjusted connector “Lane Change” distances

5. 2040 Simulation Results

5.1 2011 Existing Conditions

The 2011 Existing Conditions Vissim model was developed and calibrated, as described in Section 4.2.68 above. The INRIX speed data, taken from a 1.5 mile corridor along Erwin Road showed the following average speeds and corresponding travel times.

Speed data and calibration results for the AM and PM eastbound and westbound travel times are shown in Table 2 below. As shown in Table 2, three of the four modeled average speeds were within the desirable calibration limits of +/- 2.5 mph. The other was within the acceptable range of +/- 5 mph. The base model is therefore considered to be calibrated and can be utilized as the basis for developing the future year alternatives. In general, the speeds in the model were lower than those from the INRIX data. Speeds were not further increased because in addition to all values falling within acceptable limits, the queuing seen in the simulation model appeared to match field observed conditions.

Table 2: 2011 Existing Scenario - Base Model Calibration Results

Direction	Length (miles)	Peak Period	Calibrated Model		INRIX		Travel Time Difference (min)	Speed Difference (MPH)	Calibration Range
			Average Travel Time (min)	Average Speed (MPH)	Average Travel Time (min)	Average Speed (MPH)			
Eastbound (EB) Travel Time and Speed Summary									
EB Corridor Wide	1.79	AM	4.09	26.38	4.33	24.86	-0.24	1.52	Within desirable
		PM	4.49	24.03	4.07	26.45	0.42	-2.42	Within desirable
Westbound (WB) Travel Time and Speed Summary									
WB Corridor Wide	1.79	AM	4.36	24.79	4.21	25.57	0.15	0.78	Within desirable
		PM	5.43	19.92	4.53	23.76	0.90	-3.84	Within acceptable

5.2 2040 No-Build Alternative

The 2040 No-Build Alternative model was developed based on the calibrated Existing Conditions model. The projects included in section 2.4 were added to the network geometry and the 2040 No-Build volumes were then input into the model. Please note that the Trent Drive at Elba Road/NC 147 Ramp intersection is unsignalized and was evaluated as such in the No-Build Alternative.

The Highway Capacity Manual defines LOS for signalized and unsignalized intersections as a function of the average vehicle control delay. LOS may be calculated per movement or per approach for any intersection configuration, but LOS for the intersection as a whole is only defined for signalized and all-way stop

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configurations. Table 3 and Table 4 demonstrate the different levels of service for signalized and unsignalized intersections based on delay and volume to capacity ratio.

Table 3: Level of Service – Signalized Intersections

Level of Service	Delay (seconds)	Description
A	≤10	This level is typically assigned when the volume-to capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.
B	>10-20	This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.
C	>20-35	This level is typically assigned when progression is favorable or the cycle length is moderate. Individual <i>cycle failures</i> (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. This number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.
D	>35-55	This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.
E	>55-80	This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.
F	>80	This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Table 4: Level of Service – Unsignalized Intersections

Level of Service	Delay (seconds)
A	≤10
B	>10-15
C	>15-25
D	>25-35
E	>35-50
F	>50

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The Erwin Road Study Area 2040 No-Build Vissim MOEs are presented in Table 5 for the AM and PM peak hours.

Table 5: 2040 No-Build Alternative Vissim Model Summary

Intersection	Movement	AM Peak			PM Peak		
		Volume (vph)	Delay (s)	LOS	Volume (vph)	Delay (s)	LOS
Cameron Boulevard/Erwin Road	SBT	1030	20.91	C	532	33.37	C
	SBL	864	23.06	C	341	34.36	C
	NBT	279	149.79	F	938	57.98	E
	NBR	384	62.68	E	253	35.41	D
	WBR	186	3.84	A	642	15.91	B
	WBL	220	43.23	D	439	44.43	D
	Overall	2963	39.73	D	3145	38.95	D
Morreene Road/Towerview Road/Erwin Road	SBT	681	55.84	E	208	71.87	E
	SBR	141	50.72	D	182	55.58	E
	SBL	314	53.78	D	218	90.83	F
	NBT	165	34.34	C	444	135.60	F
	NBL	14	39.27	D	149	133.85	F
	NBR	21	14.96	B	119	123.01	F
	EBR	174	29.40	C	41	24.66	C
	EBL	218	36.63	D	143	63.68	E
	EBT	794	32.37	C	326	32.04	C
	WBL	49	48.18	D	102	22.94	C
	WBR	214	10.58	B	344	20.26	C
	WBT	227	30.09	C	833	21.61	C
Overall	3012	39.48	D	3108	60.42	E	
LaSalle Street/Erwin Road	SBT	259	51.66	D	79	76.94	E
	SBR	80	11.03	B	167	14.96	B
	SBL	350	59.06	E	149	88.55	F
	NBT	48	44.41	D	149	67.86	E
	NBL	15	54.53	D	119	56.64	E
	NBR	45	7.99	A	168	9.96	A
	EBL	83	16.88	B	204	33.26	C
	EBR	160	6.69	A	27	5.90	A
	EBT	1269	17.37	B	697	23.03	C
	WBR	136	4.93	A	408	9.88	A
	WBL	136	31.76	C	21	15.08	B
	WBT	313	14.08	B	1159	15.54	B
Overall	2893	24.91	C	3346	25.64	C	

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Intersection	Movement	AM Peak			PM Peak		
		Volume (vph)	Delay (s)	LOS	Volume (vph)	Delay (s)	LOS
Douglas Street/Research Drive/Erwin Road	SBT	32	65.49	E	12	70.66	E
	SBR	70	9.26	A	284	10.57	B
	SBL	101	67.29	E	224	67.74	E
	NBT	10	58.46	E	27	65.63	E
	NBL	68	68.30	E	299	62.64	E
	NBR	201	8.24	A	412	17.54	B
	EBL	152	16.53	B	57	24.53	C
	EBR	291	5.46	A	57	3.84	A
	EBT	774	15.96	B	632	22.56	C
	WBR	74	2.91	A	45	5.27	A
	WBL	282	29.29	C	152	22.83	C
	WBT	552	14.98	B	855	16.06	B
Overall		2605	19.03	B	3054	26.13	C
Duke Eye Center Drive/Erwin Road	NBT	0	0.00	A	0	0.00	A
	NBL	8	70.64	E	16	58.88	E
	NBR	36	6.36	A	82	11.10	B
	SBT	1	35.52	D	3	78.27	E
	SBR	23	23.27	C	64	31.68	C
	SBL	85	64.77	E	116	65.79	E
	EBL	67	9.01	A	31	15.29	B
	EBR	34	2.03	A	63	4.43	A
	EBT	693	3.90	A	1096	8.10	A
	WBR	194	3.11	A	136	3.45	A
	WBL	92	4.66	A	28	13.18	B
	WBT	973	3.28	A	922	4.39	A
Overall		2203	6.54	A	2558	10.20	B
Fulton Street/Erwin Road	NBL	68	59.36	E	37	62.26	E
	NBT	98	83.81	F	63	62.16	E
	NBR	84	93.00	F	39	76.50	E
	EBR	41	22.98	C	61	24.29	C
	EBL	275	41.53	D	416	66.51	E
	EBT	495	22.91	C	803	33.71	C
	SBT	52	62.43	E	76	25.18	C
	SBR	692	29.48	C	321	15.86	B
	SBL	216	59.37	E	78	46.70	D
	WBL	27	24.35	C	53	18.08	B
	WBT	494	25.22	C	729	21.09	C
	WBR	153	18.48	B	396	20.53	C
Overall		2694	35.66	D	3070	32.51	C

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Intersection	Movement	AM Peak			PM Peak		
		Volume (vph)	Delay (s)	LOS	Volume (vph)	Delay (s)	LOS
Fulton Street/Elba Street	SBR	96	7.20	A	43	1.99	A
	SBT	505	22.20	C	249	9.96	A
	SBL	382	23.41	C	113	17.32	B
	EBL	24	73.60	E	78	67.03	E
	EBR	16	15.84	B	40	34.83	C
	EBT	18	70.21	E	66	65.79	E
	NBT	329	22.58	C	666	14.73	B
	NBL	20	25.23	C	22	13.98	B
	NBR	177	4.18	A	187	3.62	A
	WBR	210	6.96	A	233	8.83	A
	WBT	59	60.51	E	37	64.46	E
	WBL	452	66.16	E	187	64.06	E
	Overall	2287	29.61	C	1921	22.20	C
Trent Drive/Erwin Road	NBT	38	67.76	E	195	64.89	E
	NBL	111	68.53	E	320	61.22	E
	NBR	36	66.04	E	120	61.48	E
	SBT	175	49.71	D	38	64.56	E
	SBR	117	19.97	B	164	12.69	B
	SBL	388	53.83	D	140	77.38	E
	EBR	219	7.63	A	68	15.28	B
	EBL	102	9.38	A	249	30.73	C
	EBT	484	7.34	A	653	28.99	C
	WBL	143	17.37	B	38	40.43	D
	WBR	35	16.20	B	186	22.39	C
	WBT	444	12.96	B	549	17.11	B
	Overall	2293	25.95	C	2719	35.73	D
Anderson Street/Erwin Road	WBL	94	34.64	C	78	58.73	E
	WBR	13	50.31	D	49	80.11	F
	WBT	403	35.71	D	374	53.93	D
	NBR	61	39.81	D	110	95.19	F
	NBT	245	57.23	E	329	142.75	F
	NBL	100	55.68	E	206	117.74	F
	SBL	32	54.03	D	20	73.82	E
	SBT	234	50.65	D	222	64.62	E
	SBR	396	9.93	A	291	10.81	B
	EBT	241	23.98	C	573	34.16	C
	EBR	68	4.68	A	140	7.38	A
	EBL	265	40.25	D	533	92.59	F
	Overall	2152	34.66	C	2925	68.09	E

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Intersection	Movement	AM Peak			PM Peak		
		Volume (vph)	Delay (s)	LOS	Volume (vph)	Delay (s)	LOS
NC147 Ramps/Trent Drive/Elba Street (unsignalized)	SBL	0	0.00	A	0	0.00	A
	SBR	917	2.43	A	151	0.21	A
	SBT	425	54.24	F	231	16.74	C
	EBT	213	0.28	A	467	0.73	A
	EBR	266	11.43	B	116	3.30	A
	NBR	176	0.39	A	630	1.28	A
	Overall		1996	14.31	B	1594	3.41
Anderson Street/15 th Street/Main Street	SBL	23	61.43	E	31	61.11	E
	SBR	1	42.08	D	8	32.51	C
	SBT	217	63.74	E	170	63.73	E
	WBR	14	3.36	A	48	12.59	B
	WBT	182	23.35	C	487	38.39	D
	WBL	223	40.59	D	224	64.81	E
	EBL	0	0.00	A	7	89.26	F
	EBT	421	49.44	D	362	82.61	F
	EBR	222	44.98	D	141	74.65	E
	NBT	265	39.53	D	396	29.40	C
	NBR	61	40.45	D	247	28.01	C
	NBL	197	37.56	D	268	27.68	C
	Overall		1827	43.73	D	2391	47.71
Emergency Drive/Erwin Road	SBT	0	0.00	A	18	58.34	E
	SBR	10	5.75	A	241	18.13	B
	SBL	1	45.01	D	0	0.00	A
	NBT	4	56.06	E	4	49.14	D
	NBL	20	56.52	E	1	31.37	C
	NBR	48	9.54	A	78	10.69	B
	EBL	14	6.74	A	1	6.91	A
	EBR	23	2.79	A	2	7.14	A
	EBT	756	4.38	A	904	15.68	B
	WBR	7	2.18	A	38	3.09	A
	WBL	22	8.26	A	58	13.88	B
	WBT	644	3.63	A	936	4.53	A
	Overall		1548	5.13	A	2282	11.18

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Intersection	Movement	AM Peak			PM Peak		
		Volume (vph)	Delay (s)	LOS	Volume (vph)	Delay (s)	LOS
Flowers Drive/Erwin Road (unsignalized)	NBT	0	0.00	A	0	0.00	A
	NBL	1	5.16	A	0	0.00	A
	NBR	28	5.56	A	348	30.98	D
	SBT	0	0.00	A	0	0.00	A
	SBR	8	5.97	A	1	14.99	B
	SBL	2	8.03	A	11	40.64	E
	EBL	64	3.46	A	3	13.94	B
	EBR	299	3.39	A	3	3.14	A
	EBT	545	1.10	A	900	23.52	C
	WBR	37	0.64	A	9	0.89	A
	WBL	251	6.14	A	87	13.85	B
	WBT	612	0.71	A	774	2.15	A
	Overall		1848	2.19	A	2136	16.44

As can be seen from the results, two intersections report overall LOS E results with a number of individual movements expected to operate at LOS E or F under the No-Build conditions. This is not unexpected as the corridor is nearing capacity under current conditions and while future vehicle volumes will continue to grow, the only capacity improvement to be included in the No-Build Conditions is a new dedicated eastbound Erwin Road right turn bay at Towerview Road/Morreene Road. The results from the No-Build analysis suggest that a number of roadway modifications may be necessary on the Erwin Road Corridor for all intersections and movements to operate at LOS D or better, regardless of the presence of the LRT.

A 2040 No-Build Synchro-based model was developed to provide an initial set of future optimized signal timings for input into Vissim. The proposed network geometry and the 2040 No-Build volumes were then input into the model. The Synchro reports for all 2040 No-Build and Build scenarios can be found in Appendix E.

Synchro, however, cannot realistically model advanced signal timing operations including Traffic Signal Preemption or Transit Signal Priority. As such, the delays caused to general traffic by signal preemption events cannot be measured by Synchro and therefore those intersections equipped with this special signal operation would underreport vehicle delays.

The Vissim results for the No-Build analysis indicate that there will be excessive delays at the intersections of Erwin Road at Morreene Road/Towerview Road and Erwin Road at Anderson Street. The Vissim analysis reflects the spillback effects that occur under congestion in actual field conditions and are indicated in MOE Tables 7 through 10 under the average and maximum queue length results. Based on the results of the Vissim analyses, the following intersections are anticipated to operate at LOS E or LOS F in at least one No-Build peak hour:

- Erwin Road at Morreene Road/Towerview Road
- Erwin Road at Anderson Street

It is important to note that these are No-Build background issues that may need to be addressed regardless of the potential D-O LRT project. This expected No-Build congestion may make it more difficult to meet the thresholds stated in NCDOT's "Policy on Street and Driveway Access to North Carolina Highways" under the Build alternatives. Queue lengths that may already be lengthy in the No-Build Conditions could cause additional queuing resulting from the build conditions to exceed the available storage space for a particular lane group.

5.3 2040 Build Conditions – Trent/Flowers Station Alternative

The Build Trent/Flowers Station Alternative was analyzed in Vissim for the 2040 AM and PM peak hours to determine traffic operations in the vicinity of the proposed project if the light rail is constructed and a station is constructed between Trent Drive and Flowers Drive. The 2040 LRT Trent/Flowers Station model was based on the 2040 No-Build models, with the LRT running in the center median along Erwin Road. A similar set of traffic volumes and signal timing plans were initially transferred to the Build conditions from the No-Build conditions. Due to the proposed prohibition of eastbound left turns from Erwin Road to Lambeth Circle and southbound left turns from Lambeth Circle to Erwin Road, future build volumes were rerouted to LaSalle Street where Lambeth Circle intersects with LaSalle Street. Similarly, the proposed prohibition of eastbound left turns from Erwin Road to Hock Plaza and southbound left turns to Erwin Road resulted in the rerouting of traffic to southbound Douglas Street as there is a connection between that street and the Hock Plaza driveway via the parking garages to the north of Erwin Road. The proposed replacement of the stop controlled intersection with a roundabout at Trent Drive and Elba Street/NC 147 On/Off Ramps with the inclusion of a northbound Trent Drive left turn movement to westbound Elba Street also rerouted vehicles from westbound Erwin Road between Trent Drive and Fulton Drive to westbound Elba Street via Trent Drive.

Intersection signal timing changes from 1) Existing to No-Build and from 2) No-Build to Build including traffic signal cycle length and phasing modifications are shown in Table 6 for LRT Alternative 1 and LRT Alternative 2 for all studied intersections. Table 6 also indicates the lane configuration modifications that are proposed between Existing to No-Build, and No-Build to Build conditions.

Based on the above model network elements and the methodologies defined under MOEs, the results from Vissim for the 2040 LRT Trent/Flowers Alternative were determined. Detailed traffic delays at individual movement level and overall intersection level were compared to No-Build scenarios in Table 7 (AM peak hour) and Table 8 (PM peak hour) in Section 6. Queuing information for 2040 LRT Alternative 1 is also included in the comparison tables

5.4 2040 Build Conditions – Duke Eye Center Station Alternative

The Build Duke Eye Center Station Alternative was analyzed in Vissim for the 2040 AM and PM peak hours to determine traffic operations in the vicinity of the proposed project if the light rail is constructed and a station is constructed just east of Duke Eye Center. The 2040 LRT Duke Eye Center Station model was based on the 2040 No-Build model, with the LRT running in the proposed median along Erwin Road. The LRT Duke Eye Center Station Alternative utilizes the same set of traffic volumes and signal timing plans as the LRT Trent/Flowers Station models for the respective peak hours.

Proposed roadway modifications that have been applied to both the 2040 LRT Trent/Flowers Station Alternative and the 2040 LRT Duke Eye Center Station Alternative are listed previously in Table 1.



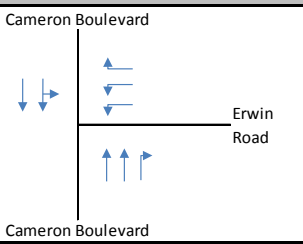
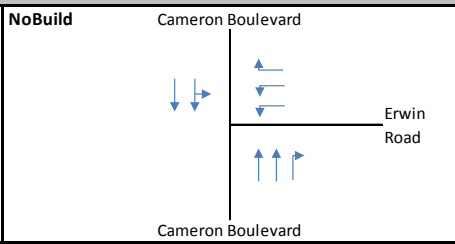
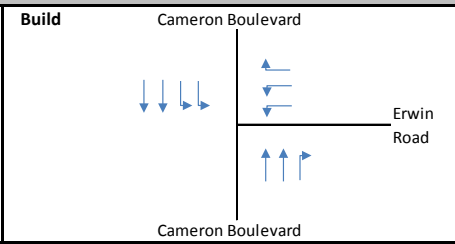
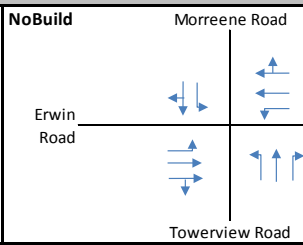
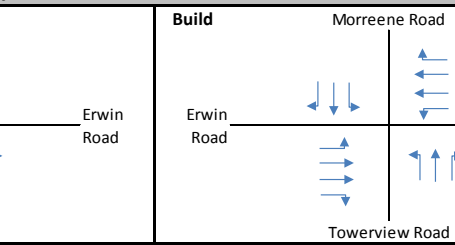
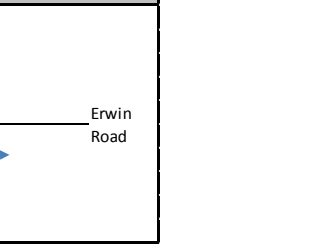
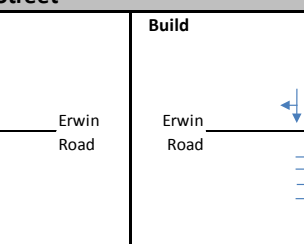
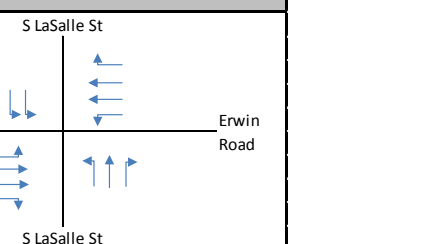
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Intersection signal timing changes from 1) Existing to No-Build and from 2) No-Build to Build including cycle length and phasing modifications are shown in Table 6. Table 6 also indicates the lane configuration modifications between Existing, No-Build and Build conditions.

Based on the above model network elements and the methodologies defined under MOEs, the results from Vissim for the 2040 LRT Eye Care Center Alternative were determined. Detailed traffic delays at individual movement level and overall intersection level were compared to No-Build scenarios in Table 9 (AM peak hour) and Table 10 (PM peak hour) in Section 6. Queuing information for 2040 LRT Alternative 2 is also included in the comparison tables

Erwin Road Traffic Simulation Report

Table 6. 2040 LRT Alternatives Signal & Lane Configuration Modifications

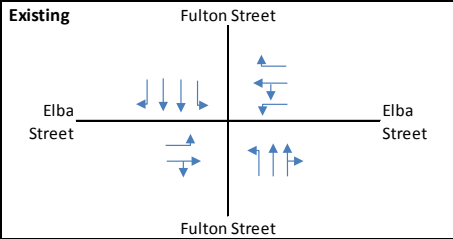
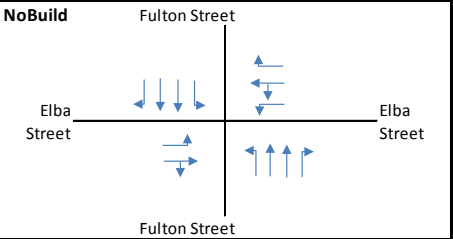
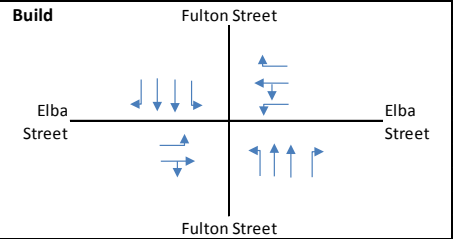
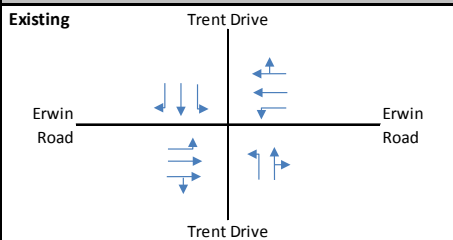
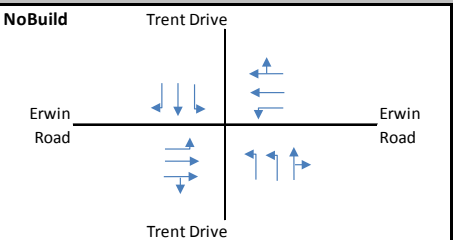
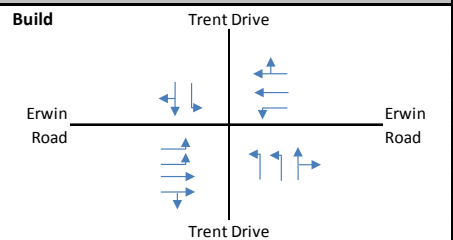
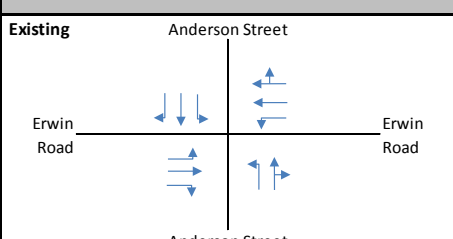
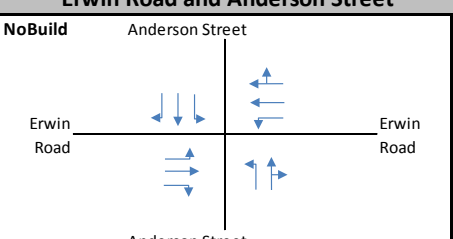
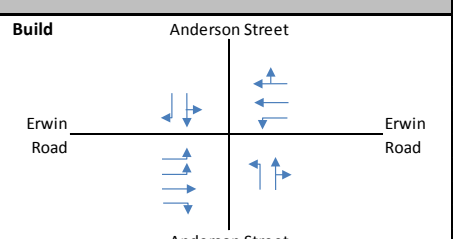
Erwin Road and Cameron Boulevard					
Existing	Cameron Boulevard 	NoBuild	Cameron Boulevard 	Build	Cameron Boulevard 
AM	Cycle Length	Phasing		PM	Cycle Length
Existing to NoBuild	Free running to 150s	No Change		Existing to NoBuild	Free running to 150s
NoBuild to Build	No Change	Transit Signal Preemption		NoBuild to Build	No Change
Erwin Road and Morreene Road/Towerview Road					
Existing	Morreene Road 	NoBuild	Morreene Road 	Build	Morreene Road 
AM	Cycle Length	Phasing		PM	Cycle Length
Existing to NoBuild	Free Running to 150s	EBL, WBL, NBL and SBL Protected Only changed to Permitted/Protected		Existing to NoBuild	Free Running to 150s
NoBuild to Build	No Change	EBL and WBL Permitted/Protected changed to Protected Only Transit Signal Preemption		NoBuild to Build	No Change
				EBL and WBL Permitted/Protected changed to Protected Only Transit Signal Preemption	
Erwin Road and LaSalle Street					
Existing	S LaSalle St 	NoBuild	S LaSalle St 	Build	S LaSalle St
AM	Cycle Length	Phasing		PM	Cycle Length
Existing to NoBuild	120s to 150s	SBL Permitted changed to Permitted/Protected		Existing to NoBuild	120s to 150s
NoBuild to Build	No Change	EBL, WBL, SBL Permitted /Protected changed to Protected Only NBL Permitted changed to Permitted/Protected Transit Signal Preemption		NoBuild to Build	No Change
				NBL and SBL Permitted changed to Permitted/Protected EBL, WBL, SBL Permitted /Protected changed to Protected Only Transit Signal Preemption	



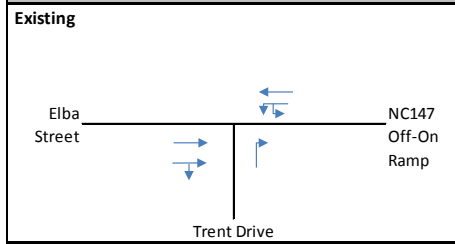
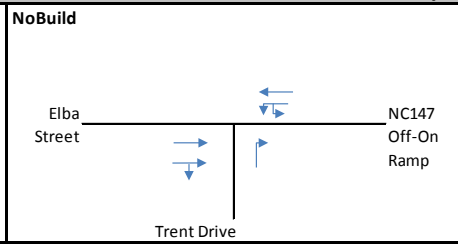
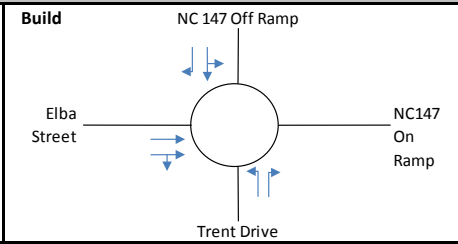
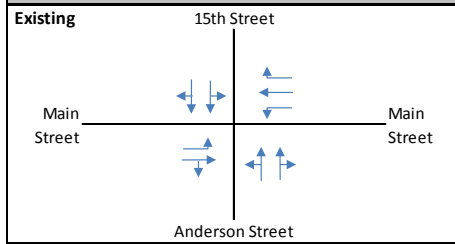
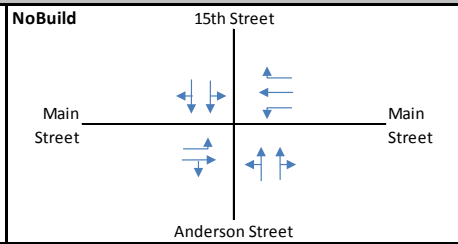
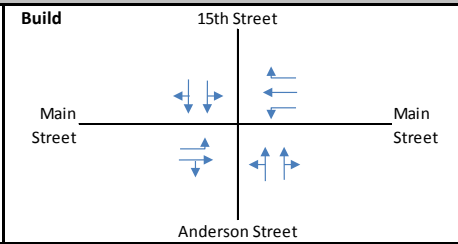
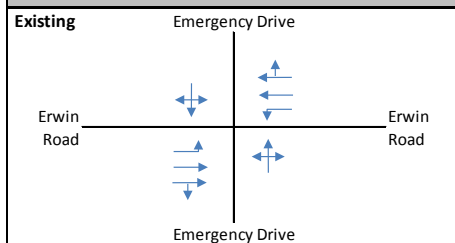
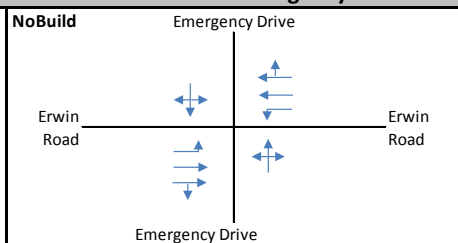
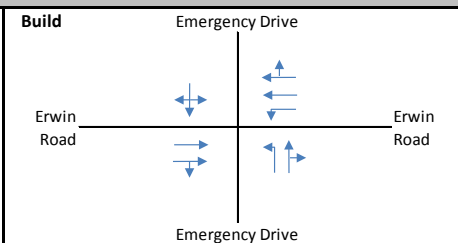
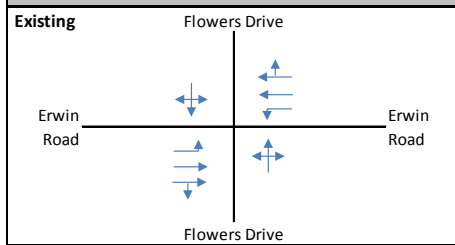
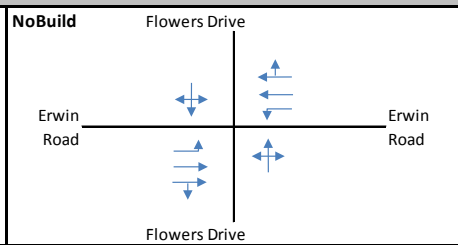
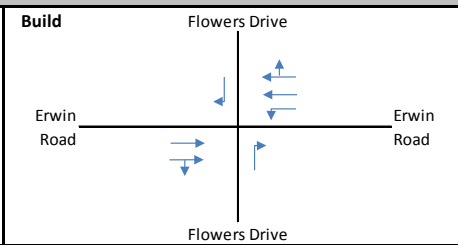
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Erwin Road and Douglas Street/Research Drive					
Existing	Douglas Street		Douglas Street		Douglas Street
Erwin Road	Erwin Road	Erwin Road	Erwin Road	Erwin Road	Erwin Road
	Research Dr	Research Dr	Research Dr	Research Dr	Research Dr
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	120s to 150s	EBL Protected Only to Permitted/Protected	Existing to NoBuild	120s to 150s	EBL and WBL Protected Only changed to Permitted/Protected
NoBuild to Build	No Change	EBL Permitted/Protected changed to Protected Only NBL and SBL Split Phase changed to simultaneous Protected Transit Signal Preemption	NoBuild to Build	No Change	EBL and WBL Permitted/Protected changed to Protected Only NBL and SBL Split Phase changed to simultaneous Protected Transit Signal Preemption
Erwin Road and VA Medical Center/Duke Eye Care Center					
Existing	Durham VA Med Center	Durham VA Med Center	Durham VA Med Center	Durham VA Med Center	Durham VA Med Center
Erwin Road	Erwin Road	Erwin Road	Erwin Road	Erwin Road	Erwin Road
	Eye Care Center	Eye Care Center	Eye Care Center	Eye Care Center	Eye Care Center
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	Free running to 150s	No Change	Existing to NoBuild	Free running to 150s	EBL and WBL Permitted/Protected changed to Permitted SBL Permitted changed to Permitted/Protected
NoBuild to Build	No Change	EBL and WBL Permitted/Protected changed to Protected Only Transit Signal Preemption	NoBuild to Build	No Change	EBL and WBL Permitted/Protected changed to Protected Only Transit Signal Preemption
Erwin Road and Fulton Street					
Existing	Fulton Street	Fulton Street	Fulton Street	Fulton Street	Fulton Street
Erwin Road	Erwin Road	Erwin Road	Erwin Road	Erwin Road	Erwin Road
	Duke Hospital	Duke Hospital	Duke Hospital	Duke Hospital	Duke Hospital
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	120s to 150s	WBL Protected Only changed to Permitted Only NBL and SBL Protected Only changed to Permitted/Protected	Existing to NoBuild	120s to 150s	WBL and SBL Protected Only changed to Permitted/Protected NBL Protected Only changed to Permitted Only
NoBuild to Build	No Change	WBL Permitted/Protected changed to Protected Only WBR overlap is removed RTOR is allowed Transit Signal Preemption	NoBuild to Build	No Change	WBL Permitted/Protected changed to Protected Only WBR overlap is removed RTOR is allowed Transit Signal Preemption

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Elba Street and Fulton Street					
Existing	NoBuild	Build			
					
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	120s to 150s	NBL Protected Only changed to Permitted Only SBL Protected Only changed to Permitted/Protected	Existing to NoBuild	120s to 150s	NBL Protected Only changed to Permitted Only SBL Protected Only changed to Permitted/Protected
NoBuild to Build	No Change	No Change	NoBuild to Build	No Change	No Change
Erwin Road and Trent Drive					
Existing	NoBuild	Build			
					
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	120s to 150s	NBL Permitted/Protected changed to Protected Only	Existing to NoBuild	120s to 150s	NBL Permitted/Protected changed to Protected Only
NoBuild to Build	No Change	EBL and WBL Permitted/Protected changed to Protected Only SBR overlap is removed Transit Signal Preemption	NoBuild to Build	No Change	EBL and WBL Permitted/Protected changed to Protected Only SBR overlap is removed Transit Signal Preemption
Erwin Road and Anderson Street					
Existing	NoBuild	Build			
					
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	120s to 150s	SBL Protected/Permitted changed to Permitted Only	Existing to NoBuild	120s to 150s	SBL Protected/Permitted changed to Permitted Only
NoBuild to Build	No Change	EBL and WBL Permitted/Protected changed to Protected Only Transit Signal Preemption	NoBuild to Build	No Change	EBL and WBL Permitted/Protected changed to Protected Only Transit Signal Preemption

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Elba Street and Trent Drive/NC 147 Ramps					
Existing		NoBuild		Build	
					
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	-	Unsignalized	Existing to NoBuild	-	Unsignalized
NoBuild to Build	-	Roundabout	NoBuild to Build	-	Roundabout
Main Street and Anderson Street/15th Street					
Existing		NoBuild		Build	
					
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	Free running to 150s	NBL and SBL Permitted changed to Split Phasing WBL Permitted changed to Permitted/Protected	Existing to NoBuild	Free running to 150s	NBL and SBL Permitted changed to Split Phasing WBL Permitted changed to Permitted/Protected
NoBuild to Build	No Change	No Change	NoBuild to Build	No Change	No Change
Erwin Road and Emergency Drive					
Existing		NoBuild		Build	
					
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	-	Unsignalized to Signalized	Existing to NoBuild	-	Unsignalized to Signalized
NoBuild to Build	No Change	EBL Permitted movement is removed WBL Permitted changed to Protected Only Transit Signal Preemption	NoBuild to Build	No Change	EBL Permitted movement is removed WBL Permitted changed to Protected Only Transit Signal Preemption
Erwin Road and Flowers Drive					
Existing		NoBuild		Build	
					
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	-	Unsignalized	Existing to NoBuild	-	Unsignalized
NoBuild to Build	-	Unsignalized	NoBuild to Build	-	Unsignalized

6. Summary of Results

The following sections summarize the results of the study. The following tables (7 through 10) include a summary of the intersection LOS for each scenario that was modeled.

The available storage shown in the tables for the through lanes represents the available distance to the adjacent intersection. For the turn bays, it is the available storage of that particular lane. The NCDOT criteria identifies the 95th percentile queue as the critical metric to be provided sufficient storage space. It is important to note that Vissim provides the “average” queue length and the “maximum” queue length. The maximum queue is based on the worst case scenario in the microsimulation model, even though this event is likely to occur only once in a peak hour. An evaluation of these MOE tables indicates a substantial difference between the average queue lengths and the maximum queue lengths. The 95th percentile queue length lies somewhere in between the two. In many cases there is a substantial difference between the No-Build maximum queue and the Build maximum queue. This can be attributed to the occasional interruption of normal signal operations by the passage of an LRV. This traffic analysis emphasized the overall intersection LOS with a focus on maximum queue lengths versus storage requirements. If the Build average queue movement and the maximum No-build queue were satisfied with the storage provided then it was assumed there was no impact. Operational priority was given to satisfying queue storage for Erwin Road approaches with the cross street operations of secondary importance.

Table 7: D-O LRT: Erwin Road Segment – Vissim Intersection Analysis Output Summary - 2040 Build Alternative 1 (Trent/Flowers Station) vs. 2040 No-Build AM Peak Hour 8:00 - 9:00 AM

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
1	Cameron Boulevard (751)/Erwin Road ¹	SBT	1023	1016	1029	1024	25.9	21.0	4.9	23.1%	C	C	75	156	-82	-52.3%	1205	530	943	-412	-43.7%
		SBL	860	861	866	867	25.5	23.6	1.9	8.2%	C	C	61	156	-96	-61.2%	450	390	943	-553	-58.7%
		NBT	285	277	278	276	51.5	153.9	-102.4	-66.5%	D	F	50	267	-217	-81.3%	2020	196	755	-559	-74.1%
		NBR	389	394	385	393	12.6	63.8	-51.2	-80.2%	B	E	0	0	0	-100.0%	230	0	23	-23	-100.0%
		EB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		WBR	190	192	190	194	4.7	3.7	1.0	26.8%	A	A	0	0	0	0.0%	500	2	0	2	0.0%
		WBL	222	223	222	226	30.3	42.4	-12.2	-28.6%	C	D	24	37	-12	-33.8%	2010	167	183	-16	-8.9%
		WB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	2980	2963	2970	2980	25.4	40.3	-14.9	-37.0%	C	D	26	103	-77	-74.5%		547	968	-422	-43.5%
2	Morreene Road/Towerview Road/Erwin Road ¹	SBT	658	677	712	728	55.8	46.2	9.5	20.6%	E	D	529	486	42	8.7%	1285	1114	1120	-6	-0.5%
		SBR	150	155	148	148	33.4	41.4	-8.0	-19.4%	C	D	131	113	19	16.5%	215	420	421	0	0.0%
		SBL	332	342	332	338	55.8	43.9	11.9	27.1%	E	D	529	487	42	8.6%	215	1114	1120	-6	-0.5%
		NBT	144	141	166	165	38.4	30.8	7.6	24.5%	D	C	33	30	2	8.0%	2800	210	224	-14	-6.2%
		NBL	10	11	14	14	46.0	33.0	13.0	39.4%	D	C	26	30	-5	-15.6%	990	199	224	-25	-11.0%
		NBR	18	18	21	21	14.8	14.1	0.6	4.5%	B	B	1	2	0	-13.3%	200	44	45	-2	-3.8%
		EBR	161	160	175	174	24.4	16.6	7.8	47.2%	C	B	8	1	7	1102.0%	200	368	118	250	213.0%
		EBL	228	230	217	220	60.5	39.3	21.2	53.8%	E	D	80	48	32	65.9%	1980	496	484	12	2.4%
		EBT	789	795	794	801	43.9	33.4	10.5	31.6%	D	C	144	100	45	44.9%	1980	850	595	255	42.9%
		EB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		WBL	45	43	50	49	81.1	48.9	32.1	65.6%	F	D	21	12	9	72.1%	2135	108	106	2	1.5%
		WBR	224	223	214	218	18.3	12.0	6.3	52.6%	B	B	0	0	0	0.0%	235	0	0	0	0.0%
		WB LRT	6	6	N/A	N/A	0.2	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		25	N/A	N/A	N/A
		WBT	238	229	227	233	54.8	35.6	19.2	53.8%	D	D	44	32	12	38.5%	2135	222	210	13	6.0%
All	3008	3024	3070	3109	46.4	36.0	10.4	28.9%	D	D	110	112	-1	-1.2%		1114	1120	-6	-0.5%		

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)					
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %	
			Model	Demand	Model	Demand																
3	LaSalle Street/Erwin Road ¹	SBT	298	297	259	256	46.3	51.2	-4.9	-9.6%	D	D	87	142	-55	-38.9%	4650	587	496	91	18.3%	
		SBR	84	82	80	80	42.1	10.3	31.9	309.7%	D	B	6	0	6	6992.9%	240	71	51	21	41.1%	
		SBL	762	760	351	352	72.9	59.2	13.6	23.0%	E	E	255	142	114	80.5%	865	594	496	98	19.8%	
		NBT	47	48	48	49	56.9	44.7	12.2	27.3%	E	D	15	13	2	16.5%	1075	112	95	17	17.6%	
		NBL	14	13	15	14	33.4	57.0	-23.7	-41.5%	C	E	15	13	2	18.0%	170	112	95	17	18.0%	
		NBR	41	39	45	43	9.5	7.8	1.7	22.0%	A	A	0	0	0	0.0%	305	0	0	0	0.0%	
		EBL	100	102	84	86	55.9	16.1	39.8	246.4%	E	B	26	5	22	470.9%	2115	206	138	68	48.8%	
		EBR	114	112	162	169	11.3	6.5	4.8	73.5%	B	A	23	481	-459	-95.2%	280	444	1033	-588	-57.0%	
		EB LRT	6	6	N/A	N/A	5.9	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		25	N/A	N/A	N/A	N/A
		EBT	925	941	1284	1355	38.8	17.5	21.3	122.0%	D	B	165	164	1	0.9%	2115	851	562	289	51.3%	
		WBR	145	144	136	135	6.5	5.0	1.5	29.1%	A	A	0	0	0	0.0%	320	13	0	13	0.0%	
		WBL	129	131	136	139	95.0	30.0	65.0	216.5%	F	C	78	19	59	307.8%	350	305	185	121	65.5%	
		WB LRT	6	6	N/A	N/A	7.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		125	N/A	N/A	N/A	N/A
		WBT	314	305	312	306	22.8	13.6	9.3	68.2%	C	B	27	14	13	97.8%	1155	286	177	109	61.3%	
All	2982	2974	2911	2984	46.8	24.7	22.1	89.2%	D	C	50	83	-33	-39.7%		851	1157	-306	-26.4%			
4	Douglas Street/Research Drive/Erwin Road ¹	SBT	32	31	32	32	73.9	65.7	8.2	12.4%	E	E	54	39	15	37.8%	1375	244	168	77	45.6%	
		SBR	71	70	70	69	5.6	9.4	-3.8	-40.4%	A	A	0	0	0	0.0%	510	0	0	0	0.0%	
		SBL	121	120	101	99	67.0	67.2	-0.2	-0.3%	E	E	54	39	15	37.8%	375	244	168	77	45.6%	
		NBT	9	9	10	10	73.6	62.6	11.0	17.6%	E	E	30	27	3	12.4%	975	151	128	23	18.1%	
		NBL	66	69	68	70	70.5	68.4	2.1	3.1%	E	E	30	26	3	13.1%	240	151	128	23	18.3%	
		NBR	197	197	201	200	7.0	8.5	-1.5	-17.1%	A	A	0	0	0	0.0%	260	0	0	0	0.0%	
		EBL	464	465	154	156	49.2	16.8	32.5	193.8%	D	B	178	12	167	1416.0%	580	840	147	693	472.2%	
		EBR	303	312	294	313	11.5	5.6	6.0	107.0%	B	A	34	3	32	1112.7%	240	544	192	351	182.6%	
		EB LRT	6	6	N/A	N/A	0.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A	N/A
		EBT	497	503	779	811	29.1	15.8	13.3	83.9%	C	B	49	45	4	8.9%	1125	386	338	48	14.1%	
		WBR	76	72	74	72	10.8	3.0	7.8	257.5%	B	A	16	4	13	349.7%	165	283	127	155	122.0%	
		WBL	279	282	281	287	45.2	30.1	15.1	50.0%	D	C	85	49	37	75.8%	315	480	351	129	36.8%	
		WB LRT	6	6	N/A	N/A	0.6	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		87	N/A	N/A	N/A	N/A
		WBT	552	551	553	551	26.4	15.0	11.4	76.3%	C	B	50	30	21	69.8%	710	356	310	46	14.8%	
All	2677	2681	2616	2670	32.2	19.1	13.1	68.4%	C	B	42	23	19	82.8%		840	378	462	122.1%			

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)						
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %		
			Model	Demand	Model	Demand																	
5	Eye Care Center Drive/Erwin Road ¹	NBT	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	0	0	0	-96.5%	95	30	42	-13	-30.2%		
		NBL	7	7	8	8	46.5	70.6	-24.2	-34.2%	D	E	2	3	-1	-44.1%	95	33	39	-6	-15.4%		
		NBR	33	33	36	37	7.0	6.4	0.6	8.7%	A	A	0	0	0	0.0%	95	0	0	0	0.0%		
		SBT	1	1	1	1	31.2	35.5	-4.4	-12.3%	C	D	20	25	-5	-19.7%	185	199	236	-37	-15.9%		
		SBR	26	24	23	21	20.8	23.2	-2.4	-10.4%	C	C	0	0	0	80.0%	185	36	32	4	13.3%		
		SBL	90	90	85	84	48.2	64.8	-16.6	-25.6%	D	E	28	35	-8	-21.8%	30	201	237	-37	-15.5%		
		EBL	67	68	67	66	61.3	8.5	52.8	622.9%	E	A	24	1	22	2036.9%	500	140	66	74	112.7%		
		EBR	40	40	34	35	2.8	2.4	0.4	16.8%	A	A	0	0	0	-97.8%	700	4	66	-62	-94.3%		
		EBT	708	712	695	719	8.4	3.9	4.5	113.7%	A	A	19	6	12	194.4%	700	222	217	5	2.5%		
		EB LRT	6	6	N/A	N/A	0.5	N/A	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		87	N/A	N/A	N/A	N/A
		WBR	197	197	195	200	7.5	3.3	4.3	131.2%	A	A	0	6	-6	-99.4%	715	10	221	-211	-95.5%		
		WBL	97	94	92	89	55.1	4.6	50.5	1100.8%	E	A	30	1	30	4152.6%	300	213	61	152	250.6%		
		WB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A	N/A
		WBT	969	964	975	971	16.5	3.3	13.2	396.2%	B	A	48	6	41	656.0%	715	468	221	247	112.1%		
All	2248	2230	2209	2231	17.1	6.6	10.6	161.4%	B	A	12	7	5	71.8%		468	292	176	60.2%				
6	Fulton Street/Erwin Road ¹	NBL	66	63	68	65	35.9	60.4	-24.5	-40.6%	D	E	71	97	-26	-27.2%	25	259	277	-18	-6.4%		
		NBT	98	96	99	98	61.7	84.8	-23.1	-27.2%	E	F	71	97	-26	-27.2%	25	259	277	-18	-6.4%		
		NBR	82	81	83	84	69.4	94.6	-25.3	-26.7%	E	F	71	97	-26	-27.2%	25	259	277	-18	-6.4%		
		EBR	49	50	41	43	21.8	23.5	-1.7	-7.3%	C	C	38	40	-1	-3.7%	730	294	324	-31	-9.5%		
		EBL	283	278	275	281	48.4	40.6	7.9	19.4%	D	D	46	39	7	17.9%	590	234	215	19	8.9%		
		EBT	502	507	498	516	24.1	23.1	1.0	4.5%	C	C	38	40	-1	-3.7%	730	294	324	-31	-9.5%		
		EB LRT	6	6	N/A	N/A	0.2	N/A	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		25	N/A	N/A	N/A	N/A
		SBT	31	34	53	56	49.5	55.6	-6.0	-10.9%	D	E	108	92	16	17.8%	260	368	386	-17	-4.5%		
		SBR	723	714	697	704	34.1	28.2	5.9	21.1%	C	C	108	92	16	17.9%	260	368	385	-17	-4.3%		
		SBL	232	222	216	215	48.1	57.9	-9.9	-17.1%	D	E	81	94	-13	-13.6%	165	375	390	-16	-4.0%		
		WBL	38	36	27	28	58.1	26.4	31.7	120.3%	E	C	13	4	9	254.0%	635	108	64	44	68.2%		
		WB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A	N/A
		WBT	477	478	495	491	24.4	29.3	-4.9	-16.9%	C	C	41	50	-9	-18.2%	865	287	286	1	0.4%		
		WBR	20	20	152	146	24.2	19.0	5.2	27.1%	C	B	41	15	27	183.0%	605	287	159	128	80.6%		
All	2612	2579	2703	2727	35.5	36.0	-0.4	-1.2%	D	D	52	63	-11	-17.5%		385	390	-6	-1.5%				

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)					
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %	
			Model	Demand	Model	Demand																
7	Fulton Street/Elba Street ¹	SBR	101	102	96	96	8.4	6.3	2.1	33.2%	A	A	0	0	0	0.0%	115	8	6	3	43.9%	
		SBT	507	512	508	511	28.5	21.6	6.9	31.9%	C	C	57	51	5	10.7%	1705	354	336	18	5.4%	
		SBL	375	381	382	388	22.7	23.5	-0.8	-3.2%	C	C	57	51	5	10.5%	1100	354	336	18	5.4%	
		EBL	26	24	24	23	73.8	73.6	0.2	0.2%	E	E	10	10	0	4.9%	140	84	85	-1	-1.4%	
		EBR	15	14	16	14	15.3	15.9	-0.6	-4.0%	B	B	0	0	0	0.0%	140	0	0	0	0.0%	
		EBT	17	17	18	18	69.4	70.2	-0.7	-1.1%	E	E	8	8	-1	-6.3%	140	74	91	-17	-18.6%	
		NBT	201	195	331	318	22.8	21.5	1.3	6.2%	C	C	16	25	-9	-35.0%	270	149	283	-134	-47.3%	
		NBL	14	12	19	18	27.3	23.5	3.8	16.3%	C	C	2	2	0	-20.4%	95	37	51	-13	-26.3%	
		NBR	186	187	176	189	4.7	4.1	0.6	14.6%	A	A	1	1	1	142.2%	215	176	114	62	54.4%	
		WBR	332	326	210	213	6.7	6.4	0.3	4.9%	A	A	17	35	-18	-51.5%	935	634	275	359	130.8%	
		WBT	73	71	59	62	56.4	58.0	-1.6	-2.7%	E	E	164	181	-17	-9.3%	2760	1094	747	347	46.5%	
		WBL	465	444	453	450	56.8	60.5	-3.7	-6.2%	E	E	164	181	-17	-9.3%	235	1094	747	347	46.5%	
All	2312	2285	2291	2300	28.4	28.0	0.4	1.4%	C	C	41	45	-4	-9.1%		1094	747	347	46.5%			
8	Trent Drive/Erwin Road ¹	NBR	31	33	36	36	52.9	66.6	-13.7	-20.5%	D	E	38	49	-10	-21.4%	1000	169	161	8	4.7%	
		NBT	59	63	38	39	49.9	68.4	-18.5	-27.1%	D	E	38	49	-10	-21.4%	1000	169	161	8	4.7%	
		NBL	78	84	111	111	55.6	68.4	-12.8	-18.7%	E	E	38	49	-11	-21.7%	585	169	161	7	4.6%	
		WBL	135	138	143	145	53.2	17.7	35.5	200.4%	D	B	45	11	34	307.3%	1065	267	127	141	111.4%	
		WBR	131	132	35	33	34.6	14.8	19.8	133.7%	C	B	58	22	36	158.6%	1230	288	175	114	65.1%	
		WB LRT	6	6	N/A	N/A	6.0	N/A	N/A	N/A	A	N/A	9	N/A	N/A	N/A		230	N/A	N/A	N/A	N/A
		WBT	339	340	443	447	32.5	12.4	20.2	163.1%	C	B	58	22	36	158.6%	1230	288	175	114	65.1%	
		SBT	183	182	173	176	33.0	54.0	-20.9	-38.8%	C	D	60	290	-229	-79.2%	385	619	795	-176	-22.1%	
		SBL	395	398	385	402	28.1	56.3	-28.2	-50.1%	C	E	107	424	-317	-74.7%	255	721	906	-185	-20.5%	
		SBR	128	125	117	117	38.2	43.2	-5.0	-11.6%	D	D	44	290	-246	-84.7%	385	536	795	-259	-32.6%	
		EBR	231	230	219	225	50.5	7.8	42.6	545.4%	D	A	148	17	131	782.5%	855	391	145	246	169.3%	
		EB LRT	6	6	N/A	N/A	0.3	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		25	N/A	N/A	N/A	N/A
		EBT	416	420	487	497	41.5	7.1	34.4	488.3%	D	A	148	17	131	782.5%	855	391	145	246	169.3%	
		EBL	177	175	101	103	40.5	9.2	31.3	341.6%	D	A	28	3	25	933.9%	660	173	65	108	166.9%	
All	2315	2320	2289	2331	38.8	27.7	11.1	40.2%	D	C	59	104	-45	-43.4%		722	906	-185	-20.4%			

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
9	Anderson Street/Erwin Road ¹	WBL	100	102	94	96	21.9	35.9	-14.0	-39.0%	C	D	9	18	-9	-50.3%	2315	109	157	-48	-30.4%
		WBT	405	407	403	405	38.3	36.3	2.1	5.7%	D	D	57	54	4	6.8%	2465	295	252	43	17.1%
		WBR	15	15	13	13	41.0	52.7	-11.7	-22.1%	D	D	57	54	4	6.8%	710	295	252	43	17.1%
		NBR	54	51	61	59	41.4	39.6	1.8	4.5%	D	D	0	1	0	-41.6%	495	64	89	-25	-27.7%
		NBL	90	91	101	102	59.5	56.2	3.4	6.0%	E	E	29	32	-3	-10.5%	125	338	424	-85	-20.1%
		NBT	238	238	245	244	72.9	57.1	15.8	27.7%	E	E	92	97	-5	-5.4%	495	531	552	-21	-3.7%
		WB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		EBT	223	224	243	250	20.4	24.2	-3.8	-15.8%	C	C	25	34	-9	-26.7%	1245	251	315	-64	-20.4%
		EBR	65	69	68	72	5.7	4.8	1.0	19.9%	A	A	0	0	0	-100.0%	1245	0	21	-21	-100.0%
		EB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		EBL	271	272	265	273	64.7	39.8	24.9	62.6%	E	D	57	46	10	22.5%	1075	244	332	-88	-26.5%
		SBL	30	29	32	30	48.4	55.5	-7.0	-12.7%	D	E	93	8	84	993.9%	205	462	175	287	164.3%
		SBT	240	239	234	232	50.4	49.4	1.1	2.2%	D	D	93	79	13	16.7%	450	462	463	-1	-0.2%
		SBR	384	377	395	388	8.1	10.2	-2.1	-20.9%	A	B	7	3	5	169.8%	450	214	212	2	1.0%
All	2127	2114	2154	2164	38.7	34.8	4.0	11.4%	D	C	37	36	2	4.2%		581	626	-46	-7.3%		
10	NC 147 Off-On Ramps/Trent Drive/Elba Street ¹ (Unsignalized Roundabout)	EBT	225	224	213	225	14.1	0.3	13.8	4426.0%	B	A	0	0	0	45.7%	1020	97	26	71	278.4%
		UTURN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		EBR	262	266	263	270	7.7	13.3	-5.6	-42.1%	A	B	0	0	0	45.7%	1020	97	26	71	278.4%
		NBR	210	175	175	175	2.5	0.4	2.1	574.6%	A	A	0	0	0	0.0%	430	29	0	29	0.0%
		NBL	156	126	N/A	N/A	8.1	N/A	N/A	N/A	A	N/A	N/A	N/A	N/A	N/A	N/A	29	N/A	N/A	N/A
		UTURN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		SBL	1	1	0	0	4.6	0.0	4.6	0.0%	A	A	0	89	-89	-100.0%	1710	3	343	-340	-99.2%
		SBR	913	910	918	925	8.5	2.6	5.9	227.0%	A	A	0	89	-89	-100.0%	1720	3	343	-340	-99.2%
		SBT	445	439	424	425	8.8	61.2	-52.4	-85.6%	A	E	0	89	-89	-100.0%	1720	3	343	-340	-99.2%
All	2212	2141	1993	2020	8.5	16.1	-7.6	-47.3%	A	B	0	44	-44	-99.7%		103	343	-240	-70.0%		

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)					
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %	
			Model	Demand	Model	Demand																
11	Anderson Street/15th Street/Main Street ¹	SBL	23	23	23	24	64.4	59.8	4.5	7.6%	E	E	61	53	8	15.6%	825	237	198	39	19.9%	
		SBR	3	3	1	1	42.9	42.1	0.8	1.9%	D	D	61	53	8	15.6%	825	237	198	39	19.9%	
		SBT	214	209	217	210	63.7	63.9	-0.2	-0.3%	E	E	61	53	8	15.6%	825	237	198	39	19.9%	
		WBT	180	178	182	181	23.5	23.5	0.0	-0.1%	C	C	23	23	0	0.1%	2100	236	217	18	8.4%	
		WBR	15	15	14	15	3.4	3.4	0.0	-0.4%	A	A	0	0	0	-88.9%	2100	8	30	-22	-71.7%	
		WBL	219	216	223	219	36.5	40.2	-3.7	-9.2%	D	D	41	51	-9	-18.3%	390	316	346	-30	-8.7%	
		EBT	417	415	421	419	53.5	49.6	3.9	7.9%	D	D	223	211	12	5.6%	3175	682	680	2	0.3%	
		EBL	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	0	0	0	0.0%	225	0	0	0	0.0%	
		EBR	221	220	222	221	49.4	45.3	4.2	9.3%	D	D	4	3	1	28.9%	3175	87	84	3	3.2%	
		NBR	61	61	61	62	37.7	39.6	-1.9	-4.9%	D	D	95	87	7	8.6%	400	394	443	-49	-11.0%	
		NBL	194	194	196	198	36.1	37.6	-1.4	-3.8%	D	D	95	87	7	8.6%	400	394	443	-49	-11.0%	
		NBT	270	270	266	270	39.3	39.7	-0.4	-1.0%	D	D	95	87	7	8.6%	400	394	443	-49	-11.0%	
All	1817	1804	1827	1820	44.5	43.7	0.7	1.6%	D	D	63	59	4	7.1%		682	680	2	0.3%			
12	Emergency Drive/Erwin Road ¹	SBT	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	0	0	0	-5.8%	40	32	26	5	19.0%	
		SBR	10	9	10	9	5.7	4.6	1.0	22.5%	A	A	0	0	0	0.0%	40	0	0	0	0.0%	
		SBL	1	1	1	1	36.6	45.0	-8.4	-18.7%	D	D	0	0	0	-5.8%	40	32	26	5	19.0%	
		NBT	3	3	4	4	55.2	56.1	-0.8	-1.5%	E	E	6	2	4	200.6%	365	72	68	4	5.6%	
		NBL	18	18	20	19	44.6	56.5	-11.9	-21.1%	D	E	6	6	0	2.3%	365	72	64	8	12.8%	
		NBR	50	49	48	48	15.0	9.4	5.5	58.8%	B	A	9	0	9	0.0%	365	77	0	77	0.0%	
		EBR	38	35	23	25	26.8	3.1	23.7	767.2%	C	A	11	0	11	0.0%	515	238	3	235	8190.4%	
		EB LRT	6	6	N/A	N/A	0.3	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		50	N/A	N/A	N/A	N/A
		EBT	776	775	759	776	22.8	4.4	18.4	420.4%	C	A	86	9	77	879.1%	515	503	193	309	160.0%	
		EBL	N/A	N/A	14	14	N/A	6.0	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	320	N/A	23	N/A	N/A
		WBR	10	15	7	14	8.6	2.3	6.3	273.8%	A	A	10	0	10	0.0%	315	175	0	175	0.0%	
		WBL	27	27	22	24	72.8	8.3	64.5	779.4%	E	A	12	0	11	4335.7%	70	89	36	53	146.6%	
		WB LRT	6	6	N/A	N/A	0.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		13	N/A	N/A	N/A	N/A
		WBT	508	507	644	637	6.0	3.9	2.1	52.3%	A	A	10	7	3	44.1%	315	175	168	6	3.6%	
All	1453	1439	1552	1571	17.6	5.2	12.4	237.8%	B	A	12	2	9	453.9%		503	206	296	143.7%			



Erwin Road Traffic Simulation Report

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
13	Flowers Dr/Erwin Road ¹ (Unsignalized)	NBT	N/A	N/A	0	0	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	820	N/A	0	N/A	N/A
		NBL	N/A	N/A	1	1	N/A	4.8	N/A	N/A	N/A	A	N/A	0	N/A	N/A	820	N/A	0	N/A	N/A
		NBR	N/A	N/A	28	29	N/A	5.6	N/A	N/A	N/A	A	N/A	0	N/A	N/A	820	N/A	0	N/A	N/A
		SBT	N/A	N/A	0	0	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	100	N/A	0	N/A	N/A
		SBR	N/A	N/A	8	9	N/A	5.7	N/A	N/A	N/A	A	N/A	0	N/A	N/A	100	N/A	0	N/A	N/A
		SBL	N/A	N/A	2	2	N/A	8.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	100	N/A	0	N/A	N/A
		EBL	N/A	N/A	64	66	N/A	3.3	N/A	N/A	N/A	A	N/A	0	N/A	N/A	125	N/A	68	N/A	N/A
		EBR	N/A	N/A	299	305	N/A	3.6	N/A	N/A	N/A	A	N/A	0	N/A	N/A	330	N/A	68	N/A	N/A
		EBT	N/A	N/A	546	564	N/A	1.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	330	N/A	68	N/A	N/A
		WBR	N/A	N/A	37	35	N/A	0.7	N/A	N/A	N/A	A	N/A	0	N/A	N/A	865	N/A	0	N/A	N/A
		WBL	N/A	N/A	251	245	N/A	6.2	N/A	N/A	N/A	A	N/A	0	N/A	N/A	700	N/A	0	N/A	N/A
		WBT	N/A	N/A	611	615	N/A	0.7	N/A	N/A	N/A	A	N/A	0	N/A	N/A	865	N/A	0	N/A	N/A
				All			1847	1871		2.2			A		0					68	
	Erwin Rd Corridor	EB LRT	6	6				7.3													
	Erwin Rd Corridor	WB LRT	6	6				13.8													
		All	28743	28554	28585	28907	32.6	26.0	6.6	25.2%	C	C	44	51	-7	-13.1%		1255	1310	-56	-4.3%

Footnote: 1 - NCDOT Traffic Impact Criteria is applied
 2 - City of Durham Traffic Impact Criteria is applied




 Indicates LRT Movement
 Indicates Traffic Impact
 Indicates Traffic Impact below Mid-D

Table 8: D-O LRT: Erwin Road Segment - Vissim Intersection Analysis Output Summary - 2040 Build Alternative 1 (Trent/Flowers Station) vs. 2040 No-Build PM Peak Hour 5:00 - 6:00 PM

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
1	Cameron Boulevard (751)/Erwin Road ¹	SBT	525	525	531	531	39.4	33.3	6.2	18.6%	D	C	67	106	-39	-36.6%	1205	342	496	-154	-31.0%
		SBL	340	340	341	340	35.5	34.8	0.7	2.0%	D	C	41	106	-64	-60.8%	450	231	496	-265	-53.4%
		NBT	925	920	938	934	67.3	57.5	9.8	17.0%	E	E	235	228	7	3.3%	2020	852	815	37	4.5%
		NBR	254	255	254	255	18.2	36.6	-18.3	-50.1%	B	D	1	0	1	1171.4%	230	37	13	24	186.4%
		EB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		WBR	657	665	642	665	15.0	15.9	-0.9	-5.8%	B	B	23	2	21	888.4%	500	598	231	367	159.1%
		WBL	427	440	440	440	52.0	43.7	8.3	18.9%	D	D	77	85	-7	-8.6%	2010	354	619	-265	-42.8%
		WB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	3139	3145	3146	3165	42.0	38.8	3.2	8.1%	D	D	56	88	-32	-36.6%		852	834	18	2.2%
2	Morreene Road/Towerview Road/Erwin Road ¹	SBT	210	205	208	203	62.2	66.1	-3.9	-5.9%	E	E	162	206	-45	-21.6%	1285	805	918	-112	-12.3%
		SBR	183	181	182	182	19.4	48.8	-29.5	-60.4%	B	D	7	10	-3	-26.9%	215	160	226	-66	-29.4%
		SBL	216	219	219	220	84.7	87.6	-2.9	-3.3%	F	F	162	206	-44	-21.3%	215	806	918	-112	-12.2%
		NBT	487	517	444	526	181.5	135.7	45.8	33.7%	F	F	1004	662	342	51.6%	2800	1323	989	335	33.9%
		NBL	165	178	149	179	101.4	134.2	-32.8	-24.4%	F	F	198	662	-464	-70.1%	990	1130	989	141	14.3%
		NBR	134	140	119	139	155.3	122.4	32.9	26.9%	F	F	205	36	168	464.8%	200	873	444	428	96.4%
		EBR	42	42	41	40	4.9	5.3	-0.4	-8.0%	A	A	0	0	0	0.0%	200	0	0	0	0.0%
		EBL	142	142	142	144	66.9	65.9	1.0	1.5%	E	E	58	52	5	10.1%	1980	267	255	12	4.7%
		EBT	328	326	326	326	26.6	32.1	-5.5	-17.1%	C	C	29	35	-6	-17.6%	1980	227	227	0	0.1%
		EB LRT	6	6	N/A	N/A	0.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		WBL	101	103	102	101	50.3	22.5	27.8	123.2%	D	C	24	8	16	208.9%	2135	342	188	154	82.0%
		WBR	344	341	345	345	28.7	20.5	8.2	40.1%	C	C	8	3	5	164.4%	235	387	230	157	68.1%
		WB LRT	6	6	N/A	N/A	0.2	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		25	N/A	N/A	N/A
		WBT	821	831	830	829	34.9	22.2	12.8	57.5%	C	C	114	83	32	38.5%	2135	831	672	159	23.7%
All	3185	3225	3106	3234	70.1	59.5	10.7	18.0%	E	E	141	164	-23	-14.0%		1324	1029	295	28.7%		

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)					
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %	
			Model	Demand	Model	Demand																
3	LaSalle Street/Erwin Road ¹	SBT	95	94	79	80	73.3	77.9	-4.6	-5.9%	E	E	101	89	11	12.7%	4650	519	416	104	25.0%	
		SBR	164	162	167	165	57.3	15.5	41.8	269.7%	E	B	1	1	0	-1.1%	240	55	22	33	151.3%	
		SBL	424	424	149	158	90.6	90.2	0.4	0.4%	F	F	173	89	84	94.5%	865	533	415	118	28.3%	
		NBT	142	135	149	142	64.3	67.8	-3.5	-5.1%	E	E	65	71	-6	-8.4%	1075	314	268	46	17.3%	
		NBL	117	118	119	120	45.3	56.6	-11.3	-20.0%	D	E	65	71	-6	-8.5%	170	314	268	46	17.3%	
		NBR	162	162	167	167	10.5	12.2	-1.7	-13.9%	B	B	0	0	0	0.0%	305	0	0	0	0.0%	
		EBL	202	203	203	207	84.0	32.9	51.1	155.2%	F	C	110	66	44	67.1%	2115	431	551	-119	-21.7%	
		EBR	17	18	27	28	4.7	6.5	-1.8	-28.0%	A	A	1	27	-26	-97.5%	280	48	233	-185	-79.4%	
		EB LRT	6	6	N/A	N/A	5.8	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		12	N/A	N/A	N/A	N/A
		EBT	459	464	691	725	31.3	25.9	5.5	21.1%	C	C	49	89	-40	-44.6%	2115	344	599	-255	-42.5%	
		WBR	383	392	408	403	21.4	9.9	11.6	117.5%	C	A	162	0	162	862433.3%	320	736	23	713	3157.6%	
		WBL	21	23	21	22	68.9	14.5	54.4	373.9%	E	B	7	1	6	631.8%	350	77	34	43	125.6%	
		WB LRT	6	6	N/A	N/A	7.4	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		112	N/A	N/A	N/A	N/A
		WBT	1157	1165	1157	1155	34.1	15.3	18.9	123.6%	C	B	348	53	294	551.7%	1155	1059	456	603	132.3%	
All	3356	3360	3336	3372	45.2	26.2	19.0	72.4%	D	C	77	46	31	66.3%		1059	640	419	65.4%			
4	Douglas Street/Research Drive/Erwin Road ¹	SBT	12	13	12	13	84.6	65.8	18.8	28.6%	F	E	102	66	36	55.6%	1375	415	220	195	89.0%	
		SBR	303	303	284	279	17.1	10.7	6.4	60.4%	B	B	0	0	0	0.0%	510	4	0	4	0.0%	
		SBL	218	214	223	228	68.5	68.5	0.0	0.0%	E	E	102	66	36	55.6%	375	415	220	195	89.0%	
		NBT	29	30	27	28	85.9	65.4	20.4	31.2%	F	E	99	96	3	2.8%	975	312	402	-90	-22.4%	
		NBL	257	259	299	298	60.1	62.7	-2.6	-4.2%	E	E	97	96	2	1.6%	240	312	402	-90	-22.4%	
		NBR	450	449	412	415	13.8	18.2	-4.4	-24.1%	B	B	0	0	0	-87.0%	260	16	24	-8	-31.8%	
		EBL	143	145	56	59	55.4	25.4	30.1	118.7%	E	C	47	6	41	676.2%	580	250	88	161	182.4%	
		EBR	72	68	56	59	4.3	3.8	0.5	13.1%	A	A	0	34	-34	-99.9%	240	19	285	-266	-93.3%	
		EB LRT	6	6	N/A	N/A	0.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A	N/A
		EBT	556	562	623	657	24.7	23.9	0.9	3.6%	C	C	44	78	-34	-43.0%	1125	281	435	-154	-35.3%	
		WBR	36	35	45	41	7.9	4.7	3.2	67.2%	A	A	18	6	12	195.2%	165	365	133	231	173.2%	
		WBL	150	152	152	156	49.9	22.9	27.0	117.9%	D	C	46	17	30	176.5%	315	352	180	172	96.0%	
		WB LRT	6	6	N/A	N/A	0.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A	N/A
		WBT	846	873	852	858	20.3	15.6	4.8	30.8%	C	B	66	44	22	48.8%	710	597	359	238	66.2%	
All	3084	3103	3039	3091	30.0	26.3	3.7	14.0%	C	C	44	42	2	4.9%		619	540	79	14.6%			

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)					
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %	
			Model	Demand	Model	Demand																
5	Eye Care Center Drive/Erwin Road ¹	NBT	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	1	1	0	-30.9%	95	65	72	-7	-9.8%	
		NBL	18	19	16	16	56.7	59.1	-2.3	-3.9%	E	E	6	5	1	11.8%	95	68	58	10	17.1%	
		NBR	90	91	83	85	9.5	11.6	-2.1	-17.8%	A	B	0	0	0	0.0%	95	0	0	0	0.0%	
		SBT	3	3	3	3	42.4	71.5	-29.1	-40.7%	D	E	37	49	-12	-24.7%	185	212	249	-37	-14.9%	
		SBR	69	69	64	62	21.7	29.6	-8.0	-26.9%	C	C	0	0	0	-20.4%	185	38	40	-2	-5.1%	
		SBL	126	123	117	116	45.6	64.6	-19.0	-29.5%	D	E	42	57	-15	-25.9%	30	204	244	-40	-16.6%	
		EBL	38	35	30	30	60.7	15.8	44.9	283.7%	E	B	12	1	11	1748.6%	500	106	44	62	141.6%	
		EBR	73	74	63	66	5.1	4.8	0.3	5.4%	A	A	2	44	-42	-95.5%	700	185	337	-152	-45.1%	
		EBT	1113	1116	1084	1129	15.3	10.5	4.8	45.6%	B	B	59	78	-19	-24.4%	700	469	539	-69	-12.9%	
		EB LRT	6	6	N/A	N/A	0.9	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		100	N/A	N/A	N/A	N/A
		WBR	141	145	135	135	7.0	3.4	3.6	105.3%	A	A	0	7	-7	-99.4%	715	27	180	-153	-85.1%	
		WBL	28	28	28	28	60.6	14.5	46.1	318.8%	E	B	9	1	8	1316.5%	300	82	43	38	88.2%	
		WB LRT	6	6	N/A	N/A	0.6	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		62	N/A	N/A	N/A	N/A
		WBT	899	917	922	927	17.3	4.2	13.2	315.9%	B	A	47	7	40	565.4%	715	462	180	282	157.1%	
All	2609	2620	2545	2597	18.1	11.0	7.1	64.1%	B	B	15	21	-5	-26.1%		515	573	-58	-10.1%			
6	Fulton Street/Erwin Road ¹	NBL	33	33	37	36	65.3	65.1	0.3	0.4%	E	E	41	42	0	-0.5%	25	198	198	0	-0.1%	
		NBT	57	59	62	64	70.0	63.0	6.9	11.0%	E	E	41	42	0	-0.5%	25	198	198	0	-0.1%	
		NBR	37	38	40	41	71.1	83.0	-11.9	-14.3%	E	F	41	42	0	-0.5%	25	198	198	0	-0.1%	
		EBR	57	56	60	61	13.1	29.1	-16.0	-54.9%	B	C	35	131	-96	-73.0%	730	406	597	-191	-32.0%	
		EBL	410	421	408	424	62.5	68.3	-5.9	-8.6%	E	E	85	87	-2	-2.4%	590	327	350	-22	-6.4%	
		EBT	861	853	786	845	14.0	46.9	-32.9	-70.2%	B	D	35	131	-96	-73.0%	730	406	597	-191	-32.0%	
		EB LRT	6	6	N/A	N/A	0.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A	N/A
		SBT	71	73	76	76	66.9	24.7	42.3	171.2%	E	C	58	21	38	182.1%	260	261	144	117	81.6%	
		SBR	315	323	322	320	40.6	15.3	25.3	165.4%	D	B	58	21	38	181.6%	260	261	143	118	82.1%	
		SBL	84	84	77	79	79.6	50.1	29.5	58.9%	E	D	36	11	25	224.3%	165	210	111	99	89.6%	
		WBL	49	51	53	54	64.6	18.2	46.5	255.7%	E	B	18	4	14	397.7%	635	122	84	38	44.8%	
		WB LRT	6	6	N/A	N/A	0.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A	N/A
		WBT	718	734	728	734	18.4	22.7	-4.4	-19.2%	B	C	46	55	-9	-16.7%	865	411	460	-49	-10.6%	
		WBR	38	40	396	397	19.4	21.6	-2.2	-10.1%	B	C	46	42	4	10.1%	605	411	417	-6	-1.3%	
All	2741	2765	3045	3131	32.3	36.7	-4.4	-12.0%	C	D	39	52	-13	-25.8%		479	664	-185	-27.8%			

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)					
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %	
			Model	Demand	Model	Demand																
7	Fulton Street/Elba Street ¹	SBR	47	47	43	43	1.7	1.9	-0.2	-11.7%	A	A	0	0	0	0.0%	115	0	0	0	0.0%	
		SBT	253	254	250	251	9.7	9.8	-0.1	-0.8%	A	A	10	12	-2	-17.7%	1705	123	124	-1	-1.1%	
		SBL	113	115	112	115	11.0	17.2	-6.1	-35.7%	B	B	9	11	-2	-19.6%	1100	123	124	-1	-1.1%	
		EBL	78	75	78	76	63.7	67.0	-3.3	-5.0%	E	E	29	31	-2	-7.0%	140	182	207	-25	-12.3%	
		EBR	40	39	40	39	37.1	34.8	2.3	6.6%	D	C	0	0	0	0.0%	140	7	12	-5	-41.8%	
		EBT	66	64	66	64	64.2	65.8	-1.6	-2.5%	E	E	35	35	0	-1.3%	140	218	237	-19	-8.0%	
		NBT	319	318	661	673	10.0	15.2	-5.2	-34.2%	A	B	9	32	-23	-71.0%	270	162	259	-97	-37.5%	
		NBL	12	11	22	21	10.0	15.6	-5.6	-36.1%	A	B	1	1	-1	-62.3%	95	29	53	-25	-46.0%	
		NBR	173	191	185	191	4.0	3.6	0.4	12.1%	A	A	2	2	0	3.7%	215	184	169	15	8.8%	
		WBR	575	583	232	230	20.4	9.1	11.3	124.8%	C	A	2	0	2	0.0%	935	73	0	73	0.0%	
		WBT	47	51	37	35	67.8	64.2	3.6	5.6%	E	E	66	57	9	15.2%	2760	392	237	155	65.3%	
		WBL	180	186	187	185	65.6	64.2	1.4	2.1%	E	E	66	57	9	15.3%	235	392	237	155	65.3%	
All	1903	1934	1914	1923	23.7	22.4	1.3	5.8%	C	C	19	20	-1	-4.9%		400	290	110	38.0%			
8	Trent Drive/Erwin Road ¹	NBR	79	77	120	123	66.4	62.9	3.5	5.6%	E	E	156	147	9	6.4%	1000	684	392	292	74.3%	
		NBT	240	242	196	194	65.4	64.0	1.3	2.1%	E	E	156	147	9	6.4%	1000	684	392	292	74.3%	
		NBL	109	111	319	314	71.1	66.4	4.7	7.1%	E	E	156	147	9	6.4%	585	684	392	292	74.3%	
		WBL	37	39	38	38	58.7	39.9	18.9	47.4%	E	D	13	4	8	194.0%	1065	119	68	50	74.0%	
		WBR	457	458	186	186	40.6	22.9	17.7	77.3%	D	C	149	59	90	152.6%	1230	718	512	206	40.2%	
		WB LRT	6	6	N/A	N/A	5.3	N/A	N/A	N/A	A	N/A	8	N/A	N/A	N/A		225	N/A	N/A	N/A	N/A
		WBT	285	288	551	566	30.8	17.7	13.1	73.9%	C	B	149	59	90	152.6%	1230	718	512	206	40.2%	
		SBT	41	43	39	40	48.4	56.2	-7.8	-13.9%	D	E	11	44	-32	-73.9%	385	97	254	-157	-61.9%	
		SBL	158	156	146	150	48.4	60.8	-12.4	-20.4%	D	E	46	61	-15	-24.1%	255	271	301	-30	-9.9%	
		SBR	147	161	163	160	58.4	33.6	24.8	73.9%	E	C	57	44	13	30.6%	385	306	254	52	20.7%	
		EBR	83	88	67	73	16.9	17.4	-0.5	-2.6%	B	B	51	97	-46	-47.6%	855	397	391	7	1.7%	
		EB LRT	6	6	N/A	N/A	0.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A	N/A
		EBT	739	734	646	697	16.1	31.7	-15.7	-49.4%	B	C	51	97	-46	-47.6%	855	397	391	7	1.7%	
		EBL	324	318	244	270	51.4	31.1	20.3	65.2%	D	C	60	31	29	92.1%	660	397	359	38	10.6%	
All	2710	2715	2716	2811	39.3	37.7	1.6	4.2%	D	D	76	78	-2	-2.6%		767	527	239	45.4%			

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
9	Anderson Street/Erwin Road ¹	WBL	80	82	78	80	57.7	59.8	-2.1	-3.5%	E	E	24	26	-2	-6.4%	2315	183	186	-3	-1.6%
		WBT	364	368	374	374	78.9	54.0	24.9	46.2%	E	D	124	80	44	55.7%	2465	464	314	150	47.8%
		WBR	52	50	49	50	103.0	80.3	22.7	28.2%	F	F	124	80	44	55.7%	710	464	314	150	47.8%
		NBR	113	110	111	117	79.3	96.3	-17.0	-17.6%	E	F	385	423	-38	-9.0%	495	707	706	1	0.2%
		NBL	207	212	206	221	87.5	116.8	-29.3	-25.1%	F	F	137	207	-70	-33.8%	125	710	709	1	0.2%
		NBT	363	363	329	367	110.8	145.4	-34.6	-23.8%	F	F	385	423	-38	-9.0%	495	707	706	1	0.2%
		WB LRT	6	6	N/A	N/A	0.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		13	N/A	N/A	N/A
		EBT	585	580	573	606	43.4	35.8	7.6	21.4%	D	D	443	164	279	170.1%	1245	1250	983	268	27.2%
		EBR	148	148	139	146	20.7	8.1	12.6	156.8%	C	A	182	137	45	33.1%	1245	775	513	261	50.9%
		EB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		EBL	581	582	532	573	68.0	94.9	-26.8	-28.3%	E	F	356	552	-196	-35.5%	1075	1141	1188	-47	-4.0%
		SBL	19	20	21	21	86.5	78.6	8.0	10.2%	F	E	139	6	133	2110.5%	205	703	76	627	824.9%
		SBT	228	225	222	219	76.2	64.4	11.8	18.4%	E	E	139	95	44	46.4%	450	703	360	343	95.5%
		SBR	294	290	291	290	11.7	11.6	0.1	1.1%	B	B	17	1	15	1043.6%	450	457	108	349	322.9%
All	3047	3030	2923	3064	64.6	69.4	-4.8	-6.9%	E	E	175	183	-8	-4.1%		1258	1189	70	5.9%		
10	NC 147 Off-On Ramps/Trent Drive/Elba Street ¹ (Unsignalized Roundabout)	EBT	439	474	466	470	9.1	0.7	8.4	1207.2%	A	A	130	0	130	0.0%	1020	203	0	203	0.0%
		UTURN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		EBR	105	116	116	120	5.2	1.7	3.5	208.1%	A	A	130	0	130	0.0%	1020	203	0	203	0.0%
		NBR	642	645	626	650	4.3	1.3	3.0	241.3%	A	A	3	0	3	1771.4%	430	201	86	114	132.9%
		NBL	379	370	N/A	N/A	5.8	N/A	N/A	N/A	A	N/A	3	N/A	N/A	N/A	N/A	201	N/A	N/A	N/A
		UTURN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		SBL	1	1	0	0	4.2	0.0	4.2	0.0%	A	A	0	0	0	0.0%	1710	0	0	0	0.0%
		SBR	151	150	151	150	2.8	0.2	2.6	1263.6%	A	A	0	0	0	0.0%	1720	0	0	0	0.0%
		SBT	231	229	233	230	3.4	12.7	-9.2	-72.9%	A	B	0	0	0	0.0%	1720	0	0	0	0.0%
All	1949	1985	1591	1620	5.5	2.7	2.8	101.6%	A	A	45	0	45	712000.0%		217	86	131	151.6%		

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)					
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %	
			Model	Demand	Model	Demand																
11	Anderson Street/15th Street/Main Street ¹	SBL	29	31	31	32	69.7	61.0	8.7	14.3%	E	E	56	51	5	10.0%	825	216	215	1	0.4%	
		SBR	7	7	9	8	44.5	31.9	12.6	39.5%	D	C	0	0	0	0.0%	825	0	0	0	0.0%	
		SBT	166	162	170	165	70.6	63.4	7.2	11.3%	E	E	56	51	5	10.6%	825	216	215	1	0.4%	
		WBT	472	475	487	492	36.3	38.9	-2.5	-6.5%	D	D	117	121	-4	-3.1%	2100	637	502	135	26.9%	
		WBR	47	46	48	46	6.6	12.6	-6.0	-47.6%	A	B	6	5	1	26.2%	2100	217	151	66	43.8%	
		WBL	233	229	225	223	65.0	64.2	0.8	1.3%	E	E	100	81	19	23.5%	390	640	444	196	44.2%	
		EBT	368	360	363	356	58.9	81.4	-22.5	-27.7%	E	F	197	282	-86	-30.4%	3175	676	684	-8	-1.1%	
		EBL	6	6	7	7	52.6	88.1	-35.4	-40.2%	D	F	1	1	0	-30.3%	225	27	28	-1	-3.7%	
		EBR	144	144	141	142	56.3	74.0	-17.7	-23.9%	E	E	1	6	-5	-78.1%	3175	81	88	-7	-7.7%	
		NBR	286	274	246	266	29.8	28.4	1.4	5.0%	C	C	154	181	-27	-15.0%	400	507	488	19	3.8%	
		NBL	287	288	268	294	26.6	27.8	-1.2	-4.4%	C	C	154	181	-27	-15.0%	400	507	488	19	3.8%	
		NBT	421	433	396	430	29.2	30.3	-1.1	-3.8%	C	C	154	181	-27	-15.0%	400	507	488	19	3.8%	
All	2468	2455	2391	2461	42.7	47.7	-5.1	-10.6%	D	D	83	95	-12	-12.7%		693	684	10	1.4%			
12	Emergency Drive/Erwin Road ¹	SBT	22	24	18	20	46.3	58.5	-12.1	-20.8%	D	E	31	0	31	0.0%	40	200	225	-25	-11.3%	
		SBR	329	333	242	242	16.3	18.2	-1.9	-10.2%	B	B	0	0	0	-70.0%	40	34	39	-5	-12.7%	
		SBL	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	0	26	-26	-99.7%	40	34	225	-191	-85.0%	
		NBT	14	13	4	4	42.7	44.5	-1.7	-3.9%	D	D	17	3	14	479.7%	365	214	91	123	135.0%	
		NBL	5	4	1	1	60.2	31.4	28.8	91.7%	E	C	17	0	17	9863.0%	365	214	12	202	1653.8%	
		NBR	172	173	79	78	18.2	10.7	7.5	70.4%	B	B	19	0	19	0.0%	365	219	0	219	0.0%	
		EBR	9	8	2	2	8.3	8.7	-0.4	-4.1%	A	A	29	57	-28	-49.0%	515	448	283	165	58.4%	
		EB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A
		EBT	974	967	892	962	10.1	18.8	-8.7	-46.3%	B	B	29	117	-88	-75.0%	515	448	508	-60	-11.8%	
		EBL	N/A	N/A	1	1	N/A	6.1	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	320	N/A	0	N/A	N/A
		WBR	31	31	39	40	5.2	4.0	1.2	29.3%	A	A	7	0	7	1577.3%	315	172	105	67	64.3%	
		WBL	40	41	58	58	77.7	14.0	63.8	456.9%	E	B	18	2	16	743.6%	70	126	103	24	23.0%	
		WB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A	N/A
		WBT	469	488	936	942	5.0	5.2	-0.3	-4.8%	A	A	7	14	-7	-49.1%	315	172	364	-192	-52.8%	
All	2077	2082	2271	2350	12.5	12.6	-0.2	-1.5%	B	B	13	21	-7	-34.9%		448	547	-99	-18.1%			



Erwin Road Traffic Simulation Report

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)					
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %	
			Model	Demand	Model	Demand																
13	Flowers Drive/Erwin Road ¹ (Unsignalized)	NBT	N/A	N/A	0	0	N/A	0.0	N/A	N/A	N/A	A	N/A	2	N/A	N/A	820	N/A	94	N/A	N/A	
		NBL	N/A	N/A	0	0	N/A	0.0	N/A	N/A	N/A	A	N/A	2	N/A	N/A	820	N/A	94	N/A	N/A	
		NBR	N/A	N/A	349	351	N/A	30.6	N/A	N/A	N/A	C	N/A	2	N/A	N/A	820	N/A	94	N/A	N/A	
		SBT	N/A	N/A	0	0	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	100	N/A	8	N/A	N/A	
		SBR	N/A	N/A	1	1	N/A	16.3	N/A	N/A	N/A	B	N/A	0	N/A	N/A	100	N/A	8	N/A	N/A	
		SBL	N/A	N/A	11	11	N/A	43.7	N/A	N/A	N/A	D	N/A	0	N/A	N/A	100	N/A	8	N/A	N/A	
		EBL	N/A	N/A	3	4	N/A	18.0	N/A	N/A	N/A	B	N/A	18	N/A	N/A	125	N/A	186	N/A	N/A	
		EBR	N/A	N/A	3	3	N/A	5.5	N/A	N/A	N/A	A	N/A	18	N/A	N/A	330	N/A	186	N/A	N/A	
		EBT	N/A	N/A	900	963	N/A	24.3	N/A	N/A	N/A	C	N/A	18	N/A	N/A	330	N/A	186	N/A	N/A	
		WBR	N/A	N/A	9	9	N/A	1.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	865	N/A	14	N/A	N/A	
		WBL	N/A	N/A	87	87	N/A	12.7	N/A	N/A	N/A	B	N/A	0	N/A	N/A	700	N/A	14	N/A	N/A	
		WBT	N/A	N/A	773	789	N/A	2.3	N/A	N/A	N/A	A	N/A	0	N/A	N/A	865	N/A	14	N/A	N/A	
				All			2136	2218		16.8			B		5					186		
	Erwin Rd Corridor	EB LRT	6	6				7.1														
	Erwin Rd Corridor	WB LRT	6	6				13.6														
		All	32268	32419	32023	32819		38.0	33.5	4.5	13.3%	D	C	67	64	3	4.4%		1356	1207	149	12.4%

Footnote: 1 - NCDOT Traffic Impact Criteria is applied
 2 - City of Durham Traffic Impact Criteria is applied
 Indicates LRT Movement
 Indicates Traffic Impact
 Indicates Traffic Impact below Mid-D

Table 9: D-O LRT: Erwin Road Segment – Vissim Intersection Analysis Output Summary - 2040 Build Alternative 2 (Eye Care Station) vs. 2040 No-Build AM Peak Hour 8:00 - 9:00 AM

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
1	Cameron Boulevard (751)/Erwin Road ¹	SBT	1022	1016	1029	1024	25.2	21.0	4.2	19.8%	C	C	75	156	-81	-51.9%	1205	539	943	-403	-42.8%
		SBL	860	861	866	867	23.7	23.6	0.1	0.5%	C	C	58	156	-98	-62.9%	450	370	943	-573	-60.8%
		NBT	284	277	278	276	51.7	153.9	-102.2	-66.4%	D	F	50	267	-217	-81.3%	2020	211	755	-544	-72.0%
		NBR	389	394	385	393	12.1	63.8	-51.7	-81.1%	B	E	0	0	0	-100.0%	230	0	23	-23	-100.0%
		EB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		WBR	189	192	190	194	4.4	3.7	0.7	18.2%	A	A	0	0	0	0.0%	2010	2	0	2	0.0%
		WBL	222	223	222	226	30.3	42.4	-12.1	-28.5%	C	D	24	37	-12	-33.7%	2010	166	183	-17	-9.3%
		WB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		All	2978	2963	2970	2980	24.5	40.3	-15.8	-39.2%	C	D	26	103	-77	-74.8%		539	968	-429	-44.3%
2	Morreene Road/Towerview Road/Erwin Road ¹	SBT	662	677	712	728	54.8	46.2	8.5	18.5%	D	D	507	486	20	4.2%	1285	1115	1120	-5	-0.4%
		SBR	150	155	148	148	30.7	41.4	-10.7	-25.8%	C	D	122	113	9	8.3%	215	421	421	1	0.2%
		SBL	334	342	332	338	53.8	43.9	9.9	22.6%	D	D	507	487	20	4.1%	215	1115	1120	-5	-0.4%
		NBT	144	141	166	165	38.9	30.8	8.1	26.4%	D	C	33	30	3	8.4%	2800	214	224	-10	-4.3%
		NBL	10	11	14	14	49.2	33.0	16.2	49.2%	D	C	30	30	-1	-1.8%	990	213	224	-11	-4.9%
		NBR	18	18	21	21	16.5	14.1	2.4	16.7%	B	B	1	2	0	-2.5%	200	46	45	0	0.6%
		EBR	162	160	175	174	25.9	16.6	9.4	56.4%	C	B	6	1	6	922.8%	200	310	118	192	163.7%
		EBL	229	230	217	220	59.3	39.3	20.0	50.9%	E	D	76	48	28	57.7%	1980	476	484	-8	-1.7%
		EBT	789	795	794	801	44.4	33.4	11.1	33.1%	D	C	145	100	45	45.3%	1980	791	595	195	32.8%
		EB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		WBL	46	43	50	49	78.8	48.9	29.9	61.1%	E	D	21	12	9	75.2%	2135	112	106	5	5.1%
		WBR	225	223	214	218	18.3	12.0	6.3	52.5%	B	B	0	0	0	0.0%	235	0	0	0	0.0%
		WB LRT	6	6	N/A	N/A	1.2	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		137	N/A	N/A	N/A
		WBT	231	229	227	233	53.5	35.6	17.8	50.1%	D	D	42	32	10	31.4%	2135	187	210	-23	-10.9%
All	3010	3024	3070	3109	45.9	36.0	9.9	27.4%	D	D	106	112	-5	-4.7%		1115	1120	-5	-0.4%		

