DIN 01607

University Drive 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 Transit Regional Demand Model
TSM	Transportation System Management
UNC	University of North Carolina
US	United States
VA	Veteran Affairs
WB	Westbound

1. Executive Summary

The study segment in this University Drive Traffic Simulation Report is a 0.7-mile long corridor that runs parallel to Chapel Hill Boulevard in the South Square area of southwest Durham. The study segment extends along University Drive from Ivy Creek Boulevard in the southwest through to Shannon Road in the northeast. Two additional intersections on Pickett Road at Petty Road and Tower Boulevard were also analyzed in this report.

University Drive is a five-lane facility under City of Durham jurisdiction with two eastbound travel lanes and two westbound travel lanes with a center two-way left-turn lane. One LRT station is proposed near the intersection of University Drive and Martin Luther King Jr. Parkway. Three LRT alignment alternatives are proposed in the New Hope Creek area, however, the Locally Preferred Alternative (LPA) and the New Hope Creek Alternative 2 (NHC 2) have the same alignment along University Drive and therefore they are analyzed as one alternative for the purposes of the traffic analysis in this report. For the New Hope Creek 1 Alternative (NHC 1), the LRT runs along the eastern side of Martin Luther King Jr. Parkway from the north and then turns east along the north side of University Drive crossing Lyckan Parkway, and then transitions across the westbound University Drive lanes at Westgate Drive to occupy the center of the roadway before turning north at Shannon Road and following adjacent to Tower Boulevard north to cross Pickett Road. Under the NHC 2 and NHC LPA Alternatives, the light rail alignment enters University Drive from the north at Ivy Creek Boulevard/Snowcrest Trail, transitions to the center of University Drive and then exits to the north at Shannon Road and follows adjacent to Tower Boulevard north to cross Pickett Road.

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

- Existing Conditions
- 2040 No-Build Conditions
- 2040 Build LRT Conditions Alternative 1 (NHC 1)
- 2040 Build LRT Conditions Alternative 2 (NHC 2/NHC LPA)

To address the vehicular traffic operations issues identified during the course of the Vissim analysis, this report recommends substantial roadway modifications such as additional through lanes on segments of University Drive and additional turn bays at intersections, which are presented in Table ES-1. With these modifications, the 2040 Build LRT Alternatives' Vissim results indicate that the majority of overall intersections will not result in traffic impacts according to NCDOT or City of Durham guidelines, and the majority of maximum queues would be contained within the proposed turn lanes as described in the following paragraphs.

It should be noted that the subject segment of University Drive is within an LRT station area and the station area is expected to be designated as a compact neighborhood with design district building standards. As such, it is important to balance roadway modifications to increase traffic capacity with the need to build a transportation network that is conducive to multi-modal travel, and is safe and inviting for people who are walking, riding bicycles, or riding transit both along University Drive and across it. Additional analyses and coordination with the City of Durham and NCDOT will be completed during the Engineering phase of the project in order to refine the recommendations contained in this report.

The Build LRT Alternatives Vissim analysis indicates that the anticipated delay and queue increases are primarily caused by three factors:

- Minimum green times and clearance intervals required increases for 2040 Build conditions due to larger intersection widths required to accommodate the LRT.
- Due to the proposed Park-and-Ride lot and multiple turn restrictions, future demand Build vehicular volumes will increase beyond the already substantial No-Build volumes for the eastbound University Drive left turn to Westgate Drive and several other critical movements at this intersection. These heavier build volumes are anticipated to worsen the bottleneck expected under No-Build Conditions along the University Drive corridor. Prior to the incorporation of mitigation measures, the eastbound University Drive left turn queues were observed to spill back to Martin Luther King Jr. Parkway and would frequently block the southbound Martin Luther King Jr. Parkway left turn and eastbound University Drive through traffic at Martin Luther King Jr. Parkway.
- Signal preemption events would interrupt signal coordination along University Drive due to LRT operations. The signal preemption that allows the LRT to travel through intersections without stopping would incur delay for conflicting movements; however, decreasing signal LRT priority by allowing LRV stops at signalized intersections would not noticeably improve vehicular operations as the same conflicting vehicular phases must be stopped during the LRT crossing.

As noted previously, the roadway modifications presented in Table ES-1 are recommended to address these traffic operations issues.

The overall intersection results of the No-Build versus Build Vissim analysis are shown in Table ES-2. The majority of intersections would operate in accordance with NCDOT and City of Durham standards under the Build LRT Alternatives with the roadway modifications recommended in Table ES-1. Only under the NHC 2/NHC LPA Alternative is a single overall intersection expected to be considered a traffic impact:

- University Drive at Martin Luther King Jr. Parkway (NHC 2/NHC LPA), which is expected to degrade from LOS D to LOS E in the AM peak hour

The Vissim results also indicate that the traffic impacts and operational efficiencies are comparable at most of the intersections along University Drive and Pickett Road between the NHC 1 and NHC 2/NHC LPA alternatives. There are several more individual movements that report delay and maximum queue impacts along University Drive at Ivy Creek Boulevard, Larchmont Road, and Martin Luther King Jr. Parkway due to the alignment of the LRT under NHC 2/NHC LPA Alternatives.

Maximum queues would exceed available storage in several locations; however these are considered infrequent occurrences and additional roadway modifications are not recommended at these locations due to the limited operational benefits that would require large capital expenditures via impractical right-of-way acquisitions and would further increase roadway widths. Many of the turn bay maximum queues would also be contained within their overall approaches' storage space and therefore would not impact upstream intersections. For both alternatives, the expected average queues would be accommodated by the available storage at all locations except for the westbound University Drive through movement at Martin Luther King Jr. Parkway in the PM peak hour for Alternative 1, the westbound University Drive right turn at Martin Luther King Jr. Parkway in the PM peak hour under Alternative 2, the southbound Martin Luther King Jr. Parkway left turn at University Drive in the AM

peak hour for Alternative 2, and the northbound Westgate Drive left turn at University Drive in the PM peak hour under Alternative 2. However, all of these average queue lengths mentioned above exceed the respective storage space by 10 feet or less.

As noted previously, extensive mitigation measures were incorporated into the LRT designs including additional University Drive through lanes and new turn bays, and additional roadway expansion is not recommended. Additional analysis of traffic impacts and the potential for additional traffic diversion from University Drive may be investigated during the Engineering phase of the project. In addition, proposed roadway modifications will be coordinated with the Durham City-County Planning Department during the Engineering phase to incorporate the forthcoming urban street standards for compact design districts. Other non-geometric mitigation strategies will also be explored by Triangle Transit and coordinated with the City of Durham, including evaluation and development of Travel Demand Management programs to encourage further mode shifts from personal automobiles to transit and non-motorized travel in the station areas.

Table ES-1: LRT Alternatives Proposed Roadway Modifications

Intersection	Roadway Modification
University Drive and Ivy Creek Boulevard/Snowcrest Trail (NHC 2 / NHC LPA)	Add eastbound University Dr through lane from Ivy Creek Blvd to Martin Luther King Jr. Pkwy. Restripe eastbound University Dr right turn lane to a shared eastbound through/right lane.
	Add a dedicated westbound University Dr right turn bay
Larchmont Road at University Drive (NHC 2 / NHC LPA)	Convert Larchmont Rd leg to right-in/right-out
	Prohibit eastbound University Dr left turn onto Larchmont Rd
	Construct connector between Snowcrest Trail and Larchmont Rd
University Drive and Martin Luther King Jr. Parkway	Extend westbound University Dr right lane upstream to commercial driveway west of Westgate Dr (NHC 1)
	Extend westbound University Dr right lane upstream to Westgate Shopping Center driveway (NHC 2 / NHC LPA)
University Drive and Lyckan Parkway	Convert Lyckan Pkwy and Parkway Plaza driveways to right-in/right-out only (NHC 2 / NHC LPA)
University Drive and Westgate Drive	Add second dedicated eastbound University Dr left turn bay
	Extend the outer eastbound University Dr left turn bay upstream to Martin Luther King Jr. Pkwy to create three eastbound lanes east of Martin Luther King Jr. Pkwy and four eastbound approach lanes at Westgate Dr
	Restripe the existing shared westbound University Dr through/right turn lane to a dedicated westbound through lane only
	Add dedicated westbound University Dr right lane and extend upstream to Westgate Shopping Center driveway
University Drive and Westgate Shopping Center	Convert north and south shopping center driveways to right-in/right-out only between Westgate Dr and Shannon Rd (impacts one leg on the north side and four legs on the south side of University Dr)
Pickett Road and Tower Boulevard	Signalize intersection
	Add dedicated northbound Tower Blvd right turn bay

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

Intersection	No-Build		NHC 1		NHC 2 / NHC LPA	
	AM	PM	AM	PM	AM	PM
University Drive at Snowcrest Trail/Ivy Creek Boulevard[2]	B	D	A	B	C	C
University Drive at Larchmont Road[2] (Unsignalized)	C	E	A	B	B	B
University Drive at Martin Luther King Parkway[1]	D	E	D	A	E	E
University Drive at Lyckan Parkway[2] (Unsignalized)	A	D	A	C	C	D
University Drive at Westgate Drive [2]	C	D	C	D	D	E
University Drive at Westgate Shopping Center[2] (Unsignalized)	A	E	A	D	A	D
University Drive at Shannon Road[2]	B	D	C	E	B	E
Pickett Road at Petty Road[2]	B	A	C	B	C	B
Pickett Road at Tower Boulevard[2] (Unsignalized to Signalized)	A	A	C	C	B	C

Footnote:

1 - NCDOT Traffic Impact Criteria is applied

2 - City of Durham Traffic Impact Criteria is applied

Indicates Traffic Impact

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 the North Carolina Railroad (NCRR) 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 NCRR 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 University Drive 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 purpose of this technical memorandum is to analyze the traffic operations for the University Drive section of the proposed D-O LRT in light of the policies identified in the *Traffic Analysis Methodology Report*.

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 improvements are necessary to accommodate that demand. As noted previously, improvements 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 any additional impacts caused by the proposed D-O LRT project.

2.4 University Drive Traffic Simulation Description

This report describes the approach and summarizes the findings and results of the traffic analysis conducted on the section of the D-O LRT alignment for the University Drive Segment. The study segment of University Drive is a 0.7-mile long corridor and includes four signalized intersections and three stop controlled intersections. In addition, two intersections along Pickett Road were also analyzed as part of this study. Figure 1 depicts the University Drive segment and study intersections in context with the regional transportation system.

Two LRT alternatives (NHC 1 and NHC 2/NHC LPA) are analyzed in the following:

- Crossing University Drive at Westgate Drive and Shannon Road (NHC 1)
- Crossing University Drive at Ivy Creek/Snowcrest Trail and Shannon Road (NHC 2/NHC LPA)
- LRT Station on University Drive east of Martin Luther King Jr. Parkway.
- Crossing of Pickett Road west of Tower Boulevard (both NHC 1 and NHC 2)

University Drive is a major corridor that runs next to US 15-501 and US 15-501 Business and serves local traffic within the South Square area in the City of Durham. Based on the preliminary designs shown in Appendix B, the NHC 1 Alternative would proceed south from US 15-501 towards University Drive along the eastern side of Martin Luther King Jr. Parkway, turning east to run along the north side of University Drive and crossing Lyckan Parkway. The LRT would cross the westbound University Drive lanes at Westgate Drive to run in the center of University Drive until Shannon Road, where the LRT would then proceed north along the eastern side of Shannon Road, continue north across 15-501 Business on elevated tracks and then run parallel to Tower Boulevard to cross Conifer Glen Lane and Pickett Road.

Under the NHC LPA Alternative and NHC 2 Alternative, the light rail alignment would intersect with University Drive at Ivy Creek Boulevard in the southwest side and leave the corridor at the intersection of University Drive and Shannon Road on the northeast side. The LRT alignment is to run in the center of University Drive between Ivy Creek Boulevard and Shannon Road. A total of seven intersections along University Drive would be impacted due to the implementation of the LRT. These intersections include University Drive at Ivy Creek Boulevard, Larchmont Road, Martin Luther King Jr. Parkway, Lyckan Parkway, Westgate Drive, Westgate Shopping Center, and Shannon Road.

In terms of the LRT's signal operation, for the purpose of this analysis it was assumed that traffic signals along University Drive, Shannon Road, and Pickett 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 University Drive, 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 (a traffic signal phase is the combination of movements running together at the same time). Transit signal preemption was used for this analysis because it provides the greatest travel time savings to the LRTs by providing reliable green phases along University Drive segment and is also the most conservative operation for general traffic. 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 accommodate transit vehicles, while preemption interrupts the normal process for special 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.

University Drive is a four lane divided facility. One LRT station is proposed for implementation along this section of the project. The LRT station is proposed to be located on University Drive at the east side of Martin Luther King Jr. Parkway. Figure 1 shows the study intersections, the LRT station alternatives along the University Drive segment, and the LRT alignments for the two Build options (NHC 1 and NHC 2/NHC LPA).

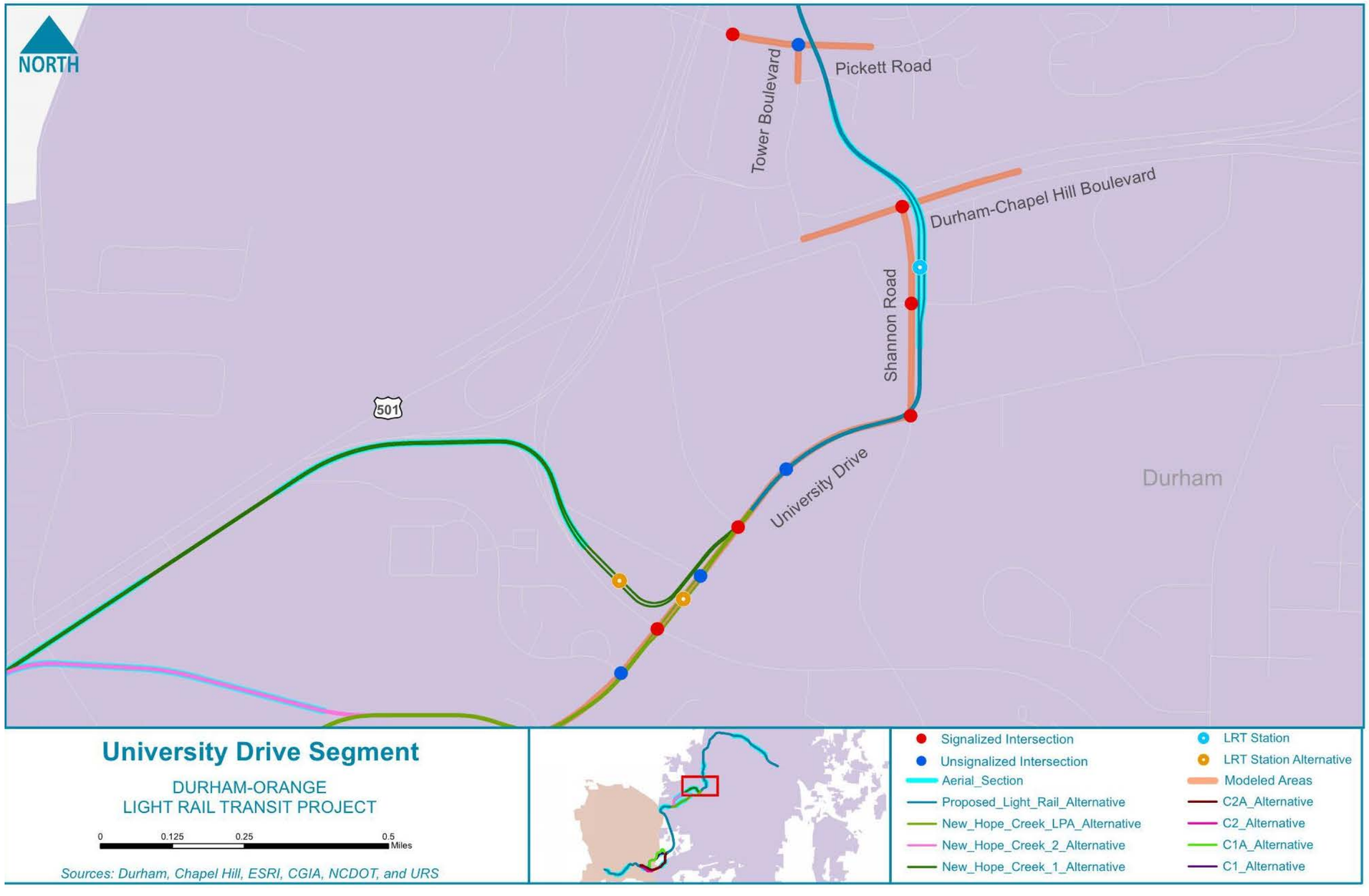
The following intersections were analyzed in the Vissim models:

- University Drive and Ivy Creek Boulevard/Snowcrest Trail (Signalized)
- University Drive and Larchmont Road (Unsignalized)
- University Drive and Martin Luther King Jr. Parkway (Signalized)
- University Drive and Lyckan Parkway (Unsignalized)
- University Drive and Westgate Drive (Signalized)
- University Drive and Westgate Shopping Center (Unsignalized)
- University Drive and Shannon Road (Signalized)

- Pickett Road and Petty Road (Signalized)
- Pickett Road and Tower Boulevard (Unsignalized)

The implementation of LRT along the University Drive corridor would require the reconstruction of the roadway with numerous specific design features from Ivy Creek Boulevard to Shannon Road.

Figure 1. University Drive Study Intersections



Synchro Version 8.0 was used to develop optimized signal timing plans for the signalized intersections for existing, 2040 No-Build and Build conditions.

To analyze the potential impacts brought by the LRT, Vissim micro-simulation models were developed to cover the area of the LRT corridor and the intersections of interest. The models aim to capture the direct impact of the LRT operation to the roadway system during both the 2040 weekday AM and PM peak hours. The LRT is assumed to enter the network from both eastbound and westbound directions concurrently and operate with 10 minute peak period frequencies. Every LRT train is assumed to have 20 seconds of dwell time at the Martin Luther King Jr. Parkway Station for passenger boarding and alighting. In this area, the LRT was assumed to operate at a speed of 30 mph with a 20 mph turning speed based on preliminary designs. In order to minimize LRT delay and improve LRT operational efficiency and schedule adherence, a signal preemption system was configured so that the light rail vehicles would pass the signalized intersections along the University Drive segment without a stop.

3. Analysis Scenarios

Four scenarios were analyzed for this study including Existing Conditions, 2040 No-Build, and two Alternatives (NHC 1 and NHC 2/NHC LPA) for 2040 Build Conditions. A brief description of the scenarios evaluated in the Vissim microscopic traffic simulation software 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 future year 2040 No-Build and Build scenarios. As discussed in the *Traffic Analysis Methodology Report*, travel time and speed were calibrated.

3.2 2040 No-Build Scenario

The 2040 No-Build scenario determined what the traffic operations would be in the vicinity of the proposed D-O LRT project if the proposed LRT project is not constructed. The No-Build Alternative assumed the local transportation system would evolve as currently planned, but without implementation of the proposed LRT project and associated improvements. Traffic volumes for the base year were projected to the year 2040 and incorporated into the existing base models. Signal timing plans were optimized in Synchro to best accommodate the 2040 peak hour traffic volumes and incorporated into Vissim for the operational analysis.

3.3 2040 Build Scenario

The 2040 Build scenarios determined what the traffic operations would be in the vicinity of the proposed project if the light rail and LRT stations are constructed along the University Drive segment.

The 2040 Build analysis was based on a preliminary design as well as the currently planned improvements within the study area. The roadway geometry and LRT alignments for Alternative 1 (NHC 1), Alternative 2 (NHC 2), and the NHC LPA are shown in the *Basis for Engineering Design* plans in Appendix B.

Under both options, LRT is proposed to run in the center of University Drive with one LRT station located on the east side of Martin Luther King Jr. Parkway for this segment. The difference between these two alternatives is that the LRT intersects the University Drive at Westgate Drive and Shannon Road respectively for Alternative 1 (NHC 1) while at Ivy Creek Boulevard and Shannon Road respectively for Alternative 2 (NHC 2 / NHC LPA).

In terms of the LRT's signal operation, for the purpose of this analysis it was assumed that traffic signals along University Drive will be programmed to operate with traffic signal pre-emption. Traffic signal pre-emption takes place when traffic signal timing is interrupted to allow trains to remain on schedule. In the case of University Drive, 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.

As the LRT route is proposed to be constructed in the center of University Drive, the improvements recommended to accommodate this alignment include widening the signalized intersections to the north and south, converting stop-controlled intersections to right-in and right-out access, and adding left-turn lanes to provide feasible volume-to-capacity ratios. The proposed specific roadway modifications at each intersection are listed in Table 1 for the two LRT Build Alternatives.