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)					
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %	
			Model	Demand	Model	Demand																
3	LaSalle Street/Erwin Road ¹	SBT	298	297	259	256	48.9	51.2	-2.3	-4.5%	D	D	97	142	-45	-31.8%	4650	582	496	86	17.3%	
		SBR	84	82	80	80	43.2	10.3	32.9	320.0%	D	B	7	0	7	7578.6%	240	71	51	20	39.7%	
		SBL	760	760	351	352	72.6	59.2	13.4	22.6%	E	E	267	142	126	88.9%	865	591	496	95	19.2%	
		NBT	47	48	48	49	56.3	44.7	11.6	25.9%	E	D	15	13	2	15.6%	1075	112	95	17	17.6%	
		NBL	14	13	15	14	32.6	57.0	-24.4	-42.9%	C	E	15	13	2	15.5%	168	111	95	17	17.6%	
		NBR	41	39	45	43	9.0	7.8	1.2	15.8%	A	A	0	0	0	0.0%	305	0	0	0	0.0%	
		EBL	100	102	84	86	53.8	16.1	37.7	233.6%	D	B	24	5	19	424.6%	2115	201	138	63	45.4%	
		EBR	113	112	162	169	12.2	6.5	5.7	87.8%	B	A	25	481	-457	-94.9%	280	484	1033	-549	-53.2%	
		EB LRT	6	6	N/A	N/A	5.8	N/A	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		25	N/A	N/A	N/A
		EBT	929	941	1284	1355	40.0	17.5	22.6	129.2%	D	B	173	164	10	5.9%	2115	891	562	329	58.4%	
		WBR	145	144	136	135	6.6	5.0	1.6	30.8%	A	A	0	0	0	0.0%	320	18	0	18	0.0%	
		WBL	128	131	136	139	72.0	30.0	42.0	140.1%	E	C	58	19	39	203.3%	350	293	185	109	58.9%	
		WB LRT	6	6	N/A	N/A	7.5	N/A	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		137	N/A	N/A	N/A
		WBT	309	305	312	306	22.3	13.6	8.7	64.2%	C	B	23	14	9	63.5%	1155	229	177	52	29.1%	
All	2979	2974	2911	2984	47.1	24.7	22.4	90.5%	D	C	50	83	-32	-39.2%		891	1157	-266	-23.0%			
4	Douglas Street/Research Drive/Erwin Road ¹	SBT	31	31	32	32	76.7	65.7	11.0	16.7%	E	E	52	39	13	33.5%	1375	244	168	76	45.4%	
		SBR	72	70	70	69	4.0	9.4	-5.3	-57.0%	A	A	0	0	0	0.0%	510	0	0	0	0.0%	
		SBL	121	120	101	99	64.6	67.2	-2.6	-3.9%	E	E	52	39	13	33.5%	375	244	168	76	45.4%	
		NBT	8	9	10	10	76.5	62.6	13.9	22.3%	E	E	29	27	2	8.0%	975	150	128	22	17.1%	
		NBL	66	69	68	70	66.8	68.4	-1.6	-2.3%	E	E	29	26	2	8.6%	240	150	128	22	17.4%	
		NBR	197	197	201	200	7.2	8.5	-1.2	-14.6%	A	A	0	0	0	0.0%	260	0	0	0	0.0%	
		EBL	468	465	154	156	46.3	16.8	29.6	176.6%	D	B	155	12	143	1216.9%	580	783	147	636	433.5%	
		EBR	302	312	294	313	12.6	5.6	7.1	126.6%	B	A	22	3	19	663.3%	250	485	192	292	151.9%	
		EB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		EBT	496	503	779	811	28.3	15.8	12.5	78.9%	C	B	47	45	2	4.9%	1125	391	338	53	15.8%	
		WBR	76	72	74	72	9.3	3.0	6.3	207.8%	A	A	13	4	10	264.9%	450	262	127	134	105.5%	
		WBL	278	282	281	287	43.6	30.1	13.5	44.7%	D	C	80	49	32	65.7%	440	472	351	121	34.6%	
		WB LRT	6	6	N/A	N/A	0.6	N/A	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		87	N/A	N/A	N/A
		WBT	547	551	553	551	25.6	15.0	10.6	71.1%	C	B	47	30	18	59.5%	710	301	310	-9	-3.0%	
All	2674	2681	2616	2670	31.2	19.1	12.0	63.0%	C	B	38	23	15	65.6%		785	378	407	107.6%			

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)					
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %	
			Model	Demand	Model	Demand																
5	Eye Care Center Drive/Erwin Road ¹	NBT	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	0	0	0	-91.2%	95	21	42	-22	-50.9%	
		NBL	7	7	8	8	42.4	70.6	-28.2	-40.0%	D	E	1	3	-1	-47.8%	95	36	39	-3	-7.9%	
		NBR	32	33	36	37	7.2	6.4	0.7	11.5%	A	A	0	0	0	0.0%	95	0	0	0	0.0%	
		SBT	1	1	1	1	34.1	35.5	-1.5	-4.1%	C	D	29	25	5	18.6%	185	198	236	-38	-16.3%	
		SBR	26	24	23	21	30.6	23.2	7.4	32.0%	C	C	0	0	0	80.0%	185	36	32	4	11.7%	
		SBL	90	90	85	84	46.9	64.8	-17.9	-27.6%	D	E	29	35	-6	-17.0%	30	198	237	-40	-16.7%	
		EBL	67	68	67	66	61.0	8.5	52.6	620.3%	E	A	24	1	23	2076.7%	500	147	66	82	123.6%	
		EBR	40	40	34	35	1.5	2.4	-0.9	-37.0%	A	A	0	0	0	-95.7%	700	8	66	-58	-88.1%	
		EBT	710	712	695	719	8.7	3.9	4.7	120.5%	A	A	19	6	12	197.7%	700	236	217	19	8.7%	
		EB LRT	6	6	N/A	N/A	0.8	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		100	N/A	N/A	N/A	N/A
		WBR	197	197	195	200	12.8	3.3	9.5	293.7%	B	A	0	6	-6	-100.0%	715	0	221	-221	-100.0%	
		WBL	96	94	92	89	55.6	4.6	51.0	1112.0%	E	A	30	1	30	4147.4%	300	210	61	149	245.3%	
		WB LRT	6	6	N/A	N/A	5.4	N/A	N/A	N/A	A	N/A	8	N/A	N/A	N/A		223	N/A	N/A	N/A	N/A
		WBT	965	964	975	971	15.6	3.3	12.3	370.1%	B	A	50	6	43	684.4%	715	436	221	215	97.6%	
All	2243	2230	2209	2231	17.3	6.6	10.8	164.7%	B	A	14	7	7	94.0%		440	292	147	50.4%			
6	Fulton Street/Erwin Road ¹	NBL	66	63	68	65	37.3	60.4	-23.1	-38.3%	D	E	75	97	-22	-23.1%	25	265	277	-12	-4.4%	
		NBT	98	96	99	98	66.4	84.8	-18.5	-21.8%	E	F	75	97	-22	-23.1%	25	265	277	-12	-4.4%	
		NBR	81	81	83	84	70.4	94.6	-24.3	-25.6%	E	F	75	97	-22	-23.1%	25	265	277	-12	-4.4%	
		EBR	50	50	41	43	32.3	23.5	8.8	37.5%	C	C	57	40	18	44.2%	730	363	324	38	11.7%	
		EBL	282	278	275	281	46.4	40.6	5.9	14.4%	D	D	47	39	8	20.2%	590	323	215	108	50.1%	
		EBT	502	507	498	516	31.6	23.1	8.5	37.0%	C	C	57	40	18	44.2%	730	363	324	38	11.7%	
		EB LRT	6	0	N/A	N/A	4.6	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		12	N/A	N/A	N/A	N/A
		SBT	31	34	53	56	50.0	55.6	-5.6	-10.1%	D	E	108	92	16	17.4%	260	374	386	-11	-2.9%	
		SBR	710	714	697	704	34.4	28.2	6.2	22.0%	C	C	108	92	16	17.5%	260	374	385	-11	-2.8%	
		SBL	228	222	216	215	48.0	57.9	-9.9	-17.1%	D	E	79	94	-15	-15.7%	165	378	390	-12	-3.1%	
		WBL	37	36	27	28	53.2	26.4	26.8	101.7%	D	C	11	4	8	217.1%	635	103	64	39	61.2%	
		WB LRT	6	6	N/A	N/A	0.3	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		37	N/A	N/A	N/A	N/A
		WBT	479	478	495	491	22.4	29.3	-6.9	-23.4%	C	C	37	50	-13	-26.2%	865	262	286	-24	-8.4%	
		WBR	20	20	152	146	24.7	19.0	5.7	29.9%	C	B	37	15	23	155.2%	605	262	159	103	64.9%	
All	2595	2579	2703	2727	36.8	36.0	0.8	2.3%	D	D	55	63	-8	-13.1%		431	390	40	10.3%			

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)					
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %	
			Model	Demand	Model	Demand																
7	Fulton Street/Elba Street ¹	SBR	101	102	96	96	8.9	6.3	2.6	41.2%	A	A	0	0	0	0.0%	115	0	6	-6	-100.0%	
		SBT	507	512	508	511	28.8	21.6	7.2	33.2%	C	C	56	51	5	9.1%	1705	352	336	16	4.7%	
		SBL	376	381	382	388	22.0	23.5	-1.4	-6.2%	C	C	56	51	5	8.9%	1100	352	336	16	4.7%	
		EBL	26	24	24	23	73.9	73.6	0.3	0.4%	E	E	11	10	1	5.4%	140	84	85	-1	-1.4%	
		EBR	15	14	16	14	16.8	15.9	0.9	5.5%	B	B	0	0	0	0.0%	140	0	0	0	0.0%	
		EBT	17	17	18	18	70.4	70.2	0.2	0.3%	E	E	8	8	0	-4.3%	140	75	91	-16	-17.4%	
		NBT	201	195	331	318	20.9	21.5	-0.6	-2.7%	C	C	15	25	-10	-38.6%	270	140	283	-143	-50.6%	
		NBL	14	12	19	18	27.4	23.5	3.9	16.5%	C	C	2	2	0	-15.8%	95	38	51	-13	-25.0%	
		NBR	186	187	176	189	4.1	4.1	0.0	0.3%	A	A	1	1	0	32.5%	215	116	114	2	1.6%	
		WBR	322	326	210	213	6.9	6.4	0.5	7.2%	A	A	10	35	-25	-71.1%	935	440	275	165	60.1%	
		WBT	72	71	59	62	56.6	58.0	-1.3	-2.3%	E	E	154	181	-27	-14.8%	2760	911	747	164	21.9%	
		WBL	452	444	453	450	57.9	60.5	-2.6	-4.4%	E	E	154	181	-27	-14.8%	235	911	747	164	21.9%	
All	2288	2285	2291	2300	28.3	28.0	0.3	1.1%	C	C	39	45	-7	-14.5%		911	747	164	21.9%			
8	Trent Drive/Erwin Road ¹	NBR	33	33	36	36	61.7	66.6	-4.9	-7.3%	E	E	46	49	-3	-5.2%	1000	188	161	27	16.7%	
		NBT	63	63	38	39	61.0	68.4	-7.3	-10.7%	E	E	46	49	-3	-5.2%	1000	188	161	27	16.7%	
		NBL	84	84	111	111	57.1	68.4	-11.3	-16.5%	E	E	46	49	-3	-5.2%	585	188	161	27	16.7%	
		WBL	138	138	143	145	50.3	17.7	32.6	183.9%	D	B	42	11	31	276.0%	1065	240	127	113	89.4%	
		WBR	130	132	35	33	31.0	14.8	16.1	108.9%	C	B	52	22	29	130.8%	1230	292	175	117	67.1%	
		WB LRT	6	6	N/A	N/A	0.7	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		100	N/A	N/A	N/A	N/A
		WBT	341	340	443	447	29.6	12.4	17.3	139.8%	C	B	52	22	29	130.8%	1230	292	175	117	67.1%	
		SBT	184	182	173	176	37.6	54.0	-16.4	-30.3%	D	D	75	290	-214	-74.0%	385	629	795	-166	-20.8%	
		SBL	398	398	385	402	30.2	56.3	-26.1	-46.4%	C	E	130	424	-294	-69.4%	255	725	906	-181	-20.0%	
		SBR	127	125	117	117	40.0	43.2	-3.1	-7.3%	D	D	31	290	-259	-89.2%	385	299	795	-496	-62.4%	
		EBR	231	230	219	225	39.4	7.8	31.6	404.5%	D	A	131	17	114	680.4%	855	411	145	266	183.1%	
		EBT	413	420	487	497	33.2	7.1	26.1	370.4%	C	A	131	17	114	680.4%	855	411	145	266	183.1%	
		EB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		855	0	N/A	N/A	N/A
		EBL	178	175	101	103	45.5	9.2	36.3	395.7%	D	A	30	3	28	1036.2%	660	176	65	112	172.1%	
All	2330	2320	2289	2331	37.2	27.7	9.5	34.4%	D	C	58	104	-45	-43.9%		725	906	-181	-20.0%			

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
9	Anderson Street/Erwin Road ¹	WBL	100	102	94	96	22.6	35.9	-13.2	-36.9%	C	D	10	18	-8	-45.1%	2315	128	157	-29	-18.4%
		WBT	404	407	403	405	37.8	36.3	1.6	4.4%	D	D	57	54	3	5.9%	2465	298	252	46	18.2%
		WBR	14	15	13	13	41.2	52.7	-11.5	-21.8%	D	D	57	54	3	5.9%	710	298	252	46	18.2%
		NBR	54	51	61	59	42.4	39.6	2.8	7.1%	D	D	0	1	-1	-72.8%	495	43	89	-46	-51.3%
		NBL	93	91	101	102	63.4	56.2	7.2	12.9%	E	E	27	32	-5	-15.4%	125	288	424	-136	-32.1%
		NBT	235	238	245	244	72.2	57.1	15.1	26.4%	E	E	98	97	1	0.6%	495	511	552	-41	-7.4%
		WB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		EBT	219	224	243	250	22.0	24.2	-2.2	-9.2%	C	C	26	34	-7	-21.9%	1245	249	315	-66	-20.9%
		EBR	69	69	68	72	5.7	4.8	1.0	20.3%	A	A	0	0	0	-100.0%	1245	0	21	-21	-100.0%
		EB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		EBL	269	272	265	273	67.1	39.8	27.3	68.5%	E	D	57	46	11	24.1%	1075	224	332	-108	-32.6%
		SBL	30	29	32	30	51.4	55.5	-4.1	-7.3%	D	E	96	8	88	1036.3%	205	513	175	338	193.2%
		SBT	241	239	234	232	51.1	49.4	1.7	3.4%	D	D	96	79	17	21.2%	450	513	463	50	10.8%
		SBR	385	377	395	388	8.3	10.2	-1.9	-19.0%	A	B	9	3	6	222.8%	450	269	212	57	27.0%
All	2125	2114	2154	2164	39.3	34.8	4.5	13.0%	D	C	38	36	3	7.2%		586	626	-40	-6.4%		
10	NC 147 Off-On Ramps/Trent Drive/Elba Street ¹ (Unsignalized Roundabout)	EBT	219	224	213	225	17.1	0.3	16.8	5366.0%	B	A	1	0	1	184.8%	1020	76	26	51	197.9%
		UTURN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		EBR	266	266	263	270	9.7	13.3	-3.6	-26.9%	A	B	1	0	1	184.8%	1020	76	26	51	197.9%
		NBR	173	175	175	175	2.0	0.4	1.6	430.5%	A	A	1	0	1	0.0%	430	124	0	124	0.0%
		NBL	131	126	N/A	N/A	7.3	N/A	N/A	N/A	A	N/A	1	N/A	N/A	N/A	N/A	124	N/A	N/A	N/A
		UTURN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		SBL	1	1	0	0	5.6	0.0	5.6	0.0%	A	A	0	89	-89	-100.0%	1710	0	343	-343	-100.0%
		SBR	912	910	918	925	7.9	2.6	5.3	202.6%	A	A	0	89	-89	-100.0%	1720	0	343	-343	-100.0%
		SBT	444	439	424	425	9.6	61.2	-51.6	-84.4%	A	E	0	89	-89	-100.0%	1720	0	343	-343	-100.0%
All	2145	2141	1993	2020	8.9	16.1	-7.2	-44.6%	A	B	1	44	-44	-98.8%		135	343	-208	-60.6%		

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)					
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %	
			Model	Demand	Model	Demand																
11	Anderson Street/15th Street/Main Street ¹	SBL	23	23	23	24	59.9	59.8	0.0	0.1%	E	E	60	53	8	14.4%	825	236	198	38	19.3%	
		SBR	3	3	1	1	38.8	42.1	-3.3	-7.9%	D	D	0	53	-53	-100.0%	825	0	198	-198	-100.0%	
		SBT	215	209	217	210	63.8	63.9	-0.2	-0.3%	E	E	60	53	8	14.6%	825	236	198	38	19.4%	
		WBT	180	178	182	181	24.1	23.5	0.6	2.6%	C	C	24	23	1	4.7%	2100	258	217	41	18.8%	
		WBR	15	15	14	15	3.2	3.4	-0.2	-5.9%	A	A	0	0	0	-96.3%	2100	3	30	-27	-90.6%	
		WBL	220	216	223	219	37.0	40.2	-3.1	-7.8%	D	D	41	51	-10	-19.4%	390	292	346	-54	-15.5%	
		EBT	418	415	421	419	53.4	49.6	3.8	7.8%	D	D	222	211	11	5.2%	3175	680	680	0	0.0%	
		EBL	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	0	0	0	0.0%	225	0	0	0	0.0%	
		EBR	221	220	222	221	49.6	45.3	4.3	9.5%	D	D	4	3	1	22.8%	3175	85	84	1	1.0%	
		NBR	60	61	61	62	38.7	39.6	-0.9	-2.4%	D	D	94	87	7	7.6%	400	406	443	-37	-8.4%	
		NBL	194	194	196	198	36.0	37.6	-1.5	-4.1%	D	D	94	87	7	7.6%	400	406	443	-37	-8.4%	
		NBT	264	270	266	270	39.6	39.7	-0.1	-0.4%	D	D	94	87	7	7.6%	400	406	443	-37	-8.4%	
All	1811	1804	1827	1820	44.6	43.7	0.8	1.9%	D	D	58	59	-1	-2.1%		680	680	0	0.0%			
12	Emergency Drive/Erwin Road ¹	SBT	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	0	0	0	7.7%	40	28	26	2	5.7%	
		SBR	10	9	10	9	5.9	4.6	1.3	27.4%	A	A	0	0	0	0.0%	40	0	0	0	0.0%	
		SBL	1	1	1	1	41.3	45.0	-3.7	-8.1%	D	D	0	0	0	7.7%	40	28	26	2	5.7%	
		NBT	3	3	4	4	26.6	56.1	-29.4	-52.5%	C	E	8	2	6	257.9%	365	86	68	17	25.2%	
		NBL	18	18	20	19	50.7	56.5	-5.9	-10.4%	D	E	8	6	1	21.8%	365	86	64	22	33.8%	
		NBR	50	49	48	48	18.5	9.4	9.1	96.2%	B	A	0	0	0	0.0%	365	4	0	4	0.0%	
		EBR	37	35	23	25	14.8	3.1	11.7	378.9%	B	A	3	0	3	0.0%	515	156	3	154	5353.6%	
		EB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A	N/A
		EBT	772	775	759	776	15.2	4.4	10.9	248.0%	B	A	48	9	39	446.9%	515	419	193	225	116.6%	
		EBL	N/A	N/A	14	14	N/A	6.0	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	320	N/A	23	N/A	N/A
		WBR	15	15	7	14	3.9	2.3	1.6	69.2%	A	A	0	0	0	0.0%	315	10	0	10	0.0%	
		WBL	28	27	22	24	74.5	8.3	66.2	799.8%	E	A	12	0	12	4547.6%	70	84	36	47	130.1%	
		WB LRT	6	6	N/A	N/A	0.5	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		37	N/A	N/A	N/A	N/A
		WBT	508	507	644	637	5.3	3.9	1.4	35.9%	A	A	8	7	2	23.7%	315	173	168	5	2.7%	
All	1454	1439	1552	1571	13.2	5.2	8.0	152.9%	B	A	7	2	5	223.7%		419	206	213	103.0%			



Erwin Road Traffic Simulation Report

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
13	Flowers Drive/Erwin Road ¹ (Unsignalized)	NBT	N/A	N/A	0	0	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	820	N/A	0	N/A	N/A
		NBL	N/A	N/A	1	1	N/A	4.8	N/A	N/A	N/A	A	N/A	0	N/A	N/A	820	N/A	0	N/A	N/A
		NBR	N/A	N/A	28	29	N/A	5.6	N/A	N/A	N/A	A	N/A	0	N/A	N/A	820	N/A	0	N/A	N/A
		SBT	N/A	N/A	0	0	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	100	N/A	0	N/A	N/A
		SBR	N/A	N/A	8	9	N/A	5.7	N/A	N/A	N/A	A	N/A	0	N/A	N/A	100	N/A	0	N/A	N/A
		SBL	N/A	N/A	2	2	N/A	8.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	100	N/A	0	N/A	N/A
		EBL	N/A	N/A	64	66	N/A	3.3	N/A	N/A	N/A	A	N/A	0	N/A	N/A	125	N/A	68	N/A	N/A
		EBR	N/A	N/A	299	305	N/A	3.6	N/A	N/A	N/A	A	N/A	0	N/A	N/A	330	N/A	68	N/A	N/A
		EBT	N/A	N/A	546	564	N/A	1.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	330	N/A	68	N/A	N/A
		WBR	N/A	N/A	37	35	N/A	0.7	N/A	N/A	N/A	A	N/A	0	N/A	N/A	865	N/A	0	N/A	N/A
		WBL	N/A	N/A	251	245	N/A	6.2	N/A	N/A	N/A	A	N/A	0	N/A	N/A	700	N/A	0	N/A	N/A
		WBT	N/A	N/A	611	615	N/A	0.7	N/A	N/A	N/A	A	N/A	0	N/A	N/A	865	N/A	0	N/A	N/A
				All			1847	1871		2.2			A		0					68	
	Erwin Rd Corridor		6	6																	
	Erwin Rd Corridor		6	6																	
		All	28632	28554	28585	28907	32.3	26.0	6.3	24.1%	C	C	43	51	-8	-15.6%		1157	1310	-154	-11.7%

Footnote: 1 - NCDOT Traffic Impact Criteria is applied
 2 - City of Durham Traffic Impact Criteria is applied

Indicates LRT Movement
 Indicates Traffic Impact
 Indicates Traffic Impact below Mid-D

Table 10: D-O LRT: Erwin Road Segment – Vissim Intersection Analysis Output Summary - 2040 Build Alternative 2 (Eye Care Station) vs. 2040 No-Build PM Peak Hour 5:00 - 6:00 PM

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)					
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %	
			Model	Demand	Model	Demand																
1	Cameron Boulevard (751)/Erwin Road ¹	SBT	525	525	531	531	38.6	33.3	5.4	16.1%	D	C	66	106	-40	-38.1%	1205	329	496	-167	-33.7%	
		SBL	340	340	341	340	35.7	34.8	1.0	2.7%	D	C	42	106	-64	-60.4%	450	232	496	-264	-53.3%	
		NBT	925	920	938	934	69.1	57.5	11.6	20.1%	E	E	241	228	13	5.6%	2020	861	815	46	5.6%	
		NBR	254	255	254	255	17.5	36.6	-19.1	-52.2%	B	D	0	0	0	814.3%	230	34	13	21	164.0%	
		EB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A	N/A
		WBR	659	665	642	665	17.1	15.9	1.1	7.1%	B	B	27	2	25	1075.5%	500	593	231	363	157.2%	
		WBL	441	440	440	440	48.9	43.7	5.2	12.0%	D	D	74	85	-10	-12.4%	2010	348	619	-271	-43.7%	
		WB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A	N/A
		All	3156	3145	3146	3165	42.4	38.8	3.6	9.2%	D	D	56	88	-32	-35.9%		861	834	27	3.3%	
2	Morreene Road/Towerview Road/Erwin Road ¹	SBT	209	205	208	203	77.7	66.1	11.6	17.5%	E	E	239	206	32	15.7%	1285	870	918	-48	-5.2%	
		SBR	181	181	182	182	27.1	48.8	-21.8	-44.6%	C	D	30	10	20	202.8%	215	247	226	21	9.1%	
		SBL	211	219	219	220	105.0	87.6	17.4	19.8%	F	F	239	206	33	15.9%	215	870	918	-48	-5.2%	
		NBT	495	517	444	526	181.1	135.7	45.4	33.4%	F	F	843	662	181	27.3%	2800	1272	989	283	28.6%	
		NBL	172	178	149	179	112.8	134.2	-21.4	-15.9%	F	F	206	662	-456	-68.8%	990	1092	989	103	10.4%	
		NBR	130	140	119	139	152.9	122.4	30.5	24.9%	F	F	51	36	15	40.8%	200	659	444	73	16.5%	
		EBR	42	42	41	40	5.6	5.3	0.3	5.9%	A	A	0	0	0	0.0%	200	0	0	0	0.0%	
		EBL	142	142	142	144	66.2	65.9	0.3	0.4%	E	E	57	52	5	9.4%	1980	268	255	13	5.2%	
		EBT	328	326	326	326	26.9	32.1	-5.2	-16.1%	C	C	29	35	-6	-16.8%	1980	239	227	12	5.2%	
		EB LRT	6	6	N/A	N/A	0.3	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		25	N/A	N/A	N/A	N/A
		WBL	106	103	102	101	55.2	22.5	32.7	145.1%	E	C	29	8	21	263.6%	2135	424	188	236	125.8%	
		WBR	343	341	345	345	27.7	20.5	7.2	35.0%	C	C	13	3	10	329.3%	235	435	230	204	88.7%	
		WB LRT	6	6	N/A	N/A	0.2	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		25	N/A	N/A	N/A	N/A
		WBT	831	831	830	829	38.2	22.2	16.0	72.0%	D	C	135	83	53	63.9%	2135	879	672	207	30.8%	
All	3202	3225	3106	3234	74.3	59.5	14.9	25.0%	E	E	134	164	-30	-18.3%		1287	1029	258	25.0%			

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)					
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %	
			Model	Demand	Model	Demand																
3	LaSalle Street/Erwin Road ¹	SBT	95	94	79	80	76.6	77.9	-1.3	-1.6%	E	E	100	89	11	11.9%	4650	505	416	90	21.6%	
		SBR	161	162	167	165	55.8	15.5	40.3	260.0%	E	B	1	1	0	-3.3%	240	55	22	34	155.1%	
		SBL	427	424	149	158	89.6	90.2	-0.6	-0.7%	F	F	171	89	82	92.4%	865	542	415	127	30.6%	
		NBT	133	135	149	142	64.2	67.8	-3.6	-5.3%	E	E	64	71	-7	-10.5%	1075	341	268	74	27.5%	
		NBL	126	118	119	120	40.5	56.6	-16.1	-28.4%	D	E	64	71	-7	-10.3%	170	342	268	74	27.6%	
		NBR	162	162	167	167	10.6	12.2	-1.6	-13.2%	B	B	0	0	0	0.0%	305	0	0	0	0.0%	
		EBL	201	203	203	207	81.1	32.9	48.1	146.2%	F	C	104	66	39	59.0%	2115	407	551	-143	-26.0%	
		EBR	16	18	27	28	4.6	6.5	-1.9	-29.3%	A	A	0	27	-27	-99.0%	280	33	233	-200	-85.9%	
		EB LRT	6	6	N/A	N/A	5.9	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		25	N/A	N/A	N/A	N/A
		EBT	453	464	691	725	30.0	25.9	4.1	15.9%	C	C	46	89	-43	-48.3%	2115	319	599	-279	-46.7%	
		WBR	384	392	408	403	22.0	9.9	12.2	123.5%	C	A	135	0	135	719400.0%	320	757	23	735	3254.1%	
		WBL	22	23	21	22	62.4	14.5	47.9	329.4%	E	B	6	1	5	538.5%	350	72	34	38	109.9%	
		WB LRT	6	6	N/A	N/A	7.9	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		162	N/A	N/A	N/A	N/A
		WBT	1162	1165	1157	1155	36.2	15.3	21.0	137.5%	D	B	321	53	267	501.1%	1155	1081	456	625	137.0%	
All	3355	3360	3336	3372	45.3	26.2	19.1	72.8%	D	C	72	46	26	55.7%		1081	640	441	68.8%			
4	Douglas Street/Research Drive/Erwin Road ¹	SBT	13	13	12	13	94.6	65.8	28.8	43.8%	F	E	90	66	25	37.6%	1375	410	220	190	86.7%	
		SBR	305	303	284	279	15.6	10.7	4.9	46.2%	B	B	0	0	0	0.0%	510	0	0	0	0.0%	
		SBL	212	214	223	228	62.4	68.5	-6.1	-8.9%	E	E	90	66	25	37.6%	375	410	220	190	86.7%	
		NBT	30	30	27	28	85.4	65.4	19.9	30.5%	F	E	102	96	6	6.0%	975	352	402	-50	-12.4%	
		NBL	260	259	299	298	63.0	62.7	0.2	0.4%	E	E	100	96	4	4.3%	240	352	402	-50	-12.4%	
		NBR	446	449	412	415	13.3	18.2	-4.9	-27.1%	B	B	0	0	0	-62.3%	260	24	24	0	-0.6%	
		EBL	146	145	56	59	56.6	25.4	31.2	123.2%	E	C	49	6	43	708.9%	580	289	88	201	227.4%	
		EBR	66	68	56	59	4.6	3.8	0.9	22.9%	A	A	0	34	-34	-99.8%	250	24	285	-261	-91.6%	
		EB LRT	6	6	N/A	N/A	0.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A	N/A
		EBT	557	562	623	657	26.1	23.9	2.2	9.2%	C	C	46	78	-32	-41.5%	1125	279	435	-156	-35.9%	
		WBR	36	35	45	41	4.0	4.7	-0.7	-15.5%	A	A	9	6	3	42.8%	450	161	133	28	20.7%	
		WBL	156	152	152	156	47.3	22.9	24.4	106.4%	D	C	44	17	27	161.6%	440	296	180	117	64.9%	
		WB LRT	6	6	N/A	N/A	0.5	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		75	N/A	N/A	N/A	N/A
		WBT	849	873	852	858	17.3	15.6	1.8	11.3%	B	B	46	44	2	3.5%	710	379	359	20	5.6%	
All	3088	3103	3039	3091	28.9	26.3	2.6	10.1%	C	C	41	42	-1	-2.9%		458	540	-82	-15.2%			

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)					
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %	
			Model	Demand	Model	Demand																
5	Eye Care Center Drive/Erwin Road ¹	NBT	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	1	1	-1	-46.4%	95	64	72	-8	-11.1%	
		NBL	18	19	16	16	56.9	59.1	-2.1	-3.6%	E	E	5	5	0	-1.5%	95	64	58	6	10.2%	
		NBR	90	91	83	85	8.7	11.6	-2.9	-25.2%	A	B	0	0	0	0.0%	95	0	0	0	0.0%	
		SBT	3	3	3	3	50.9	71.5	-20.6	-28.8%	D	E	55	49	6	12.4%	185	207	249	-43	-17.1%	
		SBR	72	69	64	62	36.7	29.6	7.0	23.7%	D	C	0	0	0	49.0%	185	42	40	2	5.6%	
		SBL	123	123	117	116	50.9	64.6	-13.7	-21.2%	D	E	55	57	-2	-4.1%	30	207	244	-37	-15.3%	
		EBL	35	35	30	30	140.5	15.8	124.7	788.4%	F	B	29	1	28	4320.0%	500	210	44	166	377.0%	
		EBR	71	74	63	66	4.6	4.8	-0.2	-4.2%	A	A	3	44	-41	-93.8%	700	246	337	-91	-26.9%	
		EBT	1110	1116	1084	1129	10.5	10.5	-0.1	-0.7%	B	B	39	78	-39	-49.6%	700	525	539	-14	-2.5%	
		EB LRT	6	6	N/A	N/A	0.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		13	N/A	N/A	N/A	N/A
		WBR	142	145	135	135	8.2	3.4	4.8	140.8%	A	A	0	7	-7	-100.0%	715	0	180	-180	-100.0%	
		WBL	27	28	28	28	127.2	14.5	112.7	779.3%	F	B	19	1	18	2868.9%	300	113	43	70	160.3%	
		WB LRT	6	6	N/A	N/A	5.4	N/A	N/A	N/A	A	N/A	8	N/A	N/A	N/A		223	N/A	N/A	N/A	N/A
		WBT	909	917	922	927	10.4	4.2	6.2	149.5%	B	A	28	7	21	292.5%	715	308	180	128	71.4%	
All	2612	2620	2545	2597	16.0	11.0	4.9	44.8%	B	B	17	21	-4	-17.2%		525	573	-48	-8.3%			
6	Fulton Street/Erwin Road ¹	NBL	32	33	37	36	68.0	65.1	2.9	4.4%	E	E	40	42	-2	-3.9%	25	191	198	-7	-3.5%	
		NBT	57	59	62	64	67.0	63.0	3.9	6.3%	E	E	40	42	-2	-3.9%	25	191	198	-7	-3.5%	
		NBR	37	38	40	41	69.6	83.0	-13.4	-16.1%	E	F	40	42	-2	-3.9%	25	191	198	-7	-3.5%	
		EBR	101	56	60	61	15.3	29.1	-13.8	-47.5%	B	C	40	131	-91	-69.4%	730	520	597	-77	-13.0%	
		EBL	414	421	408	424	64.3	68.3	-4.0	-5.8%	E	E	101	87	14	16.6%	590	542	350	192	54.9%	
		EBT	806	853	786	845	15.3	46.9	-31.6	-67.3%	B	D	40	131	-91	-69.4%	730	520	597	-77	-13.0%	
		EB LRT	6	6	N/A	N/A	5.8	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A	N/A
		SBT	71	73	76	76	65.8	24.7	41.2	166.8%	E	C	58	21	37	180.1%	260	297	144	153	106.5%	
		SBR	317	323	322	320	40.1	15.3	24.8	162.5%	D	B	58	21	37	179.6%	260	297	143	154	107.2%	
		SBL	82	84	77	79	79.0	50.1	28.9	57.6%	E	D	36	11	25	221.5%	165	236	111	125	113.2%	
		WBL	50	51	53	54	62.3	18.2	44.1	242.7%	E	B	18	4	14	389.2%	635	121	84	37	44.3%	
		WB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A	N/A
		WBT	729	734	728	734	18.4	22.7	-4.4	-19.2%	B	C	46	55	-9	-16.9%	865	329	460	-130	-28.3%	
		WBR	37	40	396	397	20.7	21.6	-0.9	-4.3%	C	C	46	42	4	9.8%	605	329	417	-87	-20.9%	
All	2746	2765	3045	3131	32.9	36.7	-3.8	-10.4%	C	D	40	52	-12	-23.1%		600	664	-65	-9.7%			

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
7	Fulton Street/Elba Street ¹	SBR	47	47	43	43	1.6	1.9	-0.3	-14.7%	A	A	0	0	0	0.0%	115	0	0	0	0.0%
		SBT	253	254	250	251	9.7	9.8	-0.1	-0.7%	A	A	9	12	-3	-21.1%	1705	117	124	-7	-5.3%
		SBL	112	115	112	115	10.9	17.2	-6.3	-36.5%	B	B	9	11	-3	-23.1%	1100	118	124	-7	-5.3%
		EBL	78	75	78	76	63.1	67.0	-3.9	-5.8%	E	E	28	31	-2	-7.4%	140	181	207	-26	-12.6%
		EBR	40	39	40	39	37.5	34.8	2.7	7.6%	D	C	0	0	0	0.0%	140	5	12	-7	-57.4%
		EBT	66	64	66	64	64.5	65.8	-1.3	-2.0%	E	E	35	35	0	-0.6%	140	219	237	-18	-7.4%
		NBT	329	318	661	673	7.9	15.2	-7.2	-47.8%	A	B	7	32	-25	-78.2%	270	130	259	-128	-49.6%
		NBL	12	11	22	21	7.1	15.6	-8.5	-54.3%	A	B	0	1	-1	-80.5%	95	25	53	-28	-52.8%
		NBR	168	191	185	191	3.3	3.6	-0.3	-8.9%	A	A	1	2	-1	-52.3%	215	131	169	-38	-22.6%
		WBR	566	583	232	230	19.5	9.1	10.4	114.6%	B	A	1	0	1	0.0%	935	27	0	27	0.0%
		WBT	47	51	37	35	66.7	64.2	2.5	3.9%	E	E	61	57	4	7.6%	2760	330	237	93	39.0%
		WBL	182	186	187	185	64.3	64.2	0.2	0.2%	E	E	61	57	4	7.6%	235	330	237	93	39.0%
All	1899	1934	1914	1923	22.9	22.4	0.5	2.1%	C	C	18	20	-2	-10.8%		336	290	47	16.1%		
8	Trent Drive/Erwin Road ¹	NBR	75	77	120	123	59.5	62.9	-3.4	-5.4%	E	E	137	147	-10	-6.7%	1000	662	392	269	68.5%
		NBT	243	242	196	194	57.7	64.0	-6.3	-9.8%	E	E	137	147	-10	-6.7%	1000	662	392	269	68.5%
		NBL	111	111	319	314	59.2	66.4	-7.2	-10.9%	E	E	137	147	-10	-6.7%	585	662	392	269	68.5%
		WBL	40	39	38	38	57.3	39.9	17.5	43.8%	E	D	12	4	8	191.4%	1065	117	68	49	71.5%
		WBR	460	458	186	186	43.8	22.9	20.9	91.3%	D	C	185	59	126	213.4%	1230	832	512	320	62.5%
		WB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		WBT	287	288	551	566	28.3	17.7	10.6	59.7%	C	B	185	59	126	213.4%	1230	832	512	320	62.5%
		SBT	42	43	39	40	42.0	56.2	-14.3	-25.4%	D	E	10	44	-34	-77.9%	385	123	254	-131	-51.6%
		SBL	152	156	146	150	41.2	60.8	-19.6	-32.3%	D	E	31	61	-30	-48.7%	255	235	301	-66	-22.0%
		SBR	158	161	163	160	49.6	33.6	16.0	47.7%	D	C	47	44	3	7.7%	385	250	254	-3	-1.3%
		EBR	85	88	67	73	19.2	17.4	1.8	10.3%	B	B	56	97	-41	-42.3%	855	387	391	-4	-1.1%
		EBT	687	734	646	697	17.0	31.7	-14.8	-46.5%	B	C	56		56	0.0%	855	387		387	0.0%
		EB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		EBL	310	318	244	270	46.8	31.1	15.6	50.2%	D	C	51	31	20	64.0%	660	311	359	-48	-13.3%
All	2661	2715	2716	2811	37.3	37.7	-0.4	-1.0%	D	D	75	78	-3	-4.3%		858	527	331	62.7%		

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
9	Anderson Street/Erwin Road ¹	WBL	80	82	78	80	58.4	59.8	-1.4	-2.4%	E	E	25	26	-1	-5.1%	2315	180	186	-6	-3.0%
		WBT	368	368	374	374	79.3	54.0	25.3	46.9%	E	D	121	80	41	52.1%	2465	448	314	134	42.7%
		WBR	49	50	49	50	98.6	80.3	18.3	22.7%	F	F	121	80	41	52.1%	710	448	314	134	42.7%
		NBR	113	110	111	117	70.1	96.3	-26.1	-27.1%	E	F	56	423	-367	-86.7%	495	214	706	-492	-69.7%
		NBL	217	212	206	221	80.6	116.8	-36.2	-31.0%	F	F	135	207	-72	-34.9%	125	709	709	0	0.0%
		NBT	357	363	329	367	97.5	145.4	-47.9	-32.9%	F	F	330	423	-94	-22.1%	495	701	706	-5	-0.7%
		WB LRT	6	6	N/A	N/A	0.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		13	N/A	N/A	N/A
		EBT	555	580	573	606	38.6	35.8	2.8	7.7%	D	D	233	164	69	42.3%	1245	1106	983	123	12.5%
		EBR	142	148	139	146	14.9	8.1	6.8	84.9%	B	A	56	137	-81	-59.2%	1245	631	513	118	23.0%
		EB LRT	6	6	N/A	N/A	0.2	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		12	N/A	N/A	N/A
		EBL	558	582	532	573	65.6	94.9	-29.2	-30.8%	E	F	184	552	-368	-66.6%	1075	1020	1188	-169	-14.2%
		SBL	19	20	21	21	81.1	78.6	2.5	3.2%	F	E	137	6	130	2071.2%	205	630	76	554	728.3%
		SBT	229	225	222	219	76.9	64.4	12.6	19.5%	E	E	137	95	42	43.8%	450	630	360	270	75.1%
		SBR	293	290	291	290	12.7	11.6	1.0	9.0%	B	B	15	1	13	903.4%	450	382	108	274	252.9%
All	2992	3030	2923	3064	60.9	69.4	-8.5	-12.2%	E	E	111	183	-72	-39.5%		1142	1189	-47	-3.9%		
10	NC 147 Off-On Ramps/Trent Drive/Elba Street ¹ (Unsignalized Roundabout)	EBT	441	474	466	470	8.7	0.7	8.0	1154.1%	A	A	127	0	127	0.0%	1020	204	0	204	0.0%
		UTURN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		EBR	106	116	116	120	5.0	1.7	3.4	197.8%	A	A	127	0	127	0.0%	1020	204	0	204	0.0%
		NBR	636	645	626	650	4.0	1.3	2.7	216.4%	A	A	3	0	3	1478.6%	430	166	86	80	92.4%
		NBL	376	370	N/A	N/A	5.2	N/A	N/A	N/A	A	N/A	3	N/A	N/A	N/A	N/A	166	N/A	N/A	N/A
		UTURN	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		SBL	1	1	0	0	2.0	0.0	2.0	0.0%	A	A	0	0	0	0.0%	1710	0	0	0	0.0%
		SBR	151	150	151	150	3.1	0.2	2.9	1415.2%	A	A	0	0	0	0.0%	1720	0	0	0	0.0%
		SBT	232	229	233	230	3.8	12.7	-8.9	-70.1%	A	B	0	0	0	0.0%	1720	0	0	0	0.0%
All	1943	1985	1591	1620	5.3	2.7	2.5	93.1%	A	A	43	0	43	690900.0%		211	86	125	145.2%		

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)					
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %	
			Model	Demand	Model	Demand																
11	Anderson Street/15th Street/Main Street ¹	SBL	29	31	31	32	68.0	61.0	7.0	11.4%	E	E	57	51	6	12.4%	825	219	215	4	1.7%	
		SBR	8	7	9	8	38.4	31.9	6.5	20.4%	D	C	0	0	0	0.0%	825	0	0	0	0.0%	
		SBT	166	162	170	165	70.4	63.4	6.9	10.9%	E	E	57	51	6	12.4%	825	219	215	4	1.7%	
		WBT	472	475	487	492	36.9	38.9	-2.0	-5.1%	D	D	115	121	-6	-5.1%	2100	631	502	129	25.7%	
		WBR	47	46	48	46	7.4	12.6	-5.2	-41.2%	A	B	8	5	3	65.0%	2100	230	151	79	52.0%	
		WBL	232	229	225	223	67.4	64.2	3.2	5.0%	E	E	107	81	26	31.6%	390	665	444	222	49.9%	
		EBT	368	360	363	356	59.1	81.4	-22.4	-27.5%	E	F	197	282	-85	-30.2%	3175	679	684	-4	-0.6%	
		EBL	6	6	7	7	55.3	88.1	-32.8	-37.2%	E	F	1	1	0	-30.3%	225	28	28	0	-0.6%	
		EBR	145	144	141	142	56.1	74.0	-17.9	-24.2%	E	E	1	6	-5	-78.9%	3175	84	88	-4	-4.4%	
		NBR	268	274	246	266	29.2	28.4	0.8	2.9%	C	C	147	181	-34	-18.7%	400	514	488	25	5.2%	
		NBL	280	288	268	294	26.8	27.8	-1.0	-3.7%	C	C	147	181	-34	-18.7%	400	514	488	25	5.2%	
		NBT	415	433	396	430	29.0	30.3	-1.3	-4.3%	C	C	147	181	-34	-18.7%	400	514	488	25	5.2%	
All	2435	2455	2391	2461	43.1	47.7	-4.6	-9.7%	D	D	82	95	-13	-13.7%		707	684	24	3.4%			
12	Emergency Drive/Erwin Road ¹	SBT	23	24	18	20	39.7	58.5	-18.7	-32.0%	D	E	25	26	-1	-3.7%	40	195	225	-30	-13.2%	
		SBR	332	333	242	242	14.7	18.2	-3.5	-19.4%	B	B	0	0	0	-97.5%	40	28	39	-11	-28.8%	
		SBL	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	25	26	-1	-3.7%	40	195	225	-30	-13.2%	
		NBT	14	13	4	4	38.7	44.5	-5.7	-12.9%	D	D	13	3	10	332.8%	365	166	91	75	82.5%	
		NBL	4	4	1	1	45.3	31.4	13.9	44.3%	D	C	13	0	12	7337.0%	365	166	12	154	1262.1%	
		NBR	174	173	79	78	15.4	10.7	4.8	44.7%	B	B	13	0	13	0.0%	365	166	0	166	0.0%	
		EBR	15	8	2	2	7.9	8.7	-0.8	-9.3%	A	A	1	57	-56	-98.4%	515	127	283	-156	-55.2%	
		EB LRT	6	6	N/A	N/A	0.5	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		50	N/A	N/A	N/A	N/A
		EBT	909	967	892	962	11.5	18.8	-7.2	-38.5%	B	B	30	117	-87	-74.5%	515	387	508	-120	-23.7%	
		EBL	N/A	N/A	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A		320	N/A	N/A	N/A	N/A
		WBR	33	31	39	40	3.2	4.0	-0.8	-20.5%	A	A	0	0	0	-100.0%	315	2	105	-103	-98.4%	
		WBL	43	41	58	58	68.2	14.0	54.3	388.7%	E	B	17	2	15	689.9%	70	108	103	5	5.1%	
		WB LRT	6	6	N/A	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A	N/A
		WBT	480	488	936	942	5.1	5.2	-0.2	-3.3%	A	A	7	14	-6	-46.6%	315	166	364	-198	-54.4%	
All	2037	2082	2271	2350	12.4	12.6	-0.3	-2.3%	B	B	11	21	-9	-46.2%		387	547	-159	-29.2%			



Erwin Road Traffic Simulation Report

Node	Intersection	Movement	Volume (VPH)				Delay (Seconds)				LOS		Avg Queue Length (ft)				Max Queue Length (ft)				
			Build		No-Build		Build	No-Build	Difference Absolute	Difference %	Build	No-Build	Build	No-Build	Difference Absolute	Difference %	Storage Space Available	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
13	Flowers Drive/Erwin Road ¹ (Unsignalized)	NBT	N/A	N/A	0	0	N/A	0.0	N/A	N/A	N/A	A	N/A	2	N/A	N/A	820	N/A	94	N/A	N/A
		NBL	N/A	N/A	0	0	N/A	0.0	N/A	N/A	N/A	A	N/A	2	N/A	N/A	820	N/A	94	N/A	N/A
		NBR	N/A	N/A	349	351	N/A	30.6	N/A	N/A	N/A	C	N/A	2	N/A	N/A	820	N/A	94	N/A	N/A
		SBT	N/A	N/A	0	0	N/A	0.0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	100	N/A	8	N/A	N/A
		SBR	N/A	N/A	1	1	N/A	16.3	N/A	N/A	N/A	B	N/A	0	N/A	N/A	100	N/A	8	N/A	N/A
		SBL	N/A	N/A	11	11	N/A	43.7	N/A	N/A	N/A	D	N/A	0	N/A	N/A	100	N/A	8	N/A	N/A
		EBL	N/A	N/A	3	4	N/A	18.0	N/A	N/A	N/A	B	N/A	18	N/A	N/A	125	N/A	186	N/A	N/A
		EBR	N/A	N/A	3	3	N/A	5.5	N/A	N/A	N/A	A	N/A	18	N/A	N/A	330	N/A	186	N/A	N/A
		EBT	N/A	N/A	900	963	N/A	24.3	N/A	N/A	N/A	C	N/A	18	N/A	N/A	330	N/A	186	N/A	N/A
		WBR	N/A	N/A	9	9	N/A	1.1	N/A	N/A	N/A	A	N/A	0	N/A	N/A	865	N/A	14	N/A	N/A
		WBL	N/A	N/A	87	87	N/A	12.7	N/A	N/A	N/A	B	N/A	0	N/A	N/A	700	N/A	14	N/A	N/A
		WBT	N/A	N/A	773	789	N/A	2.3	N/A	N/A	N/A	A	N/A	0	N/A	N/A	865	N/A	14	N/A	N/A
				All			2136	2218		16.8			B		5					186	
	Erwin Rd Corridor		6	6			12.8														
	Erwin Rd Corridor		6	6			14.1														
		All	32126	32419	32023	32819	37.7	33.5	4.2	12.4%	D	C	59	64	-5	-7.5%		1321	1207	114	9.5%

Footnote: 1 - NCDOT Traffic Impact Criteria is applied
 2 - City of Durham Traffic Impact Criteria is applied

Indicates LRT Movement
 Indicates Traffic Impact
 Indicates Traffic Impact below Mid-D

6.1 Analysis of LOS Thresholds

Each of the two 2040 Build LRT Alternatives were compared to the respective No-Build scenario at each intersection by overall and individual movement levels. For the purposes of the traffic impact analysis, the worst LOS, highest delay, and longest maximum queue length among both build options has been selected for discussion below. The following section discusses the intersections where LRT impacts have been identified. The identified impacts are discussed below in regards to the NCDOT thresholds, as all intersections include a NCDOT facility.

With proposed roadway modifications, all overall intersections are expected to operate at LOS E or better. However, queuing and increases in delay were also considered in determining if modifications to the roadway should be analyzed. Each intersection is discussed below in regards to the NCDOT thresholds.

6.1.1 Erwin Road at Cameron Boulevard (NC 751)

The alignment and roadway configurations for LRT Alternative 1 and LRT Alternative 2 are consistent at this intersection. For both 2040 LRT Alternatives, there are no expected overall intersection or individual movement delay or LOS impacts at Erwin Road and Cameron Boulevard.

For both 2040 Build LRT Alternatives, the maximum queue lengths are generally consistent between alternatives. The following movement will exceed both its available storage space and the respective peak hour No-Build maximum queue length by more than 10 feet:

- Westbound Erwin Road right turn exceeds storage space by 98 feet in PM only

As part of the mitigation measures shown in Table 1, the proposed design for LRT Alternative 1 and LRT Alternative 2 include a dedicated westbound Erwin Road right turn bay that would terminate immediately upstream of the Center for Living driveway. Due to the proposed alignment of the LRT in the center of Erwin Road, the general traffic lanes would be shifted outwards and would require right-of-way acquisition on both sides of Erwin Road for a substantial distance. The westbound Erwin Road right turn bay is proposed to be extended to its practical maximum length.

6.1.2 Erwin Road at Morreene Road/Towerview Road

The alignment and roadway configurations for LRT Alternative 1 and LRT Alternative 2 are consistent at this intersection. For both LRT Alternatives, the overall intersection delay increases by approximately 29% while maintaining the same LOS D experienced in the No-Build during the AM peak hour. The resulting AM peak hour Build Alternatives' overall intersection delays would be approximately one second greater than the 45.0 second Mid-D LOS that is used to identify delay impacts. During the PM peak hour, both LRT Alternatives overall intersection delays are expected to meet the NCDOT thresholds.

In the AM peak hour, both LRT Alternatives report that five individual movements are expected to operate with degraded LOS of middle D or worse including the southbound Morreene Road through movement, the southbound Morreene Road left turn, the northbound Towerview Road left turn, the eastbound Erwin Road left turn, and the westbound Erwin Road left turn. The westbound Erwin Road through movement would also experience an increase in delay greater than 25% in the AM peak hour for both LRT Alternatives.

In the PM peak hour under both LRT Alternatives, the LOS is expected to degrade for the westbound Erwin Road left turn due to signal preemption activities at the intersection. The northbound Towerview Road through movement and right turn would also experience an increase in delay greater than 25% in the PM hour for both LRT Alternatives.

For both 2040 LRT Alternatives, the maximum queue lengths are generally consistent. The following movements are expected to exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Eastbound Erwin Road right turn exceeds storage space by 168 feet in AM only
- Westbound Erwin Road right turn exceeds storage space by 200 feet in PM only
- Northbound Towerview Road left turn exceeds storage space by 140 feet in PM only
- Northbound Towerview Road right turn exceeds storage space by 673 feet in PM only
- Southbound Morreene Road right turn exceeds storage space by 32 feet in PM only

The maximum queue lengths along the intersection approaches are expected to increase due to signal preemption activities. However, the average queues are well below the available storage lengths for these affected movements except for the northbound Towerview Road right turn, which would experience average queue lengths in excess of the available storage space.

All practical roadway modifications were included in the designs for both LRT Alternatives. The eastbound Erwin Road right turn is expected to exceed the storage space of the new turn bay that was recently constructed; however, the maximum queue length would be contained by the overall eastbound approach. The westbound Erwin Road right turn bay is proposed in both LRT Alternatives; however, its storage length is dictated by the proximity to the convalescence facility located approximately 300 feet to the east along the north side of Erwin Road. Modifications are also proposed for the northbound approach by removing street parking along Towerview Road between Circuit Drive and Erwin Road. The southbound Morreene Road right turn maximum queue exceeds the storage space by only 32 feet in the PM. This queue would be contained within the southbound approach and would not impact a signalized intersection.

6.1.3 Erwin Road at LaSalle Street

The alignment and roadway configurations for LRT Alternative 1 and LRT Alternative 2 are consistent at this intersection. For the intersection of Erwin Road at LaSalle Street, both LRT Alternatives' overall intersection delays increase to middle LOS D (approximately 46 seconds/delay) from a No-Build LOS C in both the AM and PM peak hours, which are considered traffic impacts according to NCDOT criteria. However, the intersection is expected to operate at LOS D conditions in 2040 which is generally considered an acceptable LOS.

For both LRT Alternatives, there are four individual movements that are expected to operate with degraded LOS of middle D or worse including the northbound LaSalle Street through movement in the AM peak hour only, the southbound LaSalle Street right turn in the PM peak hour only, the eastbound Erwin Road left turn in the AM and PM peak hours, and the westbound Erwin Road left turn in the AM and PM peak hours.

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For both 2040 LRT scenarios, the maximum queue lengths are generally consistent. The following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Northbound LaSalle Street left turn exceeds storage space by 172 feet in PM only
- Westbound Erwin Road right turn exceeds storage space by 437 feet in PM only

The two intersection movements noted above are expected to have Build maximum queue lengths that extend beyond the turn bay storage space, however, their queues would be contained within their respective approach's storage space without impacting the upstream intersection. Additionally, the maximum queue events are infrequent, and the average queue lengths are well below the available storage space for the respective movements.

Due to the LRT's alignment in the center of Erwin Road, the westbound Erwin Road right turn will be located to the north of the existing curbline outside of the existing right-of-way. The right turn bay cannot be extended any further to the east without eliminating the Lakeview accessible parking. The northbound LaSalle Street left turn cannot be extended further without impacting parking within the Duke Medical Center.

6.1.4 Erwin Road at Douglas Street/Research Drive

For the intersection of Erwin Road at Douglas Street/Research Drive, the overall intersection delays for both LRT Alternatives' AM and PM peak hours are expected to meet the NCDOT thresholds. For both LRT Alternatives, there are four individual movements that are expected to operate with degraded LOS of middle D or worse including the southbound Douglas Street through movement in the PM peak hour only, the northbound Research Drive through movement in the PM peak hour only, the eastbound Erwin Road left turn in both AM and PM peak hours, and the westbound Erwin Road left turn in the PM peak hour only.

Due to the presence of the LRT station at Eye Care Center, additional right-of-way would be required to accommodate the required travel lanes. By using this additional right-of-way, longer westbound Erwin Road right turn and left turn bays would be provided under Alternative 2 and would produce different results compared to Alternative 1.

For the 2040 LRT Trent/Flowers Station Alternative, the maximum queue length for the following movements will exceed both the available storage space and their peak hour No-Build maximum queue by more than 10 feet:

- Southbound Douglas Street left turn exceeds storage space by 40 feet in PM
- Eastbound Erwin Road left turn exceeds storage space by 260 feet in AM only
- Eastbound Erwin Road right turn exceeds storage space by 304 feet in AM only
- Westbound Erwin Road right turn exceeds storage space by 118 feet in AM and by 200 feet in PM
- Westbound Erwin Road left turn exceeds storage space by 165 feet in AM and by 37 feet in PM

The eastbound Erwin Road left turn maximum queue length may reach beyond the unsignalized intersection with Downing Street; however, there is no conflicting movement at the upstream intersection. The eastbound Erwin Road right turn maximum queue would not impact any conflicting movement at the upstream unsignalized intersection with Downing Street. The westbound Erwin Road left and right turn maximum queues would both be contained within the overall westbound approach before

impacting the upstream signalized intersection of Erwin Road and Eye Care Center. Similarly, the southbound Douglas Street left turn maximum queue length would be contained by the southbound approach storage space without impacting the upstream unsignalized intersection of Douglas Street and Pratt Street. Additionally, although, the maximum queue lengths for the impacted movements may exceed the storage space, these maximum events are considered infrequent, while the average queue lengths for all these movements are far shorter than their available storage space.

For the 2040 LRT Trent/Flowers Station Alternative, the maximum queue length for the following movements will exceed both the available storage space and their peak hour No-Build maximum queue by more than 10 feet:

- Southbound Douglas Street left turn exceeds storage space by 35 feet in PM only
- Eastbound Erwin Road left turn exceeds storage space by 203 feet in AM only
- Eastbound Erwin Road right turn exceeds storage space by 235 feet in AM only
- Westbound Erwin Road left turn exceeds storage space by 32 feet in AM only

As with the Alternative 1 maximum queue lengths, under Alternative 2 the maximum queue lengths for the impacted movements would not affect a signalized intersection and cause gridlock. The average queue lengths for all these movements are also well below their respective storage lengths. The eastbound Erwin Road left turn maximum queue length may reach beyond the unsignalized intersection with Downing Street; however, there is no conflicting movement at the upstream intersection. The eastbound Erwin Road right turn maximum queue would not impact any conflicting movement at the upstream unsignalized intersection with Downing Street. The westbound Erwin Road left maximum queues would be contained within the overall westbound approach before impacting the upstream signalized intersection of Erwin Road and Eye Care Center. Similarly, the southbound Douglas Street left turn maximum queue length would be contained by the southbound approach storage space without impacting the upstream unsignalized intersection of Douglas Street and Pratt Street.

6.1.5 Erwin Road at Duke Eye Center/VA Medical Center

The alignment for LRT Alternative 1 and LRT Alternative 2 are different at this intersection due to the proposed station located between Trent Drive and Flowers Drive under Alternative 1 only. For the intersection of Erwin Road at Duke Eye Center/VA Medical Center, the overall intersection delays for both LRT Alternatives during the AM and PM peak hours are expected to meet the NCDOT thresholds.

For both LRT Alternatives, there are two individual movements that are expected to operate with degraded LOS of middle D or worse including the eastbound Erwin Road left turn in the AM and PM hours and the westbound Erwin Road left turn in the AM and PM hours. Noticeably, the delay times for these two movements are higher in the PM peak hour under the Eye Care Station Alternative due to the presence of the LRT station. Under Alternative 1, the westbound and eastbound Erwin Road left turns degrade from LOS B to E in the PM peak hour, however, for Alternative 2, the degradation is more significant changing from LOS B to F for both movements in the PM peak hour.

For both 2040 LRT Alternatives, there are no maximum queue length impacts expected.

No additional improvements were proposed at this intersection since these movements all have demand volumes less than 100 vehicles per hour and to improve delays additional lanes would be required, but

due to the physically constrained location, it is not practical to acquire right-of-way given the relatively low volumes that are affected.

6.1.6 Erwin Road at Fulton Street

The alignment for LRT Alternative 1 and LRT Alternative 2 are consistent at this intersection, however, the two Build LRT Alternatives report different delays, LOS, and queue lengths at this intersection.

For the intersection of Erwin Road at Fulton Street, the overall intersection LOS and delays for both LRT alternatives during the AM and PM peak hours are expected to meet the NCDOT criteria.

For LRT Alternatives 1 and 2, there are three individual movements that are expected to operate with degraded LOS of middle D or worse including the southbound Fulton Street through movement in the PM hour only, the southbound Fulton Street left turn in the PM peak hour only, and the westbound Erwin Road left turn in the AM and PM peak hours.

For the 2040 LRT Trent/Flowers Station Alternative, the maximum queue length for the following movement will exceed both its available storage space and its peak hour No-Build maximum queue by more than 10 feet:

- Southbound Fulton Street left turn exceeds storage space by 45 feet in PM only

For the 2040 LRT Eye Care Center Alternative, the following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Southbound Fulton Street through movement exceeds storage space by 37 feet in PM only
- Southbound Fulton Street right turn exceeds storage space by 37 feet in PM only
- Southbound Fulton Street left turn exceeds storage space by 71 feet in PM only

The southbound approach maximum queue lengths may exceed the available storage space and impact the upstream signalized intersection, however, these maximum queue events are considered rare while the average queue lengths for all three movements are far shorter than the storage space and would be contained within the southbound approach. There are no practical roadway modifications other than allowing right-turns-on-red for the southbound approach. However, this ban was implemented due to the high pedestrian crossing volumes. Removing this ban would therefore impact safety and is not recommended.

6.1.7 Fulton Street at Elba Drive/VA Medical Center Deck

For the intersection of Fulton Street and Elba Drive/VA Medical Center Deck, the overall intersection delays and all vehicular movements are expected to meet the NCDOT thresholds for both LRT Build scenarios.

Between the 2040 LRT Alternatives, there are noticeable differences in maximum queue lengths between the Trent/Flowers Station Alternative and the Eye Care Station Alternative.

For both 2040 Build LRT Alternatives, the maximum queue lengths are generally consistent between alternatives. The following movement will exceed both its available storage space and the respective peak hour No-Build maximum queue length by more than 10 feet:

- Westbound Elba Street left turn exceeds storage space by 859 feet in AM and 157 feet in PM

The increased maximum queue for the westbound Elba Street left turn is caused by the downstream queue at the southbound Fulton Street right turn, which infrequently blocks the upstream Elba Drive westbound left turn from clearing. A second contributor to the queue is the westbound Elba Drive left turn queue to the Duke Medical Center parking garage, which may combine with the downstream queue to create a compound queue that could potentially extend beyond the roundabout at Trent Drive and Elba Drive and impact the NC 147 off-ramp. The westbound Elba Drive left turning vehicles are frequently not afforded sufficient vehicle gaps between the opposing eastbound Elba Drive through vehicles at the unsignalized intersection, which causes the westbound left lane to queue while waiting for an acceptable gap. There are two potential roadway improvement options that can be evaluated during the Engineering phase of the project: 1) reroute traffic from this parking deck entrance or 2) signalize the intersection of Elba Drive and the Duke Medical Center Parking Deck entrance to provide a protected westbound left turn that would allow the left turn queue to clear on a regular basis.

Although, the westbound Elba Drive left turn maximum queue exceeds the storage space and may extend into the roundabout upstream at Trent Drive and Elba Drive for both LRT Alternatives during the AM peak hour, the maximum queue events are infrequent, and the average queue lengths are well below the available storage space for the respective movements.

6.1.8 Erwin Road at Trent Drive

The alignment for LRT Alternative 1 and LRT Alternative 2 are different at this intersection due to the proposed station located between Trent Drive and Flowers Drive under Alternative 1 only. For the intersection of Erwin Road at Trent Drive, the overall intersection delays are expected to meet the NCDOT thresholds for both the LRT Alternatives in both peak hours.

The two Build LRT Alternatives report different delays, LOS, and queue lengths at this intersection.

For LRT Alternative 1, four individual movements are expected to operate with degraded LOS of middle D or worse including the westbound Erwin Road left turn in the AM and PM peak hours, the eastbound Erwin Road right turn in the AM peak hour only, eastbound Erwin Road left turn in the PM peak hour only and southbound Trent Drive right turn in the PM peak hour only.

Under LRT Alternative 2, four individual movements are expected to operate with degraded LOS of middle D or worse including the westbound Erwin Road left turn in the AM and PM peak hours, the eastbound Erwin Road right turn in the AM peak hour only, eastbound Erwin Road left turn in the AM PM peak hour and southbound Trent Drive right turn in the PM peak hour only.

Compared with the Eye Care Station Alternative, the Trent/Flowers Station Alternative would experience slightly higher delays due to the proximity of the LRT station that requires longer preemption events due to the lower train speeds crossing the intersection.

For the 2040 LRT Alternative 1, the maximum queue length for the following movement will exceed both its available storage space and its respective peak hour No-Build maximum queue length by more than 10 feet:

- Northbound Trent Drive left turn exceeds storage space by 99 feet in PM only.

For the 2040 LRT Alternative 2, the maximum queue length for the following movement will exceed both its available storage space and its respective peak hour No-Build maximum queue length by more than 10 feet:

- Northbound Trent Drive left turn exceeds storage space by 77 feet in PM only.

Although the maximum queue length for the northbound left turn exceeds the storage space that is defined by the Duke Clinic parking garage exit, the queue will not impact a signalized intersection and it would terminate upstream of the Duke Clinic Circle for both Alternatives. Additionally, maximum queue events are considered infrequent events, and the average queue length for the northbound left turn would be far shorter than the available storage space in both alternatives. For both 2040 LRT Alternatives, the same roadway modifications were proposed as shown in Table 1.

6.1.9 Erwin Road at Anderson Street

For the intersection of Erwin Road at Anderson Street, the overall intersection delays are not expected to exceed the NCDOT thresholds.

The two LRT Alternatives report similar LOS at this intersection except where noted. For both LRT Alternatives, several individual movements are expected to operate with degraded LOS of middle D or worse including the eastbound Erwin Road left turn in the AM peak hour only, the westbound Erwin Road through movement in the PM peak hour only and the southbound Anderson Street left turn in the PM peak hour only. The northbound Anderson Street through movement would experience an increase in delay greater than 25% in the AM peak hour for both LRT Alternatives. Additionally, the westbound Erwin Road westbound right turn also has an increase in delay greater than 25% in the PM peak hour under the Trent/Flowers Station Alternative only. The delay time for this movement also increases under the Eye Care Station Alternative but does not reach the 25% threshold identified by NCDOT.

Since this intersection is near the LRT station under the Trent/Flowers Station Alternative, the delay time varies between the two Build alternatives and certain movements experience longer delays due to the impact of the LRT station.

The two LRT Alternatives report different maximum queue lengths. For the 2040 LRT Trent/Flowers Station Alternative, the maximum queue length for the following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Southbound Anderson Street left turn exceeds storage space by 257 feet in AM and 498 feet in PM.
- Southbound Anderson Street through movement exceeds storage space by 253 feet in PM only.

Although the maximum queue lengths for the southbound approaches exceed the available storage space and would potentially extend beyond the signalized intersection at Main Street, the average queue lengths for these two movements are far shorter than the available storage space. Today as in the future, there are regulatory signs stating “Do Not Stop on Tracks.” Additionally, the southbound left turn is forecasted to have a demand of 20 vehicles per hour in the PM peak hour. The southbound left turning vehicles are impacted by the southbound through movement queue that forms in the shared through/left lane. As part of the proposed roadway modifications for this intersection, a second eastbound Erwin Road left turn bay was added, which then required two receiving lanes on the north leg of Anderson Street. Due to the physical constraints of the bridge crossing NC 147 and the forecasted volumes, the southbound lane configuration was recommended to be a dedicated southbound right lane and a shared through/left lane. To address the remaining impacts caused by the LRT project, there are two additional roadway modification options that could be tested during the Engineering phase: 1) prohibit the low volume

southbound Anderson Street left turn onto Erwin Road and reroute this traffic or 2) reconstruct the bridge over NC 147 to provide five lanes with dedicated lanes for the southbound left, through, and right movements.

For the 2040 LRT Eye Care Station Alternative, the maximum queue length for the following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Southbound Anderson Street left turn exceeds storage space by 308 feet in AM and 425 feet in PM.
- Southbound Anderson Street through movement exceeds storage space by 63 feet in AM and 180 feet in PM.

As with Alternative 1, the same movements are impacted by the LRT project but there are different queue lengths. Although the maximum queue lengths for the southbound approaches exceed the available storage space and would potentially extend beyond the signalized intersection at Main Street, the average queue lengths for these two movements are far shorter than the available storage space. Today as in the future, there are regulatory signs stating “Do Not Stop on Tracks.” Additionally, the southbound left turn is forecasted to have a demand of 20 vehicles per hour in the PM peak hour. The southbound left turning vehicles are impacted by the southbound through movement queue that forms in the shared through/left lane. The same lane configuration mitigation measures were planned for Alternative 2 as Alternative 1 as the future volumes are the same. And as with Alternative 1, to address the remaining queue impacts, either the southbound left turn movement could be prohibited or a new bridge would be required. These mitigation options can be evaluated for feasibility and operational benefits during the Engineering phase.

6.1.10 Anderson Street/15th Street at Main Street

The alignment and roadway configurations for the Build LRT Trent/Flowers Alternative and Build LRT Eye Care Center Alternative are consistent at this intersection. For the intersection of Anderson Street/15th Street at Main Street the overall intersection delays and all vehicular movements are expected to meet the NCDOT thresholds in both AM and PM peak hours for both LRT Alternatives.

For both LRT Alternatives, the maximum queue lengths for the following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue by more than 10 feet:

- Westbound Main Street left turn exceeds storage space by 275 feet in PM only.
- Northbound Anderson Street/15th Street right turn exceeds storage space by 114 feet in PM only.
- Northbound Anderson Street/15th Street through movement exceeds storage space by 114 feet in PM only.
- Northbound Anderson Street/15th Street left turn exceeds storage space by 114 feet in PM only.

The Build maximum queue lengths for the northbound approach movements are only 25 feet longer than the respective No-Build maximum queue lengths. The maximum queue events are also considered infrequent occurrences and the average queue lengths for all impacted movements are expected to be well below the available storage space. Due to the NCRR corridor bisecting the southern leg of Anderson Street and the bridge over NC 147 to the south, it is impractical to consider widening this leg to provide additional storage for the northbound Anderson Street maximum queue. The westbound Main Street left

turn's maximum queue may extend beyond the striped bay, however, the queue will not impact a signalized intersection upstream.

6.1.11 Erwin Road at Emergency Drive

For the intersection of Erwin Road at Emergency Drive, the overall intersection delays do not exceed the NCDOT thresholds in both AM and PM peak hours for both 2040 Build LRT Alternatives.

The two LRT Alternatives report similar LOS at this intersection. For both LRT Alternatives, two individual movements are expected to operate with degraded LOS of middle D or worse including the westbound Erwin Road left turn in both AM and PM peak hours, and the northbound Emergency Drive left turn in PM peak hour only. As noticed, both Build scenarios have traffic impacts on westbound Erwin Road left turn because left-turn operations have been changed to protected-only from protected and permitted operations in the No-Build Conditions. In order to minimize traffic impacts from the perspective of traffic delay, protected and permitted left-turn phasing could be applied to the LRT alternatives, however, this would potentially sacrifice safety at intersections along Erwin Road that conflict with the LRT.

Since this intersection is adjacent to the LRT station under the Trent/Flowers Station Alternative, the delay time varies between the two Build alternatives and certain movements experience longer delays due to the impact of the LRT station.

For both LRT Alternatives, the maximum queue lengths are generally consistent except where noted. The following movements will exceed both their available storage space and their respective peak hour No-Build maximum queue length by more than 10 feet:

- Westbound Erwin Road left turn exceeds storage space by 19 feet in AM for both LRT Alternatives, and by 56 feet in the PM for Alternative 1 only

For both LRT Alternatives designs, a dedicated Erwin Road left turn has been provided to southbound Emergency Drive. The resulting maximum queues exceed the available storage lengths by approximately two cars and this excess queue would be contained within the westbound approach before it impacted the upstream signalized intersection with Trent Drive.

7. Conclusions/Recommendations

The Vissim results for the 2040 Build Alternatives indicate that all intersections would operate at LOS E or better during both peak hours and the majority of overall intersections will satisfy NCDOT criteria with the modifications proposed in Table 1. Only the following intersections would exceed the LOS threshold under both LRT Alternatives:

- Erwin Road and LaSalle Street (AM and PM peak hours)
- Erwin Road and Morreene Road/Towerview Road (AM peak hour)

As part of the traffic simulation analysis, traffic impacts associated with the implementation of the LRT were identified in the forms of delay, LOS, and queues. All locations showing impacts were investigated to determine the significance of the impact and whether there was a feasible roadway modification to eliminate or reduce the impact. Table 1 indicates the series of improvement measures that were proposed and analyzed in an effort to mitigate traffic impacts resulting from the LRT condition. These proposed mitigations eliminated a majority of the initial traffic impacts. The remaining traffic impacts along Erwin Road are not expected to significantly deteriorate traffic operations. Only the intersection of Erwin Road and LaSalle Street would experience an overall degradation in LOS, however, the overall delay would not exceed 48 seconds with an LOS D under the LRT conditions. The intersection of Erwin Road and Morreene Road/Towerview Road also experiences an overall increase in delay greater than 25% in the AM peak hour; however, the LOS would remain D with a delay barely above a Mid-D of 46 seconds.

Although the maximum queues on the Erwin Road approaches may exceed the storage space for a particular turn bay, the maximum queue is generally contained within the adjacent through lane storage space without reaching the upstream signalized intersections. The maximum queue events represent the absolute farthest extent of the queue for a particular movement, which are infrequent occurrences. For those movements that report maximum queues exceeding the available storage space, the respective average queues would be contained within their storage space. Given the limited impact on traffic operations and the lack of additional practical modifications to the roadway at these locations, no further modifications are recommended to the LRT Alternative designs beyond those proposed in Table 1.

The expected average queues would be accommodated by the available storage at all locations except for northbound Towerview Road right turn to eastbound Erwin Road in the PM peak hour under Alternative 1, however, this excess queue as well as the maximum queue would be contained by the overall northbound approach and additional widening is not recommended.

Common to both LRT Alternatives, the southbound Anderson Street approach at Erwin Road may experience maximum queues that could spill back to the at-grade railroad crossing; however, the No-Build is also expected to have maximum queue lengths that extend upstream across the tracks and onto Main Street. To ensure the safe operations of the D-O LRT and the railroad crossing, the signal and gate operations along Anderson Street will be further refined during the Engineering phase of the project. The second challenge to be addressed is the potential maximum queue that originates at the westbound Elba Drive left turn to southbound Fulton Street. Under certain circumstances, this queue can combine



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with the upstream queue at the westbound Elba Drive left turn to the Duke Medical Center Parking Deck that can result in a maximum length that extends beyond the roundabout at Trent Drive and Elba Drive/NC 147 On/Off-Ramps and could potentially reach the NC 147 off-ramp. This is an unlikely event, however, to mitigate this compounded maximum queue, the intersection of Elba Drive and the Duke Medical Center Parking Deck should be investigated further during the Engineering Phase to determine if traffic can be rerouted from this parking deck entrance or if the intersection may require signalization.

Overall, there are minimal traffic operations differences between the Build LRT Trent/Flowers Alternative and the LRT Eye Care Center Alternative, and a determination of a preferred alignment should consider other factors.

As noted previously, substantial modifications to the roadway are incorporated into the design including additional turn bays, restriping of intersection approaches to accommodate additional receiving lanes, while additional roadway expansion is not recommended. Additional traffic analysis will be investigated during the Engineering phase of the project and the proposed roadway modifications may be refined. Other non-geometric mitigation strategies will also be explored by Triangle Transit and coordinated with the City of Durham, NCDOT and major institutional stakeholders along Erwin Road, including evaluation, development, and enhancement of Travel Demand Management programs to encourage further mode shifts from personal automobiles to transit and non-motorized travel in the station areas.



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Appendices



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Appendix A:

Traffic Analysis Methodology Report

TRAFFIC ANALYSIS METHODOLOGY

Durham-Orange Light Rail Transit Project



November 2013



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1. Introduction

The proposed Triangle Transit Durham-Orange Light Rail Transit Draft Environmental Impact Statement (D-O LRT Draft EIS) will address existing and future transportation conditions along the proposed corridor and quantify the transportation impacts of the No-Build and Build Alternatives as well as some transportation system management (TSM) improvements. For the purposes of this study the No-Build and TSM scenarios will be combined. The project will potentially have transportation and traffic impacts that will include impacts to streets and highways, bikeways, parking, railroad operations, and public transit.

Following is a description of the proposed methodology for evaluating the potential impacts to traffic and transportation services and facilities that could occur due to the implementation of the proposed D-O LRT. This proposal includes analysis methodologies used to describe existing and future travel patterns and the transportation environment, estimation of forecast year traffic volumes under the No-Build and Build Alternatives, and the analysis of impacts of the light rail operations at intersections and railroad/highway at-grade crossings.

Generally, data required for the traffic and transportation analyses will be developed by the study team, or will be provided by either Triangle Transit, the Town of Chapel Hill, City of Durham, Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO), or the North Carolina Department of Transportation (NCDOT). Data from other agencies, if needed, is noted in the task descriptions. Triangle Transit will provide information on existing and planned transit services and performance. Existing conditions traffic data from the previous Alternatives Analysis (AA) study will be utilized for the base year analysis and future year volumes will be developed based on travel demand analysis completed by other members of the project teams. The analysis will include both regional travel demand data as well as specific transit route ridership forecasts. The base year for the analysis will be 2011 and the design year will be 2040 in order to be consistent with the DCHC MPO's *2040 Metropolitan Transportation Plan*.

The project team will use the Triangle Regional Travel Demand Model V5 (TRTDM) for this project. The model is based on the traditional four-step travel demand process of trip generation, trip distribution, mode split, and traffic assignment. Documentation for the model development and calibration process is maintained by NCDOT and the Institute for Transportation Research and Engineering (ITRE).



2. Existing Conditions

Following is a description of the elements that will be used to define existing transportation conditions, and the procedures to be used in developing that definition.

Calibrated base models will be constructed and validated using VisSim. The calibration and validation process is described below. For this study 2011 will serve as the base year for analysis.

2.1 Identification Of Simulation Areas

Specific segments of the D-O LRT corridor where the proposed LRT interacts with the roadway network will be analyzed. Along much of the D-O LRT corridor the track is not at grade or is routed in areas that are not near the roadway network. As such, there is no interaction between the proposed D-O LRT and the current or planned roadway network. The segments that are proposed for analysis are as follows:

- Mason Farm Road – East Drive to US 15-501
- NC 54 – Hamilton Road to Downing Creek including Prestwick Road and Meadowmont Lane (Alternative C-1)
- Leigh Village – Includes crossings of proposed Leigh Village as well as Ephesus Church Road and Farrington Road intersection if needed
- Patterson Place – McFarland Drive from Mt. Moriah Road to Witherspoon Boulevard as well as any crossing of Garrett Road
- South Square – Including University Drive from Snow Creek Trail to Shannon Road, Shannon Road from University Drive to US 15-501, and Tower Road from US 15-501 northbound ramps to Pickett Road
- Cornwallis Road – At Grade crossing near US 15/501 (as needed)
- Erwin Road – Cameron Drive to Anderson Street/15th Street, Fulton Street and Trent Drive, and Elba Street as needed
- Pettigrew Street – Erwin Road/9th Street to Sumter Street and Chapel Hill Street to Alston Avenue and proximate intersections as needed
- Peabody Street – Gregson Street to Duke Street

Maps of the proposed simulation areas and intersections are shown in Figures 1 and 2. The selection of the studied areas and intersection was based on the results from the AA. Potential changes to alignment and subsequently crossings may require revision and correction of the current selection.



2.2 Balanced Volume Data

For the traffic analysis portion of the D-O LRT Draft EIS we will employ the data collected as part of the AA phase of the project, including peak hour turning movements for all intersections identified. Traffic counts from 2008 or before will be increased based on the growth of background traffic to represent base year conditions. If significant changes in street configuration or roadway geometry have occurred since the count was taken then newer counts in these areas reflecting such changes will be collected and used for the traffic analysis.

Background growth will be based on data from the NCDOT traffic volume maps (<http://www.ncdot.gov/travel/statemapping/trafficvolumemaps/>). After developing the raw peak hour turning volumes for the base year, the volumes will be balanced across the networks. Sink and source nodes will be added where necessary to account for mid-block changes in traffic volumes due to major origins or destinations. Input data for the loading points will be developed based on the balanced volumes.

2.3 Model Development

For the development of the base model in VisSim, the following will be completed:

- Develop base data including acceleration, speed distributions, vehicle classes, vehicle distributions, and link behavior types
- Develop link geometric data
- Input traffic demand data based on outcome of previous step
- Input origin-destination routing
- Input traffic control data at intersections, including signal timings
- Input traffic operations and management data for links
- Input driver behavior data
- Set simulation run control
- Code network outputs

Data Needs:

Signal Plans from Chapel Hill, Durham, and NCDOT

2.4 Pedestrian And Bicycle Volumes

Where necessary, pedestrian and bicycle data will be collected and utilized in the model stream. To guide this effort, *Effects of Pedestrians on Capacity of Signalized Intersections* by Milazzo et al published in Transportation Research Record 1646 was reviewed. This article serves as the basis for determining the impact of pedestrians on saturation flow rates at signalized intersections as described in chapter 31 of the *2010 Highway Capacity Manual* published by the Transportation Research Board. In that review it was found that pedestrian conflicts reduce saturation flow in a linear manner from 0 to 1000 conflicting pedestrians per hour of green time. The reduction in saturation flow at 1000 conflicting pedestrians per hour of green time is 50%. A threshold of 20% reduction in saturation flow rate will be utilized for this analysis based on the previously referenced items. This 20% reduction



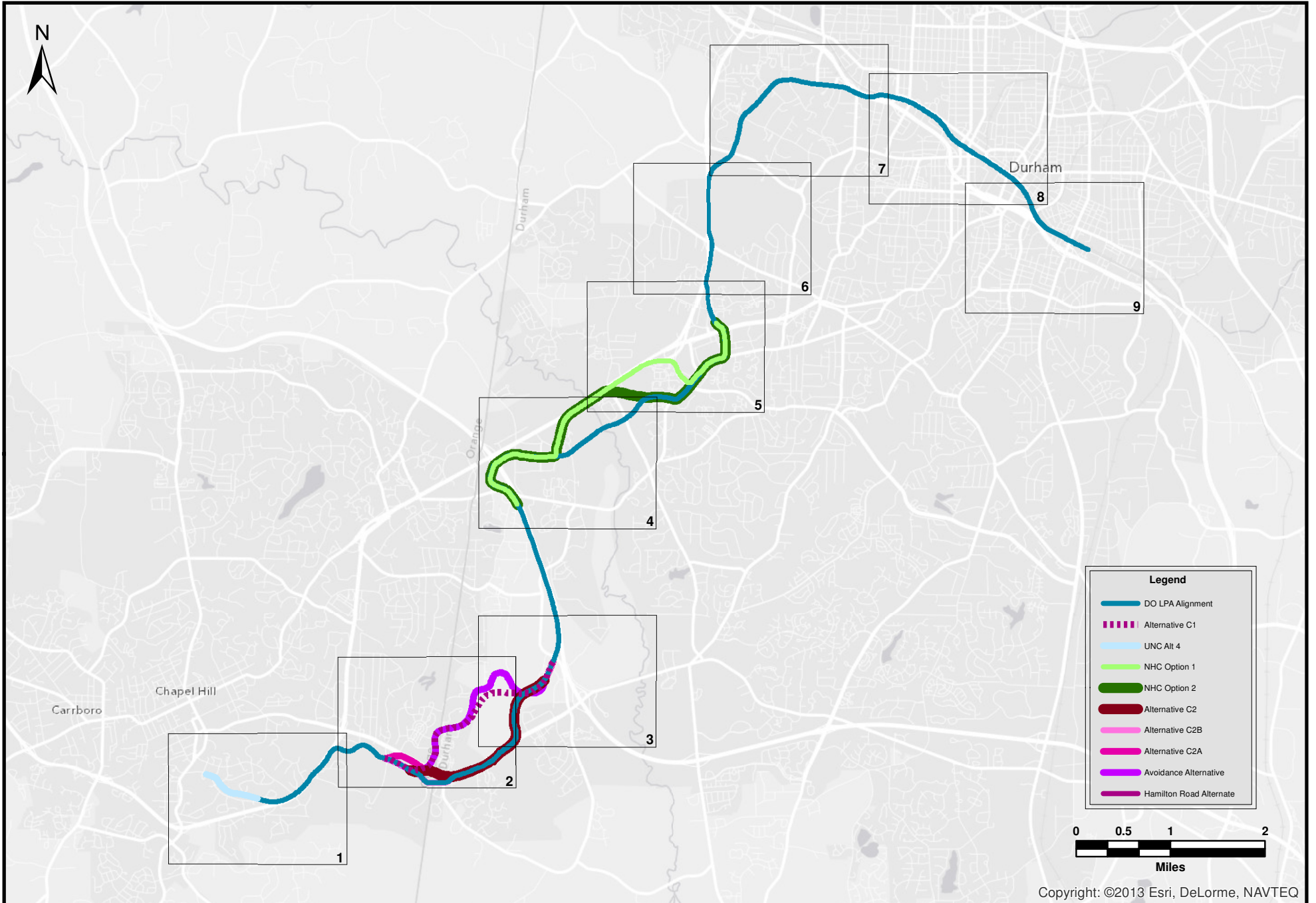
threshold corresponds to 400 conflicting pedestrians per hour of green time. If a conservative assumption is made that turning movements are provided green time equal to 25% of the cycle length, then we can interpolate that for a 20% reduction in turning movement saturation flow rate there must be at least 100 conflicting pedestrians for that particular movement in the peak hour. As such, we are proposing to include only pedestrian movements in the simulation where pedestrian volumes are greater than 100 conflicting pedestrians in the peak hour. To reach that threshold either the volume of conflicting pedestrians on a single crosswalk must be greater than 100 pedestrians in the peak hour or the combined volume of conflicting pedestrians of two adjacent crosswalks must be greater than 100 pedestrians in the peak hour.

A partial field review was conducted to determine locations where pedestrian and bicycle volumes were above the 100 pedestrians per hour threshold. Initial review of the proposed areas revealed that the intersection of Erwin Road and Fulton Street meets this threshold in the base year. Additional examination will be conducted later.

2.5 Calibration Of Model

Once the model is created and visually validated, model data will be extracted to ensure that the model is accurately representing base year conditions. The model will be pre-loaded for 15 minutes with volumes that are 75% of those anticipated for the peak hour. Model outputs will be compared to INRIX traffic data from the base year to ensure relatively similar travel times. The models will be considered calibrated when the travel speeds are within 5 mph of the data obtained from INRIX. That said, reasonable efforts will be made to reduce the difference between model travel time speeds and INRIX data to be within 2.5 mph. Given that INRIX data is aggregated over a period of time and that the model run is for one specific day it may not be possible to achieve the narrower band for the purposes of calibration. The model will be run for a sufficient number of iterations to ensure calibration based on Federal Highway Administration (FHWA) guidelines. The number of iterations necessary to achieve calibration for each corridor will be recorded and future year models will be run utilizing the same number of iterations. Models will be run using static trip assignment.