Table 1: Build LRT Alternatives - Recommended Roadway Modifications

Intersection	Roadway Modification
University Drive and Ivy Creek Boulevard/Snowcrest Trail (NHC 2 / NHC LPA)	Add eastbound University Dr through lane from Ivy Creek Blvd to Martin Luther King Jr. Pkwy. Restripe eastbound University Dr right turn lane to a shared eastbound through/right lane.
	Add a dedicated westbound University Dr right turn bay
Larchmont Road at University Drive (NHC 2 / NHC LPA)	Convert Larchmont Rd leg to right-in/right-out
	Prohibit eastbound University Dr left turn onto Larchmont Rd
	Construct connector between Snowcrest Trail and Larchmont Rd
University Drive and Martin Luther King Jr. Parkway	Extend westbound University Dr right lane upstream to commercial driveway west of Westgate Dr (NHC 1)
	Extend westbound University Dr right lane upstream to Westgate Shopping Center driveway (NHC 2 / NHC LPA)
University Drive and Lyckan Parkway	Convert Lyckan Pkwy and Parkway Plaza driveways to right-in/right-out only (NHC 2 / NHC LPA)
University Drive and Westgate Drive	Add second dedicated eastbound University Dr left turn bay
	Extend the outer eastbound University Dr left turn bay upstream to Martin Luther King Jr. Pkwy to create three eastbound lanes east of Martin Luther King Pkwy and four eastbound approach lanes at Westgate Dr
	Restripe the existing shared westbound University Dr through/right turn lane to a dedicated westbound through lane only
	Add dedicated westbound University Dr right lane and extend upstream to Westgate Shopping Center driveway
University Drive and Westgate Shopping Center	Convert north and south shopping center driveways to right-in/right-out only between Westgate Dr and Shannon Rd (impacts one leg on the north side and four legs on the south side of University Dr)
Pickett Road and Tower Boulevard	Signalize intersection
	Add dedicated northbound Tower Blvd right turn bay

4. Methodology

The analysis followed the methodology documented in the *Traffic Analysis Methodology Report* for the Durham-Orange Light Rail Project developed in November 2013. Two traffic analytical software tools, Synchro and Vissim, were used to provide measures of effectiveness (MOE) necessary for the analysis. This study used Synchro Version 8.0 to develop optimized signal timing plans as input for microscopic simulation modeling.

The use of microscopic traffic simulation was completed using Vissim (version 5.4). Vissim is a microscopic, behavior-based multi-purpose traffic simulation program that evaluates each vehicle individually every model time step and then assigns the appropriate behavior logic according to the traffic operations that the specific vehicle encounters. 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 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 (MOE)

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 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 HCM-based delays.

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. These criteria set thresholds for MOEs to define whether a traffic impact

should be considered for mitigation. It should be noted that NCDOT's criteria were used to determine traffic impact only for the intersection of University Drive at Martin Luther King Jr. Parkway. For all other intersections in the study area, the City of Durham – Compact Neighborhood criteria were used as shown in Table 2 below.

Table 2: City of Durham Traffic Level of Service Standards

Application	Level of Service Standard
Downtown Tier	LOS E
Compact Neighborhood Tier	LOS E
Urban Tier	LOS D
Suburban Tier	LOS D
Rural Tier	LOS C

The City of Durham – Compact Neighborhood traffic impact criteria from the table above were applied with the following thresholds:

- Build movements that degrade to LOS F should be considered an impact (unless the No-Build movement also reports LOS F; if the No-Build movement reports LOS F, the movement should be considered an impact if the delay increases by 25% or more).
- Any build movement queue that exceeds the No Build queue length and also exceeds the available storage space by more than 10 feet should be considered an impact.

For the purposes of this analysis, any analysis result that exceeded the City of Durham criteria was highlighted in the Vissim Build vs No-Build Comparison tables with orange.

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

- 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, for intersections subject to NCDOT criteria, traffic impacts were considered for mitigation if the Build Alternative delay was at or above a middle LOS D or 45.0 seconds or greater at University Drive and MLK Jr. Parkway. 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 would not warrant roadway modifications and were highlighted with yellow.

To be considered a queue impact, movements were highlighted with orange where 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.

In summary, Table 3 shows the traffic impact criteria applied to the various study intersections.

Table 3: Application of Traffic Impact Criteria

Segment	Location	Criteria Applied
University Drive	Martin Luther King Jr. Parkway	NCDOT
	All Other Intersections	City of Durham – Compact Neighborhood
Pickett Road	Petty Road and Tower Boulevard	City of Durham – Compact Neighborhood

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 2014 Base Year network and the 2040 No-Build network are based on the current geometry of University Drive. The network was created using aerials from North Carolina OneMap, Google Maps, field verification, and contour maps from the NCDOT.

The proposed roadway geometry for 2040 Build Alternatives are described in Section 3.3.

4.2.2 Traffic Control

Signal and coordination plans were obtained from NCDOT for the four signalized intersections along University Drive and one signalized intersection on Pickett Road included in the study area. These plans were used to input timing, phasing, and detectors for the following intersections in the base year:

- University Drive and Ivy Creek Boulevard/Snowcrest Trail
- University Drive and Martin Luther King Jr. Parkway
- University Drive and Westgate Drive
- University Drive and Shannon Road
- Pickett Road and Petty Road

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 for segments along the University Drive corridor 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 a mean of 12 mph with a standard deviation of 1 mph for right turns and a mean of 20 mph with a standard deviation of 2 mph for left turns. The University Drive speed distribution used was 35 mph posted, with a range of 32 to 40 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 based on the Wiedemann 74 model. The Wiedemann 74 model includes three parameters which can be calibrated based on the data collected. Initially, the 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

To accurately model the network, peak hour volumes were developed into a balanced network for the proposed roadway geometry with LRT in the horizon year of 2040. The peak hour volumes were determined based on peak hour count data that was balanced along University Drive 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 Condition were developed based on the 2011 count data. The projection of the future volumes for no-build and build conditions were based on Triangle Regional Travel Demand Model (TRM) v5 as outlined in the *Traffic Analysis Methodology Report*.

Due to the introduction of the LRT, including park-and-ride lots and a modal demand shift from personal vehicles to public transit, the 2040 No-Build and Build volumes were based on separate TRM roadway growth rates. Separate future 2040 Build balanced volumes were developed for Build NHC 1 and Build NHC 2 / NHC LPA along University Drive due to the conversion of Larchmont Road, Lyckan Parkway, and

the ITT driveway to right-in/right-out access only, due to the presence of the LRT in the center of University Drive.

Volumes for the 2011 Bear Year, 2040 No-Build and the 2040 Build scenarios were created using the count data and the Triangle Regional Travel Demand Model (TRM) v5 as outlined in the *Traffic Analysis Methodology Report*. The balanced peak hour volumes are located in Appendix D.

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 10 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 and speed versus historic INRIX speed and travel time 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 the University Drive within the study area for AM and PM peak hours. The average speed and corresponding travel time for each direction along the University Drive 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 the calibration effort, the average travel time was determined by averaging a statistically adequate number (see section 4.2.6) 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*.

5. 2040 Simulation Results

Based on the above model network elements and the methodologies defined under MOEs, the results from Vissim and Synchro can be determined.

5.1 2011 Existing Conditions

The 2011 Existing Conditions Vissim model was developed and calibrated, as described in Section 4.2.8 above. The INRIX speed data, taken from a 0.7 mile corridor along University Drive showed the following average speeds and corresponding travel times. The results of the calibrated base model are shown in Table 4 below.

Based on the data included in Table 4, two 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.

Table 4: 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	0.7	AM	1.8	23	1.97	21	-0.2	2	Within Desirable
		PM	2.4	17	2.1	20	0.3	-3	Within Acceptable
Westbound (WB) Travel Time and Speed Summary									
WB Corridor Wide	0.7	AM	1.96	21	1.75	24	0.2	-3	Within Acceptable
		PM	2.59	16	2.73	15	-0.1	1	Within Desirable

5.2 2014 No-Build Scenario

The 2040 No-Build model was developed based on the calibrated existing base model for both AM and PM peak hours. Existing network geometry, optimized signal timing plans and volumes for 2040 No-Build conditions were input into the base model.

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 configurations. Table 5 and Table 6 demonstrate the different levels of service for signalized and unsignalized intersections based on delay and volume to capacity ratio.

Table 5: 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 *cycle failures* (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 6: 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

Table 7 lists turning movement volumes, delays, and LOS at intersections along University Drive and Pickett Road during AM and PM peak hours under 2040 No-Build conditions.

Table 7: 2040 No-Build Vissim Model Summary

Intersection	Movement	AM Peak			PM Peak		
		Volume (VPH)	Delay (Seconds)	LOS	Volume (VPH)	Delay (Seconds)	LOS
University Drive at Snowcrest Trail/Ivy Creek Boulevard	EBRT	175	5.1	A	20	17.0	B
	EBLT	9	7.5	A	55	31.3	C
	EBTH	1098	8.2	A	918	42.8	D
	NBLT	49	65.2	E	137	68.4	E
	NBTH	0	0.0	A	3	69.3	E
	NBRT	55	6.5	A	419	42.0	D
	SBRT	23	34.6	C	10	34.4	C
	SBTH	1	48.1	D	1	30.7	C
	SBLT	60	65.5	E	48	58.9	E
	WBTH	776	5.1	A	1067	29.2	C
	WBLT	198	14.0	B	17	25.1	C
	WBRT	15	4.5	A	50	27.2	C
	Overall	**2459**	**10.2**	**B**	**2745**	**37.7**	**D**
University Drive at Larchmont Road (Unsignalized)	EBLT	13	15.8	B	8	18.9	B
	EBTH	1200	22.2	C	1377	82.3	F
	SBRT	71	71.6	E	22	223.1	F
	SBLT	213	138.9	F	117	422.5	F
	WBTH	918	0.3	A	1112	0.9	A
	WBRT	21	0.4	A	111	1.0	A
	Overall	**2436**	**19.4**	**B**	**2747**	**41.1**	**D**

Intersection	Movement	AM Peak			PM Peak		
		Volume (VPH)	Delay (Seconds)	LOS	Volume (VPH)	Delay (Seconds)	LOS
University Drive at Martin Luther King Jr Parkway	EBRT	107	10.9	B	175	24.4	C
	EBLT	594	69.0	E	620	71.6	E
	EBTH	712	31.3	C	699	81.9	F
	NBLT	67	31.3	C	128	40.7	D
	NBTH	558	51.0	D	388	51.6	D
	NBRT	177	8.3	A	263	18.1	B
	SBRT	443	12.4	B	341	15.3	B
	SBTH	663	38.3	D	852	46.9	D
	SBLT	349	40.9	D	302	144.9	F
	WBTH	429	45.2	D	754	48.3	D
	WBLT	289	71.1	E	512	84.5	F
	WBRT	107	15.2	B	276	18.3	B
	Overall	**4495**	**40.7**	**D**	**5310**	**56.8**	**E**
University Drive at Lyckan Parkway (Unsignalized)	EBRT	37	2.1	A	99	13.9	B
	EBLT	158	3.8	A	157	49.0	D
	EBTH	1059	3.9	A	964	45.6	D
	NBLT	8	11.7	B	183	40.5	D
	NBTH	0	0.0	A	2	21.3	C
	NBRT	10	11.4	B	12	24.0	C
	SBRT	93	7.5	A	192	30.5	C
	SBTH	0	0.0	A	1	24.4	C
	SBLT	7	11.1	B	7	68.9	E
	WBTH	586	1.5	A	1283	12.2	B
	WBLT	14	9.3	A	78	24.0	C
	WBRT	11	1.9	A	13	6.6	A
	Overall	**1983**	**3.4**	**A**	**2991**	**29.0**	**C**

Intersection	Movement	AM Peak			PM Peak		
		Volume (VPH)	Delay (Seconds)	LOS	Volume (VPH)	Delay (Seconds)	LOS
University Drive at Westgate Drive	EBRT	1	0.0	A	16	16.4	B
	EBLT	262	21.2	C	476	65.3	E
	EBTH	747	16.2	B	473	20.0	B
	NBLT	4	74.4	E	15	53.9	D
	NBTH	27	71.3	E	53	56.2	E
	NBRT	28	26.9	C	26	25.4	C
	SBRT	304	9.1	A	490	18.4	B
	SBTH	20	45.4	D	73	37.0	D
	SBLT	269	50.7	D	516	42.3	D
	WBTH	358	22.8	C	670	43.9	D
	WBLT	8	26.2	C	44	38.6	D
	WBRT	324	15.9	B	519	26.8	C
	Overall	**2352**	**21.9**	**C**	**3371**	**36.4**	**D**
University Drive at Westgate Shopping Center (Unsignalized)	EBRT	42	0.6	A	225	1.0	A
	EBTH	837	0.4	A	706	0.6	A
	EBLT	165	4.8	A	84	48.2	D
	NBLT	31	15.8	B	32	77.3	E
	NBTH	0	0.0	A	9	49.3	D
	NBRT	1	7.5	A	62	28.9	C
	SBRT	136	11.3	B	125	127.4	F
	SBTH	4	16.8	B	9	152.4	F
	SBLT	5	12.7	B	35	164.4	F
	WBTH	523	3.5	A	1076	55.1	E
	WBLT	28	3.5	A	30	33.0	C
	WBRT	9	6.0	A	96	60.0	E
	Overall	**1781**	**3.0**	**A**	**2489**	**36.5**	**D**

Intersection	Movement	AM Peak			PM Peak		
		Volume (VPH)	Delay (Seconds)	LOS	Volume (VPH)	Delay (Seconds)	LOS
University Drive at Shannon Road	EBRT	3	6.0	A	56	17.2	B
	EBLT	37	9.8	A	98	41.3	D
	EBTH	671	8.9	A	690	23.7	C
	NBLT	6	48.3	D	44	65.6	E
	NBTH	41	47.8	D	206	59.7	E
	NBRT	132	8.8	A	269	31.6	C
	SBRT	72	6.6	A	42	43.7	D
	SBTH	15	29.3	C	135	39.6	D
	SBLT	122	34.6	C	178	82.3	F
	WBTH	390	7.9	A	948	50.3	D
	WBLT	41	11.8	B	217	29.4	C
	WBRT	60	5.8	A	220	38.6	D
	Overall	**1590**	**11.8**	**B**	**3103**	**42.0**	**D**
Pickett Road at Petty Road	EBRT	21	14.4	B	8	6.6	A
	EBLT	136	21.4	C	136	13.0	B
	EBTH	623	17.0	B	401	9.8	A
	NBLT	13	24.1	C	17	15.3	B
	NBTH	43	26.4	C	22	16.5	B
	NBRT	14	12.6	B	15	7.9	A
	SBRT	174	22.3	C	80	10.8	B
	SBTH	88	31.4	C	16	18.7	B
	SBLT	103	31.1	C	98	17.9	B
	WBTH	453	10.3	B	347	6.5	A
	EBLT	1	9.1	A	0	0.0	A
	EBRT	36	7.2	A	76	4.7	A
	Overall	**1705**	**17.7**	**B**	**1216**	**9.9**	**A**
Pickett Road at Tower Boulevard (Unsignalized)	EBRT	281	2.7	A	278	1.6	A
	EBTH	459	3.0	A	237	1.8	A
	NBLT	120	18.5	B	142	15.4	B
	NBRT	109	14.4	B	103	11.9	B
	WBTH	370	0.8	A	283	0.4	A
	WBLT	99	9.3	A	137	5.6	A
	Overall	**1438**	**5.0**	**A**	**1180**	**4.4**	**A**

As can be seen from the results, all intersections except for Martin Luther King Jr. Parkway report overall intersection LOS of D or better. A number of individual movements are expected to operate at LOS E or F under the No-Build conditions. Martin Luther King Jr. Parkway is anticipated to operate at a LOS E during the PM peak hour. This is not unexpected as the corridor is anticipated to be capacity-constrained by year 2040 under the existing lane configurations. The results from the No-Build analysis suggest that a number of roadway modifications may be necessary on the University Drive segment 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.

Based on the results of the Vissim analysis, the following intersections are anticipated to operate at LOS E or LOS F in at least one No-Build peak hour:

- University Drive at Larchmont Road*
- University Drive at Martin Luther King Jr Parkway
- University Drive at Westgate Shopping Center*
- Pickett Road at Tower Boulevard*

* - *Indicates unsignalized intersection with at least one movement operating at LOS F conditions.*

It is important to note that these are No-Build background issues that should 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." Queue lengths that may already be lengthy in the No-Build condition could cause additional queuing resulting from the Build conditions to exceed the available storage space for a particular lane group.

5.3 2040 Build Scenario – NHC 1 Alternative

The Build Alternatives were analyzed in Vissim for the 2040 AM and PM peak hours to determine traffic operations for the University Drive segment assuming that the light rail facility is constructed. The 2040 LRT model for NHC 1 Alternative was developed based on the 2040 No-Build models, with the LRT entering University Drive at Westgate Drive, running in the center of University Drive and then continuing north on Shannon Road before crossing Pickett Road. The LRT station is located at the northeast corner of University Drive and Martin Luther King Jr. Parkway.

Vissim simulation and intersection MOE results indicated that Westgate Drive is a bottleneck for corridor operations specifically during the PM peak hour under NHC 1 Alternative conditions. The southbound Westgate Drive left turn and eastbound University Drive left turn traffic are substantial during the PM peak hour. Without substantial modifications to the roadway, movements are anticipated to operate at LOS F with extensive delays which then result in excessive queue lengths for both

eastbound and southbound approaches. The maximum queue lengths at the eastbound University Drive left turn bays extend upstream to Martin Luther King Jr. Parkway, which then blocks eastbound through traffic along University Drive and the southbound Martin Luther King Jr. Parkway left turn traffic.

Two different options were identified and evaluated to address this issue during the analysis process. The first strategy was to improve the eastbound University Drive left turn to northbound Westgate Drive capacity by adding two new left turn bays to provide triple eastbound left turn bays at Westgate Drive. The Vissim results indicated that the eastbound University Drive left turn at Westgate Drive would improves from LOS F to LOS E with a 30 second delay reduction. Although the southbound Martin Luther King Jr. Parkway left turn at University Drive would still be expected to operate at LOS F in the PM peak hour, the delay would decrease by 17 seconds with the triple eastbound University Drive left turn bay configuration at Westgate Drive. The overall intersection performance is anticipated to improve from LOS E to LOS D at University Drive and Martin Luther King Jr. Parkway.

Although the triple eastbound University Drive left turn bay at Westgate Drive concept would improve the traffic operations at the movement, intersection and corridor levels, it is not recommended based on consultation with NCDOT and City of Durham staff due to concerns regarding operational efficiency, vehicle and pedestrian safety, undesirable alignment, long pedestrian crossing times, and right-of-way impact.

The other option was to reduce the eastbound University Drive left turn volumes at Westgate Drive by diverting a portion of the volume to a different route, and using only two eastbound University Drive left turn lanes. This is based on an assumption that a subset of drivers will use alternative routes to avoid the extensive delays expected at the eastbound Westgate Drive left turn and rerouting to Shannon Road. A capacity calculation was used to determine the total number of vehicles to be reduced from the eastbound University Drive left turn movement and this volume is re-routed based on the weighted volumes from the according upstream movements at Martin Luther King Jr. Parkway and Ivy Creek Boulevard. It should be noted that the southbound Martin Luther King Jr. Parkway left turn traffic at University Drive was not re-routed, as an alternative route via US 15-501 Business already exists and is signed. Origin-Destination build volumes for the non-diverted two lane eastbound University Drive left turn NHC 1 Alternative and the diverted two lane eastbound University Drive left turn NHC 1 Alternative are shown in Appendix F.

The Vissim results indicate the major bottleneck at Westgate Drive would be alleviated and traffic operations would be improved at the movement, intersection and corridor levels. Although the eastbound University Drive left turn movement would remain the same LOS F as it is under the scenario with two eastbound University Drive left turn lanes without diversion, the eastbound congestion along University Drive was mitigated. In addition, the southbound Westgate Drive left turn was improved from LOS F to LOS E and the eastbound University Drive through movement was improved from LOS E to LOS D at Martin Luther King Jr. Parkway. The overall intersection performance was improved from LOS E to LOS D for both intersections in the PM peak hour.

The analysis results indicated that providing two eastbound University Drive left turn lanes and inducing some volume diversion from the eastbound approach at Westgate Drive is a recommended measure to mitigate the expected impact. Table 8 shows the intersection MOE comparisons between the 2040 No-Build and the NHC 1 Build Alternative Options that were evaluated.