Figure 1 - Project Overview

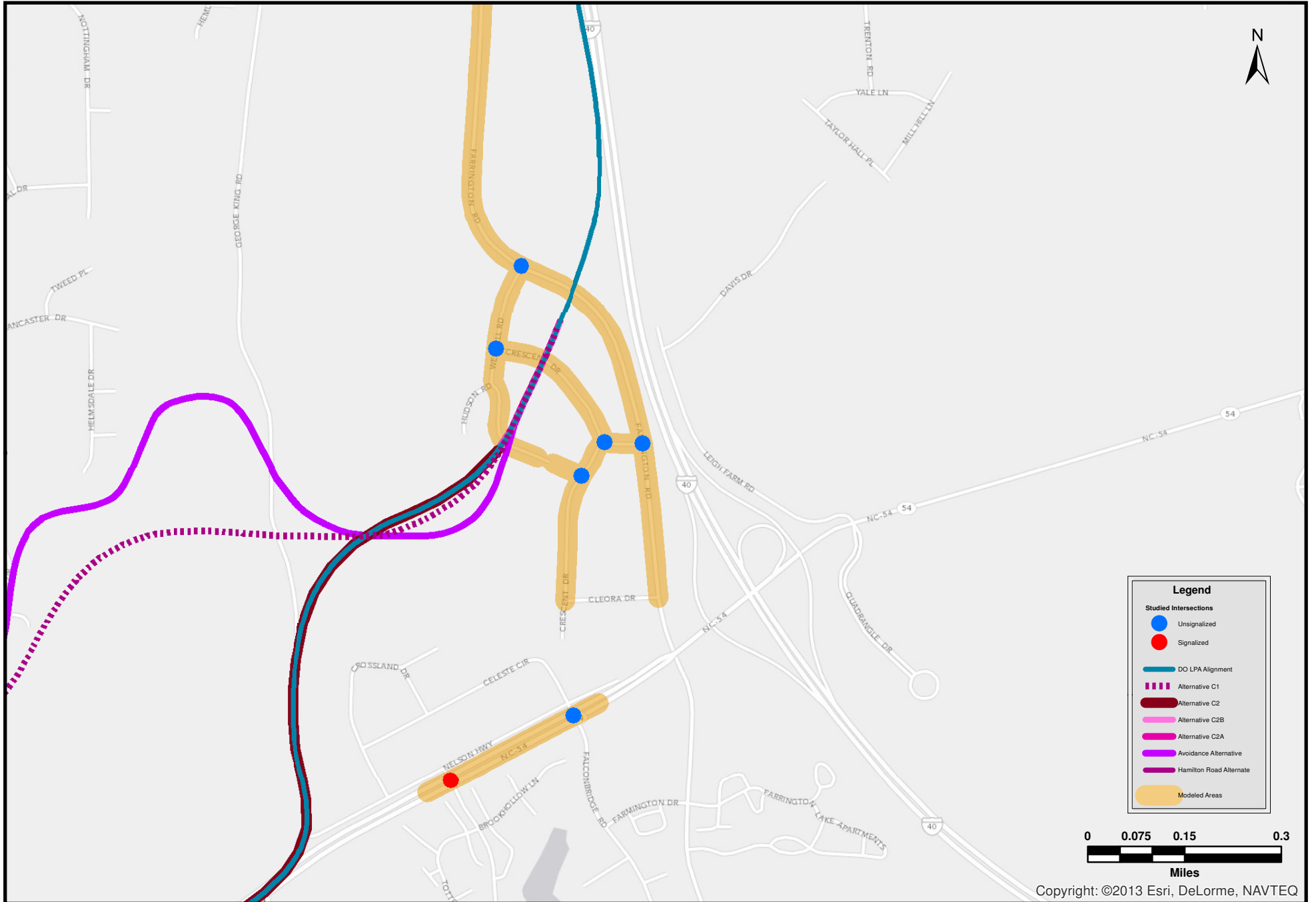


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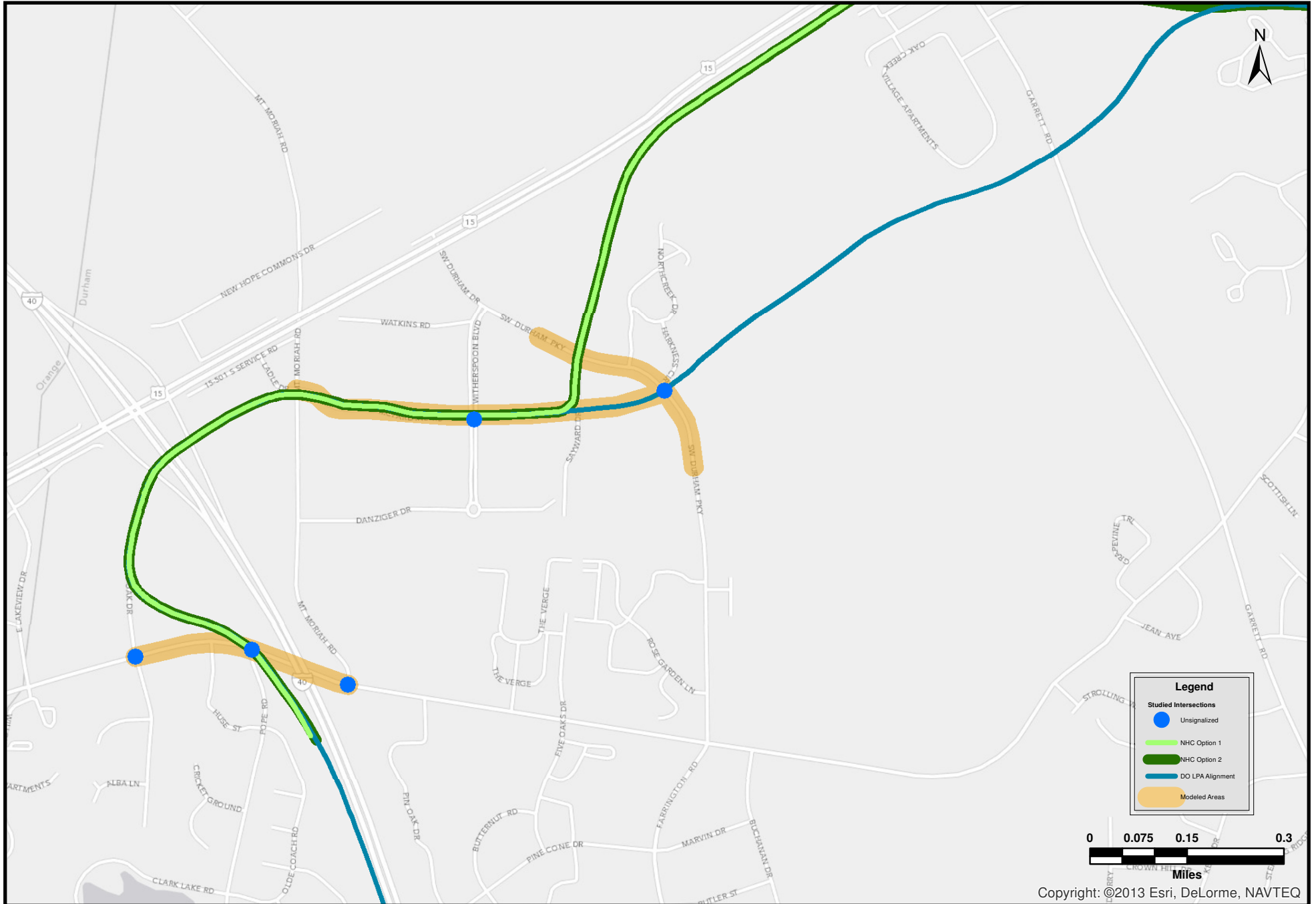


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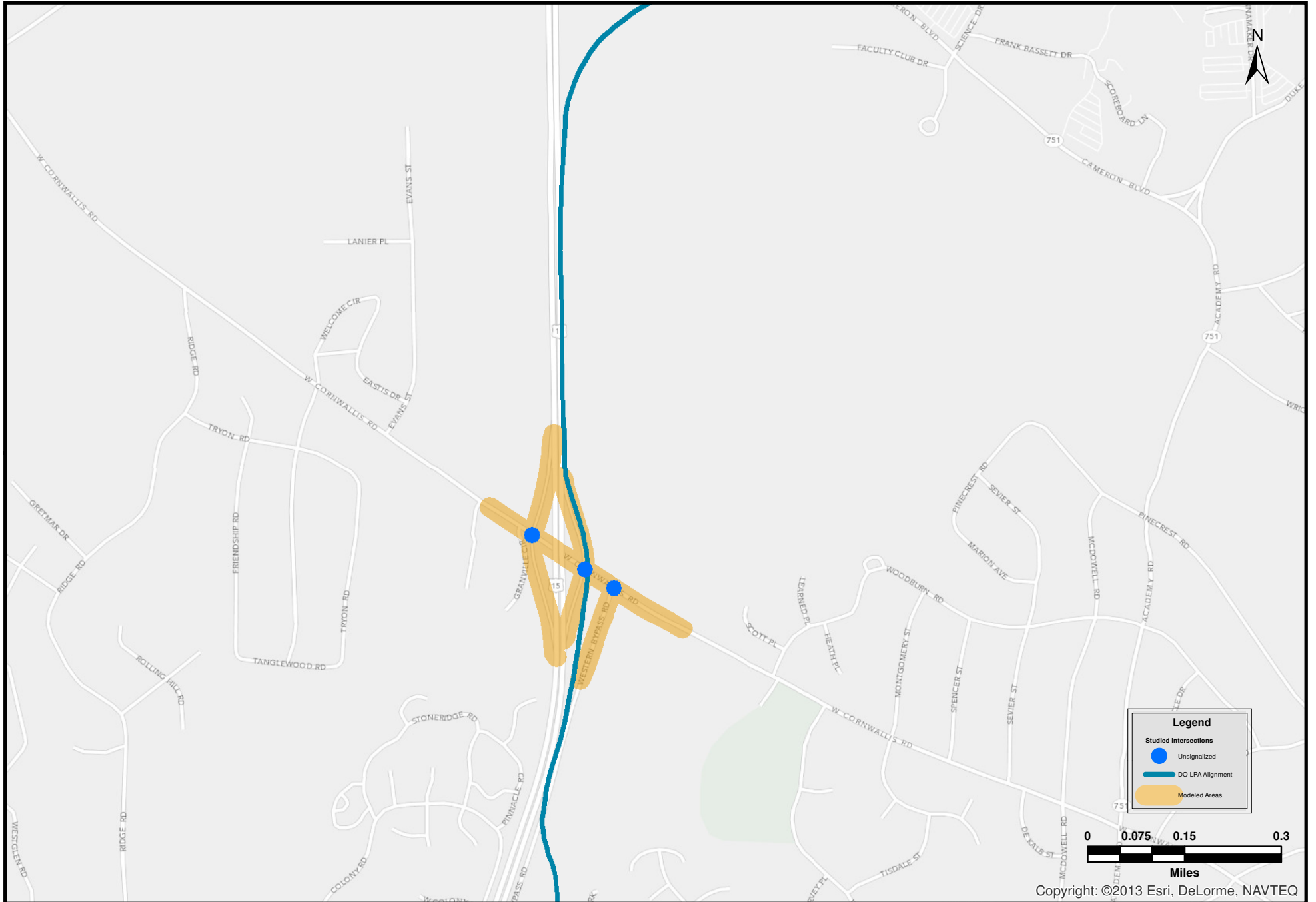
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Figure 2, Sheet 7 of 9

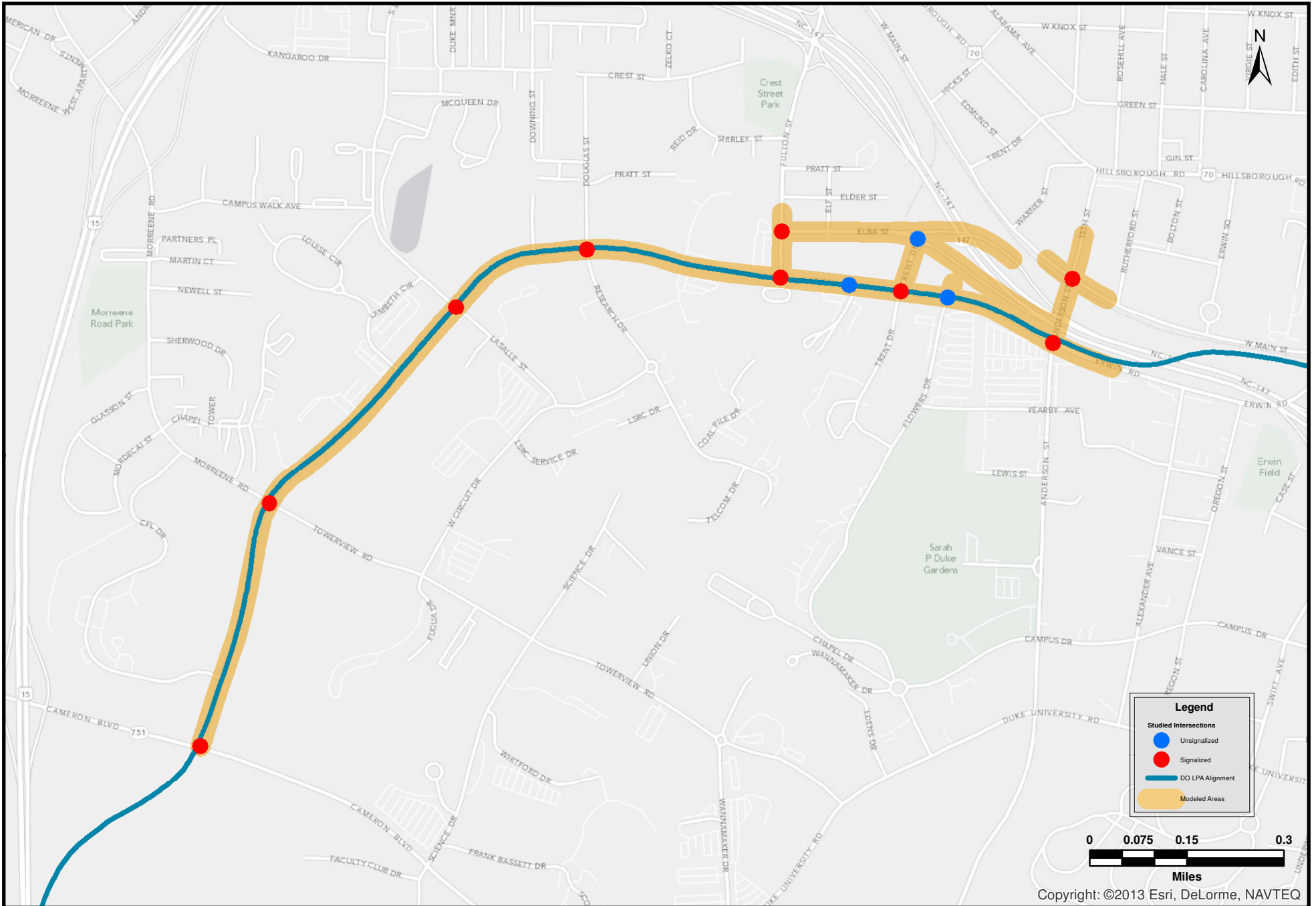


Figure 2, Sheet 8 of 9

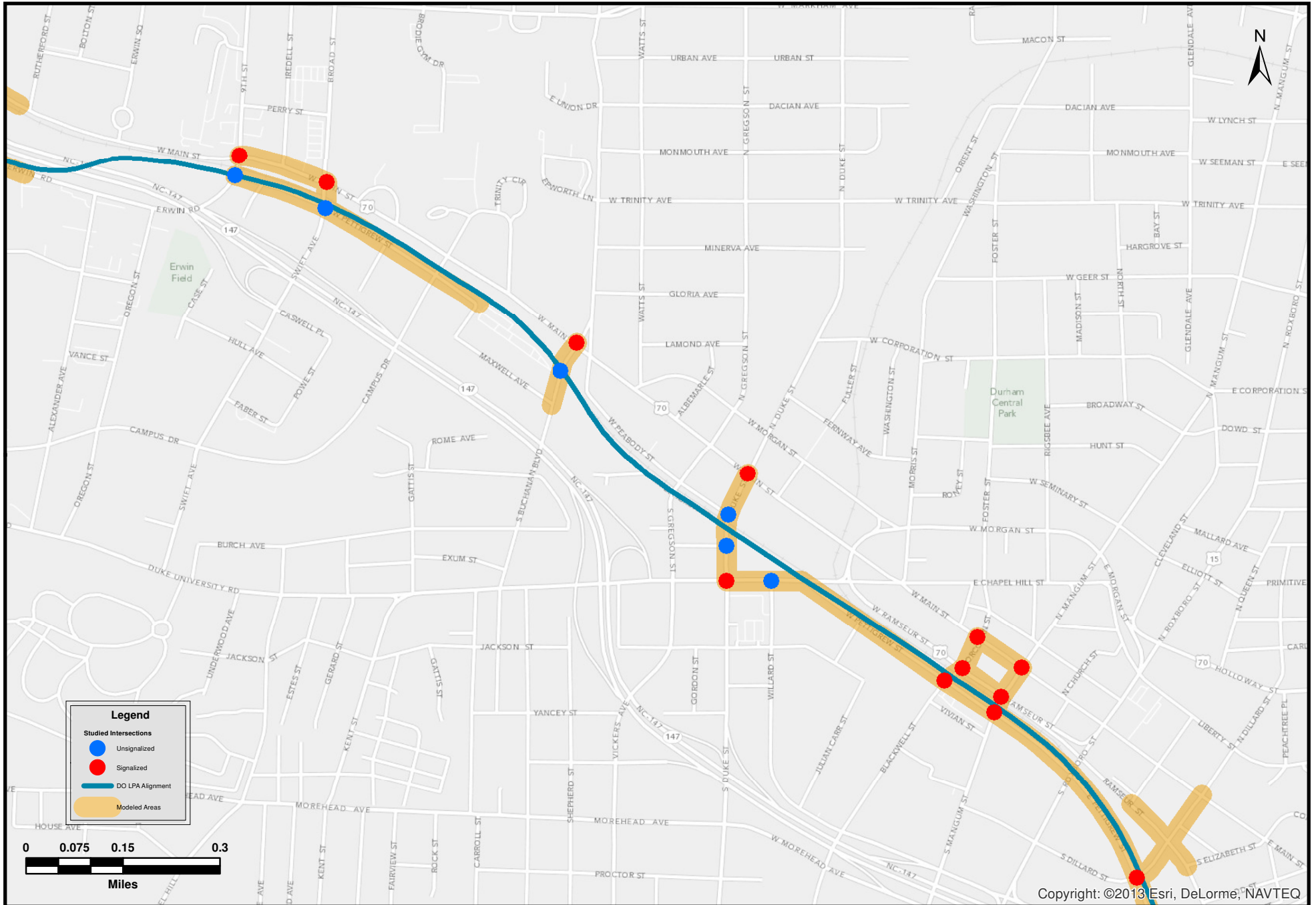
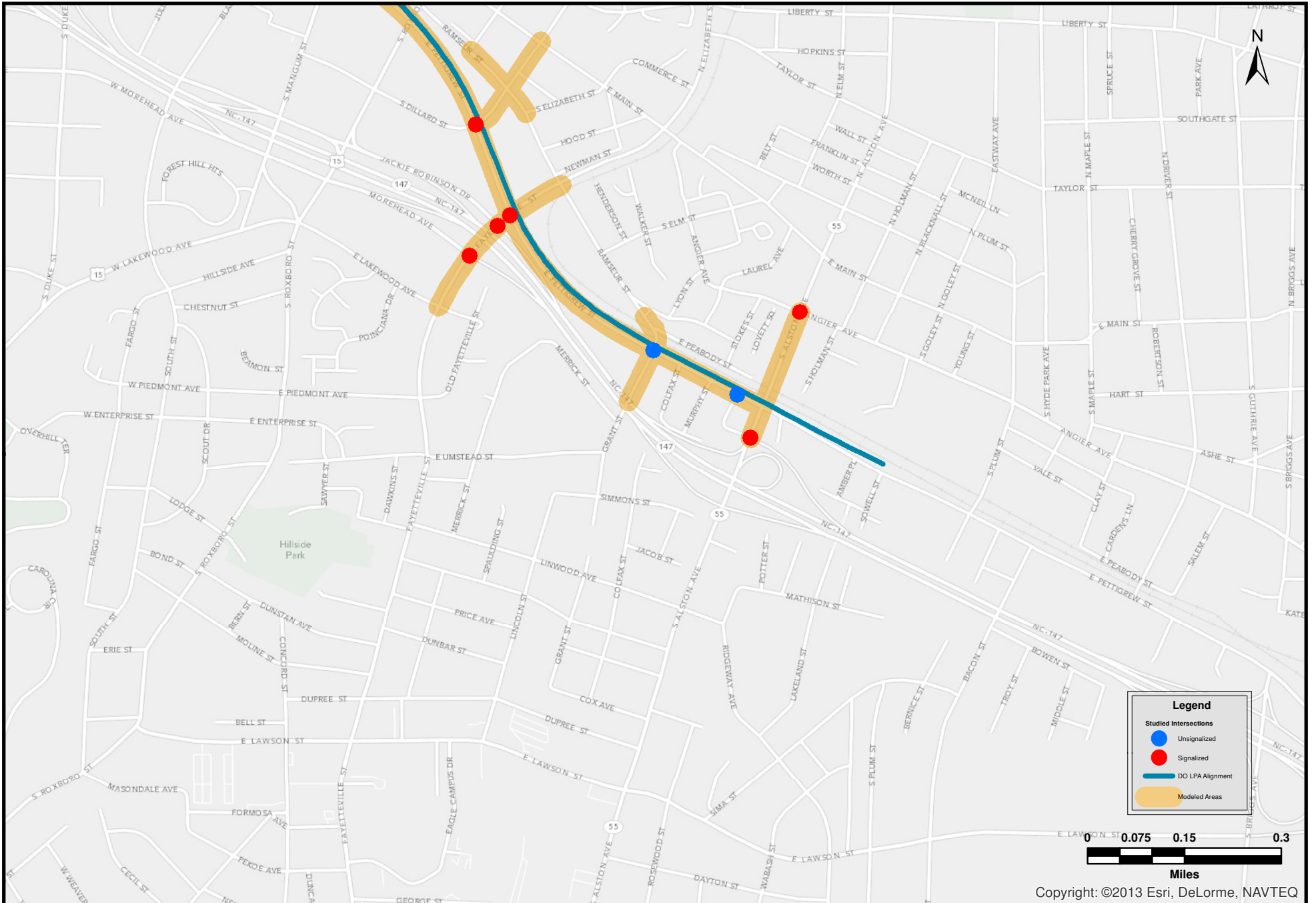


Figure 2, Sheet 9 of 9





3. Future Year No-Build/TSM Model

The No-Build and TSM alternatives are being combined as the traffic volumes are expected to be roughly similar. A future year No-Build/TSM model will be developed for each of the areas identified in section 2.1. These models will examine future conditions that could occur if the D-O LRT line were not constructed. As part of this analysis some projected deficiencies of the roadway network could be discovered. This analysis will not aim to categorize those deficiencies or to develop mitigation strategies. This analysis will be limited to determining likely future year conditions.

3.1 Develop Future Year No-Build/Tsm Volume Data

The balanced volumes developed for the base year analysis will be employed as the starting point for developing the future year No-Build/TSM volume data. Based on the balanced base-year peak-hour turning-movement, data link volumes will be generated for both the AM and PM peak hours. Data from the TRTDM will be used to obtain an appropriate growth factor for every link and this growth factor will be applied to base year link volumes to forecast future year No-Build/TSM peak-hour link volumes for the AM and PM peak hours. Data utilized for this will include daily volume growth, daily percentage growth, peak hour volume growth, and peak hour percentage growth. It will be critical to examine the peak hour data as well as the daily volume data as some peak spreading is likely to occur along the D-O LRT corridor given the developed nature of the corridor and the limited right-of-way available for additional roadway expansion. Engineering judgment will be employed to ensure that appropriate growth rates are extracted from the model.

Growth rates and projected link volumes will be reviewed in light of planned improvements in the area including projected development and changes to parking and transit operations. The model will be reviewed to determine which changes may have already been included within the socio-economic assumptions in the TRTDM. Forecasted link volumes will then be adjusted as necessary to reflect known changes that were not captured in the TRTDM.

Peak-hour turning volumes will be forecasted based on the peak-hour link volumes. Using the *TurnsW32* program (<http://www.kittelsohn.com/toolbox/turnsw32>) and the future year peak-hour link volumes and the base-year turning movements as input data, future year turning movements will be generated. These volumes will then be balanced in a manner similar to that used in the base year, although this process is likely to be less intensive.

Lastly, the sink and source nodes developed for the base year will be revisited. Based on existing development, planned development, and, to a lesser extent, sink and source nodes for the future year, a No-Build/TSM scenario will be developed.

3.2 Pedestrian And Bicycle Volumes

Local pedestrian and bicycle plans will be examined and proposed improvements that intersect the corridor will be noted. Qualitative estimates of the extent to which pedestrian and bicycle traffic will interact with the roadway network will be developed based on base year conditions and proposed developments. For this analysis cyclists will be assumed to cross at crosswalks and will not be included in the vehicular flow. At those locations where pedestrian and bicycle traffic is expected to be above the 100 conflicting pedestrians per hour data will be developed and added to the model. The intersection Erwin Road and Fulton Street will include pedestrian or bicycle flow data in keeping with the base year calibration process. Additional intersections, particularly in downtown Durham or near either of the major college campuses, may also include pedestrian data in the future year No-Build/TSM analysis.

3.3 Future Year No-Build/Tsm Model Development

The base year model will be updated based on expected improvements to the roadway network. For this process the State Transportation Improvement Plan (STIP), the Metropolitan Transportation Improvement Plan (MTIP), various Capitol Improvement Plans (CIP), and bond packages will be reviewed to ensure that anticipated improvements are included in the future year model network. Unsignalized intersections will be given a cursory examination to determine if signalization is appropriate for future year conditions based on the volumes developed in the previous steps.

Signal timings will be updated using either Synchro or Vistro and the projected volumes and geometries. These new timings will be added to the model. Regardless of the development of pedestrian and bicycle data from the previous step all signals will be optimized to allow for safe pedestrian crossings.

Lastly routing information will be updated as needed to reflect changes in the roadway network based on proposed changes.

3.4 Model Simulation And Output Extraction

Upon developing the future year No-Build/TSM model, the model will run for the number of iterations necessary to achieve base year calibration. Models will be run using static trip assignments. The following data will be extracted and analyzed:

- Intersection Level of Service (LOS)
- Queuing
- Control delay
- Travel time
- Travel speeds
- Network delay (total and average per vehicle)



3.5 Comparison To Synchro

The Synchro analysis completed in the Alternative Analysis phase will be updated with new traffic volumes. The data from Synchro will be compared to the VisSim output. Differences will be noted and explained.



4. Future Year Build Models

A future year Build model will be developed for each of the areas identified in section 2.1. As noted in section 3.0 this analysis may reveal potential deficiencies in the future year roadway network. Only those areas negatively impacted above a certain threshold will be identified as part of this analysis. Areas anticipated to be deficient regardless of construction of the D-O LRT will not be identified nor will any potential mitigation strategy be developed.

4.1 Develop Future Year Build Volume Data

The balanced volumes developed for the future year No-Build/TSM analysis will be used as the starting point for developing the future year build volume data. Based on the balanced future-year No-Build/TSM turning-movement data, peak-hour link volumes will be generated for both the AM and PM peak hours. Data from the TRTDM will be used to obtain an appropriate diversion factor for every link for the AM and PM peak hours. Data utilized for this will include daily volume diversion, daily percentage diversion, peak hour volume diversion, and peak hour percentage diversion. It will be critical to examine the peak hour data as well as the daily data as some peak spreading is likely to occur along the D-O LRT corridor given the developed nature of the corridor and the limited right-of-way available for additional roadway expansion. Engineering judgment will be employed to ensure that appropriate growth rates are extracted from the model. A check will also be done between the Build and No-Build/TSM volume data to see if patterns suggested by the TRTDM are reflected in the volume data.

Growth rates and projected link volumes will be reviewed in light of planned improvements in the area including projected development and changes to parking and transit operations. The model will be reviewed to determine which changes may have already been included within the socio-economic assumptions in the TRTDM. Forecasted link volumes will then be adjusted as necessary to reflect known changes that were not captured in the TRTDM.

Peak-hour turning volumes will be forecast based on the peak-hour link volumes. Using the *TurnsW32* program (<http://www.kittelsohn.com/toolbox/turnsw32>) and the future year peak hour link volumes and the base year turning movements as input data future year turning movements will be generated. These volumes will then be balanced in a manner similar to that used in the base year, although this process is likely to be less intensive.

Lastly, the sink and source nodes developed for the base year will be revisited. Based on existing development, planned development, and, to a lesser extent, sink and source nodes for the future year, a Build scenario will be developed.



4.2 Pedestrian And Bicycle Volumes

In addition to data collected in section 3.2, station area data and ridership information will be examined to determine which areas may need to include pedestrian and bicycle flows in the analysis. The increase in pedestrian traffic due to the proposed D-O LRT will be above and beyond any increase due to future year land use. Qualitative estimates of pedestrian and bicycle flows will be developed based on base year conditions and proposed developments. In keeping with the future year No-Build/TSM analysis cyclists will be assumed to cross at crosswalks and will not be included in the vehicular flow. At those locations where pedestrians and bicycles are expected to be above the 100 conflicting pedestrians in the peak hour, data will be developed and added to the model.

4.3 Future Year Build Model Development

The future year Build model will be updated based on the proposed D-O LRT. Unsignalized intersections will be given a cursory examination to determine if signalization is appropriate for future year conditions based on the volumes developed in the previous steps.

Prior to signal optimization the project team will meet with local officials to discuss preferred interactions between the LRT and nearby signals. This will include discussions of both transit signal priority (TSP) and pre-emption. An interaction strategy for each individual signal will be identified.

Signal timings will be updated utilizing either Synchro or Vistro and the projected volumes and geometries and interaction strategy. These new timings will be added to the model. Regardless of the development of pedestrian and bicycle data from the previous step all signals will be optimized to allow for safe pedestrian crossings.

Lastly routing information will be updated as needed to reflect changes in the roadway network based on proposed changes.

4.4 Model Simulation And Output Extraction

Upon developing the future year Build model, the model will run for the number of iteration necessary to achieve base year calibration. Models will be run utilizing static trip assignment. The following data will be extracted and analyzed:

- Intersection LOS
- Queuing
- Control delay
- Travel time
- Travel speeds
- Network delay (total and average per vehicle)



4.5 Identify D-O LRT Impacts

Future year build output will be compared to future year no-build data. Those intersections that are expected to increase delay above a certain threshold will be identified. For the purposes of this study NCDOT's Policy on Street and Driveway, Chapter 5, Section J will be used to identify intersections on facilities owned by NCDOT and in the Town of Chapel Hill. The *Durham Comprehensive Plan Policy 8.1.2a, Traffic Level of Service (LOS) Standards* from the City of Durham will be applied to identify intersections on facilities owned by the City of Durham. Mitigation strategies to address the degradation in LOS and control delay will be developed for those identified intersections in the next phase of the project.



5. Friday Center Drive and Barbee Chapel Road Grade Separation Analysis

A grade separation analysis will be conducted to determine the benefit of grade separating the LRT crossings at Friday Center Drive and Barbee Chapel Road, both near NC 54. These locations were determined based on an analysis completed during the AA portion of the project and due to recent adjustments to the proposed D-O LRT alignment. The AA included a high level review of grade-separated and at-grade crossings and made definitive recommendations for the other crossings. The analysis for the Friday Center Drive and Barbee Chapel Road crossings could not be completed during the AA phase because of the more limited data available in this phase. This analysis will include altering the future year build network in the area to include a grade separated LRT crossing at Friday Center Drive. The model will then be re-run and new data will be extracted. The new model run data will be compared to the previous future year build data to determine the benefits of grade separating at this crossing. If necessary the analysis will review both alternative C1 and C2 to determine the benefits of grade separation.



6. Mitigation Plan

As noted above, a list of intersections expected to experience an increase in control above given thresholds will be developed. To reduce the impact of the D-O LRT, mitigation strategies will be identified for these locations. Such strategies could include additional turn lanes, improvements to alternative paths, alterations to travel patterns reducing delay, and improvements that do not add capacity such as improved wayfinding. These strategies will be tested utilizing VisSim to the extent possible. The modeled networks will be altered to include the roadway improvements or, in the case of strategies that alter travel patterns, the routing and volume data will be adjusted to reflect those new paths. The effectiveness of the strategies will be determined based on model results.

While the sections simulated are generally corridors, it is possible that some mitigation strategies may include the creation or improvement of alternative paths. Such an improvement may require the use of dynamic traffic assignment. A previously proposed mitigation strategy that would create an alternative path is the conversion of the Trent Drive and Elba Street intersection from the current configuration to a roundabout. Currently traffic on northbound Trent Drive cannot continue to westbound Elba Street. The conversion of this intersection to a roundabout would allow traffic on northbound Trent Drive to continue to westbound Elba Street. This conversion would provide an alternative path to the right-turning traffic from westbound Erwin Road to northbound Fulton Street, thus allowing this stream of traffic the opportunity to bypass the Erwin Road and Fulton Street intersection.

For this potential improvement, as well as similar improvements that create alternative paths, we are proposing to continue the use of static traffic assignment. Routing decisions will be updated such that traffic will be diverted to the new route and the model will be re-run and data on travel times extracted. The congested travel time of the new path will be compared to the existing path for the runs with the shifted traffic. If the travel time for the new path is still less than that for the existing path then no additional analysis will be required. In a case like this dynamic traffic assignment would shift all traffic to the new path as it is the shortest path. If the travel time for the new path is greater than the travel time for the existing path then dynamic traffic assignment will be used to provide the appropriate balance between traffic that will use the new path and traffic that will use the existing path. It is under this, and only this, condition that dynamic traffic assignment would be employed.



Erwin Road Traffic Simulation Report

Appendix B:

Basis for Engineering Plans

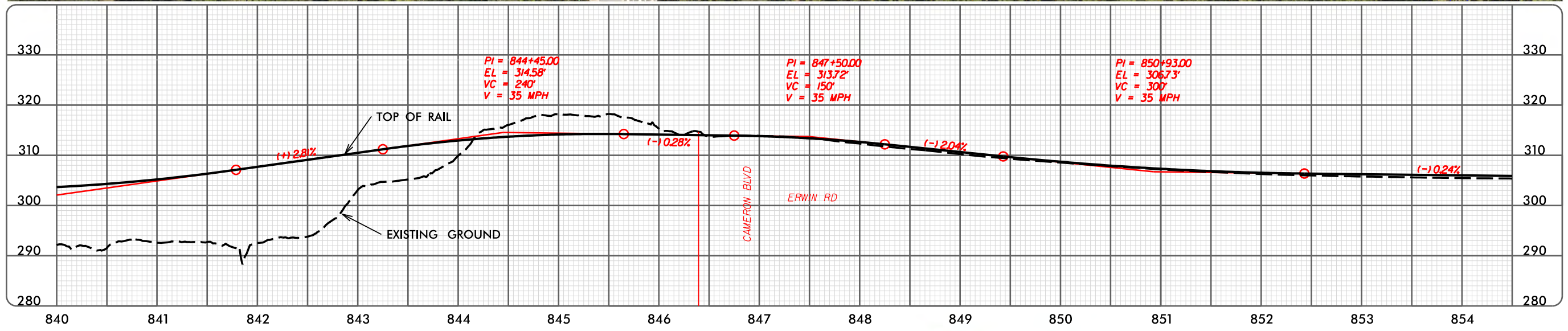
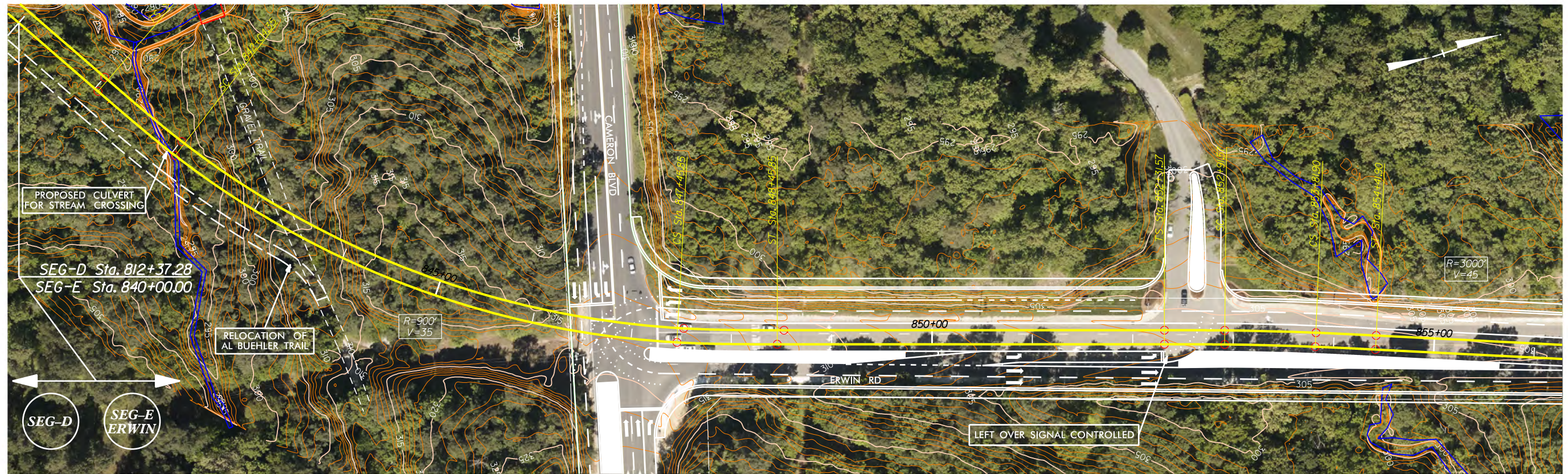
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SEGMENT E – ERWIN ROAD

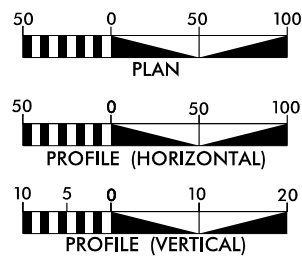
PLAN AND PROFILE SHEETS



ERWIN ROAD



GRAPHIC SCALES



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SEGMENT E

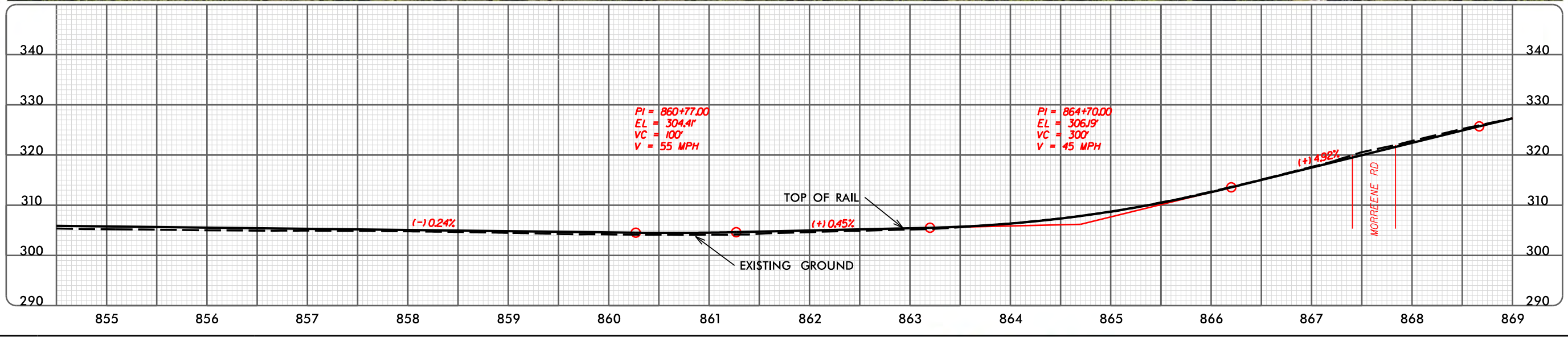
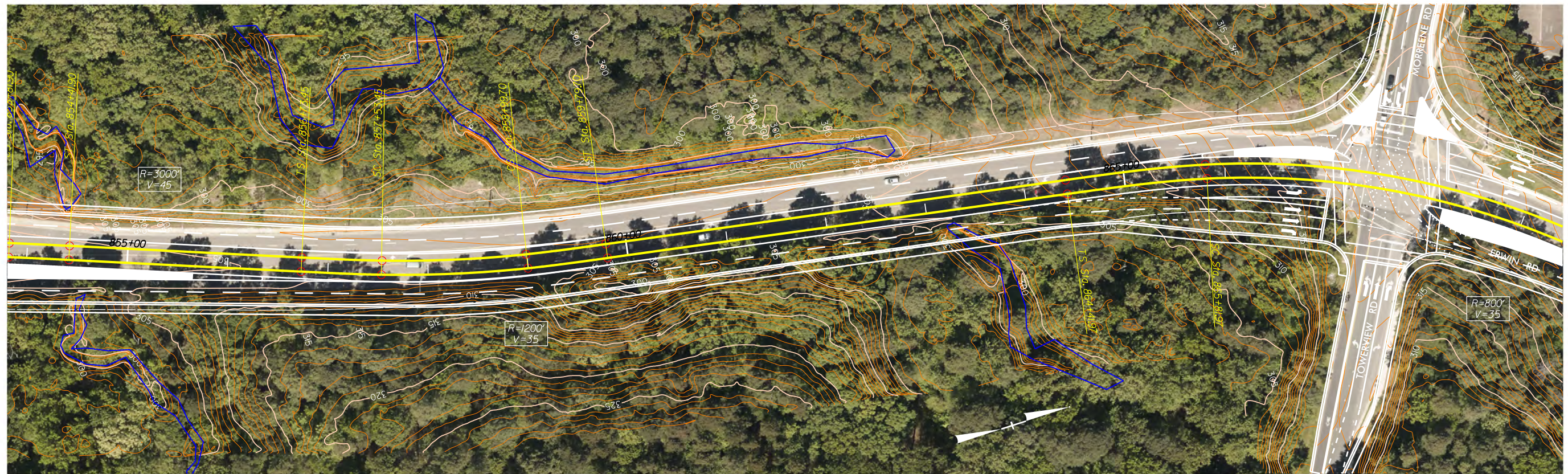
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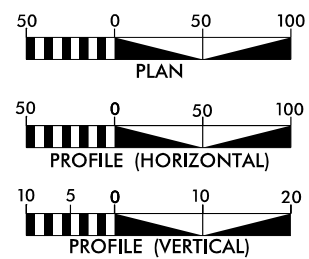
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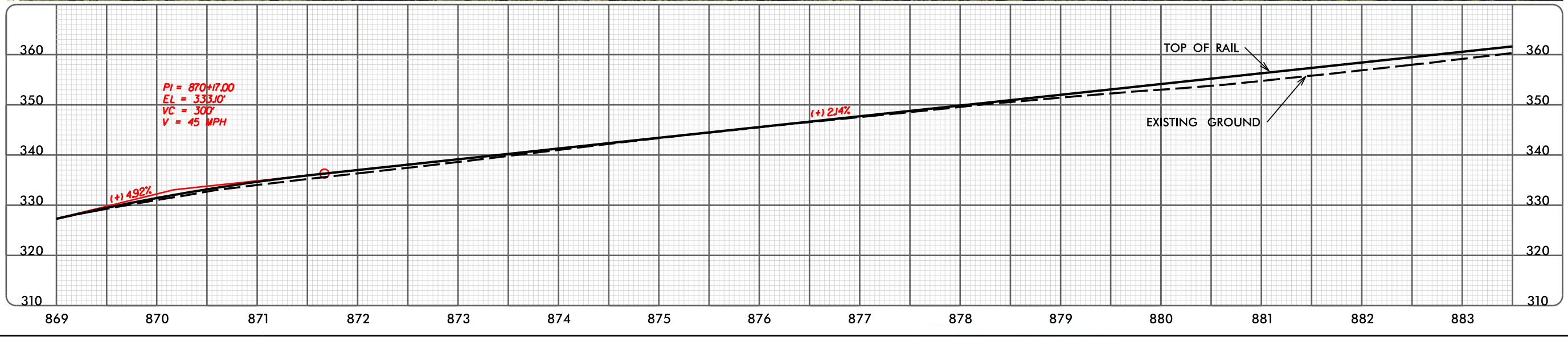
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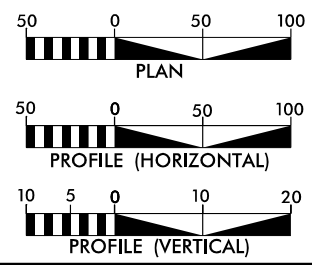
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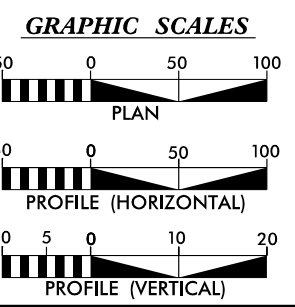
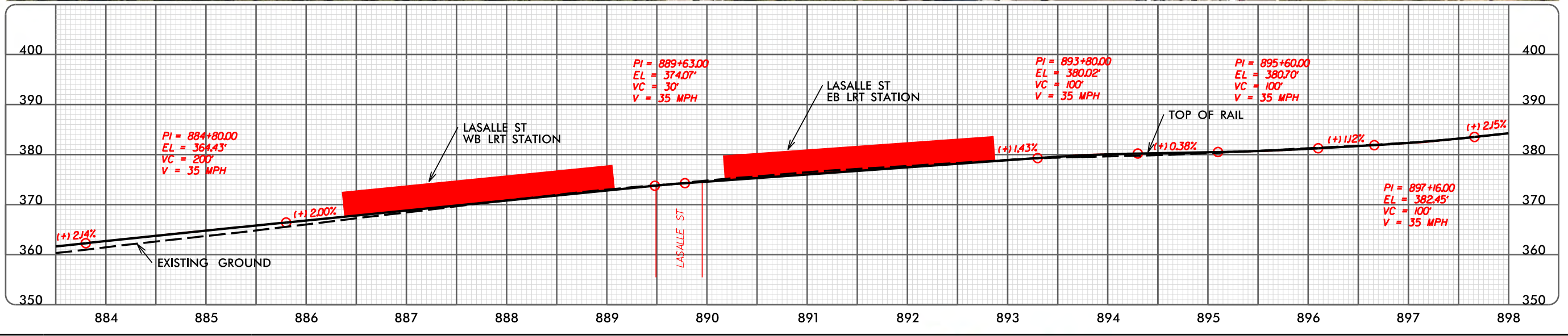
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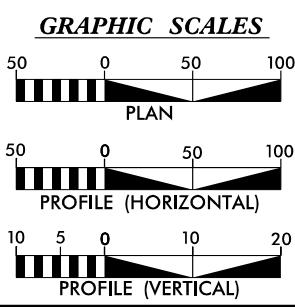
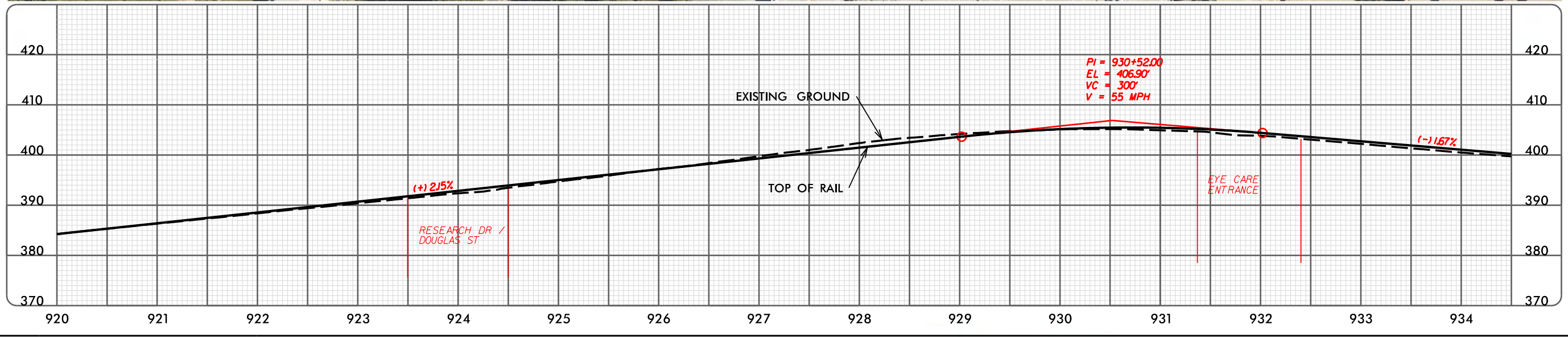
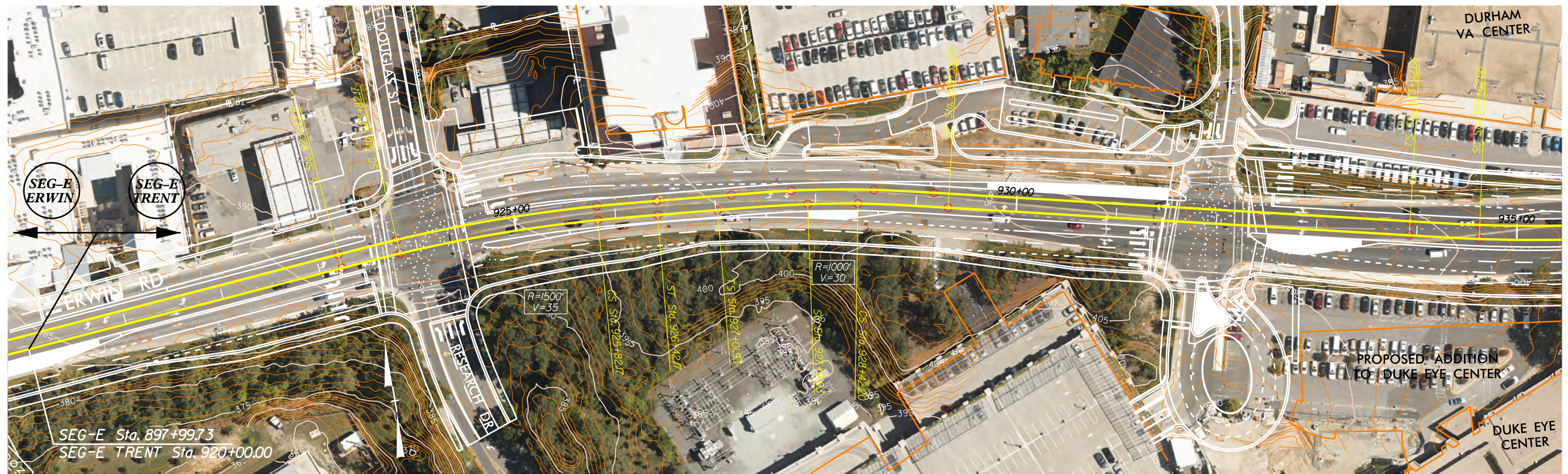
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SEGMENT E – TRENT/FLOWERS DRIVE ALTERNATIVE

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— (cyan)	ELEVATED TRK
— (blue)	WETLANDS
— (red)	STATION

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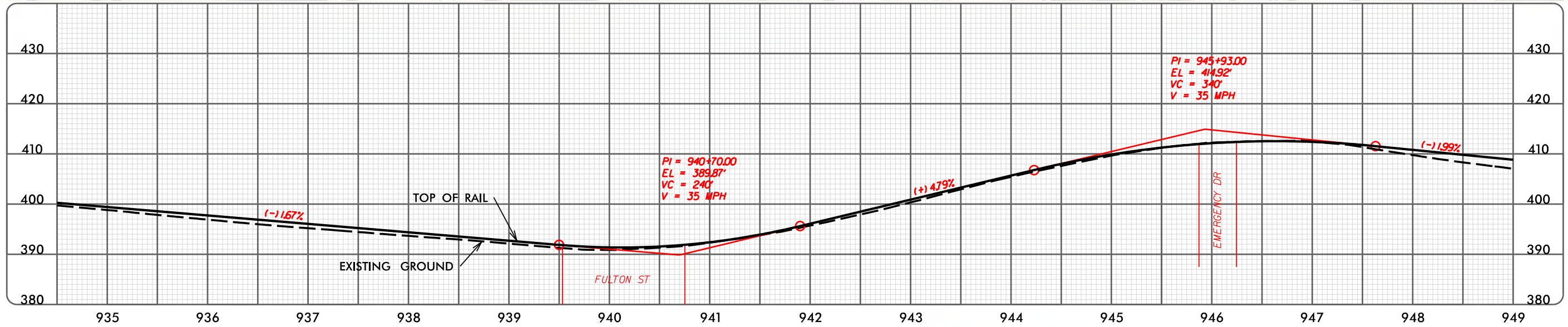
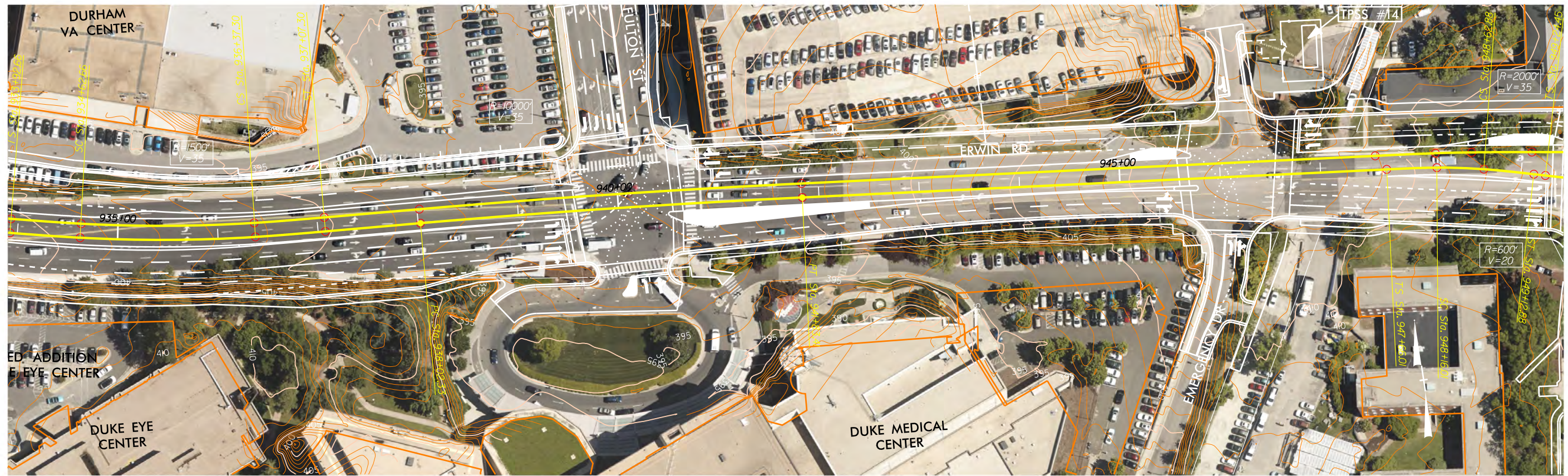
SEGMENT E

PLAN & PROFILE

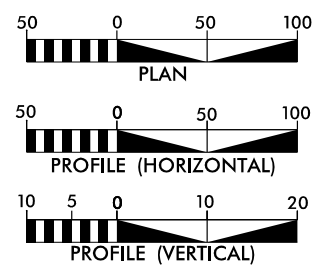
SHEET:
E - 05

4/8/2015

ERWIN ROAD - TRENT /FLOWERS DRIVE ALTERNATIVE



GRAPHIC SCALES



CONCEPT PLANS ONLY
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INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

LEGEND

- BRIDGE PIERS
- AT-GRADE TRK
- ELEVATED TRK
- WETLANDS
- STATION



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Morrisville, North Carolina 27560
Phone (919)461-1100 Fax (919)461-1415
NC Lic.# C-2243



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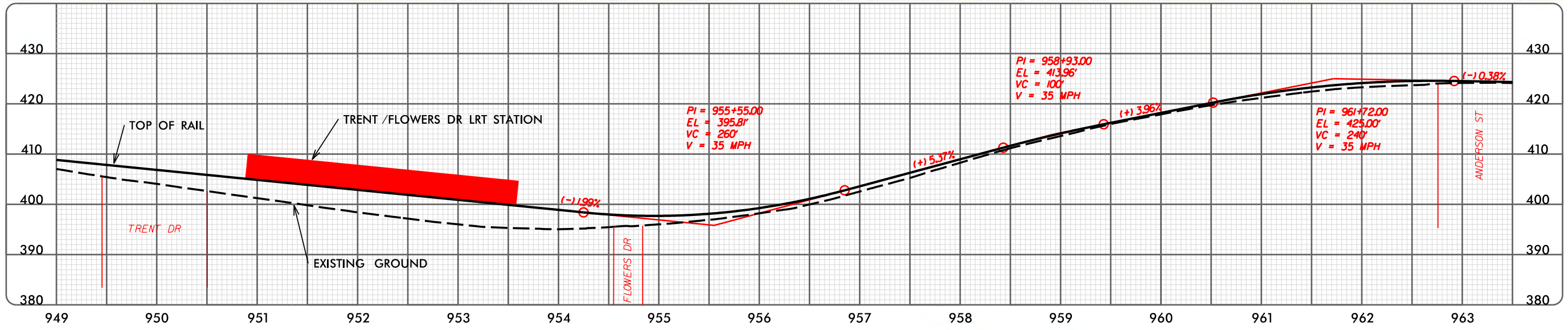
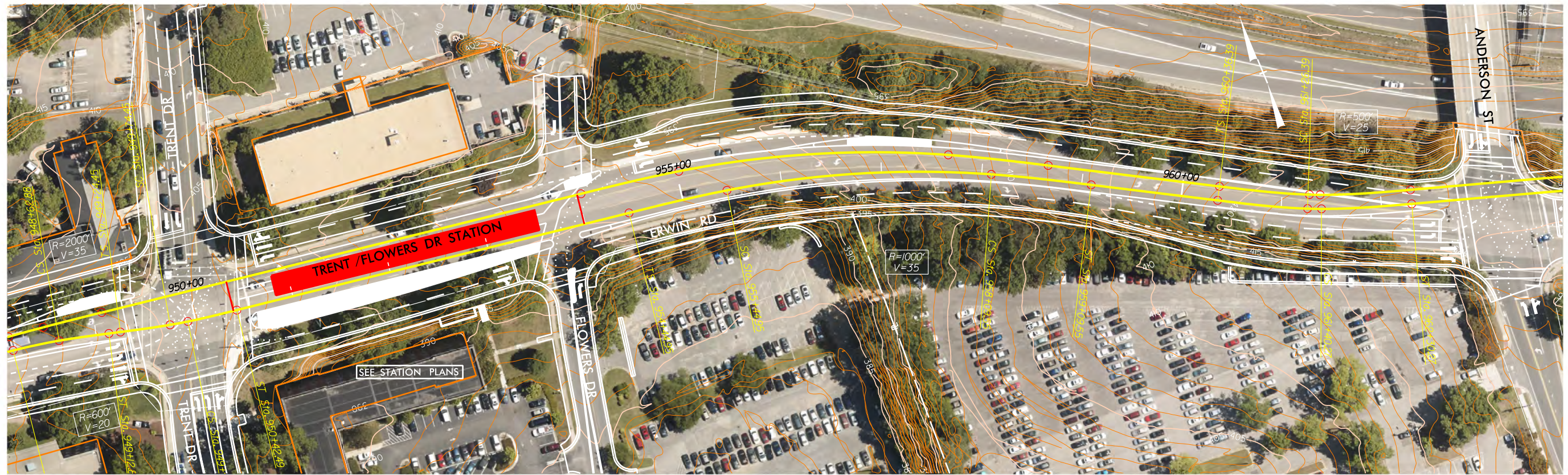
PLAN AND PROFILE

SEGMENT E

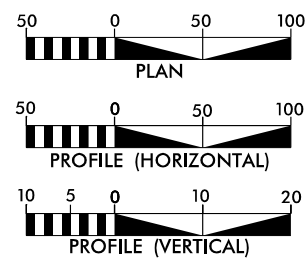
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PROFILE

SHEET:
E - 06

TRENT / FLOWERS STATION - TRENT / FLOWERS DRIVE ALTERNATIVE



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PLAN AND PROFILE

SEGMENT E

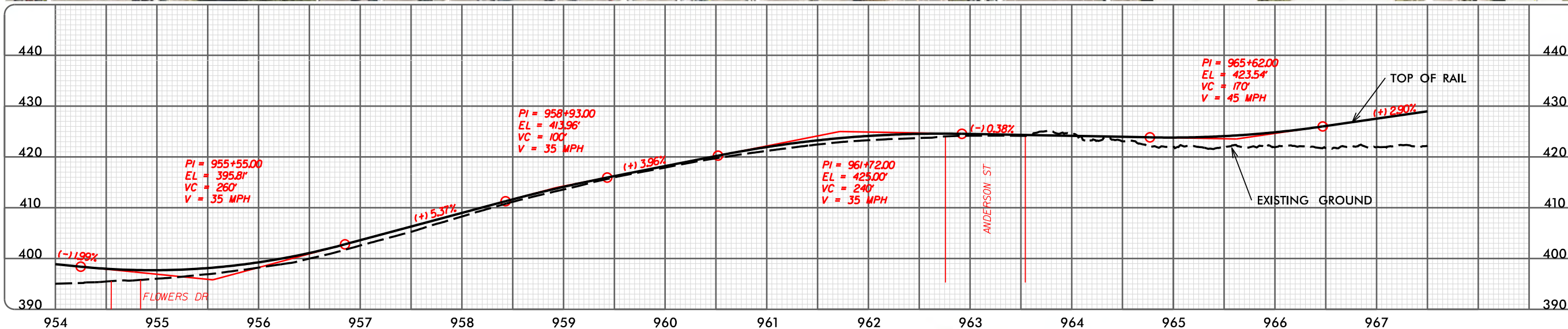
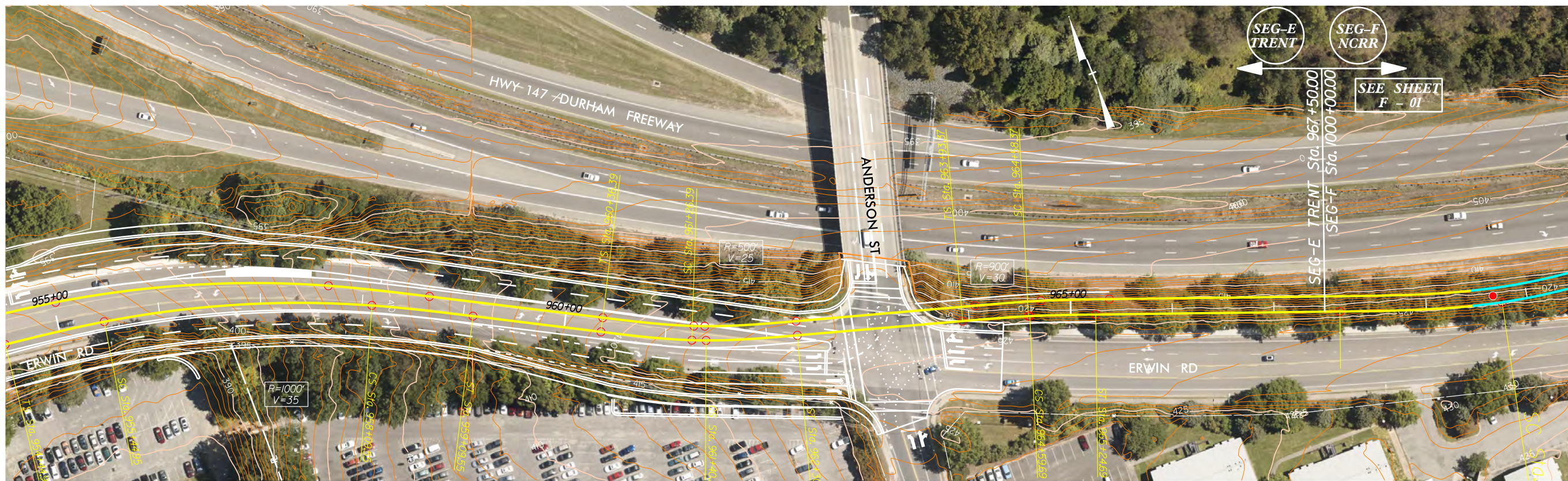
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PROFILE

SHEET:

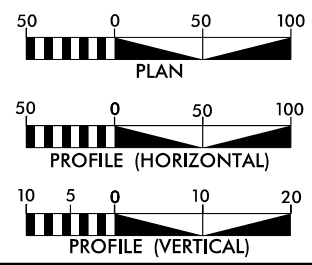
E - 07

4/8/2015

ERWIN ROAD - TRENT /FLOWERS DRIVE ALTERNATIVE



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PLAN AND PROFILE

SEGMENT E

PLAN &
PROFILE

SHEET:
E - 08

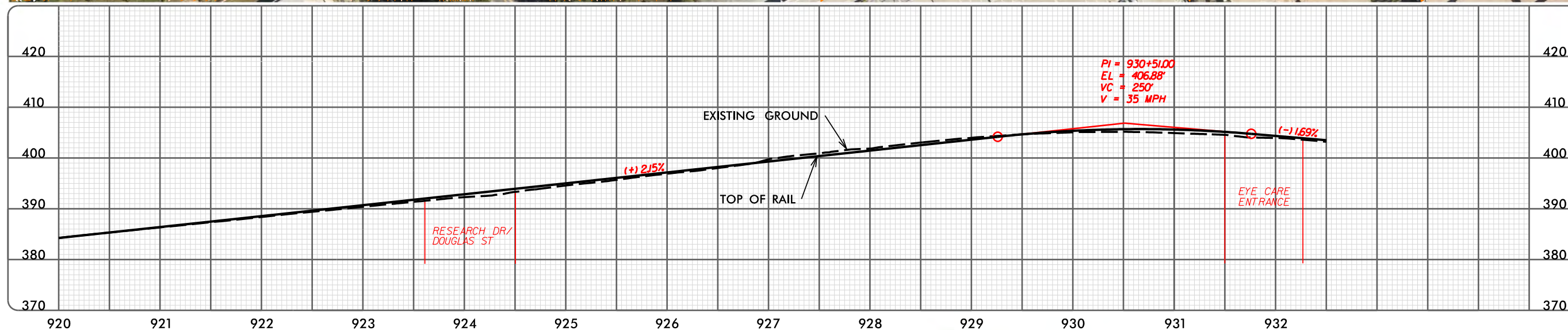
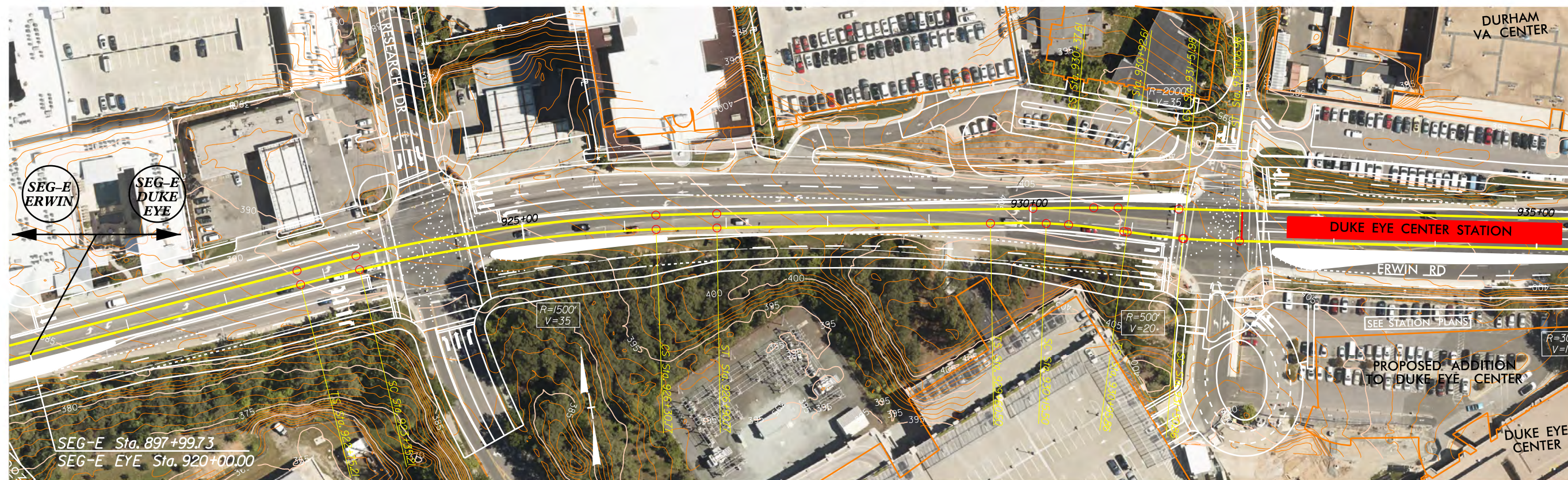
4/8/2015

SEGMENT E – DUKE EYE CENTER ALTERNATIVE

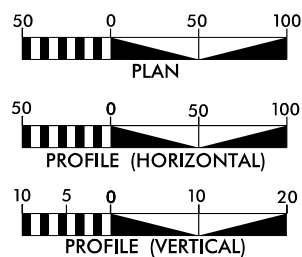
PLAN AND PROFILE SHEETS



DUKE EYE CENTER STATION - DUKE EYE CENTER ALTERNATIVE



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PLAN AND PROFILE

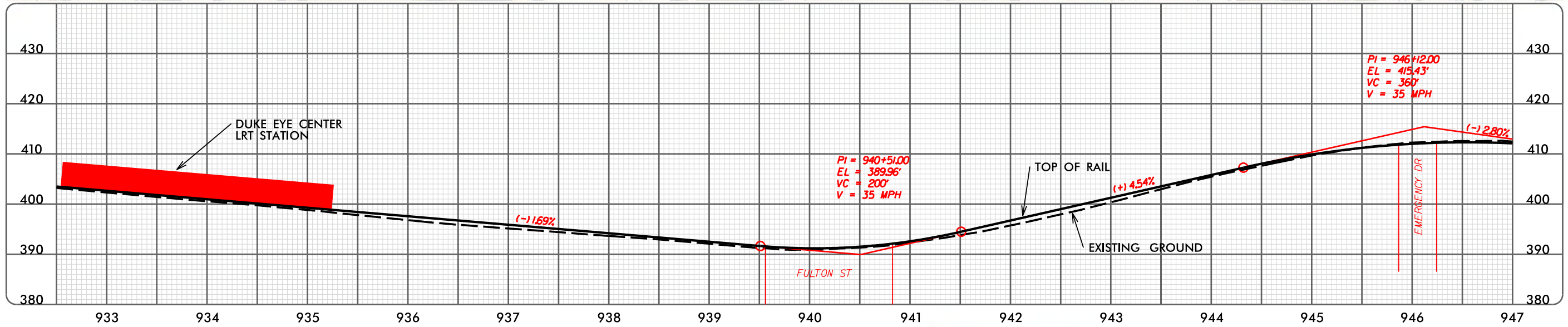
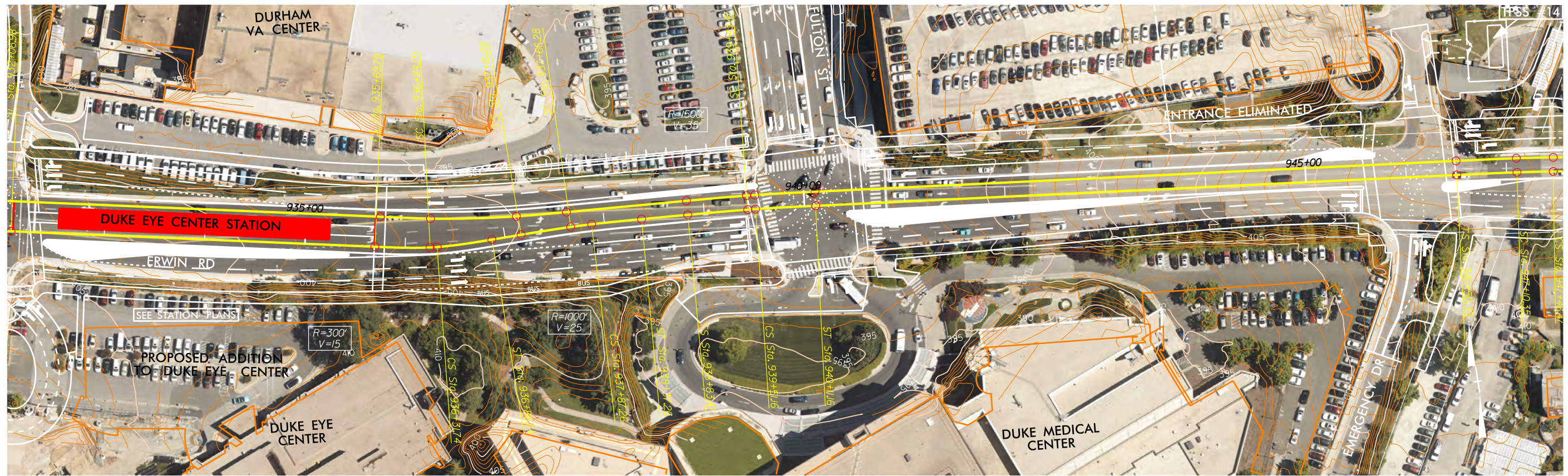
SEGMENT E

PLAN &
PROFILE

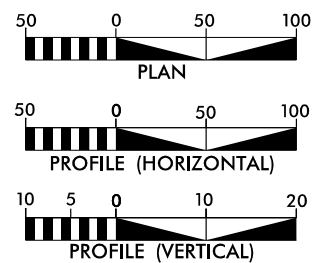
SHEET:
E1 - 05

4/8/2015

DUKE EYE CENTER STATION - DUKE EYE CENTER ALTERNATIVE



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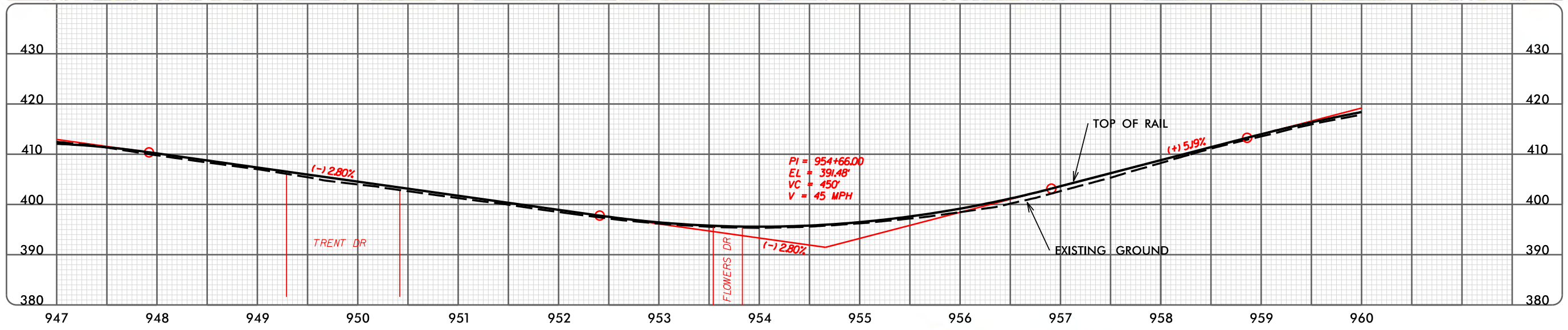
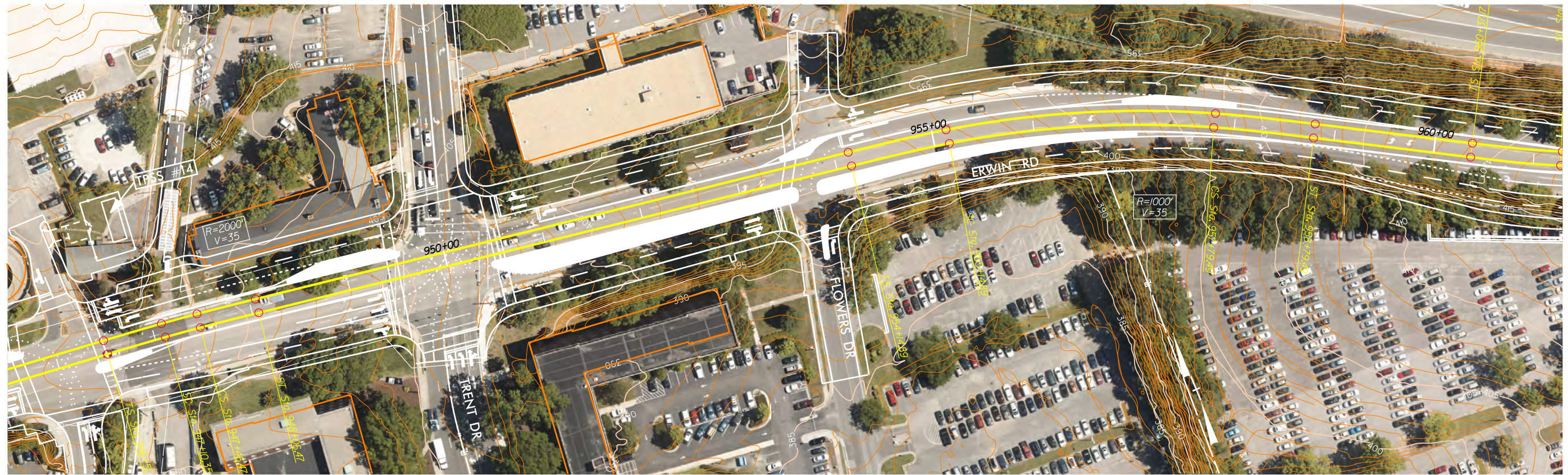
PLAN AND PROFILE

SEGMENT E

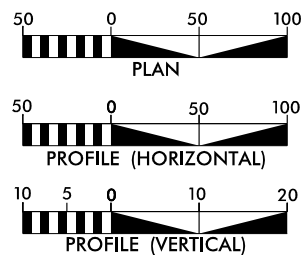
PLAN &
PROFILE

SHEET:
EI - 06

ERWIN ROAD - DUKE EYE CENTER ALTERNATIVE



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PLAN AND PROFILE

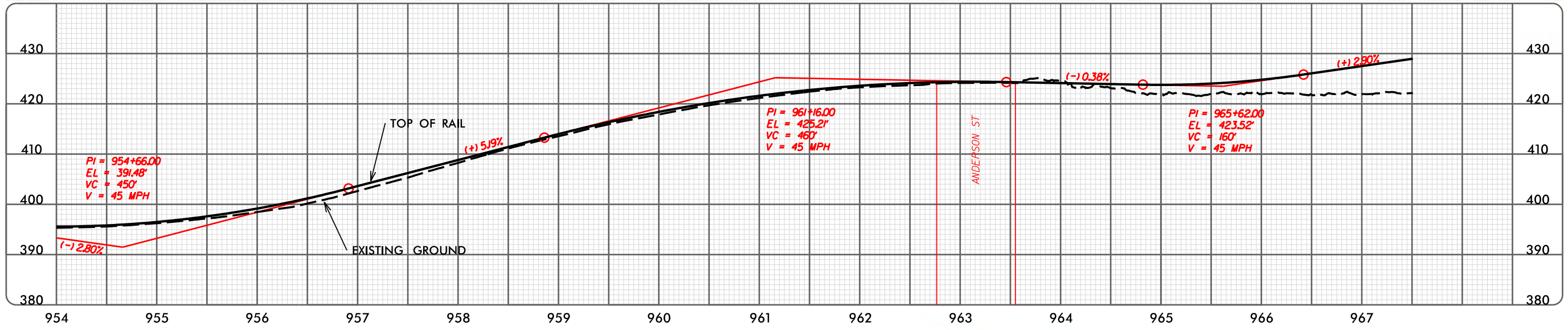
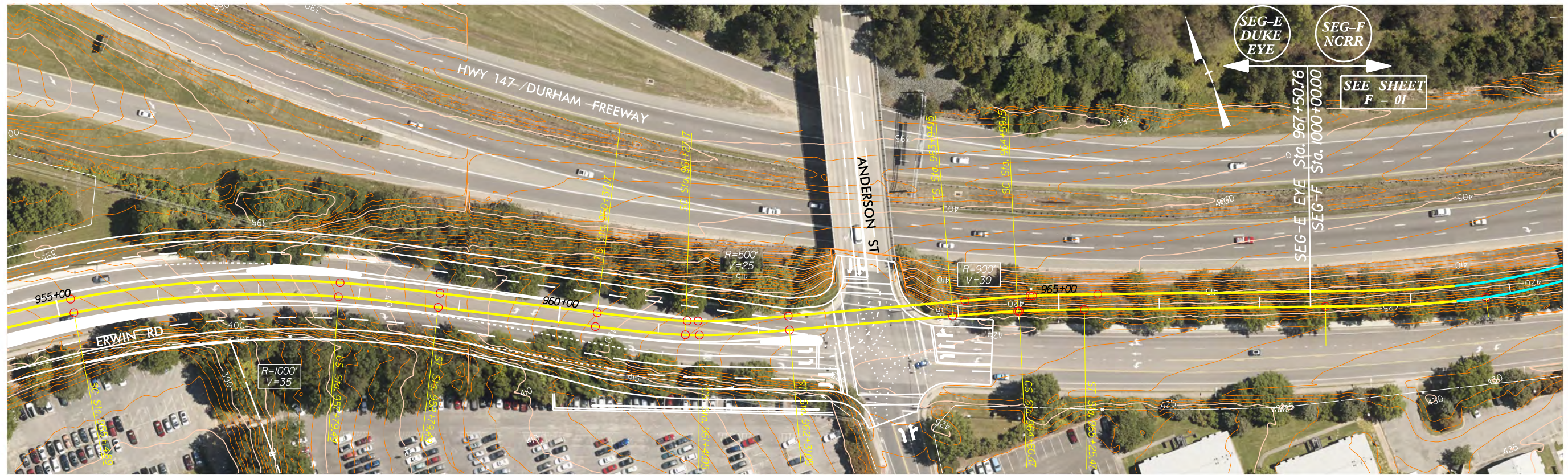
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PLAN &
PROFILE

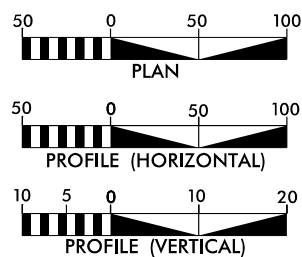
SHEET:
E1 - 07

4/8/2015

ERWIN ROAD - DUKE EYE CENTER ALTERNATIVE



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PLAN AND PROFILE

SEGMENT E

PLAN &
PROFILE

SHEET:
E1 - 08

4/8/2015

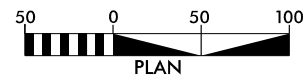
ROADWAY MODIFICATIONS



CAMERON BLVD



GRAPHIC SCALES



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PLAN

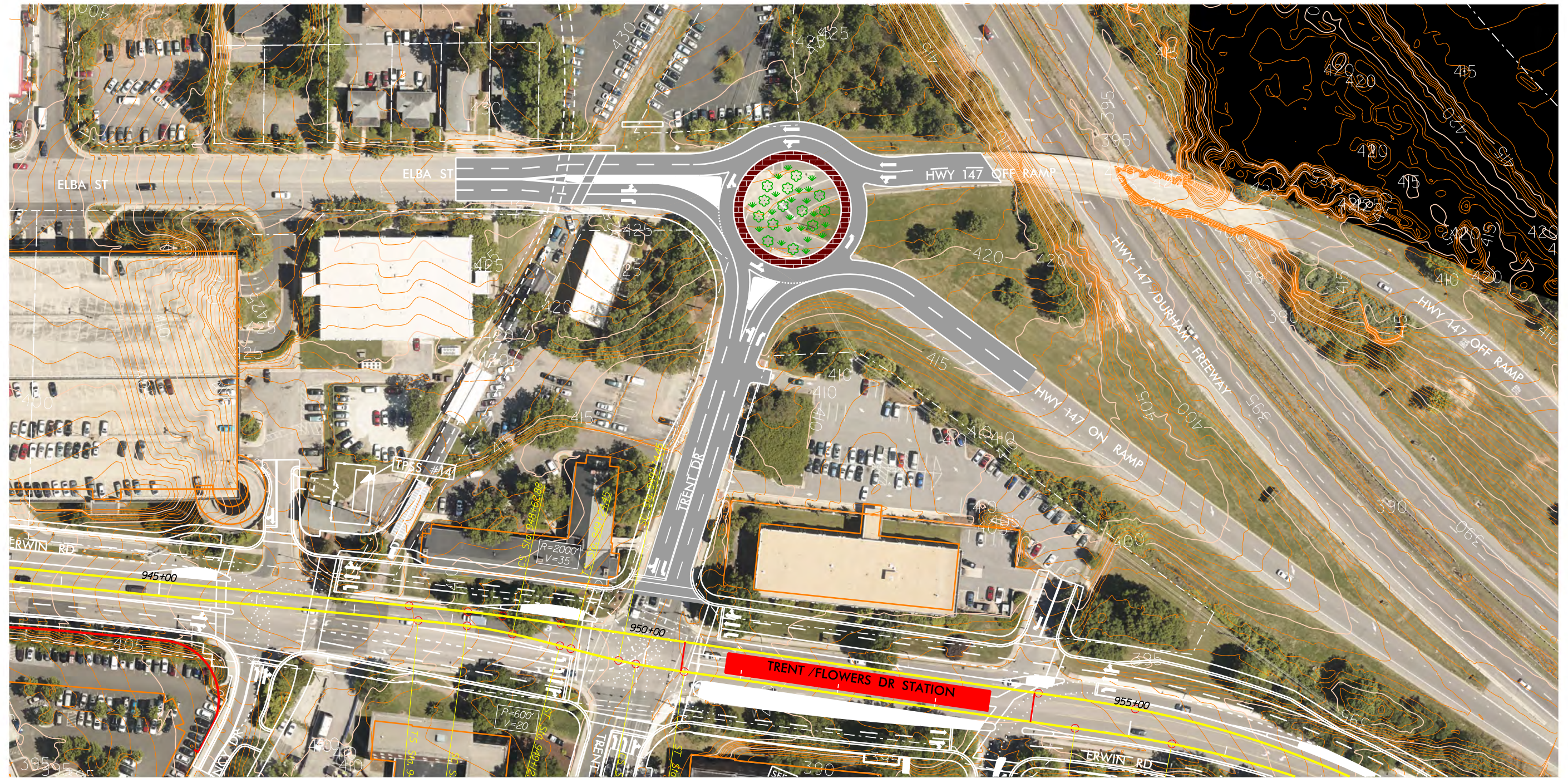
SEGMENT E
CAMERON BLVD

DWG: PLAN

SHEET:
RD - 03

3/31/2015

ELBA STREET ROUNDABOUT



GRAPHIC SCALES



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NC LICENSE #P-0189

PLAN

SEGMENT E

ELBA STREET ROUNDABOUT

DWG: PLAN

SHEET:
RD - 04

3/31/2015



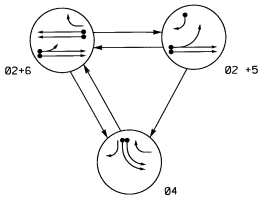
Erwin Road Traffic Simulation Report

Appendix C:

Existing Traffic Signal Timing Plans

PROJECT REFERENCE NO.	SHEET NO.
PDR	Fig. 1

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

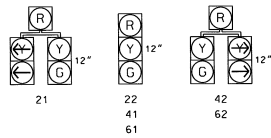
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- ⇄ UNSIGNALIZED MOVEMENT
- ← PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE					
	Ø	N	Ø	Ø	Ø	Ø
21	G	R	Ø	R	Ø	Ø
22	G	R	Ø	R	Ø	Ø
41	R	Ø	G	R	Ø	Ø
42	R	Ø	G	R	Ø	Ø
61	G	R	Ø	R	Ø	Ø
62	G	R	Ø	R	Ø	Ø

SIGNAL FACE I.D.

All Heads L.E.D.



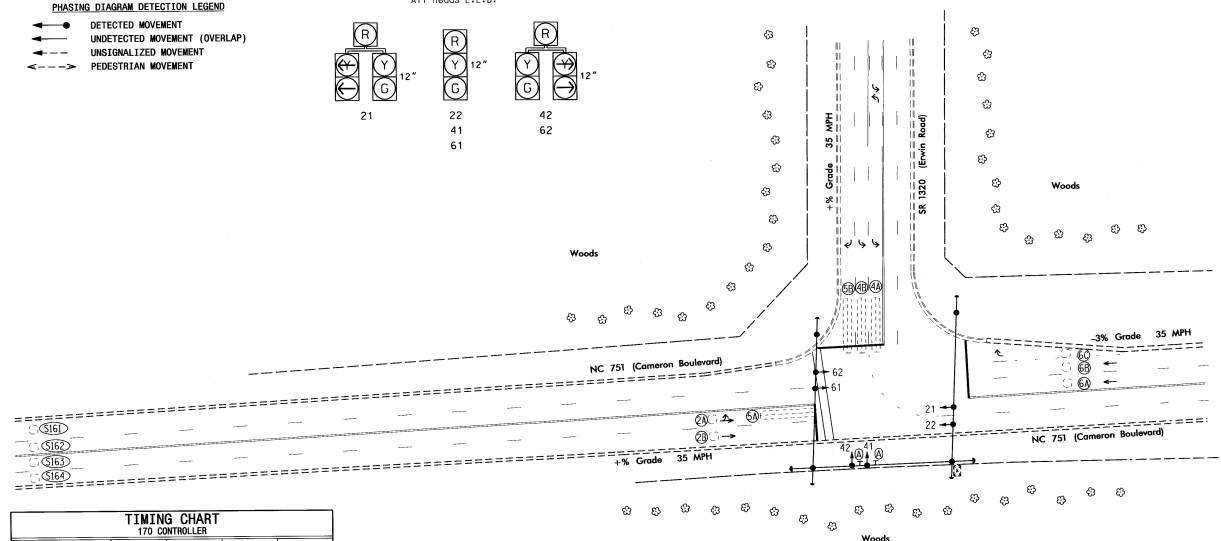
170 LOOP & DETECTOR UNIT INSTALLATION CHART

INDUCTIVE LOOPS														DETECTOR PROGRAMMING												
LOOP NO.	SIZE (ft)	TURNS	DET FROM SYSTEM (ft)	NEW/EXIST	REMA PHASE	TIMING		ATTRIBUTES													STATUS					
						DELAY	CARRY (EXTENSION)	TYPE	1	2	3	4	5	6	7	8	9	10	11	12		13	14	15	16	
2A, 2B	6X6	EXIST	70	-	X	2	-	SEC	-	SEC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
4A, 4B	6X40	2-4-2	+5	-	X	4	-	SEC	-	SEC	-	-	-	-	-	-	-	-	-	X	X	-	-	-	-	X
5A	6X40	2-4-2	70	-	X	5	10	SEC	-	SEC	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-	X
5B	6X40	2-4-2	+5	-	X	5	20	SEC	-	SEC	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	X
6A, 6B, 6C	6X6	EXIST	0	-	X	6	-	SEC	-	SEC	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	X
SI62	6X6	EXIST	+680	-	X	-	-	SEC	-	SEC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X
SI62	6X6	EXIST	+680	-	X	-	-	SEC	-	SEC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X
SI62	6X6	EXIST	570	-	X	-	-	SEC	-	SEC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X
SI62	6X6	EXIST	570	-	X	-	-	SEC	-	SEC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X

3 Phase Fully Actuated (Durham Signal System)

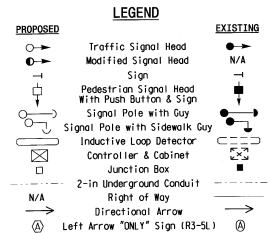
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 5 may be lagged.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Pavement markings are existing.
- Program all timing information into phase banks 1, 2, and 3 unless otherwise noted.
- Set phase bank 3 maximum limit to 250 seconds for phases used.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.



PHASE	Ø2	Ø4	Ø5	Ø6
MINIMUM INITIAL *	12 SEC.	7 SEC.	7 SEC.	12 SEC.
VEHICLE EXTENSION *	2.0 SEC.	1.0 SEC.	2.0 SEC.	2.0 SEC.
YELLOW CHANGE INT.	4.0 SEC.	4.0 SEC.	4.0 SEC.	4.0 SEC.
RED CLEARANCE	2.0 SEC.	2.0 SEC.	2.0 SEC.	2.0 SEC.
MAXIMUM LIMIT *	30 SEC.	20 SEC.	20 SEC.	30 SEC.
RECALL POSITION	VEH RECALL	NONE	VEH RECALL	NONE
VEHICLE CALL MEMORY	YELLOW LOCK	NONLOCK	YELLOW LOCK	NONLOCK
DOUBLE ENTRY	OFF	OFF	OFF	OFF
WALK *	- SEC.	- SEC.	- SEC.	- SEC.
FLASHING DON'T WALK	- SEC.	- SEC.	- SEC.	- SEC.
TYPE 3 LIMIT	- SEC.	- SEC.	- SEC.	- SEC.
ALTERNATE EXTENSION	- SEC.	- SEC.	- SEC.	- SEC.
ADDP PER VEHICLE *	- SEC.	- SEC.	- SEC.	- SEC.
MAXIMUM INITIAL *	- SEC.	- SEC.	- SEC.	- SEC.
MAXIMUM GAP *	2.0 SEC.	1.0 SEC.	2.0 SEC.	2.0 SEC.
REDUCE 0.1 SEC EVERY *	- SEC.	- SEC.	- SEC.	- SEC.
MINIMUM GAP	2.0 SEC.	1.0 SEC.	2.0 SEC.	2.0 SEC.

*These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.



Plan of Record

PREPARED BY: *Oshun Williams* DATE: August 2011
 REVIEWED BY: *R. J. Zieba* DATE: September 2011
 SIGNATURE: _____ DATE: 9/23/11

Update loops _____ COMMENTS _____

This plan of record reflects existing field conditions as updated by this document. This plan may have been modified from its original state.

Plan of Record

Prepared in the Office of

NC 751 (Cameron Blvd.) at SR 1320 (Erwin Road)

Division 5 Durham County Durham

PLAN DATE: April 1997 REVIEWED BY: DL Jones

PREPARED BY: CE Carter REVIEWED BY: _____

REVISIONS	INIT.	DATE

Not a certified document. This document originally issued and sealed by James H. Durkin, PE, #18060, on 04/21/1997. This document shall not be considered a certified document.