Table 8: Critical Vissim Intersection Comparisons – 2040 NHC 1 Alternative Options

PM Peak Hour

Intersection	Movement	Delay (Seconds)				LOS			
		No-Build	2 EBL	3 EBL	2 EBL with Diversion	No-Build	2 EBL	3 EBL	2 EBL with Diversion
University Drive at Martin Luther King Parkway[1]	EBR	28.1	17.7	18.6	17.2	C	B	B	B
	EBL	81.1	55.2	70.3	51.1	F	E	E	D
	EBT	32.0	70.3	68.5	51.6	C	E	E	D
	NBL	57.3	52.8	69.7	71.4	E	D	E	E
	NBT	53.3	67.0	65.6	65.9	D	E	E	E
	NBR	9.1	21.2	14.1	17.2	A	C	B	B
	SBR	14.8	19.0	15.8	16.2	B	B	B	B
	SBT	55.0	56.7	48.2	51.9	E	E	D	D
	SBL	78.4	109.9	82.7	65.6	E	F	F	E
	WBT	58.2	62.7	52.3	50.3	E	E	D	D
	WBL	193.3	87.1	79.0	62.6	F	F	E	E
	WBR	23.0	17.6	13.9	15.3	C	B	B	B
	All	58.4	58.0	54.0	47.9	E	E	D	D
University Drive at Westgate Drive[2]	EBR	21.2	13.5	12.0	15.2	C	B	B	B
	EBL	71.1	100.5	69.5	92.5	E	F	E	F
	EBT	28.3	20.5	15.4	17.0	C	C	B	B
	LRT EB	0.0	36.4	0.0	0.0	N/A	D	A	A
	NBL	81.0	58.0	109.0	47.0	F	E	F	D
	NBT	87.3	94.1	99.2	93.2	F	F	F	F
	NBR	62.7	53.1	54.4	59.7	E	D	D	E
	SBR	23.9	26.4	75.5	25.5	C	C	E	C
	SBT	91.6	89.8	97.5	86.2	F	F	F	F
	SBL	76.1	89.6	134.4	84.2	E	F	F	F
	LRT WB	0.6	0.7	0.0	0.0	N/A	A	A	A
	WBT	87.7	65.3	51.8	62.1	F	E	D	E
	WBL	50.9	8.7	23.1	9.5	D	A	C	A
	WBR	30.8	22.1	19.2	22.1	C	C	B	C
	All	58.7	57.3	62.9	51.9	E	E	E	D

Footnote:

1 - NCDOT Traffic Impact Criteria is applied

2 - City of Durham Traffic Impact Criteria is applied

Indicates Traffic Impact

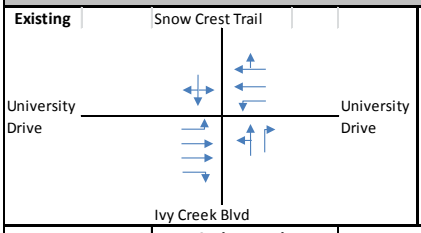
The roadway modifications associated with the two eastbound University Drive left turn bays and traffic diversion concept are recommended for the LRT design and analysis of the 2040 Build LRT NHC 1 Alternative and are listed in Table 1.

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 9 for LRT NHC 1 Alternative from University Drive and Ivy Creek Boulevard to Petty Road and Pickett Road. Table 9 also indicates the lane configuration modifications that are proposed between Existing to No-Build, and No-Build to Build Conditions.

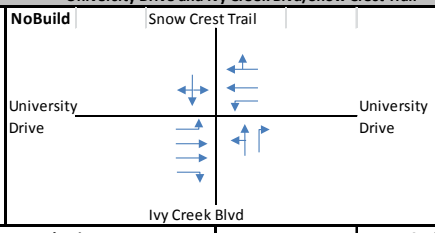
Table 9: 2040 LRT Alternatives Signal & Lane Configuration Modifications – NHC 1

University Drive and Ivy Creek Blvd/Snow Crest Trail

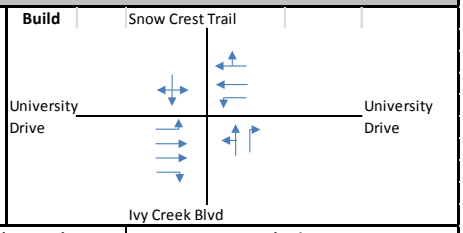
Existing



NoBuild



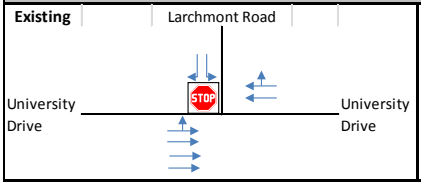
Build



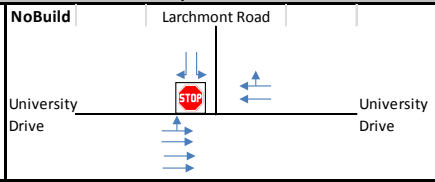
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	110s to 150s	No Change	Existing to NoBuild	105s to 150s	EBL Perm changed to pm+pt
NoBuild to Build	150s to 160s	EBL Perm changed to pm+pt	NoBuild to Build	150s to 160s	No Change

University Drive and Larchmont Road

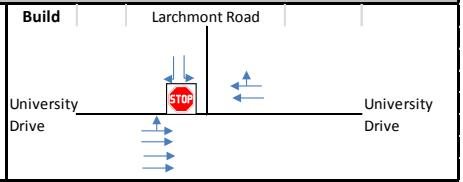
Existing



NoBuild



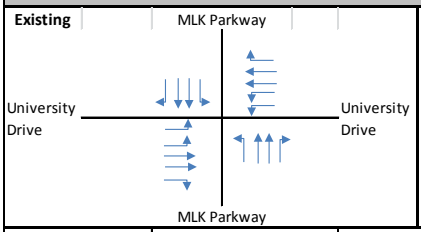
Build



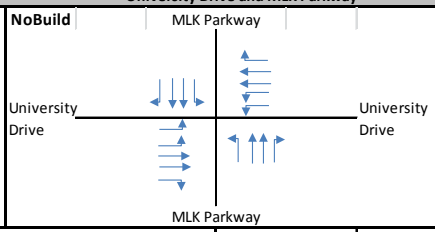
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	N/A	N/A	Existing to NoBuild	N/A	N/A
NoBuild to Build	N/A	N/A	NoBuild to Build	N/A	N/A

University Drive and MLK Parkway

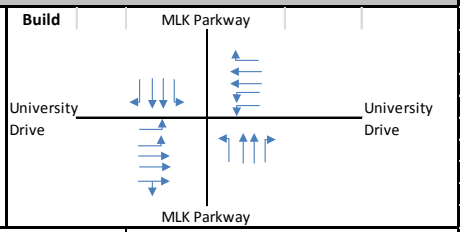
Existing



NoBuild



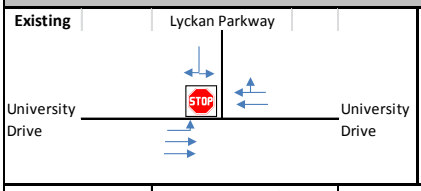
Build



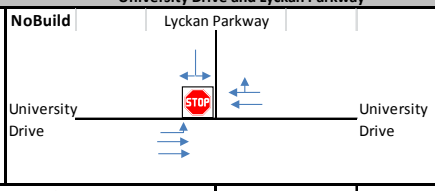
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	110s to 150s	Changed Lead WBL to Lag WBL	Existing to NoBuild	105s to 150s	NBL and SBL Prot changed to pm+pt
NoBuild to Build	150s to 160s	NBL and SBL Prot changed to pm+pt	NoBuild to Build	150s to 160s	No change

University Drive and Lyckan Parkway

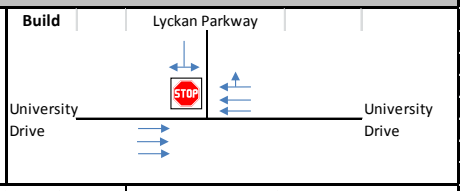
Existing



NoBuild



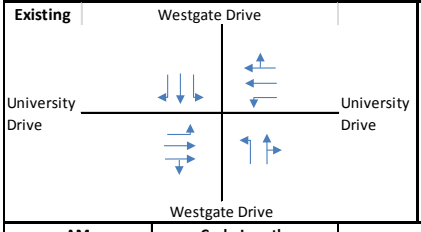
Build



AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	N/A	N/A	Existing to NoBuild	N/A	N/A
NoBuild to Build	N/A	N/A	NoBuild to Build	N/A	N/A

University Drive and Westgate Drive

Existing



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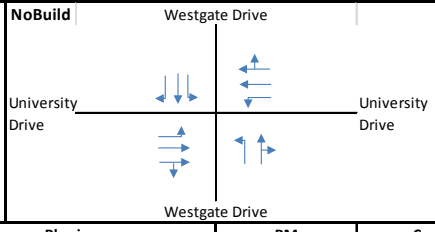
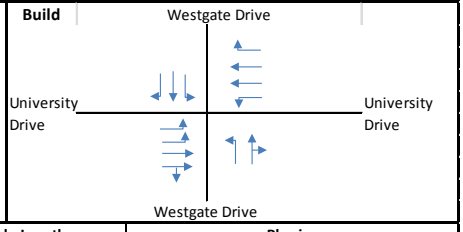


Build

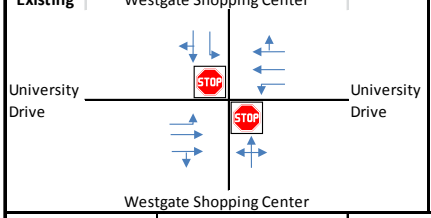


AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	110s to 150s	NBL and WBL pm+pt changed to Perm	Existing to NoBuild	105s to 150s	NBL and WBL pm+pt changed to Perm
NoBuild to Build	150s to 160s	EBL pm+pt changed to Prot WBL and NBL Perm changed to pm+pt Transit Signal Preemption	NoBuild to Build	150s to 160s	EBL pm+pt changed to Prot WBL and NBL Perm changed to pm+pt Transit Signal Preemption

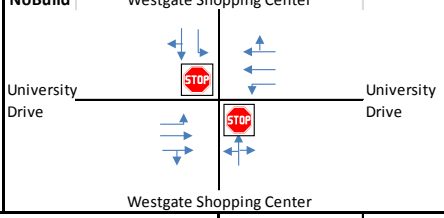
University Drive Traffic Simulation Report

University Drive and Westgate Shopping Center

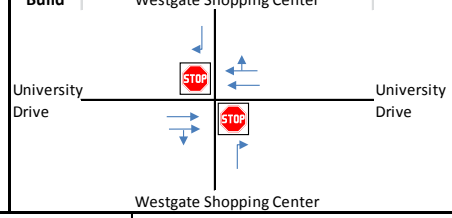
Existing



NoBuild



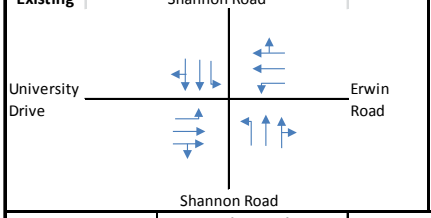
Build



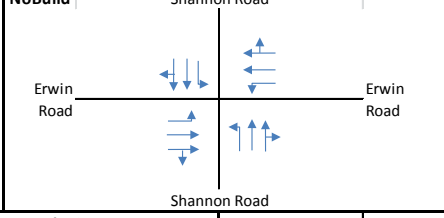
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	N/A	N/A	Existing to NoBuild	N/A	N/A
NoBuild to Build	N/A	N/A	NoBuild to Build	N/A	N/A

University Drive and Shannon Road

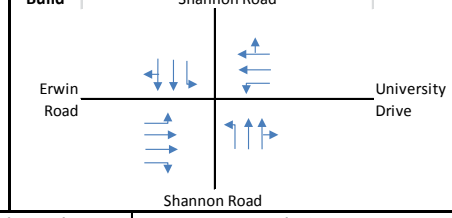
Existing



NoBuild



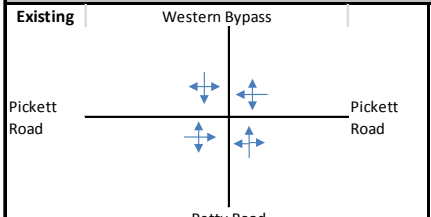
Build



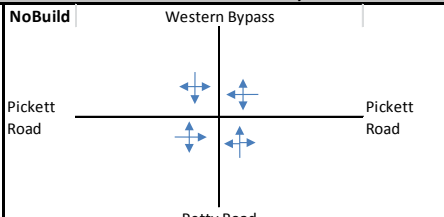
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	110s to 150s	NBL Prot changed to Perm SBL Prot changed to pm+pt	Existing to NoBuild	105s to 150s	NBL Prot changed to Perm SBL Prot changed to pm+pt
NoBuild to Build	150s to 160s	NBL Perm changed to pm+pt Transit Signal Preemption	NoBuild to Build	150s to 160s	NBL Perm changed to pm+pt Transit Signal Preemption

Pickett Road and Petty Road

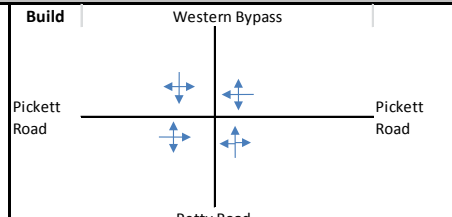
Existing



NoBuild



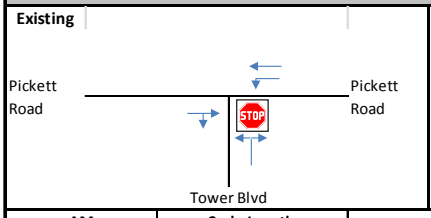
Build



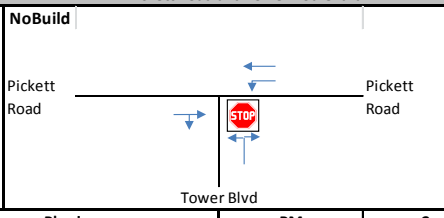
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	N/A	N/A	Existing to NoBuild	N/A	N/A
NoBuild to Build	90s to 160s	No Change	NoBuild to Build	60s to 130s	No Change

Pickett Road and Tower Boulevard

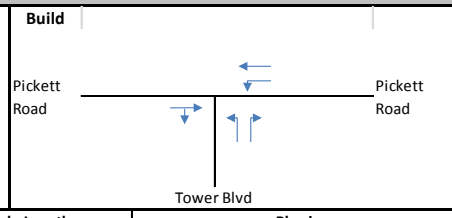
Existing



NoBuild



Build



AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	N/A	N/A	Existing to NoBuild	N/A	N/A
NoBuild to Build	Changed to 160s	Transit Signal Preemption	NoBuild to Build	Changed to 130s	Transit Signal Preemption

5.4 2040 Build Scenario – NHC 2/NHC LPA Alternative

The 2040 LRT model for the NHC 2/NHC LPA Alternative was based on the 2040 No-Build models, with the LRT entering University Drive at Ivy Creek Boulevard, running in the center median along University Drive, and then continuing north on Shannon Road before crossing Pickett Road. The LRT station is located east of Martin Luther King Jr. Parkway.

Similar to NHC 1, Vissim simulation and intersection MOE results indicated that Westgate Drive will act as a bottleneck for corridor operations during both AM and PM peak hours under NHC 2/NHC LPA conditions. Without diversion, NHC 2/NHC LPA eastbound left turn volume was 641 vehicles per hour and 763 vehicles per hour during AM and PM peak hours, respectively, at Westgate Drive. Without substantial roadway modifications as part of NHC 2/NHC LPA Alternative, the eastbound University Drive left turn movement is anticipated to operate at a LOS F with extensive delays. This results in excessive queue lengths that extend upstream to Martin Luther King Jr. Parkway and blocks the eastbound through traffic along University Drive and the southbound Martin Luther King Jr. Parkway left turn traffic.

The same two options at Westgate Drive as noted for NHC 1 Alternative, (1) triple eastbound left turn bays and (2) dual eastbound left turn lanes with volume diversion, were evaluated in the analysis under NHC 2/NHC LPA Alternative traffic conditions for both AM and PM peak hours. The Vissim PM results indicate that eastbound left turn movement at Westgate Drive improves from a LOS F to LOS E with a range of 12 second to 26 second delay reduction. Even though the southbound left turn movement at Martin Luther King Jr. Parkway is still expected to operate at LOS F, the delay is expected to decrease substantially, by more than 100 seconds during the PM peak hour. It was observed that congestion due to the eastbound University Drive left turn delay was alleviated under both options.

Due to the same concerns of implementing triple left turn lanes discussed for the NHC 1 Alternative in Section 5.3, the option of implementing two eastbound University Drive left turn lanes and assuming a reasonable portion of eastbound left turn volume would divert is recommended for this analysis. The same method used for NHC 1 was applied to the NHC 2/NHC LPA analysis to determine the total number of vehicles to be reduced from the eastbound University Drive left turn at Westgate Drive and added to the eastbound University Drive left turn and northbound Shannon Road through movement at University Drive and Shannon Road. Origin-Destination build volumes for the non-diverted two lane eastbound University Drive left turn NHC 2/NHC LPA Alternative and the diverted two lane eastbound University Drive left turn NHC 2/NHC LPA Alternative are shown in Appendix F.

Table 10 shows the intersection MOE comparisons between the 2040 No-Build and Build scenarios being evaluated for PM peak hour which is the worst conditions in the traffic analysis.

The roadway modifications associated with the two eastbound University Drive left turn lanes and traffic diversion concept are recommended for the design and analysis of the 2040 LRT NHC 2/NHC LPA Alternative and are listed in Table 1.

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 11 for LRT NHC 2/NHC LPA Alternative from University Drive and Ivy Creek Boulevard to Petty Road and Pickett Road. Table 11 also indicates the lane configuration modifications that are proposed between Existing to No-Build, and No-Build to Build Conditions.

Table 10: Critical Vissim Intersection Comparisons – 2040 NHC 2/NHC LPA Alternative Roadway Modification Options

PM Peak Hour

Intersection	Movement	Delay (Seconds)				LOS			
		No-Build	2 EBL	3 EBL	2 EBL with Diversion	No-Build	2 EBL	3 EBL	2 EBL with Diversion
University Drive at Martin Luther King Parkway[1]	EBR	28.1	38.2	19.2	27.3	C	D	B	C
	EBL	81.1	77.4	72.4	78.2	F	E	E	E
	EBT	32.0	66.3	25.2	33.4	C	E	C	C
	LRT EB	0	0.2	0	0.1	N/A	A	A	A
	NBL	57.3	57.8	43.6	64.2	E	E	D	E
	NBT	53.3	57.8	60.0	55.6	D	E	E	E
	NBR	9.1	14.4	7.1	7.8	A	B	A	A
	SBR	14.8	18.4	15.4	15.2	B	B	B	B
	SBT	55.0	61.6	53.5	57.4	E	E	D	E
	SBL	78.4	195.6	94.6	87.2	E	F	F	F
	WB	58.2	58.2	51.2	59.5	E	E	D	E
	LRT WB	5.8	5.8	5.8	5.8	N/A	A	A	A
	WBL	193.3	197.8	241.7	196.7	F	F	F	F
	WBR	23.0	24.9	12.0	22.4	C	C	B	C
	All	58.4	70.4	58.8	60.1	E	E	E	E
University Drive at Westgate Drive[2]	EBR	21.2	24.4	0.0	24.6	C	C	A	C
	EBL	71.1	90.0	64.3	78.5	E	F	E	E
	EBT	28.3	30.5	18.6	31.9	C	C	B	C
	LRT EB	0.0	0.0	0.0	0.0	N/A	A	A	A
	NBL	81.0	81.8	52.6	81.6	F	F	D	F
	NBT	87.3	82.2	68.1	86.0	F	F	E	F
	NBR	62.7	61.7	43.3	55.0	E	E	D	E
	SBR	23.9	23.4	10.5	21.3	C	C	B	C
	SBT	91.6	91.1	89.8	92.5	F	F	F	F
	SBL	76.1	73.5	74.2	69.3	E	E	E	E
	LRT WB	0.6	0.6	0.5	0.3	N/A	A	A	A
	WBT	87.7	93.7	16.5	91.8	F	F	B	F
	WBL	50.9	53.0	21.7	58.6	D	D	C	E
	WBR	30.8	33.8	10.0	31.2	C	C	A	C
	All	58.7	62.4	37.3	57.5	E	E	D	E

Footnote:

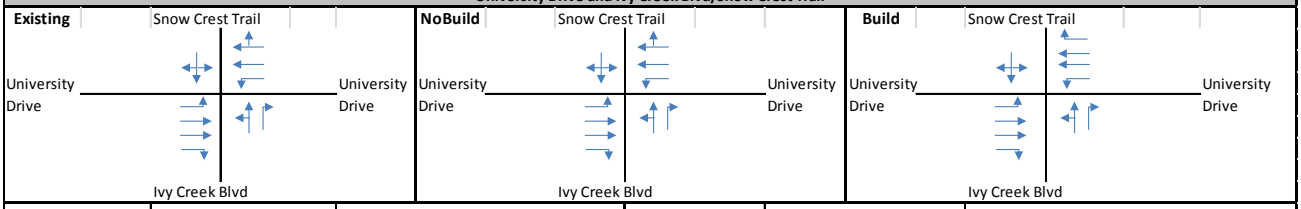
1 - NCDOT Traffic Impact Criteria is applied

2 - City of Durham Traffic Impact Criteria is applied

Indicates Traffic Impact

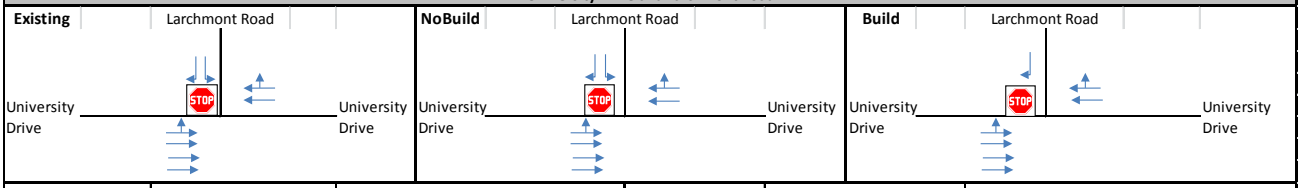
Table 11: 2040 LRT Alternatives Signal & Lane Configuration Modifications – NHC 2/NHC LPA

University Drive and Ivy Creek Blvd/Snow Crest Trail



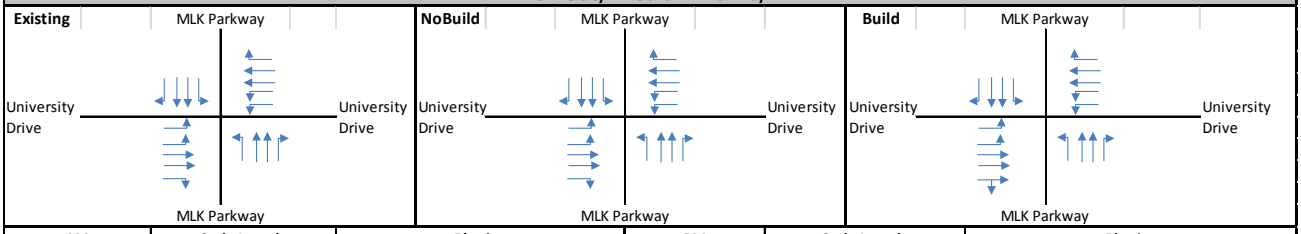
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	110s to 150s	No Change	Existing to NoBuild	105s to 150s	EBL Perm changed to pm+pt
NoBuild to Build	150s to 160s	EBL Perm changed to pm+pt Transit Signal Preemption	NoBuild to Build	150s to 175s	No Change Transit Signal Preemption

University Drive and Larchmont Road



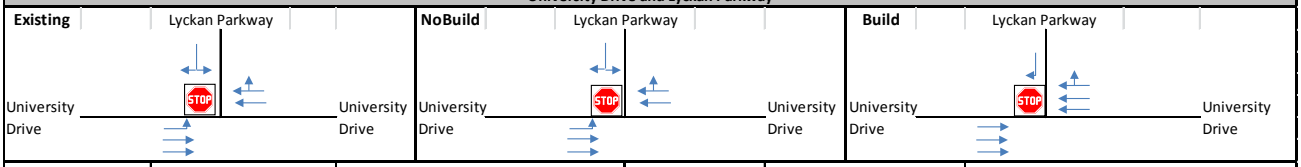
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	N/A	N/A	Existing to NoBuild	N/A	N/A
NoBuild to Build	N/A	N/A	NoBuild to Build	N/A	N/A

University Drive and MLK Parkway



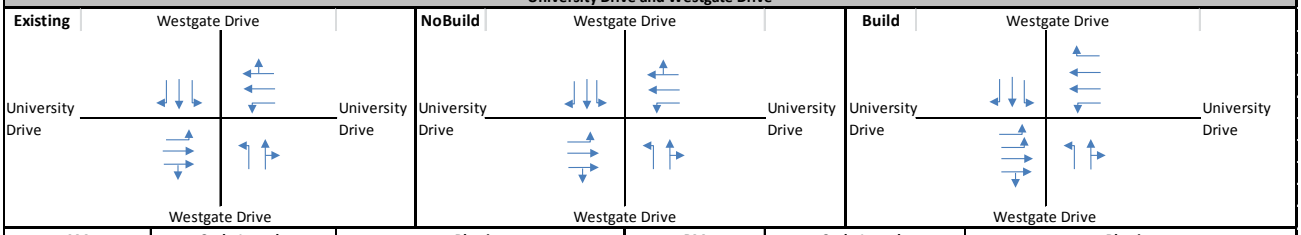
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	110s to 150s	Changed Lead WBL to Lag WBL	Existing to NoBuild	105s to 150s	NBL and SBL Prot changed to pm+pt
NoBuild to Build	150s to 160s	NBL and SBL Prot changed to pm+pt Transit Signal Preemption	NoBuild to Build	150s to 175s	No change Transit Signal Preemption

University Drive and Lyckan Parkway



AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	N/A	N/A	Existing to NoBuild	N/A	N/A
NoBuild to Build	N/A	N/A	NoBuild to Build	N/A	N/A

University Drive and Westgate Drive

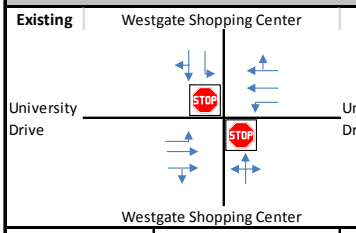


AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	110s to 150s	NBL and WBL pm+pt changed to Perm	Existing to NoBuild	105s to 150s	NBL and WBL pm+pt changed to Perm
NoBuild to Build	150s to 160s	EBL pm+pt changed to Prot WBL and NBL Perm changed to pm+pt Transit Signal Preemption	NoBuild to Build	150s to 175s	EBL pm+pt changed to Prot WBL and NBL Perm changed to pm+pt Transit Signal Preemption

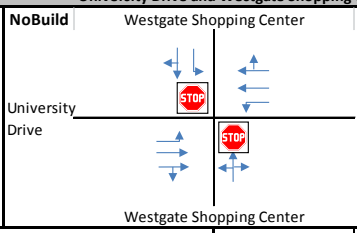
University Drive Traffic Simulation Report

University Drive and Westgate Shopping Center

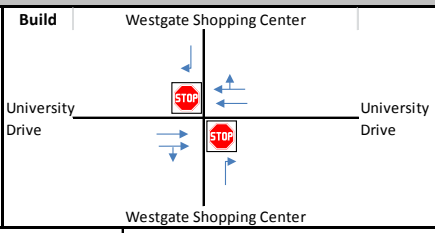
Existing



NoBuild



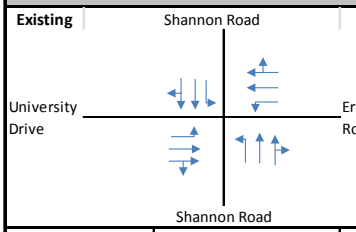
Build



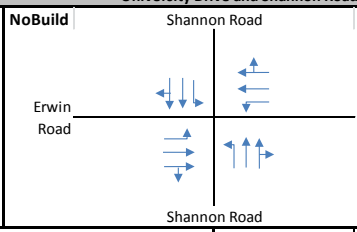
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	N/A	N/A	Existing to NoBuild	N/A	N/A
NoBuild to Build	N/A	N/A	NoBuild to Build	N/A	N/A

University Drive and Shannon Road

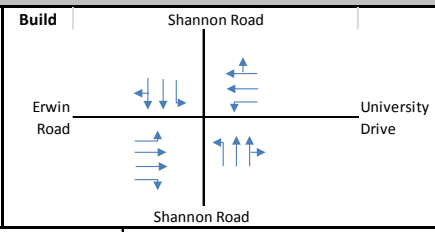
Existing



NoBuild



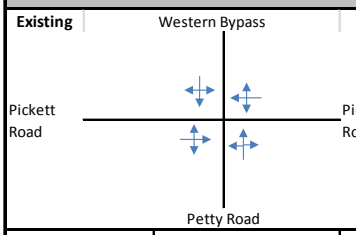
Build



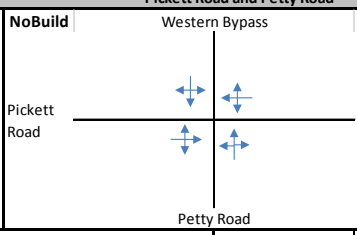
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	110s to 150s	NBL Prot changed to Perm SBL Prot changed to pm+pt	Existing to NoBuild	105s to 150s	NBL Prot changed to Perm SBL Prot changed to pm+pt
NoBuild to Build	150s to 160s	NBL Perm changed to pm+pt Transit Signal Preemption	NoBuild to Build	150s to 175s	NBL Perm changed to pm+pt Transit Signal Preemption

Pickett Road and Petty Road

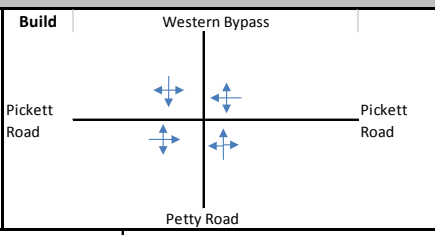
Existing



NoBuild



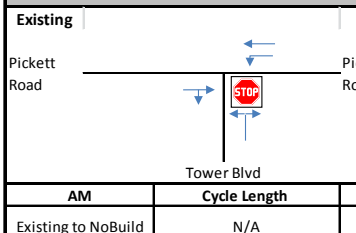
Build



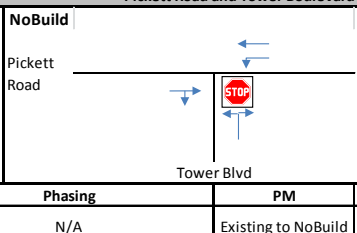
AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	N/A	N/A	Existing to NoBuild	N/A	N/A
NoBuild to Build	90s to 160s	No Change	NoBuild to Build	60s to 130s	No Change

Pickett Road and Tower Boulevard

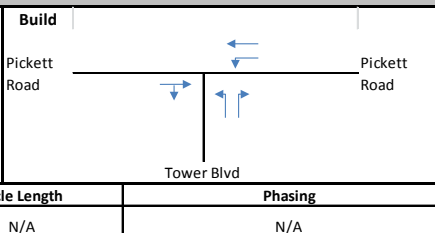
Existing



NoBuild



Build



AM	Cycle Length	Phasing	PM	Cycle Length	Phasing
Existing to NoBuild	N/A	N/A	Existing to NoBuild	N/A	N/A
NoBuild to Build	Changed to 160s	Transit Signal Preemption	NoBuild to Build	Changed to 130s	Transit Signal Preemption

6. Summary of Results

The following section summarizes the Vissim simulation results for the 2040 No-Build versus the two 2040 Build LRT Alternatives (NHC 1 and NHC 2/NHC LPA) in a side by side manner. Table 12 through Table 15 include individual movement and overall intersection delays, LOS and queuing information as reported by Vissim for all future scenarios.