SIG. INVENTORY NO. 05-0668

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0668-Cameron Blvd & Erwin Rd

Group Assignment: **p**
 Field Master Assignment: **NONE**
 System Reference Number: **91**

N/S Street Name: **Not Assigned**
 E/W Street Name: **Not Assigned**

Last Database Change: **2/8/2012 15:02**

Change Record					
Change	By	Date	Change	By	Date

Notes: **11/1/10 LT Put all phases in max recall because of bad loops**

Manual Plan
 0 = Automatic
 1-9 = Plan 1-9
 14 = Free
 15 = Flash

Manual Offset
 0 = Automatic
 1 = Offset A
 2 = Offset B
 3 = Offset C

Drop Number	2	<C/0+0+0>
Zone Number	1	<C/0+0+1>
Area Number	1	<C/0+0+2>
Area Address	91	<C/0+0+3>
QuicNet Channel	COM123:	(QuicNet)

Manual Plan		<C/0+A+1>
Manual Offset		<C/0+B+1>

Red Start	0.0	<F/1+C+0>
Flash Start	10	<F/1+0+E>
Red Revert	5.0	<F/1+0+F>

Exclusive Walk	0	<F/1+0+0>
Exclusive FDW	0	<F/1+0+1>
All Red Clear	0.0	<F/1+0+2>

Communication Addresses
 [Configuration not in timing menus]

Manual Selection
 [Set Manual Plan/Offset not timing]

Start / Revert Times
 [Miscellaneous Timing]

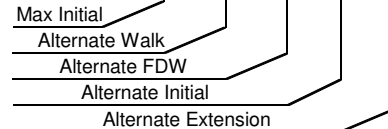
Exclusive Ped Phase
 (Outputs specified in Assignable
 Outputs at E/127+A+E & F)

[Miscellaneous Timing]

Row	Phase Names ---->	Phase							
		1	2	3	4	5	6	7	8
0	Ped Walk	0	0	0	0	0	0	0	0
1	Ped FDW	0	0	0	0	0	0	0	0
2	Min Green	0	12	0	7	7	12	0	0
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	0.0	3.0	0.0	2.0	2.0	3.0	0.0	0.0
6	Max Gap	0.0	3.0	0.0	2.0	2.0	3.0	0.0	0.0
7	Min Gap	0.0	3.0	0.0	2.0	2.0	3.0	0.0	0.0
8	Max Limit	0	60	0	30	20	60	0	0
9	Max Limit 2	0	0	0	0	0	0	0	0
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	0	0	0	0	0	0	0	0
C	Cond Serv Min	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	0.0	4.0	0.0	4.0	4.0	4.0	0.0	0.0
F	Red Clear	0.0	2.0	0.0	2.0	2.0	2.0	0.0	0.0

Phase Timing - Bank 1 <C+0+F=1>
 [Phase Timing Bank 1]

	9	A	B	C	D
Phase 1	0	0	0	0	0.0
Phase 2	0	0	0	0	0.0
Phase 3	0	0	0	0	0.0
Phase 4	0	0	0	0	0.0
Phase 5	0	0	0	0	0.0
Phase 6	0	0	0	0	0.0
Phase 7	0	0	0	0	0.0
Phase 8	0	0	0	0	0.0



Alternate Timing <C+0+F=1>
 [Phase Timing Bank 1]

	E	F	Row
RR-1 Delay	0		0
RR-1 Clear	0		1
EV-A Delay	0		2
EV-A Clear	0		3
EV-B Delay	0		4
EV-B Clear	0		5
EV-C Delay	0		6
EV-C Clear	0		7
EV-D Delay	0		8
EV-D Clear	0		9
RR-2 Delay	0		A
RR-2 Clear	0		B
View EV Delay	---		C
View EV Clear	---		D
View RR Delay	---		E
View RR Clear	---		F

Phase Functions <C+0+F=1>
 [Phase Functions]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0668-Cameron Blvd & Erwin Rd

		Overlap							
Column Numbers ---->		1	2	3	4	5	6	7	8
Row	Overlap Name ---->								
0	Load Switch Number	0	0	0	0	0	0	0	0
1	Veh Set 1 - Phases								12345678
2	Veh Set 2 - Phases								
3	Veh Set 3 - Phases								
4	Neg Veh Phases								
5	Neg Ped Phases								
6	Green Omit Phases								
7	Green Clear Omit Phs.								
8									
9									
A									
B									
C									
D	Green Clear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F	Red Clear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Overlap Assignments <C+0+E=29>
 [Overlap Configuration]

Extra 1 Flags
 1 = TBC Type 1
 2 = NEMA Ext. Coord
 3 = Auto Daylight Savings
 4 = EV Advance
 5 = Extended Status
 6 = International Ped
 7 = Flash - Clear Outputs
 8 = Split Ring

Extra 2 Flags
 1 = AWB During Initial
 2 = LMU Installed
 3 = Disable Min Walk
 4 = QuicNet/4 System
 5 = Ignore P/P on EV
 6 =
 7 = Reserved
 8 =

	C	Row
EV-A	0	0
EV-B	0	1
EV-C	0	2
EV-D	0	3
RR-1 *	---	4
RR-2 *	---	5
SE-1	0	6
SE-2	0	7

Preempt Priority
 <C+0+E=125>
 (* RR-1 is always Highest,
 and RR-2 is always
 Second Highest)

[Preempt Parameters]

Row	Column Numbers ---->	E
0	Exclusive Phases	
1	RR-1 Clear Phases	
2	RR-2 Clear Phases	
3	RR-2 Limited Service	
4	Prot / Perm Phases	
5	Flash to PE Circuits	
6	Flash Entry Phases	2 6
7	Disable Yellow Range	
8	Disable Ovp Yel Range	
9	Overlap Yellow Flash	
A	EV-A Phases	
B	EV-B Phases	
C	EV-C Phases	
D	EV-D Phases	
E	Extra 1 Config. Bits	1 3 5
F	IC Select (Interconnect)	2

Configuration <C+0+E=125>
 [Configuration Data]

Row	Column Numbers ---->	F
0	Ext. Permit 1 Phases	
1	Ext. Permit 2 Phases	
2	Exclusive Ped Assign	
3	Preempt Non-Lock	
4	Ped for 2P Output	
5	Ped for 6P Output	
6	Ped for 4P Output	
7	Ped for 8P Output	
8	Yellow Flash Phases	2 6
9	Low Priority A Phases	
A	Low Priority B Phases	
B	Low Priority C Phases	
C	Low Priority D Phases	
D	Restricted Phases	
E	Extra 2 Config. Bits	4

Configuration <C+0+E=125>
 [Configuration Data]

Row	Column Numbers ---->	F
0	Fast Green Flash Phase	
1	Green Flash Phases	
2	Flashing Walk Phases	
3	Guaranteed Passage	
4	Simultaneous Gap Term	2 456
5	Sequential Timing	
6	Advance Walk Phases	
7	Delay Walk Phases	
8	External Recall	
9	Start-up Overlap Green	
A	Max Extension	
B	Inhibit Ped Reserve	
C	Semi-Actuated	
D	Start-up Overlap Yellow	
E	Start-up Vehicle Calls	2 456
F	Start-up Ped Calls	

Specials <C+0+F=2>
 [Phase Functions]

Flash to PE & PE Non-Lock
 1 = EV A 5 = RR 1
 2 = EV B 6 = RR 2
 3 = EV C 7 = SE 1
 4 = EV D 8 = SE 2

IC Select Flags
 1 =
 2 = Modem
 3 = 7-Wire Slave
 4 = Flash / Free
 5 =
 6 = Simplex Master
 7 = 7-Wire Master
 8 = Offset Interrupter

	2	Row
Phase 1	7	1
Phase 2	12	2
Phase 3	7	3
Phase 4	7	4
Phase 5	7	5
Phase 6	12	6
Phase 7	7	7
Phase 8	7	8

Coordination Transition Minimums
 <C+0+C=5>
 [Coordination Functions]

Display Indications:
 0=Walk
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INTERSECTION: 0668-Cameron Blvd & Erwin Rd

		Plan								
Column Numbers ---->		1	2	3	4	5	6	7	8	9
Row	Plan Name ---->									
0	Cycle Length	120	120	0	0	0	0	0	0	100
1	Phase 1 - ForceOff	0	0	0	0	0	0	0	0	55
2	Phase 2 - ForceOff	0	0	0	0	0	0	0	0	0
3	Phase 3 - ForceOff	0	0	0	0	0	0	0	0	20
4	Phase 4 - ForceOff	23	23	0	0	0	0	0	0	40
5	Phase 5 - ForceOff	0	0	0	0	0	0	0	0	55
6	Phase 6 - ForceOff	60	75	0	0	0	0	0	0	0
7	Phase 7 - ForceOff	0	0	0	0	0	0	0	0	20
8	Phase 8 - ForceOff	0	0	0	0	0	0	0	0	40
9	Ring Offset	0	0	0	0	0	0	0	0	0
A	Offset A	0	0	0	0	0	0	0	0	0
B	Offset B	0	0	0	0	0	0	0	0	0
C	Offset C	0	0	0	0	0	0	0	0	0
D	Perm 1 - End	9	9	0	0	0	0	0	0	15
E	Hold Release	255	255	255	255	255	255	255	255	255
F	Zone Offset	0	0	0	0	0	0	0	0	0

Coordination - Bank 1 <C+0+C=1>
 [Coordination Timing 1 -]

Row										
0	Ped Adjustment	0	0	0	0	0	0	0	0	0
1	Perm 2 - Start	9	9	0	0	0	0	0	0	0
2	Perm 2 - End	37	37	0	0	0	0	0	0	0
3	Perm 3 - Start	0	0	0	0	0	0	0	0	0
4	Perm 3 - End	0	0	0	0	0	0	0	0	0
5	Reservice Time	0	0	0	0	0	0	0	0	0
6	Reservice Phases									
7										
8	Pretimed Phases									
9	Max Recall		6							
A	Perm 1 Veh Phase	4	4				12345678	12345678	12345678	12345678
B	Perm 1 Ped Phase						12345678	12345678	12345678	12345678
C	Perm 2 Veh Phase	6	6							
D	Perm 2 Ped Phase									
E	Perm 3 Veh Phase									
F	Perm 3 Ped Phase									

Coordination - Bank 2 <C+0+C=2>
 [Coordination Timing 2]

Coord Extra
 1 = Programmed WALK Time for Sync Phases
 2 = Always Terminate Sync Phase Peds

Row	E	Row
		0
Plan 1 - Sync	2 5	1
Plan 2 - Sync	2 5	2
Plan 3 - Sync	2 6	3
Plan 4 - Sync	2 6	4
Plan 5 - Sync	2 6	5
Plan 6 - Sync	2 6	6
Plan 7 - Sync	2 6	7
Plan 8 - Sync	2 6	8
Plan 9 - Sync	2 6	9
NEMA Sync		A
NEMA Hold		B
		C
		D
Coord Extra		E
		F

Sync Phases <C+0+C=1>
 [Coordination Functions]

Row	F	Row
Free Lag	2 45 8	0
Plan 1 - Lag	2 45 8	1
Plan 2 - Lag	2 45 8	2
Plan 3 - Lag	2 4 6 8	3
Plan 4 - Lag	2 4 6 8	4
Plan 5 - Lag	2 4 6 8	5
Plan 6 - Lag	2 4 6 8	6
Plan 7 - Lag	2 4 6 8	7
Plan 8 - Lag	2 4 6 8	8
Plan 9 - Lag	2 4 6 8	9
External Lag		A
		B
		C
		D
		E
		F

Lag Phases <C+0+C=1>
 [Coordination Functions]

Display Indications:
 0=Walk
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 8=Red Rest
 9=Preemption
 A=Stop Time

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INTERSECTION: 0668-Cameron Blvd & Erwin Rd

Row	Column 9	Column A	Column B	Column C	Column D	Column E	Column F	Row							
0	Spec. Funct. 1	0	NOT-3	0	Max 2	0	Pretimed	0	Set DOW	0	Dial 2 (7-Wire)	0	Sim Term	0	0
1	Spec. Funct. 2	0	NOT-4	0	System Det 1	58	Plan 1	0	Ext. Perm 1	0	Dial 3 (7-Wire)	0	EV-A	71	1
2	Spec. Funct. 3	0	OR-4 (a)	0	System Det 2	57	Plan 2	0	Ext. Perm 2	0	Offset 1 (7-Wire)	0	EV-B	72	2
3	Spec. Funct. 4	0	OR-4 (b)	0	System Det 3	42	Plan 3	0	Dimming	0	Offset 2 (7-Wire)	0	EV-C	73	3
4	NAND-3 (a)	0	OR-5 (a)	0	System Det 4	46	Plan 4	0	Set Clock	0	Offset 3 (7-Wire)	0	EV-D	74	4
5	NAND-3 (b)	0	OR-5 (b)	0	System Det 5	0	Plan 5	0	Stop Time	82	Free (7-Wire)	0	RR-1	51	5
6	NAND-4 (a)	0	OR-6 (a)	0	System Det 6	0	Plan 6	0	Flash Sense	81	Flash (7-Wire)	0	RR-2	52	6
7	NAND-4 (b)	0	OR-6 (b)	0	System Det 7	0	Plan 7	0	Manual Enable	53	Excl. Ped Omit	0	Spec. Event 1	0	7
8	OR-7 (a)	0	Fig 3 Diamond	0	System Det 8	0	Plan 8	0	Man. Advance	80	NOT-1	220	Spec. Event 2	0	8
9	OR-7 (b)	0	Fig 4 Diamond	0	Max Inhibit (nema)	0	Plan 9	0	External Alarm	75	NOT-2	0	External Lag	0	9
A	OR-7 (c)	0	AND-4 (a)	0	Force A (nema)	0	DELAY-A	0	Phase Bank 2	0	OR-1 (a)	0	AND-1 (a)	0	A
B	OR-7 (d)	0	AND-4 (b)	0	Force B (nema)	0	DELAY-B	0	Phase Bank 3	221	OR-1 (b)	0	AND-1 (b)	0	B
C	OR-8 (a)	0	NAND-1 (a)	0	C.N.A. (nema)	0	DELAY-C	0	Overlap Set 2	0	OR-2 (a)	0	AND-2 (a)	0	C
D	OR-8 (b)	0	NAND-1 (b)	0	Hold (nema)	0	DELAY-D	0	Overlap Set 3	0	OR-2 (b)	0	AND-2 (b)	0	D
E	OR-8 (c)	0	NAND-2 (a)	0	Max Recall	0	DELAY-E	0	Detector Set 2	0	OR-3 (a)	0	AND-3 (a)	0	E
F	OR-8 (d)	0	NAND-2 (b)	0	Min Recall	0	DELAY-F	0	Detector Set 3	0	OR-3 (b)	0	AND-3 (b)	0	F

Assignable Inputs
 [Input Assignments]

<C=0+E=126>

Row	Column 9	Column A	Column B	Column C	Column D	Column E	Column F	Row							
0	Phase ON - 1	0	Preempt Fail	0	Flasher 0	0	Free	220	NOT-1	221	TOD Out 1	201	Dial 2 (7-Wire)	0	0
1	Phase ON - 2	0	Sp Evnt Out 1	0	Flasher 1	0	Plan 1	211	OR-1	0	TOD Out 2	202	Dial 3 (7-Wire)	0	1
2	Phase ON - 3	0	Sp Evnt Out 2	0	Fast Flasher	0	Plan 2	212	OR-2	0	TOD Out 3	203	Offset 1 (7-Wire)	0	2
3	Phase ON - 4	0	Sp Evnt Out 3	0	Fig 3 Diamond	0	Plan 3	213	OR-3	0	TOD Out 4	204	Offset 2 (7-Wire)	0	3
4	Phase ON - 5	0	Sp Evnt Out 4	0	Fig 4 Diamond	0	Plan 4	214	AND-1	0	TOD Out 5	205	Offset 3 (7-Wire)	0	4
5	Phase ON - 6	0	Sp Evnt Out 5	0			Plan 5	215	AND-2	0	TOD Out 6	206	Free (7-Wire)	0	5
6	Phase ON - 7	0	Sp Evnt Out 6	0			Plan 6	216	AND-3	0	TOD Out 7	207	Flash (7-Wire)	0	6
7	Phase ON - 8	0	Sp Evnt Out 7	0			Plan 7	217	NOT-2	0	TOD Out 8	208	Preempt	0	7
8	Ph. Check - 1	0	Sp Evnt Out 8	0	NOT-3	0	Plan 8	218	EV-A	0	Adv. Warn - 1	0	Low Priority A	0	8
9	Ph. Check - 2	0			NOT-4	0	Plan 9	219	EV-B	0	Adv. Warn - 2	0	Low Priority B	0	9
A	Ph. Check - 3	0	Detector Fail	0	OR-4	0	Spec. Funct. 3	0	EV-C	0	DELAY-A	0	Low Priority C	0	A
B	Ph. Check - 4	0	Spec. Funct. 1	0	OR-5	0	Spec. Funct. 4	0	EV-D	0	DELAY-B	0	Low Priority D	0	B
C	Ph. Check - 5	0	Spec. Funct. 2	0	OR-6	0	NAND-3	0	RR-1	0	DELAY-C	0			C
D	Ph. Check - 6	0	Central Control	0	AND-4	0	NAND-4	0	RR-2	0	DELAY-D	0			D
E	Ph. Check - 7	0	Excl. Ped DW	0	NAND-1	0	OR-7	0	Spec. Event 1	0	DELAY-E	0			E
F	Ph. Check - 8	0	Excl. Ped WK	0	NAND-2	0	OR-8	0	Spec. Event 2	0	DELAY-F	0			F

Assignable Outputs
 [Output Assignments]

<C=0+E=127>

Display Indications:
 0=Walk
 1=Flashing Don't Walk
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4=Variable Initial
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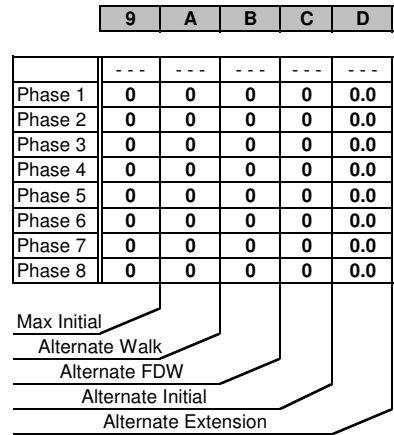
INTERSECTION: 0668-Cameron Blvd & Erwin Rd

		Phase							
Column Numbers ---->		1	2	3	4	5	6	7	8
Row	Phase Names ---->	0	0	0	0	0	0	0	0
0	Ped Walk	0	0	0	0	0	0	0	0
1	Ped FDW	0	0	0	0	0	0	0	0
2	Min Green	0	12	0	7	7	12	0	0
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	0.0	3.0	0.0	2.0	2.0	3.0	0.0	0.0
6	Max Gap	0.0	3.0	0.0	2.0	2.0	3.0	0.0	0.0
7	Min Gap	0.0	3.0	0.0	2.0	2.0	3.0	0.0	0.0
8	Max Limit	0	60	0	30	20	60	0	0
9	Max Limit 2	0	0	0	0	0	0	0	0
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	0	0	0	0	0	0	0	0
C	Cond Serv Min	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	0.0	4.0	0.0	4.0	4.0	4.0	0.0	0.0
F	Red Clear	0.0	2.0	0.0	2.0	2.0	0.0	0.0	0.0

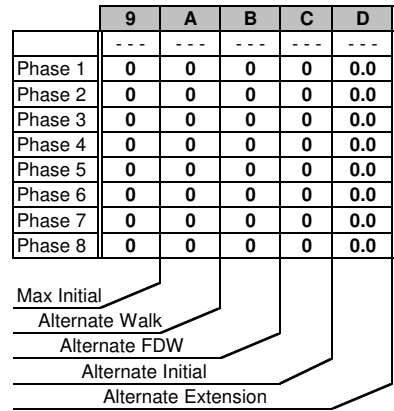
Phase Timing - Bank 2 <C=0+F=2>
 [Phase Timing Bank2]

		1	2	3	4	5	6	7	8
Row	Phase Names ---->	0	0	0	0	0	0	0	0
0	Ped Walk	0	0	0	0	0	0	0	0
1	Ped FDW	0	0	0	0	0	0	0	0
2	Min Green	0	12	0	7	7	12	0	0
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	0.0	3.0	0.0	2.0	2.0	3.0	0.0	0.0
6	Max Gap	0.0	3.0	0.0	2.0	2.0	3.0	0.0	0.0
7	Min Gap	0.0	3.0	0.0	2.0	2.0	3.0	0.0	0.0
8	Max Limit	0	250	0	250	250	250	0	0
9	Max Limit 2	0	0	0	0	0	0	0	0
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	0	0	0	0	0	0	0	0
C	Cond Serv Min	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	0.0	4.0	0.0	4.0	4.0	4.0	0.0	0.0
F	Red Clear	0.0	2.0	0.0	2.0	2.0	2.0	0.0	0.0

Phase Timing - Bank 3 <C=0+F=3>
 [Phase Timing Bank 3]



Alternate Timing
 [Phase Timing Bank2]



Alternate Timing
 [Phase Timing Bank 3]

Transition Type
 0.X = Shortway
 1.X = Lengthen
 X.1 thru X.4 =
 Number of
 cycles when
 lengthening

Daylight Savings
 Date
 If set to all zeros,
 standard dates
 will be used.

Transition Type | 0.2 <C/5+1+9>

TBC Transition

[Coordination Functions]

Cycle 1 Fail	0	C/5+1+1
Cycle 2 Fail	0	C/5+1+2

Cycle Fail Thresholds (minutes)

[Coordination Functions]

Lag Hold Phases | <C/5+1+A>

Coordinated Lag Hold Phases

[Coordination Functions]

Sync Output Time | 0.0 <C/5+1+C>

7-Wire Master

[Coordination Function/ called Sync Time]

Begin Month	3	<C/5+2+A>
Begin Week	2	<C/5+2+B>
End Month	11	<C/5+2+C>
End Week	1	<C/5+2+D>

Daylight Savings Time

[Dialback and Daylight Saving]

Time B4 Yellow	0.0	<F/1+C+E>
Phase Number	0	<F/1+C+F>

Advance Warning Beacon - Sign 1

[Miscellaneous Timing]

Time B4 Yellow	0.0	<F/1+D+E>
Phase Number	0	<F/1+D+F>

Advance Warning Beacon - Sign 2

[Miscellaneous Timing]

Long Failure	0.7	<F/1+0+6>
Short Failure	0.7	<F/1+0+7>

Power Cycle Correction (Default = 0.7)

[Miscellaneous Timing]

Min Time (seconds) | 0 <F/1+0+8>

Min Green Before PE Force Off

[Preempt Parameters]

Max Time (minutes) | 255 <F/1+0+9>

Max Preempt Time Before Failure

[Preempt Parameters]

Min Time (seconds) | 0 <F/1+0+A>

Min Time Between Same Preempts

(Does Not Apply To Railroad Preempt)

Low Pri. Channel | <E/125+C+8>

Disable Low Priority Channel

[Preempt Parameters]

Low Priority
 1 = Channel A
 2 = Channel B
 3 = Channel C
 4 = Channel D

Display Indications:
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 9=Preemption
 A=Stop Time

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 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0668-Cameron Blvd & Erwin Rd

Column Numbers ---->		0	1	2	3	1	3	
Row	Det Num	Detector Name	C1 Pin Number	Attributes	Phase(s)	Assign	Delay	Carry-over
0	1		39	5 7	2	123 8	0.0	0.0
1	2		43	5 7	2	123 8	0.0	0.0
2	3		41	5 7	4	123 8	0.0	0.0
3	4		55	5 7	5	123 8	10.0	0.0
4	5		55	5 7	2	123 8	0.0	0.0
5	6		45	5 7	5	123 8	20.0	0.0
6	7		40	5 7	6	123 8	0.0	0.0
7	8		44	5 7	6	123 8	0.0	0.0
8	9		58	4		123	0.0	0.0
9	10		57	4		123	0.0	0.0
A	11		42	4		123	0.0	0.0
B	12		46	4		123	0.0	0.0
C	13		0				0.0	0.0
D	14		0				0.0	0.0
E	15		0				0.0	0.0
F	16		0				0.0	0.0

Detector Types
 EXTENTION: Detector only active during the Phase Green Interval
 COUNT: used in computing "Added Initial
 CALL: Detector only active during the non green phase will not extend the phases
 TYPE 3: will allow a call detector to extend its phase until the call first drops or the type 3 limit is reached

Column Numbers ---->		Ped / Phase / Overlap								Row
		1	2	3	4	5	6	7	8	
Walk		0	0	0	0	0	0	0	0	0
Don't Walk		0	0	0	0	0	0	0	0	1
Phase Green		0	0	0	0	0	0	0	0	2
Phase Yellow		0	0	0	0	0	0	0	0	3
Phase Red		0	0	0	0	0	0	0	0	4
Overlap Green		0	0	0	0	0	0	0	0	5
Overlap Yellow		0	0	0	0	0	0	0	0	6
Overlap Red		0	0	0	0	0	0	0	0	7

Redirect Phase Outputs <C+0+E=127>

[Phase Output Redirections]

Cabinet Type	0	<E/125+D+0>	D	Row
Enable Redirection			12345678	0
(Enable Redirection = 30)				1
[Phase Output Redirection]				2
Max OFF (minutes)	255	<D/0+0+1>		3
Max ON (minutes)	7	<D/0+0+2>		4
Detector Failure Monitor				5
[Miscellaneous Timing]				6
				7

Dimming <C+0+E=125>

[Output Dimming]

Output Bit:	12345678	Row
Output Port 1		1
Output Port 2		2
Output Port 3		3
Output Port 4		4
Output Port 5		5
Output Port 6		6
Output Port 7		7

Delay Logic Times

<C+0+D=0> (seconds)

[Miscellaneous Timing]

Omit Alarm <C/5+F+0>

Disable Alarm Reporting

[Dialback and Daylight Saving]

Time 0 <C/5+C+0>

Redial Time (minutes)

(View Redial Timer at E/2+D+6)

[Dialback and Daylight Saving]

Column Numbers ---->		4	5	6	7	2	4	
Row	Det Num	Detector Name	C1 Pin Number	Attributes	Phase(s)	Assign	Delay	Carry-over
0	17		0				0.0	0.0
1	18		0				0.0	0.0
2	19		0				0.0	0.0
3	20		0				0.0	0.0
4	21		0				0.0	0.0
5	22		0				0.0	0.0
6	23		0				0.0	0.0
7	24		0				0.0	0.0
8	25		0				0.0	0.0
9	26		0				0.0	0.0
A	27		0				0.0	0.0
B	28		0				0.0	0.0
C	29		0				0.0	0.0
D	30		0				0.0	0.0
E	31		0				0.0	0.0
F	32		0				0.0	0.0

Detector Attributes
 1 = Full Time Delay
 2 = Ped Call
 3 =
 4 = Count
 5 = Extension
 6 = Type 3
 7 = Calling
 8 = Alternate

Det. Assignments

1 = Det. Set 1
 2 = Det. Set 2
 3 = Det. Set 3
 4 =
 5 =
 6 = Failure - Min Recall
 7 = Failure - Max Recall
 8 = Report on Failure

Number of Digits	D
1 st Digit	0
2 ed Digit	0
3 ed Digit	0
4 th Digit	0
5 th Digit	0
6 th Digit	0
7 th Digit	0
8 th Digit	0
9 th Digit	0
10 th Digit	0
11 th Digit	0
12 th Digit	0
13 th Digit	0
14 th Digit	0
15 th Digit	0

Dial-Back Telephone Number

[Dialback and Daylight Saving]

Detector Assignments <C+0+E=126>

[Detector Attributes]

<C+0+D=0>

[Detector Timing]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0668-Cameron Blvd & Erwin Rd

Row	Time	Plan	Offset	Day of Week
0	00:00	E	0	1234567
1	06:00	E	0	1234567
2	23:00	E	0	1234567
3	07:15	1	B	23456
4	08:45	2	B	23456
5	09:45	E	0	23456
6	00:00	0	0	
7	00:00	0	0	
8	00:00	0	0	
9	00:00	0	0	
A	00:00	0	0	
B	00:00	0	0	
C	00:00	0	0	
D	00:00	0	0	
E	00:00	0	0	
F	00:00	0	0	

TOD Coordination <C+0+9=0.1>
 (Bank 1)
 [Time of Day Functions]

Row	Time	Plan	Offset	Day of Week
0	00:00	0	0	
1	00:00	0	0	
2	00:00	0	0	
3	00:00	0	0	
4	00:00	0	0	
5	00:00	0	0	
6	00:00	0	0	
7	00:00	0	0	
8	00:00	0	0	
9	00:00	0	0	
A	00:00	0	0	
B	00:00	0	0	
C	00:00	0	0	
D	00:00	0	0	
E	00:00	0	0	
F	00:00	0	0	

TOD Coordination <C+0+9=0.2>
 (Bank 2)
 [Time Base Coordination]

Time	Funct.	Day of Week	Column 4 Phases/Bits
00:00	E	1234567	4 78
06:15	E	1234567	78
23:00	E	1234567	4 78
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		

TOD Function <C+0+7=0.1> <C+0+E=27>
 [Time of Day Functions]

Time	Funct.	Holiday Type	Column 4 Phases/Bits
00:00	E	123	4 78
06:15	E	123	78
23:00	E	123	4 78
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		

Holiday TOD Function <C+0+7=0.2> <C+0+E=28>
 [Time of Day Functions]

Day	Year	Month	Holiday Type
01	99	1	1
04	99	7	1
24	99	11	2
25	99	11	1
26	99	11	3
24	99	12	2
25	99	12	1
00	00	0	
01	00	1	1
04	00	7	1
22	00	11	2
23	00	11	1
24	00	11	3
24	00	12	2
25	00	12	1
00	00	0	

Holiday Dates <C+0+8=1.1>
 (Bank 1)
 [Holiday Dates]

Day	Year	Month	Holiday Type
01	01	1	1
04	01	7	1
21	01	11	2
22	01	11	1
23	01	11	3
24	01	12	2
25	01	12	1
00	00	0	
01	02	1	1
04	02	7	1
20	02	11	2
21	02	11	1
22	02	11	3
24	02	12	2
25	02	12	1
00	00	0	

Holiday Dates <C+0+8=1.2>
 (Bank 2)
 [Holiday Dates]

Time	Plan	Offset	Holiday Type
00:00	F	0	123
05:00	E	0	123
23:00	F	0	123
00:00	0	0	
07:00	1	B	2
09:00	E	0	2
12:00	E	0	2
19:00	E	0	2
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	

Holiday Events <C+0+9=1.1>
 (Bank 1)
 [Holiday TBC Plans]

Time	Plan	Offset	Holiday Type
05:30	1	B	3
09:00	E	0	3
11:30	E	0	3
13:30	E	0	3
16:00	E	0	3
19:00	E	0	3
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	

Holiday Events <C+0+9=1.2>
 (Bank 2)
 [Holiday TBC Plans]

T.O.D. Functions
 0 =
 1 = Red Lock
 2 = Yellow Lock
 3 = Veh Min Recall
 4 = Ped Recall
 5 =
 6 = Rest In Walk
 7 = Red Rest
 8 = Double Entry
 9 = Veh Max Recall
 A = Veh Soft Recall
 B = Maximum 2
 C = Conditional Service
 D = Free Lag Phases
 E = Bit 1 - Local Override
 Bit 4 - Disable Detector
 OFF Monitor
 Bit 7 - Detector Count
 Monitor
 Bit 8 - Real Time Split
 Monitor
 F = Output Bits 1 thru 8

Plan Select
 1 thru 9 = Coordination
 Plan 1 thru 9
 14 or E = Free
 15 or F = Flash

Offset Select
 A = Offset A
 B = Offset B
 C = Offset C

Month Select
 1 = January
 2 = February
 3 = March
 4 = April
 5 = May
 6 = June
 7 = July
 8 = August
 9 = September
 A = October
 B = November
 C = December

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0668-Cameron Blvd & Erwin Rd

Row	6 Clear	7 Time	8 Ped Call	9 Hold	A Advance	B Force Off	C Vehicle Call	D Permit Phases	E Ped Omit	F Circuit
0		0								
1		0								
2		0								
3		0								
4		0								
5		0								
6		0								
7		0								
8		0								
9		0								
A		0								
B		0								
C		0								
D		0								
E		0								
F		0								

Special Event Schedule -- Table 1
[Special Event Sequence 1]

<C+0+E=27>

Notes:

0 <E/27+5+F>
Limited Service Interval
[Special Event Sequence 1]

Row	6 Clear	7 Time	8 Ped Call	9 Hold	A Advance	B Force Off	C Vehicle Call	D Permit Phases	E Ped Omit	F Circuit
0		0								
1		0								
2		0								
3		0								
4		0								
5		0								
6		0								
7		0								
8		0								
9		0								
A		0								
B		0								
C		0								
D		0								
E		0								
F		0								

Special Event Schedule -- Table 2
[Special Event Sequence 2]

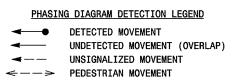
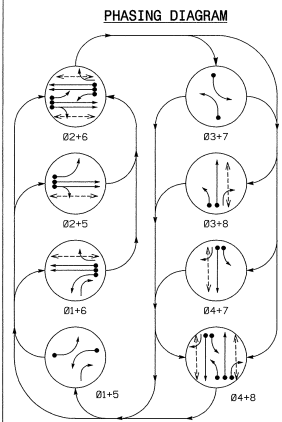
<C+0+E=28>

Notes:

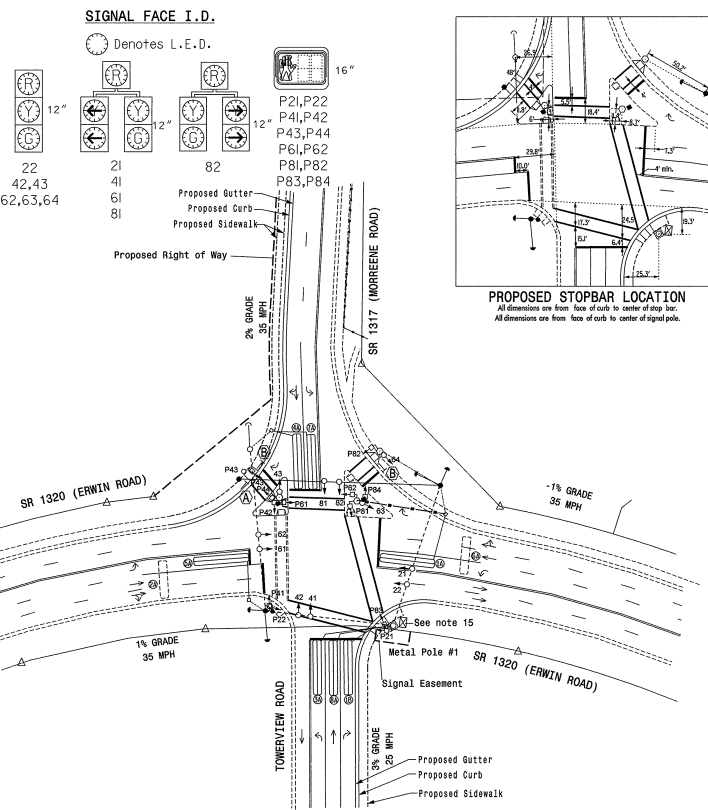
0 <E/28+5+F>
Limited Service Interval
[Special Event Sequence 2]

8 PHASE FULLY ACTUATED (DURHAM SIGNAL SYSTEM) NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated July 2006, and "Standard Specifications for Roads and Structures" dated July 2006, and all applicable sections of the latest version of the generic Project Special Provisions. The PSP can be accessed at the following website: <http://www.ncdot.org/doh/preconstruct/traffic/tmssu/>
2. Set all detector units to presence mode.
3. Do not program signal for late night flashing operation unless otherwise directed by the engineer.
4. Program phases 1 and 5 as protected/permissive.
5. Program phases 3 and 7 as protected/permissive.
6. Program controller to clear from phase 2+6 to phase 1 and/or 5 by progressing through phase 4+8 (see electrical details for programming).
7. Program all timing information into phase banks 1, 2, and 3 unless otherwise noted.
8. Set phase bank 3 maximum limit to 250 seconds for phases used.
9. Stop bars and crosswalks must be restored on all approaches.
10. Maximum times shown in timing charts are free-run operation only. Coordinated signal system timing values supersede these values.
11. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
12. In the event of loop replacement, refer to the current Signals and Geometrics Design Manual and submit a Plan of Record to the Signals and Geometrics Section.
13. Omit "Walk" and flashing "Don't Walk" with no pedestrian calls.
14. Relocate existing street signs to new span wire.
15. Use controller/cabinet relocated from LaSalle Street at Erwin Road intersection. Paint new signal inventory number on the cabinet (05-0917).
16. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.



SIGNAL FACE	PHASE							
	01	02	03	04	05	06	07	08
21	R	R	G	R	R	R	Y	
22	R	R	G	R	R	R	Y	
41	R	R	G	R	R	R	Y	
42	R	R	G	R	R	R	Y	
43	R	R	G	R	R	R	Y	
61	R	R	G	R	R	R	Y	
62	R	R	G	R	R	R	Y	
63	R	R	G	R	R	R	Y	
64	R	R	G	R	R	R	Y	
81	R	R	G	R	R	R	Y	
82	R	R	G	R	R	R	Y	
P21, P22	DW	DW	W	DW	DW	DW	DRK	
P41, P42	DW	DW	DW	DW	DW	W	DRK	
P43, P44	DW	DW	DW	DW	DW	W	DRK	
P61, P62	DW	W	DW	DW	DW	DW	DRK	
P81, P82	DW	DW	DW	DW	DW	DW	DRK	
P83, P84	DW	DW	DW	DW	DW	DW	DRK	



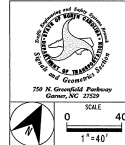
LOOP & DETECTOR UNIT INSTALLATION CHART																				
170 CONTROLLER AND CABINET																				
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEMA PHASE	DETECTOR PROGRAMMING															
					TIMING	ATTRIBUTES														
						DELAY	CURTAIN	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6	TYPE 7	TYPE 8					
IA	6x40	2-4-2	0	X	1	IS	SEC.	SEC.												
IB	6x40	2-4-2	0	X	1	IS	SEC.	SEC.												
2A	6x27	2	70	X	2	-	SEC.	SEC.												
3A	6x40	2-4-2	0	X	3	IS	SEC.	SEC.												
4A	6x40	2-4-2	0	X	4	IS	SEC.	SEC.												
5A	6x40	2-4-2	0	X	5	IS	SEC.	SEC.												
6A	6x27	2	60	X	6	-	SEC.	SEC.												
7A	6x40	2-4-2	0	X	7	IS	SEC.	SEC.												
8A	6x40	2-4-2	0	X	8	-	SEC.	SEC.												
P21, P22	N/A	N/A	N/A	X	2	-	SEC.	SEC.												
P41, P42	N/A	N/A	N/A	X	4	-	SEC.	SEC.												
P43, P44	N/A	N/A	N/A	X	4	-	SEC.	SEC.												
P61, P62	N/A	N/A	N/A	X	6	-	SEC.	SEC.												
P81, P82	N/A	N/A	N/A	X	8	-	SEC.	SEC.												
P83, P84	N/A	N/A	N/A	X	8	-	SEC.	SEC.												

TIMING CHART									
170 CONTROLLER									
PHASE	01	02	03	04	05	06	07	08	
MINIMUM INITIAL *	7	10	7	7	7	10	7	7	
VEHICLE EXTENSION *	1.0	3.0	1.0	1.0	1.0	3.0	1.0	1.0	
YELLOW CHANGE INT.	3.0	3.8	3.0	3.7	3.0	3.9	3.0	3.1	
RED CLEARANCE	2.3	1.6	2.6	1.7	2.4	1.4	2.4	2.6	
MAXIMUM LIMIT *	20	60	20	35	20	60	35	35	
RECALL POSITION	NONE	VEH RECALL	NONE	NONE	NONE	VEH RECALL	NONE	NONE	
VEHICLE CALL MEMORY	NONLOCK	YELLOW LOCK	NONLOCK	NONLOCK	NONLOCK	YELLOW LOCK	NONLOCK	NONLOCK	
DOUBLE ENTRY	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	
WALK *	-	4	-	4	-	4	-	4	
FLASHING DON'T WALK	-	12	-	21	-	24	-	27	
TYPE 3 LIMIT	-	-	-	-	-	-	-	-	
ADD PER VEHICLE *	-	-	-	-	-	-	-	-	
MAXIMUM INITIAL *	-	-	-	-	-	-	-	-	
MAXIMUM GAP *	1.0	3.0	1.0	1.0	1.0	3.0	1.0	1.0	
REDUCE 0.1 SEC EVERY *	-	-	-	-	-	-	-	-	
MINIMUM GAP	1.0	3.0	1.0	1.0	1.0	3.0	1.0	1.0	

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 4 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
DATE: 11/1/07
Traffic Engineering Branch

SIGNAL UPGRADE



SR 1320 (ERWIN ROAD) AT SR 1317 (MORRENE ROAD) / TOWERVIEW ROAD			
DEVISION	5	DURHAM COUNTY	DURHAM
PLAN DATE	10-09-2007	REVISION 01	JLL
PREPARED BY	JW	REVISION 01	
REVISIONS		INT.	DATE



This plan supersedes plan signed and sealed on 12/22/2006.

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0917-Erwin Rd & Morreene Rd

Group Assignment: **p**
 Field Master Assignment: **NONE**
 System Reference Number: **94**

N/S Street Name: **Not Assigned**
 E/W Street Name: **Not Assigned**

Last Database Change: 5/31/2013 9:05

Change Record					
Change	By	Date	Change	By	Date

Notes: 11/24/09 per Citizen complaint via Dale M. not enough time to get thru on bike from 3/29/10 changed max limit in bank 3 from 250 to 60 until 7A until new loop is instal 4/5/10 New loop cut on 4/1/10. Changed max limit back to 250 from 60 sec. CB

Manual Plan
 0 = Automatic
 1-9 = Plan 1-9
 14 = Free
 15 = Flash

Manual Offset
 0 = Automatic
 1 = Offset A
 2 = Offset B
 3 = Offset C

Drop Number	5	<C/0+0+0>
Zone Number	1	<C/0+0+1>
Area Number	1	<C/0+0+2>
Area Address	94	<C/0+0+3>
QuicNet Channel	COM123:	(QuicNet)

Manual Plan		<C/0+A+1>
Manual Offset		<C/0+B+1>

Red Start	0.0	<F/1+C+0>
Flash Start	10	<F/1+0+E>
Red Revert	5.0	<F/1+0+F>

Exclusive Walk	0	<F/1+0+0>
Exclusive FDW	0	<F/1+0+1>
All Red Clear	0.0	<F/1+0+2>

Communication Addresses
 [Configuration not in timing menus]

Manual Selection
 [Set Manual Plan/Offset not timing]

Start / Revert Times
 [Miscellaneous Timing]

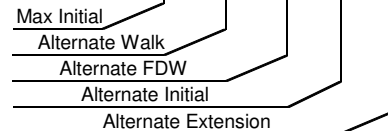
Exclusive Ped Phase
 (Outputs specified in Assignable
 Outputs at E/127+A+E & F)

[Miscellaneous Timing]

Row	Phase Names ---->	Phase							
		1	2	3	4	5	6	7	8
0	Ped Walk	0	4	0	4	0	4	0	4
1	Ped FDW	0	12	0	21	0	24	0	27
2	Min Green	7	10	7	7	7	10	7	7
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
6	Max Gap	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
7	Min Gap	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
8	Max Limit	20	60	20	35	20	60	35	35
9	Max Limit 2	0	0	0	0	0	0	0	0
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	0	0	0	0	0	0	0	0
C	Cond Serv Min	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	3.0	3.8	3.0	3.7	3.0	3.9	3.0	3.1
F	Red Clear	2.3	1.6	2.6	1.7	2.4	1.4	2.4	2.6

Phase Timing - Bank 1 <C+0+F=1>
 [Phase Timing Bank 1]

	9	A	B	C	D
Phase 1	0	0	0	0	0.0
Phase 2	0	0	0	0	0.0
Phase 3	0	0	0	0	0.0
Phase 4	0	0	0	0	0.0
Phase 5	0	0	0	0	0.0
Phase 6	0	0	0	0	0.0
Phase 7	0	0	0	0	0.0
Phase 8	0	0	0	0	0.0



Alternate Timing <C+0+F=1>
 [Phase Timing Bank 1]

	E	F	Row
RR-1 Delay	0		0
RR-1 Clear	0		1
EV-A Delay	0		2
EV-A Clear	0		3
EV-B Delay	0		4
EV-B Clear	0		5
EV-C Delay	0		6
EV-C Clear	0		7
EV-D Delay	0		8
EV-D Clear	0		9
RR-2 Delay	0		A
RR-2 Clear	0		B
View EV Delay	---		C
View EV Clear	---		D
View RR Delay	---		E
View RR Clear	---		F

Preempt Timing
 [Preempt Timing]

Permit	12345678	0
Red Lock		1
Yellow Lock	2 6	2
Min Recall	2 6	3
Ped Recall		4
View Set Peds	-----	5
Rest In Walk		6
Red Rest		7
Dual Entry	4 8	8
Max Recall		9
Soft Recall		A
Max 2		B
Cond. Service		C
Ext Cont Calls	12345678	D
Yellow Start		E
First Phases	2 6	F

Phase Functions <C+0+F=1>
 [Phase Functions]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0917-Erwin Rd & Morreene Rd

		Overlap							
Column Numbers ---->		1	2	3	4	5	6	7	8
Row	Overlap Name ---->								
0	Load Switch Number	0	0	0	0	0	0	0	0
1	Veh Set 1 - Phases								12345678
2	Veh Set 2 - Phases								
3	Veh Set 3 - Phases								
4	Neg Veh Phases								
5	Neg Ped Phases								
6	Green Omit Phases								
7	Green Clear Omit Phs.								
8									
9									
A									
B									
C									
D	Green Clear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F	Red Clear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Overlap Assignments <C+0+E=29>
 [Overlap Configuration]

Extra 1 Flags
 1 = TBC Type 1
 2 = NEMA Ext. Coord
 3 = Auto Daylight Savings
 4 = EV Advance
 5 = Extended Status
 6 = International Ped
 7 = Flash - Clear Outputs
 8 = Split Ring

Extra 2 Flags
 1 = AWB During Initial
 2 = LMU Installed
 3 = Disable Min Walk
 4 = QuicNet/4 System
 5 = Ignore P/P on EV
 6 =
 7 = Reserved
 8 =

	C	Row
EV-A	0	0
EV-B	0	1
EV-C	0	2
EV-D	0	3
RR-1 *	---	4
RR-2 *	---	5
SE-1	0	6
SE-2	0	7

Preempt Priority
 <C+0+E=125>
 (* RR-1 is always Highest, and RR-2 is always Second Highest)

[Preempt Parameters]

Row	Column Numbers ---->	E
0	Exclusive Phases	
1	RR-1 Clear Phases	
2	RR-2 Clear Phases	
3	RR-2 Limited Service	
4	Prot / Perm Phases	
5	Flash to PE Circuits	
6	Flash Entry Phases	2 6
7	Disable Yellow Range	
8	Disable Ovp Yel Range	
9	Overlap Yellow Flash	
A	EV-A Phases	
B	EV-B Phases	
C	EV-C Phases	
D	EV-D Phases	
E	Extra 1 Config. Bits	1 3 5
F	IC Select (Interconnect)	2

Configuration <C+0+E=125>
 [Configuration Data]

Row	Column Numbers ---->	F
0	Ext. Permit 1 Phases	
1	Ext. Permit 2 Phases	
2	Exclusive Ped Assign	
3	Preempt Non-Lock	
4	Ped for 2P Output	2
5	Ped for 6P Output	6
6	Ped for 4P Output	4
7	Ped for 8P Output	8
8	Yellow Flash Phases	2 6
9	Low Priority A Phases	
A	Low Priority B Phases	
B	Low Priority C Phases	
C	Low Priority D Phases	
D	Restricted Phases	
E	Extra 2 Config. Bits	4

Configuration <C+0+E=125>
 [Configuration Data]

Row	Column Numbers ---->	F
0	Fast Green Flash Phase	
1	Green Flash Phases	
2	Flashing Walk Phases	
3	Guaranteed Passage	
4	Simultaneous Gap Term	12345678
5	Sequential Timing	
6	Advance Walk Phases	
7	Delay Walk Phases	
8	External Recall	
9	Start-up Overlap Green	
A	Max Extension	
B	Inhibit Ped Reserve	
C	Semi-Actuated	
D	Start-up Overlap Yellow	
E	Start-up Vehicle Calls	12345678
F	Start-up Ped Calls	2 4 6 8

Specials <C+0+F=2>
 [Phase Functions]

Flash to PE & PE Non-Lock
 1 = EV A 5 = RR 1
 2 = EV B 6 = RR 2
 3 = EV C 7 = SE 1
 4 = EV D 8 = SE 2

IC Select Flags
 1 =
 2 = Modem
 3 = 7-Wire Slave
 4 = Flash / Free
 5 =
 6 = Simplex Master
 7 = 7-Wire Master
 8 = Offset Interrupter

	2	Row
Phase 1	10	1
Phase 2	10	2
Phase 3	10	3
Phase 4	10	4
Phase 5	10	5
Phase 6	10	6
Phase 7	10	7
Phase 8	10	8

Coordination Transition Minimums
 <C+0+C=5>
 [Coordination Functions]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extension
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0917-Erwin Rd & Morreene Rd

		Plan								
Column Numbers ---->		1	2	3	4	5	6	7	8	9
Row	Plan Name ---->									
0	Cycle Length	0	0	0	0	0	0	0	0	0
1	Phase 1 - ForceOff	0	0	0	0	0	0	0	0	0
2	Phase 2 - ForceOff	0	0	0	0	0	0	0	0	0
3	Phase 3 - ForceOff	0	0	0	0	0	0	0	0	0
4	Phase 4 - ForceOff	0	0	0	0	0	0	0	0	0
5	Phase 5 - ForceOff	0	0	0	0	0	0	0	0	0
6	Phase 6 - ForceOff	0	0	0	0	0	0	0	0	0
7	Phase 7 - ForceOff	0	0	0	0	0	0	0	0	0
8	Phase 8 - ForceOff	0	0	0	0	0	0	0	0	0
9	Ring Offset	0	0	0	0	0	0	0	0	0
A	Offset A	0	0	0	0	0	0	0	0	0
B	Offset B	0	0	0	0	0	0	0	0	0
C	Offset C	0	0	0	0	0	0	0	0	0
D	Perm 1 - End	0	0	0	0	0	0	0	0	0
E	Hold Release	0	0	0	0	0	0	0	0	0
F	Zone Offset	0	0	0	0	0	0	0	0	0

Coordination - Bank 1 <C+0+C=1>
 [Coordination Timing 1 -]

Row										
0	Ped Adjustment	0	0	0	0	0	0	0	0	0
1	Perm 2 - Start	0	0	0	0	0	0	0	0	0
2	Perm 2 - End	0	0	0	0	0	0	0	0	0
3	Perm 3 - Start	0	0	0	0	0	0	0	0	0
4	Perm 3 - End	0	0	0	0	0	0	0	0	0
5	Reservice Time	0	0	0	0	0	0	0	0	0
6	Reservice Phases									
7										
8	Pretimed Phases									
9	Max Recall									
A	Perm 1 Veh Phase	12345678	12345678	12345678	12345678	12345678	12345678	12345678	12345678	12345678
B	Perm 1 Ped Phase	12345678	12345678	12345678	12345678	12345678	12345678	12345678	12345678	12345678
C	Perm 2 Veh Phase									
D	Perm 2 Ped Phase									
E	Perm 3 Veh Phase									
F	Perm 3 Ped Phase									

Coordination - Bank 2 <C+0+C=2>
 [Coordination Timing 2]

Coord Extra
 1 = Programmed WALK Time for Sync Phases
 2 = Always Terminate Sync Phase Peds

Row	E	Row
0		0
1	Plan 1 - Sync	2 6
2	Plan 2 - Sync	2 6
3	Plan 3 - Sync	2 6
4	Plan 4 - Sync	2 6
5	Plan 5 - Sync	2 6
6	Plan 6 - Sync	2 6
7	Plan 7 - Sync	2 6
8	Plan 8 - Sync	2 6
9	Plan 9 - Sync	2 6
A	NEMA Sync	
B	NEMA Hold	
C		
D		
E	Coord Extra	
F		

Sync Phases <C+0+C=1>
 [Coordination Functions]

Row	F	Row
0	Free Lag	2 4 6 8
1	Plan 1 - Lag	2 4 6 8
2	Plan 2 - Lag	2 4 6 8
3	Plan 3 - Lag	2 4 6 8
4	Plan 4 - Lag	2 4 6 8
5	Plan 5 - Lag	2 4 6 8
6	Plan 6 - Lag	2 4 6 8
7	Plan 7 - Lag	2 4 6 8
8	Plan 8 - Lag	2 4 6 8
9	Plan 9 - Lag	2 4 6 8
A	External Lag	
B		
C		
D		
E		
F		

Lag Phases <C+0+C=1>
 [Coordination Functions]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0917-Erwin Rd & Morreene Rd

Row	Column 9	Column A	Column B	Column C	Column D	Column E	Column F	Row							
0	Spec. Funct. 1	0	NOT-3	0	Max 2	0	Pretimed	0	Set DOW	0	Dial 2 (7-Wire)	0	Sim Term	0	0
1	Spec. Funct. 2	0	NOT-4	0	System Det 1	0	Plan 1	0	Ext. Perm 1	0	Dial 3 (7-Wire)	0	EV-A	71	1
2	Spec. Funct. 3	0	OR-4 (a)	0	System Det 2	0	Plan 2	0	Ext. Perm 2	0	Offset 1 (7-Wire)	0	EV-B	72	2
3	Spec. Funct. 4	0	OR-4 (b)	0	System Det 3	0	Plan 3	0	Dimming	0	Offset 2 (7-Wire)	0	EV-C	73	3
4	NAND-3 (a)	0	OR-5 (a)	0	System Det 4	0	Plan 4	0	Set Clock	0	Offset 3 (7-Wire)	0	EV-D	74	4
5	NAND-3 (b)	0	OR-5 (b)	0	System Det 5	0	Plan 5	0	Stop Time	82	Free (7-Wire)	0	RR-1	51	5
6	NAND-4 (a)	0	OR-6 (a)	0	System Det 6	0	Plan 6	0	Flash Sense	81	Flash (7-Wire)	0	RR-2	52	6
7	NAND-4 (b)	0	OR-6 (b)	0	System Det 7	0	Plan 7	0	Manual Enable	53	Excl. Ped Omit	0	Spec. Event 1	0	7
8	OR-7 (a)	0	Fig 3 Diamond	0	System Det 8	0	Plan 8	0	Man. Advance	80	NOT-1	220	Spec. Event 2	0	8
9	OR-7 (b)	0	Fig 4 Diamond	0	Max Inhibit (nema)	0	Plan 9	0	External Alarm	75	NOT-2	0	External Lag	0	9
A	OR-7 (c)	0	AND-4 (a)	0	Force A (nema)	0	DELAY-A	0	Phase Bank 2	0	OR-1 (a)	0	AND-1 (a)	0	A
B	OR-7 (d)	0	AND-4 (b)	0	Force B (nema)	0	DELAY-B	0	Phase Bank 3	221	OR-1 (b)	0	AND-1 (b)	0	B
C	OR-8 (a)	0	NAND-1 (a)	0	C.N.A. (nema)	0	DELAY-C	0	Overlap Set 2	0	OR-2 (a)	0	AND-2 (a)	0	C
D	OR-8 (b)	0	NAND-1 (b)	0	Hold (nema)	0	DELAY-D	0	Overlap Set 3	0	OR-2 (b)	0	AND-2 (b)	0	D
E	OR-8 (c)	0	NAND-2 (a)	0	Max Recall	0	DELAY-E	0	Detector Set 2	0	OR-3 (a)	0	AND-3 (a)	0	E
F	OR-8 (d)	0	NAND-2 (b)	0	Min Recall	0	DELAY-F	0	Detector Set 3	0	OR-3 (b)	0	AND-3 (b)	0	F

Assignable Inputs
 [Input Assignments]

<C=0+E=126>

Row	Column 9	Column A	Column B	Column C	Column D	Column E	Column F	Row							
0	Phase ON - 1	0	Preempt Fail	0	Flasher 0	0	Free	220	NOT-1	221	TOD Out 1	201	Dial 2 (7-Wire)	0	0
1	Phase ON - 2	0	Sp Evnt Out 1	0	Flasher 1	0	Plan 1	211	OR-1	0	TOD Out 2	202	Dial 3 (7-Wire)	0	1
2	Phase ON - 3	0	Sp Evnt Out 2	0	Fast Flasher	0	Plan 2	212	OR-2	0	TOD Out 3	203	Offset 1 (7-Wire)	0	2
3	Phase ON - 4	0	Sp Evnt Out 3	0	Fig 3 Diamond	0	Plan 3	213	OR-3	0	TOD Out 4	204	Offset 2 (7-Wire)	0	3
4	Phase ON - 5	0	Sp Evnt Out 4	0	Fig 4 Diamond	0	Plan 4	214	AND-1	0	TOD Out 5	205	Offset 3 (7-Wire)	0	4
5	Phase ON - 6	0	Sp Evnt Out 5	0			Plan 5	215	AND-2	0	TOD Out 6	206	Free (7-Wire)	0	5
6	Phase ON - 7	0	Sp Evnt Out 6	0			Plan 6	216	AND-3	0	TOD Out 7	207	Flash (7-Wire)	0	6
7	Phase ON - 8	0	Sp Evnt Out 7	0			Plan 7	217	NOT-2	0	TOD Out 8	208	Preempt	0	7
8	Ph. Check - 1	0	Sp Evnt Out 8	0	NOT-3	0	Plan 8	218	EV-A	0	Adv. Warn - 1	0	Low Priority A	0	8
9	Ph. Check - 2	0			NOT-4	0	Plan 9	219	EV-B	0	Adv. Warn - 2	0	Low Priority B	0	9
A	Ph. Check - 3	0	Detector Fail	0	OR-4	0	Spec. Funct. 3	0	EV-C	0	DELAY-A	0	Low Priority C	0	A
B	Ph. Check - 4	0	Spec. Funct. 1	0	OR-5	0	Spec. Funct. 4	0	EV-D	0	DELAY-B	0	Low Priority D	0	B
C	Ph. Check - 5	0	Spec. Funct. 2	0	OR-6	0	NAND-3	0	RR-1	0	DELAY-C	0			C
D	Ph. Check - 6	0	Central Control	0	AND-4	0	NAND-4	0	RR-2	0	DELAY-D	0			D
E	Ph. Check - 7	0	Excl. Ped DW	0	NAND-1	0	OR-7	0	Spec. Event 1	0	DELAY-E	0			E
F	Ph. Check - 8	0	Excl. Ped WK	0	NAND-2	0	OR-8	0	Spec. Event 2	0	DELAY-F	0			F

Assignable Outputs
 [Output Assignments]

<C=0+E=127>

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extension
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

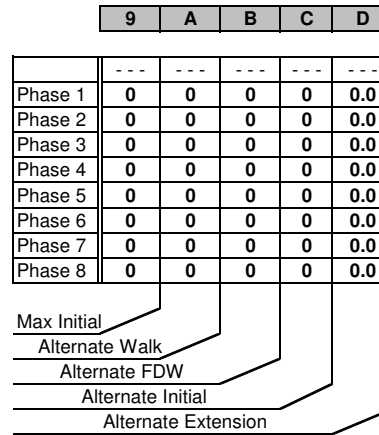
INTERSECTION: 0917-Erwin Rd & Morreene Rd

Row	Phase Names ---->	Phase							
		1	2	3	4	5	6	7	8
0	Ped Walk	0	4	0	4	0	4	0	4
1	Ped FDW	0	12	0	21	0	24	0	27
2	Min Green	7	12	7	7	7	10	7	7
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
6	Max Gap	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
7	Min Gap	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
8	Max Limit	20	60	20	35	20	60	35	35
9	Max Limit 2	0	0	0	0	0	0	0	0
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	0	0	0	0	0	0	0	0
C	Cond Serv Min	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	3.7	0.0	0.0	0.0	0.0
E	Yellow Change	3.0	3.8	3.0	1.7	3.0	3.9	3.0	3.1
F	Red Clear	2.3	1.6	2.6	2.0	0.0	1.4	2.4	2.6

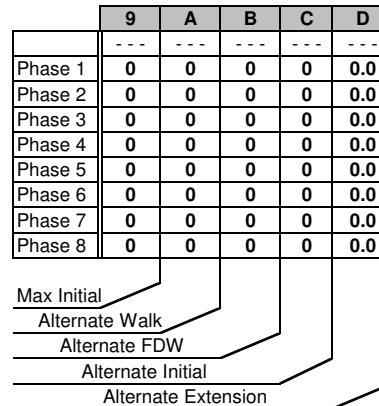
Phase Timing - Bank 2 <C=0+F=2>
 [Phase Timing Bank2]

Row	Phase Names ---->	Phase							
		1	2	3	4	5	6	7	8
0	Ped Walk	0	4	0	4	0	4	0	4
1	Ped FDW	0	12	0	21	0	24	0	27
2	Min Green	7	12	7	7	7	10	7	7
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	1.0	3.0	2.0	2.0	1.0	3.0	2.0	2.0
6	Max Gap	1.0	3.0	2.0	2.0	1.0	3.0	2.0	2.0
7	Min Gap	1.0	3.0	2.0	2.0	1.0	3.0	2.0	2.0
8	Max Limit	250	250	250	250	250	250	250	250
9	Max Limit 2	0	0	0	0	0	0	0	0
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	0	0	0	0	0	0	0	0
C	Cond Serv Min	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	3.0	3.8	3.0	1.7	3.0	3.9	3.0	3.1
F	Red Clear	2.3	1.6	2.6	1.7	2.4	1.4	2.4	2.6

Phase Timing - Bank 3 <C=0+F=3>
 [Phase Timing Bank 3]



Alternate Timing
 [Phase Timing Bank2]



Alternate Timing
 [Phase Timing Bank 3]

Transition Type
 0.X = Shortway
 1.X = Lengthen
 X.1 thru X.4 =
 Number of
 cycles when
 lengthening

Daylight Savings
 Date
 If set to all zeros,
 standard dates
 will be used.

Transition Type | 0.3 <C/5+1+9>

TBC Transition

[Coordination Functions]

Cycle 1 Fail | 0 C/5+1+1

Cycle 2 Fail | 0 C/5+1+2

Cycle Fail Thresholds (minutes)

[Coordination Functions]

Lag Hold Phases | <C/5+1+A>

Coordinated Lag Hold Phases

[Coordination Functions]

Sync Output Time | 0.0 <C/5+1+C>

7-Wire Master

[Coordination Function/ called Sync Time]

Begin Month | 3 <C/5+2+A>

Begin Week | 2 <C/5+2+B>

End Month | 11 <C/5+2+C>

End Week | 1 <C/5+2+D>

Daylight Savings Time

[Dialback and Daylight Saving]

Time B4 Yellow | 0.0 <F/1+C+E>

Phase Number | 0 <F/1+C+F>

Advance Warning Beacon - Sign 1

[Miscellaneous Timing]

Time B4 Yellow | 0.0 <F/1+D+E>

Phase Number | 0 <F/1+D+F>

Advance Warning Beacon - Sign 2

[Miscellaneous Timing]

Long Failure | 0.7 <F/1+0+6>

Short Failure | 0.7 <F/1+0+7>

Power Cycle Correction (Default = 0.7)

[Miscellaneous Timing]

Min Time (seconds) | 0 <F/1+0+8>

Min Green Before PE Force Off

[Preempt Parameters]

Max Time (minutes) | 255 <F/1+0+9>

Max Preempt Time Before Failure

[Preempt Parameters]

Min Time (seconds) | 0 <F/1+0+A>

Min Time Between Same Preempts

(Does Not Apply To Railroad Preempt)

Low Pri. Channel | <E/125+C+8>

Disable Low Priority Channel

[Preempt Parameters]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0917-Erwin Rd & Morreene Rd

Column Numbers ---->		0	1	2	3	1	3
Row	Det Num	C1 Pin Number	Attributes	Phase(s)	Assign	Delay	Carry-over
0	1	56	5 7	1	123 8	15.0	0.0
1	2	56	5 7	6	123 8	0.0	0.0
2	3	56	7	8	123 8	15.0	0.0
3	4	39	5 7	2	123 8	0.0	0.0
4	5	58	5 7	3	123 8	15.0	0.0
5	6	58	5 7	8	123 8	3.0	0.0
6	7	41	5 7	4	123 8	10.0	0.0
7	8	60	5 7	1	123 8	15.0	0.0
8	9	60	5 7	8	123 8	15.0	0.0
9	10	55	5 7	2	123 8	0.0	0.0
A	11	55	5 7	5	123 8	15.0	0.0
B	12	55	7	4	123 8	15.0	0.0
C	13	40	5 7	6	123 8	0.0	0.0
D	14	57	5 7	4	123 8	3.0	0.0
E	15	57	5 7	7	123 8	15.0	0.0
F	16	42	5 7	8	123 8	0.0	0.0

Detector Types
 EXTENTION: Detector only active during the Phase Green Interval
 COUNT: used in computing "Added Initial"
 CALL: Detector only active during the non green phase will not extend the phases
 TYPE 3: will allow a call detector to extend its phase until the call first drops or the type 3 limit is reached

Column Numbers ---->		Ped / Phase / Overlap								Row
		1	2	3	4	5	6	7	8	
Walk		0	0	0	0	0	0	0	0	0
Don't Walk		0	0	0	0	0	0	0	0	1
Phase Green		0	0	0	0	0	0	0	0	2
Phase Yellow		0	0	0	0	0	0	0	0	3
Phase Red		0	0	0	0	0	0	0	0	4
Overlap Green		0	0	0	0	0	0	0	0	5
Overlap Yellow		0	0	0	0	0	0	0	0	6
Overlap Red		0	0	0	0	0	0	0	0	7

Redirect Phase Outputs <C+0+E=127>

[Phase Output Redirections]

Cabinet Type	0	<E/125+D+0>	D	Row
Enable Redirection			12345678	0
(Enable Redirection = 30)				1
[Phase Output Redirection]				2
Max OFF (minutes)	255	<D/0+0+1>		3
Max ON (minutes)	7	<D/0+0+2>		4
Detector Failure Monitor				5
[Miscellaneous Timing]				6
				7

Dimming <C+0+E=125>

[Output Dimming]

Output Bit:	D	Row
Output Port 1		1
Output Port 2		2
Output Port 3		3
Output Port 4		4
Output Port 5		5
Output Port 6		6
Output Port 7		7

Delay Logic Times

<C+0+D=0> (seconds)

[Miscellaneous Timing]

Omit Alarm [] <C/5+F+0>

Disable Alarm Reporting

[Dialback and Daylight Saving]

Time [0] <C/5+C+0>

Redial Time (minutes)

(View Redial Timer at E/2+D+6)

[Dialback and Daylight Saving]

Column Numbers ---->		4	5	6	7	2	4
Row	Det Num	C1 Pin Number	Attributes	Phase(s)	Assign	Delay	Carry-over
0	17	67	2	2	123	0.0	0.0
1	18	69	2	4	123	0.0	0.0
2	19	68	2	6	123	0.0	0.0
3	20	70	2	8	123	0.0	0.0
4	21	0				0.0	0.0
5	22	0				0.0	0.0
6	23	0				0.0	0.0
7	24	0				0.0	0.0
8	25	0				0.0	0.0
9	26	0				0.0	0.0
A	27	0				0.0	0.0
B	28	0				0.0	0.0
C	29	0				0.0	0.0
D	30	0				0.0	0.0
E	31	0				0.0	0.0
F	32	0				0.0	0.0

Detector Attributes
 1 = Full Time Delay
 2 = Ped Call
 3 =
 4 = Count
 5 = Extension
 6 = Type 3
 7 = Calling
 8 = Alternate

Det. Assignments

1 = Det. Set 1
 2 = Det. Set 2
 3 = Det. Set 3
 4 =
 5 =
 6 = Failure - Min Recall
 7 = Failure - Max Recall
 8 = Report on Failure

Detector Assignments <C+0+E=126>

[Detector Attributes]

<C+0+D=0>

[Detector Timing]

Dial-Back Telephone Number

[Dialback and Daylight Saving]

Disable Alarms

1 = Stop Time
 2 = Flash Sense
 3 = Keyboard Entry
 4 = Manual Plan
 5 = Police Control
 6 = External Alarm
 7 = Detector Failure
 8 =

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
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INTERSECTION: 0917-Erwin Rd & Morreene Rd

Row	Time	Plan	Offset	Day of Week
0	00:00	0	0	
1	00:00	0	0	
2	00:00	0	0	
3	00:00	0	0	
4	00:00	0	0	
5	00:00	0	0	
6	00:00	0	0	
7	00:00	0	0	
8	00:00	0	0	
9	00:00	0	0	
A	00:00	0	0	
B	00:00	0	0	
C	00:00	0	0	
D	00:00	0	0	
E	00:00	0	0	
F	00:00	0	0	

TOD Coordination <C+0+9=0.1>
 (Bank 1)
 [Time of Day Functions]

Time	Funct.	Day of Week
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	

TOD Function <C+0+7=0.1>
 [Time of Day Functions]

Column 4 Phases/Bits

<C+0+E=27>

Day	Year	Month	Holiday Type
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	

Holiday Dates <C+0+8=1.1>
 (Bank 1)
 [Holiday Dates]

Time	Plan	Offset	Holiday Type
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	

Holiday Events <C+0+9=1.1>
 (Bank 1)
 [Holiday TBC Plans]

T.O.D. Functions
 0 =
 1 = Red Lock
 2 = Yellow Lock
 3 = Veh Min Recall
 4 = Ped Recall
 5 =
 6 = Rest In Walk
 7 = Red Rest
 8 = Double Entry
 9 = Veh Max Recall
 A = Veh Soft Recall
 B = Maximum 2
 C = Conditional Service
 D = Free Lag Phases
 E = Bit 1 - Local Override
 Bit 4 - Disable Detector
 OFF Monitor
 Bit 7 - Detector Count
 Monitor
 Bit 8 - Real Time Split
 Monitor
 F = Output Bits 1 thru 8

Plan Select
 1 thru 9 = Coordination
 Plan 1 thru 9
 14 or E = Free
 15 or F = Flash

Offset Select
 A = Offset A
 B = Offset B
 C = Offset C

Month Select
 1 = January
 2 = February
 3 = March
 4 = April
 5 = May
 6 = June
 7 = July
 8 = August
 9 = September
 A = October
 B = November
 C = December

Row	Time	Plan	Offset	Day of Week
0	00:00	0	0	
1	00:00	0	0	
2	00:00	0	0	
3	00:00	0	0	
4	00:00	0	0	
5	00:00	0	0	
6	00:00	0	0	
7	00:00	0	0	
8	00:00	0	0	
9	00:00	0	0	
A	00:00	0	0	
B	00:00	0	0	
C	00:00	0	0	
D	00:00	0	0	
E	00:00	0	0	
F	00:00	0	0	

TOD Coordination <C+0+9=0.2>
 (Bank 2)
 [Time Base Coordination]

Time	Funct.	Holiday Type
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	

Holiday TOD Function <C+0+7=0.2>
 [Time of Day Functions]

Column 4 Phases/Bits

<C+0+E=28>

Day	Year	Month	Holiday Type
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	

Holiday Dates <C+0+8=1.2>
 (Bank 2)
 [Holiday Dates]

Time	Plan	Offset	Holiday Type
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	

Holiday Events <C+0+9=1.2>
 (Bank 2)
 [Holiday TBC Plans]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0917-Erwin Rd & Morreene Rd

Row	6 Clear	7 Time	8 Ped Call	9 Hold	A Advance	B Force Off	C Vehicle Call	D Permit Phases	E Ped Omit	F Circuit
0		0								
1		0								
2		0								
3		0								
4		0								
5		0								
6		0								
7		0								
8		0								
9		0								
A		0								
B		0								
C		0								
D		0								
E		0								
F		0								

Special Event Schedule -- Table 1
[Special Event Sequence 1]

<C+0+E=27>

Notes:

0 <E/27+5+F>
Limited Service Interval
[Special Event Sequence 1]

Row	6 Clear	7 Time	8 Ped Call	9 Hold	A Advance	B Force Off	C Vehicle Call	D Permit Phases	E Ped Omit	F Circuit
0		0								
1		0								
2		0								
3		0								
4		0								
5		0								
6		0								
7		0								
8		0								
9		0								
A		0								
B		0								
C		0								
D		0								
E		0								
F		0								

Special Event Schedule -- Table 2
[Special Event Sequence 2]

<C+0+E=28>

Notes:

0 <E/28+5+F>
Limited Service Interval
[Special Event Sequence 2]

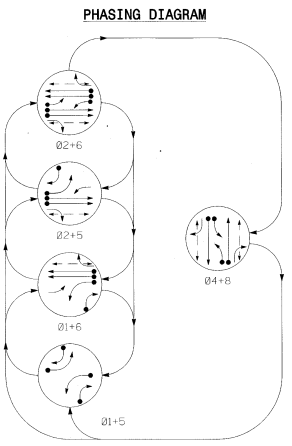
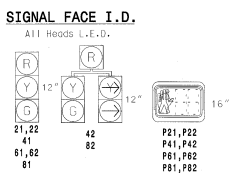


TABLE OF OPERATION

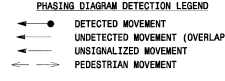
SIGNAL FACE	PHASE			
	01+5	02+5	01+6	02+6
11	R	R	R	R
21,22	R	R	R	R
41	R	R	R	R
42	R	R	R	R
51	R	R	R	R
61,62	R	R	R	R
81	R	R	R	R
82	R	R	R	R
P21, P22	DM	DM	DM	DM
P41, P42	DM	DM	DM	DM
P61, P62	DM	DM	DM	DM
P81, P82	DM	DM	DM	DM



170 LOOP & DETECTOR UNIT INSTALLATION CHART

LOOP NO.	INDUCTIVE LOOPS				NEW EXISTING	NEMA PHASE	TIMING		DETECTOR PROGRAMING							STATUS	
	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	DELAY			CARRY DETECTION	ATTRIBUTES									
								1	2	3	4	5	6	7	8		
1A	6x80	2-4-2	14	X	1	15	SEC	-	SEC	-	-	-	-	X	X	-	X
1B	6x40	2-4-2	0	X	1	15	SEC	-	SEC	-	-	-	-	X	X	-	X
2A	6x6	4	70	X	2	-	SEC	-	SEC	-	-	-	-	X	X	-	X
2B	6x6	4	70	X	2	-	SEC	-	SEC	-	-	-	-	X	X	-	X
4A	6x40	2-4-2	0	X	4	3	SEC	-	SEC	-	-	-	-	X	X	-	X
4B	6x40	2-4-2	0	X	4	-	SEC	-	SEC	-	-	-	-	X	X	-	X
5A	6x40	2-4-2	0	X	2	-	SEC	-	SEC	-	-	-	-	X	X	-	X
5B	6x40	2-4-2	0	X	5	15	SEC	-	SEC	-	-	-	-	X	X	-	X
6A	6x6	4	70	X	6	-	SEC	-	SEC	-	-	-	-	X	X	-	X
6B	6x6	4	70	X	6	-	SEC	-	SEC	-	-	-	-	X	X	-	X
8A	6x40	2-4-2	0	X	8	3	SEC	-	SEC	-	-	-	-	X	X	-	X
8B	6x40	2-4-2	0	X	8	-	SEC	-	SEC	-	-	-	-	X	X	-	X
P21, P22	N/A	N/A	N/A	X	2	-	SEC	-	SEC	-	-	-	-	X	X	-	X
P41, P42	N/A	N/A	N/A	X	4	-	SEC	-	SEC	-	-	-	-	X	X	-	X
P61, P62	N/A	N/A	N/A	X	6	-	SEC	-	SEC	-	-	-	-	X	X	-	X
P81, P82	N/A	N/A	N/A	X	8	-	SEC	-	SEC	-	-	-	-	X	X	-	X

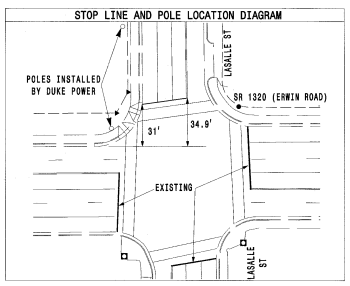
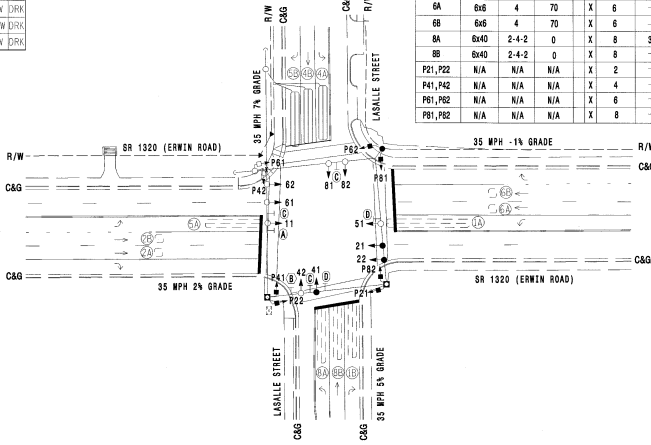
- 5 PHASE FULLY ACTUATED (DURHAM SIGNAL SYSTEM) NOTES**
- Refer to "Roadway Standard Drawings M007" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2008, and all applicable sections of the latest version of the generic Project Special Provisions. The PSP can be accessed at the following website: <http://www.ncdot.org/dsh/preconstruction/traffic/ites/>
 - Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
 - Phase 1 and/or phase 6 may be lagged.
 - Set all detector units to presence mode.
 - In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
 - Program all timing information into phase banks 1, 2, and 3 unless otherwise noted.
 - Set phase bank 3 maximum limit to 250 seconds for phases used.
 - Set "WALK" and flashing "DON'T WALK" with no pedestrian calls.
 - Program pedestrian heads to countdown the flashing "Don't Walk" time only.
 - Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
 - Relocate existing street name signs to new span wire.
 - Pavement markings shall be installed by contractor.



STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

	TO
F	1 2 1 2 1 2
R	1 2 1 2 1 2
O	1 2 1 2 1 2
M	1 2 1 2 1 2

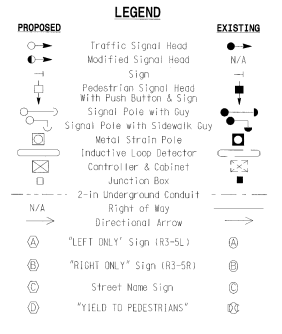
◄ = Flashing Yellow Arrow



TIMING CHART 170 CONTROLLER

PHASE	01	02	04	05	06	08
MINIMUM INITIAL *	7.0 SEC.	10.0 SEC.	7.0 SEC.	7.0 SEC.	10.0 SEC.	7.0 SEC.
VEHICLE EXTENSION *	1.0 SEC.	3.0 SEC.	2.0 SEC.	2.0 SEC.	3.0 SEC.	2.0 SEC.
YELLOW CHANGE INT.	3.0 SEC.	3.9 SEC.	3.5 SEC.	3.0 SEC.	3.9 SEC.	3.6 SEC.
RED CLEARANCE	2.8 SEC.	1.9 SEC.	2.3 SEC.	2.6 SEC.	1.9 SEC.	2.2 SEC.
MAXIMUM LIMIT *	** SEC.	** SEC.	** SEC.	** SEC.	** SEC.	** SEC.
RECALL POSITION	NONE	VEH. RECALL	NONE	NONE	VEH. RECALL	NONE
VEHICLE CALL MEMORY	NONE	YELLOW LOCK	NONE	NONE	YELLOW LOCK	NONE
DOUBLE ENTRY	OFF	OFF	ON	OFF	OFF	ON
WALK *	- SEC.	7 SEC.	7 SEC.	- SEC.	6 SEC.	7 SEC.
FLASHING DON'T WALK	- SEC.	13 SEC.	20 SEC.	- SEC.	12 SEC.	18 SEC.
TYPE 3 LIMIT	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
ALTERNATE EXTENSION	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
ADD FOR VEHICLE *	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
MAXIMUM INITIAL *	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
MAXIMUM GAP*	1.0 SEC.	3.0 SEC.	2.0 SEC.	2.0 SEC.	3.0 SEC.	2.0 SEC.
REDUCE 0.1 SEC EVERY *	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
MINIMUM GAP	1.0 SEC.	3.0 SEC.	2.0 SEC.	2.0 SEC.	3.0 SEC.	2.0 SEC.

* These values may be field adjusted. Do not adjust Min Green and Extension times for phase 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.
 ** Timing to be determined by the City of Durham.



Signal Upgrade

Prepared in the offices of:

RAMEY KEMP ASSOCIATES, INC.

SR 1320 (Erwin Road) at LaSalle Street

Division 5 Durham County

DATE: August 2011
 PREPARED BY: MJ. Hamilton
 CHECKED BY: BB Falls
 SCALE: 1"=40'

PROJECT NO.: 10051 (240)

DATE: 8-22-11

SEC. INVENTORY NO.: 05-0426

INTERSECTION: 0426-Erwin Rd & LaSalle St

QuicNet System Parameters

Group Assignment: **Group 0051**
 Field Master Assignment: **NONE**
 System Reference Number: **207**
 Communications Channel: **COM123:**
 Drop Address: **9**
 Area Number: **2**
 Area Address: **93**

N/S Street Name: **Not Assigned**
 E/W Street Name: **Not Assigned**

Last QuicNet Database Change: 1/4/2013 10:30

Notes:

- 1/25/07 DB Mismatch central had default timing. Uploaded field. BE
- 10/27/08 Downloaded new AM plan (Sch D) LT
- 6/28/12 Uploaded new timing for FYA installation. CB
- 9/07/12 Changed clearances 1 and 5 to match. CB

Field Change Record					
Change	By	Date	Change	By	Date

Excl Ped Assignment	_____	Note: Set the Exclusive Ped Outputs on the "Outputs / General" page				
Exclusive Walk	0					
Exclusive FDW	0					
All Red Clear	0.0					
Exclusive Ped Phase		<table border="1"> <tr> <td>Walk Output</td> <td>0</td> </tr> <tr> <td>Don't Walk Output</td> <td>0</td> </tr> </table>	Walk Output	0	Don't Walk Output	0
Walk Output	0					
Don't Walk Output	0					

	Phase							
	1	2	3	4	5	6	7	8
Min Green	7	10	0	7	7	10	0	7
Extension	1.0	3.0	0.0	2.0	2.0	3.0	0.0	2.0
Max	20	44	0	24	19	44	0	24
Max 2	0	0	0	0	0	0	0	0
Cond Serve Check	0	0	0	0	0	0	0	0

	Phase							
	1	2	3	4	5	6	7	8
Alternate Walk	0	0	0	0	0	0	0	0
Alternate Ped Clear	0	0	0	0	0	0	0	0
Alternate Minimum	0	0	0	0	0	0	0	0
Alternate Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternate Timing - Bank 1

	Phase							
	1	2	3	4	5	6	7	8
Yellow Change	3.0	3.9	0.0	3.5	3.0	3.9	0.0	3.6
Red Clear	2.8	1.9	0.0	2.3	2.8	1.9	0.0	2.2

Red Lock	_____	Red Rest	_____
Yellow Lock	2_6	Dual Entry	4_8
Simultaneous Gap	12_456_8	Sequential Timing	_____
Rest In Walk	_____	Inhibit Ped Reservice	_____
Advance Walk	_____	Semi-Actuated	_____
Flashing Walk	_____	Guaranteed Passage	_____
Max Extension	_____	Conditional Service	_____

	Phase							
	1	2	3	4	5	6	7	8
Walk	0	7	0	7	0	6	0	7
Ped Clear - FDW	0	13	0	20	0	12	0	18
Adv / Delay Walk	0	0	0	0	0	0	0	0
PE Min Ped FDW	0	0	0	0	0	0	0	0

Phase Functions - Page 1

Type 3 Disconnect	0	0	0	0	0	0	0	0
Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Added Initial	0	0	0	0	0	0	0	0
Min Gap	1.0	3.0	0.0	2.0	2.0	3.0	0.0	2.0
Max Gap	1.0	3.0	0.0	2.0	2.0	3.0	0.0	2.0
Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 1

Minimum Recall	2_6	Soft Recall	_____
Ped Recall	_____	External Recall	_____
Maximum Recall	_____	Manual Control Calls	12_456_8
Green Flash	_____	Fast Green Flash	_____
Overlap Green Flash	_____	Fast Overlap G. Flash	_____

Phase Functions - Page 2

		Phase							
		1	2	3	4	5	6	7	8
Basic Phase Timing	Min Green	7	10	0	7	7	10	0	7
	Extension	1.0	3.0	0.0	2.0	2.0	3.0	0.0	2.0
	Max	20	44	0	24	19	44	0	24
	Max 2	0	0	0	0	0	0	0	0
	Cond Serve Check	0	0	0	0	0	0	0	0
Clear	Yellow Change	3.0	3.9	0.0	3.5	3.0	3.9	0.0	3.6
	Red Clear	2.8	1.9	0.0	2.3	2.8	1.9	0.0	2.2
Pedestrian Timing	Walk	0	7	0	7	0	6	0	7
	Ped Clear - FDW	0	13	0	20	0	12	0	18
	Adv / Delay Walk	0	0	0	0	0	0	0	0
	PE Min Ped FDW	0	0	0	0	0	0	0	0
Volume Density	Type 3 Disconnect	0	0	0	0	0	0	0	0
	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Max Added Initial	0	0	0	0	0	0	0	0
	Min Gap	1.0	3.0	0.0	2.0	2.0	3.0	0.0	2.0
	Max Gap	1.0	3.0	0.0	2.0	2.0	3.0	0.0	2.0
	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 2

		Phase							
		1	2	3	4	5	6	7	8
Basic Phase Timing	Min Green	7	10	0	7	7	10	0	7
	Extension	1.0	3.0	0.0	2.0	2.0	3.0	0.0	2.0
	Max	250	250	0	250	250	250	0	250
	Max 2	250	250	0	250	250	250	0	250
	Cond Serve Check	0	0	0	0	0	0	0	0
Clear	Yellow Change	3.0	3.9	0.0	3.5	3.0	3.9	0.0	3.6
	Red Clear	2.8	1.9	0.0	2.3	2.8	1.9	0.0	2.2
Pedestrian Timing	Walk	0	7	0	7	0	6	0	7
	Ped Clear - FDW	0	13	0	20	0	12	0	18
	Adv / Delay Walk	0	0	0	0	0	0	0	0
	PE Min Ped FDW	0	0	0	0	0	0	0	0
Volume Density	Type 3 Disconnect	0	0	0	0	0	0	0	0
	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Max Added Initial	0	0	0	0	0	0	0	0
	Min Gap	1.0	3.0	0.0	2.0	2.0	3.0	0.0	2.0
	Max Gap	1.0	3.0	0.0	2.0	2.0	3.0	0.0	2.0
	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 3

		Phase							
		1	2	3	4	5	6	7	8
Alternate Walk	0	0	0	0	0	0	0	0	0
Alternate Ped Clear	0	0	0	0	0	0	0	0	0
Alternate Minimum	0	0	0	0	0	0	0	0	0
Alternate Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternate Timing - Bank 2

		Phase							
		1	2	3	4	5	6	7	8
Alternate Walk	0	0	0	0	0	0	0	0	0
Alternate Ped Clear	0	0	0	0	0	0	0	0	0
Alternate Minimum	0	0	0	0	0	0	0	0	0
Alternate Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternate Timing - Bank 3

Note: Set the Limited Service Interval on the "Utilities / Misc" page

Clear Phases	
Delay	0
Clear Time	0
Railroad - 1	

Clear Phases	
Limited Service Phases	
Delay	0
Clear Time	0
Railroad - 2	

Railroad Preempt Parameters

Min Grn Before PE Force-Off	1
Max Pre-Empt Time	255
Min Time Before Same PE	0

	Delay	Clear	Clear Phases
EV - A	0	0	
EV - B	0	0	
EV - C	0	0	
EV - D	0	0	
Emergency Vehicle Preempt			

SE - 1	
SE - 2	
EV - A	
EV - B	
EV - C	
EV - D	
Preempt Priority	

Step	Time	Clear	Ped Call	Hold	Advance	Force Off	Vehicle Call	Permit	Ped Omit	Output
0	0									
1	0									
2	0									
3	0									
4	0									
5	0									
6	0									
7	0									
8	0									
9	0									
10	0									
11	0									
12	0									
13	0									
14	0									
15	0									

Special Event Sequence - 1

Step	Time	Clear	Ped Call	Hold	Advance	Force Off	Vehicle Call	Permit	Ped Omit	Output
0	0									
1	0									
2	0									
3	0									
4	0									
5	0									
6	0									
7	0									
8	0									
9	0									
10	0									
11	0									
12	0									
13	0									
14	0									
15	0									

Special Event Sequence - 2

Note:
The Ring-Barrier Sum of these Minimums will be the Minimum Cycle Length During Transition

Transition Type	0.2
Coord Extra Functions	
Phase 1 - Minimum	14
Phase 2 - Minimum	20
Phase 3 - Minimum	14
Phase 4 - Minimum	14
Phase 5 - Minimum	14
Phase 6 - Minimum	20
Phase 7 - Minimum	14
Phase 8 - Minimum	14
Coordination - General	

- Coord Extra
- 1 = Programmed Walk Time for Sync Phases
 - 2 = Always Terminate Sync Phase Peds
 - 3 = Use "Floating Force Off"
 - 4 =
 - 5 = Use "Start of Green" for Sync Point

- Transition Type
- 0.X = Shortway
 - 1.X = Lengthen Only
 - 2.X = Shorten Only
 - X.1 thru X.4 = Number of Cycles to get "In Step"

	Coordination Plan								
	1	2	3	4	5	6	7	8	9
Cycle	120	0	120	120	0	0	0	0	0
Offset - 1	90	0	40	75	0	0	0	0	0
Offset - 2	90	0	40	75	0	0	0	0	0
Offset - 3	90	0	40	75	0	0	0	0	0
Zone Offset	0	0	0	0	0	0	0	0	0
Ring Offset	0	0	0	0	0	0	0	0	0
Hold Release	255	255	255	255	255	255	255	255	255
Ped Adjust	0	0	0	0	0	0	0	0	0
Force Off - 1	65	0	65	65	0	0	0	0	0
Force Off - 2	0	0	0	0	0	0	0	0	0
Force Off - 3	0	0	0	0	0	0	0	0	0
Force Off - 4	47	0	45	45	0	0	0	0	0
Force Off - 5	65	0	65	65	0	0	0	0	0
Force Off - 6	0	0	0	0	0	0	0	0	0
Force Off - 7	0	0	0	0	0	0	0	0	0
Force Off - 8	47	0	45	45	0	0	0	0	0
Coordination - Cycle, Offsets, & Force Offs									

	Coordination Plan								
	1	2	3	4	5	6	7	8	9
Perm 1 - Begin	0	0	0	0	0	0	0	0	0
Perm 1 - End	18	0	17	17	0	0	0	0	0
Perm 1 - Veh Phases	4 8		4 8	4 8			12345678	12345678	12345678
Perm 1 - Ped Phases	4 8		4 8	4 8			12345678	12345678	12345678
Perm 2 - Begin	18	0	17	17	0	0	0	0	0
Perm 2 - End	52	0	52	52	0	0	0	0	0
Perm 2 - Veh Phases	1 5		1 5	1 5					
Perm 2 - Ped Phases									
Perm 3 - Begin	0	0	0	0	0	0	0	0	0
Perm 3 - End	0	0	0	0	0	0	0	0	0
Perm 3 - Veh Phases									
Perm 3 - Ped Phases									
Max Inhibit Phases									
Max Recall Phases									
Sync Phases	2 6		2 6	2 6					
Lag Phases	2 4 6 8		2 4 6 8	2 4 6 8					
Pre-Timed Phases									
Coordination - Permissives & Phase Sequence									

	Overlap Number							
	1	2	3	4	5	6	7	8
Load Switch Number	0	0	0	0	0	0	0	0
Vehicle Set 1	_____	_____	_____	_____	_____	_____	_____	_____
Vehicle Set 2	_____	_____	_____	_____	_____	_____	_____	_____
Vehicle Set 3	_____	_____	_____	_____	_____	_____	_____	_____
Negative Vehicle	_____	_____	_____	_____	_____	_____	_____	_____
Negative Ped	_____	_____	_____	_____	_____	_____	_____	_____
Green Omit	_____	_____	_____	_____	_____	_____	_____	_____
Green Clear Omit	_____	_____	_____	_____	_____	_____	_____	_____
Green Clearance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Clearance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Overlaps

	AND 1	AND 2	AND 3	AND 4
Input - A	0	0	0	0
Input - B	0	0	0	0
Output	0	0	0	0

AND Gates

	NAND 1	NAND 2	NAND 3	NAND 4
Input - A	0	0	0	0
Input - B	0	0	0	0
Output	0	0	0	0

NAND Gates

	OR 1	OR 2	OR 3	OR 4	OR 5	OR 6
Input - A	0	0	0	0	0	0
Input - B	0	0	0	0	0	0
Output	0	0	0	0	0	0

2 Input - OR Gates

	OR 7	OR 8
Input - A	0	0
Input - B	0	0
Input - C	0	0
Input - D	0	0
Output	0	0

4 Input - OR Gates

	NOT 1	NOT 2	NOT 3	NOT 4
Input	220	0	0	0
Output	221	0	0	0

NOT Gates (Inverters)

	DELAY 1	DELAY 2	DELAY 3	DELAY 4	DELAY 5	DELAY 6
Input	0	0	0	0	0	0
Delay Time	0	0	0	0	0	0
Output	0	0	0	0	0	0

DELAY Gates

Latch:	1	2	3	4	5	6	7	8
Set	0	0	0	0	0	0	0	0
Reset	0	0	0	0	0	0	0	0
Out	0	0	0	0	0	0	0	0
/Out	0	0	0	0	0	0	0	0

Logic Latches

Det. #	C-1 Pin #	Delay	Carry-over	Phase Assignmnrnts	Detector Attributes	Detector Set Assignments
1	56	15.0	0.0	1	5 7	123 8
2	56	0.0	0.0	6	5 7	123 8
3	39	0.0	0.0	2	5 7	123 8
4	43	0.0	0.0	2	5 7	123 8
5	41	3.0	0.0	4	5 7	123 8
6	45	0.0	0.0	4	5 7	123 8
7	60	15.0	0.0	1	5 7	123 8
8	55	15.0	0.0	5	5 7	123 8
9	55	0.0	0.0	2	5 7	123 8
10	40	0.0	0.0	6	5 7	123 8
11	44	0.0	0.0	6	5 7	123 8
12	42	3.0	0.0	8	5 7	123 8
13	46	0.0	0.0	8	5 7	123 8
14	59	15.0	0.0	5	5 7	123 8
15	67	0.0	0.0	2	2	123
16	69	0.0	0.0	4	2	123
17	68	0.0	0.0	6	2	123
18	70	0.0	0.0	8	2	123
19	0	0.0	0.0			
20	47	0.0	0.0	2	5 7	123
21	49	0.0	0.0	4	5 7	123
22	48	0.0	0.0	6	4 7	123
23	50	0.0	0.0	8	5 7	123
24	0	0.0	0.0			
25	0	0.0	0.0			
26	0	0.0	0.0			
27	0	0.0	0.0			
28	0	0.0	0.0			
29	0	0.0	0.0			
30	0	0.0	0.0			
31	0	0.0	0.0			
32	0	0.0	0.0			

Detector Assignments

Detector Attributes

- 1 = Full Time Delay
- 2 = Ped Call
- 3 =
- 4 = Count
- 5 = Extension
- 6 = Type 3
- 7 = Calling
- 8 = Alternate

Detector Assignments

- 1 = Detector Set 1
- 2 = Detector Set 2
- 3 = Detector Set 3
- 4 =
- 5 =
- 6 = Failure - Min Recall
- 7 = Failure - Max Recall
- 8 = Report on Failure

	C-1 Pin #
Flash Sense	81
External Permit - 1	0
External Permit - 2	0
External Permit - 3	0
Exclusive Ped Omit	0
Max. Term Inhibit	0
Max. 2	0
External Lag Phases	0
External Max. Recall	0
Stop Time	82
Manual Control Enable	53
Manual Cont. Advance	80
External Min. Recall	0

General Inputs

	C-1 Pin #
Railroad - 1	0
Railroad - 2	52
Special Event - 1	0
Special Event - 2	0
Gate Down	0
EV - A	71
EV - B	72
EV - C	73
EV - D	74

Preempt Inputs

	C-1 Pin #
Door Ajar	0
UPS Battery	0
UPS Power	0
Cabinet Temperature	0

	C-1 Pin #
Plan 1	0
Plan 2	0
Plan 3	0
Plan 4	0
Plan 5	0
Plan 6	0
Plan 7	0
Plan 8	0
Plan 9	0
Free	0
Flash	0

Coordination Plan Inputs

	C-1 Pin #
Phase Bank - 2	0
Phase Bank - 3	221
Detector Set - 2	0
Detector Set - 3	0
Overlap Vehicle Set - 2	0
Overlap Vehicle Set - 3	0

Bank & Set Inputs

	C-1 Pin #
Alarm - 1	75
Alarm - 2	0
Alarm - 3	0
Alarm - 4	0

	C-1 Pin #
Advance Warning - 1	0
Advance Warning - 2	0
Detector Failure	0
Flasher - Alternating 1	0
Flasher - Alternating 2	0
Fast Flasher	0
On Line	0
Exclusive - Walk	0
Exclusive - Don't Walk	0

General Outputs

	C-1 Pin #
Output - 1	201
Output - 2	202
Output - 3	203
Output - 4	204
Output - 5	205
Output - 6	206
Output - 7	207
Output - 8	208

Time of Day Outputs

	C-1 Pin #
Plan - 1	211
Plan - 2	212
Plan - 3	213
Plan - 4	214
Plan - 5	215
Plan - 6	216
Plan - 7	217
Plan - 8	218
Plan - 9	219
Free	220

Coordination Plan Out

	Ped Phase
Ped 2-P Loadswitch	2
Ped 4-P Loadswitch	4
Ped 6-P Loadswitch	6
Ped 8-P Loadswitch	8

Ped Loadswitch Assignment

	C-1 Pin #
Dial - 2	0
Dial - 3	0
Offset - 1	0
Offset - 2	0
Offset - 3	0
Free	0
Flash	0

Seven Wire Outputs

	C-1 Pin #	
	On	Flash
Railroad - 1	0	0
Railroad - 2	0	0
Special Event - 1	0	0
Special Event - 2	0	0
Preempt Failure	0	0
EV - A	0	0
EV - B	0	0
EV - C	0	0
EV - D	0	0
Any Preempt	0	0

Preemption Outputs

	C-1 Pin #
Output - 1	0
Output - 2	0
Output - 3	0
Output - 4	0
Output - 5	0
Output - 6	0
Output - 7	0
Output - 8	0

Special Event Outputs

	C-1 Pin #
Phase - 1	99
Phase - 2	0
Phase - 3	0
Phase - 4	0
Phase - 5	90
Phase - 6	0
Phase - 7	0
Phase - 8	0

FYA PPLT Outputs

	Phase Number							
	1	2	3	4	5	6	7	8
Red	97	0	0	0	88	0	0	0
Yellow	98	0	0	0	89	0	0	0
Green	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0
Don't Walk	0	0	0	0	0	0	0	0

Phase Output Redirection

	C-1 Pin #
Output - 1	0
Output - 2	0
Output - 3	0
Output - 4	0
Output - 5	0
Output - 6	0
Output - 7	0
Output - 8	0

Special Function Output

	C-1 Pin #
Output - 1	0
Output - 2	0
Output - 3	0
Output - 4	0
Output - 5	0
Output - 6	0
Output - 7	0
Output - 8	0

	Overlap Number							
	1	2	3	4	5	6	7	8
Red	0	0	0	0	0	0	0	0
Yellow	0	0	0	0	0	0	0	0
Green	0	0	0	0	0	0	0	0

Overlap Output Redirection

Event	Day of Week	Season	Hour	Minute	Plan	Offset
0	1234567		0	0	E	0
1	1234567		6	0	E	0
2	1234567		23	0	E	0
3	_____		0	0	0	0
4	_23456_		6	30	1	C
5	_23456_		9	30	4	C
6	_____		0	0	0	0
7	_23456_		15	30	3	C
8	_23456_		18	30	4	C
9	_23456_		21	0	E	0
10	_____		0	0	0	0
11	_____		0	0	0	0
12	_____		0	0	0	0
13	_____		0	0	0	0
14	_____		0	0	0	0
15	_____		0	0	0	0
16	_____		0	0	0	0
17	_____		0	0	0	0
18	_____		0	0	0	0
19	_____		0	0	0	0
20	_____		0	0	0	0
21	_____		0	0	0	0
22	_____		0	0	0	0
23	_____		0	0	0	0
24	_____		0	0	0	0
25	_____		0	0	0	0
26	_____		0	0	0	0
27	_____		0	0	0	0
28	_____		0	0	0	0
29	_____		0	0	0	0
30	_____		0	0	0	0
31	_____		0	0	0	0

Time Base Coordination Events

Event	Day of Week	Season	Hour	Minute	Funct.	Phase / Bits
0	1234567		0	0	14	__4__
1	1234567		6	0	14	_____
2	1234567		23	0	14	__4__
3	_____		0	0	0	_____
4	_____		0	0	0	_____
5	_____		0	0	0	_____
6	_____		0	0	0	_____
7	_____		0	0	0	_____
8	_____		0	0	0	_____
9	_____		0	0	0	_____
10	_____		0	0	0	_____
11	_____		0	0	0	_____
12	_____		0	0	0	_____
13	_____		0	0	0	_____
14	_____		0	0	0	_____
15	_____		0	0	0	_____

Time of Day Function Events

TOD Functions

- 0 = Permitted Phases
- 1 = Red Lock
- 2 = Yellow Lock
- 3 = Vehicle Min Recall
- 4 = Ped Recall
- 5 =
- 6 = Rest In Walk
- 7 = Red Rest
- 8 = Double Entry
- 9 = Vehicle Max Recall
- 10 = Soft Recall
- 11 = Max Extension 2
- 12 = Conditional Service
- 13 = Lag Free Phases
- 14, Bit 1 = Local Override
- 14, Bit 4 = Disable Det Off Monitoring
- 15 = TOD Outputs

#	Holiday Type	Day	Month	Year
0		0	0	0
1		0	0	0
2		0	0	0
3		0	0	0
4		0	0	0
5		0	0	0
6		0	0	0
7		0	0	0
8		0	0	0
9		0	0	0
10		0	0	0
11		0	0	0
12		0	0	0
13		0	0	0
14		0	0	0
15		0	0	0
16		0	0	0
17		0	0	0
18		0	0	0
19		0	0	0
20		0	0	0
21		0	0	0
22		0	0	0
23		0	0	0
24		0	0	0
25		0	0	0
26		0	0	0
27		0	0	0
28		0	0	0
29		0	0	0
30		0	0	0
31		0	0	0

Holiday Dates

Event	Holiday Type	Hour	Minute	Plan	Offset
0	123	0	0	4	0
1		0	0	0	0
2	2	6	0	1	0
3	2	9	0	4	0
4	2	12	0	3	0
5	2	20	0	4	0
6		0	0	0	0
7	3	5	0	1	0
8	3	9	0	4	0
9	3	16	0	3	0
10	3	19	0	4	0
11		0	0	0	0
12		0	0	0	0
13		0	0	0	0
14		0	0	0	0
15		0	0	0	0
16		5	30	0	0
17		9	0	0	0
18		0	0	0	0
19		0	0	0	0
20		16	0	0	0
21		19	0	0	0
22		0	0	0	0
23		0	0	0	0
24		0	0	0	0
25		0	0	0	0
26		0	0	0	0
27		0	0	0	0
28		0	0	0	0
29		0	0	0	0
30		0	0	0	0
31		0	0	0	0

Holiday Time Base Coordination Events

Event	Holiday Type	Hour	Minute	Funct.	Phase / Bits
0		0	0	0	
1		0	0	0	
2		0	0	0	
3		0	0	0	
4		0	0	0	
5		0	0	0	
6		0	0	0	
7		0	0	0	
8		0	0	0	
9		0	0	0	
10		0	0	0	
11		0	0	0	
12		0	0	0	
13		0	0	0	
14		0	0	0	
15		0	0	0	

Holiday Time of Day Function Events

Season #	Start Month	Start Day	End Month	End Day
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0

Season Definitions

Red Start Time	0.0
Yellow Start Phases	_____
First Green Phases	2_6_
Startup Vehicle Calls	12_456_8
Startup Ped Calls	2_4_6_8

Startup

Max ON Time	7
Max OFF Time	255
Chatter	_____

Detector Check

	Sign 1	Sign 2
Phase Number	0	0
Time Before Yellow	0.0	0.0

Advance Warning Signs

Flash Entry Phases	_____
Flash Phases Yellow	_____
Flash Overlaps Yellow	_____
Flash Type	_____

Flash Setup

Exclusive Phases	_____
Protect / Permissive	_____
Disable Yellow Range	_____
Extra One	1_3_5_
Lag Phases - Free	2_4_6_8

Configuration

Permitted Phases	12_456_8
Restricted Phases	_____
Disable Overlap Range	_____
Extra Two	4
External Permit 1	_____
External Permit 2	_____
External Permit 3	_____

Configuration

Keyboard Beep	_____
Backlight Timeout	_____
Spec Evnt 1 - Ltd Serv Interval	0
Spec Evnt 2 - Ltd Serv Interval	0
Red Start	0.0
Flash Start	7
Red Revert	0.0

Miscellaneous

Spring Month (Begin)	_____
Spring Week (Begin)	_____
Fall Month (End)	_____
Fall Week (End)	_____

Daylight Savings Time

Manual Plan	_____
Manual Offset	_____

Manual

Address	_____
Area Number	_____
Area Address	_____
IP Port	_____
IP Address	_____
Subnet Mask	_____
Gateway	_____

Ethernet Port Address

	Port 1	Port 2	Port 3	Port 4
Address	_____	_____	_____	_____
Area Number	_____	_____	_____	_____
Area Address	_____	_____	_____	_____
Comm Time Out	_____	_____	_____	_____
CTS Delay	_____	_____	_____	_____
RTS Hold	_____	_____	_____	_____
Baud Rate	_____	_____	_____	_____
Data Format	_____	_____	_____	_____

Communications Parameters

Event	Day of Week	Hour	Minute	Headway	Direction
0		0	0	0	0
1		0	0	0	0
2		0	0	0	0
3		0	0	0	0
4		0	0	0	0
5		0	0	0	0
6		0	0	0	0
7		0	0	0	0
8		0	0	0	0
9		0	0	0	0
10		0	0	0	0
11		0	0	0	0
12		0	0	0	0
13		0	0	0	0
14		0	0	0	0
15		0	0	0	0

Bus Headway Schedule

Approach	A	B	C	D
Travel Time	0	0	0	0
Passage	0	0	0	0
Extension	0	0	0	0
Phases				

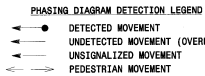
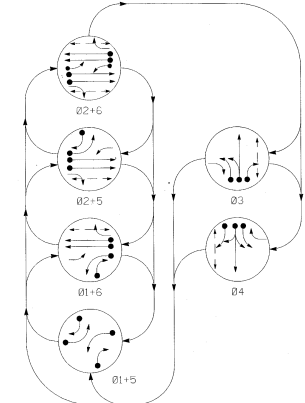
Bus Approach

	A	B	C	D
Phase 1	0	0	0	0
Phase 2	0	0	0	0
Phase 3	0	0	0	0
Phase 4	0	0	0	0
Phase 5	0	0	0	0
Phase 6	0	0	0	0
Phase 7	0	0	0	0
Phase 8	0	0	0	0

Non-Priority Phase Maximums



PHASING DIAGRAM



STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL

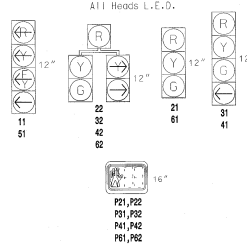
	TO			
	1	2	1	2
F	→	→	→	→
R	→	→	→	→
O	→	→	→	→
M	→	→	→	→

⇄ = Flashing Yellow Arrow

TABLE OF OPERATION

SIGNAL FACE	PHASE			
	01+5	02+5	02+6	03
11	←	←	←	←
21	←	←	←	←
22	←	←	←	←
31	←	←	←	←
32	←	←	←	←
41	←	←	←	←
42	←	←	←	←
51	←	←	←	←
61	←	←	←	←
62	←	←	←	←
P21, P22	DW	DW	W	DW
P31, P32	DW	DW	DW	DW
P41, P42	DW	DW	DW	DW
P61, P62	DW	DW	DW	DW

SIGNAL FACE I.D.

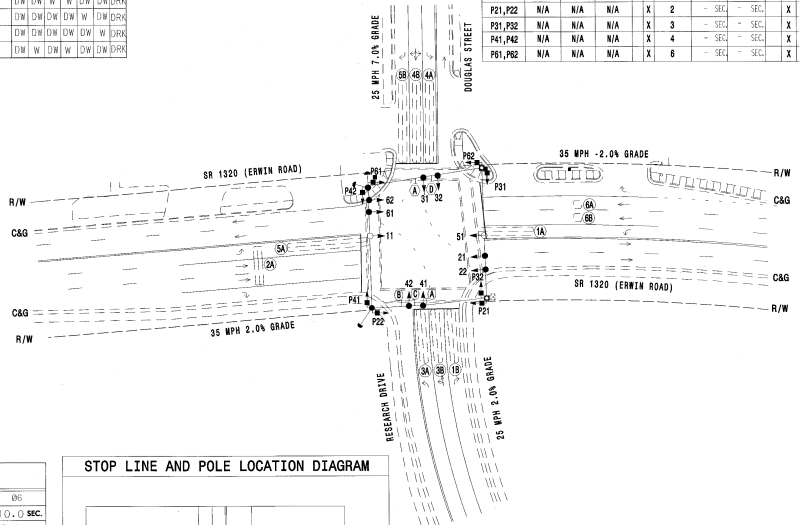


170 LOOP & DETECTOR UNIT INSTALLATION CHART

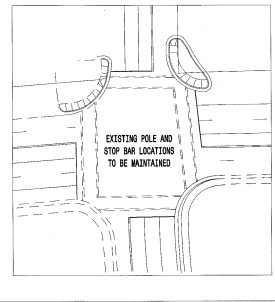
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOP (ft)	NEMA PHASE	TIMING		ATTRIBUTES																	
					DELAY	CARRY	1	2	3	4	5	6	7	8	9	10	11	12						
1A	6X40	2-4-2	+4	X	1	15 SEC.	-	SEC.																
1B	6X40	2-4-2	0	X	1	15 SEC.	-	SEC.																
2A	6X28	3	70	X	2	SEC.	-	SEC.																
3A	6X40	2-4-2	0	X	3	SEC.	-	SEC.																
3B	6X40	2-4-2	0	X	3	SEC.	-	SEC.																
4A	6X60	2-4-2	0	X	4	SEC.	-	SEC.																
4B	6X60	2-4-2	0	X	4	SEC.	-	SEC.																
5A	6X60	2-4-2	+5	X	5	SEC.	-	SEC.																
5B	6X60	2-4-2	0	X	5	SEC.	-	SEC.																
6A	6X6	3	70	X	6	SEC.	-	SEC.																
6B	6X6	3	70	X	6	SEC.	-	SEC.																
F21, F22	N/A	N/A	N/A	X	2	-	SEC.	-	SEC.															
F31, F32	N/A	N/A	N/A	X	3	-	SEC.	-	SEC.															
F41, F42	N/A	N/A	N/A	X	4	-	SEC.	-	SEC.															
F61, F62	N/A	N/A	N/A	X	6	-	SEC.	-	SEC.															

6 PHASE FULLY ACTUATED (DURHAM SIGNAL SYSTEM) NOTES

- Refer to "Roadway Standard Drawings M2007" dated July 2006 and "Standard Specifications For Roads and Structures" dated July 2006, and all applicable sections of the latest version of the generic Project Special Provisions. The PSP can be accessed at the following website: <http://www.ncdot.org/dot/construct/traffic/its/>
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 4 and/or phase 5 may be large.
- Reposition existing signal heads numbered 21, 22, 61 and 62.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Program all timing information into phase banks 1, 2, and 3 unless otherwise noted.
- Set phase bank 3 maximum limit to 250 seconds for phase used.
- Out "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't walk" time only.
- Maximum limits shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Remove existing "Left Turn Yield on Green Ball" signs on span wire along south approach of Erwin Road.
- Maintain existing street name signs on span wires.
- Favement markings shall be installed by contractor.



STOP LINE AND POLE LOCATION DIAGRAM



LEGEND

PROPOSED	EXISTING
○ Metal Strain Pole	○ Traffic Signal Head
○ Modified Signal Head	○ N/A
○ Pedestrian Signal Head with Push Button & Sign	○ Signal Pole with Guy
○ Signal Pole with Sidewalk Guy	○ Inductive Loop Detector
○ Controller & Cabinet	○ Junction Box
○ 2-In Underground Conduit	○ Directional Arrow
○ Left Arrow "ONLY" Sign (R3-5L)	○ Right Arrow "ONLY" Sign (R3-5R)
○ Left Through Right Arrow Sign (R3-19)	○ Combined Through and Left Arrow Sign (R3-6L)

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
FINAL DRAWING Date: 8/30/11
Checked: [Signature]
Traffic Engineering Branch

Signal Upgrade

Proposed in the office of:
RAMEY KEMP ASSOCIATES, INC.
TRAFFIC SIGNAL ENGINEER
1700 W. Main Street, Durham, NC 27709

SR 1320 (Erwin Road) at Douglas Street/Research Drive
Division 5 Durham County
PREPARED BY: BB Palla
CHECKED BY: NJ Hamilton
DATE: August 2011
REVISED BY: INK PRO - NO. 10051 (040)

8-21-11
SIGNATURE: [Signature]
DATE: [Date]
SIC. INVENTOR NO. 05-0251

0 SCALE 1"=40'

05/20/2011 09:00:00 AM C:\P\38249\3003\151g-1.dwg

INTERSECTION: 0251-Research Douglas & Erwin

QuicNet System Parameters

Group Assignment: **Group 0051**
 Field Master Assignment: **NONE**
 System Reference Number: **208**
 Commications Channel: **COM123:**
 Drop Address: **15**
 Area Number: **2**
 Area Address: **96**

N/S Street Name: **Not Assigned**
 E/W Street Name: **Not Assigned**

Last QuicNet Database Change: **6/5/2013 14:49**

Notes:

- 12/29/06 DB Mismatch alarm detectors info chg. saved field. BE
- 7/31/07 LT Changed clearance times
- 10/27/08 Downloaded new AM plan (Sch D) LT
- 9/07/12 Changed clearances 1 and 5 to match. CB

Field Change Record					
Change	By	Date	Change	By	Date

Excl Ped Assignment	_____	Note: Set the Exclusive Ped Outputs on the "Outputs / General" page				
Exclusive Walk	0					
Exclusive FDW	0					
All Red Clear	0.0					
Exclusive Ped Phase		<table border="1"> <tr> <td>Walk Output</td> <td>0</td> </tr> <tr> <td>Don't Walk Output</td> <td>0</td> </tr> </table>	Walk Output	0	Don't Walk Output	0
Walk Output	0					
Don't Walk Output	0					

	Phase							
	1	2	3	4	5	6	7	8
Min Green	7	10	7	7	7	10	0	0
Extension	2.0	3.0	2.0	1.0	1.0	3.0	0.0	0.0
Max	30	42	24	22	30	42	0	0
Max 2	0	0	0	0	0	0	0	0
Cond Serve Check	0	0	0	0	0	0	0	0

	Phase							
	1	2	3	4	5	6	7	8
Alternate Walk	0	0	0	0	0	0	0	0
Alternate Ped Clear	0	0	0	0	0	0	0	0
Alternate Minimum	0	0	0	0	0	0	0	0
Alternate Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternate Timing - Bank 1

	Phase							
	1	2	3	4	5	6	7	8
Yellow Change	3.0	4.0	2.1	3.0	3.0	4.0	0.0	0.0
Red Clear	2.8	2.1	2.8	2.9	2.8	2.1	0.0	0.0

Red Lock	_____	Red Rest	_____
Yellow Lock	2 6	Dual Entry	_____
Simultaneous Gap	123456	Sequential Timing	_____
Rest In Walk	_____	Inhibit Ped Reservice	_____
Advance Walk	_____	Semi-Actuated	_____
Flashing Walk	_____	Guaranteed Passage	_____
Max Extension	_____	Conditional Service	_____

	Phase							
	1	2	3	4	5	6	7	8
Walk	0	7	7	7	0	7	0	0
Ped Clear - FDW	0	15	19	17	0	11	0	0
Adv / Delay Walk	0	0	0	0	0	0	0	0
PE Min Ped FDW	0	0	0	0	0	0	0	0

Phase Functions - Page 1

Type 3 Disconnect	0	0	0	0	0	0	0	0
Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Added Initial	0	0	0	0	0	0	0	0
Min Gap	2.0	3.0	2.0	1.0	1.0	3.0	0.0	0.0
Max Gap	2.0	3.0	2.0	1.0	1.0	3.0	0.0	0.0
Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 1

Minimum Recall	2 6	Soft Recall	_____
Ped Recall	_____	External Recall	_____
Maximum Recall	_____	Manual Control Calls	123456
Green Flash	_____	Fast Green Flash	_____
Overlap Green Flash	_____	Fast Overlap G. Flash	_____

Phase Functions - Page 2

		Phase							
		1	2	3	4	5	6	7	8
B as e	Min Green	7	10	7	7	7	10	10	0
	Extension	2.0	3.0	2.0	1.0	1.0	3.0	3.0	0.0
	Max	30	42	24	22	30	42	0	0
	Max 2	0	0	0	0	0	0	0	0
	Cond Serve Check	0	0	0	0	0	0	0	0
C h e	Yellow Change	3.0	4.0	3.1	3.0	3.0	4.0	4.0	0.0
	Red Clear	2.8	2.1	2.8	2.9	2.8	2.1	1.5	0.0
P e d	Walk	0	7	7	7	0	7	6	0
	Ped Clear - FDW	0	15	19	17	0	11	9	0
	Adv / Delay Walk	0	0	0	0	0	0	0	0
	PE Min Ped FDW	0	0	0	0	0	0	0	0
> o o	Type 3 Disconnect	0	0	0	0	0	0	0	0
	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Max Added Initial	0	0	0	0	0	0	0	0
	Min Gap	2.0	3.0	2.0	1.0	1.0	3.0	3.0	0.0
	Max Gap	2.0	3.0	2.0	1.0	1.0	3.0	3.0	0.0
	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 2

		Phase							
		1	2	3	4	5	6	7	8
B as e	Min Green	7	10	7	7	7	10	0	0
	Extension	2.0	3.0	2.0	1.0	1.0	3.0	0.0	0.0
	Max	250	250	250	250	250	250	0	0
	Max 2	250	250	250	250	250	250	0	0
	Cond Serve Check	0	0	0	0	0	0	0	0
C h e	Yellow Change	3.0	4.0	3.1	3.0	3.0	4.0	0.0	0.0
	Red Clear	2.8	2.1	2.8	2.9	2.8	2.1	0.0	0.0
P e d	Walk	0	7	7	7	0	7	0	0
	Ped Clear - FDW	0	15	19	17	0	11	0	0
	Adv / Delay Walk	0	0	0	0	0	0	0	0
	PE Min Ped FDW	0	0	0	0	0	0	0	0
> o o	Type 3 Disconnect	0	0	0	0	0	0	0	0
	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Max Added Initial	0	0	0	0	0	0	0	0
	Min Gap	2.0	3.0	2.0	1.0	1.0	3.0	0.0	0.0
	Max Gap	2.0	3.0	2.0	1.0	1.0	3.0	0.0	0.0
	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 3

	Phase							
	1	2	3	4	5	6	7	8
Alternate Walk	0	0	0	0	0	0	0	0
Alternate Ped Clear	0	0	0	0	0	0	0	0
Alternate Minimum	0	0	0	0	0	0	0	0
Alternate Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternate Timing - Bank 2

	Phase							
	1	2	3	4	5	6	7	8
Alternate Walk	0	0	0	0	0	0	0	0
Alternate Ped Clear	0	0	0	0	0	0	0	0
Alternate Minimum	0	0	0	0	0	0	0	0
Alternate Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternate Timing - Bank 3

Note: Set the Limited Service Interval on the "Utilities / Misc" page

Clear Phases	
Delay	0
Clear Time	0
Railroad - 1	

Clear Phases	
Limited Service Phases	
Delay	0
Clear Time	0
Railroad - 2	

Railroad Preempt Parameters

Min Grn Before PE Force-Off	1
Max Pre-Empt Time	255
Min Time Before Same PE	0

	Delay	Clear	Clear Phases
EV - A	0	0	
EV - B	0	0	
EV - C	0	0	
EV - D	0	0	
Emergency Vehicle Preempt			

SE - 1	
SE - 2	
EV - A	
EV - B	
EV - C	
EV - D	
Preempt Priority	

Step	Time	Clear	Ped Call	Hold	Advance	Force Off	Vehicle Call	Permit	Ped Omit	Output
0	0									
1	0									
2	0									
3	0									
4	0									
5	0									
6	0									
7	0									
8	0									
9	0									
10	0									
11	0									
12	0									
13	0									
14	0									
15	0									

Special Event Sequence - 1

Step	Time	Clear	Ped Call	Hold	Advance	Force Off	Vehicle Call	Permit	Ped Omit	Output
0	0									
1	0									
2	0									
3	0									
4	0									
5	0									
6	0									
7	0									
8	0									
9	0									
10	0									
11	0									
12	0									
13	0									
14	0									
15	0									

Special Event Sequence - 2

Transition Type	0.2
Coord Extra Functions	
Phase 1 - Minimum	14
Phase 2 - Minimum	20
Phase 3 - Minimum	14
Phase 4 - Minimum	14
Phase 5 - Minimum	14
Phase 6 - Minimum	20
Phase 7 - Minimum	14
Phase 8 - Minimum	14

Coordination - General

Transiti

Coordination Plan

	1	2	3	4	5	6	7	8	9
Cycle	120	0	120	120	0	0	0	0	0
Offset - 1	95	0	96	85	0	0	0	0	0
Offset - 2	95	0	96	85	0	0	0	0	0
Offset - 3	95	0	96	85	0	0	0	0	0
Zone Offset	0	0	0	0	0	0	0	0	0
Ring Offset	0	0	0	0	0	0	0	0	0
Hold Release	255	255	255	255	255	255	255	255	255
Ped Adjust	0	0	0	0	0	0	0	0	0
Force Off - 1	81	0	80	70	0	0	0	0	0
Force Off - 2	0	0	0	0	0	0	0	0	0
Force Off - 3	30	0	30	25	0	0	0	0	0
Force Off - 4	59	0	59	45	0	0	0	0	0
Force Off - 5	81	0	80	70	0	0	0	0	0
Force Off - 6	0	0	0	0	0	0	0	0	0
Force Off - 7	0	0	0	0	0	0	0	0	0
Force Off - 8	0	0	0	0	0	0	0	0	0

Coordination - Cycle, Offsets, & Force Offs

Coordination Plan

	1	2	3	4	5	6	7	8	9
Perm 1 - Begin	0	0	0	0	0	0	0	0	0
Perm 1 - End	6	0	6	6	0	0	0	0	0
Perm 1 - Veh Phases	3		3	3			12345678	12345678	12345678
Perm 1 - Ped Phases	3		3	3			12345678	12345678	12345678
Perm 2 - Begin	7	0	6	6	0	0	0	0	0
Perm 2 - End	35	0	35	34	0	0	0	0	0
Perm 2 - Veh Phases	4		4	4					
Perm 2 - Ped Phases	4		4	4					
Perm 3 - Begin	36	0	35	34	0	0	0	0	0
Perm 3 - End	64	0	74	55	0	0	0	0	0
Perm 3 - Veh Phases	1 5		1 5	1 5					
Perm 3 - Ped Phases									
Max Inhibit Phases									
Max Recall Phases									
Sync Phases	2 6		2 6	2 6					
Lag Phases	234 6		234 6	234 6					
Pre-Timed Phases									

on - Permissives & Phase Sequence

	Overlap Number							
	1	2	3	4	5	6	7	8
Load Switch Number	0	0	0	0	0	0	0	0
Vehicle Set 1	_____	_____	_____	_____	_____	_____	_____	12345678
Vehicle Set 2	_____	_____	_____	_____	_____	_____	_____	_____
Vehicle Set 3	_____	_____	_____	_____	_____	_____	_____	_____
Negative Vehicle	_____	_____	_____	_____	_____	_____	_____	_____
Negative Ped	_____	_____	_____	_____	_____	_____	_____	_____
Green Omit	_____	_____	_____	_____	_____	_____	_____	_____
Green Clear Omit	_____	_____	_____	_____	_____	_____	_____	_____

Green Clearance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Clearance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Overlaps

	AND 1	AND 2	AND 3	AND 4
Input - A	0	0	0	0
Input - B	0	0	0	0
Output	0	0	0	0

AND Gates

	NAND 1	NAND 2	NAND 3	NAND 4
Input - A	0	0	0	0
Input - B	0	0	0	0
Output	0	0	0	0

NAND Gates

	OR 1	OR 2	OR 3	OR 4	OR 5	OR 6
Input - A	0	0	0	0	0	0
Input - B	0	0	0	0	0	0
Output	0	0	0	0	0	0

2 Input - OR Gates

	OR 7	OR 8
Input - A	0	0
Input - B	0	0
Input - C	0	0
Input - D	0	0
Output	0	0

4 Input - OR Gates

	NOT 1	NOT 2	NOT 3	NOT 4
Input	220	0	0	0
Output	221	0	0	0

NOT Gates (Inverters)

	DELAY 1	DELAY 2	DELAY 3	DELAY 4	DELAY 5	DELAY 6
Input	0	0	0	0	0	0
Delay Time	0	0	0	0	0	0
Output	0	0	0	0	0	0

DELAY Gates

Latch:	1	2	3	4	5	6	7	8
Set	0	0	0	0	0	0	0	0
Reset	0	0	0	0	0	0	0	0
Out	0	0	0	0	0	0	0	0
/Out	0	0	0	0	0	0	0	0

Logic Latches

Det. #	C-1 Pin #	Delay	Carry-over	Phase Assignmrnts	Detector Attributes	Detector Set Assignments
1	56	15.0	0.0	1	5 7	123 8
2	56	0.0	0.0	6	5 7	123 8
3	39	15.0	0.0	2	5 7	123 8
4	47	0.0	0.0	3	5 7	123 8
5	58	3.0	0.0	3	5 7	123 8
6	41	0.0	0.0	4	5 7	123 8
7	45	3.0	0.0	4	5 7	123 8
8	60	0.0	0.0	1	5 7	123 8
9	55	15.0	0.0	5	5 7	123 8
10	55	0.0	0.0	2	5 7	123 8
11	40	15.0	0.0	6	5 7	123 8
12	44	0.0	0.0	6	5 7	123 8
13	59	0.0	0.0	5	5 7	123 8
14	0	0.0	0.0			
15	67	0.0	0.0	2	2	123
16	69	0.0	0.0	4	2	123
17	68	0.0	0.0	6	2	123
18	70	0.0	0.0	3	2	123
19	0	0.0	0.0			
20	0	0.0	0.0			
21	0	0.0	0.0			
22	0	0.0	0.0			
23	0	0.0	0.0			
24	0	0.0	0.0			
25	0	0.0	0.0			
26	0	0.0	0.0			
27	0	0.0	0.0			
28	0	0.0	0.0			
29	0	0.0	0.0			
30	0	0.0	0.0			
31	0	0.0	0.0			
32	0	0.0	0.0			

Detector Assignments

Detector Attributes

- 1 = Full Time Delay
- 2 = Ped Call
- 3 =
- 4 = Count
- 5 = Extension
- 6 = Type 3
- 7 = Calling
- 8 = Alternate

Detector Assignments

- 1 = Detector Set 1
- 2 = Detector Set 2
- 3 = Detector Set 3
- 4 =
- 5 =
- 6 = Failure - Min Recall
- 7 = Failure - Max Recall
- 8 = Report on Failure

	C-1 Pin #
Flash Sense	81
External Permit - 1	0
External Permit - 2	0
External Permit - 3	0
Exclusive Ped Omit	0
Max. Term Inhibit	0
Max. 2	0
External Lag Phases	0
External Max. Recall	0
Stop Time	82
Manual Control Enable	53
Manual Cont. Advance	80
External Min. Recall	0

General Inputs

	C-1 Pin #
Railroad - 1	0
Railroad - 2	52
Special Event - 1	0
Special Event - 2	0
Gate Down	0
EV - A	71
EV - B	72
EV - C	73
EV - D	74

Preempt Inputs

	C-1 Pin #
Door Ajar	0
UPS Battery	0
UPS Power	0
Cabinet Temperature	0

	C-1 Pin #
Plan 1	0
Plan 2	0
Plan 3	0
Plan 4	0
Plan 5	0
Plan 6	0
Plan 7	0
Plan 8	0
Plan 9	0
Free	0
Flash	0

Coordination Plan Inputs

	C-1 Pin #
Phase Bank - 2	0
Phase Bank - 3	221
Detector Set - 2	0
Detector Set - 3	0
Overlap Vehicle Set - 2	0
Overlap Vehicle Set - 3	0

Bank & Set Inputs

	C-1 Pin #
Alarm - 1	75
Alarm - 2	0
Alarm - 3	0
Alarm - 4	0

	C-1 Pin #
Advance Warning - 1	0
Advance Warning - 2	0
Detector Failure	0
Flasher - Alternating 1	0
Flasher - Alternating 2	0
Fast Flasher	0
On Line	0
Exclusive - Walk	0
Exclusive - Don't Walk	0

General Outputs

	C-1 Pin #
Output - 1	201
Output - 2	202
Output - 3	203
Output - 4	204
Output - 5	205
Output - 6	206
Output - 7	207
Output - 8	208

Time of Day Outputs

	C-1 Pin #
Plan - 1	211
Plan - 2	212
Plan - 3	213
Plan - 4	214
Plan - 5	215
Plan - 6	216
Plan - 7	217
Plan - 8	218
Plan - 9	219
Free	220

Coordination Plan Out

	Ped Phase
Ped 2-P Loadswitch	2
Ped 4-P Loadswitch	4
Ped 6-P Loadswitch	6
Ped 8-P Loadswitch	3

Ped Loadswitch Assignment

	C-1 Pin #
Dial - 2	0
Dial - 3	0
Offset - 1	0
Offset - 2	0
Offset - 3	0
Free	0
Flash	0

Seven Wire Outputs

	C-1 Pin #	
	On	Flash
Railroad - 1	0	0
Railroad - 2	0	0
Special Event - 1	0	0
Special Event - 2	0	0
Preempt Failure	0	0
EV - A	0	0
EV - B	0	0
EV - C	0	0
EV - D	0	0
Any Preempt	0	0

Preemption Outputs

	C-1 Pin #
Output - 1	0
Output - 2	0
Output - 3	0
Output - 4	0
Output - 5	0
Output - 6	0
Output - 7	0
Output - 8	0

Special Event Outputs

	C-1 Pin #
Phase - 1	99
Phase - 2	0
Phase - 3	0
Phase - 4	0
Phase - 5	90
Phase - 6	0
Phase - 7	0
Phase - 8	0

FYA PPLT Outputs

	Phase Number							
	1	2	3	4	5	6	7	8
Red	97	0	0	0	88	0	0	0
Yellow	98	0	0	0	89	0	0	0
Green	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0
Don't Walk	0	0	0	0	0	0	0	0

Phase Output Redirection

	C-1 Pin #
Output - 1	0
Output - 2	0
Output - 3	0
Output - 4	0
Output - 5	0
Output - 6	0
Output - 7	0
Output - 8	0

Special Function Output

	Overlap Number							
	1	2	3	4	5	6	7	8
Red	0	0	0	0	0	0	0	0
Yellow	0	0	0	0	0	0	0	0
Green	0	0	0	0	0	0	0	0

Overlap Output Redirection

Event	Day of Week	Season	Hour	Minute	Plan	Offset
0	1234567		0	0	E	0
1	1234567		6	0	E	0
2	1234567		23	0	E	0
3	_____		0	0	0	0
4	_23456_		6	30	1	C
5	_23456_		9	30	4	C
6	_____		0	0	0	0
7	_23456_		15	30	3	C
8	_23456_		18	30	4	C
9	_23456_		21	0	E	0
10	_____		0	0	0	0
11	_____		0	0	0	0
12	_____		0	0	0	0
13	_____		0	0	0	0
14	_____		0	0	0	0
15	_____		0	0	0	0
16	_____		0	0	0	0
17	_____		0	0	0	0
18	_____		0	0	0	0
19	_____		0	0	0	0
20	_____		0	0	0	0
21	_____		0	0	0	0
22	_____		0	0	0	0
23	_____		0	0	0	0
24	_____		0	0	0	0
25	_____		0	0	0	0
26	_____		0	0	0	0
27	_____		0	0	0	0
28	_____		0	0	0	0
29	_____		0	0	0	0
30	_____		0	0	0	0
31	_____		0	0	0	0

Time Base Coordination Events

Event	Day of Week	Season	Hour	Minute	Funct.	Phase / Bits
0	_____		0	0	0	_____
1	_____		0	0	0	_____
2	_____		0	0	0	_____
3	_____		0	0	0	_____
4	_____		0	0	0	_____
5	_____		0	0	0	_____
6	_____		0	0	0	_____
7	_____		0	0	0	_____
8	_____		0	0	0	_____
9	_____		0	0	0	_____
10	_____		0	0	0	_____
11	_____		0	0	0	_____
12	_____		0	0	0	_____
13	_____		0	0	0	_____
14	_____		0	0	0	_____
15	_____		0	0	0	_____

Time of Day Function Events

TOD Functions

- 0 = Permitted Phases
- 1 = Red Lock
- 2 = Yellow Lock
- 3 = Vehicle Min Recall
- 4 = Ped Recall
- 5 =
- 6 = Rest In Walk
- 7 = Red Rest
- 8 = Double Entry
- 9 = Vehicle Max Recall
- 10 = Soft Recall
- 11 = Max Extension 2
- 12 = Conditional Service
- 13 = Lag Free Phases
- 14, Bit 1 = Local Override
- 14, Bit 4 = Disable Det Off Monitoring
- 15 = TOD Outputs

#	Holiday Type	Day	Month	Year
0		0	0	0
1		0	0	0
2		0	0	0
3		0	0	0
4		0	0	0
5		0	0	0
6		0	0	0
7		0	0	0
8		0	0	0
9		0	0	0
10		0	0	0
11		0	0	0
12		0	0	0
13		0	0	0
14		0	0	0
15		0	0	0
16		0	0	0
17		0	0	0
18		0	0	0
19		0	0	0
20		0	0	0
21		0	0	0
22		0	0	0
23		0	0	0
24		0	0	0
25		0	0	0
26		0	0	0
27		0	0	0
28		0	0	0
29		0	0	0
30		0	0	0
31		0	0	0

Holiday Dates

Event	Holiday Type	Hour	Minute	Plan	Offset
0	123	0	0	4	C
1		0	0	0	0
2	2	6	0	1	C
3	2	9	0	4	C
4	2	12	0	3	C
5	2	20	0	4	C
6		0	0	0	0
7	3	5	0	1	C
8	3	9	0	4	C
9	3	16	0	3	C
10	3	19	0	4	C
11		0	0	0	0
12		0	0	0	0
13		0	0	0	0
14		0	0	0	0
15		0	0	0	0
16		0	0	0	0
17		0	0	0	0
18		0	0	0	0
19		0	0	0	0
20		0	0	0	0
21		0	0	0	0
22		0	0	0	0
23		0	0	0	0
24		0	0	0	0
25		0	0	0	0
26		0	0	0	0
27		0	0	0	0
28		0	0	0	0
29		0	0	0	0
30		0	0	0	0
31		0	0	0	0

Holiday Time Base Coordination Events

Event	Holiday Type	Hour	Minute	Funct.	Phase / Bits
0		0	0	0	
1		0	0	0	
2		0	0	0	
3		0	0	0	
4		0	0	0	
5		0	0	0	
6		0	0	0	
7		0	0	0	
8		0	0	0	
9		0	0	0	
10		0	0	0	
11		0	0	0	
12		0	0	0	
13		0	0	0	
14		0	0	0	
15		0	0	0	

Holiday Time of Day Function Events

Season #	Start Month	Start Day	End Month	End Day
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0

Season Definitions

Red Start Time	0.0
Yellow Start Phases	_____
First Green Phases	2_6_
Startup Vehicle Calls	123456_
Startup Ped Calls	234_6_

Startup

Max ON Time	7
Max OFF Time	255
Chatter	_____

Detector Check

	Sign 1	Sign 2
Phase Number	0	0
Time Before Yellow	0.0	0.0

Advance Warning Signs

Flash Entry Phases	_____
Flash Phases Yellow	_____
Flash Overlaps Yellow	_____
Flash Type	_____

Flash Setup

Exclusive Phases	_____
Protect / Permissive	_____
Disable Yellow Range	_____
Extra One	1_3_5_
Lag Phases - Free	234_6_

Configuration

Permitted Phases	123456_
Restricted Phases	_____
Disable Overlap Range	_____
Extra Two	4_
External Permit 1	_____
External Permit 2	_____
External Permit 3	_____

Configuration

Keyboard Beep	_____
Backlight Timeout	_____
Spec Evnt 1 - Ltd Serv Interval	0
Spec Evnt 2 - Ltd Serv Interval	0
Red Start	0.0
Flash Start	7
Red Revert	2.0

Miscellaneous

Spring Month (Begin)	_____
Spring Week (Begin)	_____
Fall Month (End)	_____
Fall Week (End)	_____

Daylight Savings Time

Manual Plan	_____
Manual Offset	_____

Manual

Address	_____
Area Number	_____
Area Address	_____
IP Port	_____
IP Address	_____
Subnet Mask	_____
Gateway	_____

Ethernet Port Address

	Port 1	Port 2	Port 3	Port 4
Address	_____	_____	_____	_____
Area Number	_____	_____	_____	_____
Area Address	_____	_____	_____	_____
Comm Time Out	_____	_____	_____	_____
CTS Delay	_____	_____	_____	_____
RTS Hold	_____	_____	_____	_____
Baud Rate	_____	_____	_____	_____
Data Format	_____	_____	_____	_____

Communications Parameters

Event	Day of Week	Hour	Minute	Headway	Direction
0		0	0	0	0
1		0	0	0	0
2		0	0	0	0
3		0	0	0	0
4		0	0	0	0
5		0	0	0	0
6		0	0	0	0
7		0	0	0	0
8		0	0	0	0
9		0	0	0	0
10		0	0	0	0
11		0	0	0	0
12		0	0	0	0
13		0	0	0	0
14		0	0	0	0
15		0	0	0	0

Bus Headway Schedule

Approach	A	B	C	D
Travel Time	0	0	0	0
Passage	0	0	0	0
Extension	0	0	0	0
Phases				

Bus Approach

	A	B	C	D
Phase 1	0	0	0	0
Phase 2	0	0	0	0
Phase 3	0	0	0	0
Phase 4	0	0	0	0
Phase 5	0	0	0	0
Phase 6	0	0	0	0
Phase 7	0	0	0	0
Phase 8	0	0	0	0

Non-Priority Phase Maximums



INTERSECTION: 2423-Erwin @ Eye Care

QuicNet System Parameters

Group Assignment: **NONE**
 Field Master Assignment: **NONE**
 System Reference Number: **397**
 Commications Channel: **COM123:**
 Drop Address: **23**
 Area Number: **3**
 Area Address: **104**

N/S Street Name: **Eye Care Drive**
 E/W Street Name: **Erwin Road (SR 1320)**

Last QuicNet Database Change: **3/1/2013 14:00**

Notes:

Field Change Record					
Change	By	Date	Change	By	Date

Excl Ped Assignment	_____	Note: Set the Exclusive Ped Outputs on the "Outputs / General" page
Exclusive Walk	0	
Exclusive FDW	0	
All Red Clear	0.0	

Walk Output	0
Don't Walk Output	0

Exclusive Ped Phase

	Phase							
	1	2	3	4	5	6	7	8
Min Green	7	10	0	7	7	10	0	7
Extension	2.0	3.0	0.0	2.0	2.0	3.0	0.0	2.0
Max	20	60	0	30	20	60	0	30
Max 2	0	0	0	0	0	0	0	0
Cond Serve Check	0	0	0	0	0	0	0	0

Basic Phase Timing

Yellow Change	3.1	4.3	0.0	3.0	3.0	4.3	0.0	4.0
Red Clear	2.4	1.5	0.0	2.6	2.3	1.5	0.0	1.8

Clear

Walk	0	6	0	7	0	6	0	7
Ped Clear - FDW	0	9	0	17	0	10	0	16
Adv / Delay Walk	0	0	0	0	0	0	0	0
PE Min Ped FDW	0	0	0	0	0	0	0	0

Pedestrian Timing

Type 3 Disconnect	0	0	0	0	0	0	0	0
Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Added Initial	0	0	0	0	0	0	0	0
Min Gap	2.0	3.0	0.0	2.0	2.0	3.0	0.0	2.0
Max Gap	2.0	3.0	0.0	2.0	2.0	3.0	0.0	2.0
Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Volume Density

Phase Timing - Bank 1

	Phase							
	1	2	3	4	5	6	7	8
Alternate Walk	0	0	0	0	0	0	0	0
Alternate Ped Clear	0	0	0	0	0	0	0	0
Alternate Minimum	0	0	0	0	0	0	0	0
Alternate Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternate Timing - Bank 1

Red Lock	_____
Yellow Lock	2 6
Simultaneous Gap	12 456 8
Rest In Walk	_____
Advance Walk	_____
Flashing Walk	_____
Max Extension	_____

Phase Functions - Page 1

Red Rest	_____
Dual Entry	4 8
Sequential Timing	_____
Inhibit Ped Reservice	_____
Semi-Actuated	_____
Guaranteed Passage	_____
Conditional Service	_____

Minimum Recall	2 6
Ped Recall	_____
Maximum Recall	_____
Green Flash	_____
Overlap Green Flash	_____

Phase Functions - Page 2

Soft Recall	_____
External Recall	_____
Manual Control Calls	_____
Fast Green Flash	_____
Fast Overlap G. Flash	_____

		Phase							
		1	2	3	4	5	6	7	8
Basic Phase Timing	Min Green	7	10	0	7	7	10	0	7
	Extension	2.0	3.0	0.0	2.0	2.0	3.0	0.0	2.0
	Max	20	60	0	30	20	60	0	30
	Max 2	0	0	0	0	0	0	0	0
	Cond Serve Check	0	0	0	0	0	0	0	0
Clear	Yellow Change	3.1	4.3	0.0	3.0	3.0	4.3	0.0	4.0
	Red Clear	2.4	1.5	0.0	2.6	2.3	1.5	0.0	1.8
Pedestrian Timing	Walk	0	6	0	7	0	6	0	7
	Ped Clear - FDW	0	9	0	17	0	10	0	16
	Adv / Delay Walk	0	0	0	0	0	0	0	0
	PE Min Ped FDW	0	0	0	0	0	0	0	0
Volume Density	Type 3 Disconnect	0	0	0	0	0	0	0	0
	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Max Added Initial	0	0	0	0	0	0	0	0
	Min Gap	2.0	3.0	0.0	2.0	2.0	3.0	0.0	2.0
	Max Gap	2.0	3.0	0.0	2.0	2.0	3.0	0.0	2.0
	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 2

		Phase							
		1	2	3	4	5	6	7	8
Basic Phase Timing	Min Green	7	10	0	7	7	10	0	7
	Extension	2.0	3.0	0.0	2.0	2.0	2.0	0.0	2.0
	Max	250	250	0	250	250	250	0	250
	Max 2	250	250	0	250	250	250	0	250
	Cond Serve Check	0	0	0	0	0	0	0	0
Clear	Yellow Change	3.1	4.3	0.0	3.0	3.0	4.3	0.0	4.0
	Red Clear	2.4	1.5	0.0	2.6	2.3	1.5	0.0	1.8
Pedestrian Timing	Walk	0	6	0	7	0	6	0	7
	Ped Clear - FDW	0	9	0	17	0	10	0	16
	Adv / Delay Walk	0	0	0	0	0	0	0	0
	PE Min Ped FDW	0	0	0	0	0	0	0	0
Volume Density	Type 3 Disconnect	0	0	0	0	0	0	0	0
	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Max Added Initial	0	0	0	0	0	0	0	0
	Min Gap	2.0	3.0	0.0	2.0	2.0	2.0	0.0	2.0
	Max Gap	2.0	3.0	0.0	2.0	2.0	2.0	0.0	2.0
	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 3

		Phase							
		1	2	3	4	5	6	7	8
Alternate Walk	0	0	0	0	0	0	0	0	0
Alternate Ped Clear	0	0	0	0	0	0	0	0	0
Alternate Minimum	0	0	0	0	0	0	0	0	0
Alternate Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternate Timing - Bank 2

		Phase							
		1	2	3	4	5	6	7	8
Alternate Walk	0	0	0	0	0	0	0	0	0
Alternate Ped Clear	0	0	0	0	0	0	0	0	0
Alternate Minimum	0	0	0	0	0	0	0	0	0
Alternate Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternate Timing - Bank 3

Note: Set the Limited Service Interval on the "Utilities / Misc" page

Clear Phases	
Delay	0
Clear Time	0

Railroad - 1

Clear Phases	
Limited Service Phases	
Delay	0
Clear Time	0

Railroad - 2

Railroad Preempt Parameters

Min Grn Before PE Force-Off	1
Max Pre-Empt Time	255
Min Time Before Same PE	0

	Delay	Clear	Clear Phases
EV - A	0	0	
EV - B	0	0	
EV - C	0	0	
EV - D	0	0	

Emergency Vehicle Preempt

SE - 1	
SE - 2	
EV - A	
EV - B	
EV - C	
EV - D	

Preempt Priority

Step	Time	Clear	Ped Call	Hold	Advance	Force Off	Vehicle Call	Permit	Ped Omit	Output
0	0									
1	0									
2	0									
3	0									
4	0									
5	0									
6	0									
7	0									
8	0									
9	0									
10	0									
11	0									
12	0									
13	0									
14	0									
15	0									

Special Event Sequence - 1

Step	Time	Clear	Ped Call	Hold	Advance	Force Off	Vehicle Call	Permit	Ped Omit	Output
0	0									
1	0									
2	0									
3	0									
4	0									
5	0									
6	0									
7	0									
8	0									
9	0									
10	0									
11	0									
12	0									
13	0									
14	0									
15	0									

Special Event Sequence - 2

Note:
The Ring-Barrier Sum of these Minimums will be the Minimum Cycle Length During Transition

Transition Type	0.0
Coord Extra Functions	
Phase 1 - Minimum	0
Phase 2 - Minimum	0
Phase 3 - Minimum	0
Phase 4 - Minimum	0
Phase 5 - Minimum	0
Phase 6 - Minimum	0
Phase 7 - Minimum	0
Phase 8 - Minimum	0
Coordination - General	

- Coord Extra**
- 1 = Programmed Walk Time for Sync Phases
 - 2 = Always Terminate Sync Phase Peds
 - 3 = Use "Floating Force Off"
 - 4 =
 - 5 = Use "Start of Green" for Sync Point

- Transition Type**
- 0.X = Shortway
 - 1.X = Lengthen Only
 - 2.X = Shorten Only
 - X.1 thru X.4 = Number of Cycles to get "In Step"

	Coordination Plan								
	1	2	3	4	5	6	7	8	9
Cycle	100	100	100	100	100	100	100	100	100
Offset - 1	0	0	0	0	0	0	0	0	0
Offset - 2	0	0	0	0	0	0	0	0	0
Offset - 3	0	0	0	0	0	0	0	0	0
Zone Offset	0	0	0	0	0	0	0	0	0
Ring Offset	0	0	0	0	0	0	0	0	0
Hold Release	255	255	255	255	255	255	255	255	255
Ped Adjust	0	0	0	0	0	0	0	0	0
Force Off - 1	55	55	55	55	55	55	55	55	55
Force Off - 2	0	0	0	0	0	0	0	0	0
Force Off - 3	20	20	20	20	20	20	20	20	20
Force Off - 4	40	40	40	40	40	40	40	40	40
Force Off - 5	55	55	55	55	55	55	55	55	55
Force Off - 6	0	0	0	0	0	0	0	0	0
Force Off - 7	20	20	20	20	20	20	20	20	20
Force Off - 8	40	40	40	40	40	40	40	40	40
Coordination - Cycle, Offsets, & Force Offs									

	Coordination Plan								
	1	2	3	4	5	6	7	8	9
Perm 1 - Begin	0	0	0	0	0	0	0	0	0
Perm 1 - End	15	15	15	15	15	15	15	15	15
Perm 1 - Veh Phases	12345678	12345678	12345678	12345678	12345678	12345678	12345678	12345678	12345678
Perm 1 - Ped Phases	12345678	12345678	12345678	12345678	12345678	12345678	12345678	12345678	12345678
Perm 2 - Begin	0	0	0	0	0	0	0	0	0
Perm 2 - End	0	0	0	0	0	0	0	0	0
Perm 2 - Veh Phases									
Perm 2 - Ped Phases									
Perm 3 - Begin	0	0	0	0	0	0	0	0	0
Perm 3 - End	0	0	0	0	0	0	0	0	0
Perm 3 - Veh Phases									
Perm 3 - Ped Phases									
Max Inhibit Phases									
Max Recall Phases									
Sync Phases	2 6	2 6	2 6	2 6	2 6	2 6	2 6	2 6	2 6
Lag Phases	2 6	2 6	2 6	2 6	2 6	2 6	2 6	2 6	2 6
Pre-Timed Phases									
Coordination - Permissives & Phase Sequence									

	Overlap Number							
	1	2	3	4	5	6	7	8
Load Switch Number	0	0	0	0	0	0	0	0
Vehicle Set 1	_____	_____	_____	_____	_____	_____	_____	12345678
Vehicle Set 2	_____	_____	_____	_____	_____	_____	_____	_____
Vehicle Set 3	_____	_____	_____	_____	_____	_____	_____	_____
Negative Vehicle	_____	_____	_____	_____	_____	_____	_____	_____
Negative Ped	_____	_____	_____	_____	_____	_____	_____	_____
Green Omit	_____	_____	_____	_____	_____	_____	_____	_____
Green Clear Omit	_____	_____	_____	_____	_____	_____	_____	_____

Green Clearance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Clearance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Overlaps

	AND 1	AND 2	AND 3	AND 4
Input - A	0	0	0	0
Input - B	0	0	0	0
Output	0	0	0	0

AND Gates

	NAND 1	NAND 2	NAND 3	NAND 4
Input - A	0	0	0	0
Input - B	0	0	0	0
Output	0	0	0	0

NAND Gates

	OR 1	OR 2	OR 3	OR 4	OR 5	OR 6
Input - A	0	0	0	0	0	0
Input - B	0	0	0	0	0	0
Output	0	0	0	0	0	0

2 Input - OR Gates

	OR 7	OR 8
Input - A	0	0
Input - B	0	0
Input - C	0	0
Input - D	0	0
Output	0	0

4 Input - OR Gates

	NOT 1	NOT 2	NOT 3	NOT 4
Input	220	0	0	0
Output	221	0	0	0

NOT Gates (Inverters)

	DELAY 1	DELAY 2	DELAY 3	DELAY 4	DELAY 5	DELAY 6
Input	0	0	0	0	0	0
Delay Time	0	0	0	0	0	0
Output	0	0	0	0	0	0

DELAY Gates

Latch:	1	2	3	4	5	6	7	8
Set	0	0	0	0	0	0	0	0
Reset	0	0	0	0	0	0	0	0
Out	0	0	0	0	0	0	0	0
/Out	0	0	0	0	0	0	0	0

Logic Latches

Det. #	C-1 Pin #	Delay	Carry-over	Phase Assignmnrnts	Detector Attributes	Detector Set Assignments
1	56	15.0	0.0	1	5 7	123 8
2	56	0.0	0.0	6	5 7	123 8
3	39	0.0	0.0	2	5 7	123 8
4	43	0.0	0.0	2	5 7	123 8
5	41	3.0	0.0	4	5 7	123 8
6	45	10.0	0.0	4	5 7	123 8
7	55	15.0	0.0	5	5 7	123 8
8	55	0.0	0.0	2	5 7	123 8
9	40	0.0	0.0	6	5 7	123 8
10	44	0.0	0.0	6	5 7	123 8
11	42	3.0	0.0	8	5 7	123 8
12	46	10.0	0.0	8	5 7	123 8
13	0	0.0	0.0			
14	67	0.0	0.0	2	2	123
15	69	0.0	0.0	4	2	123
16	68	0.0	0.0	6	2	123
17	70	0.0	0.0	8	2	123
18	0	0.0	0.0			
19	47	0.0	0.0	2	5 7	123
20	49	0.0	0.0	4	5 7	123
21	48	0.0	0.0	6	5 7	123
22	50	0.0	0.0	8	5 7	123
23	0	0.0	0.0			
24	0	0.0	0.0			
25	0	0.0	0.0			
26	0	0.0	0.0			
27	0	0.0	0.0			
28	0	0.0	0.0			
29	0	0.0	0.0			
30	0	0.0	0.0			
31	0	0.0	0.0			
32	0	0.0	0.0			

Detector Assignments

Detector Attributes

- 1 = Full Time Delay
- 2 = Ped Call
- 3 =
- 4 = Count
- 5 = Extension
- 6 = Type 3
- 7 = Calling
- 8 = Alternate

Detector Assignments

- 1 = Detector Set 1
- 2 = Detector Set 2
- 3 = Detector Set 3
- 4 =
- 5 =
- 6 = Failure - Min Recall
- 7 = Failure - Max Recall
- 8 = Report on Failure

	C-1 Pin #
Flash Sense	81
External Permit - 1	0
External Permit - 2	0
External Permit - 3	0
Exclusive Ped Omit	0
Max. Term Inhibit	0
Max. 2	0
External Lag Phases	0
External Max. Recall	0
Stop Time	82
Manual Control Enable	80
Manual Cont. Advance	0
External Min. Recall	0

General Inputs

	C-1 Pin #
Railroad - 1	0
Railroad - 2	52
Special Event - 1	0
Special Event - 2	0
Gate Down	0
EV - A	71
EV - B	72
EV - C	73
EV - D	74

Preempt Inputs

	C-1 Pin #
Door Ajar	0
UPS Battery	0
UPS Power	0
Cabinet Temperature	0

	C-1 Pin #
Plan 1	0
Plan 2	0
Plan 3	0
Plan 4	0
Plan 5	0
Plan 6	0
Plan 7	0
Plan 8	0
Plan 9	0
Free	0
Flash	0

Coordination Plan Inputs

	C-1 Pin #
Phase Bank - 2	0
Phase Bank - 3	221
Detector Set - 2	0
Detector Set - 3	0
Overlap Vehicle Set - 2	0
Overlap Vehicle Set - 3	0

Bank & Set Inputs

	C-1 Pin #
Alarm - 1	75
Alarm - 2	0
Alarm - 3	0
Alarm - 4	0

	C-1 Pin #
Advance Warning - 1	0
Advance Warning - 2	0
Detector Failure	0
Flasher - Alternating 1	0
Flasher - Alternating 2	0
Fast Flasher	0
On Line	0
Exclusive - Walk	0
Exclusive - Don't Walk	0

General Outputs

	C-1 Pin #
Output - 1	201
Output - 2	202
Output - 3	203
Output - 4	204
Output - 5	205
Output - 6	206
Output - 7	207
Output - 8	208

Time of Day Outputs

	C-1 Pin #
Plan - 1	211
Plan - 2	212
Plan - 3	213
Plan - 4	214
Plan - 5	215
Plan - 6	216
Plan - 7	217
Plan - 8	218
Plan - 9	219
Free	220

Coordination Plan Out

	Ped Phase
Ped 2-P Loadswitch	2
Ped 4-P Loadswitch	4
Ped 6-P Loadswitch	6
Ped 8-P Loadswitch	8

Ped Loadswitch Assignment

	C-1 Pin #
Dial - 2	0
Dial - 3	0
Offset - 1	0
Offset - 2	0
Offset - 3	0
Free	0
Flash	0

Seven Wire Outputs

	C-1 Pin #	
	On	Flash
Railroad - 1	0	0
Railroad - 2	0	0
Special Event - 1	0	0
Special Event - 2	0	0
Preempt Failure	0	0
EV - A	0	0
EV - B	0	0
EV - C	0	0
EV - D	0	0
Any Preempt	0	0

Preemption Outputs

	C-1 Pin #
Output - 1	0
Output - 2	0
Output - 3	0
Output - 4	0
Output - 5	0
Output - 6	0
Output - 7	0
Output - 8	0

Special Event Outputs

	C-1 Pin #
Phase - 1	99
Phase - 2	0
Phase - 3	0
Phase - 4	0
Phase - 5	90
Phase - 6	0
Phase - 7	0
Phase - 8	0

FYA PPLT Outputs

	C-1 Pin #
Output - 1	0
Output - 2	0
Output - 3	0
Output - 4	0
Output - 5	0
Output - 6	0
Output - 7	0
Output - 8	0

Special Function Output

	Phase Number							
	1	2	3	4	5	6	7	8
Red	97	0	0	0	88	0	0	0
Yellow	98	0	0	0	89	0	0	0
Green	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0
Don't Walk	0	0	0	0	0	0	0	0

Phase Output Redirection

	Overlap Number							
	1	2	3	4	5	6	7	8
Red	0	0	0	0	0	0	0	0
Yellow	0	0	0	0	0	0	0	0
Green	0	0	0	0	0	0	0	0

Overlap Output Redirection

Event	Day of Week	Season	Hour	Minute	Plan	Offset
0			0	0	0	0
1			0	0	0	0
2			0	0	0	0
3			0	0	0	0
4			0	0	0	0
5			0	0	0	0
6			0	0	0	0
7			0	0	0	0
8			0	0	0	0
9			0	0	0	0
10			0	0	0	0
11			0	0	0	0
12			0	0	0	0
13			0	0	0	0
14			0	0	0	0
15			0	0	0	0
16			0	0	0	0
17			0	0	0	0
18			0	0	0	0
19			0	0	0	0
20			0	0	0	0
21			0	0	0	0
22			0	0	0	0
23			0	0	0	0
24			0	0	0	0
25			0	0	0	0
26			0	0	0	0
27			0	0	0	0
28			0	0	0	0
29			0	0	0	0
30			0	0	0	0
31			0	0	0	0

Time Base Coordination Events

Event	Day of Week	Season	Hour	Minute	Funct.	Phase / Bits
0			0	0	0	
1			0	0	0	
2			0	0	0	
3			0	0	0	
4			0	0	0	
5			0	0	0	
6			0	0	0	
7			0	0	0	
8			0	0	0	
9			0	0	0	
10			0	0	0	
11			0	0	0	
12			0	0	0	
13			0	0	0	
14			0	0	0	
15			0	0	0	

Time of Day Function Events

TOD Functions

- 0 = Permitted Phases
- 1 = Red Lock
- 2 = Yellow Lock
- 3 = Vehicle Min Recall
- 4 = Ped Recall
- 5 =
- 6 = Rest In Walk
- 7 = Red Rest
- 8 = Double Entry
- 9 = Vehicle Max Recall
- 10 = Soft Recall
- 11 = Max Extension 2
- 12 = Conditional Service
- 13 = Lag Free Phases
- 14, Bit 1 = Local Override
- 14, Bit 4 = Disable Det Off Monitoring
- 15 = TOD Outputs

#	Holiday Type	Day	Month	Year
0		0	0	0
1		0	0	0
2		0	0	0
3		0	0	0
4		0	0	0
5		0	0	0
6		0	0	0
7		0	0	0
8		0	0	0
9		0	0	0
10		0	0	0
11		0	0	0
12		0	0	0
13		0	0	0
14		0	0	0
15		0	0	0
16		0	0	0
17		0	0	0
18		0	0	0
19		0	0	0
20		0	0	0
21		0	0	0
22		0	0	0
23		0	0	0
24		0	0	0
25		0	0	0
26		0	0	0
27		0	0	0
28		0	0	0
29		0	0	0
30		0	0	0
31		0	0	0

Holiday Dates

Event	Holiday Type	Hour	Minute	Plan	Offset
0		0	0	0	0
1		0	0	0	0
2		0	0	0	0
3		0	0	0	0
4		0	0	0	0
5		0	0	0	0
6		0	0	0	0
7		0	0	0	0
8		0	0	0	0
9		0	0	0	0
10		0	0	0	0
11		0	0	0	0
12		0	0	0	0
13		0	0	0	0
14		0	0	0	0
15		0	0	0	0
16		0	0	0	0
17		0	0	0	0
18		0	0	0	0
19		0	0	0	0
20		0	0	0	0
21		0	0	0	0
22		0	0	0	0
23		0	0	0	0
24		0	0	0	0
25		0	0	0	0
26		0	0	0	0
27		0	0	0	0
28		0	0	0	0
29		0	0	0	0
30		0	0	0	0
31		0	0	0	0

Holiday Time Base Coordination Events

Event	Holiday Type	Hour	Minute	Funct.	Phase / Bits
0		0	0	0	
1		0	0	0	
2		0	0	0	
3		0	0	0	
4		0	0	0	
5		0	0	0	
6		0	0	0	
7		0	0	0	
8		0	0	0	
9		0	0	0	
10		0	0	0	
11		0	0	0	
12		0	0	0	
13		0	0	0	
14		0	0	0	
15		0	0	0	

Holiday Time of Day Function Events

Season #	Start Month	Start Day	End Month	End Day
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0

Season Definitions

Red Start Time	0.0
Yellow Start Phases	_____
First Green Phases	2_6_
Startup Vehicle Calls	12_456_8
Startup Ped Calls	2_4_6_8

Startup

Max ON Time	7
Max OFF Time	255
Chatter	_____

Detector Check

	Sign 1	Sign 2
Phase Number	0	0
Time Before Yellow	0.0	0.0

Advance Warning Signs

Flash Entry Phases	_____
Flash Phases Yellow	_____
Flash Overlaps Yellow	_____
Flash Type	_____

Flash Setup

Exclusive Phases	_____
Protect / Permissive	_____
Disable Yellow Range	_____
Extra One	1_3_5_
Lag Phases - Free	_____

Configuration

Permitted Phases	12_456_8
Restricted Phases	_____
Disable Overlap Range	_____
Extra Two	4
External Permit 1	_____
External Permit 2	_____
External Permit 3	_____

Configuration

Keyboard Beep	_____
Backlight Timeout	_____
Spec Evnt 1 - Ltd Serv Interval	0
Spec Evnt 2 - Ltd Serv Interval	0
Red Start	0.0
Flash Start	7
Red Revert	2.0

Miscellaneous

Spring Month (Begin)	_____
Spring Week (Begin)	_____
Fall Month (End)	_____
Fall Week (End)	_____

Daylight Savings Time

Manual Plan	_____
Manual Offset	_____

Manual

Address	_____
Area Number	_____
Area Address	_____
IP Port	_____
IP Address	_____
Subnet Mask	_____
Gateway	_____

Ethernet Port Address

	Port 1	Port 2	Port 3	Port 4
Address	_____	_____	_____	_____
Area Number	_____	_____	_____	_____
Area Address	_____	_____	_____	_____
Comm Time Out	_____	_____	_____	_____
CTS Delay	_____	_____	_____	_____
RTS Hold	_____	_____	_____	_____
Baud Rate	_____	_____	_____	_____
Data Format	_____	_____	_____	_____

Communications Parameters

Event	Day of Week	Hour	Minute	Headway	Direction
0		0	0	0	0
1		0	0	0	0
2		0	0	0	0
3		0	0	0	0
4		0	0	0	0
5		0	0	0	0
6		0	0	0	0
7		0	0	0	0
8		0	0	0	0
9		0	0	0	0
10		0	0	0	0
11		0	0	0	0
12		0	0	0	0
13		0	0	0	0
14		0	0	0	0
15		0	0	0	0

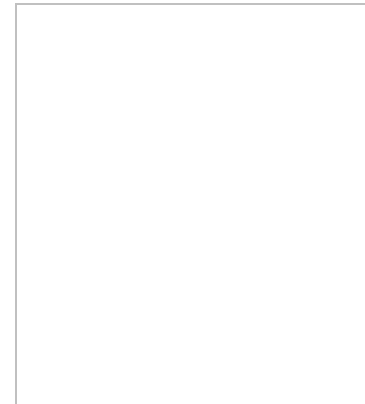
Bus Headway Schedule

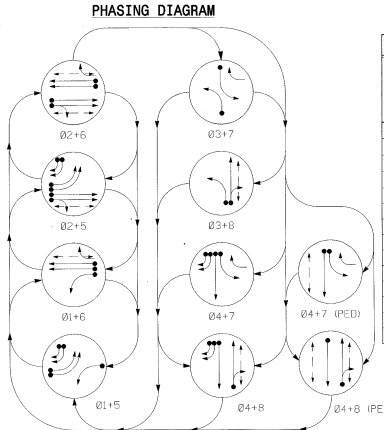
Approach	A	B	C	D
Travel Time	0	0	0	0
Passage	0	0	0	0
Extension	0	0	0	0
Phases				

Bus Approach

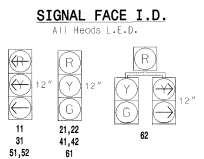
	A	B	C	D
Phase 1	0	0	0	0
Phase 2	0	0	0	0
Phase 3	0	0	0	0
Phase 4	0	0	0	0
Phase 5	0	0	0	0
Phase 6	0	0	0	0
Phase 7	0	0	0	0
Phase 8	0	0	0	0

Non-Priority Phase Maximums



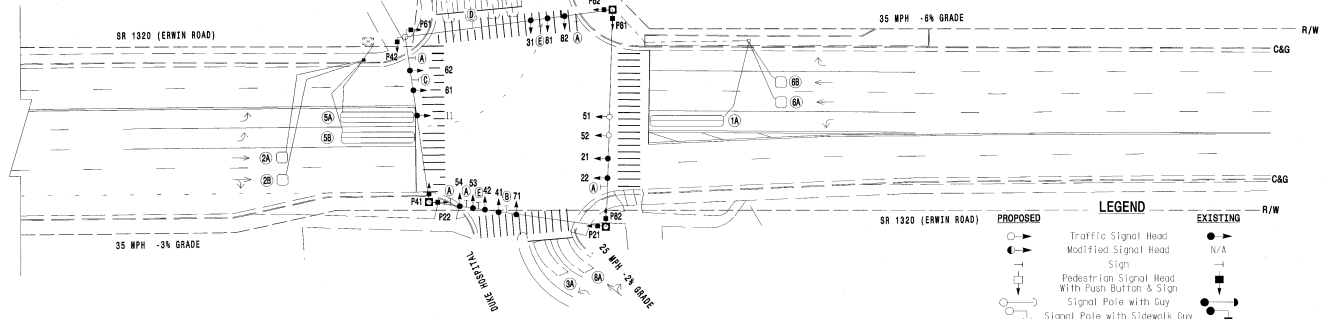
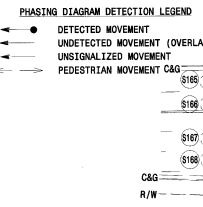


SIGNAL FACE	PHASE												
	01+5	02+5	02+6	03+7	03+8	04+7	04+8	04+8 (PED)	01+5	02+5	02+6	03+7	
11	-	-	-	-	-	-	-	-	-	-	-	-	-
21,22	R	R	G	G	R	R	R	R	R	R	R	R	Y
31	-	-	-	-	-	-	-	-	-	-	-	-	-
41,42	R	R	R	R	R	R	G	G	G	G	R	R	Y
51,52	-	-	-	-	-	-	-	-	-	-	-	-	-
61	R	G	R	G	R	R	R	R	R	R	R	R	Y
71	-	-	-	-	-	-	-	-	-	-	-	-	-
81,82	R	R	R	R	R	R	R	R	R	R	R	R	Y
P21,P22	DW	DW	W	W	DW	DW	DW	DW	DW	DW	DR	DR	DR
P41,P42	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DR	DR	DR
P61,P62	DW	W	DW	W	DW	DW	DW	DW	DW	DW	DR	DR	DR
P81,P82	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DR	DR	DR

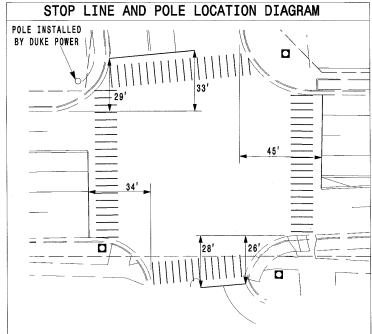


LOOP NO.	SIZE (ft)	TURNS	DEE FROM STOPLINE (ft)	INDUCTIVE LOOP DETECTOR	NEMA PHASE	DETECTOR PROGRAMMING												STATUS									
						DELAY	CARRY (SECONDS)	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6	TYPE 7	TYPE 8	TYPE 9	TYPE 10										
1A	6 X 40	2-4-2	0	X	1	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X				
2A	6 X 6	5	70	X	2	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X			
2B	6 X 6	5	70	X	2	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X		
2C	6 X 25	2	0	X	3	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X		
4A	6 X 60	2-4-2	+5	X	4	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X		
5A	6 X 40	2-4-2	0	X	5	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
5B	6 X 40	2-4-2	0	X	5	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
5C	6 X 60	2-4-2	+5	X	5	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
5D	6 X 60	2-4-2	+5	X	5	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
6A	6 X 6	5	70	X	6	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
6B	6 X 6	5	70	X	6	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
7A	6 X 60	2-4-2	+5	X	7	3	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
8A	6 X 25	2	0	X	8	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
P21,P22	N/A	N/A	N/A	X	2	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
P41,P42	N/A	N/A	N/A	X	4	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
P61,P62	N/A	N/A	N/A	X	6	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
P81,P82	N/A	N/A	N/A	X	8	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
S165	6 X 6	5	+800	X	YS	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
S166	6 X 6	5	+800	X	YS	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
S167	6 X 6	5	675	X	YS	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
S168	6 X 6	5	675	X	YS	-	SEC.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X

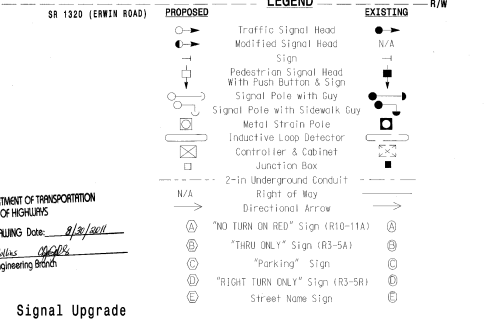
- 8 PHASE FULLY ACTUATED (DURHAM SIGNAL SYSTEM) NOTES**
- Refer to "Roadway Standard Drawings M200" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006, and all applicable sections of the latest version of the generic Project Special Provisions. The PSP can be accessed at the following website: <http://www.ncdot.org/dot/presentations/traffic/13ss/>
 - Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
 - Phase 1 and/or phase 5 may be lagged.
 - Set all detector units to presence mode.
 - In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
 - Program all timing information into phase banks 1, 2, and 3 unless otherwise noted.
 - Set phase bank 3 maximum limit to 250 seconds for phases used.
 - Quit "MALK" and flashing "DONT WALK" with no pedestrian calls.
 - Program pedestrian heads to countdown the flashing "Don't Walk" time only.
 - Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
 - Relabel existing loops in cabinet.
 - Pavement markings shall be installed by contractor.



PHASE	01	02	03	04	05	06	07	08	09	0LT
MINIMUM INITIAL *	7.0 SEC.	10.0 SEC.	7.0 SEC.	7.0 SEC.	7.0 SEC.	10.0 SEC.	7.0 SEC.	7.0 SEC.	0.0 SEC.	0.0 SEC.
VEHICLE EXTENSION *	2.0 SEC.	3.0 SEC.	1.0 SEC.	1.0 SEC.	2.0 SEC.	3.0 SEC.	1.0 SEC.	1.0 SEC.	-	-
YELLOW CHANGE INT.	3.1 SEC.	4.1 SEC.	3.0 SEC.	4.0 SEC.	3.0 SEC.	4.3 SEC.	3.0 SEC.	3.3 SEC.	3.5 SEC.	-
RED CLEARANCE	3.2 SEC.	2.3 SEC.	3.2 SEC.	2.3 SEC.	3.2 SEC.	2.3 SEC.	3.3 SEC.	3.1 SEC.	2.1 SEC.	-
MAXIMUM LIMIT *	** SEC.	** SEC.	** SEC.	** SEC.	** SEC.	** SEC.	** SEC.	** SEC.	** SEC.	** SEC.
RECALL POSITION	NONE	VEH. RECALL	NONE	NONE	NONE	VEH. RECALL	NONE	NONE	NONE	NONE
VEHICLE CALL MEMORY	NONLOCK	YELLOW LOCK	NONLOCK	NONLOCK	NONLOCK	YELLOW LOCK	NONLOCK	NONLOCK	NONLOCK	NONLOCK
DOUBLE ENTRY	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
WALK *	-	SEC.	7 SEC.	-	SEC.	7 SEC.	-	SEC.	7 SEC.	-
FLASHING DONT WALK	-	SEC.	12 SEC.	-	SEC.	19 SEC.	-	SEC.	20 SEC.	-
TYPE 3 LIMIT	-	SEC.	-	SEC.	-	SEC.	-	SEC.	-	SEC.
ALTERNATE EXTENSION	-	SEC.	-	SEC.	-	SEC.	-	SEC.	-	SEC.
ADD FOR VEHICLE *	-	SEC.	-	SEC.	-	SEC.	-	SEC.	-	SEC.
MAXIMUM INITIAL *	-	SEC.	-	SEC.	-	SEC.	-	SEC.	-	SEC.
MAXIMUM GAP *	2.0 SEC.	3.0 SEC.	1.0 SEC.	1.0 SEC.	2.0 SEC.	3.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	-
REDUCE Q3 SEC EVERY *	-	SEC.	-	SEC.	-	SEC.	-	SEC.	-	SEC.
MINIMUM GAP	2.0 SEC.	3.0 SEC.	1.0 SEC.	1.0 SEC.	2.0 SEC.	3.0 SEC.	1.0 SEC.	1.0 SEC.	1.0 SEC.	-



NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PLAN DRAWING Date: 8/24/2011
C: C. Collins
Traffic Engineering Branch



Signal Upgrade

Prepared by: **RAMEY KEMP ASSOCIATES, INC.**

PROJECT: SR 1320 (Erwin Road) at Fulton Street/ Duke University Hospital Entrance

DATE: August 2011

SCALE: 1"=30'

APPROVED: [Signature]

DATE: 8-24-11

PROJECT NO.: 10051 (040)

DATE: 05-0388

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0388-Erwin Rd & Fulton St

Group Assignment: **p**
 Field Master Assignment: **NONE**
 System Reference Number: **210**

N/S Street Name: **Not Assigned**
 E/W Street Name: **Not Assigned**

Last Database Change: **4/22/2013 9:50**

Change Record					
Change	By	Date	Change	By	Date

Notes: 5/4/11 Put phase 2 in ped recall due to buttons not putting call to controller
8/2/07 LT Changed clearance times
10/27/08 Downloaded new AM plan (Sch D) LT
2/24/10 Put 4 and 7 in max recall because of paving work, also changed all detector
4/19/12 CB Took phase 2 ped out of recall in database timing. Buttons working prop

Manual Plan
 0 = Automatic
 1-9 = Plan 1-9
 14 = Free
 15 = Flash

Manual Offset
 0 = Automatic
 1 = Offset A
 2 = Offset B
 3 = Offset C

Drop Number	7	<C/0+0+0>
Zone Number	1	<C/0+0+1>
Area Number	2	<C/0+0+2>
Area Address	94	<C/0+0+3>
Area Channel	COM123:	(QuicNet)

Manual Plan	<C/0+A+1>
Manual Offset	<C/0+B+1>

Red Start	0.0	<F/1+C+0>
Flash Start	10	<F/1+0+E>
Red Revert	5.0	<F/1+0+F>

Exclusive Walk	0	<F/1+0+0>
Exclusive FDW	0	<F/1+0+1>
All Red Clear	0.0	<F/1+0+2>

Communication Addresses
 [Configuration not in timing menus]

Manual Selection
 [Set Manual Plan/Offset not timing]

Start / Revert Times
 [Miscellaneous Timing]

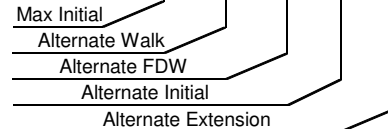
Exclusive Ped Phase
 (Outputs specified in Assignable
 Outputs at E/127+A+E & F)

[Miscellaneous Timing]

Row	Phase Names ---->	Phase							
		1	2	3	4	5	6	7	8
0	Ped Walk	0	7	0	7	0	7	0	7
1	Ped FDW	0	12	0	19	0	20	0	20
2	Min Green	7	10	7	7	7	10	7	7
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	2.0	3.0	3.0	1.0	2.0	3.0	1.0	3.0
6	Max Gap	2.0	3.0	3.0	1.0	2.0	3.0	1.0	3.0
7	Min Gap	2.0	3.0	3.0	1.0	2.0	3.0	1.0	3.0
8	Max Limit	45	60	30	30	45	60	30	30
9	Max Limit 2	0	60	0	30	40	60	30	30
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	0	0	0	0	0	0	0	0
C	Cond Serv Min	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	3.1	4.1	3.0	4.0	3.0	4.3	3.0	3.3
F	Red Clear	3.2	2.3	3.2	2.3	3.2	2.3	3.3	3.1

Phase Timing - Bank 1 <C+0+F=1>
 [Phase Timing Bank 1]

	9	A	B	C	D
Phase 1	0	0	0	0	0.0
Phase 2	0	0	0	0	0.0
Phase 3	0	0	0	0	0.0
Phase 4	0	0	0	0	0.0
Phase 5	0	0	0	0	0.0
Phase 6	0	0	0	0	0.0
Phase 7	0	0	0	0	0.0
Phase 8	0	0	0	0	0.0



Alternate Timing <C+0+F=1>
 [Phase Timing Bank 1]

	E
RR-1 Delay	0
RR-1 Clear	0
EV-A Delay	0
EV-A Clear	0
EV-B Delay	0
EV-B Clear	0
EV-C Delay	0
EV-C Clear	0
EV-D Delay	0
EV-D Clear	0
RR-2 Delay	0
RR-2 Clear	0
View EV Delay	---
View EV Clear	---
View RR Delay	---
View RR Clear	---

Preempt Timing
 [Preempt Timing]

	F	Row
Permit	12345678	0
Red Lock	_____	1
Yellow Lock	__2__6__	2
Min Recall	__2__6__	3
Ped Recall	_____	4
View Set Peds	-----	5
Rest In Walk	_____	6
Red Rest	_____	7
Dual Entry	_____	8
Max Recall	_____	9
Soft Recall	_____	A
Max 2	_____	B
Cond. Service	_____	C
Ext Cont Calls	12345678	D
Yellow Start	_____	E
First Phases	__2__6__	F

Phase Functions <C+0+F=1>
 [Phase Functions]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
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4=Variable Initial
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 7=Reduce GAP
 8=Red Rest
 9=Preemption
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 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0388-Erwin Rd & Fulton St

		Overlap							
Column Numbers ---->		1	2	3	4	5	6	7	8
Row	Overlap Name ---->								
0	Load Switch Number	9	0	0	0	0	0	0	0
1	Veh Set 1 - Phases	45							12345678
2	Veh Set 2 - Phases								
3	Veh Set 3 - Phases								
4	Neg Veh Phases	3 6							
5	Neg Ped Phases	4 6							
6	Green Omit Phases								
7	Green Clear Omit Phs.								
8									
9									
A									
B									
C									
D	Green Clear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F	Red Clear	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Overlap Assignments <C+0+E=29>
 [Overlap Configuration]

Extra 1 Flags
 1 = TBC Type 1
 2 = NEMA Ext. Coord
 3 = Auto Daylight Savings
 4 = EV Advance
 5 = Extended Status
 6 = International Ped
 7 = Flash - Clear Outputs
 8 = Split Ring

Extra 2 Flags
 1 = AWB During Initial
 2 = LMU Installed
 3 = Disable Min Walk
 4 = QuicNet/4 System
 5 = Ignore P/P on EV
 6 =
 7 = Reserved
 8 =

	C	Row
EV-A	0	0
EV-B	0	1
EV-C	0	2
EV-D	0	3
RR-1 *	---	4
RR-2 *	---	5
SE-1	0	6
SE-2	0	7

Preempt Priority
 <C+0+E=125>
 (* RR-1 is always Highest, and RR-2 is always Second Highest)

[Preempt Parameters]

Row	Column Numbers ---->	E
0	Exclusive Phases	
1	RR-1 Clear Phases	
2	RR-2 Clear Phases	
3	RR-2 Limited Service	
4	Prot / Perm Phases	
5	Flash to PE Circuits	
6	Flash Entry Phases	2 6
7	Disable Yellow Range	
8	Disable Ovp Yel Range	
9	Overlap Yellow Flash	
A	EV-A Phases	
B	EV-B Phases	
C	EV-C Phases	
D	EV-D Phases	
E	Extra 1 Config. Bits	1 3 5
F	IC Select (Interconnect)	2

Configuration <C+0+E=125>
 [Configuration Data]

	F
Ext. Permit 1 Phases	
Ext. Permit 2 Phases	
Exclusive Ped Assign	
Preempt Non-Lock	
Ped for 2P Output	2
Ped for 6P Output	6
Ped for 4P Output	4
Ped for 8P Output	8
Yellow Flash Phases	2 6
Low Priority A Phases	
Low Priority B Phases	
Low Priority C Phases	
Low Priority D Phases	
Restricted Phases	
Extra 2 Config. Bits	4

Configuration <C+0+E=125>
 [Configuration Data]

	F
Fast Green Flash Phase	
Green Flash Phases	
Flashing Walk Phases	
Guaranteed Passage	
Simultaneous Gap Term	12345678
Sequential Timing	
Advance Walk Phases	
Delay Walk Phases	
External Recall	
Start-up Overlap Green	
Max Extension	
Inhibit Ped Reserve	
Semi-Actuated	
Start-up Overlap Yellow	
Start-up Vehicle Calls	12345678
Start-up Ped Calls	2 4 6 8

Specials <C+0+F=2>
 [Phase Functions]

Flash to PE & PE Non-Lock
 1 = EV A 5 = RR 1
 2 = EV B 6 = RR 2
 3 = EV C 7 = SE 1
 4 = EV D 8 = SE 2

IC Select Flags
 1 =
 2 = Modem
 3 = 7-Wire Slave
 4 = Flash / Free
 5 =
 6 = Simplex Master
 7 = 7-Wire Master
 8 = Offset Interrupter

	2	Row
Phase 1	14	1
Phase 2	20	2
Phase 3	14	3
Phase 4	14	4
Phase 5	14	5
Phase 6	20	6
Phase 7	14	7
Phase 8	14	8

Coordination Transition Minimums
 <C+0+C=5>
 [Coordination Functions]

Display Indications:
 0=Walk
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 5=Extention
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 9=Preemption
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 D=Yellow Gap Max Term
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		Plan
Column Numbers ---->		1
Row	Plan Name ---->	
0	Cycle Length	120
1	Phase 1 - ForceOff	17
2	Phase 2 - ForceOff	0
3	Phase 3 - ForceOff	43
4	Phase 4 - ForceOff	76
5	Phase 5 - ForceOff	106
6	Phase 6 - ForceOff	17
7	Phase 7 - ForceOff	43
8	Phase 8 - ForceOff	76
9	Ring Offset	0
A	Offset A	0
B	Offset B	0
C	Offset C	0
D	Perm 1 - End	8
E	Hold Release	255
F	Zone Offset	0

Row		
0	Ped Adjustment	0
1	Perm 2 - Start	9
2	Perm 2 - End	25
3	Perm 3 - Start	26
4	Perm 3 - End	40
5	Reservice Time	0
6	Reservice Phases	
7		
8	Pretimed Phases	
9	Max Recall	
A	Perm 1 Veh Phase	1
B	Perm 1 Ped Phase	
C	Perm 2 Veh Phase	3 7
D	Perm 2 Ped Phase	
E	Perm 3 Veh Phase	4 8
F	Perm 3 Ped Phase	4 8

Display Indications:
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INTERSECTION: 0388-Erwin Rd & Fulton St

Row	Column 9	Column A	Column B	Column C	Column D	Column E	Column F	Row							
0	Spec. Funct. 1	0	NOT-3	0	Max 2	0	Pretimed	0	Set DOW	0	Dial 2 (7-Wire)	0	Sim Term	0	0
1	Spec. Funct. 2	0	NOT-4	0	System Det 1	65	Plan 1	0	Ext. Perm 1	0	Dial 3 (7-Wire)	0	EV-A	71	1
2	Spec. Funct. 3	0	OR-4 (a)	0	System Det 2	78	Plan 2	0	Ext. Perm 2	0	Offset 1 (7-Wire)	0	EV-B	72	2
3	Spec. Funct. 4	0	OR-4 (b)	0	System Det 3	64	Plan 3	0	Dimming	0	Offset 2 (7-Wire)	0	EV-C	73	3
4	NAND-3 (a)	0	OR-5 (a)	0	System Det 4	77	Plan 4	0	Set Clock	0	Offset 3 (7-Wire)	0	EV-D	74	4
5	NAND-3 (b)	0	OR-5 (b)	0	System Det 5	0	Plan 5	0	Stop Time	82	Free (7-Wire)	0	RR-1	0	5
6	NAND-4 (a)	0	OR-6 (a)	0	System Det 6	0	Plan 6	0	Flash Sense	81	Flash (7-Wire)	0	RR-2	52	6
7	NAND-4 (b)	0	OR-6 (b)	0	System Det 7	0	Plan 7	0	Manual Enable	53	Excl. Ped Omit	0	Spec. Event 1	0	7
8	OR-7 (a)	0	Fig 3 Diamond	0	System Det 8	0	Plan 8	0	Man. Advance	80	NOT-1	220	Spec. Event 2	0	8
9	OR-7 (b)	0	Fig 4 Diamond	0	Max Inhibit (nema)	0	Plan 9	0	External Alarm	75	NOT-2	0	External Lag	0	9
A	OR-7 (c)	0	AND-4 (a)	0	Force A (nema)	0	DELAY-A	0	Phase Bank 2	0	OR-1 (a)	0	AND-1 (a)	6	A
B	OR-7 (d)	0	AND-4 (b)	0	Force B (nema)	0	DELAY-B	0	Phase Bank 3	221	OR-1 (b)	0	AND-1 (b)	97	B
C	OR-8 (a)	0	NAND-1 (a)	0	C.N.A. (nema)	0	DELAY-C	0	Overlap Set 2	201	OR-2 (a)	0	AND-2 (a)	0	C
D	OR-8 (b)	0	NAND-1 (b)	0	Hold (nema)	0	DELAY-D	0	Overlap Set 3	0	OR-2 (b)	0	AND-2 (b)	0	D
E	OR-8 (c)	0	NAND-2 (a)	0	Max Recall	0	DELAY-E	0	Detector Set 2	0	OR-3 (a)	0	AND-3 (a)	0	E
F	OR-8 (d)	0	NAND-2 (b)	0	Min Recall	0	DELAY-F	0	Detector Set 3	0	OR-3 (b)	0	AND-3 (b)	0	F

Assignable Inputs
 [Input Assignments]

<C=0+E=126>

Row	Column 9	Column A	Column B	Column C	Column D	Column E	Column F	Row							
0	Phase ON - 1	0	Preempt Fail	0	Flasher 0	0	Free	220	NOT-1	221	TOD Out 1	0	Dial 2 (7-Wire)	0	0
1	Phase ON - 2	0	Sp Evnt Out 1	0	Flasher 1	0	Plan 1	211	OR-1	0	TOD Out 2	0	Dial 3 (7-Wire)	0	1
2	Phase ON - 3	0	Sp Evnt Out 2	0	Fast Flasher	0	Plan 2	212	OR-2	0	TOD Out 3	0	Offset 1 (7-Wire)	0	2
3	Phase ON - 4	0	Sp Evnt Out 3	0	Fig 3 Diamond	0	Plan 3	213	OR-3	0	TOD Out 4	0	Offset 2 (7-Wire)	0	3
4	Phase ON - 5	0	Sp Evnt Out 4	0	Fig 4 Diamond	0	Plan 4	214	AND-1	201	TOD Out 5	0	Offset 3 (7-Wire)	0	4
5	Phase ON - 6	0	Sp Evnt Out 5	0			Plan 5	215	AND-2	0	TOD Out 6	0	Free (7-Wire)	0	5
6	Phase ON - 7	0	Sp Evnt Out 6	0			Plan 6	216	AND-3	0	TOD Out 7	0	Flash (7-Wire)	0	6
7	Phase ON - 8	0	Sp Evnt Out 7	0			Plan 7	217	NOT-2	0	TOD Out 8	0	Preempt	0	7
8	Ph. Check - 1	0	Sp Evnt Out 8	0	NOT-3	0	Plan 8	218	EV-A	0	Adv. Warn - 1	0	Low Priority A	0	8
9	Ph. Check - 2	0			NOT-4	0	Plan 9	219	EV-B	0	Adv. Warn - 2	0	Low Priority B	0	9
A	Ph. Check - 3	0	Detector Fail	0	OR-4	0	Spec. Funct. 3	0	EV-C	0	DELAY-A	0	Low Priority C	0	A
B	Ph. Check - 4	0	Spec. Funct. 1	0	OR-5	0	Spec. Funct. 4	0	EV-D	0	DELAY-B	0	Low Priority D	0	B
C	Ph. Check - 5	0	Spec. Funct. 2	0	OR-6	0	NAND-3	0	RR-1	0	DELAY-C	0			C
D	Ph. Check - 6	0	Central Control	0	AND-4	0	NAND-4	0	RR-2	0	DELAY-D	0			D
E	Ph. Check - 7	0	Excl. Ped DW	0	NAND-1	0	OR-7	0	Spec. Event 1	0	DELAY-E	0			E
F	Ph. Check - 8	0	Excl. Ped WK	0	NAND-2	0	OR-8	0	Spec. Event 2	0	DELAY-F	0			F

Assignable Outputs
 [Output Assignments]

<C=0+E=127>

Display Indications:
 0=Walk
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 2=Minimum Green

4=Variable Initial
 5=Extension
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 A=Stop Time

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 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

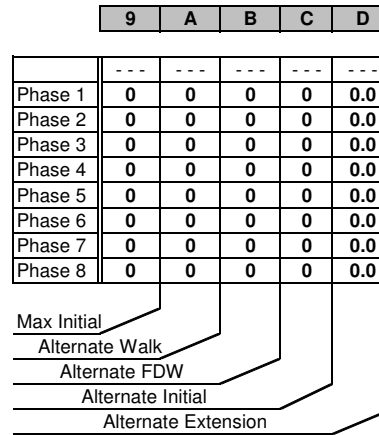
INTERSECTION: 0388-Erwin Rd & Fulton St

Row	Phase Names ---->	Phase							
		1	2	3	4	5	6	7	8
0	Ped Walk	0	7	0	7	0	7	0	7
1	Ped FDW	0	12	0	19	0	20	0	20
2	Min Green	7	10	7	7	7	10	7	7
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	2.0	3.0	1.0	1.0	2.0	3.0	1.0	1.0
6	Max Gap	2.0	3.0	1.0	1.0	2.0	3.0	1.0	1.0
7	Min Gap	2.0	3.0	1.0	1.0	2.0	3.0	1.0	1.0
8	Max Limit	45	60	30	50	45	60	30	50
9	Max Limit 2	0	0	0	0	0	0	0	0
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	0	0	0	0	0	0	0	0
C	Cond Serv Min	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	3.1	4.1	3.0	4.0	3.0	4.3	3.0	3.3
F	Red Clear	3.2	2.3	3.2	2.3	0.0	2.3	3.3	3.1

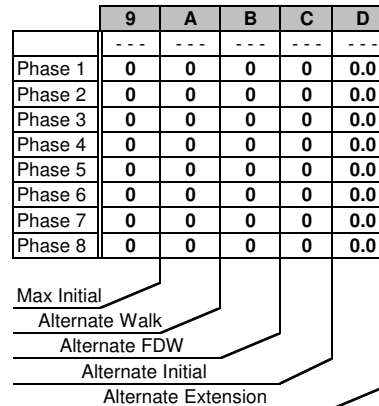
Phase Timing - Bank 2 <C=0+F=2>
 [Phase Timing Bank2]

Row	Phase Names ---->	Phase							
		1	2	3	4	5	6	7	8
0	Ped Walk	0	7	0	7	0	7	0	7
1	Ped FDW	0	12	0	19	0	20	0	20
2	Min Green	7	10	7	7	7	10	7	7
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	2.0	3.0	1.0	1.0	2.0	3.0	1.0	1.0
6	Max Gap	2.0	3.0	1.0	1.0	2.0	3.0	1.0	1.0
7	Min Gap	2.0	3.0	1.0	1.0	2.0	3.0	1.0	1.0
8	Max Limit	250	250	250	250	250	250	250	250
9	Max Limit 2	250	250	250	250	250	250	250	250
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	0	0	0	0	0	0	0	0
C	Cond Serv Min	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	3.1	4.1	3.0	4.0	3.0	4.3	3.0	3.3
F	Red Clear	3.2	2.3	3.0	2.3	3.2	2.3	3.3	3.1

Phase Timing - Bank 3 <C=0+F=3>
 [Phase Timing Bank 3]



Alternate Timing
 [Phase Timing Bank2]



Alternate Timing
 [Phase Timing Bank 3]

Transition Type
 0.X = Shortway
 1.X = Lengthen
 X.1 thru X.4 =
 Number of
 cycles when
 lengthening

Daylight Savings
 Date
 If set to all zeros,
 standard dates
 will be used.

Transition Type | 0.2 <C/5+1+9>

TBC Transition

[Coordination Functions]

Cycle 1 Fail | 0 C/5+1+1

Cycle 2 Fail | 0 C/5+1+2

Cycle Fail Thresholds (minutes)

[Coordination Functions]

Lag Hold Phases | <C/5+1+A>

Coordinated Lag Hold Phases

[Coordination Functions]

Sync Output Time | 0.0 <C/5+1+C>

7-Wire Master

[Coordination Function/ called Sync Time]

Begin Month | 3 <C/5+2+A>

Begin Week | 2 <C/5+2+B>

End Month | 11 <C/5+2+C>

End Week | 1 <C/5+2+D>

Daylight Savings Time

[Dialback and Daylight Saving]

Time B4 Yellow | 0.0 <F/1+C+E>

Phase Number | 0 <F/1+C+F>

Advance Warning Beacon - Sign 1

[Miscellaneous Timing]

Time B4 Yellow | 0.0 <F/1+D+E>

Phase Number | 0 <F/1+D+F>

Advance Warning Beacon - Sign 2

[Miscellaneous Timing]

Long Failure | 0.7 <F/1+0+6>

Short Failure | 0.7 <F/1+0+7>

Power Cycle Correction (Default = 0.7)

[Miscellaneous Timing]

Min Time (seconds) | 0 <F/1+0+8>

Min Green Before PE Force Off

[Preempt Parameters]

Max Time (minutes) | 255 <F/1+0+9>

Max Preempt Time Before Failure

[Preempt Parameters]

Min Time (seconds) | 0 <F/1+0+A>

Min Time Between Same Preempts

(Does Not Apply To Railroad Preempt)

Low Pri. Channel | <E/125+C+8>

Disable Low Priority Channel

[Preempt Parameters]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
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 9=Preemption
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 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0388-Erwin Rd & Fulton St

Column Numbers ---->		0	1	2	3	1	3
Row	Det Num	C1 Pin Number	Attributes	Phase(s)	Assign	Delay	Carry-over
0	1	56	5 7	1	123 8	0.0	0.0
1	2	39	5 7	2	123 8	0.0	0.0
2	3	43	5 7	2	123 8	0.0	0.0
3	4	58	5 7	3	123 8	0.0	0.0
4	5	41	5 7	4	123 8	0.0	0.0
5	6	60	5 7	5	123 8	0.0	0.0
6	7	62	5 7	5	123 8	0.0	0.0
7	8	55	5 7	5	123 8	0.0	0.0
8	9	40	5 7	6	123 8	0.0	0.0
9	10	44	5 7	6	123 8	0.0	0.0
A	11	57	5 7	7	123 8	3.0	0.0
B	12	42	5 7	8	123 8	0.0	0.0
C	13	66	5 7	5	123 8	0.0	0.0
D	14	0				0.0	0.0
E	15	67	2	2	123	0.0	0.0
F	16	69	2	4	123	0.0	0.0

Detector Types
 EXTENTION: Detector only active during the Phase Green Interval
 COUNT: used in computing "Added Initial
 CALL: Detector only active during the non green phase will not extend the phases
 TYPE 3: will allow a call detector to extend its phase until the call first drops or the type 3 limit is reached

Column Numbers ---->		Ped / Phase / Overlap								Row
		1	2	3	4	5	6	7	8	
Walk		0	0	0	0	0	0	0	0	0
Don't Walk		0	0	0	0	0	0	0	0	1
Phase Green		0	0	0	0	0	0	0	0	2
Phase Yellow		0	0	0	0	0	0	0	0	3
Phase Red		0	0	0	0	0	0	0	0	4
Overlap Green		0	0	0	0	0	0	0	0	5
Overlap Yellow		0	0	0	0	0	0	0	0	6
Overlap Red		0	0	0	0	0	0	0	0	7

Redirect Phase Outputs <C+0+E=127>

[Phase Output Redirections]

Cabinet Type	0	<E/125+D+0>	D	Row
Enable Redirection			12345678	0
(Enable Redirection = 30)				1
[Phase Output Redirection]				2
Max OFF (minutes)	255	<D/0+0+1>		3
Max ON (minutes)	7	<D/0+0+2>		4
Detector Failure Monitor				5
[Miscellaneous Timing]				6
				7

Dimming <C+0+E=125>

[Output Dimming]

Output Bit:	12345678	Row
Output Port 1		1
Output Port 2		2
Output Port 3		3
Output Port 4		4
Output Port 5		5
Output Port 6		6
Output Port 7		7

Disable Alarms

- 1 = Stop Time
- 2 = Flash Sense
- 3 = Keyboard Entry
- 4 = Manual Plan
- 5 = Police Control
- 6 = External Alarm
- 7 = Detector Failure
- 8 =

Delay Logic Times

<C+0+D=0> (seconds)

[Miscellaneous Timing]

Omit Alarm		<C/5+F+0>
------------	--	-----------

Disable Alarm Reporting

[Dialback and Daylight Saving]

Time	0	<C/5+C+0>
------	---	-----------

Redial Time (minutes)

(View Redial Timer at E/2+D+6)

[Dialback and Daylight Saving]

Column Numbers ---->		4	5	6	7	2	4
Row	Det Num	C1 Pin Number	Attributes	Phase(s)	Assign	Delay	Carry-over
0	17	68	2	6	123	0.0	0.0
1	18	70	2	8	123	0.0	0.0
2	19	0				0.0	0.0
3	20	0				0.0	0.0
4	21	0				0.0	0.0
5	22	0				0.0	0.0
6	23	0				0.0	0.0
7	24	0				0.0	0.0
8	25	56	5 7	1	123	0.0	0.0
9	26	47	5 7	2	123	0.0	0.0
A	27	58	5 7	3	123	0.0	0.0
B	28	49	5 7	4	123	0.0	0.0
C	29	55	5 7	5	123	0.0	0.0
D	30	48	5 7	6	123	0.0	0.0
E	31	57	5 7	7	123	0.0	0.0
F	32	50	5 7	8	123	0.0	0.0

Detector Attributes
 1 = Full Time Delay
 2 = Ped Call
 3 =
 4 = Count
 5 = Extension
 6 = Type 3
 7 = Calling
 8 = Alternate

Det. Assignments

- 1 = Det. Set 1
- 2 = Det. Set 2
- 3 = Det. Set 3
- 4 =
- 5 =
- 6 = Failure - Min Recall
- 7 = Failure - Max Recall
- 8 = Report on Failure

Detector Assignments <C+0+E=126>

[Detector Attributes]

<C+0+D=0>

[Detector Timing]

Dial-Back Telephone Number

[Dialback and Daylight Saving]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0388-Erwin Rd & Fulton St

Row	Time	Plan	Offset	Day of Week
0	00:00	E	0	1234567
1	00:00	0	0	
2	00:00	0	0	
3	00:00	0	0	
4	06:30	1	C	23456
5	09:30	4	C	23456
6	00:00	0	0	
7	15:00	3	C	23456
8	18:30	4	C	23456
9	21:00	E	0	23456
A	00:00	0	0	
B	00:00	0	0	
C	00:00	0	0	
D	00:00	0	0	
E	00:00	0	0	
F	00:00	0	0	

TOD Coordination <C+0+9=0.1>
 (Bank 1)
 [Time of Day Functions]

Time	Funct.	Day of Week	Column 4 Phases/Bits
00:00	E	1234567	4 78
06:00	E	1234567	78
23:00	E	1234567	4 78
15:00	E	1234567	78
06:30	B	23456	2 4 678
09:30	B	23456	
15:30	B	23456	2 456 8
18:00	B	23456	
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		

TOD Function <C+0+7=0.1> <C+0+E=27>
 (Bank 1)
 [Time of Day Functions]

Day	Year	Month	Holiday Type
01	03	1	1
04	03	7	1
26	03	11	2
27	03	11	1
28	03	11	3
24	03	12	2
25	03	12	1
00	00	0	
01	04	1	1
04	04	7	1
24	04	11	2
25	04	11	1
26	04	11	3
24	04	12	2
25	04	12	1
00	00	0	

Holiday Dates <C+0+8=1.1>
 (Bank 1)
 [Holiday Dates]

Time	Plan	Offset	Holiday Type
00:00	4	0	123
00:00	0	0	
06:00	1	0	2
09:00	4	0	2
12:00	3	0	2
20:00	4	0	2
00:00	0	0	
05:00	1	0	3
09:00	4	0	3
16:00	3	0	3
19:00	4	0	3
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	

Holiday Events <C+0+9=1.1>
 (Bank 1)
 [Holiday TBC Plans]

T.O.D. Functions
 0 =
 1 = Red Lock
 2 = Yellow Lock
 3 = Veh Min Recall
 4 = Ped Recall
 5 =
 6 = Rest In Walk
 7 = Red Rest
 8 = Double Entry
 9 = Veh Max Recall
 A = Veh Soft Recall
 B = Maximum 2
 C = Conditional Service
 D = Free Lag Phases
 E = Bit 1 - Local Override
 Bit 4 - Disable Detector
 OFF Monitor
 Bit 7 - Detector Count
 Monitor
 Bit 8 - Real Time Split
 Monitor
 F = Output Bits 1 thru 8

Plan Select
 1 thru 9 = Coordination
 Plan 1 thru 9
 14 or E = Free
 15 or F = Flash

Offset Select
 A = Offset A
 B = Offset B
 C = Offset C

Month Select
 1 = January
 2 = February
 3 = March
 4 = April
 5 = May
 6 = June
 7 = July
 8 = August
 9 = September
 A = October
 B = November
 C = December

Row	Time	Plan	Offset	Day of Week
0	00:00	0	0	
1	00:00	0	0	
2	00:00	0	0	
3	00:00	0	0	
4	00:00	0	0	
5	00:00	0	0	
6	00:00	0	0	
7	00:00	0	0	
8	00:00	0	0	
9	00:00	0	0	
A	00:00	0	0	
B	00:00	0	0	
C	00:00	0	0	
D	00:00	0	0	
E	00:00	0	0	
F	00:00	0	0	

TOD Coordination <C+0+9=0.2>
 (Bank 2)
 [Time Base Coordination]

Time	Funct.	Holiday Type	Column 4 Phases/Bits
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		

Holiday <C+0+7=0.2> <C+0+E=28>
 (Bank 2)
 [Time of Day Functions]

Day	Year	Month	Holiday Type
01	01	1	1
04	01	7	1
21	01	11	2
22	01	11	1
23	01	11	3
24	01	12	2
25	01	12	1
00	00	0	
01	02	1	1
04	02	7	1
27	02	11	2
28	02	11	1
29	02	11	3
24	02	12	2
25	02	12	1
00	00	0	

Holiday Dates <C+0+8=1.2>
 (Bank 2)
 [Holiday Dates]

Time	Plan	Offset	Holiday Type
05:30	0	0	
09:00	0	0	
00:00	0	0	
00:00	0	0	
16:00	0	0	
19:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	

Holiday Events <C+0+9=1.2>
 (Bank 2)
 [Holiday TBC Plans]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0388-Erwin Rd & Fulton St

Row	6 Clear	7 Time	8 Ped Call	9 Hold	A Advance	B Force Off	C Vehicle Call	D Permit Phases	E Ped Omit	F Circuit
0		0								
1		0								
2		0								
3		0								
4		0								
5		0								
6		0								
7		0								
8		0								
9		0								
A		0								
B		0								
C		0								
D		0								
E		0								
F		0								

Special Event Schedule -- Table 1
[Special Event Sequence 1]

<C+0+E=27>

Notes:

0 <E/27+5+F>
Limited Service Interval
[Special Event Sequence 1]

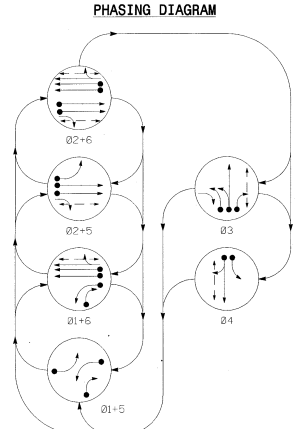
Row	6 Clear	7 Time	8 Ped Call	9 Hold	A Advance	B Force Off	C Vehicle Call	D Permit Phases	E Ped Omit	F Circuit
0		0								
1		0								
2		0								
3		0								
4		0								
5		0								
6		0								
7		0								
8		0								
9		0								
A		0								
B		0								
C		0								
D		0								
E		0								
F		0								

Special Event Schedule -- Table 2
[Special Event Sequence 2]

<C+0+E=28>

Notes:

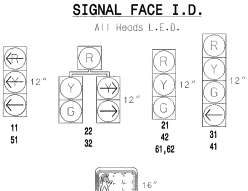
0 <E/28+5+F>
Limited Service Interval
[Special Event Sequence 2]



PHASING DIAGRAM DETECTION LEGEND

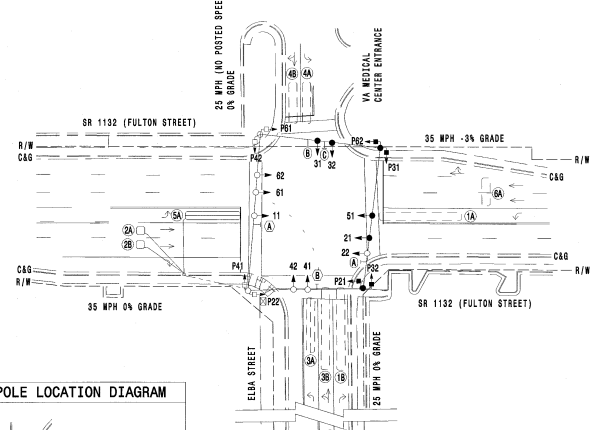
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- ◀ UNINSTANTIALIZED MOVEMENT
- ↔ PEDESTRIAN MOVEMENT

SIGNAL FACE	PHASE											
	01	02	03	04	05	06	07	08	09	10	11	12
11	1	1	1	1	1	1	1	1	1	1	1	1
21	R	R	R	G	G	R	R	Y				
22	R	R	G	G	R	R	Y					
31	R	R	R	R	G	R	R					
32	R	R	R	R	G	R	R					
41	R	R	R	R	G	R	R					
42	R	R	R	R	G	R	R					
51	1	1	1	1	1	1	1	1	1	1	1	1
61,62	R	G	R	G	R	R	Y					
P21,P22	DW	DW	W	W	DW	DW	DKR					
P31,P32	DW	DW	DW	DW	DW	DW	DKR					
P41,P42	DW	DW	DW	DW	DW	DW	DKR					
P61,P62	DW	W	DW	W	DW	DW	DKR					



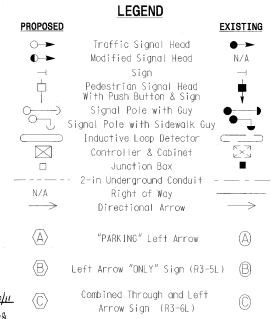
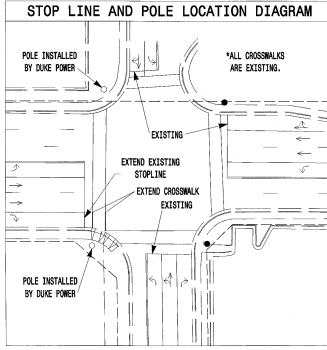
170 LOOP & DETECTOR UNIT INSTALLATION CHART													
INDUCTIVE LOOPS						DETECTOR PROGRAMMING							
LOOP NO.	SIZE (ft)	TURNS	DISF FROM STRIP (ft)	REMA PHASE	REMA	TIMING DELAY	CARRY (STRETCH)	ATTRIBUTES				STATUS	
								1	2	3	4	5	
								RECALL	RECALL	RECALL	RECALL	RECALL	
1A	6X60	1	+5	X	1	-	SEC.	-	-	-	-	-	X
1B	6X60	1	+5	X	1	15	SEC.	-	-	-	-	-	X
2A	6X6	3	70	X	2	-	SEC.	-	-	-	-	-	X
2B	6X6	3	70	X	2	-	SEC.	-	-	-	-	-	X
3A	6X40	2-4-2	0	X	3	3	SEC.	-	-	-	-	-	X
3B	6X50	1	+5	X	3	-	SEC.	-	-	-	-	-	X
4A	6X30	1	+5	X	4	3	SEC.	-	-	-	-	-	X
4B	6X30	1	+5	X	4	10	SEC.	-	-	-	-	-	X
5A	6X40	2-4-2	0	X	5	-	SEC.	-	-	-	-	-	X
6A	6X28	2	70	X	6	-	SEC.	-	-	-	-	-	X
P21,P22	N/A	N/A	N/A	X	2	-	SEC.	-	-	-	-	-	X
P31,P32	N/A	N/A	N/A	X	3	-	SEC.	-	-	-	-	-	X
P41,P42	N/A	N/A	N/A	X	4	-	SEC.	-	-	-	-	-	X
P61,P62	N/A	N/A	N/A	X	6	-	SEC.	-	-	-	-	-	X
S169	6X6	3	370	X	619	-	SEC.	-	-	-	-	-	X
S170	6X6	3	370	X	619	-	SEC.	-	-	-	-	-	X
S171	6X6	3	+510	X	619	-	SEC.	-	-	-	-	-	X
S172	6X6	3	+510	X	619	-	SEC.	-	-	-	-	-	X

- 6 PHASE FULLY ACTUATED (DURHAM SIGNAL SYSTEM) NOTES**
- Refer to "Roadway Standard Drawings M2007" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2006, and all applicable sections of the latest version of the generic Project Special Provisions. The PSP can be accessed at the following website: <http://www.ncdot.org/infrastructure/traffic/itsa/>
 - Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
 - Phase 1 and/or phase 5 may be lagged.
 - The order of phase 3 and phase 4 may be reversed.
 - Reposition existing signal head numbered 21.
 - Set all detector units to presence mode.
 - In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
 - Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
 - Program all timing information into phase banks 1, 2, and 3 unless otherwise noted.
 - Set phase bank 3 maximum limit to 250 seconds for phases used.
 - Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
 - Program pedestrian heads to countdown the flashing "Don't Walk" time only.
 - Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
 - Pavement markings shall be installed by contractor.



TIMING CHART 170 CONTROLLER						
PHASE	01	02	03	04	05	06
MINIMUM INITIAL *	7.0 SEC.	10.0 SEC.	7.0 SEC.	7.0 SEC.	7.0 SEC.	10.0 SEC.
VEHICLE EXTENSION *	1.0 SEC.	3.0 SEC.	2.0 SEC.	2.0 SEC.	2.0 SEC.	3.0 SEC.
YELLOW CHANGE INT.	3.0 SEC.	3.8 SEC.	3.2 SEC.	3.2 SEC.	3.0 SEC.	4.1 SEC.
RED CLEARANCE	2.8 SEC.	1.9 SEC.	3.3 SEC.	3.2 SEC.	3.1 SEC.	1.8 SEC.
MAXIMUM LIMIT *	** SEC.	** SEC.	** SEC.	** SEC.	** SEC.	** SEC.
RECALL POSITION	NONE	VEH. RECALL	NONE	NONE	NONE	VEH. RECALL
VEHICLE CALL MEMORY	NONLOCK	YELLOW LOCK	NONLOCK	NONLOCK	NONLOCK	YELLOW LOCK
DOUBLE ENTRY	OFF	OFF	OFF	OFF	OFF	OFF
WALK *	-	SEC. 7	SEC. 7	SEC. 7	SEC. -	SEC. 7
FLASHING DON'T WALK	-	SEC. 14	SEC. 19	SEC. 23	SEC. -	SEC. 8
TYPE 3 LIMIT	-	SEC. -	SEC. -	SEC. -	SEC. -	SEC. -
ALTERNATE EXTENSION	-	SEC. -	SEC. -	SEC. -	SEC. -	SEC. -
ADD FOR VEHICLE *	-	SEC. -	SEC. -	SEC. -	SEC. -	SEC. -
MAXIMUM INITIAL *	-	SEC. -	SEC. -	SEC. -	SEC. -	SEC. -
MAXIMUM GAP*	1.0 SEC.	3.0 SEC.	2.0 SEC.	1.0 SEC.	2.0 SEC.	3.0 SEC.
REDUCE 0.1 SEC EVERY *	-	SEC. -	SEC. -	SEC. -	SEC. -	SEC. -
MINIMUM GAP	1.0 SEC.	3.0 SEC.	2.0 SEC.	1.0 SEC.	2.0 SEC.	3.0 SEC.

* These values may be field adjusted. Do not adjust Min. Green and Extension times for phases 2 and 4 lower than what is shown. Min. Green for all other phases should be no lower than 4 seconds.
 ** Timing to be determined by the City of Durham.

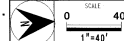


NC DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 FINAL DRAWING Date: 8/2/11
 Traffic Engineering Branch

Signal Upgrade

	SR 1132 (Fulton Street) at Elba Street		
	Division 5 PLAY ESTE: August 2011 PREPARED BY: BB Falls	Durham RECEIVED BY: WJ Hamilton IGA PROJ. NO: 10051 (040)	

Prepared in the office of:
RAMEY KEMP ASSOCIATES, INC.
 7500 Kildwick Road, Durham, NC 27709
 919.286.8800



INTERSECTION: 1132-Elba St & Fulton St

QuicNet System Parameters

Group Assignment: **Group 0051**
 Field Master Assignment: **NONE**
 System Reference Number: **209**
 Commications Channel: **COM123:**
 Drop Address: **8**
 Area Number: **2**
 Area Address: **95**

N/S Street Name: **Not Assigned**
 E/W Street Name: **Not Assigned**

Last QuicNet Database Change: **3/28/2013 12:50**

Notes:

2/24/10 Changed all detector attributes from 6 to 7 (in failure, max recall) because of possible paving work LT
5/7/10 Put ph 4 in max recall because of driveway work (changed det attributes back to 6) LT
1/7/13 Keep these timings as this is needed to match the plan. CB

Field Change Record					
Change	By	Date	Change	By	Date

Excl Ped Assignment	_____	Note: Set the Exclusive Ped Outputs on the "Outputs / General" page				
Exclusive Walk	0					
Exclusive FDW	0					
All Red Clear	0.0					
Exclusive Ped Phase		<table border="1"> <tr> <td>Walk Output</td> <td>0</td> </tr> <tr> <td>Don't Walk Output</td> <td>0</td> </tr> </table>	Walk Output	0	Don't Walk Output	0
Walk Output	0					
Don't Walk Output	0					

	Phase							
	1	2	3	4	5	6	7	8
Basic Phase Timing								
Min Green	7	10	7	7	7	10	0	0
Extension	2.0	3.0	2.0	1.0	2.0	3.0	0.0	0.0
Max	30	44	23	23	13	44	0	0
Max 2	0	0	0	0	0	0	0	0
Cond Serve Check	0	0	0	0	0	0	0	0
Clear								
Yellow Change	3.0	3.8	3.2	3.2	3.0	4.1	0.0	0.0
Red Clear	2.8	1.9	3.3	3.2	3.1	1.8	0.0	0.0
Pedestrian Timing								
Walk	0	7	7	7	0	7	0	0
Ped Clear - FDW	0	14	19	23	0	8	0	0
Adv / Delay Walk	0	0	0	0	0	0	0	0
PE Min Ped FDW	0	0	0	0	0	0	0	0
Volume Density								
Type 3 Disconnect	0	0	0	0	0	0	0	0
Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Added Initial	0	0	0	0	0	0	0	0
Min Gap	1.0	3.0	2.0	1.0	2.0	3.0	0.0	0.0
Max Gap	1.0	3.0	2.0	1.0	2.0	3.0	0.0	0.0
Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 1

	Phase							
	1	2	3	4	5	6	7	8
Alternate Walk	0	0	0	0	0	0	0	0
Alternate Ped Clear	0	0	0	0	0	0	0	0
Alternate Minimum	0	0	0	0	0	0	0	0
Alternate Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternate Timing - Bank 1

Red Lock	_____	Red Rest	_____
Yellow Lock	2 6	Dual Entry	_____
Simultaneous Gap	123456	Sequential Timing	_____
Rest In Walk	_____	Inhibit Ped Reservice	_____
Advance Walk	_____	Semi-Actuated	_____
Flashing Walk	_____	Guaranteed Passage	_____
Max Extension	_____	Conditional Service	_____

Phase Functions - Page 1

Minimum Recall	2 6	Soft Recall	_____
Ped Recall	2	External Recall	_____
Maximum Recall	_____	Manual Control Calls	123456
Green Flash	_____	Fast Green Flash	_____
Overlap Green Flash	_____	Fast Overlap G. Flash	_____

Phase Functions - Page 2

		Phase							
		1	2	3	4	5	6	7	8
Basic Phase Timing	Min Green	7	10	7	7	7	10	0	0
	Extension	1.0	3.0	2.0	1.0	2.0	3.0	0.0	0.0
	Max	19	44	23	23	19	44	0	0
	Max 2	0	0	0	0	0	0	0	0
	Cond Serve Check	0	0	0	0	0	0	0	0
Clear	Yellow Change	3.0	3.8	3.2	3.2	3.0	4.1	0.0	0.0
	Red Clear	2.8	1.9	3.3	3.2	3.1	1.8	0.0	0.0
Pedestrian Timing	Walk	0	7	7	7	0	7	0	0
	Ped Clear - FDW	0	14	19	23	0	8	0	0
	Adv / Delay Walk	0	0	0	0	0	0	0	0
	PE Min Ped FDW	0	0	0	0	0	0	0	0
Volume Density	Type 3 Disconnect	0	0	0	0	0	0	0	0
	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Max Added Initial	0	0	0	0	0	0	0	0
	Min Gap	1.0	3.0	2.0	1.0	2.0	3.0	0.0	0.0
	Max Gap	1.0	3.0	2.0	1.0	2.0	3.0	0.0	0.0
	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 2

		Phase							
		1	2	3	4	5	6	7	8
Basic Phase Timing	Min Green	7	10	7	7	7	7	0	0
	Extension	1.0	3.0	2.0	1.0	2.0	3.0	0.0	0.0
	Max	250	250	250	250	250	250	0	0
	Max 2	250	250	250	250	250	250	0	0
	Cond Serve Check	0	0	0	0	0	0	0	0
Clear	Yellow Change	3.0	3.8	3.2	3.2	3.0	4.1	0.0	0.0
	Red Clear	2.8	1.9	3.3	3.2	3.1	1.8	0.0	0.0
Pedestrian Timing	Walk	0	7	7	7	0	7	0	0
	Ped Clear - FDW	0	14	19	23	0	8	0	0
	Adv / Delay Walk	0	0	0	0	0	0	0	0
	PE Min Ped FDW	0	0	0	0	0	0	0	0
Volume Density	Type 3 Disconnect	0	0	0	0	0	0	0	0
	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Max Added Initial	0	0	0	0	0	0	0	0
	Min Gap	1.0	3.0	2.0	1.0	2.0	3.0	0.0	0.0
	Max Gap	1.0	3.0	2.0	1.0	2.0	3.0	0.0	0.0
	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 3

		Phase							
		1	2	3	4	5	6	7	8
Alternate Walk	0	0	0	0	0	0	0	0	0
Alternate Ped Clear	0	0	0	0	0	0	0	0	0
Alternate Minimum	0	0	0	0	0	0	0	0	0
Alternate Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternate Timing - Bank 2

		Phase							
		1	2	3	4	5	6	7	8
Alternate Walk	0	0	0	0	0	0	0	0	0
Alternate Ped Clear	0	0	0	0	0	0	0	0	0
Alternate Minimum	0	0	0	0	0	0	0	0	0
Alternate Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternate Timing - Bank 3

Note: Set the Limited Service Interval on the "Utilities / Misc" page

Clear Phases	
Delay	0
Clear Time	0
Railroad - 1	

Clear Phases	
Limited Service Phases	
Delay	0
Clear Time	0
Railroad - 2	

Railroad Preempt Parameters

Min Grn Before PE Force-Off	1
Max Pre-Empt Time	255
Min Time Before Same PE	0

	Delay	Clear	Clear Phases
EV - A	0	0	
EV - B	0	0	
EV - C	0	0	
EV - D	0	0	

Emergency Vehicle Preempt

SE - 1	
SE - 2	
EV - A	
EV - B	
EV - C	
EV - D	

Preempt Priority

Step	Time	Clear	Ped Call	Hold	Advance	Force Off	Vehicle Call	Permit	Ped Omit	Output
0	0									
1	0									
2	0									
3	0									
4	0									
5	0									
6	0									
7	0									
8	0									
9	0									
10	0									
11	0									
12	0									
13	0									
14	0									
15	0									

Special Event Sequence - 1

Step	Time	Clear	Ped Call	Hold	Advance	Force Off	Vehicle Call	Permit	Ped Omit	Output
0	0									
1	0									
2	0									
3	0									
4	0									
5	0									
6	0									
7	0									
8	0									
9	0									
10	0									
11	0									
12	0									
13	0									
14	0									
15	0									

Special Event Sequence - 2

Note:
The Ring-Barrier Sum of these Minimums will be the Minimum Cycle Length During Transition

Transition Type	0.2
Coord Extra Functions	
Phase 1 - Minimum	14
Phase 2 - Minimum	20
Phase 3 - Minimum	14
Phase 4 - Minimum	14
Phase 5 - Minimum	14
Phase 6 - Minimum	20
Phase 7 - Minimum	14
Phase 8 - Minimum	14
Coordination - General	

- Coord Extra
- 1 = Programmed Walk Time for Sync Phases
 - 2 = Always Terminate Sync Phase Peds
 - 3 = Use "Floating Force Off"
 - 4 =
 - 5 = Use "Start of Green" for Sync Point

- Transition Type
- 0.X = Shortway
 - 1.X = Lengthen Only
 - 2.X = Shorten Only
 - X.1 thru X.4 = Number of Cycles to get "In Step"

	Coordination Plan								
	1	2	3	4	5	6	7	8	9
Cycle	120	0	120	120	0	0	0	0	100
Offset - 1	61	0	109	109	0	0	0	0	0
Offset - 2	61	0	109	109	0	0	0	0	0
Offset - 3	61	0	109	109	0	0	0	0	0
Zone Offset	0	0	0	0	0	0	0	0	0
Ring Offset	0	0	0	0	0	0	0	0	0
Hold Release	255	255	255	255	255	255	255	255	255
Ped Adjust	0	0	0	0	0	0	0	0	0
Force Off - 1	94	0	16	22	0	0	0	0	55
Force Off - 2	0	0	0	0	0	0	0	0	0
Force Off - 3	29	0	45	51	0	0	0	0	20
Force Off - 4	59	0	75	81	0	0	0	0	40
Force Off - 5	74	0	91	97	0	0	0	0	55
Force Off - 6	0	0	16	22	0	0	0	0	0
Force Off - 7	0	0	0	0	0	0	0	0	20
Force Off - 8	0	0	0	0	0	0	0	0	40
Coordination - Cycle, Offsets, & Force Offs									

	Coordination Plan								
	1	2	3	4	5	6	7	8	9
Perm 1 - Begin	0	0	0	0	0	0	0	0	0
Perm 1 - End	6	0	8	8	0	0	0	0	15
Perm 1 - Veh Phases	3		1	1	12345678	12345678	12345678	12345678	12345678
Perm 1 - Ped Phases	3				12345678	12345678	12345678	12345678	12345678
Perm 2 - Begin	7	0	9	9	0	0	0	0	0
Perm 2 - End	35	0	21	21	0	0	0	0	0
Perm 2 - Veh Phases	4		3	3					
Perm 2 - Ped Phases	4		3	3					
Perm 3 - Begin	36	0	22	22	0	0	0	0	0
Perm 3 - End	62	0	50	50	0	0	0	0	0
Perm 3 - Veh Phases	1 5		45	45					
Perm 3 - Ped Phases			4	4					
Max Inhibit Phases									
Max Recall Phases									
Sync Phases	2 6		2 6	2 6					
Lag Phases	2 4 6 8		1 4 6 8	1 4 6 8					
Pre-Timed Phases									
Coordination - Permissives & Phase Sequence									

	Overlap Number							
	1	2	3	4	5	6	7	8
Load Switch Number	0	0	0	0	0	0	0	0
Vehicle Set 1	_____	_____	_____	_____	_____	_____	_____	12345678
Vehicle Set 2	_____	_____	_____	_____	_____	_____	_____	_____
Vehicle Set 3	_____	_____	_____	_____	_____	_____	_____	_____
Negative Vehicle	_____	_____	_____	_____	_____	_____	_____	_____
Negative Ped	_____	_____	_____	_____	_____	_____	_____	_____
Green Omit	_____	_____	_____	_____	_____	_____	_____	_____
Green Clear Omit	_____	_____	_____	_____	_____	_____	_____	_____
Green Clearance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Clearance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Overlaps

	AND 1	AND 2	AND 3	AND 4
Input - A	0	0	0	0
Input - B	0	0	0	0
Output	0	0	0	0

AND Gates

	NAND 1	NAND 2	NAND 3	NAND 4
Input - A	0	0	0	0
Input - B	0	0	0	0
Output	0	0	0	0

NAND Gates

	OR 1	OR 2	OR 3	OR 4	OR 5	OR 6
Input - A	0	0	0	0	0	0
Input - B	0	0	0	0	0	0
Output	0	0	0	0	0	0

2 Input - OR Gates

	OR 7	OR 8
Input - A	0	0
Input - B	0	0
Input - C	0	0
Input - D	0	0
Output	0	0

4 Input - OR Gates

	NOT 1	NOT 2	NOT 3	NOT 4
Input	220	0	0	0
Output	221	0	0	0

NOT Gates (Inverters)

	DELAY 1	DELAY 2	DELAY 3	DELAY 4	DELAY 5	DELAY 6
Input	0	0	0	0	0	0
Delay Time	0	0	0	0	0	0
Output	0	0	0	0	0	0

DELAY Gates

Latch:	1	2	3	4	5	6	7	8
Set	0	0	0	0	0	0	0	0
Reset	0	0	0	0	0	0	0	0
Out	0	0	0	0	0	0	0	0
/Out	0	0	0	0	0	0	0	0

Logic Latches

Det. #	C-1 Pin #	Delay	Carry-over	Phase Assignmnrnts	Detector Attributes	Detector Set Assignments
1	56	0.0	0.0	1	5 7	123 8
2	39	0.0	0.0	2	5 7	123 8
3	43	0.0	0.0	2	5 7	123 8
4	47	15.0	0.0	1	5 7	123 8
5	41	3.0	0.0	4	5 7	123 8
6	45	10.0	0.0	4	5 7	123 8
7	55	0.0	0.0	5	5 7	123 8
8	40	0.0	0.0	6	5 7	123 8
9	42	3.0	0.0	3	5 7	123 8
10	46	0.0	0.0	3	5 7	123 8
11	0	0.0	0.0			
12	0	0.0	0.0			
13	0	0.0	0.0			
14	0	0.0	0.0			
15	0	0.0	0.0			
16	0	0.0	0.0			
17	67	0.0	0.0	2	2	123
18	69	0.0	0.0	4	2	123
19	68	0.0	0.0	6	2	123
20	70	0.0	0.0	3	2	123
21	0	0.0	0.0			
22	58	0.0	0.0	3	5 7	123
23	49	0.0	0.0	4	5 7	123
24	48	0.0	0.0	6	5 7	123
25	0	0.0	0.0			
26	0	0.0	0.0			
27	0	0.0	0.0			
28	0	0.0	0.0			
29	0	0.0	0.0			
30	0	0.0	0.0			
31	0	0.0	0.0			
32	0	0.0	0.0			

Detector Assignments

Detector Attributes

- 1 = Full Time Delay
- 2 = Ped Call
- 3 =
- 4 = Count
- 5 = Extension
- 6 = Type 3
- 7 = Calling
- 8 = Alternate

Detector Assignments

- 1 = Detector Set 1
- 2 = Detector Set 2
- 3 = Detector Set 3
- 4 =
- 5 =
- 6 = Failure - Min Recall
- 7 = Failure - Max Recall
- 8 = Report on Failure

	C-1 Pin #
Flash Sense	81
External Permit - 1	0
External Permit - 2	0
External Permit - 3	0
Exclusive Ped Omit	0
Max. Term Inhibit	0
Max. 2	0
External Lag Phases	0
External Max. Recall	0
Stop Time	82
Manual Control Enable	53
Manual Cont. Advance	80
External Min. Recall	0

General Inputs

	C-1 Pin #
Plan 1	0
Plan 2	0
Plan 3	0
Plan 4	0
Plan 5	0
Plan 6	0
Plan 7	0
Plan 8	0
Plan 9	0
Free	0
Flash	0

Coordination Plan Inputs

	C-1 Pin #
Railroad - 1	0
Railroad - 2	52
Special Event - 1	0
Special Event - 2	0
Gate Down	0
EV - A	71
EV - B	72
EV - C	73
EV - D	74

Preempt Inputs

	C-1 Pin #
Phase Bank - 2	0
Phase Bank - 3	221
Detector Set - 2	0
Detector Set - 3	0
Overlap Vehicle Set - 2	0
Overlap Vehicle Set - 3	0

Bank & Set Inputs

	C-1 Pin #
Door Ajar	0
UPS Battery	0
UPS Power	0
Cabinet Temperature	0

	C-1 Pin #
Alarm - 1	75
Alarm - 2	0
Alarm - 3	0
Alarm - 4	0

	C-1 Pin #
Advance Warning - 1	0
Advance Warning - 2	0
Detector Failure	0
Flasher - Alternating 1	0
Flasher - Alternating 2	0
Fast Flasher	0
On Line	0
Exclusive - Walk	0
Exclusive - Don't Walk	0

General Outputs

	C-1 Pin #
Output - 1	201
Output - 2	202
Output - 3	203
Output - 4	204
Output - 5	205
Output - 6	206
Output - 7	207
Output - 8	208

Time of Day Outputs

	C-1 Pin #
Plan - 1	211
Plan - 2	212
Plan - 3	213
Plan - 4	214
Plan - 5	215
Plan - 6	216
Plan - 7	217
Plan - 8	218
Plan - 9	219
Free	220

Coordination Plan Out

	Ped Phase
Ped 2-P Loadswitch	2
Ped 4-P Loadswitch	4
Ped 6-P Loadswitch	6
Ped 8-P Loadswitch	3

Ped Loadswitch Assignment

	C-1 Pin #
Dial - 2	0
Dial - 3	0
Offset - 1	0
Offset - 2	0
Offset - 3	0
Free	0
Flash	0

Seven Wire Outputs

	C-1 Pin #	
	On	Flash
Railroad - 1	0	0
Railroad - 2	0	0
Special Event - 1	0	0
Special Event - 2	0	0
Preempt Failure	0	0
EV - A	0	0
EV - B	0	0
EV - C	0	0
EV - D	0	0
Any Preempt	0	0

Preemption Outputs

	C-1 Pin #
Output - 1	0
Output - 2	0
Output - 3	0
Output - 4	0
Output - 5	0
Output - 6	0
Output - 7	0
Output - 8	0

Special Event Outputs

	C-1 Pin #
Phase - 1	0
Phase - 2	0
Phase - 3	0
Phase - 4	0
Phase - 5	0
Phase - 6	0
Phase - 7	0
Phase - 8	0

FYA PPLT Outputs

	Phase Number							
	1	2	3	4	5	6	7	8
Red	0	0	0	0	0	0	0	0
Yellow	0	0	0	0	0	0	0	0
Green	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0
Don't Walk	0	0	0	0	0	0	0	0

Phase Output Redirection

	C-1 Pin #
Output - 1	0
Output - 2	0
Output - 3	0
Output - 4	0
Output - 5	0
Output - 6	0
Output - 7	0
Output - 8	0

Special Function Output

	C-1 Pin #
Output - 1	0
Output - 2	0
Output - 3	0
Output - 4	0
Output - 5	0
Output - 6	0
Output - 7	0
Output - 8	0

	Overlap Number							
	1	2	3	4	5	6	7	8
Red	0	0	0	0	0	0	0	0
Yellow	0	0	0	0	0	0	0	0
Green	0	0	0	0	0	0	0	0

Overlap Output Redirection

Event	Day of Week	Season	Hour	Minute	Plan	Offset
0	1234567		0	0	0	0
1	1234567		6	0	E	0
2	1234567		23	0	E	0
3	_____		0	0	0	0
4	_23456_		6	30	1	C
5	_23456_		9	30	4	C
6	_____		0	0	0	0
7	_23456_		15	0	3	C
8	_23456_		18	30	4	C
9	_23456_		21	0	E	0
10	_____		0	0	0	0
11	_____		0	0	0	0
12	_____		0	0	0	0
13	_____		0	0	0	0
14	_____		0	0	0	0
15	_____		0	0	0	0
16	_____		0	0	0	0
17	_____		0	0	0	0
18	_____		0	0	0	0
19	_____		0	0	0	0
20	_____		0	0	0	0
21	_____		0	0	0	0
22	_____		0	0	0	0
23	_____		0	0	0	0
24	_____		0	0	0	0
25	_____		0	0	0	0
26	_____		0	0	0	0
27	_____		0	0	0	0
28	_____		0	0	0	0
29	_____		0	0	0	0
30	_____		0	0	0	0
31	_____		0	0	0	0

Time Base Coordination Events

Event	Day of Week	Season	Hour	Minute	Funct.	Phase / Bits
0	1234567		0	0	14	__4__
1	1234567		6	0	14	_____
2	1234567		23	0	14	__4__
3	_____		0	0	0	_____
4	_____		0	0	0	_____
5	_____		0	0	0	_____
6	_____		0	0	0	_____
7	_____		0	0	0	_____
8	_____		0	0	0	_____
9	_____		0	0	0	_____
10	_____		0	0	0	_____
11	_____		0	0	0	_____
12	_____		0	0	0	_____
13	_____		0	0	0	_____
14	_____		0	0	0	_____
15	_____		0	0	0	_____

Time of Day Function Events

TOD Functions

- 0 = Permitted Phases
- 1 = Red Lock
- 2 = Yellow Lock
- 3 = Vehicle Min Recall
- 4 = Ped Recall
- 5 =
- 6 = Rest In Walk
- 7 = Red Rest
- 8 = Double Entry
- 9 = Vehicle Max Recall
- 10 = Soft Recall
- 11 = Max Extension 2
- 12 = Conditional Service
- 13 = Lag Free Phases
- 14, Bit 1 = Local Override
- 14, Bit 4 = Disable Det Off Monitoring
- 15 = TOD Outputs

#	Holiday Type	Day	Month	Year
0		0	0	0
1		0	0	0
2		0	0	0
3		0	0	0
4		0	0	0
5		0	0	0
6		0	0	0
7		0	0	0
8		0	0	0
9		0	0	0
10		0	0	0
11		0	0	0
12		0	0	0
13		0	0	0
14		0	0	0
15		0	0	0
16		0	0	0
17		0	0	0
18		0	0	0
19		0	0	0
20		0	0	0
21		0	0	0
22		0	0	0
23		0	0	0
24		0	0	0
25		0	0	0
26		0	0	0
27		0	0	0
28		0	0	0
29		0	0	0
30		0	0	0
31		0	0	0

Holiday Dates

Event	Holiday Type	Hour	Minute	Plan	Offset
0		0	0	0	0
1		0	0	0	0
2		0	0	0	0
3		0	0	0	0
4		0	0	0	0
5		0	0	0	0
6		0	0	0	0
7		0	0	0	0
8		0	0	0	0
9		0	0	0	0
10		0	0	0	0
11		0	0	0	0
12		0	0	0	0
13		0	0	0	0
14		0	0	0	0
15		0	0	0	0
16		0	0	0	0
17		0	0	0	0
18		0	0	0	0
19		0	0	0	0
20		0	0	0	0
21		0	0	0	0
22		0	0	0	0
23		0	0	0	0
24		0	0	0	0
25		0	0	0	0
26		0	0	0	0
27		0	0	0	0
28		0	0	0	0
29		0	0	0	0
30		0	0	0	0
31		0	0	0	0

Holiday Time Base Coordination Events

Event	Holiday Type	Hour	Minute	Funct.	Phase / Bits
0		0	0	0	
1		0	0	0	
2		0	0	0	
3		0	0	0	
4		0	0	0	
5		0	0	0	
6		0	0	0	
7		0	0	0	
8		0	0	0	
9		0	0	0	
10		0	0	0	
11		0	0	0	
12		0	0	0	
13		0	0	0	
14		0	0	0	
15		0	0	0	

Holiday Time of Day Function Events

Season #	Start Month	Start Day	End Month	End Day
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0

Season Definitions

Red Start Time	0.0
Yellow Start Phases	_____
First Green Phases	2_6_
Startup Vehicle Calls	123456_
Startup Ped Calls	234_6_

Startup

Max ON Time	7
Max OFF Time	255
Chatter	_____

Detector Check

	Sign 1	Sign 2
Phase Number	0	0
Time Before Yellow	0.0	0.0

Advance Warning Signs

Flash Entry Phases	_____
Flash Phases Yellow	_____
Flash Overlaps Yellow	_____
Flash Type	_____

Flash Setup

Exclusive Phases	_____
Protect / Permissive	_____
Disable Yellow Range	_____
Extra One	1_3_5_
Lag Phases - Free	2_4_6_8

Configuration

Permitted Phases	123456_
Restricted Phases	_____
Disable Overlap Range	_____
Extra Two	4
External Permit 1	_____
External Permit 2	_____
External Permit 3	_____

Configuration

Keyboard Beep	_____
Backlight Timeout	_____
Spec Evnt 1 - Ltd Serv Interval	0
Spec Evnt 2 - Ltd Serv Interval	0
Red Start	0.0
Flash Start	7
Red Revert	2.0

Miscellaneous

Spring Month (Begin)	_____
Spring Week (Begin)	_____
Fall Month (End)	_____
Fall Week (End)	_____

Daylight Savings Time

Manual Plan	_____
Manual Offset	_____

Manual

Address	_____
Area Number	_____
Area Address	_____
IP Port	_____
IP Address	_____
Subnet Mask	_____
Gateway	_____

Ethernet Port Address

	Port 1	Port 2	Port 3	Port 4
Address	_____	_____	_____	_____
Area Number	_____	_____	_____	_____
Area Address	_____	_____	_____	_____
Comm Time Out	_____	_____	_____	_____
CTS Delay	_____	_____	_____	_____
RTS Hold	_____	_____	_____	_____
Baud Rate	_____	_____	_____	_____
Data Format	_____	_____	_____	_____

Communications Parameters

Event	Day of Week	Hour	Minute	Headway	Direction
0		0	0	0	0
1		0	0	0	0
2		0	0	0	0
3		0	0	0	0
4		0	0	0	0
5		0	0	0	0
6		0	0	0	0
7		0	0	0	0
8		0	0	0	0
9		0	0	0	0
10		0	0	0	0
11		0	0	0	0
12		0	0	0	0
13		0	0	0	0
14		0	0	0	0
15		0	0	0	0

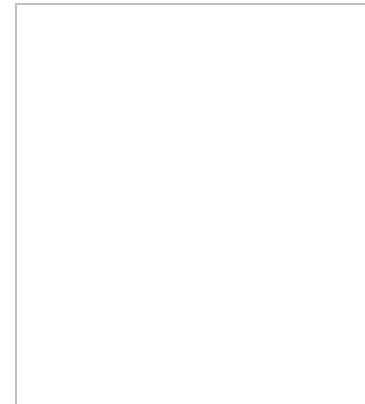
Bus Headway Schedule

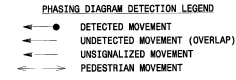
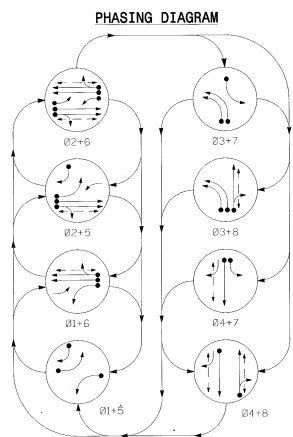
Approach	A	B	C	D
Travel Time	0	0	0	0
Passage	0	0	0	0
Extension	0	0	0	0
Phases				

Bus Approach

	A	B	C	D
Phase 1	0	0	0	0
Phase 2	0	0	0	0
Phase 3	0	0	0	0
Phase 4	0	0	0	0
Phase 5	0	0	0	0
Phase 6	0	0	0	0
Phase 7	0	0	0	0
Phase 8	0	0	0	0

Non-Priority Phase Maximums





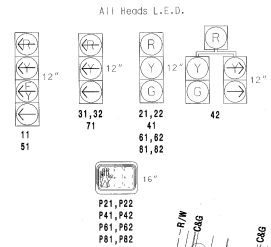
STANDARD SIGNAL FACE CLEARANCES FOR FLASHING LEFT TURN SIGNAL



TABLE OF OPERATION

SIGNAL FACE	PHASE											
	01	02	03	04	05	06	07	08	09	10	11	12
11												
21,22	R	R	G	G	R	R	R	R	Y			
31,32	R	R	G	G	R	R	R	R	Y			
41	R	R	R	R	R	R	R	R	Y			
42	R	R	R	R	R	R	R	R	Y			
51	R	R	R	R	R	R	R	R	Y			
61	R	R	R	R	R	R	R	R	Y			
71	R	R	R	R	R	R	R	R	Y			
81,82	R	R	R	R	R	R	R	R	Y			
P21,P22	DW	DW	W	DW	DW	DW	DW	DW	DR			
P41,P42	DW	DW	DW	DW	DW	DW	DW	DW	DR			
P61,P62	DW	DW	DW	DW	DW	DW	DW	DW	DR			
P81,P82	DW	DW	DW	DW	DW	DW	DW	DW	DR			

SIGNAL FACE I.D.

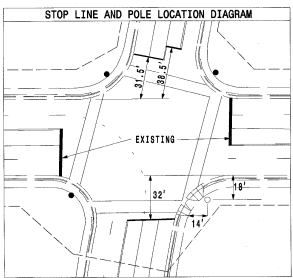
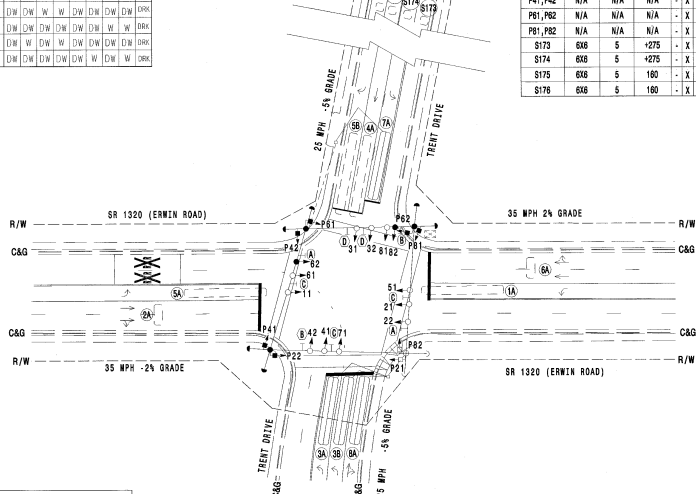


170 LOOP & DETECTOR UNIT INSTALLATION CHART

LOOP NO.	SIZE (ft)	TURNS	DET FROM STOPBAR (ft)	DETECTOR TYPE	NEMA PHASE	TIMING		ATTRIBUTES								STATUS				
						DELAY	CARRY EXTENSION	1	2	3	4	5	6	7	8		9	10		
1A	6X80	1	+5	-	X	1	15 SEC.	-	SEC.	-	-	-	-	-	-	-	-	-	-	X
2A	6X15	2	70	-	X	2	-	-	-	-	-	-	-	-	-	-	-	-	-	X
3A	6X40	2-4-2	0	X	-	3	3 SEC.	-	SEC.	-	-	-	-	-	-	-	-	-	-	X
3B	6X40	2-4-2	0	X	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	X
4A	6X80	1	+5	-	X	4	-	-	-	-	-	-	-	-	-	-	-	-	-	X
5A	6X80	1	+5	-	X	5	15 SEC.	-	SEC.	-	-	-	-	-	-	-	-	-	-	X
5B	6X80	1	+5	-	X	5	15 SEC.	-	SEC.	-	-	-	-	-	-	-	-	-	-	X
6A	6X15	2	70	-	X	6	-	-	-	-	-	-	-	-	-	-	-	-	-	X
7A	6X40	2-4-2	0	X	-	7	3 SEC.	-	SEC.	-	-	-	-	-	-	-	-	-	-	X
8A	6X40	2-4-2	0	X	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	X
P21,P22	N/A	N/A	N/A	-	X	2	-	-	-	-	-	-	-	-	-	-	-	-	-	X
P41,P42	N/A	N/A	N/A	-	X	4	-	-	-	-	-	-	-	-	-	-	-	-	-	X
P61,P62	N/A	N/A	N/A	-	X	6	-	-	-	-	-	-	-	-	-	-	-	-	-	X
P81,P82	N/A	N/A	N/A	-	X	8	-	-	-	-	-	-	-	-	-	-	-	-	-	X
S173	6X6	5	+275	X	SYS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
S174	6X6	5	+275	X	SYS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
S175	6X6	5	180	X	SYS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
S178	6X6	5	180	X	SYS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X

8 PHASE FULLY ACTUATED (DURHAM SIGNAL SYSTEM) NOTES

- Refer to "Roadway Standard Drawings K2001" dated July 2006 and "Standard Specifications for Roads and Structures" dated July 2009, and all applicable sections of the latest version of the generic Project Special Provisions. The PSP can be accessed at the following website: <http://www.road.org/roadprosspecstructtrafficsign/>
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or phase 5 may be jagged.
- Phase 3 and/or phase 7 may be jagged.
- Reposition existing signal heads numbered 62 and 82.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
- Program all timing information into phase banks 1, 2, and 3 unless otherwise noted.
- Set phase bank 3 maximum limit to 250 seconds for phases used.
- Only "WALK" and flashing "DON'T WALK" with no pedestrian calls.
- Program pedestrian heads to countdown the flashing "Don't Walk" time only.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal timing system values supersede these values.
- Relabel loops in cabinet.
- Contractor shall remove existing "Left Turn Yield on Green Ball" signs on span wire along each approach of Erwin Road.



TIMING CHART 170 CONTROLLER

PHASE	01	02	03	04	05	06	07	08
MINIMUM INITIAL *	7.0 SEC.	10.0 SEC.	7.0 SEC.	7.0 SEC.	7.0 SEC.	10.0 SEC.	7.0 SEC.	7.0 SEC.
VEHICLE EXTENSION *	1.0 SEC.	3.0 SEC.	2.0 SEC.	1.0 SEC.	1.0 SEC.	3.0 SEC.	2.0 SEC.	2.0 SEC.
YELLOW CHANGE INT.	3.0 SEC.	4.0 SEC.	3.1 SEC.	3.5 SEC.	3.0 SEC.	4.0 SEC.	3.1 SEC.	3.5 SEC.
RED CLEARANCE	3.1 SEC.	2.4 SEC.	3.1 SEC.	3.0 SEC.	3.2 SEC.	2.4 SEC.	2.8 SEC.	2.6 SEC.
MAXIMUM LIMIT *	** SEC.	** SEC.	** SEC.	** SEC.	** SEC.	** SEC.	** SEC.	** SEC.
RECALL POSITION	NONE	VEH. RECALL	NONE	NONE	NONE	VEH. RECALL	NONE	NONE
VEHICLE CALL MEMORY	NONE	YELLOW LOCK	NONE	NONE	NONE	YELLOW LOCK	NONE	NONE
DOUBLE ENTRY	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON
WALK *	- SEC.	7 SEC.	- SEC.	7 SEC.	- SEC.	7 SEC.	- SEC.	7 SEC.
FLASHING DON'T WALK	- SEC.	15 SEC.	- SEC.	17 SEC.	- SEC.	17 SEC.	- SEC.	20 SEC.
TYPE 3 LIMIT	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
ALTERNATE EXTENSION	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
ADD PER VEHICLE *	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
MAXIMUM INITIAL *	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
MAXIMUM GAP*	1.0 SEC.	3.0 SEC.	2.0 SEC.	1.0 SEC.	1.0 SEC.	3.0 SEC.	2.0 SEC.	2.0 SEC.
REDUCE 0.1 SEC EVERY *	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
MINIMUM GAP	1.0 SEC.	3.0 SEC.	2.0 SEC.	1.0 SEC.	1.0 SEC.	3.0 SEC.	2.0 SEC.	2.0 SEC.

* These values may be field adjusted. Do not adjust Min Green and Extension times for phase 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.
** Timing to be determined by the City of Durham.

LEGEND

	PROPOSED Traffic Signal Head		EXISTING Traffic Signal Head
	PROPOSED Modified Signal Head		EXISTING Modified Signal Head
	PROPOSED Sign		EXISTING Sign
	PROPOSED Pedestrian Signal Head		EXISTING Pedestrian Signal Head
	PROPOSED Signal Pole with Guy		EXISTING Signal Pole with Guy
	PROPOSED Signal Pole with Standard Guy		EXISTING Signal Pole with Standard Guy
	PROPOSED Inductive Loop Detector		EXISTING Inductive Loop Detector
	PROPOSED Controller & Cabinet		EXISTING Controller & Cabinet
	PROPOSED Junction Box		EXISTING Junction Box
	PROPOSED 2-in Underground Conduit		EXISTING 2-in Underground Conduit
	PROPOSED Right of Way		EXISTING Right of Way
	PROPOSED Directional Arrow		EXISTING Directional Arrow

PROPOSED

- (A) "NO TURN ON RED" Sign (R10-11)
- (B) "RIGHT TURN ONLY" Sign (R3-5R)
- (C) Street Name Sign
- (D) "LEFT TURN ONLY" Sign (R3-5L)

Signal Upgrade

SR 1320 (Erwin Road) at Trent Drive

Division 5 Durham County Durham
 PLAN DATE: August 2011 REVIEW DATE: WJ Hamilton
 PREPARED BY: BB Parris HMA PROJ. NO.: 10051 (040)
 REVISIONS: _____

Prepared in the office of:
RAMEY KEMP ASSOCIATES, INC.
 TRANSPORTATION CONSULTANTS
 250 N. Green Street, Raleigh, NC 27601
 TEL: 919.833.2200 FAX: 919.833.2201
 WWW.RAMEYKEMP.COM

SCALE: 1"=40'
 DATE: 8-14-11
 SHEET NO.: 05-0380

INTERSECTION: 0360-Erwin Rd & Trent Dr

QuicNet System Parameters

Group Assignment: **Group 0051**
 Field Master Assignment: **NONE**
 System Reference Number: **211**
 Commications Channel: **COM123:**
 Drop Address: **13**
 Area Number: **2**
 Area Address: **97**

N/S Street Name: **Not Assigned**
 E/W Street Name: **Not Assigned**

Last QuicNet Database Change: **9/10/2012 10:57**

Notes:

- 12/29/06 DB Mismatch alarm had default timing uploaded field. BE
- 8/1/07 LT Changed clearance times
- 10/27/08 Downloaded new AM plan (Sch D) LT
- 2/3/12 Increased min time for ph 3 from 7 to 12 s in ph bank 3, 7 to 10 s in ph bank 1, because of bad loop LT
- 9/07/12 Changed clearances 1 and 5 to match. CB

Field Change Record					
Change	By	Date	Change	By	Date

Excl Ped Assignment	_____	Note: Set the Exclusive Ped Outputs on the "Outputs / General" page				
Exclusive Walk	0					
Exclusive FDW	0					
All Red Clear	0.0					
Exclusive Ped Phase		<table border="1"> <tr> <td>Walk Output</td> <td>0</td> </tr> <tr> <td>Don't Walk Output</td> <td>0</td> </tr> </table>	Walk Output	0	Don't Walk Output	0
Walk Output	0					
Don't Walk Output	0					

	Phase							
	1	2	3	4	5	6	7	8
Min Green	7	10	7	7	7	10	7	7
Extension	1.0	3.0	2.0	1.0	1.0	3.0	2.0	2.0
Max	19	44	19	24	19	44	19	24
Max 2	0	0	0	0	0	0	0	0
Cond Serve Check	0	0	0	0	0	0	0	0

	Phase							
	1	2	3	4	5	6	7	8
Alternate Walk	0	0	0	0	0	0	0	0
Alternate Ped Clear	0	0	0	0	0	0	0	0
Alternate Minimum	0	0	0	0	0	0	0	0
Alternate Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternate Timing - Bank 1

	Phase							
	1	2	3	4	5	6	7	8
Yellow Change	3.0	4.0	3.1	3.5	3.0	4.0	3.1	3.5
Red Clear	3.2	2.4	3.1	3.0	3.2	2.4	2.8	2.6

Red Lock	_____	Red Rest	_____
Yellow Lock	2 6	Dual Entry	4 8
Simultaneous Gap	12345678	Sequential Timing	_____
Rest In Walk	_____	Inhibit Ped Reservice	_____
Advance Walk	_____	Semi-Actuated	_____
Flashing Walk	_____	Guaranteed Passage	_____
Max Extension	_____	Conditional Service	_____

	Phase							
	1	2	3	4	5	6	7	8
Walk	0	7	0	7	0	7	0	7
Ped Clear - FDW	0	15	0	17	0	17	0	20
Adv / Delay Walk	0	0	0	0	0	0	0	0
PE Min Ped FDW	0	0	0	0	0	0	0	0

Phase Functions - Page 1

Type 3 Disconnect	0	0	0	0	0	0	0	0
Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Added Initial	0	0	0	0	0	0	0	0
Min Gap	1.0	3.0	2.0	1.0	1.0	3.0	2.0	2.0
Max Gap	1.0	3.0	2.0	1.0	1.0	3.0	2.0	2.0
Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 1

Minimum Recall	2 6	Soft Recall	_____
Ped Recall	_____	External Recall	_____
Maximum Recall	_____	Manual Control Calls	12345678
Green Flash	_____	Fast Green Flash	_____
Overlap Green Flash	_____	Fast Overlap G. Flash	_____

Phase Functions - Page 2

		Phase							
		1	2	3	4	5	6	7	8
Basic Phase Timing	Min Green	7	10	7	7	7	10	7	7
	Extension	1.0	3.0	2.0	1.0	1.0	3.0	2.0	2.0
	Max	19	44	19	24	19	44	19	24
	Max 2	0	0	0	0	0	0	0	0
	Cond Serve Check	0	0	0	0	0	0	0	0
Clear	Yellow Change	3.0	4.0	3.1	3.5	3.0	4.0	3.1	3.5
	Red Clear	3.2	2.4	3.1	3.0	3.2	2.4	2.8	2.6
Pedestrian Timing	Walk	0	7	0	7	0	7	0	7
	Ped Clear - FDW	0	15	0	17	0	17	0	20
	Adv / Delay Walk	0	0	0	0	0	0	0	0
	PE Min Ped FDW	0	0	0	0	0	0	0	0
Volume Density	Type 3 Disconnect	0	0	0	0	0	0	0	0
	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Max Added Initial	0	0	0	0	0	0	0	0
	Min Gap	1.0	3.0	2.0	1.0	1.0	3.0	2.0	2.0
	Max Gap	1.0	3.0	2.0	1.0	1.0	3.0	2.0	2.0
	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 2

		Phase							
		1	2	3	4	5	6	7	8
Basic Phase Timing	Min Green	7	10	7	7	7	10	7	7
	Extension	1.0	3.0	2.0	1.0	1.0	3.0	2.0	2.0
	Max	250	250	250	250	250	250	250	250
	Max 2	250	250	250	250	250	250	250	250
	Cond Serve Check	0	0	0	0	0	0	0	0
Clear	Yellow Change	3.0	4.0	3.1	3.5	3.0	4.0	3.1	3.5
	Red Clear	3.2	2.4	3.1	3.0	3.2	2.4	2.8	2.6
Pedestrian Timing	Walk	0	7	0	7	0	7	0	7
	Ped Clear - FDW	0	15	0	17	0	17	0	20
	Adv / Delay Walk	0	0	0	0	0	0	0	0
	PE Min Ped FDW	0	0	0	0	0	0	0	0
Volume Density	Type 3 Disconnect	0	0	0	0	0	0	0	0
	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Max Added Initial	0	0	0	0	0	0	0	0
	Min Gap	1.0	3.0	2.0	1.0	1.0	3.0	2.0	2.0
	Max Gap	1.0	3.0	2.0	1.0	1.0	3.0	2.0	2.0
	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Phase Timing - Bank 3

		Phase							
		1	2	3	4	5	6	7	8
Alternate Walk	0	0	0	0	0	0	0	0	0
Alternate Ped Clear	0	0	0	0	0	0	0	0	0
Alternate Minimum	0	0	0	0	0	0	0	0	0
Alternate Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternate Timing - Bank 2

		Phase							
		1	2	3	4	5	6	7	8
Alternate Walk	0	0	0	0	0	0	0	0	0
Alternate Ped Clear	0	0	0	0	0	0	0	0	0
Alternate Minimum	0	0	0	0	0	0	0	0	0
Alternate Extension	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alternate Timing - Bank 3

Note: Set the Limited Service Interval on the "Utilities / Misc" page

Clear Phases	
Delay	0
Clear Time	0
Railroad - 1	

Clear Phases	
Limited Service Phases	
Delay	0
Clear Time	0
Railroad - 2	

Railroad Preempt Parameters

Min Grn Before PE Force-Off	1
Max Pre-Empt Time	255
Min Time Before Same PE	0

	Delay	Clear	Clear Phases
EV - A	0	0	
EV - B	0	0	
EV - C	0	0	
EV - D	0	0	
Emergency Vehicle Preempt			

SE - 1	
SE - 2	
EV - A	
EV - B	
EV - C	
EV - D	
Preempt Priority	

Step	Time	Clear	Ped Call	Hold	Advance	Force Off	Vehicle Call	Permit	Ped Omit	Output
0	0									
1	0									
2	0									
3	0									
4	0									
5	0									
6	0									
7	0									
8	0									
9	0									
10	0									
11	0									
12	0									
13	0									
14	0									
15	0									

Special Event Sequence - 1

Step	Time	Clear	Ped Call	Hold	Advance	Force Off	Vehicle Call	Permit	Ped Omit	Output
0	0									
1	0									
2	0									
3	0									
4	0									
5	0									
6	0									
7	0									
8	0									
9	0									
10	0									
11	0									
12	0									
13	0									
14	0									
15	0									

Special Event Sequence - 2

Note:
The Ring-Barrier Sum of these Minimums will be the Minimum Cycle Length During Transition

Transition Type	0.2
Coord Extra Functions	
Phase 1 - Minimum	14
Phase 2 - Minimum	20
Phase 3 - Minimum	14
Phase 4 - Minimum	14
Phase 5 - Minimum	14
Phase 6 - Minimum	20
Phase 7 - Minimum	14
Phase 8 - Minimum	14
Coordination - General	

- Coord Extra
- 1 = Programmed Walk Time for Sync Phases
 - 2 = Always Terminate Sync Phase Peds
 - 3 = Use "Floating Force Off"
 - 4 =
 - 5 = Use "Start of Green" for Sync Point

- Transition Type
- 0.X = Shortway
 - 1.X = Lengthen Only
 - 2.X = Shorten Only
 - X.1 thru X.4 = Number of Cycles to get "In Step"

	Coordination Plan								
	1	2	3	4	5	6	7	8	9
Cycle	120	0	120	120	0	0	0	0	0
Offset - 1	18	0	23	10	0	0	0	0	0
Offset - 2	18	0	23	10	0	0	0	0	0
Offset - 3	18	0	23	10	0	0	0	0	0
Zone Offset	0	0	0	0	0	0	0	0	0
Ring Offset	0	0	0	0	0	0	0	0	0
Hold Release	255	255	255	255	255	255	255	255	255
Ped Adjust	0	0	0	0	0	0	0	0	0
Force Off - 1	77	0	78	77	0	0	0	0	0
Force Off - 2	0	0	0	0	0	0	0	0	0
Force Off - 3	18	0	18	25	0	0	0	0	0
Force Off - 4	62	0	60	55	0	0	0	0	0
Force Off - 5	77	0	82	77	0	0	0	0	0
Force Off - 6	0	0	0	0	0	0	0	0	0
Force Off - 7	18	0	22	25	0	0	0	0	0
Force Off - 8	62	0	60	55	0	0	0	0	0
Coordination - Cycle, Offsets, & Force Offs									

	Coordination Plan								
	1	2	3	4	5	6	7	8	9
Perm 1 - Begin	0	0	0	0	0	0	0	0	0
Perm 1 - End	8	0	12	12	0	0	0	0	0
Perm 1 - Veh Phases	<u>3</u> <u>7</u>		<u>3</u> <u>7</u>	<u>3</u> <u>7</u>			12345678	12345678	12345678
Perm 1 - Ped Phases							12345678	12345678	12345678
Perm 2 - Begin	9	0	12	12	0	0	0	0	0
Perm 2 - End	37	0	35	27	0	0	0	0	0
Perm 2 - Veh Phases	<u>4</u> <u>8</u>		<u>4</u> <u>8</u>	<u>4</u> <u>8</u>					
Perm 2 - Ped Phases	<u>4</u> <u>8</u>		<u>4</u> <u>8</u>	<u>4</u> <u>8</u>					
Perm 3 - Begin	38	0	35	27	0	0	0	0	0
Perm 3 - End	62	0	65	64	0	0	0	0	0
Perm 3 - Veh Phases	<u>1</u> <u>5</u>		<u>1</u> <u>5</u>	<u>1</u> <u>5</u>					
Perm 3 - Ped Phases									
Max Inhibit Phases									
Max Recall Phases									
Sync Phases	<u>2</u> <u>6</u>		<u>2</u> <u>6</u>	<u>2</u> <u>6</u>					
Lag Phases	<u>2</u> <u>4</u> <u>6</u> <u>8</u>		<u>2</u> <u>4</u> <u>6</u> <u>8</u>	<u>2</u> <u>4</u> <u>6</u> <u>8</u>					
Pre-Timed Phases									
Coordination - Permissives & Phase Sequence									

	Overlap Number							
	1	2	3	4	5	6	7	8
Load Switch Number	0	0	0	0	0	0	0	0
Vehicle Set 1	_____	_____	_____	_____	_____	_____	_____	12345678
Vehicle Set 2	_____	_____	_____	_____	_____	_____	_____	_____
Vehicle Set 3	_____	_____	_____	_____	_____	_____	_____	_____
Negative Vehicle	_____	_____	_____	_____	_____	_____	_____	_____
Negative Ped	_____	_____	_____	_____	_____	_____	_____	_____
Green Omit	_____	_____	_____	_____	_____	_____	_____	_____
Green Clear Omit	_____	_____	_____	_____	_____	_____	_____	_____

Green Clearance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Clearance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Overlaps

	AND 1	AND 2	AND 3	AND 4
Input - A	0	0	0	0
Input - B	0	0	0	0
Output	0	0	0	0

AND Gates

	NAND 1	NAND 2	NAND 3	NAND 4
Input - A	0	0	0	0
Input - B	0	0	0	0
Output	0	0	0	0

NAND Gates

	OR 1	OR 2	OR 3	OR 4	OR 5	OR 6
Input - A	0	0	0	0	0	0
Input - B	0	0	0	0	0	0
Output	0	0	0	0	0	0

2 Input - OR Gates

	OR 7	OR 8
Input - A	0	0
Input - B	0	0
Input - C	0	0
Input - D	0	0
Output	0	0

4 Input - OR Gates

	NOT 1	NOT 2	NOT 3	NOT 4
Input	220	0	0	0
Output	221	0	0	0

NOT Gates (Inverters)

	DELAY 1	DELAY 2	DELAY 3	DELAY 4	DELAY 5	DELAY 6
Input	0	0	0	0	0	0
Delay Time	0	0	0	0	0	0
Output	0	0	0	0	0	0

DELAY Gates

Latch:	1	2	3	4	5	6	7	8
Set	0	0	0	0	0	0	0	0
Reset	0	0	0	0	0	0	0	0
Out	0	0	0	0	0	0	0	0
/Out	0	0	0	0	0	0	0	0

Logic Latches

Det. #	C-1 Pin #	Delay	Carry-over	Phase Assignmnrnts	Detector Attributes	Detector Set Assignments
1	56	15.0	0.0	1	5 7	123 8
2	56	0.0	0.0	6	5 7	123 8
3	39	0.0	0.0	2	5 7	123 8
4	58	3.0	0.0	3	5 7	123 8
5	41	0.0	0.0	4	5 7	123 8
6	45	0.0	0.0	3	5 7	123 8
7	55	15.0	0.0	5	5 7	123 8
8	55	0.0	0.0	2	5 7	123 8
9	40	15.0	0.0	6	5 7	123 8
10	44	0.0	0.0	5	5 7	123 8
11	57	3.0	0.0	7	5 7	123 8
12	42	0.0	0.0	8	5 7	123 8
13	0	0.0	0.0			
14	67	0.0	0.0	2	2	123
15	69	0.0	0.0	4	2	123
16	68	0.0	0.0	6	2	123
17	70	0.0	0.0	8	2	123
18	0	0.0	0.0			
19	0	0.0	0.0			
20	0	0.0	0.0			
21	0	0.0	0.0			
22	0	0.0	0.0			
23	0	0.0	0.0			
24	0	0.0	0.0			
25	0	0.0	0.0			
26	0	0.0	0.0			
27	0	0.0	0.0			
28	0	0.0	0.0			
29	0	0.0	0.0			
30	0	0.0	0.0			
31	0	0.0	0.0			
32	0	0.0	0.0			

Detector Assignments

Detector Attributes

- 1 = Full Time Delay
- 2 = Ped Call
- 3 =
- 4 = Count
- 5 = Extension
- 6 = Type 3
- 7 = Calling
- 8 = Alternate

Detector Assignments

- 1 = Detector Set 1
- 2 = Detector Set 2
- 3 = Detector Set 3
- 4 =
- 5 =
- 6 = Failure - Min Recall
- 7 = Failure - Max Recall
- 8 = Report on Failure

	C-1 Pin #
Flash Sense	81
External Permit - 1	0
External Permit - 2	0
External Permit - 3	0
Exclusive Ped Omit	0
Max. Term Inhibit	0
Max. 2	0
External Lag Phases	0
External Max. Recall	0
Stop Time	82
Manual Control Enable	53
Manual Cont. Advance	80
External Min. Recall	0

General Inputs

	C-1 Pin #
Railroad - 1	0
Railroad - 2	52
Special Event - 1	0
Special Event - 2	0
Gate Down	0
EV - A	71
EV - B	72
EV - C	73
EV - D	74

Preempt Inputs

	C-1 Pin #
Door Ajar	0
UPS Battery	0
UPS Power	0
Cabinet Temperature	0

	C-1 Pin #
Plan 1	0
Plan 2	0
Plan 3	0
Plan 4	0
Plan 5	0
Plan 6	0
Plan 7	0
Plan 8	0
Plan 9	0
Free	0
Flash	0

Coordination Plan Inputs

	C-1 Pin #
Phase Bank - 2	0
Phase Bank - 3	221
Detector Set - 2	0
Detector Set - 3	0
Overlap Vehicle Set - 2	0
Overlap Vehicle Set - 3	0

Bank & Set Inputs

	C-1 Pin #
Alarm - 1	75
Alarm - 2	0
Alarm - 3	0
Alarm - 4	0

	C-1 Pin #
Advance Warning - 1	0
Advance Warning - 2	0
Detector Failure	0
Flasher - Alternating 1	0
Flasher - Alternating 2	0
Fast Flasher	0
On Line	0
Exclusive - Walk	0
Exclusive - Don't Walk	0

General Outputs

	C-1 Pin #
Output - 1	201
Output - 2	202
Output - 3	203
Output - 4	204
Output - 5	205
Output - 6	206
Output - 7	207
Output - 8	208

Time of Day Outputs

	C-1 Pin #
Plan - 1	211
Plan - 2	212
Plan - 3	213
Plan - 4	214
Plan - 5	215
Plan - 6	216
Plan - 7	217
Plan - 8	218
Plan - 9	219
Free	220

Coordination Plan Out

	Ped Phase
Ped 2-P Loadswitch	2
Ped 4-P Loadswitch	4
Ped 6-P Loadswitch	6
Ped 8-P Loadswitch	8

Ped Loadswitch Assignment

	C-1 Pin #
Dial - 2	0
Dial - 3	0
Offset - 1	0
Offset - 2	0
Offset - 3	0
Free	0
Flash	0

Seven Wire Outputs

	C-1 Pin #	
	On	Flash
Railroad - 1	0	0
Railroad - 2	0	0
Special Event - 1	0	0
Special Event - 2	0	0
Preempt Failure	0	0
EV - A	0	0
EV - B	0	0
EV - C	0	0
EV - D	0	0
Any Preempt	0	0

Preemption Outputs

	C-1 Pin #
Output - 1	0
Output - 2	0
Output - 3	0
Output - 4	0
Output - 5	0
Output - 6	0
Output - 7	0
Output - 8	0

Special Event Outputs

	C-1 Pin #
Phase - 1	99
Phase - 2	0
Phase - 3	0
Phase - 4	0
Phase - 5	90
Phase - 6	0
Phase - 7	0
Phase - 8	0

FYA PPLT Outputs

	C-1 Pin #
Output - 1	0
Output - 2	0
Output - 3	0
Output - 4	0
Output - 5	0
Output - 6	0
Output - 7	0
Output - 8	0

Special Function Output

	Phase Number							
	1	2	3	4	5	6	7	8
Red	97	0	0	0	88	0	0	0
Yellow	98	0	0	0	89	0	0	0
Green	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0
Don't Walk	0	0	0	0	0	0	0	0

Phase Output Redirection

	Overlap Number							
	1	2	3	4	5	6	7	8
Red	0	0	0	0	0	0	0	0
Yellow	0	0	0	0	0	0	0	0
Green	0	0	0	0	0	0	0	0

Overlap Output Redirection

Event	Day of Week	Season	Hour	Minute	Plan	Offset
0	1234567		0	0	0	C
1	1234567		6	0	E	C
2	1234567		23	0	E	C
3	_____		0	0	0	0
4	_23456_		6	30	1	C
5	_23456_		9	30	4	C
6	_____		0	0	0	0
7	_23456_		16	30	3	C
8	_23456_		18	45	4	C
9	_23456_		22	15	E	C
10	_____		0	0	0	0
11	_____		0	0	0	0
12	1____7		8	30	4	C
13	1____7		22	15	E	C
14	_____		0	0	0	0
15	_____		0	0	0	0
16	_____		0	0	0	0
17	_____		0	0	0	0
18	_____		0	0	0	0
19	_____		0	0	0	0
20	_____		0	0	0	0
21	_____		0	0	0	0
22	_____		0	0	0	0
23	_____		0	0	0	0
24	_____		0	0	0	0
25	_____		0	0	0	0
26	_____		0	0	0	0
27	_____		0	0	0	0
28	_____		0	0	0	0
29	_____		0	0	0	0
30	_____		0	0	0	0
31	_____		0	0	0	0

Time Base Coordination Events

Event	Day of Week	Season	Hour	Minute	Funct.	Phase / Bits
0	1234567		0	0	14	__4__
1	1234567		6	0	14	_____
2	1234567		23	0	14	__4__
3	_____		0	0	0	_____
4	_____		0	0	0	_____
5	_____		0	0	0	_____
6	_____		0	0	0	_____
7	_____		0	0	0	_____
8	_____		0	0	0	_____
9	_____		0	0	0	_____
10	_____		0	0	0	_____
11	_____		0	0	0	_____
12	_____		0	0	0	_____
13	_____		0	0	0	_____
14	_____		0	0	0	_____
15	_____		0	0	0	_____

Time of Day Function Events

- TOD Functions
- 0 = Permitted Phases
 - 1 = Red Lock
 - 2 = Yellow Lock
 - 3 = Vehicle Min Recall
 - 4 = Ped Recall
 - 5 =
 - 6 = Rest In Walk
 - 7 = Red Rest
 - 8 = Double Entry
 - 9 = Vehicle Max Recall
 - 10 = Soft Recall
 - 11 = Max Extension 2
 - 12 = Conditional Service
 - 13 = Lag Free Phases
 - 14, Bit 1 = Local Override
 - 14, Bit 4 = Disable Det Off Monitoring
 - 15 = TOD Outputs

#	Holiday Type	Day	Month	Year
0		0	0	0
1		0	0	0
2		0	0	0
3		0	0	0
4		0	0	0
5		0	0	0
6		0	0	0
7		0	0	0
8		0	0	0
9		0	0	0
10		0	0	0
11		0	0	0
12		0	0	0
13		0	0	0
14		0	0	0
15		0	0	0
16		0	0	0
17		0	0	0
18		0	0	0
19		0	0	0
20		0	0	0
21		0	0	0
22		0	0	0
23		0	0	0
24		0	0	0
25		0	0	0
26		0	0	0
27		0	0	0
28		0	0	0
29		0	0	0
30		0	0	0
31		0	0	0

Holiday Dates

Event	Holiday Type	Hour	Minute	Plan	Offset
0		0	0	0	0
1		0	0	0	0
2		0	0	0	0
3		0	0	0	0
4		0	0	0	0
5		0	0	0	0
6		0	0	0	0
7		0	0	0	0
8		0	0	0	0
9		0	0	0	0
10		0	0	0	0
11		0	0	0	0
12		0	0	0	0
13		0	0	0	0
14		0	0	0	0
15		0	0	0	0
16		0	0	0	0
17		0	0	0	0
18		0	0	0	0
19		0	0	0	0
20		0	0	0	0
21		0	0	0	0
22		0	0	0	0
23		0	0	0	0
24		0	0	0	0
25		0	0	0	0
26		0	0	0	0
27		0	0	0	0
28		0	0	0	0
29		0	0	0	0
30		0	0	0	0
31		0	0	0	0

Holiday Time Base Coordination Events

Event	Holiday Type	Hour	Minute	Funct.	Phase / Bits
0		0	0	0	
1		0	0	0	
2		0	0	0	
3		0	0	0	
4		0	0	0	
5		0	0	0	
6		0	0	0	
7		0	0	0	
8		0	0	0	
9		0	0	0	
10		0	0	0	
11		0	0	0	
12		0	0	0	
13		0	0	0	
14		0	0	0	
15		0	0	0	

Holiday Time of Day Function Events

Season #	Start Month	Start Day	End Month	End Day
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0

Season Definitions

Red Start Time	0.0
Yellow Start Phases	_____
First Green Phases	2_6_
Startup Vehicle Calls	12345678
Startup Ped Calls	2_4_6_8

Startup

Max ON Time	7
Max OFF Time	255
Chatter	_____

Detector Check

	Sign 1	Sign 2
Phase Number	0	0
Time Before Yellow	0.0	0.0

Advance Warning Signs

Flash Entry Phases	_____
Flash Phases Yellow	_____
Flash Overlaps Yellow	_____
Flash Type	_____

Flash Setup

Exclusive Phases	_____
Protect / Permissive	_____
Disable Yellow Range	_____
Extra One	1_3_5_
Lag Phases - Free	2_4_6_8

Configuration

Permitted Phases	12345678
Restricted Phases	_____
Disable Overlap Range	_____
Extra Two	4
External Permit 1	_____
External Permit 2	_____
External Permit 3	_____

Configuration

Keyboard Beep	_____
Backlight Timeout	_____
Spec Evnt 1 - Ltd Serv Interval	0
Spec Evnt 2 - Ltd Serv Interval	0
Red Start	0.0
Flash Start	7
Red Revert	2.0

Miscellaneous

Spring Month (Begin)	_____
Spring Week (Begin)	_____
Fall Month (End)	_____
Fall Week (End)	_____

Daylight Savings Time

Manual Plan	_____
Manual Offset	_____

Manual

Address	_____
Area Number	_____
Area Address	_____
IP Port	_____
IP Address	_____
Subnet Mask	_____
Gateway	_____

Ethernet Port Address

	Port 1	Port 2	Port 3	Port 4
Address	_____	_____	_____	_____
Area Number	_____	_____	_____	_____
Area Address	_____	_____	_____	_____
Comm Time Out	_____	_____	_____	_____
CTS Delay	_____	_____	_____	_____
RTS Hold	_____	_____	_____	_____
Baud Rate	_____	_____	_____	_____
Data Format	_____	_____	_____	_____

Communications Parameters

Event	Day of Week	Hour	Minute	Headway	Direction
0		0	0	0	0
1		0	0	0	0
2		0	0	0	0
3		0	0	0	0
4		0	0	0	0
5		0	0	0	0
6		0	0	0	0
7		0	0	0	0
8		0	0	0	0
9		0	0	0	0
10		0	0	0	0
11		0	0	0	0
12		0	0	0	0
13		0	0	0	0
14		0	0	0	0
15		0	0	0	0

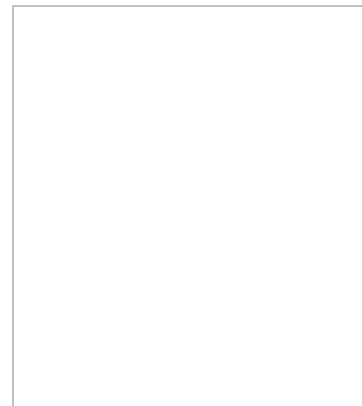
Bus Headway Schedule

Approach	A	B	C	D
Travel Time	0	0	0	0
Passage	0	0	0	0
Extension	0	0	0	0
Phases				

Bus Approach

	A	B	C	D
Phase 1	0	0	0	0
Phase 2	0	0	0	0
Phase 3	0	0	0	0
Phase 4	0	0	0	0
Phase 5	0	0	0	0
Phase 6	0	0	0	0
Phase 7	0	0	0	0
Phase 8	0	0	0	0

Non-Priority Phase Maximums



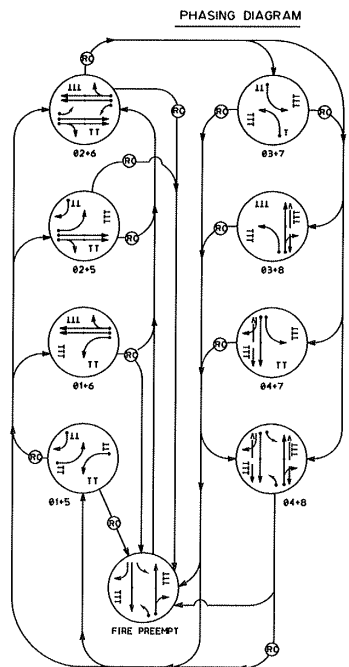


TABLE OF OPERATION

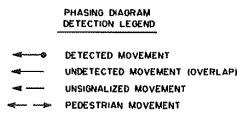
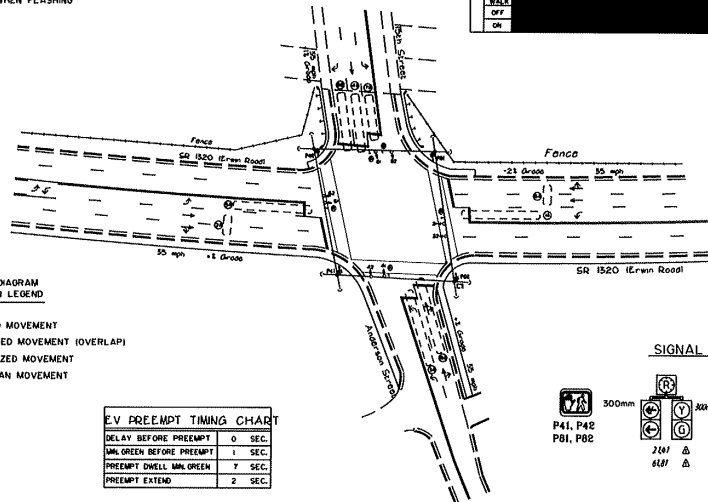
SIGNAL FACE	PHASE											
	01+6	02+5	03+7	03+8	04+7	04+8	05+6	06+5	07+4	08+3	09+2	10+1
21	G	R	R	R	R	R	R	R	R	R	R	Y
22	G	R	R	R	R	R	R	R	R	R	R	Y
41	R	R	R	R	R	R	R	R	R	R	R	Y
42	R	R	R	R	R	R	R	R	R	R	R	Y
61	G	R	R	R	R	R	R	R	R	R	R	Y
62	G	R	R	R	R	R	R	R	R	R	R	Y
81	R	R	R	R	R	R	R	R	R	R	R	Y
82	R	R	R	R	R	R	R	R	R	R	R	Y
PHL/P42	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	+
PBL/P82	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	+

* BLANK WHEN FLASHING

STANDARD SIGNAL FACE CLEARANCES

TO	FROM											
	01+6	02+5	03+7	03+8	04+7	04+8	05+6	06+5	07+4	08+3	09+2	10+1
01+6	0	0	0	0	0	0	0	0	0	0	0	0
02+5	0	0	0	0	0	0	0	0	0	0	0	0
03+7	0	0	0	0	0	0	0	0	0	0	0	0
03+8	0	0	0	0	0	0	0	0	0	0	0	0
04+7	0	0	0	0	0	0	0	0	0	0	0	0
04+8	0	0	0	0	0	0	0	0	0	0	0	0
05+6	0	0	0	0	0	0	0	0	0	0	0	0
06+5	0	0	0	0	0	0	0	0	0	0	0	0
07+4	0	0	0	0	0	0	0	0	0	0	0	0
08+3	0	0	0	0	0	0	0	0	0	0	0	0
09+2	0	0	0	0	0	0	0	0	0	0	0	0
10+1	0	0	0	0	0	0	0	0	0	0	0	0

- NOTES**
1. SIGNAL UPGRADE.
 2. THIS SIGNAL IS TO BE PART OF THE DURHAM COMPLETED SIGNAL SYSTEM.
 3. PAVEMENT MARKINGS ARE EXISTING.
 4. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE 1974 ROAD TRAFFIC SIGNAL SPECIFICATIONS AND ANY SUBSEQUENT ADDENDA.
 5. MAXIMUM TIMES SHOWN IN TIMING CHART ARE FOR FULL-SIZE OPERATION ONLY. COORDINATED SIGNAL SYSTEM TIMING VALUES SHALL SUPERSEDE THESE VALUES.
 6. GIVE "WALK" AND FLASHING "DON'T WALK" WITH NO PRESTRIKING CALLS.
 7. SIGNAL TO FLASH FROM 11:00 AM UNTIL 6:00 AM UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
 8. SET ALL DETECTOR UNITS TO PRESENCE MODE.
 9. SET PHASE BANK'S MAXIMUM LIMIT TO 200 SECONDS FOR PHASES USED.
 10. PLAN IS TO BE CONSIDERED "AS-BUILT" FOR DURHAM CONTROLLER CHANGE-OUT PROJECT.
 11. THE PREEMPT APPROACH IN/R ROUTE IS 50.
 12. OFFICIAL RELEASE TO BE FIELD LOCKED.
 13. PROGRAM PHASES 1, 3 & 7 AS PRELECTED/PERMITTED.
 14. THIRTY DAYS AFTER IMPLEMENTATION OF THE REVERSED SIGNAL OPERATION (RED ON AND/OR GREEN FLASH) MAY BE REQUESTED AT THE DISCRETION OF THE AREA TRAFFIC ENGINEER.
 15. PROGRAM ALL TIMING INFORMATION INTO PHASE BANKS 1, 2 AND 3 UNLESS OTHERWISE NOTED.
 16. PROGRAM CONTROLLER TO CLEAR FROM PHASES 2, 8 & 9 TO PHASES 1 AND/OR 5 BY PROGRESSING THROUGH PHASES 4, 6.



EV PREEMPT TIMING CHART

DELAY BEFORE PREEMPT	0 SEC.
MIN. GREEN BEFORE PREEMPT	1 SEC.
PREEMPT DWELL MIN. GREEN	7 SEC.
PREEMPT EXTEND	2 SEC.

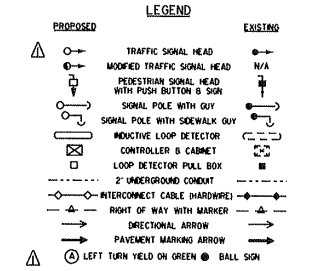
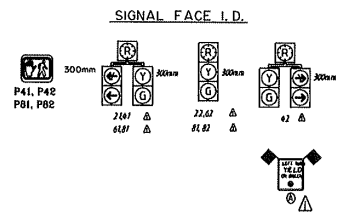
TYPE 170 CONTROLLER LOOP & DETECTION CHART

LOOP NO.	SIZE (IN)	TURNS	DISTANCE FROM STOREY (IN)	SIGNAL PHASE	TIMING		ATTRIBUTES								MANN	
					DELAY	CARRY OVER EXTENSION	INDUCTIVE	INDUCTIVE	INDUCTIVE	INDUCTIVE	INDUCTIVE	INDUCTIVE	INDUCTIVE	INDUCTIVE		
1A	1.82x18	2	1.52	01	30 SEC.	SEC.	X	X	X	X	X	X	X	X	X	X
2A	1.82x36	2	21.28	02	30 SEC.	SEC.	X	X	X	X	X	X	X	X	X	X
3A	1.82x18	2	1.52	03	30 SEC.	SEC.	X	X	X	X	X	X	X	X	X	X
4A	1.82x36	2	21.28	04	30 SEC.	SEC.	X	X	X	X	X	X	X	X	X	X
5A	1.82x18	2	1.52	05	30 SEC.	SEC.	X	X	X	X	X	X	X	X	X	X
6A	1.82x36	2	21.28	06	30 SEC.	SEC.	X	X	X	X	X	X	X	X	X	X
7A	1.82x18	2	1.52	07	30 SEC.	SEC.	X	X	X	X	X	X	X	X	X	X
8A	1.82x36	2	21.28	08	30 SEC.	SEC.	X	X	X	X	X	X	X	X	X	X
P41, P42				04			X	X	X	X	X	X	X	X	X	X
P81, P82				08			X	X	X	X	X	X	X	X	X	X

TIMING CHART

PHASE	01	02	03	04	05	06	07	08
MINIMUM INITIAL	7 SEC.	10 SEC.	7 SEC.	7 SEC.	7 SEC.	10 SEC.	7 SEC.	7 SEC.
TYPE 3 LIMIT	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
VEHICLE EXTENSION	2 SEC.	3 SEC.	2 SEC.	2 SEC.	2 SEC.	3 SEC.	2 SEC.	2 SEC.
ALTERNATE EXTENSION	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
MAX. LIMIT	+ SEC.	+ SEC.	+ SEC.	+ SEC.	+ SEC.	+ SEC.	+ SEC.	+ SEC.
MAX. 2	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
MIN. GAP	2 SEC.	3 SEC.	2 SEC.	2 SEC.	2 SEC.	3 SEC.	2 SEC.	2 SEC.
MAX. GAP	2 SEC.	3 SEC.	2 SEC.	2 SEC.	2 SEC.	3 SEC.	2 SEC.	2 SEC.
WALK	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
FLASHING DON'T WALK	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
PED. RECALL	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.	- SEC.
YELLOW CHANGE INTERVAL	4 SEC.	4 SEC.	4 SEC.	4 SEC.	4 SEC.	4 SEC.	4 SEC.	4 SEC.
RED CLEARANCE	2 SEC.	2 SEC.	2 SEC.	2 SEC.	2 SEC.	2 SEC.	2 SEC.	2 SEC.
VEHICLE CALL MEMORY	NO LACK	PRELIM LACK	NO LACK	NO LACK	PRELIM LACK	NO LACK	NO LACK	NO LACK
VEHICLE CALL MEMORY	NO	NO	NO	NO	NO	NO	NO	NO
DOUBLE ENTRY	NO	NO	NO	NO	NO	NO	NO	NO

* TIMING TO BE DETERMINED BY THE CITY OF DURHAM



TYPE 170 CONTROLLER

DURHAM
1869
CITY HALL PLAZA
DURHAM, NC 27701

SR 1520 (Erwin Road)
at
Anderson Street and 15th Street

DIVISION 05 DURHAM COUNTY DURHAM

PLN. DATE: 10/25/99
PREPARED BY: J. STEWART

REVISIONS

CHANGE TO P/P ON ALL APPROACHES AS SHOWN

SEAL

This document was originally sealed by Edward W. Sogony, Registration # 1074, on 5/17/00

SIGNATURE: _____ DATE: 10/25/99

REG. INVENTORY NO. 05-0359

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
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 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0359-Anderson St & Erwin Rd

Group Assignment: **p**
 Field Master Assignment: **NONE**
 System Reference Number: **221**

N/S Street Name: **Not Assigned**
 E/W Street Name: **Not Assigned**

Last Database Change: **9/18/2012 9:58**

Change Record					
Change	By	Date	Change	By	Date

Notes: **6/7/06CB timing chg db messed up upload field**
8/1/07 LT Changed clearance times
10/27/08 Downloaded new AM plan (Sch D) LT
4/19/11 Loop Cut (phase 4 set to max recall)
4/21/11 Loop repaired (took ph 4 out of max recall)
11/29/11 Bad loop -- 1A; put ph 1 in max recall per time of day
9/17/12 uploaded timing corrections made in field by RA based on complaints. BE

Manual Plan
 0 = Automatic
 1-9 = Plan 1-9
 14 = Free
 15 = Flash

Manual Offset
 0 = Automatic
 1 = Offset A
 2 = Offset B
 3 = Offset C

Drop Number	12	<C/0+0+0>
Zone Number	1	<C/0+0+1>
Area Number	2	<C/0+0+2>
Area Address	107	<C/0+0+3>
Area Net Channel	COM123:	(QuicNet)

Manual Plan		<C/0+A+1>
Manual Offset		<C/0+B+1>

Red Start	0.0	<F/1+C+0>
Flash Start	10	<F/1+0+E>
Red Revert	5.0	<F/1+0+F>

Exclusive Walk	0	<F/1+0+0>
Exclusive FDW	0	<F/1+0+1>
All Red Clear	0.0	<F/1+0+2>

Communication Addresses
 [Configuration not in timing menus]

Manual Selection
 [Set Manual Plan/Offset not timing]

Start / Revert Times
 [Miscellaneous Timing]

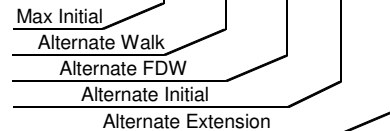
Exclusive Ped Phase
 (Outputs specified in Assignable Outputs at E/127+A+E & F)

[Miscellaneous Timing]

Row	Phase Names ---->	Phase							
		1	2	3	4	5	6	7	8
0	Ped Walk	0	0	0	4	0	0	0	7
1	Ped FDW	0	0	0	14	0	0	0	14
2	Min Green	7	10	7	7	7	10	7	7
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
6	Max Gap	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
7	Min Gap	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
8	Max Limit	19	44	19	24	19	44	19	24
9	Max Limit 2	0	0	0	0	0	0	0	0
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	0	0	0	1	0	0	0	1
C	Cond Serv Min	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	3.5	3.8	3.5	3.9	3.5	4.0	3.5	3.8
F	Red Clear	2.1	1.5	2.6	1.7	2.0	1.6	2.2	1.7

Phase Timing - Bank 1 <C+0+F=1>
 [Phase Timing Bank 1]

	9	A	B	C	D
Phase 1	0	0	0	0	0.0
Phase 2	0	0	0	0	0.0
Phase 3	0	0	0	0	0.0
Phase 4	0	0	0	0	0.0
Phase 5	0	0	0	0	0.0
Phase 6	0	0	0	0	0.0
Phase 7	0	0	0	0	0.0
Phase 8	0	0	0	0	0.0



Alternate Timing <C+0+F=1>
 [Phase Timing Bank 1]

	E	F	Row
RR-1 Delay	0		0
RR-1 Clear	0		1
EV-A Delay	0		2
EV-A Clear	0		3
EV-B Delay	0		4
EV-B Clear	20		5
EV-C Delay	0		6
EV-C Clear	0		7
EV-D Delay	0		8
EV-D Clear	0		9
RR-2 Delay	0		A
RR-2 Clear	0		B
View EV Delay	---		C
View EV Clear	---		D
View RR Delay	---		E
View RR Clear	---		F

Preempt Timing
 [Preempt Timing]

Permit	12345678	0
Red Lock		1
Yellow Lock	2 6	2
Min Recall	2 6	3
Ped Recall		4
View Set Peds	-----	5
Rest In Walk		6
Red Rest		7
Dual Entry	4 8	8
Max Recall		9
Soft Recall		A
Max 2		B
Cond. Service		C
Ext Cont Calls	12345678	D
Yellow Start		E
First Phases	2 6	F

Phase Functions <C+0+F=1>
 [Phase Functions]

Display Indications:
 0=Walk
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INTERSECTION: 0359-Anderson St & Erwin Rd

		Overlap							
Column Numbers ---->		1	2	3	4	5	6	7	8
Row	Overlap Name ---->								
0	Load Switch Number	0	0	0	0	0	0	0	0
1	Veh Set 1 - Phases								12345678
2	Veh Set 2 - Phases								
3	Veh Set 3 - Phases								
4	Neg Veh Phases								
5	Neg Ped Phases								
6	Green Omit Phases								
7	Green Clear Omit Phs.								
8									
9									
A									
B									
C									
D	Green Clear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F	Red Clear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Overlap Assignments <C+0+E=29>
 [Overlap Configuration]

Extra 1 Flags
 1 = TBC Type 1
 2 = NEMA Ext. Coord
 3 = Auto Daylight Savings
 4 = EV Advance
 5 = Extended Status
 6 = International Ped
 7 = Flash - Clear Outputs
 8 = Split Ring

Extra 2 Flags
 1 = AWB During Initial
 2 = LMU Installed
 3 = Disable Min Walk
 4 = QuicNet/4 System
 5 = Ignore P/P on EV
 6 =
 7 = Reserved
 8 =

	C	Row
EV-A	0	0
EV-B	0	1
EV-C	0	2
EV-D	0	3
RR-1 *	---	4
RR-2 *	---	5
SE-1	0	6
SE-2	0	7

Preempt Priority
 <C+0+E=125>
 (* RR-1 is always Highest, and RR-2 is always Second Highest)

[Preempt Parameters]

Row	Column Numbers ---->	E
0	Exclusive Phases	
1	RR-1 Clear Phases	
2	RR-2 Clear Phases	
3	RR-2 Limited Service	
4	Prot / Perm Phases	1 3 5 7
5	Flash to PE Circuits	
6	Flash Entry Phases	2 6
7	Disable Yellow Range	
8	Disable Ovp Yel Range	
9	Overlap Yellow Flash	
A	EV-A Phases	
B	EV-B Phases	3 8
C	EV-C Phases	
D	EV-D Phases	
E	Extra 1 Config. Bits	1 3 5
F	IC Select (Interconnect)	2

Configuration <C+0+E=125>
 [Configuration Data]

Row	Column Numbers ---->	F
0	Ext. Permit 1 Phases	
1	Ext. Permit 2 Phases	
2	Exclusive Ped Assign	
3	Preempt Non-Lock	
4	Ped for 2P Output	
5	Ped for 6P Output	
6	Ped for 4P Output	4
7	Ped for 8P Output	8
8	Yellow Flash Phases	2 6
9	Low Priority A Phases	
A	Low Priority B Phases	
B	Low Priority C Phases	
C	Low Priority D Phases	
D	Restricted Phases	
E	Extra 2 Config. Bits	4

Configuration <C+0+E=125>
 [Configuration Data]

Row	Column Numbers ---->	F
0	Fast Green Flash Phase	
1	Green Flash Phases	
2	Flashing Walk Phases	
3	Guaranteed Passage	
4	Simultaneous Gap Term	12345678
5	Sequential Timing	
6	Advance Walk Phases	
7	Delay Walk Phases	
8	External Recall	
9	Start-up Overlap Green	
A	Max Extension	
B	Inhibit Ped Reserve	
C	Semi-Actuated	
D	Start-up Overlap Yellow	
E	Start-up Vehicle Calls	12345678
F	Start-up Ped Calls	4 8

Specials <C+0+F=2>
 [Phase Functions]

Flash to PE & PE Non-Lock
 1 = EV A 5 = RR 1
 2 = EV B 6 = RR 2
 3 = EV C 7 = SE 1
 4 = EV D 8 = SE 2

IC Select Flags
 1 =
 2 = Modem
 3 = 7-Wire Slave
 4 = Flash / Free
 5 =
 6 = Simplex Master
 7 = 7-Wire Master
 8 = Offset Interrupter

	2	Row
Phase 1	14	1
Phase 2	20	2
Phase 3	14	3
Phase 4	14	4
Phase 5	14	5
Phase 6	20	6
Phase 7	14	7
Phase 8	14	8

Coordination Transition Minimums
 <C+0+C=5>
 [Coordination Functions]

Display Indications:
 0=Walk
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INTERSECTION: 0359-Anderson St & Erwin Rd

		Plan								
Column Numbers ---->		1	2	3	4	5	6	7	8	9
Row	Plan Name ---->									
0	Cycle Length	120	0	120	120	0	0	0	0	100
1	Phase 1 - ForceOff	76	0	75	67	0	0	0	0	55
2	Phase 2 - ForceOff	0	0	0	0	0	0	0	0	0
3	Phase 3 - ForceOff	22	0	30	25	0	0	0	0	20
4	Phase 4 - ForceOff	61	0	60	50	0	0	0	0	40
5	Phase 5 - ForceOff	82	0	85	72	0	0	0	0	55
6	Phase 6 - ForceOff	0	0	0	0	0	0	0	0	0
7	Phase 7 - ForceOff	22	0	15	15	0	0	0	0	20
8	Phase 8 - ForceOff	61	0	60	50	0	0	0	0	40
9	Ring Offset	0	0	0	0	0	0	0	0	0
A	Offset A	45	0	80	40	0	0	0	0	0
B	Offset B	45	0	80	40	0	0	0	0	0
C	Offset C	45	0	80	40	0	0	0	0	0
D	Perm 1 - End	10	0	8	2	0	0	0	0	15
E	Hold Release	255	255	255	255	255	255	255	255	255
F	Zone Offset	0	0	0	0	0	0	0	0	0

Coordination - Bank 1 <C+0+C=1>
 [Coordination Timing 1 -]

Row										
0	Ped Adjustment	0	0	0	0	0	0	0	0	0
1	Perm 2 - Start	11	0	8	2	0	0	0	0	0
2	Perm 2 - End	38	0	35	26	0	0	0	0	0
3	Perm 3 - Start	39	0	35	26	0	0	0	0	0
4	Perm 3 - End	60	0	62	59	0	0	0	0	0
5	Reservice Time	0	0	0	0	0	0	0	0	0
6	Reservice Phases									
7										
8	Pretimed Phases									
9	Max Recall									
A	Perm 1 Veh Phase	3 7		3 7	3 7		12345678	12345678	12345678	12345678
B	Perm 1 Ped Phase						12345678	12345678	12345678	12345678
C	Perm 2 Veh Phase	4 8		4 8	4 8					
D	Perm 2 Ped Phase	4 8		4 8	4 8					
E	Perm 3 Veh Phase	1 5		1 5	1 5					
F	Perm 3 Ped Phase									

Coordination - Bank 2 <C+0+C=2>
 [Coordination Timing 2]

Coord Extra
 1 = Programmed WALK Time for Sync Phases
 2 = Always Terminate Sync Phase Peds

Row		E	Row
	Plan 1 - Sync	2 6	1
	Plan 2 - Sync		2
	Plan 3 - Sync	2 6	3
	Plan 4 - Sync	2 6	4
	Plan 5 - Sync		5
	Plan 6 - Sync		6
	Plan 7 - Sync		7
	Plan 8 - Sync		8
	Plan 9 - Sync		9
	NEMA Sync		A
	NEMA Hold		B
			C
			D
	Coord Extra		E
			F

Sync Phases <C+0+C=1>
 [Coordination Functions]

Row		F	Row
	Free Lag	2 4 6 8	0
	Plan 1 - Lag	2 4 6 8	1
	Plan 2 - Lag		2
	Plan 3 - Lag	2 4 6 8	3
	Plan 4 - Lag	2 4 6 8	4
	Plan 5 - Lag		5
	Plan 6 - Lag		6
	Plan 7 - Lag		7
	Plan 8 - Lag		8
	Plan 9 - Lag		9
	External Lag		A
			B
			C
			D
			E
			F

Lag Phases <C+0+C=1>
 [Coordination Functions]

Display Indications:
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 9=Preemption
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 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0359-Anderson St & Erwin Rd

Row	Column 9	Column A	Column B	Column C	Column D	Column E	Column F	Row							
0	Spec. Funct. 1	0	NOT-3	0	Max 2	0	Pretimed	0	Set DOW	0	Dial 2 (7-Wire)	0	Sim Term	0	0
1	Spec. Funct. 2	0	NOT-4	0	System Det 1	0	Plan 1	0	Ext. Perm 1	0	Dial 3 (7-Wire)	0	EV-A	71	1
2	Spec. Funct. 3	0	OR-4 (a)	0	System Det 2	0	Plan 2	0	Ext. Perm 2	0	Offset 1 (7-Wire)	0	EV-B	72	2
3	Spec. Funct. 4	0	OR-4 (b)	0	System Det 3	0	Plan 3	0	Dimming	0	Offset 2 (7-Wire)	0	EV-C	73	3
4	NAND-3 (a)	0	OR-5 (a)	0	System Det 4	0	Plan 4	0	Set Clock	0	Offset 3 (7-Wire)	0	EV-D	74	4
5	NAND-3 (b)	0	OR-5 (b)	0	System Det 5	0	Plan 5	0	Stop Time	82	Free (7-Wire)	0	RR-1	0	5
6	NAND-4 (a)	0	OR-6 (a)	0	System Det 6	0	Plan 6	0	Flash Sense	81	Flash (7-Wire)	0	RR-2	52	6
7	NAND-4 (b)	0	OR-6 (b)	0	System Det 7	0	Plan 7	0	Manual Enable	53	Excl. Ped Omit	0	Spec. Event 1	0	7
8	OR-7 (a)	0	Fig 3 Diamond	0	System Det 8	0	Plan 8	0	Man. Advance	80	NOT-1	220	Spec. Event 2	0	8
9	OR-7 (b)	0	Fig 4 Diamond	0	Max Inhibit (nema)	0	Plan 9	0	External Alarm	75	NOT-2	0	External Lag	0	9
A	OR-7 (c)	0	AND-4 (a)	0	Force A (nema)	0	DELAY-A	0	Phase Bank 2	0	OR-1 (a)	0	AND-1 (a)	0	A
B	OR-7 (d)	0	AND-4 (b)	0	Force B (nema)	0	DELAY-B	0	Phase Bank 3	221	OR-1 (b)	0	AND-1 (b)	0	B
C	OR-8 (a)	0	NAND-1 (a)	0	C.N.A. (nema)	0	DELAY-C	0	Overlap Set 2	0	OR-2 (a)	0	AND-2 (a)	0	C
D	OR-8 (b)	0	NAND-1 (b)	0	Hold (nema)	0	DELAY-D	0	Overlap Set 3	0	OR-2 (b)	0	AND-2 (b)	0	D
E	OR-8 (c)	0	NAND-2 (a)	0	Max Recall	0	DELAY-E	0	Detector Set 2	0	OR-3 (a)	0	AND-3 (a)	0	E
F	OR-8 (d)	0	NAND-2 (b)	0	Min Recall	0	DELAY-F	0	Detector Set 3	0	OR-3 (b)	0	AND-3 (b)	0	F

Assignable Inputs
 [Input Assignments]

<C=0+E=126>

Row	Column 9	Column A	Column B	Column C	Column D	Column E	Column F	Row							
0	Phase ON - 1	0	Preempt Fail	0	Flasher 0	0	Free	220	NOT-1	221	TOD Out 1	201	Dial 2 (7-Wire)	0	0
1	Phase ON - 2	0	Sp Evnt Out 1	0	Flasher 1	0	Plan 1	211	OR-1	0	TOD Out 2	202	Dial 3 (7-Wire)	0	1
2	Phase ON - 3	0	Sp Evnt Out 2	0	Fast Flasher	0	Plan 2	212	OR-2	0	TOD Out 3	203	Offset 1 (7-Wire)	0	2
3	Phase ON - 4	0	Sp Evnt Out 3	0	Fig 3 Diamond	0	Plan 3	213	OR-3	0	TOD Out 4	204	Offset 2 (7-Wire)	0	3
4	Phase ON - 5	0	Sp Evnt Out 4	0	Fig 4 Diamond	0	Plan 4	214	AND-1	0	TOD Out 5	205	Offset 3 (7-Wire)	0	4
5	Phase ON - 6	0	Sp Evnt Out 5	0			Plan 5	215	AND-2	0	TOD Out 6	206	Free (7-Wire)	0	5
6	Phase ON - 7	0	Sp Evnt Out 6	0			Plan 6	216	AND-3	0	TOD Out 7	207	Flash (7-Wire)	0	6
7	Phase ON - 8	0	Sp Evnt Out 7	0			Plan 7	217	NOT-2	0	TOD Out 8	208	Preempt	0	7
8	Ph. Check - 1	0	Sp Evnt Out 8	0	NOT-3	0	Plan 8	218	EV-A	0	Adv. Warn - 1	0	Low Priority A	0	8
9	Ph. Check - 2	0			NOT-4	0	Plan 9	219	EV-B	0	Adv. Warn - 2	0	Low Priority B	0	9
A	Ph. Check - 3	0	Detector Fail	0	OR-4	0	Spec. Funct. 3	0	EV-C	0	DELAY-A	0	Low Priority C	0	A
B	Ph. Check - 4	0	Spec. Funct. 1	0	OR-5	0	Spec. Funct. 4	0	EV-D	0	DELAY-B	0	Low Priority D	0	B
C	Ph. Check - 5	0	Spec. Funct. 2	0	OR-6	0	NAND-3	0	RR-1	0	DELAY-C	0			C
D	Ph. Check - 6	0	Central Control	0	AND-4	0	NAND-4	0	RR-2	0	DELAY-D	0			D
E	Ph. Check - 7	0	Excl. Ped DW	0	NAND-1	0	OR-7	0	Spec. Event 1	0	DELAY-E	0			E
F	Ph. Check - 8	0	Excl. Ped WK	0	NAND-2	0	OR-8	0	Spec. Event 2	0	DELAY-F	0			F

Assignable Outputs
 [Output Assignments]

<C=0+E=127>

Display Indications:
 0=Walk
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 9=Preemption
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B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
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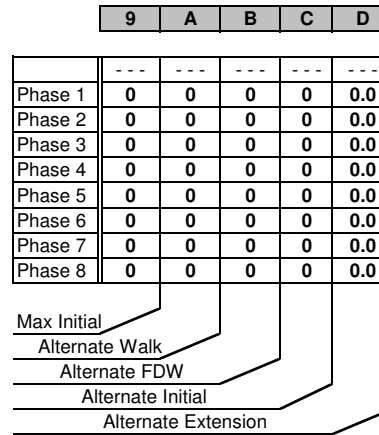
INTERSECTION: 0359-Anderson St & Erwin Rd

Row	Phase Names ---->	Phase							
		1	2	3	4	5	6	7	8
0	Ped Walk	0	0	0	4	0	0	0	4
1	Ped FDW	0	0	0	14	0	0	0	14
2	Min Green	7	10	7	7	7	10	7	7
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
6	Max Gap	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
7	Min Gap	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
8	Max Limit	19	44	19	24	19	44	19	24
9	Max Limit 2	0	0	0	0	0	0	0	0
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	0	0	0	1	0	0	0	1
C	Cond Serv Min	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
F	Red Clear	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

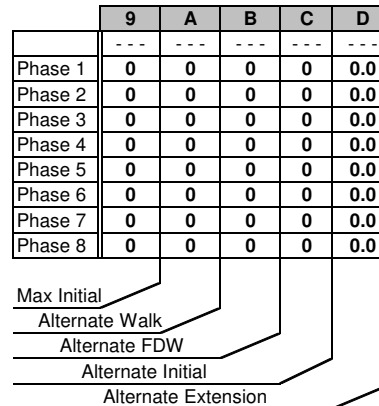
Phase Timing - Bank 2 <C=0+F=2>
 [Phase Timing Bank2]

Row	Phase Names ---->	Phase							
		1	2	3	4	5	6	7	8
0	Ped Walk	0	0	0	4	0	0	0	4
1	Ped FDW	0	0	0	14	0	0	0	14
2	Min Green	7	10	7	7	7	10	7	7
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
6	Max Gap	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
7	Min Gap	2.0	3.0	2.0	2.0	2.0	3.0	2.0	2.0
8	Max Limit	150	250	150	250	150	250	150	250
9	Max Limit 2	150	250	150	250	150	250	150	250
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	0	0	0	0	0	0	0	0
C	Cond Serv Min	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	3.5	3.8	3.5	3.9	3.5	4.0	3.5	3.8
F	Red Clear	2.1	1.5	2.6	1.7	2.0	1.6	2.2	1.7

Phase Timing - Bank 3 <C=0+F=3>
 [Phase Timing Bank 3]



Alternate Timing
 [Phase Timing Bank2]



Alternate Timing
 [Phase Timing Bank 3]

Transition Type
 0.X = Shortway
 1.X = Lengthen
 X.1 thru X.4 =
 Number of
 cycles when
 lengthening

Daylight Savings
 Date
 If set to all zeros,
 standard dates
 will be used.

Transition Type | 0.2 <C/5+1+9>

TBC Transition

[Coordination Functions]

Cycle 1 Fail | 0 C/5+1+1

Cycle 2 Fail | 0 C/5+1+2

Cycle Fail Thresholds (minutes)

[Coordination Functions]

Lag Hold Phases | <C/5+1+A>

Coordinated Lag Hold Phases

[Coordination Functions]

Sync Output Time | 0.0 <C/5+1+C>

7-Wire Master

[Coordination Function/ called Sync Time]

Begin Month | 3 <C/5+2+A>

Begin Week | 2 <C/5+2+B>

End Month | 11 <C/5+2+C>

End Week | 1 <C/5+2+D>

Daylight Savings Time

[Dialback and Daylight Saving]

Time B4 Yellow | 0.0 <F/1+C+E>

Phase Number | 0 <F/1+C+F>

Advance Warning Beacon - Sign 1

[Miscellaneous Timing]

Time B4 Yellow | 0.0 <F/1+D+E>

Phase Number | 0 <F/1+D+F>

Advance Warning Beacon - Sign 2

[Miscellaneous Timing]

Long Failure | 0.7 <F/1+0+6>

Short Failure | 0.7 <F/1+0+7>

Power Cycle Correction (Default = 0.7)

[Miscellaneous Timing]

Min Time (seconds) | 1 <F/1+0+8>

Min Green Before PE Force Off

[Preempt Parameters]

Max Time (minutes) | 255 <F/1+0+9>

Max Preempt Time Before Failure

[Preempt Parameters]

Min Time (seconds) | 0 <F/1+0+A>

Min Time Between Same Preempts

(Does Not Apply To Railroad Preempt)

Low Pri. Channel | <E/125+C+8>

Disable Low Priority Channel

[Preempt Parameters]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0359-Anderson St & Erwin Rd

Column Numbers ---->		0	1	2	3	1	3	
Row	Det Num	Detector Name	C1 Pin Number	Attributes	Phase(s)	Assign	Delay	Carry-over
0	1		56	5 7	1	123 8	15.0	0.0
1	2		56	5 7	6	123 8	3.0	0.0
2	3		56	7	4	123 8	10.0	0.0
3	4		39	5 7	2	123 8	0.0	1.5
4	5		43	5 7	2	123 8	0.0	1.5
5	6		58	5 7	3	123 8	10.0	0.0
6	7		58	5 7	8	123 8	3.0	0.0
7	8		41	5 7	4	123 8	0.0	0.0
8	9		55	5 7	5	123 8	15.0	0.0
9	10		55	5 7	2	123 8	3.0	0.0
A	11		55	7	4	123 8	10.0	0.0
B	12		59	5 7	5	123 8	3.0	0.0
C	13		40	5 7	6	123 8	0.0	1.5
D	14		44	5 7	6	123 8	0.0	1.5
E	15		61	5 7	7	123 8	10.0	0.0
F	16		61	5 7	4	123 8	3.0	0.0

Detector Types
 EXTENTION: Detector only active during the Phase Green Interval
 COUNT: used in computing "Added Initial
 CALL: Detector only active during the non green phase will not extend the phases
 TYPE 3: will allow a call detector to extend its phase until the call first drops or the type 3 limit is reached

Column Numbers ---->		Ped / Phase / Overlap								Row
		1	2	3	4	5	6	7	8	
Walk		0	0	0	0	0	0	0	0	0
Don't Walk		0	0	0	0	0	0	0	0	1
Phase Green		0	0	0	0	0	0	0	0	2
Phase Yellow		0	0	0	0	0	0	0	0	3
Phase Red		0	0	0	0	0	0	0	0	4
Overlap Green		0	0	0	0	0	0	0	0	5
Overlap Yellow		0	0	0	0	0	0	0	0	6
Overlap Red		0	0	0	0	0	0	0	0	7

Redirect Phase Outputs <C+0+E=127>

[Phase Output Redirections]

Cabinet Type	0	<E/125+D+0>	D	Row
Enable Redirection			12345678	0
(Enable Redirection = 30)				1
[Phase Output Redirection]				2
Max OFF (minutes)	255	<D/0+0+1>		3
Max ON (minutes)	7	<D/0+0+2>		4
Detector Failure Monitor				5
[Miscellaneous Timing]				6
				7

Dimming <C+0+E=125>

[Output Dimming]

Output Bit:	12345678	Row
Output Port 1		1
Output Port 2		2
Output Port 3		3
Output Port 4		4
Output Port 5		5
Output Port 6		6
Output Port 7		7

Disable Alarms

- 1 = Stop Time
- 2 = Flash Sense
- 3 = Keyboard Entry
- 4 = Manual Plan
- 5 = Police Control
- 6 = External Alarm
- 7 = Detector Failure
- 8 =

Delay Logic Times

<C+0+D=0> (seconds)

[Miscellaneous Timing]

Omit Alarm		<C/5+F+0>	Row
------------	--	-----------	-----

Disable Alarm Reporting

[Dialback and Daylight Saving]

Time	0	<C/5+C+0>	Row
------	---	-----------	-----

Redial Time (minutes)

(View Redial Timer at E/2+D+6)

[Dialback and Daylight Saving]

Column Numbers ---->		4	5	6	7	2	4	
Row	Det Num	Detector Name	C1 Pin Number	Attributes	Phase(s)	Assign	Delay	Carry-over
0	17		42	5 7	8	123 8	0.0	0.0
1	18		0				0.0	0.0
2	19		69	2	4	123	0.0	0.0
3	20		70	2	8	123	0.0	0.0
4	21		0				0.0	0.0
5	22		0				0.0	0.0
6	23		0				0.0	0.0
7	24		0				0.0	0.0
8	25		0				0.0	0.0
9	26		0				0.0	0.0
A	27		0				0.0	0.0
B	28		0				0.0	0.0
C	29		0				0.0	0.0
D	30		0				0.0	0.0
E	31		0				0.0	0.0
F	32		0				0.0	0.0

Detector Attributes
 1 = Full Time Delay
 2 = Ped Call
 3 =
 4 = Count
 5 = Extension
 6 = Type 3
 7 = Calling
 8 = Alternate

Det. Assignments

- 1 = Det. Set 1
- 2 = Det. Set 2
- 3 = Det. Set 3
- 4 =
- 5 =
- 6 = Failure - Min Recall
- 7 = Failure - Max Recall
- 8 = Report on Failure

Detector Assignments <C+0+E=126>

[Detector Attributes]

Detector Timing <C+0+D=0>

[Detector Timing]

Dial-Back Telephone Number

[Dialback and Daylight Saving]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0359-Anderson St & Erwin Rd

Row	Time	Plan	Offset	Day of Week
0	00:00	E	0	1234567
1	06:00	E	0	1234567
2	23:00	E	0	1234567
3	00:00	0	0	
4	06:30	1	C	23456
5	09:30	E	C	23456
6	00:00	0	0	
7	15:30	3	C	23456
8	18:30	4	C	23456
9	21:00	E	0	23456
A	00:00	0	0	
B	00:00	0	0	
C	00:00	0	0	
D	00:00	0	0	
E	00:00	0	0	
F	00:00	0	0	

TOD Coordination <C+0+9=0.1>
 (Bank 1)
 [Time of Day Functions]

Time	Funct.	Day of Week	Column 4 Phases/Bits
00:00	E	1234567	4
06:00	E	1234567	
23:00	E	1234567	4
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		

TOD Function <C+0+7=0.1> <C+0+E=27>
 (Bank 1)
 [Time of Day Functions]

Day	Year	Month	Holiday Type
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	

Holiday Dates <C+0+8=1.1>
 (Bank 1)
 [Holiday Dates]

Time	Plan	Offset	Holiday Type
00:00	4	0	123
00:00	0	0	
06:00	1	0	2
09:00	4	0	2
12:00	3	0	2
20:00	4	0	2
00:00	0	0	
05:00	1	0	3
09:00	4	0	3
16:00	3	0	3
19:00	4	0	3
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	

Holiday Events <C+0+9=1.1>
 (Bank 1)
 [Holiday TBC Plans]

T.O.D. Functions
 0 =
 1 = Red Lock
 2 = Yellow Lock
 3 = Veh Min Recall
 4 = Ped Recall
 5 =
 6 = Rest In Walk
 7 = Red Rest
 8 = Double Entry
 9 = Veh Max Recall
 A = Veh Soft Recall
 B = Maximum 2
 C = Conditional Service
 D = Free Lag Phases
 E = Bit 1 - Local Override
 Bit 4 - Disable Detector
 OFF Monitor
 Bit 7 - Detector Count
 Monitor
 Bit 8 - Real Time Split
 Monitor
 F = Output Bits 1 thru 8

Plan Select
 1 thru 9 = Coordination
 Plan 1 thru 9
 14 or E = Free
 15 or F = Flash

Offset Select
 A = Offset A
 B = Offset B
 C = Offset C

Month Select
 1 = January
 2 = February
 3 = March
 4 = April
 5 = May
 6 = June
 7 = July
 8 = August
 9 = September
 A = October
 B = November
 C = December

Row	Time	Plan	Offset	Day of Week
0	00:00	0	0	
1	00:00	0	0	
2	00:00	0	0	
3	00:00	0	0	
4	00:00	0	0	
5	00:00	0	0	
6	00:00	0	0	
7	00:00	0	0	
8	00:00	0	0	
9	00:00	0	0	
A	00:00	0	0	
B	00:00	0	0	
C	00:00	0	0	
D	00:00	0	0	
E	00:00	0	0	
F	00:00	0	0	

TOD Coordination <C+0+9=0.2>
 (Bank 2)
 [Time Base Coordination]

Time	Funct.	Holiday Type	Column 4 Phases/Bits
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		
00:00	0		

Holiday TOD Function <C+0+7=0.2> <C+0+E=28>
 (Bank 2)
 [Time of Day Functions]

Day	Year	Month	Holiday Type
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	
00	00	0	

Holiday Dates <C+0+8=1.2>
 (Bank 2)
 [Holiday Dates]

Time	Plan	Offset	Holiday Type
05:30	0	0	
09:00	0	0	
00:00	0	0	
00:00	0	0	
16:00	0	0	
19:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	

Holiday Events <C+0+9=1.2>
 (Bank 2)
 [Holiday TBC Plans]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: 0359-Anderson St & Erwin Rd

Row	6 Clear	7 Time	8 Ped Call	9 Hold	A Advance	B Force Off	C Vehicle Call	D Permit Phases	E Ped Omit	F Circuit
0		0								
1		0								
2		0								
3		0								
4		0								
5		0								
6		0								
7		0								
8		0								
9		0								
A		0								
B		0								
C		0								
D		0								
E		0								
F		0								

Special Event Schedule -- Table 1
 [Special Event Sequence 1]

<C+0+E=27>

Notes:

0 <E/27+5+F>
Limited Service Interval
 [Special Event Sequence 1]

Row	6 Clear	7 Time	8 Ped Call	9 Hold	A Advance	B Force Off	C Vehicle Call	D Permit Phases	E Ped Omit	F Circuit
0		0								
1		0								
2		0								
3		0								
4		0								
5		0								
6		0								
7		0								
8		0								
9		0								
A		0								
B		0								
C		0								
D		0								
E		0								
F		0								

Special Event Schedule -- Table 2
 [Special Event Sequence 2]

<C+0+E=28>

Notes:

0 <E/28+5+F>
Limited Service Interval
 [Special Event Sequence 2]

PHASING DIAGRAM

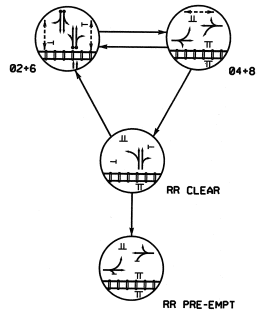
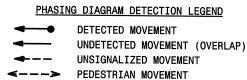
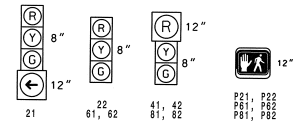


TABLE OF OPERATION

SIGNAL FACE	PHASE							
	02	04	06	08	RR CLEAR	RR PRE-EMPT	PEDESTRIAN	PEDESTRIAN
21	G	R	R	R	R	R	R	R
22	G	R	R	R	R	R	R	R
23, 24	G	R	R	R	R	R	R	R
41, 42	R	G	R	R	G	Y		
61, 62	G	R	R	R	G	Y		
81, 82	R	G	R	R	G	Y		
P21, P22	W	DM	DM	DM	DM	DM	DM	DM
P61, P62	W	DM	DM	DM	DM	DM	DM	DM
P81, P82	DM	W	DM	DM	DM	DM	DM	DM

* SEE NOTE #5

SIGNAL FACE I.D.



LOOP & DETECTOR UNIT INSTALLATION CHART
170 CONTROLLER AND CABINET

LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STORAGE (ft)	IS NEW	NEMA PHASE	TIMING		DETECTOR PROGRAMMING										STATUS		
						DELAY	CARRY (STRETCH)	PRELIMINARY SENSITIVITY	REVERSE	E-COUNT	EXTENSION	TYPE 3	ALTERNATE	SYSTEM LOCK	NEW	EXISTING				
2A	6X6	2-4-2	-5	-	X	2	- SEC.	- SEC.	-	-	-	-	-	-	-	-	-	-	-	X
2B	6X6	2-4-2	-5	-	X	2	- SEC.	- SEC.	-	-	-	-	-	-	-	-	-	-	-	X
6A	6X6	2-4-2	-5	-	X	6	- SEC.	- SEC.	-	-	-	-	-	-	-	-	-	-	-	X
6B	6X6	2-4-2	-5	-	X	6	- SEC.	- SEC.	-	-	-	-	-	-	-	-	-	-	-	X
P21, P22	N/A	N/A	N/A	-	X	2	- SEC.	- SEC.	-	-	-	-	-	-	-	-	-	-	-	X
P61, P62	N/A	N/A	N/A	-	X	6	- SEC.	- SEC.	-	-	-	-	-	-	-	-	-	-	-	X
P81, P82	N/A	N/A	N/A	-	X	8	- SEC.	- SEC.	-	-	-	-	-	-	-	-	-	-	-	X

2 PHASE SEMI ACTUATED W/ RR PREEMPTION (DURHAM SIGNAL SYSTEM)

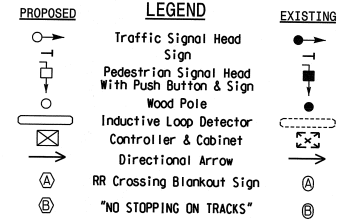
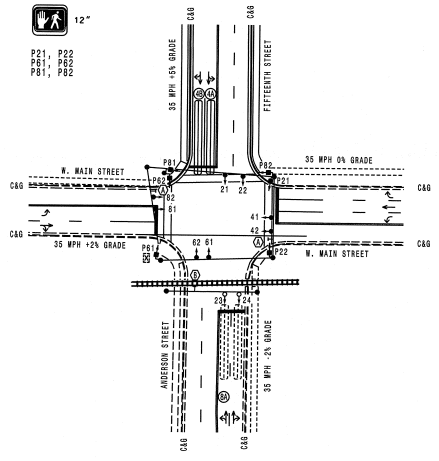
NOTES

- REFER TO "ROADWAY STANDARD DRAWINGS NCDOT" DATED JANUARY 2002 AND "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2002, AND ALL APPLICABLE SECTIONS OF THE LATEST VERSION OF THE PROJECT SPECIAL PROVISIONS.
- THIS SIGNAL IS TO BE PART OF THE DURHAM COMPUTERIZED SIGNAL SYSTEM
- PAVEMENT MARKINGS ARE EXISTING.
- MAXIMUM TIMES SHOWN IN TIMING CHART ARE FOR FREE RUN OPERATION ONLY. COORDINATED SIGNAL SYSTEM TIMING VALUES SHALL SUPERSEDE THESE VALUES.
- DO NOT PROGRAM SIGNAL FOR LATE NIGHT FLASHING OPERATION UNLESS OTHERWISE DIRECTED BY THE ENGINEER
- SET ALL DETECTORS TO PRESENCE MODE.
- PROGRAM ALL TIMING INFORMATION INTO PHASE BANKS 1, 2 & 3 UNLESS OTHERWISE NOTED.
- SET PHASE BANK 3 MAXIMUM LIMIT TO 250 SECONDS FOR PHASES USED.
- OMIT "WALK" AND FLASHING "DON'T WALK" WITH NO PEDESTRIAN CALLS.

TIMING CHART
170 CONTROLLER

PHASE	02	04	06	08
MINIMUM INITIAL*	10 SEC.	12 SEC.	10 SEC.	12 SEC.
VEHICLE EXTENSION*	2.0 SEC.	2.0 SEC.	2.0 SEC.	2.0 SEC.
YELLOW CHANGE INT.	4.0 SEC.	4.0 SEC.	4.0 SEC.	4.0 SEC.
RED CLEARANCE	2.0 SEC.	2.0 SEC.	2.0 SEC.	2.0 SEC.
MAXIMUM LIMIT*	* SEC.	* SEC.	* SEC.	* SEC.
RECALL POSITION	NONE	MIN. RECALL	NONE	MIN. RECALL
VEHICLE CALL MEMORY	NONLOCK	YELLOW LOCK	NONLOCK	YELLOW LOCK
DOUBLE ENTRY	OFF	OFF	ON	OFF
WALK*	4 SEC.	- SEC.	4 SEC.	4 SEC.
FLASHING DON'T WALK	8 SEC.	- SEC.	8 SEC.	13 SEC.

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.



PLAN OF RECORD

FIFTEENTH ST. / ANDERSON ST. & W. MAIN ST.

DIVISION 5 DURHAM COUNTY DURHAM

PLAN DATE: AUGUST 2003 REVIEWED BY: L. W. BLOTHEN

PREPARED BY: P. NICHOLAS DESIGNED BY: P. LEBLANC

SCALE: 1" = 40'

REVISIONS: DATE: SCALE:

10 0 10 30
1" = 40'

SEAL: PROFESSIONAL ENGINEER, STATE OF NORTH CAROLINA, No. 48868, P. NICHOLAS

DATE: 08-09-03

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: C0041-Anderson Main & 15th

Group Assignment: **p**
 Field Master Assignment: **NONE**
 System Reference Number: **222**

N/S Street Name: **Not Assigned**
 E/W Street Name: **Not Assigned**

Last Database Change: **4/3/2012 10:34**

Change Record					
Change	By	Date	Change	By	Date

Notes: **1/25/07 DB Mismatch central had default timing uploaded field. BE**

Manual Plan
 0 = Automatic
 1-9 = Plan 1-9
 14 = Free
 15 = Flash

Manual Offset
 0 = Automatic
 1 = Offset A
 2 = Offset B
 3 = Offset C

Drop Number	10	<C/0+0+0>
Zone Number	1	<C/0+0+1>
Area Number	2	<C/0+0+2>
Area Address	108	<C/0+0+3>
QuicNet Channel	COM123:	(QuicNet)

Manual Plan		<C/0+A+1>
Manual Offset		<C/0+B+1>

Red Start	0.0	<F/1+C+0>
Flash Start	10	<F/1+0+E>
Red Revert	5.0	<F/1+0+F>

Exclusive Walk	0	<F/1+0+0>
Exclusive FDW	0	<F/1+0+1>
All Red Clear	0.0	<F/1+0+2>

Communication Addresses
 [Configuration not in timing menus]

Manual Selection
 [Set Manual Plan/Offset not timing]

Start / Revert Times
 [Miscellaneous Timing]

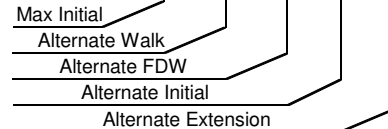
Exclusive Ped Phase
 (Outputs specified in Assignable
 Outputs at E/127+A+E & F)

[Miscellaneous Timing]

Row	Phase Names ---->	Phase							
		1	2	3	4	5	6	7	8
0	Ped Walk	0	0	0	7	0	7	0	7
1	Ped FDW	0	0	0	11	0	12	0	11
2	Min Green	0	14	18	8	0	14	0	15
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	0.0	2.0	0.0	2.0	0.0	2.0	0.0	4.0
6	Max Gap	0.0	2.0	0.0	2.0	0.0	2.0	0.0	4.0
7	Min Gap	0.0	2.0	0.0	2.0	0.0	2.0	0.0	4.0
8	Max Limit	0	24	18	24	0	24	0	24
9	Max Limit 2	0	0	0	0	0	0	0	0
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	0	0	0	0	0	0	0	0
C	Cond Serv Min	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	0.0	4.0	4.0	4.0	0.0	4.0	0.0	4.0
F	Red Clear	0.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0

Phase Timing - Bank 1 <C+0+F=1>
 [Phase Timing Bank 1]

	9	A	B	C	D
Phase 1	0	0	0	0	0.0
Phase 2	0	0	0	0	0.0
Phase 3	0	0	0	0	0.0
Phase 4	0	0	0	0	0.0
Phase 5	0	0	0	0	0.0
Phase 6	0	0	0	0	0.0
Phase 7	0	0	0	0	0.0
Phase 8	0	0	0	0	0.0



Alternate Timing <C+0+F=1>
 [Phase Timing Bank 1]

	E	F	Row
RR-1 Delay	0		0
RR-1 Clear	0		1
EV-A Delay	0		2
EV-A Clear	0		3
EV-B Delay	0		4
EV-B Clear	0		5
EV-C Delay	0		6
EV-C Clear	0		7
EV-D Delay	0		8
EV-D Clear	0		9
RR-2 Delay	0		A
RR-2 Clear	18		B
View EV Delay	---		C
View EV Clear	---		D
View RR Delay	---		E
View RR Clear	---		F

Preempt Timing
 [Preempt Timing]

		Row
Permit	2 4 6 8	0
Red Lock		1
Yellow Lock	4 8	2
Min Recall		3
Ped Recall		4
View Set Peds	-----	5
Rest In Walk		6
Red Rest		7
Dual Entry	4 8	8
Max Recall	2 6	9
Soft Recall		A
Max 2		B
Cond. Service		C
Ext Cont Calls	2 4 6 8	D
Yellow Start		E
First Phases	4 8	F

Phase Functions <C+0+F=1>
 [Phase Functions]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: C0041-Anderson Main & 15th

		Overlap							
Column Numbers ---->		1	2	3	4	5	6	7	8
Row	Overlap Name ---->								
0	Load Switch Number	9	0	0	0	0	0	0	0
1	Veh Set 1 - Phases	4							12345678
2	Veh Set 2 - Phases								
3	Veh Set 3 - Phases								
4	Neg Veh Phases								
5	Neg Ped Phases								
6	Green Omit Phases								
7	Green Clear Omit Phs.								
8									
9									
A									
B									
C									
D	Green Clear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F	Red Clear	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Overlap Assignments <C+0+E=29>
 [Overlap Configuration]

Extra 1 Flags
 1 = TBC Type 1
 2 = NEMA Ext. Coord
 3 = Auto Daylight Savings
 4 = EV Advance
 5 = Extended Status
 6 = International Ped
 7 = Flash - Clear Outputs
 8 = Split Ring

Extra 2 Flags
 1 = AWB During Initial
 2 = LMU Installed
 3 = Disable Min Walk
 4 = QuicNet/4 System
 5 = Ignore P/P on EV
 6 =
 7 = Reserved
 8 =

	C	Row
EV-A	0	0
EV-B	0	1
EV-C	0	2
EV-D	0	3
RR-1 *	---	4
RR-2 *	---	5
SE-1	0	6
SE-2	0	7

Preempt Priority
 <C+0+E=125>
 (* RR-1 is always Highest, and RR-2 is always Second Highest)

[Preempt Parameters]

Row	Column Numbers ---->	E
0	Exclusive Phases	
1	RR-1 Clear Phases	
2	RR-2 Clear Phases	3 8
3	RR-2 Limited Service	2 6
4	Prot / Perm Phases	
5	Flash to PE Circuits	
6	Flash Entry Phases	4 8
7	Disable Yellow Range	
8	Disable Ovp Yel Range	
9	Overlap Yellow Flash	1
A	EV-A Phases	
B	EV-B Phases	
C	EV-C Phases	
D	EV-D Phases	
E	Extra 1 Config. Bits	1 3 5
F	IC Select (Interconnect)	2

Configuration <C+0+E=125>
 [Configuration Data]

	F
Ext. Permit 1 Phases	2 6
Ext. Permit 2 Phases	
Exclusive Ped Assign	
Preempt Non-Lock	
Ped for 2P Output	
Ped for 6P Output	6
Ped for 4P Output	4
Ped for 8P Output	8
Yellow Flash Phases	4 8
Low Priority A Phases	
Low Priority B Phases	
Low Priority C Phases	
Low Priority D Phases	
Restricted Phases	
Extra 2 Config. Bits	4

Configuration <C+0+E=125>
 [Configuration Data]

	F
Fast Green Flash Phase	
Green Flash Phases	
Flashing Walk Phases	
Guaranteed Passage	
Simultaneous Gap Term	2 4 6 8
Sequential Timing	
Advance Walk Phases	
Delay Walk Phases	
External Recall	
Start-up Overlap Green	
Max Extension	
Inhibit Ped Reserve	
Semi-Actuated	
Start-up Overlap Yellow	
Start-up Vehicle Calls	2 4 6 8
Start-up Ped Calls	4 6 8

Specials <C+0+F=2>
 [Phase Functions]

Flash to PE & PE Non-Lock
 1 = EV A 5 = RR 1
 2 = EV B 6 = RR 2
 3 = EV C 7 = SE 1
 4 = EV D 8 = SE 2

IC Select Flags
 1 =
 2 = Modem
 3 = 7-Wire Slave
 4 = Flash / Free
 5 =
 6 = Simplex Master
 7 = 7-Wire Master
 8 = Offset Interrupter

	2	Row
Phase 1	14	1
Phase 2	20	2
Phase 3	14	3
Phase 4	14	4
Phase 5	14	5
Phase 6	20	6
Phase 7	14	7
Phase 8	14	8

Coordination Transition Minimums
 <C+0+C=5>
 [Coordination Functions]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extension
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: C0041-Anderson Main & 15th

		Plan								
Column Numbers ---->		1	2	3	4	5	6	7	8	9
Row	Plan Name ---->									
0	Cycle Length	0	0	0	0	0	0	0	0	100
1	Phase 1 - ForceOff	0	0	0	0	0	0	0	0	55
2	Phase 2 - ForceOff	0	0	0	0	0	0	0	0	0
3	Phase 3 - ForceOff	0	0	0	0	0	0	0	0	20
4	Phase 4 - ForceOff	0	0	0	0	0	0	0	0	40
5	Phase 5 - ForceOff	0	0	0	0	0	0	0	0	55
6	Phase 6 - ForceOff	0	0	0	0	0	0	0	0	0
7	Phase 7 - ForceOff	0	0	0	0	0	0	0	0	20
8	Phase 8 - ForceOff	0	0	0	0	0	0	0	0	40
9	Ring Offset	0	0	0	0	0	0	0	0	0
A	Offset A	0	0	0	0	0	0	0	0	0
B	Offset B	0	0	0	0	0	0	0	0	0
C	Offset C	0	0	0	0	0	0	0	0	0
D	Perm 1 - End	0	0	0	0	0	0	0	0	15
E	Hold Release	255	255	255	255	255	255	255	255	255
F	Zone Offset	0	0	0	0	0	0	0	0	0

Coordination - Bank 1 <C+0+C=1>
 [Coordination Timing 1 -]

Row		1	2	3	4	5	6	7	8	9
0	Ped Adjustment	0	0	0	0	0	0	0	0	0
1	Perm 2 - Start	0	0	0	0	0	0	0	0	0
2	Perm 2 - End	0	0	0	0	0	0	0	0	0
3	Perm 3 - Start	0	0	0	0	0	0	0	0	0
4	Perm 3 - End	0	0	0	0	0	0	0	0	0
5	Reservice Time	0	0	0	0	0	0	0	0	0
6	Reservice Phases									
7										
8	Pretimed Phases									
9	Max Recall									
A	Perm 1 Veh Phase						12345678	12345678	12345678	12345678
B	Perm 1 Ped Phase						12345678	12345678	12345678	12345678
C	Perm 2 Veh Phase									
D	Perm 2 Ped Phase									
E	Perm 3 Veh Phase									
F	Perm 3 Ped Phase									

Coordination - Bank 2 <C+0+C=2>
 [Coordination Timing 2]

Coord Extra
 1 = Programmed WALK Time for Sync Phases
 2 = Always Terminate Sync Phase Peds

Row		E	Row
	Plan 1 - Sync		0
	Plan 2 - Sync		1
	Plan 3 - Sync		2
	Plan 4 - Sync		3
	Plan 5 - Sync		4
	Plan 6 - Sync		5
	Plan 7 - Sync		6
	Plan 8 - Sync		7
	Plan 9 - Sync	2 6	8
	NEMA Sync		9
	NEMA Hold		A
			B
			C
			D
	Coord Extra		E
			F

Sync Phases <C+0+C=1>
 [Coordination Functions]

Row		F	Row
	Free Lag	2 4 6 8	0
	Plan 1 - Lag		1
	Plan 2 - Lag		2
	Plan 3 - Lag		3
	Plan 4 - Lag		4
	Plan 5 - Lag		5
	Plan 6 - Lag		6
	Plan 7 - Lag		7
	Plan 8 - Lag		8
	Plan 9 - Lag	2 4 6 8	9
	External Lag		A
			B
			C
			D
			E
			F

Lag Phases <C+0+C=1>
 [Coordination Functions]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: C0041-Anderson Main & 15th

Row	Column 9	Column A	Column B	Column C	Column D	Column E	Column F	Row							
0	Spec. Funct. 1	0	NOT-3	0	Max 2	0	Pretimed	0	Set DOW	0	Dial 2 (7-Wire)	0	Sim Term	0	0
1	Spec. Funct. 2	0	NOT-4	0	System Det 1	0	Plan 1	0	Ext. Perm 1	251	Dial 3 (7-Wire)	0	EV-A	71	1
2	Spec. Funct. 3	0	OR-4 (a)	0	System Det 2	0	Plan 2	0	Ext. Perm 2	0	Offset 1 (7-Wire)	0	EV-B	72	2
3	Spec. Funct. 4	0	OR-4 (b)	0	System Det 3	0	Plan 3	0	Dimming	0	Offset 2 (7-Wire)	0	EV-C	73	3
4	NAND-3 (a)	0	OR-5 (a)	0	System Det 4	0	Plan 4	0	Set Clock	0	Offset 3 (7-Wire)	0	EV-D	74	4
5	NAND-3 (b)	0	OR-5 (b)	0	System Det 5	0	Plan 5	0	Stop Time	82	Free (7-Wire)	0	RR-1	0	5
6	NAND-4 (a)	0	OR-6 (a)	0	System Det 6	0	Plan 6	0	Flash Sense	81	Flash (7-Wire)	0	RR-2	52	6
7	NAND-4 (b)	0	OR-6 (b)	0	System Det 7	0	Plan 7	0	Manual Enable	53	Excl. Ped Omit	0	Spec. Event 1	0	7
8	OR-7 (a)	0	Fig 3 Diamond	0	System Det 8	0	Plan 8	0	Man. Advance	80	NOT-1	220	Spec. Event 2	0	8
9	OR-7 (b)	0	Fig 4 Diamond	0	Max Inhibit (nema)	0	Plan 9	0	External Alarm	75	NOT-2	0	External Lag	0	9
A	OR-7 (c)	0	AND-4 (a)	0	Force A (nema)	0	DELAY-A	0	Phase Bank 2	0	OR-1 (a)	0	AND-1 (a)	0	A
B	OR-7 (d)	0	AND-4 (b)	0	Force B (nema)	0	DELAY-B	0	Phase Bank 3	221	OR-1 (b)	0	AND-1 (b)	0	B
C	OR-8 (a)	0	NAND-1 (a)	0	C.N.A. (nema)	0	DELAY-C	0	Overlap Set 2	250	OR-2 (a)	0	AND-2 (a)	0	C
D	OR-8 (b)	0	NAND-1 (b)	0	Hold (nema)	0	DELAY-D	0	Overlap Set 3	0	OR-2 (b)	0	AND-2 (b)	0	D
E	OR-8 (c)	0	NAND-2 (a)	0	Max Recall	0	DELAY-E	0	Detector Set 2	0	OR-3 (a)	0	AND-3 (a)	0	E
F	OR-8 (d)	0	NAND-2 (b)	0	Min Recall	0	DELAY-F	0	Detector Set 3	0	OR-3 (b)	0	AND-3 (b)	0	F

Assignable Inputs
 [Input Assignments]

<C=0+E=126>

Row	Column 9	Column A	Column B	Column C	Column D	Column E	Column F	Row							
0	Phase ON - 1	0	Preempt Fail	0	Flasher 0	0	Free	220	NOT-1	221	TOD Out 1	201	Dial 2 (7-Wire)	0	0
1	Phase ON - 2	0	Sp Evnt Out 1	0	Flasher 1	0	Plan 1	211	OR-1	0	TOD Out 2	202	Dial 3 (7-Wire)	0	1
2	Phase ON - 3	251	Sp Evnt Out 2	0	Fast Flasher	0	Plan 2	212	OR-2	0	TOD Out 3	203	Offset 1 (7-Wire)	0	2
3	Phase ON - 4	0	Sp Evnt Out 3	0	Fig 3 Diamond	0	Plan 3	213	OR-3	0	TOD Out 4	204	Offset 2 (7-Wire)	0	3
4	Phase ON - 5	0	Sp Evnt Out 4	0	Fig 4 Diamond	0	Plan 4	214	AND-1	0	TOD Out 5	205	Offset 3 (7-Wire)	0	4
5	Phase ON - 6	0	Sp Evnt Out 5	0			Plan 5	215	AND-2	0	TOD Out 6	206	Free (7-Wire)	0	5
6	Phase ON - 7	0	Sp Evnt Out 6	0			Plan 6	216	AND-3	0	TOD Out 7	207	Flash (7-Wire)	0	6
7	Phase ON - 8	0	Sp Evnt Out 7	0			Plan 7	217	NOT-2	0	TOD Out 8	208	Preempt	0	7
8	Ph. Check - 1	0	Sp Evnt Out 8	0	NOT-3	0	Plan 8	218	EV-A	0	Adv. Warn - 1	0	Low Priority A	0	8
9	Ph. Check - 2	0			NOT-4	0	Plan 9	219	EV-B	0	Adv. Warn - 2	0	Low Priority B	0	9
A	Ph. Check - 3	0	Detector Fail	0	OR-4	0	Spec. Funct. 3	0	EV-C	0	DELAY-A	0	Low Priority C	0	A
B	Ph. Check - 4	0	Spec. Funct. 1	0	OR-5	0	Spec. Funct. 4	0	EV-D	0	DELAY-B	0	Low Priority D	0	B
C	Ph. Check - 5	0	Spec. Funct. 2	0	OR-6	0	NAND-3	0	RR-1	0	DELAY-C	0			C
D	Ph. Check - 6	0	Central Control	0	AND-4	0	NAND-4	0	RR-2	37	DELAY-D	0			D
E	Ph. Check - 7	0	Excl. Ped DW	0	NAND-1	0	OR-7	0	Spec. Event 1	0	DELAY-E	0			E
F	Ph. Check - 8	0	Excl. Ped WK	0	NAND-2	0	OR-8	0	Spec. Event 2	0	DELAY-F	0			F

Assignable Outputs
 [Output Assignments]

<C=0+E=127>

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extension
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

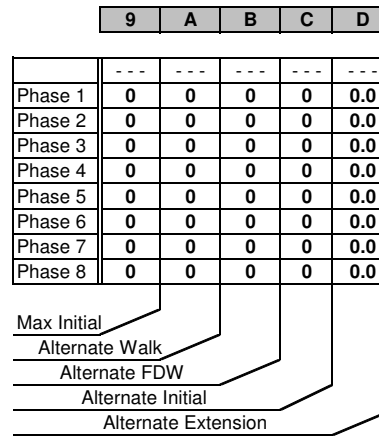
INTERSECTION: C0041-Anderson Main & 15th

Row	Phase Names ---->	Phase							
		1	2	3	4	5	6	7	8
0	Ped Walk	0	0	0	7	0	7	0	7
1	Ped FDW	0	0	0	11	0	12	0	11
2	Min Green	0	7	18	8	0	7	0	8
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
6	Max Gap	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
7	Min Gap	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
8	Max Limit	0	24	18	24	0	24	0	24
9	Max Limit 2	0	0	0	0	0	0	0	0
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	0	0	0	0	0	0	0	0
C	Cond Serv Min	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	0.0	4.0	4.0	4.0	0.0	4.0	0.0	4.0
F	Red Clear	0.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0

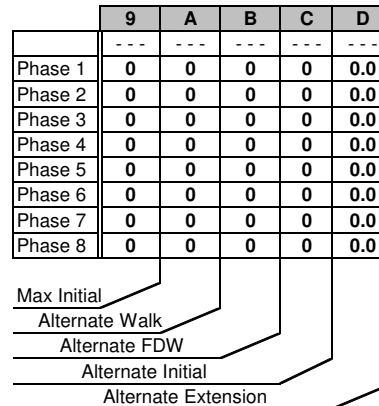
Phase Timing - Bank 2 <C=0+F=2>
 [Phase Timing Bank2]

Row	Phase Names ---->	Phase							
		1	2	3	4	5	6	7	8
0	Ped Walk	0	0	0	7	0	7	0	7
1	Ped FDW	0	0	0	11	0	12	0	11
2	Min Green	0	7	18	8	0	7	0	8
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Veh Extension	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
6	Max Gap	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
7	Min Gap	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
8	Max Limit	0	250	150	250	0	250	0	250
9	Max Limit 2	0	250	150	250	0	250	0	250
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	0	0	0	0	0	0	0	0
C	Cond Serv Min	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	0.0	4.0	4.0	4.0	0.0	4.0	0.0	4.0
F	Red Clear	0.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0

Phase Timing - Bank 3 <C=0+F=3>
 [Phase Timing Bank 3]



Alternate Timing
 [Phase Timing Bank2]



Alternate Timing
 [Phase Timing Bank 3]

Transition Type
 0.X = Shortway
 1.X = Lengthen
 X.1 thru X.4 =
 Number of
 cycles when
 lengthening

Daylight Savings
 Date
 If set to all zeros,
 standard dates
 will be used.

Transition Type | 0.2 <C/5+1+9>

TBC Transition

[Coordination Functions]

Cycle 1 Fail | 0 C/5+1+1

Cycle 2 Fail | 0 C/5+1+2

Cycle Fail Thresholds (minutes)

[Coordination Functions]

Lag Hold Phases | <C/5+1+A>

Coordinated Lag Hold Phases

[Coordination Functions]

Sync Output Time | 0.0 <C/5+1+C>

7-Wire Master

[Coordination Function/ called Sync Time]

Begin Month | 3 <C/5+2+A>

Begin Week | 2 <C/5+2+B>

End Month | 11 <C/5+2+C>

End Week | 1 <C/5+2+D>

Daylight Savings Time

[Dialback and Daylight Saving]

Time B4 Yellow | 0.0 <F/1+C+E>

Phase Number | 0 <F/1+C+F>

Advance Warning Beacon - Sign 1

[Miscellaneous Timing]

Time B4 Yellow | 0.0 <F/1+D+E>

Phase Number | 0 <F/1+D+F>

Advance Warning Beacon - Sign 2

[Miscellaneous Timing]

Long Failure | 0.0 <F/1+0+6>

Short Failure | 0.0 <F/1+0+7>

Power Cycle Correction (Default = 0.7)

[Miscellaneous Timing]

Min Time (seconds) | 1 <F/1+0+8>

Min Green Before PE Force Off

[Preempt Parameters]

Max Time (minutes) | 255 <F/1+0+9>

Max Preempt Time Before Failure

[Preempt Parameters]

Min Time (seconds) | 0 <F/1+0+A>

Min Time Between Same Preempts

(Does Not Apply To Railroad Preempt)

Low Pri. Channel | <E/125+C+8>

Disable Low Priority Channel

[Preempt Parameters]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: C0041-Anderson Main & 15th

Column Numbers ---->		0	1	2	3	1	3
Row	Det Num	C1 Pin Number	Attributes	Phase(s)	Assign	Delay	Carry-over
0	1	39	5 7	2	123 6 8	0.0	0.0
1	2	40	5 7	6	123 6 8	0.0	0.0
2	3	41	5 7	4	123 6 8	0.0	0.0
3	4	42	5 7	8	123 6 8	0.0	0.0
4	5	46	5 7	8	123 6 8	0.0	2.0
5	6	0				0.0	2.0
6	7	68	2	6	123	0.0	0.0
7	8	69	2	4	123	0.0	0.0
8	9	70	2	8	123	0.0	0.0
9	10	0				0.0	0.0
A	11	0				0.0	0.0
B	12	0				0.0	0.0
C	13	0				0.0	0.0
D	14	0				0.0	0.0
E	15	0				0.0	0.0
F	16	0				0.0	0.0

Detector Types
 EXTENTION: Detector only active during the Phase Green Interval
 COUNT: used in computing "Added Initial"
 CALL: Detector only active during the non green phase will not extend the phases
 TYPE 3: will allow a call detector to extend its phase until the call first drops or the type 3 limit is reached

Column Numbers ---->		Ped / Phase / Overlap								Row
		1	2	3	4	5	6	7	8	
Walk		0	0	0	0	0	0	0	0	0
Don't Walk		0	0	0	0	0	0	0	0	1
Phase Green		0	0	0	0	0	0	0	0	2
Phase Yellow		0	0	0	0	0	0	0	0	3
Phase Red		0	0	0	0	0	0	0	0	4
Overlap Green		0	0	0	0	0	0	0	0	5
Overlap Yellow		0	0	0	0	0	0	0	0	6
Overlap Red		0	0	0	0	0	0	0	0	7

Redirect Phase Outputs <C+0+E=127>

[Phase Output Redirections]

Cabinet Type	0	<E/125+D+0>	D	Row
Enable Redirection			12345678	0
(Enable Redirection = 30)				1
[Phase Output Redirection]				2
Max OFF (minutes)	255	<D/0+0+1>		3
Max ON (minutes)	7	<D/0+0+2>		4
Detector Failure Monitor				5
[Miscellaneous Timing]				6
				7

Dimming <C+0+E=125>

[Output Dimming]

Output Bit:	12345678	Row
Output Port 1		1
Output Port 2		2
Output Port 3		3
Output Port 4		4
Output Port 5		5
Output Port 6		6
Output Port 7		7

Delay Logic Times

<C+0+D=0> (seconds)

[Miscellaneous Timing]

Omit Alarm [] <C/5+F+0>

Disable Alarm Reporting

[Dialback and Daylight Saving]

Time [0] <C/5+C+0>

Redial Time (minutes)

(View Redial Timer at E/2+D+6)

[Dialback and Daylight Saving]

Column Numbers ---->		4	5	6	7	2	4
Row	Det Num	C1 Pin Number	Attributes	Phase(s)	Assign	Delay	Carry-over
0	17	0				0.0	0.0
1	18	0				0.0	0.0
2	19	0				0.0	0.0
3	20	0				0.0	0.0
4	21	0				0.0	0.0
5	22	0				0.0	0.0
6	23	0				0.0	0.0
7	24	0				0.0	0.0
8	25	0				0.0	0.0
9	26	0				0.0	0.0
A	27	0				0.0	0.0
B	28	0				0.0	0.0
C	29	0				0.0	0.0
D	30	0				0.0	0.0
E	31	0				0.0	0.0
F	32	0				0.0	0.0

Detector Attributes
 1 = Full Time Delay
 2 = Ped Call
 3 =
 4 = Count
 5 = Extension
 6 = Type 3
 7 = Calling
 8 = Alternate

Det. Assignments

1 = Det. Set 1
 2 = Det. Set 2
 3 = Det. Set 3
 4 =
 5 =
 6 = Failure - Min Recall
 7 = Failure - Max Recall
 8 = Report on Failure

Number of Digits	D
1 st Digit	0
2 ed Digit	0
3 ed Digit	0
4 th Digit	0
5 th Digit	0
6 th Digit	0
7 th Digit	0
8 th Digit	0
9 th Digit	0
10 th Digit	0
11 th Digit	0
12 th Digit	0
13 th Digit	0
14 th Digit	0
15 th Digit	0

Dial-Back Telephone Number

[Dialback and Daylight Saving]

Detector Assignments <C+0+E=126>

[Detector Attributes]

<C+0+D=0>

[Detector Timing]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: C0041-Anderson Main & 15th

Row	Time	Plan	Offset	Day of Week
0	00:00	E	0	1234567
1	00:00	0	0	
2	00:00	0	0	
3	00:00	0	0	
4	00:00	0	0	
5	00:00	0	0	
6	00:00	0	0	
7	00:00	0	0	
8	00:00	0	0	
9	00:00	0	0	
A	00:00	0	0	
B	00:00	0	0	
C	00:00	0	0	
D	00:00	0	0	
E	00:00	0	0	
F	00:00	0	0	

TOD Coordination <C+0+9=0.1>
 (Bank 1)
 [Time of Day Functions]

Time	Funct.	Day of Week
00:00	E	1234567
06:00	E	1234567
23:00	E	1234567
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	

TOD Function <C+0+7=0.1>
 (Bank 1)
 [Time of Day Functions]

Column 4 Phases/Bits
4
4

<C+0+E=27>

Day	Year	Month	Holiday Type
01	03	1	1
04	03	7	1
26	03	11	2
27	03	11	1
28	03	11	3
24	03	12	2
25	03	12	1
00	00	0	
01	04	1	1
04	04	7	1
24	04	11	2
25	04	11	1
26	04	11	3
24	04	12	2
25	04	12	1
00	00	0	

Holiday Dates <C+0+8=1.1>
 (Bank 1)
 [Holiday Dates]

Time	Plan	Offset	Holiday Type
00:00	4	C	123
00:00	0	0	
06:00	1	C	2
09:00	4	C	2
12:00	3	C	2
20:00	4	C	2
00:00	0	0	
05:00	1	C	3
09:00	4	C	3
16:00	3	C	3
19:00	4	C	3
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	

Holiday Events <C+0+9=1.1>
 (Bank 1)
 [Holiday TBC Plans]

T.O.D. Functions
 0 =
 1 = Red Lock
 2 = Yellow Lock
 3 = Veh Min Recall
 4 = Ped Recall
 5 =
 6 = Rest In Walk
 7 = Red Rest
 8 = Double Entry
 9 = Veh Max Recall
 A = Veh Soft Recall
 B = Maximum 2
 C = Conditional Service
 D = Free Lag Phases
 E = Bit 1 - Local Override
 Bit 4 - Disable Detector
 OFF Monitor
 Bit 7 - Detector Count
 Monitor
 Bit 8 - Real Time Split
 Monitor
 F = Output Bits 1 thru 8

Plan Select
 1 thru 9 = Coordination
 Plan 1 thru 9
 14 or E = Free
 15 or F = Flash

Offset Select
 A = Offset A
 B = Offset B
 C = Offset C

Month Select
 1 = January
 2 = February
 3 = March
 4 = April
 5 = May
 6 = June
 7 = July
 8 = August
 9 = September
 A = October
 B = November
 C = December

Row	Time	Plan	Offset	Day of Week
0	00:00	0	0	
1	00:00	0	0	
2	00:00	0	0	
3	00:00	0	0	
4	00:00	0	0	
5	00:00	0	0	
6	00:00	0	0	
7	00:00	0	0	
8	00:00	0	0	
9	00:00	0	0	
A	00:00	0	0	
B	00:00	0	0	
C	00:00	0	0	
D	00:00	0	0	
E	00:00	0	0	
F	00:00	0	0	

TOD Coordination <C+0+9=0.2>
 (Bank 2)
 [Time Base Coordination]

Time	Funct.	Holiday Type
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	
00:00	0	

Holiday TOD Function <C+0+7=0.2>
 (Bank 2)
 [Time of Day Functions]

Column 4 Phases/Bits

<C+0+E=28>

Day	Year	Month	Holiday Type
01	01	1	1
04	01	7	1
21	01	11	2
22	01	11	1
23	01	11	3
24	01	12	2
25	01	12	1
00	00	0	
01	02	1	1
04	02	7	1
27	02	11	2
28	02	11	1
29	02	11	3
24	02	12	2
25	02	12	1
00	00	0	

Holiday Dates <C+0+8=1.2>
 (Bank 2)
 [Holiday Dates]

Time	Plan	Offset	Holiday Type
05:30	0	0	
09:00	0	0	
00:00	0	0	
00:00	0	0	
16:00	0	0	
19:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	
00:00	0	0	

Holiday Events <C+0+9=1.2>
 (Bank 2)
 [Holiday TBC Plans]

Display Indications:
 0=Walk
 1=Flashing Don't Walk
 2=Minimum Green

4=Variable Initial
 5=Extention
 7=Reduce GAP
 8=Red Rest
 9=Preemption
 A=Stop Time

B=Red Revert
 C=Yellow Gap Term
 D=Yellow Gap Max Term
 E=Yellow Force-Off Term
 F=Red Clearance

INTERSECTION: C0041-Anderson Main & 15th

Row	6 Clear	7 Time	8 Ped Call	9 Hold	A Advance	B Force Off	C Vehicle Call	D Permit Phases	E Ped Omit	F Circuit
0		0								
1		0								
2		0								
3		0								
4		0								
5		0								
6		0								
7		0								
8		0								
9		0								
A		0								
B		0								
C		0								
D		0								
E		0								
F		0								

Special Event Schedule -- Table 1
[Special Event Sequence 1]

<C+0+E=27>

Notes:

0 <E/27+5+F>
Limited Service Interval
[Special Event Sequence 1]

Row	6 Clear	7 Time	8 Ped Call	9 Hold	A Advance	B Force Off	C Vehicle Call	D Permit Phases	E Ped Omit	F Circuit
0		0								
1		0								
2		0								
3		0								
4		0								
5		0								
6		0								
7		0								
8		0								
9		0								
A		0								
B		0								
C		0								
D		0								
E		0								
F		0								

Special Event Schedule -- Table 2
[Special Event Sequence 2]

<C+0+E=28>

Notes:

0 <E/28+5+F>
Limited Service Interval
[Special Event Sequence 2]

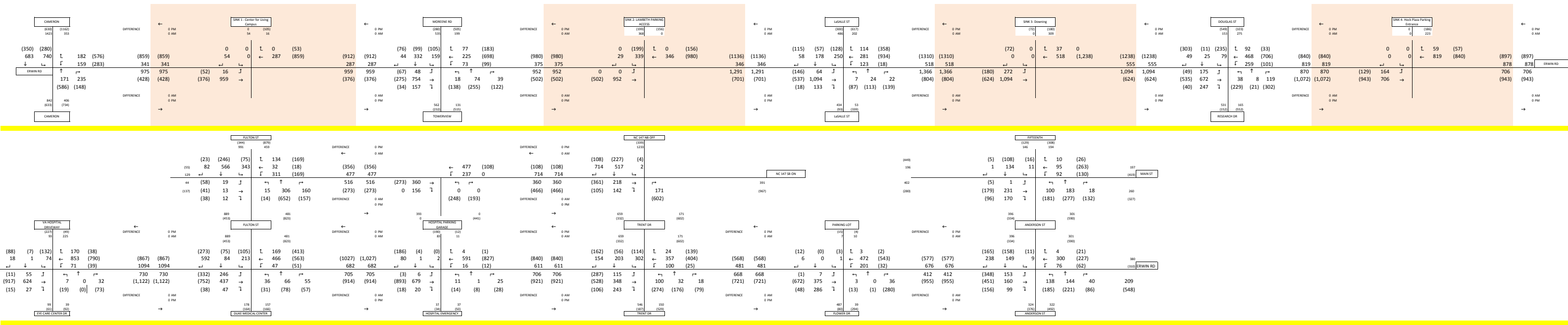


Erwin Road Traffic Simulation Report

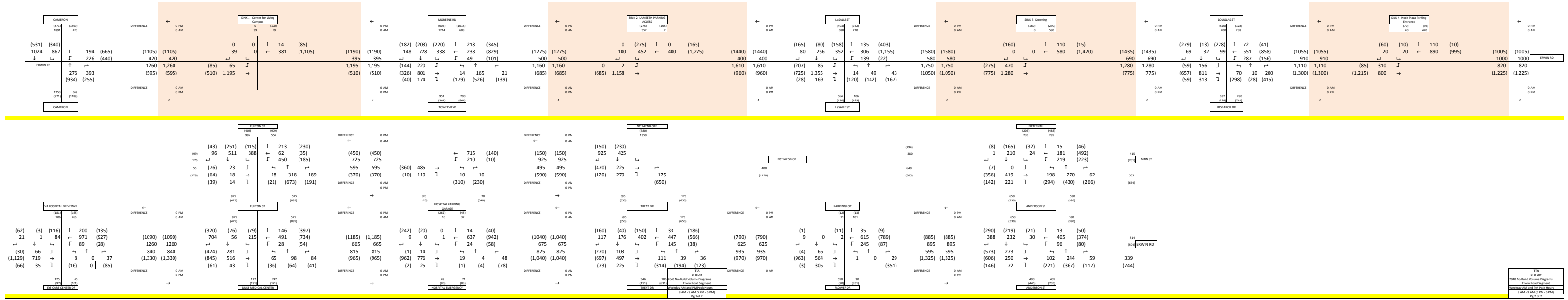
Appendix D:

Balanced Peak Hour Volumes

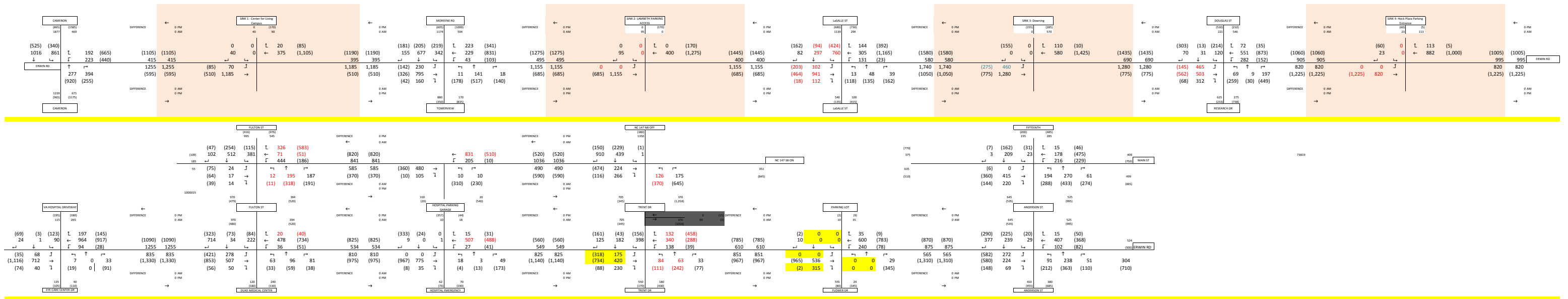
Volume Diagram - Existing AM (PM)



Volume Diagram - No-Build AM (PM)



Volume Diagram - Build AM (PM)





Erwin Road Traffic Simulation Report

Appendix E:

2040 Synchro Outputs

Synchro Output-2040 No Build AM

Lanes, Volumes, Timings

46: Erwin Rd. & Morreene Rd./Towerview Dr.

3/25/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	338	728	148	14	165	21	220	801	174	49	233	218
Satd. Flow (prot)	1661	1763	0	1661	1748	1486	1661	3207	1435	1718	3083	0
Flt Permitted	0.519			0.076			0.165			0.246		
Satd. Flow (perm)	907	1763	0	133	1748	1486	288	3207	1435	445	3083	0
Satd. Flow (RTOR)		11							154		144	
Lane Group Flow (vph)	376	973	0	16	183	23	244	890	193	54	501	0
Turn Type	pm+pt	NA		Perm	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4			8	1	5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Total Split (s)	31.0	87.0		56.0	56.0	14.0	27.0	49.0	49.0	14.0	36.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Act Effct Green (s)	82.0	82.0		52.6	52.6	61.6	46.8	46.8	46.8	31.8	31.8	
Actuated g/C Ratio	0.55	0.55		0.35	0.35	0.41	0.31	0.31	0.31	0.21	0.21	
v/c Ratio	0.61	1.01		0.35	0.30	0.04	0.86	0.89	0.35	0.32	0.65	
Control Delay	24.7	63.6		61.9	37.5	14.5	55.4	52.8	11.1	45.1	27.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	24.7	63.6		61.9	37.5	14.5	55.4	52.8	11.1	45.1	27.3	
LOS	C	E		E	D	B	E	D	B	D	C	
Approach Delay		52.8			36.9			47.2			29.0	
Approach LOS		D			D			D			C	
Queue Length 50th (ft)	209	~934		12	132	8	186	440	23	24	52	
Queue Length 95th (ft)	290	#1251		41	200	19	m206	m#479	m25	60	136	
Internal Link Dist (ft)		886			910			926			1131	
Turn Bay Length (ft)	600			110		110	600			600		
Base Capacity (vph)	626	968		46	613	610	290	1000	553	170	767	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.60	1.01		0.35	0.30	0.04	0.84	0.89	0.35	0.32	0.65	

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 45 (30%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 45.8

Intersection LOS: D

Intersection Capacity Utilization 97.8%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

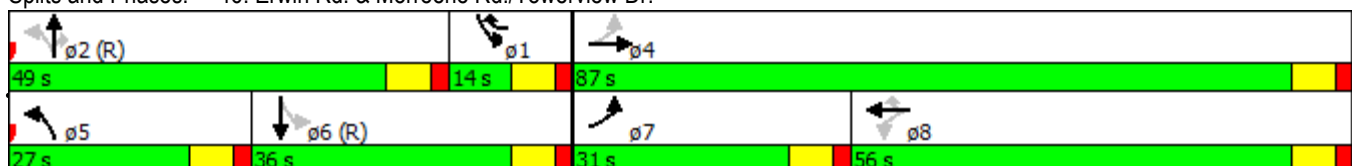
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

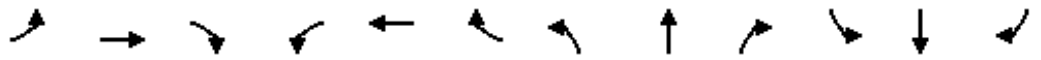
Splits and Phases: 46: Erwin Rd. & Morreene Rd./Towerview Dr.



Lanes, Volumes, Timings

48: Research Dr./Douglas St. & Erwin Rd.

3/25/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	156	811	313	287	551	72	70	10	200	99	32	69
Satd. Flow (prot)	1718	3207	1435	1661	3207	1384	1578	1546	1384	1523	1480	1363
Flt Permitted	0.281			0.950			0.950	0.964		0.950	0.979	
Satd. Flow (perm)	508	3207	1435	1661	3207	1384	1578	1546	1384	1523	1480	1363
Satd. Flow (RTOR)			261			80			222		3	131
Lane Group Flow (vph)	173	901	348	319	612	80	44	45	222	77	77	69
Turn Type	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	5	2	8	1	6	4	8	8	1	4	4	5
Permitted Phases	2		2			6			8			4
Total Split (s)	25.0	48.0	36.0	33.0	56.0	33.0	36.0	36.0	33.0	33.0	33.0	25.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Act Effct Green (s)	64.5	64.5	88.4	28.0	76.4	100.0	18.8	18.8	46.8	18.6	18.6	34.8
Actuated g/C Ratio	0.43	0.43	0.59	0.19	0.51	0.67	0.13	0.13	0.31	0.12	0.12	0.23
v/c Ratio	0.50	0.65	0.37	1.03	0.38	0.08	0.22	0.23	0.38	0.41	0.41	0.17
Control Delay	20.4	24.4	1.2	104.1	23.2	3.2	57.3	57.7	3.7	64.6	62.5	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	24.4	1.2	104.1	23.2	3.2	57.3	57.7	3.7	64.6	62.5	0.9
LOS	C	C	A	F	C	A	E	E	A	E	E	A
Approach Delay		18.2			47.1			19.1			44.1	
Approach LOS		B			D			B			D	
Queue Length 50th (ft)	39	167	12	~340	110	7	43	44	0	76	76	0
Queue Length 95th (ft)	m105	m#505	m4	#526	180	m19	75	77	30	123	126	0
Internal Link Dist (ft)		512			725			711			638	
Turn Bay Length (ft)	500		150	500		125	175		175	200		
Base Capacity (vph)	379	1379	952	310	1632	1030	326	319	585	284	278	448
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.65	0.37	1.03	0.38	0.08	0.13	0.14	0.38	0.27	0.28	0.15

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 118 (79%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 30.1

Intersection LOS: C

Intersection Capacity Utilization 61.8%

ICU Level of Service B

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 48: Research Dr./Douglas St. & Erwin Rd.

#2 (R)	#1	#4	#8
48 s	33 s	33 s	36 s
#5	#6 (R)		
25 s	56 s		

Lanes, Volumes, Timings

49: Eye Care Center/Durham VA Med. Ctr. & Erwin Rd.

3/25/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	719	35	89	971	200	8	0	37	84	1	21
Satd. Flow (prot)	1661	3207	1332	1718	3124	0	1718	1537	0	1718	1548	0
Flt Permitted	0.168			0.320			0.742			0.730		
Satd. Flow (perm)	294	3207	1332	579	3124	0	1342	1537	0	1320	1548	0
Satd. Flow (RTOR)			80		30			282			23	
Lane Group Flow (vph)	73	799	39	99	1301	0	9	41	0	93	24	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8				4
Permitted Phases	2		2	6			8			4		
Total Split (s)	16.0	98.0	98.0	16.0	98.0		36.0	36.0		36.0	36.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Act Effct Green (s)	114.7	105.2	105.2	115.3	105.5		20.0	20.0		20.0	20.0	
Actuated g/C Ratio	0.76	0.70	0.70	0.77	0.70		0.13	0.13		0.13	0.13	
v/c Ratio	0.23	0.36	0.04	0.19	0.59		0.05	0.09		0.53	0.11	
Control Delay	4.6	7.2	0.3	3.1	8.3		52.5	0.4		69.8	19.7	
Queue Delay	0.0	0.0	0.0	0.0	0.2		0.0	0.0		0.0	0.0	
Total Delay	4.6	7.2	0.3	3.1	8.4		52.5	0.4		69.8	19.7	
LOS	A	A	A	A	A		D	A		E	B	
Approach Delay		6.7			8.1			9.8				59.5
Approach LOS		A			A			A				E
Queue Length 50th (ft)	4	235	3	9	91		8	0		88	1	
Queue Length 95th (ft)	m10	38	m0	26	388		25	0		141	28	
Internal Link Dist (ft)		725			737			406				436
Turn Bay Length (ft)	200		50	125			140			50		
Base Capacity (vph)	328	2249	957	534	2206		277	541		272	338	
Starvation Cap Reductn	0	0	0	0	225		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.22	0.36	0.04	0.19	0.66		0.03	0.08		0.34	0.07	

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 139 (93%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 10.0

Intersection LOS: B

Intersection Capacity Utilization 62.9%

ICU Level of Service B

Analysis Period (min) 15

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

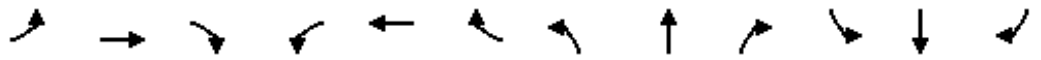
Splits and Phases: 49: Eye Care Center/Durham VA Med. Ctr. & Erwin Rd.



Lanes, Volumes, Timings

50: Duke Hospital/Fulton St. & Erwin Rd.

3/25/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↕↗		↖	↕↕	↗	↖	↗		↖	↕	↗↗
Volume (vph)	281	516	43	28	491	146	65	98	84	215	56	704
Satd. Flow (prot)	3556	3395	0	1833	3322	1486	1775	1740	0	1604	1748	2706
Flt Permitted	0.950			0.416			0.501			0.631		
Satd. Flow (perm)	3556	3395	0	803	3322	1486	936	1740	0	1065	1748	2706
Satd. Flow (RTOR)												
Lane Group Flow (vph)	312	621	0	31	546	162	72	202	0	239	62	782
Turn Type	Prot	NA		Perm	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2			6	7	3	8		7	4	5
Permitted Phases				6		6	8			4		4
Total Split (s)	33.0	81.0		48.0	48.0	31.0	15.0	38.0		31.0	54.0	33.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Act Effct Green (s)	22.0	88.6		61.6	61.6	82.9	25.0	25.0		39.4	39.4	66.4
Actuated g/C Ratio	0.15	0.59		0.41	0.41	0.55	0.17	0.17		0.26	0.26	0.44
v/c Ratio	0.60	0.31		0.09	0.40	0.20	0.34	0.70		0.67	0.14	0.65
Control Delay	40.6	11.5		12.6	12.1	6.6	56.8	71.0		50.1	37.3	19.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.5	0.0	1.5
Total Delay	40.6	11.5		12.6	12.1	6.6	56.8	71.0		50.7	37.3	20.6
LOS	D	B		B	B	A	E	E		D	D	C
Approach Delay		21.3			10.9			67.3			28.2	
Approach LOS		C			B			E			C	
Queue Length 50th (ft)	129	236		9	139	56	62	189		178	35	296
Queue Length 95th (ft)	127	242		38	213	109	105	263		m203	m49	67
Internal Link Dist (ft)		737			510			355			298	
Turn Bay Length (ft)	400			150		430				155		
Base Capacity (vph)	663	2005		330	1364	868	212	382		405	571	1305
Starvation Cap Reductn	0	0		0	0	0	0	0		27	0	327
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.47	0.31		0.09	0.40	0.19	0.34	0.53		0.63	0.11	0.80

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 16 (11%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 25.4

Intersection LOS: C

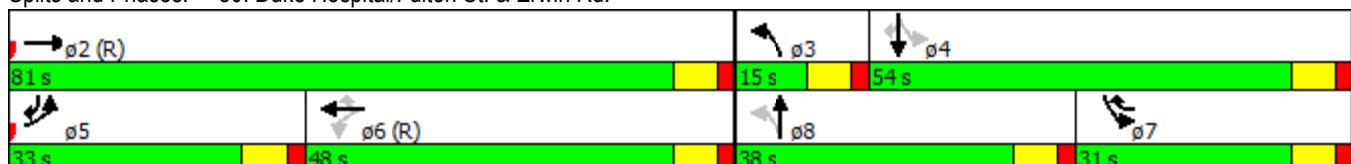
Intersection Capacity Utilization 62.8%

ICU Level of Service B

Analysis Period (min) 15

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

Splits and Phases: 50: Duke Hospital/Fulton St. & Erwin Rd.



Lanes, Volumes, Timings

51: Fulton St. & VA Med. Ctr./Elba St.

3/25/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	18	14	450	62	213	18	318	189	388	511	96
Satd. Flow (prot)	1775	1631	0	1578	1601	1486	1661	3322	1486	1661	3322	1486
Flt Permitted	0.950			0.950	0.964		0.439			0.420		
Satd. Flow (perm)	1775	1631	0	1578	1601	1486	768	3322	1486	734	3322	1486
Satd. Flow (RTOR)		16				237			210			69
Lane Group Flow (vph)	26	36	0	285	284	237	20	353	210	431	568	107
Turn Type	Split	NA		Split	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	4	4		8	8	5		6	8	5	2	4
Permitted Phases						8	6		6	2		2
Total Split (s)	37.0	37.0		40.0	40.0	45.0	28.0	28.0	40.0	45.0	73.0	37.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Act Effct Green (s)	18.3	18.3		33.0	33.0	68.9	47.8	47.8	80.8	83.7	83.7	107.0
Actuated g/C Ratio	0.12	0.12		0.22	0.22	0.46	0.32	0.32	0.54	0.56	0.56	0.71
v/c Ratio	0.12	0.17		0.82	0.81	0.29	0.08	0.33	0.23	0.72	0.31	0.10
Control Delay	54.3	35.3		74.9	73.3	2.9	33.6	29.8	5.6	30.4	20.4	3.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Total Delay	54.3	35.3		74.9	73.3	2.9	33.6	29.8	5.8	30.4	20.4	3.1
LOS	D	D		E	E	A	C	C	A	C	C	A
Approach Delay		43.3			53.2			21.3			22.6	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)	25	19		272	270	0	6	55	0	224	138	11
Queue Length 95th (ft)	48	48		#415	#400	42	m38	218	132	420	239	30
Internal Link Dist (ft)		366			785			298			665	
Turn Bay Length (ft)	125			130			100		130	200		35
Base Capacity (vph)	378	360		372	377	886	244	1058	917	656	1853	1209
Starvation Cap Reductn	0	0		0	0	0	0	0	244	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	46	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.10		0.77	0.75	0.27	0.08	0.33	0.31	0.66	0.31	0.09

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 148 (99%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 32.5

Intersection LOS: C

Intersection Capacity Utilization 63.5%

ICU Level of Service B

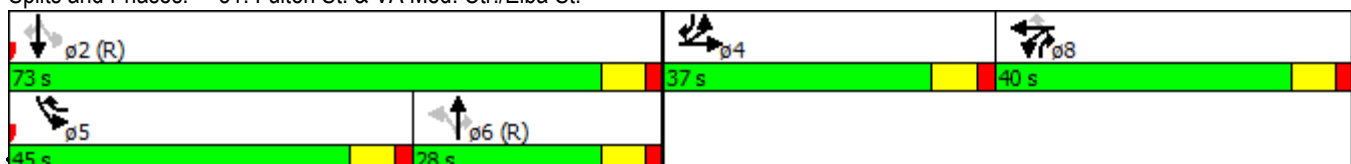
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

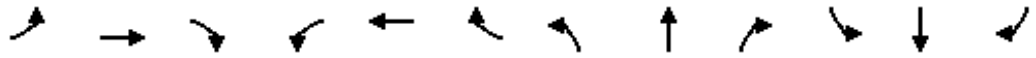
Splits and Phases: 51: Fulton St. & VA Med. Ctr./Elba St.



Lanes, Volumes, Timings

53: Trent Dr. & Elba St./NC 147 On Ramp

3/25/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↔							↗		↖	
Volume (vph)	0	225	270	0	0	0	0	0	175	0	425	0
Satd. Flow (prot)	0	3155	0	0	0	0	0	0	1564	0	2050	0
Flt Permitted												
Satd. Flow (perm)	0	3155	0	0	0	0	0	0	1564	0	2050	0
Lane Group Flow (vph)	0	550	0	0	0	0	0	0	194	0	472	0
Sign Control		Free			Free			Yield			Stop	

Intersection Summary

Control Type: Unsignalized

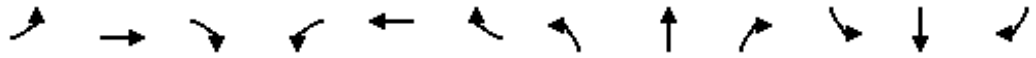
Intersection Capacity Utilization 78.9%

ICU Level of Service D

Analysis Period (min) 15

Lanes, Volumes, Timings
55: Flowers Dr. & Erwin Rd.

3/25/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	564	305	245	615	35	1	0	29	2	0	9
Satd. Flow (prot)	1718	3146	0	1718	3295	0	0	1569	0	0	1591	0
Flt Permitted	0.950			0.950				0.998			0.992	
Satd. Flow (perm)	1718	3146	0	1718	3295	0	0	1569	0	0	1591	0
Lane Group Flow (vph)	73	966	0	272	722	0	0	33	0	0	12	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Control Type: Unsignalized

Intersection Capacity Utilization 52.3%

ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings

56: Anderson St. & Erwin Rd.

3/25/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	273	250	72	96	405	13	102	244	59	30	232	388
Satd. Flow (prot)	1661	1748	1486	1661	3305	0	1718	1756	0	1604	1688	1486
Flt Permitted	0.485			0.356			0.258			0.502		
Satd. Flow (perm)	848	1748	1486	622	3305	0	467	1756	0	847	1688	1486
Satd. Flow (RTOR)			80		2			9				181
Lane Group Flow (vph)	303	278	80	107	464	0	113	337	0	33	258	431
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov
Protected Phases	5	2	3	1	6		3	8			4	5
Permitted Phases	2		2	6			8			4		4
Total Split (s)	45.0	68.0	16.0	20.0	43.0		16.0	62.0		46.0	46.0	45.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Act Effct Green (s)	74.8	74.8	90.7	48.9	48.9		46.1	46.1		30.2	30.2	70.2
Actuated g/C Ratio	0.50	0.50	0.60	0.33	0.33		0.31	0.31		0.20	0.20	0.47
v/c Ratio	0.47	0.32	0.09	0.36	0.43		0.48	0.62		0.19	0.76	0.54
Control Delay	33.4	26.4	2.8	42.3	42.2		44.1	47.6		39.7	52.6	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	33.4	26.4	2.8	42.3	42.2		44.1	47.6		39.7	52.6	11.8
LOS	C	C	A	D	D		D	D		D	D	B
Approach Delay		26.7			42.2			46.7			27.7	
Approach LOS		C			D			D			C	
Queue Length 50th (ft)	158	135	3	76	186		82	275		22	205	129
Queue Length 95th (ft)	m228	m195	m11	138	262		124	352		m23	m207	m133
Internal Link Dist (ft)		890			593			452			482	
Turn Bay Length (ft)	170			255			400			100		
Base Capacity (vph)	639	871	931	311	1078		235	672		231	461	791
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	6
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.47	0.32	0.09	0.34	0.43		0.48	0.50		0.14	0.56	0.55

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 12 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 34.4

Intersection LOS: C

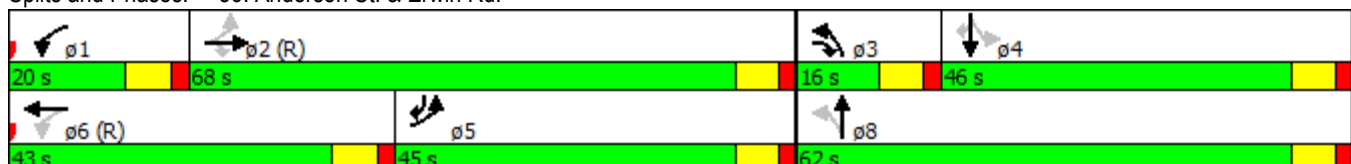
Intersection Capacity Utilization 65.7%

ICU Level of Service C

Analysis Period (min) 15

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

Splits and Phases: 56: Anderson St. & Erwin Rd.



Lanes, Volumes, Timings

57: Anderson St./15th St. & W. Main St.

3/25/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	419	221	219	181	15	198	270	62	24	210	1
Satd. Flow (prot)	1688	1543	0	1604	1688	1537	0	3203	0	0	3302	0
Flt Permitted				0.081				0.982			0.995	
Satd. Flow (perm)	1688	1543	0	137	1688	1537	0	3203	0	0	3302	0
Satd. Flow (RTOR)		22				102						
Lane Group Flow (vph)	0	712	0	243	201	17	0	589	0	0	261	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases		4		3	8		2	2		6	6	
Permitted Phases	4			8		8						
Total Split (s)	70.0	70.0		19.0	89.0	89.0	35.0	35.0		26.0	26.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0		8.0			5.0	
Act Effct Green (s)		65.0		84.0	84.0	84.0		27.0			21.0	
Actuated g/C Ratio		0.43		0.56	0.56	0.56		0.18			0.14	
v/c Ratio		1.05		1.14	0.21	0.02		1.02			0.56	
Control Delay		86.8		137.9	17.2	0.1		96.8			65.5	
Queue Delay		0.0		0.0	0.0	0.0		0.0			0.0	
Total Delay		86.8		137.9	17.2	0.1		96.8			65.5	
LOS		F		F	B	A		F			E	
Approach Delay		86.8			80.2			96.8			65.5	
Approach LOS		F			F			F			E	
Queue Length 50th (ft)		~741		~211	95	0		~322			127	
Queue Length 95th (ft)		#992		#393	142	0		#438			176	
Internal Link Dist (ft)		578			333			482			659	
Turn Bay Length (ft)				200								
Base Capacity (vph)		681		213	945	905		576			462	
Starvation Cap Reductn		0		0	0	0		0			0	
Spillback Cap Reductn		0		0	0	0		0			0	
Storage Cap Reductn		0		0	0	0		0			0	
Reduced v/c Ratio		1.05		1.14	0.21	0.02		1.02			0.56	

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 150

Offset: 56 (37%), Referenced to phase 2:NBTL, Start of 1st Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 85.5

Intersection LOS: F

Intersection Capacity Utilization 90.4%

ICU Level of Service E

Analysis Period (min) 15

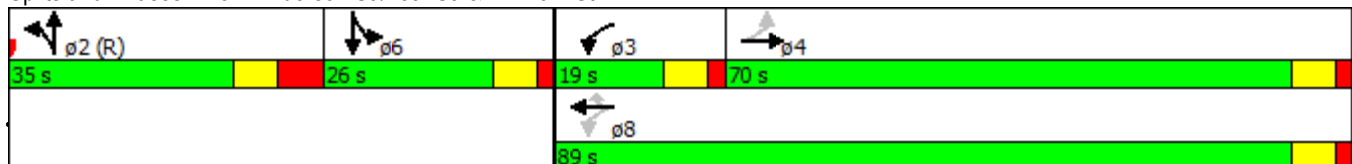
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

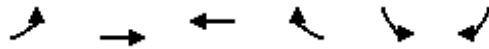
Splits and Phases: 57: Anderson St./15th St. & W. Main St.



Synchro Output-2040 No Build PM

Lanes, Volumes, Timings
45: NC 751 & Erwin Rd.

4/10/2015



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑	↗	↖↗	↖
Volume (vph)	340	531	934	255	440	665
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	9	11	10
Grade (%)		2%	2%		2%	
Storage Length (ft)	0			50	600	0
Storage Lanes	0			1	1	1
Taper Length (ft)	25				25	
Satd. Flow (prot)	0	3259	3436	1384	3222	1435
Flt Permitted		0.981			0.950	
Satd. Flow (perm)	0	3259	3436	1384	3222	1435
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				81		15
Link Speed (mph)		35	35		35	
Link Distance (ft)		1054	1065		1051	
Travel Time (s)		20.5	20.7		20.5	
Lane Group Flow (vph)	0	968	1038	283	489	739
Turn Type	Split	NA	NA	pm+ov	Prot	pm+ov
Protected Phases	2	2	6	4	4	2
Permitted Phases				6		4
Total Split (s)	64.0	64.0	55.0	31.0	31.0	64.0
Total Lost Time (s)		5.0	5.0	5.0	5.0	5.0
Act Effct Green (s)		60.1	49.2	79.9	25.7	90.8
Actuated g/C Ratio		0.40	0.33	0.53	0.17	0.61
v/c Ratio		0.74	0.92	0.37	0.89	0.85
Control Delay		42.9	61.9	15.3	50.9	30.1
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		42.9	61.9	15.3	50.9	30.1
LOS		D	E	B	D	C
Approach Delay		42.9	51.9		38.4	
Approach LOS		D	D		D	
Queue Length 50th (ft)		427	511	107	224	615
Queue Length 95th (ft)		513	#635	173	m239	m691
Internal Link Dist (ft)		974	985		971	
Turn Bay Length (ft)				50	600	
Base Capacity (vph)		1305	1145	777	558	874
Starvation Cap Reductn		0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0
Reduced v/c Ratio		0.74	0.91	0.36	0.88	0.85

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	14 (9%), Referenced to phase 2:EBTL, Start of 1st Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.92
Intersection Signal Delay:	44.7
Intersection LOS:	D

Lanes, Volumes, Timings

45: NC 751 & Erwin Rd.

4/10/2015

Intersection Capacity Utilization 75.4%

ICU Level of Service D

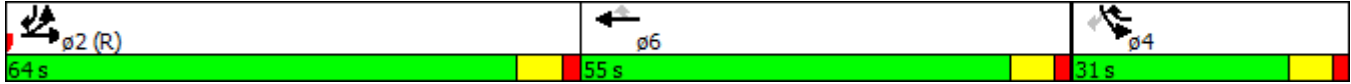
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 45: NC 751 & Erwin Rd.



Lanes, Volumes, Timings

46: Erwin Rd. & Morreene Rd./Towerview Dr.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	203	182	179	526	139	144	326	40	101	829	345
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	10	11	11	11	11	10	10	12	11	10
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	600		40	110		110	600		0	600		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1661	1680	0	1661	1748	1486	1661	3207	1435	1718	3176	0
Flt Permitted	0.133			0.133			0.067			0.484		
Satd. Flow (perm)	233	1680	0	233	1748	1486	117	3207	1435	875	3176	0
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		30							182		50	
Link Speed (mph)		35			25			35			35	
Link Distance (ft)		966			990			1006			1211	
Travel Time (s)		18.8			27.0			19.6			23.6	
Lane Group Flow (vph)	244	428	0	199	584	154	160	362	44	112	1304	0
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Total Split (s)	19.0	49.0		22.0	52.0	14.0	15.0	65.0	65.0	14.0	64.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Act Effct Green (s)	44.1	44.1		47.0	47.0	61.0	70.0	60.0	60.0	68.0	59.0	
Actuated g/C Ratio	0.29	0.29		0.31	0.31	0.41	0.47	0.40	0.40	0.45	0.39	
v/c Ratio	1.21	0.83		0.85	1.07	0.25	1.02	0.28	0.06	0.25	1.02	
Control Delay	183.5	60.9		72.0	106.1	30.9	116.6	18.6	0.1	9.6	51.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	183.5	60.9		72.0	106.1	30.9	116.6	18.6	0.1	9.6	51.4	
LOS	F	E		E	F	C	F	B	A	A	D	
Approach Delay		105.4			86.5			44.9			48.1	
Approach LOS		F			F			D			D	
Queue Length 50th (ft)	~243	369		152	~629	99	~119	89	0	32	~695	
Queue Length 95th (ft)	#426	#545		#287	#866	156	m#244	128	m0	m31	#818	
Internal Link Dist (ft)		886			910			926			1131	
Turn Bay Length (ft)	600			110		110	600			600		
Base Capacity (vph)	201	515		234	547	604	157	1282	683	447	1279	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	1.21	0.83		0.85	1.07	0.25	1.02	0.28	0.06	0.25	1.02	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	69 (46%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.21
Intersection Signal Delay:	68.3
Intersection LOS:	E

Lanes, Volumes, Timings

46: Erwin Rd. & Morreene Rd./Towerview Dr.

4/10/2015

Intersection Capacity Utilization 98.5%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

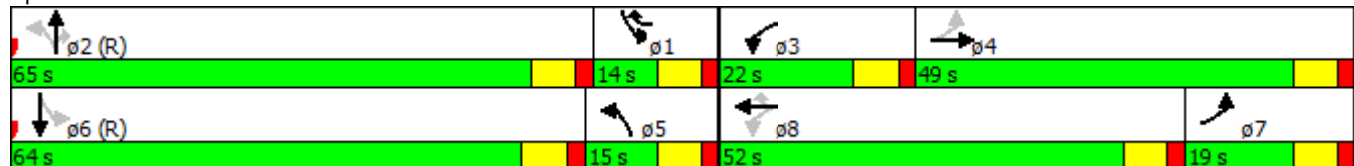
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

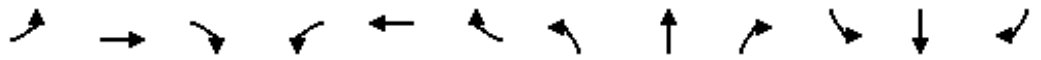
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 46: Erwin Rd. & Morreene Rd./Towerview Dr.



Lanes, Volumes, Timings
47: LaSalle St. & Erwin Rd.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	207	725	28	22	1155	403	120	142	167	158	80	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	10	10	12	11	11	11	11	11	10	10	10
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	600		150	500		270	80		200	225		150
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1718	3207	1435	1718	3322	1486	1661	1748	1486	1604	1688	1435
Flt Permitted	0.073			0.347			0.699			0.404		
Satd. Flow (perm)	132	3207	1435	628	3322	1486	1222	1748	1486	682	1688	1435
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131			344			156			131
Link Speed (mph)		35			35			25				35
Link Distance (ft)		1002			638			912				840
Travel Time (s)		19.5			12.4			24.9				16.4
Lane Group Flow (vph)	230	806	31	24	1283	448	133	158	186	176	89	183
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases	2		2	6		6	8		8	4		4
Total Split (s)	27.0	84.0	84.0	16.0	73.0	73.0	14.0	34.0	16.0	16.0	36.0	27.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Act Effct Green (s)	85.8	85.8	85.8	77.1	77.1	77.1	31.2	22.2	33.2	35.2	24.2	48.9
Actuated g/C Ratio	0.57	0.57	0.57	0.51	0.51	0.51	0.21	0.15	0.22	0.23	0.16	0.33
v/c Ratio	0.81	0.44	0.04	0.06	0.75	0.48	0.47	0.61	0.41	0.78	0.33	0.33
Control Delay	52.7	26.5	0.4	20.5	25.4	6.3	51.2	69.1	9.7	70.3	57.3	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	26.5	0.4	20.5	25.4	6.3	51.2	69.1	9.7	70.3	57.3	11.8
LOS	D	C	A	C	C	A	D	E	A	E	E	B
Approach Delay		31.4			20.4			41.0				43.8
Approach LOS		C			C			D				D
Queue Length 50th (ft)	170	297	0	7	308	33	108	149	19	147	79	35
Queue Length 95th (ft)	m243	m348	m1	m21	496	118	159	215	69	209	128	90
Internal Link Dist (ft)		922			558			832				760
Turn Bay Length (ft)	600		150	500		270	80		200	225		150
Base Capacity (vph)	309	1834	876	402	1706	930	280	337	450	227	348	577
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.44	0.04	0.06	0.75	0.48	0.47	0.47	0.41	0.78	0.26	0.32

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	140 (93%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.81
Intersection Signal Delay:	29.0
Intersection LOS:	C

Lanes, Volumes, Timings
 47: LaSalle St. & Erwin Rd.

4/10/2015

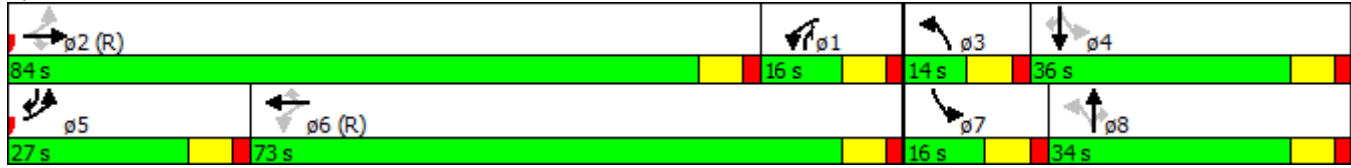
Intersection Capacity Utilization 76.3%

ICU Level of Service D

Analysis Period (min) 15

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

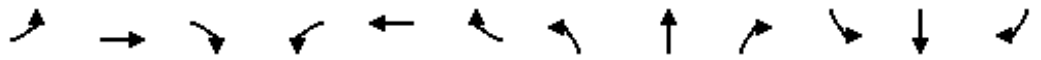
Splits and Phases: 47: LaSalle St. & Erwin Rd.



Lanes, Volumes, Timings

48: Research Dr./Douglas St. & Erwin Rd.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	657	59	156	858	41	298	28	415	228	13	279
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	10	10	11	10	9	11	10	9	10	10	10
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	500		150	500		125	175		175	200		0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1718	3207	1435	1661	3207	1384	1578	1540	1384	1523	1368	1363
Flt Permitted	0.096			0.315			0.950	0.960		0.950	0.986	
Satd. Flow (perm)	174	3207	1435	551	3207	1384	1578	1540	1384	1523	1368	1363
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131			80			131		55	131
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		592			805			791			718	
Travel Time (s)		11.5			15.7			21.6			19.6	
Lane Group Flow (vph)	66	730	66	173	953	46	179	183	461	200	191	186
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+ov	Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	5	2		1	6	4	8	8	1	4	4	5
Permitted Phases	2		2	6		6			8			4
Total Split (s)	15.0	48.0	48.0	33.0	66.0	33.0	36.0	36.0	33.0	33.0	33.0	15.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Act Effct Green (s)	51.7	51.7	51.7	69.6	69.6	99.8	25.1	25.1	53.1	25.1	25.1	35.2
Actuated g/C Ratio	0.34	0.34	0.34	0.46	0.46	0.67	0.17	0.17	0.35	0.17	0.17	0.23
v/c Ratio	0.40	0.66	0.11	0.37	0.64	0.05	0.68	0.71	0.80	0.78	0.69	0.44
Control Delay	39.3	29.5	0.4	20.5	18.7	2.8	71.0	73.6	28.0	80.8	54.8	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.3	29.5	0.4	20.5	18.7	2.8	71.0	73.6	28.0	80.8	54.8	11.6
LOS	D	C	A	C	B	A	E	E	C	F	D	B
Approach Delay		28.0			18.4			47.5			49.9	
Approach LOS		C			B			D			D	
Queue Length 50th (ft)	28	280	0	69	215	3	175	181	175	195	137	29
Queue Length 95th (ft)	m68	324	m0	123	291	m16	254	262	236	294	236	72
Internal Link Dist (ft)		512			725			711			638	
Turn Bay Length (ft)	500		150	500		125	175		175	200		
Base Capacity (vph)	165	1106	580	463	1489	972	326	318	574	284	300	422
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.66	0.11	0.37	0.64	0.05	0.55	0.58	0.80	0.70	0.64	0.44

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	9 (6%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.80
Intersection Signal Delay:	33.1
Intersection LOS:	C

Lanes, Volumes, Timings

48: Research Dr./Douglas St. & Erwin Rd.

4/10/2015

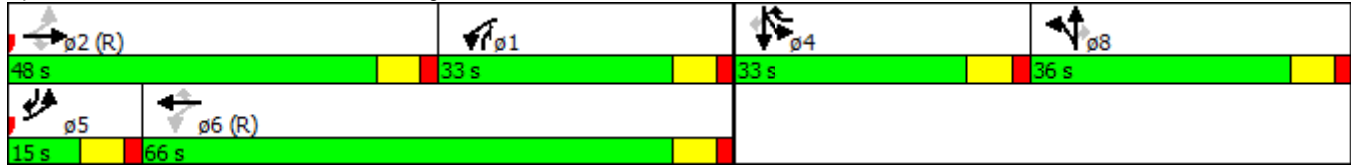
Intersection Capacity Utilization 65.9%

ICU Level of Service C

Analysis Period (min) 15

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

Splits and Phases: 48: Research Dr./Douglas St. & Erwin Rd.



Lanes, Volumes, Timings

49: Eye Care Center/Durham VA Med. Ctr. & Erwin Rd.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	1129	66	28	927	135	16	0	85	116	3	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	10	8	12	10	10	12	12	12	12	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	200		50	125		0	140		0	50		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1661	3207	1332	1718	3146	0	1718	1537	0	1718	1548	0
Flt Permitted	0.200			0.181			0.710			0.460		
Satd. Flow (perm)	350	3207	1332	327	3146	0	1284	1537	0	832	1548	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			80		20			109				69
Link Speed (mph)		35			35			10				10
Link Distance (ft)		805			817			486				516
Travel Time (s)		15.7			15.9			33.1				35.2
Lane Group Flow (vph)	33	1254	73	31	1180	0	18	94	0	129	72	0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			6			8		7	4	
Permitted Phases	2		2	6			8			4		
Total Split (s)	99.0	99.0	99.0	99.0	99.0		35.0	35.0		16.0	51.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Act Effct Green (s)	107.3	107.3	107.3	107.3	107.3		16.7	16.7		32.7	32.7	
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72		0.11	0.11		0.22	0.22	
v/c Ratio	0.13	0.55	0.07	0.13	0.52		0.13	0.35		0.52	0.18	
Control Delay	7.2	7.8	0.5	9.4	9.1		56.9	9.7		55.7	10.2	
Queue Delay	0.0	0.1	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.2	7.9	0.5	9.4	9.1		56.9	9.7		55.7	10.2	
LOS	A	A	A	A	A		E	A		E	B	
Approach Delay		7.4			9.1			17.3				39.4
Approach LOS		A			A			B				D
Queue Length 50th (ft)	5	138	0	8	161		17	0		115	2	
Queue Length 95th (ft)	m12	250	m2	m19	230		39	38		156	41	
Internal Link Dist (ft)		725			737			406				436
Turn Bay Length (ft)	200		50	125			140			50		
Base Capacity (vph)	250	2294	975	233	2256		256	394		246	522	
Starvation Cap Reductn	0	118	0	0	1		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.58	0.07	0.13	0.52		0.07	0.24		0.52	0.14	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	125 (83%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.55
Intersection Signal Delay:	10.8
Intersection LOS:	B

Lanes, Volumes, Timings

49: Eye Care Center/Durham VA Med. Ctr. & Erwin Rd.

4/10/2015

Intersection Capacity Utilization 52.6%

ICU Level of Service A

Analysis Period (min) 15

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

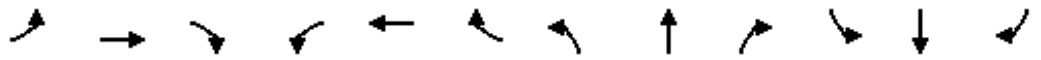
Splits and Phases: 49: Eye Care Center/Durham VA Med. Ctr. & Erwin Rd.



Lanes, Volumes, Timings

50: Duke Hospital/Fulton St. & Erwin Rd.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	424	845	61	54	734	397	36	64	41	79	76	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	12	12	14	11	11	13	13	13	10	11	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	400		0	150		430	0		0	155		0
Storage Lanes	2		0	1		1	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	3556	3402	0	1833	3322	1486	1775	1759	0	1604	1748	2706
Flt Permitted	0.950			0.261			0.698			0.574		
Satd. Flow (perm)	3556	3402	0	504	3322	1486	1305	1759	0	969	1748	2706
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			10			35	
Link Distance (ft)		817			590			435			378	
Travel Time (s)		15.9			11.5			29.7			7.4	
Lane Group Flow (vph)	471	1007	0	60	816	441	40	117	0	88	84	356
Turn Type	Prot	NA		pm+pt	NA	pm+ov	Perm	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6	7		8		7	4	5
Permitted Phases				6		6	8			4		4
Total Split (s)	32.0	72.0		14.0	54.0	30.0	34.0	34.0		30.0	64.0	32.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Act Effct Green (s)	25.6	83.7		73.4	64.4	84.1	20.4	20.4		45.0	45.0	75.6
Actuated g/C Ratio	0.17	0.56		0.49	0.43	0.56	0.14	0.14		0.30	0.30	0.50
v/c Ratio	0.78	0.53		0.18	0.57	0.53	0.23	0.49		0.24	0.16	0.26
Control Delay	67.2	18.5		13.0	27.6	13.0	57.6	65.3		28.4	26.8	11.2
Queue Delay	0.0	0.0		0.0	0.3	0.1	0.0	0.0		0.0	0.0	0.0
Total Delay	67.2	18.5		13.0	27.9	13.1	57.6	65.3		28.4	26.8	11.2
LOS	E	B		B	C	B	E	E		C	C	B
Approach Delay		34.0			22.3			63.3			16.5	
Approach LOS		C			C			E			B	
Queue Length 50th (ft)	200	254		16	252	157	36	110		35	34	55
Queue Length 95th (ft)	263	440		30	415	275	70	164		71	68	53
Internal Link Dist (ft)		737			510			355			298	
Turn Bay Length (ft)	400			150		430				155		
Base Capacity (vph)	644	1899		326	1426	885	252	340		430	687	1392
Starvation Cap Reductn	0	0		0	169	40	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.73	0.53		0.18	0.65	0.52	0.16	0.34		0.20	0.12	0.26

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	148 (99%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	28.2
Intersection LOS:	C

Lanes, Volumes, Timings

50: Duke Hospital/Fulton St. & Erwin Rd.

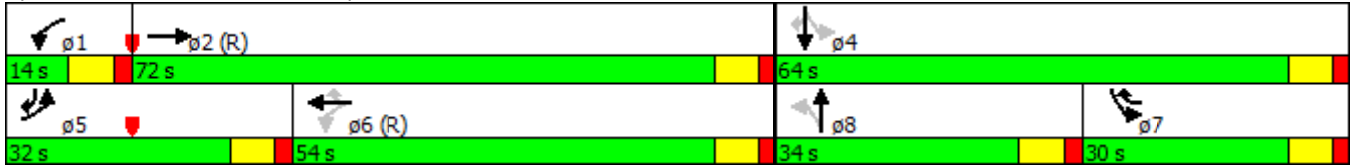
4/10/2015

Intersection Capacity Utilization 55.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 50: Duke Hospital/Fulton St. & Erwin Rd.



Lanes, Volumes, Timings

51: Fulton St. & VA Med. Ctr./Elba St.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	76	64	39	185	35	230	21	673	191	115	251	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	11	11	11	11	11	11	11	11	11	11	11
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	125		0	130		0	100		130	200		35
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1775	1649	0	1578	1606	1486	1661	3322	1486	1661	3322	1486
Flt Permitted	0.950			0.950	0.967		0.580			0.286		
Satd. Flow (perm)	1775	1649	0	1578	1606	1486	1014	3322	1486	500	3322	1486
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19				256			188			48
Link Speed (mph)		10			25			35				35
Link Distance (ft)		446			865			378				745
Travel Time (s)		30.4			23.6			7.4				14.5
Lane Group Flow (vph)	84	114	0	122	123	256	23	748	212	128	279	48
Turn Type	Split	NA		Split	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	4	4		8	8	5		6	8	5	2	4
Permitted Phases						8	6		6	2		2
Total Split (s)	38.0	38.0		36.0	36.0	21.0	55.0	55.0	36.0	21.0	76.0	38.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Act Effct Green (s)	20.7	20.7		21.7	21.7	37.7	71.6	71.6	98.3	92.6	92.6	118.3
Actuated g/C Ratio	0.14	0.14		0.14	0.14	0.25	0.48	0.48	0.66	0.62	0.62	0.79
v/c Ratio	0.34	0.47		0.54	0.53	0.45	0.05	0.47	0.20	0.30	0.14	0.04
Control Delay	59.4	53.3		66.6	66.2	4.8	23.5	21.7	3.0	23.1	15.1	1.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.6	0.5	0.0	0.0	0.0
Total Delay	59.4	53.3		66.6	66.2	4.8	23.5	22.3	3.6	23.1	15.1	1.5
LOS	E	D		E	E	A	C	C	A	C	B	A
Approach Delay		55.8			34.9			18.3			15.9	
Approach LOS		E			C			B			B	
Queue Length 50th (ft)	78	90		120	121	0	7	125	0	43	50	0
Queue Length 95th (ft)	120	140		180	181	38	m18	247	m36	110	108	11
Internal Link Dist (ft)		366			785			298			665	
Turn Bay Length (ft)	125			130			100		130	200		35
Base Capacity (vph)	390	377		326	331	565	483	1584	1024	432	2049	1298
Starvation Cap Reductn	0	0		0	0	0	0	438	495	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.30		0.37	0.37	0.45	0.05	0.65	0.40	0.30	0.14	0.04

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	119 (79%), Referenced to phase 2:SBTL and 6:NBTL, Start of 1st Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.54
Intersection Signal Delay:	25.1
Intersection LOS:	C

Lanes, Volumes, Timings

51: Fulton St. & VA Med. Ctr./Elba St.

4/10/2015

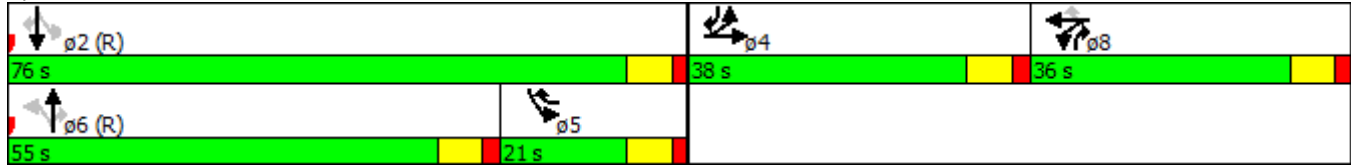
Intersection Capacity Utilization 51.2%

ICU Level of Service A

Analysis Period (min) 15

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

Splits and Phases: 51: Fulton St. & VA Med. Ctr./Elba St.



Lanes, Volumes, Timings
52: Emergency Dr. & Erwin Rd.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	1	962	2	58	942	40	1	4	78	0	20	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	13	11	11	9	9	9	12	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1718	3322	0	1775	3302	0	0	1418	0	0	1583	0
Flt Permitted	0.232			0.238				0.987				
Satd. Flow (perm)	420	3322	0	445	3302	0	0	1401	0	0	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					5			87				97
Link Speed (mph)		35			35			10				10
Link Distance (ft)		590			396			499				232
Travel Time (s)		11.5			7.7			34.0				15.8
Lane Group Flow (vph)	1	1071	0	64	1091	0	0	92	0	0	291	0
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		2			6			8				4
Permitted Phases	2			6			8			4		
Total Split (s)	91.0	91.0		91.0	91.0		59.0	59.0		59.0		59.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0				5.0
Act Effct Green (s)	111.9	111.9		111.9	111.9			28.1				28.1
Actuated g/C Ratio	0.75	0.75		0.75	0.75			0.19				0.19
v/c Ratio	0.00	0.43		0.19	0.44			0.28				0.78
Control Delay	4.0	4.0		8.7	8.4			11.6				51.5
Queue Delay	0.0	0.0		0.0	0.6			0.0				0.0
Total Delay	4.0	4.1		8.7	9.1			11.6				51.5
LOS	A	A		A	A			B				D
Approach Delay		4.1			9.0			11.6				51.5
Approach LOS		A			A			B				D
Queue Length 50th (ft)	0	72		21	210			4				187
Queue Length 95th (ft)	m0	74		m37	237			49				270
Internal Link Dist (ft)		510			316			419				152
Turn Bay Length (ft)	100			100								
Base Capacity (vph)	313	2479		331	2465			560				631
Starvation Cap Reductn	0	121		0	900			0				0
Spillback Cap Reductn	0	175		0	0			4				0
Storage Cap Reductn	0	0		0	0			0				0
Reduced v/c Ratio	0.00	0.46		0.19	0.70			0.17				0.46

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	143 (95%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	11.8
Intersection LOS:	B

Lanes, Volumes, Timings
 52: Emergency Dr. & Erwin Rd.

4/10/2015

Intersection Capacity Utilization 64.2%

ICU Level of Service C

Analysis Period (min) 15

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

Splits and Phases: 52: Emergency Dr. & Erwin Rd.



Lanes, Volumes, Timings

53: Trent Dr. & Elba St./NC 147 On Ramp

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑							↑		↑	
Volume (vph)	0	470	120	0	0	0	0	0	650	0	230	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	16	16	12
Grade (%)		2%			2%			2%			2%	
Satd. Flow (prot)	0	3333	0	0	0	0	0	0	1564	0	2050	0
Flt Permitted												
Satd. Flow (perm)	0	3333	0	0	0	0	0	0	1564	0	2050	0
Link Speed (mph)		25			50			35			35	
Link Distance (ft)		256			306			455			168	
Travel Time (s)		7.0			4.2			8.9			3.3	
Lane Group Flow (vph)	0	655	0	0	0	0	0	0	722	0	256	0
Sign Control		Free			Free			Yield			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	74.3%
ICU Level of Service	D
Analysis Period (min)	15

Lanes, Volumes, Timings
54: Trent Dr. & Erwin Rd.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	697	73	38	566	186	314	194	123	150	40	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	11	11	11	11	11	11	11	11
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	80		0	155		0	325		0	200		0
Storage Lanes	1		0	1		0	2		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1718	3275	0	1718	3199	0	3222	1647	0	1661	1748	1486
Flt Permitted	0.230			0.133			0.950			0.398		
Satd. Flow (perm)	416	3275	0	241	3199	0	3222	1647	0	696	1748	1486
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			35	
Link Distance (ft)		396			365			563			455	
Travel Time (s)		7.7			7.1			15.4			8.9	
Lane Group Flow (vph)	300	855	0	42	836	0	349	353	0	167	44	178
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2			6						4		4
Total Split (s)	31.0	72.0		14.0	55.0		29.0	47.0		17.0	35.0	31.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Act Effct Green (s)	74.1	74.1		54.5	54.5		27.7	37.5		34.8	24.6	48.8
Actuated g/C Ratio	0.49	0.49		0.36	0.36		0.18	0.25		0.23	0.16	0.33
v/c Ratio	0.70	0.53		0.24	0.72		0.59	0.86		0.70	0.15	0.37
Control Delay	33.9	12.7		20.0	27.6		62.1	73.4		56.3	54.1	25.9
Queue Delay	0.0	0.4		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	33.9	13.0		20.0	27.6		62.1	73.4		56.3	54.1	25.9
LOS	C	B		B	C		E	E		E	D	C
Approach Delay		18.4			27.2			67.8			42.2	
Approach LOS		B			C			E			D	
Queue Length 50th (ft)	165	290		17	376		169	326		117	37	83
Queue Length 95th (ft)	254	107		m31	467		224	444		178	74	127
Internal Link Dist (ft)		316			285			483			375	
Turn Bay Length (ft)	80			155			325			200		
Base Capacity (vph)	431	1617		177	1161		610	461		238	349	483
Starvation Cap Reductn	0	286		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.70	0.64		0.24	0.72		0.57	0.77		0.70	0.13	0.37

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 34.9 Intersection LOS: C

Lanes, Volumes, Timings
 54: Trent Dr. & Erwin Rd.

4/10/2015

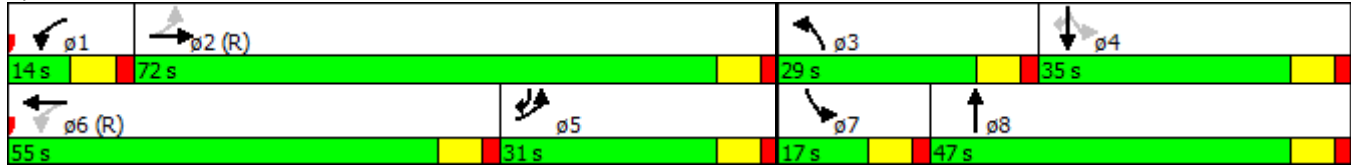
Intersection Capacity Utilization 79.2%

ICU Level of Service D

Analysis Period (min) 15

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

Splits and Phases: 54: Trent Dr. & Erwin Rd.



Lanes, Volumes, Timings
55: Flowers Dr. & Erwin Rd.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	963	3	87	789	9	0	0	351	11	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	11	11	12	12	10	12	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1718	3322	0	1718	3315	0	0	1564	0	0	1712	0
Flt Permitted	0.950			0.950							0.956	
Satd. Flow (perm)	1718	3322	0	1718	3315	0	0	1564	0	0	1712	0
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		365			970			710			190	
Travel Time (s)		7.1			18.9			19.4			5.2	
Lane Group Flow (vph)	4	1073	0	97	887	0	0	390	0	0	13	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	63.3%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings

56: Anderson St. & Erwin Rd.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	573	606	146	80	374	50	221	367	117	21	219	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	10	10	11
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	600		0	255		0	400		0	100		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1661	1748	1486	1661	3262	0	1718	1744	0	1604	1688	1486
Flt Permitted	0.482			0.172			0.270			0.198		
Satd. Flow (perm)	843	1748	1486	301	3262	0	488	1744	0	334	1688	1486
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			162		9			12				131
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		970			673			532			562	
Travel Time (s)		18.9			13.1			14.5			15.3	
Lane Group Flow (vph)	637	673	162	89	472	0	246	538	0	23	243	322
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov
Protected Phases	5	2	3	1	6		3	8			4	5
Permitted Phases	2		2	6			8			4		4
Total Split (s)	57.0	78.0	21.0	14.0	35.0		21.0	58.0		37.0	37.0	57.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Act Effct Green (s)	75.3	75.3	96.3	33.0	33.0		50.0	50.0		29.0	29.0	81.0
Actuated g/C Ratio	0.50	0.50	0.64	0.22	0.22		0.33	0.33		0.19	0.19	0.54
v/c Ratio	0.90	0.77	0.16	0.58	0.65		0.84	0.91		0.36	0.75	0.37
Control Delay	51.0	35.0	1.2	65.7	57.9		63.9	67.7		63.7	67.3	9.5
Queue Delay	48.8	0.0	0.0	0.0	0.0		0.0	0.1		0.0	0.0	0.1
Total Delay	99.8	35.0	1.2	65.7	57.9		63.9	67.8		63.7	67.3	9.6
LOS	F	C	A	E	E		E	E		E	E	A
Approach Delay		59.3			59.1			66.6			35.5	
Approach LOS		E			E			E			D	
Queue Length 50th (ft)	410	433	2	74	225		182	480		20	229	123
Queue Length 95th (ft)	#637	591	m8	#138	290		#301	#685		m22	m227	m110
Internal Link Dist (ft)		890			593			452			482	
Turn Bay Length (ft)	600			255			400			100		
Base Capacity (vph)	706	877	1011	154	725		293	623		71	360	862
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	78
Spillback Cap Reductn	217	0	0	0	0		0	1		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	1.30	0.77	0.16	0.58	0.65		0.84	0.86		0.32	0.68	0.41

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	124 (83%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.91
Intersection Signal Delay:	56.8
Intersection LOS:	E

Lanes, Volumes, Timings
 56: Anderson St. & Erwin Rd.

4/10/2015

Intersection Capacity Utilization 92.6% ICU Level of Service F

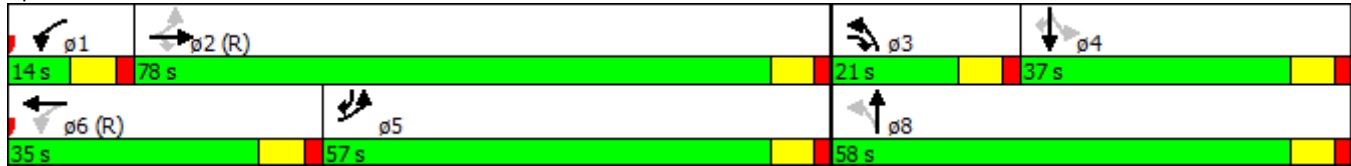
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

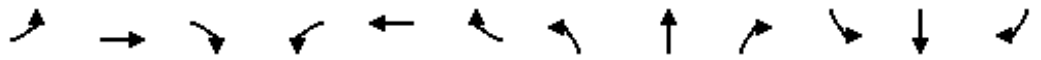
Splits and Phases: 56: Anderson St. & Erwin Rd.



Lanes, Volumes, Timings

57: Anderson St./15th St. & W. Main St.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	356	142	223	492	46	294	430	266	32	165	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	9	9	10	10	12	11	11	11	11	11	11
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	150		0	200		0	200		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1604	1558	0	1604	1688	1537	0	3141	0	0	3276	0
Flt Permitted	0.107			0.083				0.985			0.992	
Satd. Flow (perm)	181	1558	0	140	1688	1537	0	3141	0	0	3276	0
Right Turn on Red			Yes			Yes			No			Yes
Satd. Flow (RTOR)		13				102						2
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		658			413			562			739	
Travel Time (s)		12.8			8.0			15.3			20.2	
Lane Group Flow (vph)	8	554	0	248	547	51	0	1101	0	0	228	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases		4		3	8		2	2		6	6	
Permitted Phases	4			8		8						
Total Split (s)	48.0	48.0		20.0	68.0	68.0	56.0	56.0		26.0	26.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0		8.0			5.0	
Act Effct Green (s)	43.0	43.0		63.0	63.0	63.0		48.0			21.0	
Actuated g/C Ratio	0.29	0.29		0.42	0.42	0.42		0.32			0.14	
v/c Ratio	0.16	1.22		1.21	0.77	0.07		1.10			0.50	
Control Delay	49.3	160.2		180.5	46.2	0.2		96.5			63.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0		2.1			0.0	
Total Delay	49.3	160.2		180.5	46.2	0.2		98.6			63.2	
LOS	D	F		F	D	A		F			E	
Approach Delay		158.6			82.8			98.6			63.2	
Approach LOS		F			F			F			E	
Queue Length 50th (ft)	6	~654		~250	456	0		~636			109	
Queue Length 95th (ft)	23	#893		#435	613	0		m#770			155	
Internal Link Dist (ft)		578			333			482			659	
Turn Bay Length (ft)	150			200								
Base Capacity (vph)	51	455		205	708	704		1005			460	
Starvation Cap Reductn	0	0		0	0	0		44			0	
Spillback Cap Reductn	0	0		0	0	0		0			0	
Storage Cap Reductn	0	0		0	0	0		0			0	
Reduced v/c Ratio	0.16	1.22		1.21	0.77	0.07		1.15			0.50	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	10 (7%), Referenced to phase 2:NBTL, Start of 1st Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.22
Intersection Signal Delay:	103.1
Intersection LOS:	F

Lanes, Volumes, Timings

57: Anderson St./15th St. & W. Main St.

4/10/2015

Intersection Capacity Utilization 96.2%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

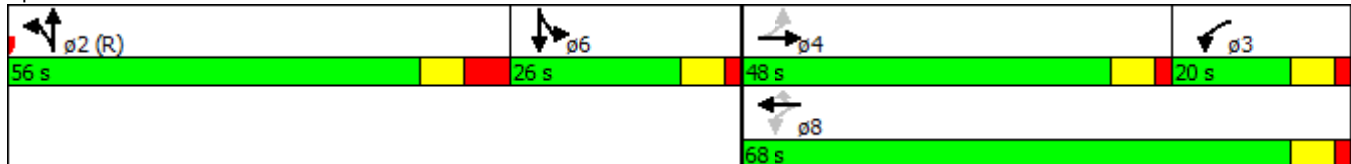
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 57: Anderson St./15th St. & W. Main St.



Synchro Output-2040 Build AM

Lanes, Volumes, Timings

45: NC 751 & Erwin Rd.

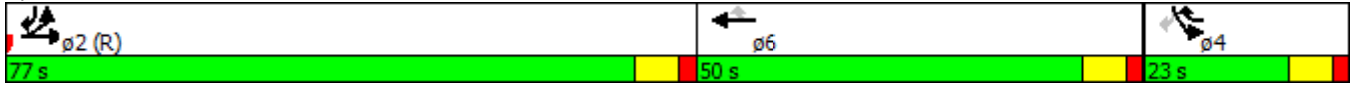
4/10/2015

Intersection Capacity Utilization 57.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 45: NC 751 & Erwin Rd.



Lanes, Volumes, Timings

46: Erwin Rd. & Morreene Rd./Towerview Dr.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	342	677	155	11	141	18	230	795	160	43	229	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	9	11	11	11	11	10	10	12	11	10
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	250		250	0		200	200		200	150		300
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1661	1809	1384	1661	1748	1486	1661	3207	1435	1718	3322	1435
Flt Permitted	0.493			0.163			0.950			0.950		
Satd. Flow (perm)	862	1809	1384	285	1748	1486	1661	3207	1435	1718	3322	1435
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131			131			131			248
Link Speed (mph)		35			25			35			35	
Link Distance (ft)		966			990			1006			1211	
Travel Time (s)		18.8			27.0			19.6			23.6	
Lane Group Flow (vph)	380	752	172	12	157	20	256	883	178	48	254	248
Turn Type	pm+pt	NA	Perm	Perm	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8	1	5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Total Split (s)	32.0	78.0	78.0	46.0	46.0	14.0	33.0	58.0	58.0	14.0	39.0	39.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Act Effct Green (s)	69.2	69.2	69.2	37.8	37.8	46.8	26.9	59.6	59.6	9.0	38.9	38.9
Actuated g/C Ratio	0.46	0.46	0.46	0.25	0.25	0.31	0.18	0.40	0.40	0.06	0.26	0.26
v/c Ratio	0.71	0.90	0.24	0.17	0.36	0.04	0.86	0.69	0.27	0.47	0.29	0.45
Control Delay	35.8	52.1	7.0	48.8	47.9	0.1	84.6	39.9	8.0	105.9	60.2	24.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.8	52.1	7.0	48.8	47.9	0.1	84.6	39.9	8.0	105.9	60.2	24.1
LOS	D	D	A	D	D	A	F	D	A	F	E	C
Approach Delay		41.4			42.9			44.2			47.9	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	246	643	21	9	125	0	254	428	55	48	124	89
Queue Length 95th (ft)	336	837	65	30	191	0	m#374	513	m53	m87	m173	m170
Internal Link Dist (ft)		886			910			926			1131	
Turn Bay Length (ft)	250		250			200	200		200	150		300
Base Capacity (vph)	541	880	740	77	477	553	310	1274	649	103	862	556
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.85	0.23	0.16	0.33	0.04	0.83	0.69	0.27	0.47	0.29	0.45

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	83 (55%), Referenced to phase 2:NBT and 6:SBT, Start of 1st Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.90
Intersection Signal Delay:	43.7
Intersection LOS:	D

Lanes, Volumes, Timings

46: Erwin Rd. & Morreene Rd./Towerview Dr.

4/10/2015

Intersection Capacity Utilization 85.9%

ICU Level of Service E

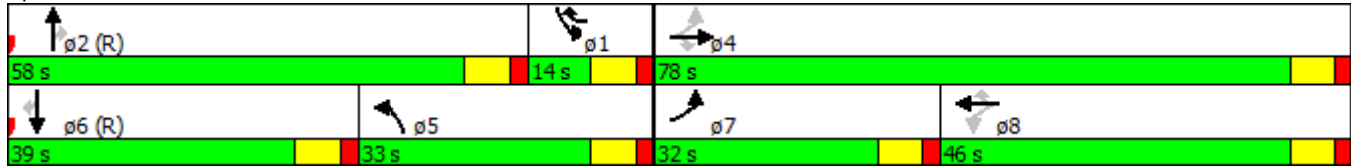
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 46: Erwin Rd. & Morreene Rd./Towerview Dr.



Lanes, Volumes, Timings
 47: LaSalle St. & Erwin Rd.

4/10/2015

Intersection Capacity Utilization 74.1%

ICU Level of Service D

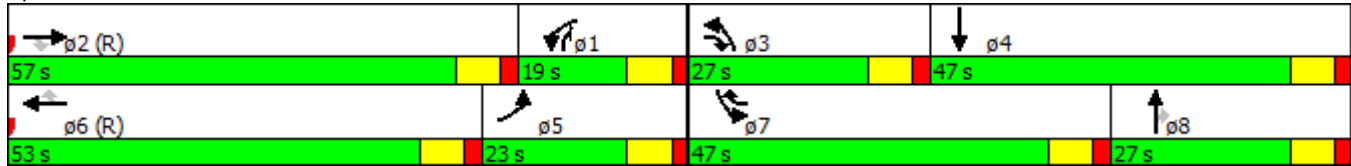
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 47: LaSalle St. & Erwin Rd.



Lanes, Volumes, Timings

48: Research Dr./Douglas St. & Erwin Rd.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	465	503	312	282	551	72	69	9	197	120	31	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	10	10	11	10	9	11	10	9	10	10	10
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	240		180	180		180	240		240	290		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1718	3207	1435	1661	3207	1384	1661	1688	1384	1604	1688	1435
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1718	3207	1435	1661	3207	1384	1661	1688	1384	1604	1688	1435
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			347			131			179			80
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		592			805			791			718	
Travel Time (s)		11.5			15.7			21.6			19.6	
Lane Group Flow (vph)	517	559	347	313	612	80	77	10	219	133	34	78
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5
Permitted Phases			2			6			8			4
Total Split (s)	57.0	50.0	27.0	46.0	39.0	27.0	27.0	27.0	46.0	27.0	27.0	57.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Act Effct Green (s)	49.3	68.3	84.3	38.3	57.3	82.8	15.0	9.4	42.2	22.5	11.2	58.7
Actuated g/C Ratio	0.33	0.46	0.56	0.26	0.38	0.55	0.10	0.06	0.28	0.15	0.07	0.39
v/c Ratio	0.92	0.38	0.36	0.74	0.50	0.10	0.46	0.10	0.42	0.55	0.27	0.13
Control Delay	52.1	35.6	6.6	47.7	33.8	1.9	72.4	68.1	8.0	68.2	70.1	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.1	35.6	6.6	47.7	33.8	1.9	72.4	68.1	8.0	68.2	70.1	3.0
LOS	D	D	A	D	C	A	E	E	A	E	E	A
Approach Delay		34.5			35.6			26.2				47.7
Approach LOS		C			D			C				D
Queue Length 50th (ft)	523	214	50	266	172	1	73	10	30	115	32	0
Queue Length 95th (ft)	m#556	m324	m91	387	230	12	125	30	57	197	69	19
Internal Link Dist (ft)		512			725			711			638	
Turn Bay Length (ft)	240		180	180		180	240		240	290		
Base Capacity (vph)	595	1459	996	454	1224	823	243	247	540	261	247	634
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.38	0.35	0.69	0.50	0.10	0.32	0.04	0.41	0.51	0.14	0.12

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	110 (73%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.92
Intersection Signal Delay:	35.1
Intersection LOS:	D

Lanes, Volumes, Timings

48: Research Dr./Douglas St. & Erwin Rd.

4/10/2015

Intersection Capacity Utilization 66.8%

ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 48: Research Dr./Douglas St. & Erwin Rd.



Lanes, Volumes, Timings

49: Eye Care Center/Durham VA Med. Ctr. & Erwin Rd.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	68	712	40	94	964	197	7	0	33	90	1	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	10	8	12	10	10	12	12	12	12	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	135		110	145		0	60		0	50		0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1661	3207	1332	1718	3207	1435	1718	1537	0	1718	1546	0
Flt Permitted	0.950			0.950			0.739			0.733		
Satd. Flow (perm)	1661	3207	1332	1718	3207	1435	1337	1537	0	1326	1546	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			80			219		329				27
Link Speed (mph)		35			35			10				10
Link Distance (ft)		805			817			486				516
Travel Time (s)		15.7			15.9			33.1				35.2
Lane Group Flow (vph)	76	791	44	104	1071	219	8	37	0	100	28	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8				4
Permitted Phases			2			6	8			4		
Total Split (s)	24.0	89.0	89.0	27.0	92.0	92.0	34.0	34.0		34.0	34.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Act Effct Green (s)	14.2	99.1	99.1	17.2	102.1	102.1	18.7	18.7		18.7	18.7	
Actuated g/C Ratio	0.09	0.66	0.66	0.11	0.68	0.68	0.12	0.12		0.12	0.12	
v/c Ratio	0.49	0.37	0.05	0.53	0.49	0.21	0.05	0.08		0.61	0.13	
Control Delay	78.6	5.2	0.3	66.7	5.7	0.6	54.9	0.3		76.6	19.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	78.6	5.2	0.3	66.7	5.7	0.6	54.9	0.3		76.6	19.7	
LOS	E	A	A	E	A	A	D	A		E	B	
Approach Delay		11.1			9.5			10.0				64.2
Approach LOS		B			A			B				E
Queue Length 50th (ft)	77	80	0	102	97	0	7	0		94	1	
Queue Length 95th (ft)	133	134	m3	165	204	10	24	0		153	31	
Internal Link Dist (ft)		725			737			406				436
Turn Bay Length (ft)	135		110	145			60			50		
Base Capacity (vph)	210	2119	907	251	2183	1046	258	562		256	320	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.36	0.37	0.05	0.41	0.49	0.21	0.03	0.07		0.39	0.09	

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 94 (63%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.61
 Intersection Signal Delay: 12.9 Intersection LOS: B

Lanes, Volumes, Timings

49: Eye Care Center/Durham VA Med. Ctr. & Erwin Rd.

4/10/2015

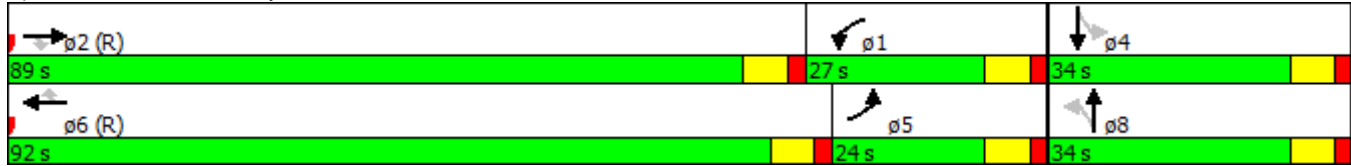
Intersection Capacity Utilization 56.6%

ICU Level of Service B

Analysis Period (min) 15

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

Splits and Phases: 49: Eye Care Center/Durham VA Med. Ctr. & Erwin Rd.



Lanes, Volumes, Timings

50: Duke Hospital/Fulton St. & Erwin Rd.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	278	507	50	36	478	20	63	96	81	222	34	714
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	12	12	14	11	11	13	13	13	10	11	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	500		0	195		0	0		0	155		0
Storage Lanes	2		0	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	3556	3388	0	1833	3302	0	1775	1740	0	1604	1748	2706
Flt Permitted	0.950			0.950			0.732			0.291		
Satd. Flow (perm)	3556	3388	0	1833	3302	0	1368	1740	0	491	1748	2706
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			3			25				325
Link Speed (mph)		35			35			10			35	
Link Distance (ft)		817			590			435			378	
Travel Time (s)		15.9			11.5			29.7			7.4	
Lane Group Flow (vph)	309	619	0	40	553	0	70	197	0	247	38	793
Turn Type	Prot	NA		Prot	NA		pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases							8			4		4
Total Split (s)	32.0	65.0		15.0	48.0		14.0	35.0		35.0	56.0	32.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Act Effct Green (s)	25.8	73.2		9.7	54.3		31.4	22.3		54.9	43.6	70.4
Actuated g/C Ratio	0.17	0.49		0.06	0.36		0.21	0.15		0.37	0.29	0.47
v/c Ratio	0.50	0.37		0.34	0.46		0.23	0.70		0.64	0.07	0.55
Control Delay	46.0	11.0		68.0	27.1		33.0	65.8		50.5	37.5	14.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		1.4	0.0	0.1
Total Delay	46.0	11.0		68.0	27.1		33.0	65.8		51.9	37.5	14.8
LOS	D	B		E	C		C	E		D	D	B
Approach Delay		22.7			29.8			57.2			24.1	
Approach LOS		C			C			E			C	
Queue Length 50th (ft)	157	91		41	132		44	163		150	22	131
Queue Length 95th (ft)	204	88		84	184		73	238		233	m41	191
Internal Link Dist (ft)		737			510			355			298	
Turn Bay Length (ft)	500			195						155		
Base Capacity (vph)	640	1658		122	1197		311	368		402	594	1444
Starvation Cap Reductn	0	0		0	0		0	0		49	0	109
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.48	0.37		0.33	0.46		0.23	0.54		0.70	0.06	0.59

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	100 (67%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.70
Intersection Signal Delay:	27.9
Intersection LOS:	C

Lanes, Volumes, Timings

50: Duke Hospital/Fulton St. & Erwin Rd.

4/10/2015

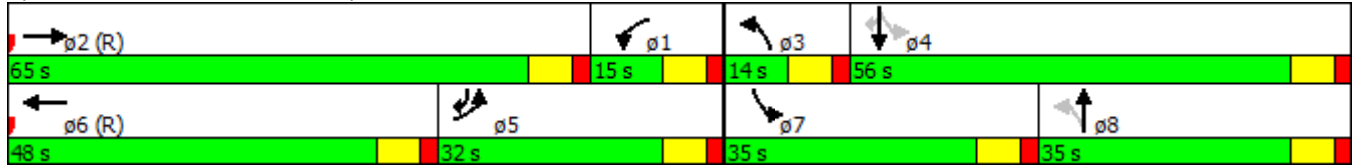
Intersection Capacity Utilization 60.7%

ICU Level of Service B

Analysis Period (min) 15

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

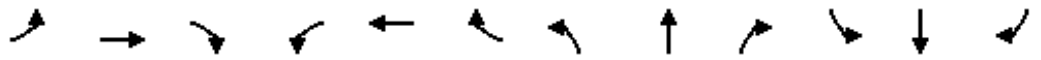
Splits and Phases: 50: Duke Hospital/Fulton St. & Erwin Rd.



Lanes, Volumes, Timings

51: Fulton St. & VA Med. Ctr./Elba St.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	17	14	444	71	326	12	195	187	381	512	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	13	11	11	11	11	11	11	11	11	11	11	11
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	125		0	130		0	100		130	200		35
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1775	1628	0	1578	1603	1486	1661	3322	1486	1661	3322	1486
Flt Permitted	0.950			0.950	0.965		0.438			0.545		
Satd. Flow (perm)	1775	1628	0	1578	1603	1486	766	3322	1486	953	3322	1486
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16				362			208			68
Link Speed (mph)		10			25			35				35
Link Distance (ft)		446			865			378				745
Travel Time (s)		30.4			23.6			7.4				14.5
Lane Group Flow (vph)	27	35	0	286	286	362	13	217	208	423	569	113
Turn Type	Split	NA		Split	NA	pm+ov	Perm	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	4	4		8	8	1		2	8	1	6	4
Permitted Phases						8	2		2	6		6
Total Split (s)	37.0	37.0		43.0	43.0	44.0	26.0	26.0	43.0	44.0	70.0	37.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Act Effct Green (s)	10.4	10.4		36.6	36.6	72.4	52.2	52.2	88.8	88.0	88.0	103.4
Actuated g/C Ratio	0.07	0.07		0.24	0.24	0.48	0.35	0.35	0.59	0.59	0.59	0.69
v/c Ratio	0.22	0.28		0.74	0.73	0.40	0.05	0.19	0.22	0.60	0.29	0.11
Control Delay	69.6	46.9		63.6	62.6	2.4	17.9	15.8	1.8	23.2	17.3	4.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Delay	69.6	46.9		63.6	62.6	2.4	17.9	15.8	1.9	23.2	17.3	4.6
LOS	E	D		E	E	A	B	B	A	C	B	A
Approach Delay		56.8			39.5			9.3			18.3	
Approach LOS		E			D			A			B	
Queue Length 50th (ft)	26	18		274	273	0	3	32	12	218	138	13
Queue Length 95th (ft)	58	56		351	349	33	m8	72	208	381	222	43
Internal Link Dist (ft)		366			785			298			665	
Turn Bay Length (ft)	125			130			100		130	200		35
Base Capacity (vph)	378	359		427	434	978	266	1156	998	751	1948	1249
Starvation Cap Reductn	0	0		0	0	0	0	0	177	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.10		0.67	0.66	0.37	0.05	0.19	0.25	0.56	0.29	0.09

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	115 (77%), Referenced to phase 2:NBTL and 6:SBTL, Start of 1st Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.74
Intersection Signal Delay:	25.5
Intersection LOS:	C

Lanes, Volumes, Timings

51: Fulton St. & VA Med. Ctr./Elba St.

4/10/2015

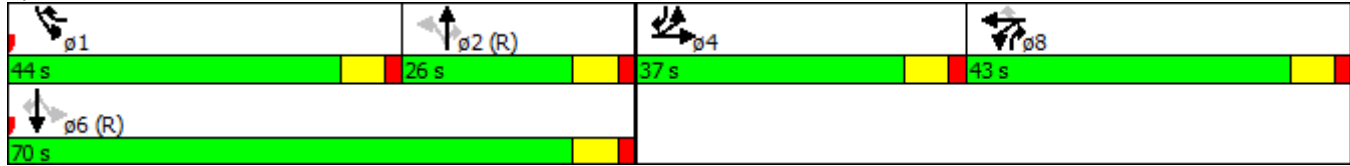
Intersection Capacity Utilization 62.8%

ICU Level of Service B

Analysis Period (min) 15

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

Splits and Phases: 51: Fulton St. & VA Med. Ctr./Elba St.



Lanes, Volumes, Timings
 52: Emergency Dr. & Erwin Rd.

4/10/2015

Intersection Capacity Utilization 36.8% ICU Level of Service A

Analysis Period (min) 15

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

Splits and Phases: 52: Emergency Dr. & Erwin Rd.



Lanes, Volumes, Timings

53: Trent Dr. & Elba St./NC 147 On Ramp

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑					↖		↗		↑	↗
Volume (vph)	0	224	266	0	0	0	126	0	175	1	439	910
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	16	16	12
Grade (%)		2%			2%			2%			2%	
Satd. Flow (prot)	0	3158	0	0	0	0	1718	0	1537	0	2050	1537
Flt Permitted							0.950					
Satd. Flow (perm)	0	3158	0	0	0	0	1718	0	1537	0	2050	1537
Link Speed (mph)		25			50			35			35	
Link Distance (ft)		256			306			455			695	
Travel Time (s)		7.0			4.2			8.9			13.5	
Lane Group Flow (vph)	0	545	0	0	0	0	140	0	194	0	489	1011
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	70.0%
	ICU Level of Service C
Analysis Period (min)	15

Lanes, Volumes, Timings
54: Trent Dr. & Erwin Rd.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	420	230	138	340	132	84	63	33	398	182	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	11	11	11	11	11	11	11	11
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	240		200	155		200	325		0	0		160
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	3333	3146	0	1718	3182	0	3222	1657	0	1661	1748	1486
Flt Permitted	0.950			0.950			0.950			0.419		
Satd. Flow (perm)	3333	3146	0	1718	3182	0	3222	1657	0	733	1748	1486
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		69			41			15				182
Link Speed (mph)		35			35			25			35	
Link Distance (ft)		396			365			563			455	
Travel Time (s)		7.7			7.1			15.4			8.9	
Lane Group Flow (vph)	194	723	0	153	525	0	93	107	0	442	202	139
Turn Type	Prot	NA		Prot	NA		Prot	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases										4		4
Total Split (s)	19.0	48.0		27.0	56.0		14.0	27.0		48.0	61.0	61.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Act Effct Green (s)	13.6	50.4		21.6	58.4		9.0	16.6		62.9	48.9	48.9
Actuated g/C Ratio	0.09	0.34		0.14	0.39		0.06	0.11		0.42	0.33	0.33
v/c Ratio	0.64	0.66		0.62	0.42		0.48	0.55		0.79	0.35	0.23
Control Delay	60.7	32.2		57.2	19.6		77.0	63.5		44.3	39.1	2.2
Queue Delay	0.0	1.1		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	60.7	33.3		57.2	19.6		77.0	63.5		44.3	39.1	2.2
LOS	E	C		E	B		E	E		D	D	A
Approach Delay		39.1			28.1			69.8			35.5	
Approach LOS		D			C			E			D	
Queue Length 50th (ft)	95	162		145	108		46	87		336	150	0
Queue Length 95th (ft)	134	174		223	158		78	147		423	208	18
Internal Link Dist (ft)		316			285			483			375	
Turn Bay Length (ft)	240			155			325					160
Base Capacity (vph)	311	1103		251	1264		193	255		573	652	668
Starvation Cap Reductn	0	174		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.62	0.78		0.61	0.42		0.48	0.42		0.77	0.31	0.21

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	97 (65%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.79
Intersection Signal Delay:	37.5
Intersection LOS:	D

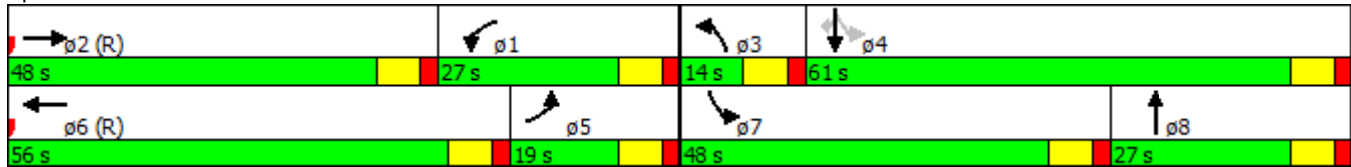
Lanes, Volumes, Timings
 54: Trent Dr. & Erwin Rd.

4/10/2015

Intersection Capacity Utilization 71.2%
 Analysis Period (min) 15

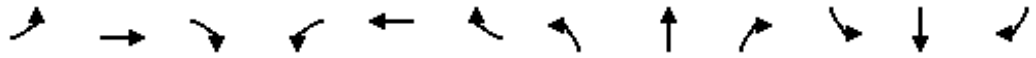
ICU Level of Service C

Splits and Phases: 54: Trent Dr. & Erwin Rd.



Lanes, Volumes, Timings
55: Flowers Dr. & Erwin Rd.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑				↗			↗
Volume (vph)	0	536	315	240	600	35	0	0	29	0	0	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	11	11	12	12	10	12	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	0		0	150		0	0		0	0		0
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3139	0	1718	3295	0	0	0	1460	0	0	1564
Flt Permitted				0.950								
Satd. Flow (perm)	0	3139	0	1718	3295	0	0	0	1460	0	0	1564
Link Speed (mph)		35			35			25				25
Link Distance (ft)		365			970			710				190
Travel Time (s)		7.1			18.9			19.4				5.2
Lane Group Flow (vph)	0	946	0	267	706	0	0	0	32	0	0	11
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 44.9%	ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
 56: Anderson St. & Erwin Rd.

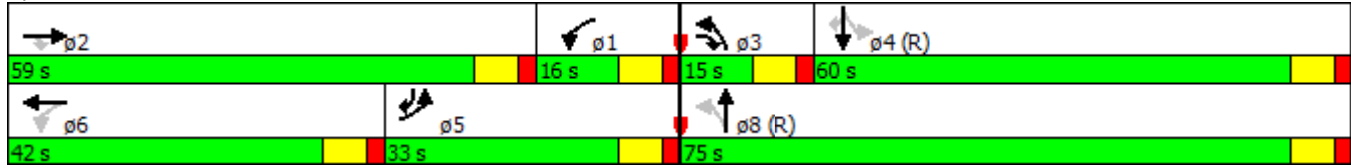
4/10/2015

Intersection Capacity Utilization 66.0% ICU Level of Service C

Analysis Period (min) 15

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

Splits and Phases: 56: Anderson St. & Erwin Rd.



Lanes, Volumes, Timings

57: Anderson St./15th St. & W. Main St.

4/10/2015

Intersection Capacity Utilization 89.8%

ICU Level of Service E

Analysis Period (min) 15

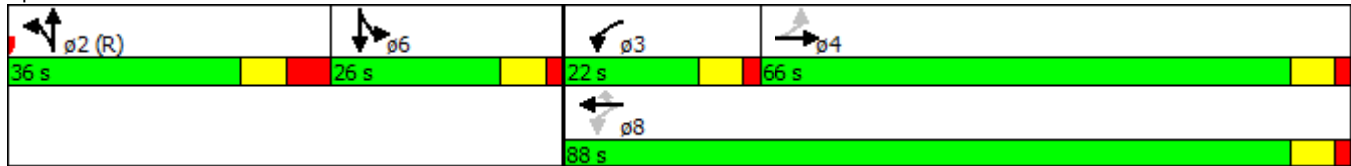
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 57: Anderson St./15th St. & W. Main St.



Synchro Output-2040 Build PM

Lanes, Volumes, Timings

45: NC 751 & Erwin Rd.

4/10/2015

Intersection Capacity Utilization 74.9%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

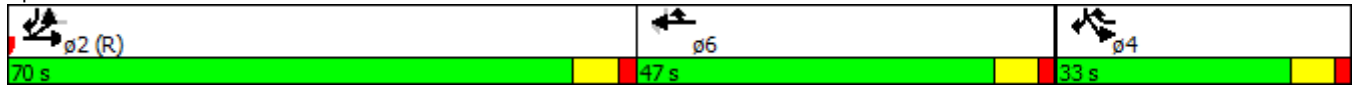
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 45: NC 751 & Erwin Rd.



Lanes, Volumes, Timings

46: Erwin Rd. & Morreene Rd./Towerview Dr.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	219	205	181	178	517	140	142	326	42	103	831	341
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	9	11	11	11	11	10	10	12	11	10
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	250		250	0		200	200		200	150		300
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1661	1809	1384	1661	1748	1486	1661	3207	1435	1718	3322	1435
Flt Permitted	0.105			0.524			0.950			0.950		
Satd. Flow (perm)	184	1809	1384	916	1748	1486	1661	3207	1435	1718	3322	1435
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			201			114			131			248
Link Speed (mph)		35			25			35				35
Link Distance (ft)		966			990			1006				1211
Travel Time (s)		18.8			27.0			19.6				23.6
Lane Group Flow (vph)	243	228	201	198	574	156	158	362	47	114	923	379
Turn Type	pm+pt	NA	Perm	pm+pt	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Total Split (s)	17.0	59.0	59.0	16.0	58.0	25.0	20.0	50.0	50.0	25.0	55.0	55.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Act Effct Green (s)	66.0	54.0	54.0	64.0	53.0	73.0	15.0	45.0	45.0	20.0	50.0	50.0
Actuated g/C Ratio	0.44	0.36	0.36	0.43	0.35	0.49	0.10	0.30	0.30	0.13	0.33	0.33
v/c Ratio	1.22	0.35	0.32	0.44	0.93	0.20	0.95	0.38	0.09	0.50	0.83	0.59
Control Delay	166.2	37.1	5.4	28.7	69.5	4.5	119.5	27.3	2.2	53.6	21.8	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	166.2	37.1	5.4	28.7	69.5	4.5	119.5	27.3	2.2	53.6	21.8	3.8
LOS	F	D	A	C	E	A	F	C	A	D	C	A
Approach Delay		74.3			49.9			50.9				19.6
Approach LOS		E			D			D				B
Queue Length 50th (ft)	~223	163	0	116	540	15	162	147	5	118	325	36
Queue Length 95th (ft)	#406	239	55	173	#773	43	#311	196	17	m136	m387	m40
Internal Link Dist (ft)		886			910			926			1131	
Turn Bay Length (ft)	250		250			200	200		200	150		300
Base Capacity (vph)	199	651	626	445	617	781	166	962	522	229	1107	643
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.22	0.35	0.32	0.44	0.93	0.20	0.95	0.38	0.09	0.50	0.83	0.59

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	143 (95%), Referenced to phase 2:NBT and 6:SBT, Start of 1st Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.22
Intersection Signal Delay:	42.6
Intersection LOS:	D

Lanes, Volumes, Timings

46: Erwin Rd. & Morreene Rd./Towerview Dr.

4/10/2015

Intersection Capacity Utilization 86.8%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

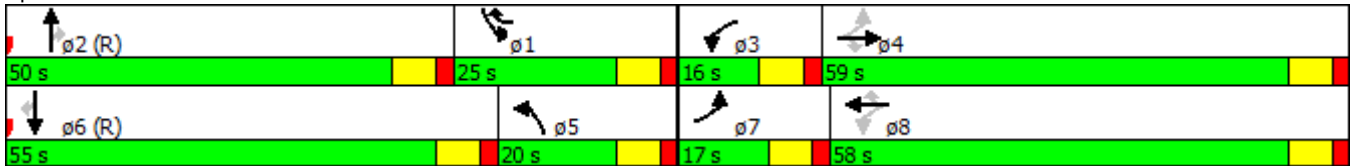
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 46: Erwin Rd. & Morreene Rd./Towerview Dr.



Lanes, Volumes, Timings
 47: LaSalle St. & Erwin Rd.

4/10/2015

Intersection Capacity Utilization 81.5%

ICU Level of Service D

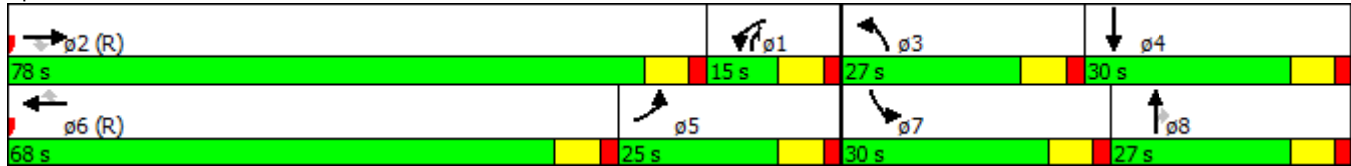
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

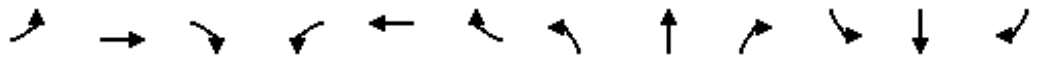
Splits and Phases: 47: LaSalle St. & Erwin Rd.



Lanes, Volumes, Timings

48: Research Dr./Douglas St. & Erwin Rd.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Volume (vph)	145	562	68	152	873	35	259	30	449	214	13	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	10	10	11	10	9	11	10	9	10	10	10
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	240		180	180		180	240		240	290		0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1718	3207	1435	1661	3207	1384	1661	1688	1384	1604	1688	1435
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1718	3207	1435	1661	3207	1384	1661	1688	1384	1604	1688	1435
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131			131			114			80
Link Speed (mph)		35			35			25				25
Link Distance (ft)		592			805			791				718
Travel Time (s)		11.5			15.7			21.6				19.6
Lane Group Flow (vph)	161	624	76	169	970	39	288	33	499	238	14	337
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases			2			6			8			4
Total Split (s)	23.0	50.0	50.0	30.0	57.0	57.0	36.0	38.0	30.0	32.0	34.0	23.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Act Effct Green (s)	18.0	70.1	70.1	25.0	77.1	77.1	33.9	11.3	34.5	26.4	9.4	22.0
Actuated g/C Ratio	0.12	0.47	0.47	0.17	0.51	0.51	0.23	0.08	0.23	0.18	0.06	0.15
v/c Ratio	0.78	0.42	0.10	0.61	0.59	0.05	0.77	0.26	1.23	0.84	0.13	1.21
Control Delay	77.2	28.1	4.4	52.3	13.3	0.1	68.7	69.5	150.8	85.2	69.0	155.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.2	28.1	4.4	52.3	13.3	0.1	68.7	69.5	150.8	85.2	69.0	155.7
LOS	E	C	A	D	B	A	E	E	F	F	E	F
Approach Delay		35.2			18.4			118.7				125.2
Approach LOS		D			B			F				F
Queue Length 50th (ft)	129	183	6	154	145	0	246	31	~406	227	13	~367
Queue Length 95th (ft)	m#206	m209	m13	242	122	m0	#429	67	#559	#368	38	#371
Internal Link Dist (ft)		512			725			711			638	
Turn Bay Length (ft)	240		180	180		180	240		240	290		
Base Capacity (vph)	206	1498	740	276	1648	774	389	371	405	288	326	279
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.42	0.10	0.61	0.59	0.05	0.74	0.09	1.23	0.83	0.04	1.21

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 49 (33%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.23
 Intersection Signal Delay: 64.7
 Intersection LOS: E

Lanes, Volumes, Timings

48: Research Dr./Douglas St. & Erwin Rd.

4/10/2015

Intersection Capacity Utilization 69.7%

ICU Level of Service C

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

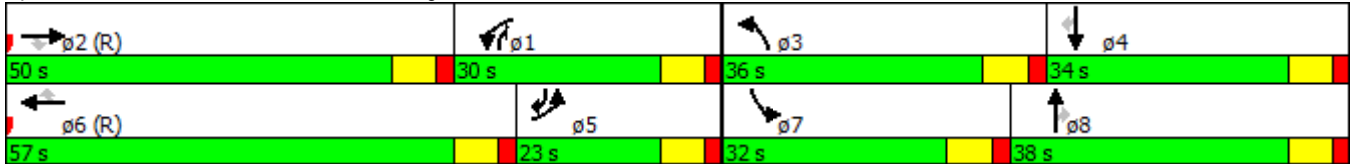
Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 48: Research Dr./Douglas St. & Erwin Rd.



Lanes, Volumes, Timings

49: Eye Care Center/Durham VA Med. Ctr. & Erwin Rd.

4/10/2015

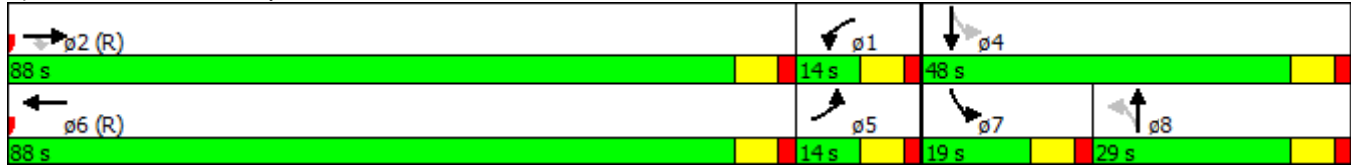
Intersection Capacity Utilization 52.7%

ICU Level of Service A

Analysis Period (min) 15

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

Splits and Phases: 49: Eye Care Center/Durham VA Med. Ctr. & Erwin Rd.



Lanes, Volumes, Timings

50: Duke Hospital/Fulton St. & Erwin Rd.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	421	853	56	51	734	40	33	59	38	84	73	323
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	12	12	14	11	11	13	13	13	10	11	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	500		0	195		0	0		0	155		0
Storage Lanes	2		0	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	3556	3406	0	1833	3295	0	1775	1761	0	1604	1748	2706
Flt Permitted	0.950			0.950			0.673			0.566		
Satd. Flow (perm)	3556	3406	0	1833	3295	0	1258	1761	0	955	1748	2706
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			4			18				132
Link Speed (mph)		35			35			10			35	
Link Distance (ft)		817			590			435			378	
Travel Time (s)		15.9			11.5			29.7			7.4	
Lane Group Flow (vph)	468	1010	0	57	860	0	37	108	0	93	81	359
Turn Type	Prot	NA		Prot	NA		Perm	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6			8		7	4	5
Permitted Phases							8			4		4
Total Split (s)	33.0	82.0		17.0	66.0		30.0	30.0		21.0	51.0	33.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Act Effct Green (s)	26.3	97.3		11.1	79.2		15.4	15.4		29.4	29.4	60.8
Actuated g/C Ratio	0.18	0.65		0.07	0.53		0.10	0.10		0.20	0.20	0.41
v/c Ratio	0.75	0.46		0.42	0.49		0.29	0.55		0.41	0.24	0.31
Control Delay	60.5	4.3		75.2	24.1		66.1	62.8		68.4	60.4	25.1
Queue Delay	0.0	0.0		0.0	0.4		0.0	0.0		0.0	0.0	0.0
Total Delay	60.5	4.3		75.2	24.5		66.1	62.8		68.4	60.4	25.1
LOS	E	A		E	C		E	E		E	E	C
Approach Delay		22.1			27.6			63.7			38.0	
Approach LOS		C			C			E			D	
Queue Length 50th (ft)	247	68		54	325		34	85		87	76	124
Queue Length 95th (ft)	307	78		106	423		70	146		143	129	175
Internal Link Dist (ft)		737			510			355			298	
Turn Bay Length (ft)	500			195						155		
Base Capacity (vph)	663	2211		146	1742		209	308		301	536	1162
Starvation Cap Reductn	0	0		0	366		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.71	0.46		0.39	0.63		0.18	0.35		0.31	0.15	0.31

Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 150
 Offset: 37 (25%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 28.5 Intersection LOS: C

Lanes, Volumes, Timings

50: Duke Hospital/Fulton St. & Erwin Rd.

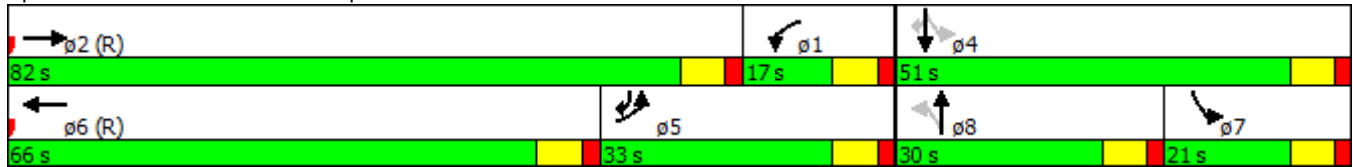
4/10/2015

Intersection Capacity Utilization 57.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 50: Duke Hospital/Fulton St. & Erwin Rd.



Lanes, Volumes, Timings

51: Fulton St. & VA Med. Ctr./Elba St.

4/10/2015

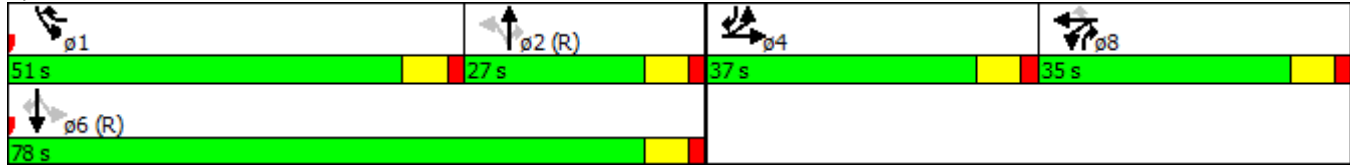
Intersection Capacity Utilization 63.2%

ICU Level of Service B

Analysis Period (min) 15

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

Splits and Phases: 51: Fulton St. & VA Med. Ctr./Elba St.



Lanes, Volumes, Timings
 52: Emergency Dr. & Erwin Rd.

4/10/2015

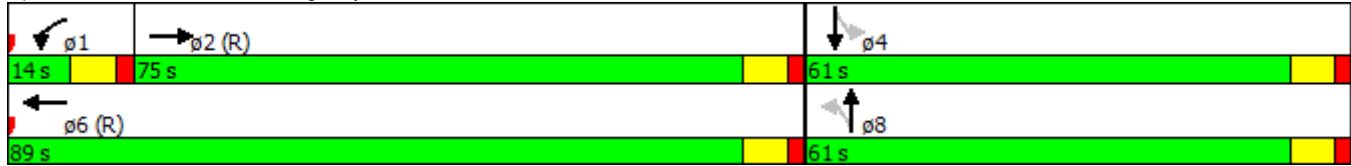
Intersection Capacity Utilization 64.3%

ICU Level of Service C

Analysis Period (min) 15

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

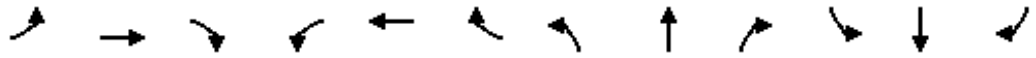
Splits and Phases: 52: Emergency Dr. & Erwin Rd.



Lanes, Volumes, Timings

53: Trent Dr. & Elba St./NC 147 On Ramp

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑					↑		↑		↑	↑
Volume (vph)	0	474	116	0	0	0	370	0	645	1	229	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	16	16	12
Grade (%)		2%			2%			2%			2%	
Satd. Flow (prot)	0	3337	0	0	0	0	1718	0	1537	0	2050	1537
Flt Permitted							0.950					
Satd. Flow (perm)	0	3337	0	0	0	0	1718	0	1537	0	2050	1537
Link Speed (mph)		25			50			35			35	
Link Distance (ft)		256			306			455			695	
Travel Time (s)		7.0			4.2			8.9			13.5	
Lane Group Flow (vph)	0	656	0	0	0	0	411	0	717	0	255	167
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	78.9%
ICU Level of Service	D
Analysis Period (min)	15

Lanes, Volumes, Timings
 54: Trent Dr. & Erwin Rd.

4/10/2015

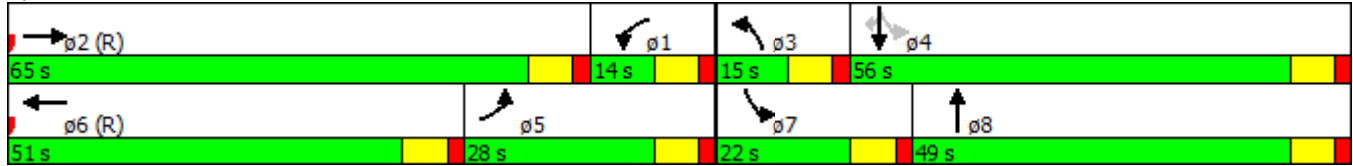
Intersection Capacity Utilization 74.5%

ICU Level of Service D

Analysis Period (min) 15

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

Splits and Phases: 54: Trent Dr. & Erwin Rd.



Lanes, Volumes, Timings
55: Flowers Dr. & Erwin Rd.

4/10/2015



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑				↗			↗
Volume (vph)	0	965	2	78	783	9	0	0	345	0	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	11	11	12	12	10	12	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	0		0	150		0	0		0	0		0
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3322	0	1718	3315	0	0	0	1460	0	0	1564
Flt Permitted				0.950								
Satd. Flow (perm)	0	3322	0	1718	3315	0	0	0	1460	0	0	1564
Link Speed (mph)		35			35			25				25
Link Distance (ft)		365			970			710				190
Travel Time (s)		7.1			18.9			19.4				5.2
Lane Group Flow (vph)	0	1074	0	87	880	0	0	0	383	0	0	2
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.8%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
 56: Anderson St. & Erwin Rd.

4/10/2015

Intersection Capacity Utilization 91.8% ICU Level of Service F

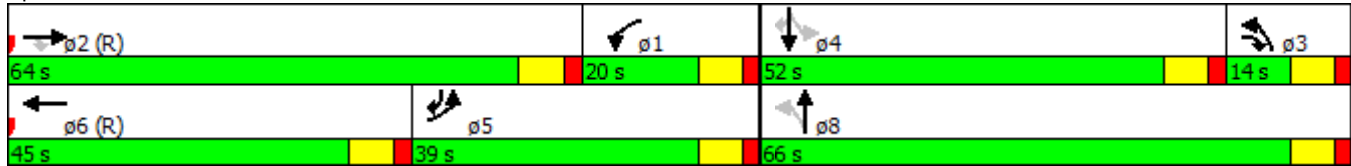
Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

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

Splits and Phases: 56: Anderson St. & Erwin Rd.



Lanes, Volumes, Timings

57: Anderson St./15th St. & W. Main St.

4/10/2015

Intersection Capacity Utilization 97.0%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 57: Anderson St./15th St. & W. Main St.