Table 12: D-O LRT: University Drive Segment – Vissim Intersection Analysis Output Summary - 2040 Build Alternative 1 (NHC 1) 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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
1	University Drive at Snowcrest Trail/Ivy Creek Boulevard[2]	EBR	166	168	172	175	4.1	5.1	-1.1	-20.6%	A	A	3	3	-1	0.0%	268	127	126	0	0.4%
		EBL	6	7	8	9	8.0	7.5	0.5	6.4%	A	A	0	0	0	0.0%	320	22	13	9	70.1%
		EBT	1099	1090	1098	1098	5.3	8.2	-3.0	-36.2%	A	A	21	35	-13	-38.5%	423	378	415	-37	-9.0%
		NBL	42	44	46	49	70.5	65.2	5.4	8.2%	E	E	17	12	5	39.5%	308	105	112	-6	-5.6%
		NBT	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	17	12	5	39.5%	308	105	112	-6	-5.6%
		NBR	51	50	57	55	5.5	6.5	-1.0	-15.7%	A	A	17	12	5	39.5%	205	105	112	-6	-5.6%
		SBR	24	23	23	23	38.0	34.6	3.5	10.0%	D	C	13	21	-8	-37.4%	333	153	175	-22	-12.6%
		SBT	1	1	1	1	23.8	48.1	-24.3	-50.6%	C	D	32	21	10	47.3%	333	189	175	14	7.9%
		SBL	62	60	59	60	71.3	65.5	5.9	9.0%	E	E	31	21	10	45.9%	333	188	175	13	7.5%
		WBT	770	775	768	776	1.5	5.1	-3.6	-71.3%	A	A	3	10	-7	-71.9%	632	122	296	-173	-58.7%
		WBL	175	190	185	198	14.8	14.0	0.8	5.6%	B	B	4	8	-4	-47.1%	450	149	166	-17	-10.0%
		WBR	11	12	13	15	1.2	4.5	-3.3	-73.8%	A	A	2	11	-9	-80.4%	632	154	317	-163	-51.4%
		All	2407	2420	2430	2459	7.8	10.2	-2.3	-22.8%	A	B	13	14	-1	-4.7%		378	417	-40	-9.5%
2	University Drive at Larchmont Road[2] (Unsignalized)	EBL	1	1	15	13	3.1	15.8	-12.7	-80.5%	A	C	1	21	-20	-93.6%	517	168	454	-286	-63.0%
		EBT	1214	1200	1183	1200	7.4	22.2	-14.8	-66.8%	A	C	1	21	-21	-97.1%	725	89	454	-366	-80.5%
		SBR	56	57	60	71	25.9	71.6	-45.8	-63.9%	D	F	18	161	-143	-88.9%	350	246	377	-132	-34.9%
		SBL	190	187	179	213	43.3	138.9	-95.5	-68.8%	E	F	18	221	-203	-91.9%	350	246	452	-206	-45.7%
		WBT	910	920	906	918	0.3	0.3	0.0	-10.7%	A	A	0	0	0	0.0%	314	0	0	0	0.0%
		WBR	3	3	24	21	0.3	0.4	-0.1	-31.3%	A	A	0	0	0	0.0%	314	0	0	0	0.0%
		All	2374	2368	2367	2436	7.9	19.4	-11.5	-59.4%	A	C	7	73	-66	-90.2%		285	528	-243	-46.0%
3	University Drive at Martin Luther King Jr Parkway[1]	EBR	108	102	102	107	9.7	10.9	-1.2	-11.1%	A	B	5	5	1	12.6%	1050	126	151	-25	-16.4%
		EBL	602	582	562	594	47.8	69.0	-21.2	-30.8%	D	E	143	242	-100	-41.1%	810	508	511	-3	-0.7%
		EBT	723	703	678	712	35.9	31.3	4.6	14.7%	D	C	153	107	46	43.0%	1050	542	440	103	23.4%
		NBL	69	65	69	67	37.1	31.3	5.9	18.7%	D	C	9	11	-2	-22.6%	311	114	106	8	7.1%
		NBT	549	554	557	558	57.7	51.0	6.7	13.1%	E	D	114	99	14	14.4%	1056	443	366	76	20.9%
		NBR	172	177	176	177	8.2	8.3	-0.1	-1.1%	A	A	0	0	0	487.2%	381	49	29	20	69.5%
		SBR	423	434	442	443	13.4	12.4	1.0	7.7%	B	B	103	89	14	15.8%	1248	477	415	62	15.0%
		SBT	649	647	670	663	44.6	38.3	6.3	16.4%	D	D	103	89	14	15.8%	1248	477	415	62	15.0%
		SBL	342	350	339	349	50.7	40.9	9.7	23.7%	D	D	107	86	22	25.3%	333	509	482	27	5.6%
		WBT	423	424	419	429	58.4	45.2	13.1	29.0%	E	D	97	74	23	30.3%	403	425	444	-19	-4.2%
		WBL	278	284	287	289	76.7	71.1	5.6	7.8%	E	E	84	97	-13	-13.2%	350	413	473	-59	-12.6%
		WBR	110	107	105	107	9.9	15.2	-5.2	-34.5%	A	B	9	0	8	0.0%	270	140	31	109	345.9%
		All	4446	4429	4406	4495	42.8	40.7	2.2	5.3%	D	D	77	75	2	3.0%		570	531	39	7.3%

University Drive 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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
4	University Drive at Lyckan Parkway[2] (Unsignalized)	EBR	34	33	36	37	1.5	2.1	-0.5	-25.4%	A	A	7	6	1	17.0%	395	285	262	23	8.7%
		EBL	181	177	148	158	5.7	3.8	1.9	50.7%	A	A	12	0	12	0.0%	135	349	47	302	638.5%
		EBT	1038	1072	1029	1059	4.0	3.9	0.1	1.5%	A	A	7	6	1	17.0%	395	285	262	23	8.7%
		LRT EB	6	6	N/A	N/A	0.2	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
		NBL	4	4	8	8	18.2	11.7	6.5	55.3%	C	B	0	1	-1	-99.5%	390	5	58	-53	-91.0%
		NBR	3	2	11	10	12.0	11.4	0.7	5.8%	B	B	0	0	0	0.0%	390	5	10	-5	-46.9%
		SBR	103	105	94	93	12.8	7.5	5.3	71.3%	B	A	5	0	4	0.0%	1037	104	28	75	264.8%
		SBL	14	14	6	7	24.3	11.1	13.2	118.9%	C	B	5	0	4	0.0%	1037	104	28	75	264.8%
		WBT	544	559	579	586	1.9	1.5	0.5	32.8%	A	A	0	0	0	56.8%	375	18	31	-14	-44.1%
		LRT WB	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
		WBL	33	30	16	14	6.0	9.3	-3.3	-35.7%	A	A	0	0	0	0.0%	195	18	0	18	0.0%
		WBR	22	22	10	11	1.5	1.9	-0.4	-21.2%	A	A	0	0	0	56.8%	375	18	31	-14	-44.1%
		All	1987	2030	1936	1983	4.1	3.4	0.7	20.1%	A	A	3	1	2	143.8%		349	264	85	32.2%
5	University Drive at Westgate Drive[2]	EBR	0	0	0	1	0.0	0.0	0.0	0.0%	A	A	18	42	-25	-58.0%	800	337	429	-91	-21.3%
		EBL	398	396	262	262	68.4	21.2	47.2	222.7%	E	C	122	42	80	191.7%	400	494	457	37	8.2%
		EBT	596	597	719	747	13.4	16.2	-2.7	-16.8%	B	B	29	55	-26	-47.6%	800	370	498	-128	-25.6%
		LRT EB	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
		NBL	72	72	2	4	59.9	74.4	-14.4	-19.4%	E	E	33	15	18	117.3%	75	137	106	31	29.4%
		NBT	31	32	27	27	106.7	71.3	35.4	49.7%	F	E	33	15	18	115.9%	375	137	105	32	30.0%
		NBR	34	33	30	28	47.1	26.9	20.2	75.1%	D	C	33	15	18	117.3%	375	137	106	31	29.4%
		SBR	298	299	305	304	14.7	9.1	5.7	62.7%	B	A	21	9	12	136.3%	468	267	147	120	81.8%
		SBT	18	17	18	20	84.8	45.4	39.4	86.8%	F	D	113	9	103	1139.0%	468	493	147	346	236.1%
		SBL	260	264	266	269	66.6	50.7	15.8	31.2%	E	D	113	87	25	29.2%	468	493	398	95	23.9%
		LRT WB	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
		WBT	283	288	357	358	32.3	22.8	9.5	41.9%	C	C	43	65	-22	-34.1%	265	338	354	-16	-4.5%
		WBL	40	41	8	8	19.6	26.2	-6.6	-25.2%	B	C	4	1	3	285.3%	265	83	39	44	114.8%
		WBR	325	324	321	324	10.4	15.9	-5.6	-35.0%	B	B	8	74	-66	-89.4%	265	281	373	-91	-24.5%
		All	2365	2375	2314	2352	34.2	21.9	12.3	56.3%	C	C	41	36	5	13.2%		509	501	9	1.7%

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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
6	University Drive at Westgate Shopping Center[2] (Unsignalized)	EBR	55	59	41	42	0.5	0.6	-0.1	-20.4%	A	A	0	1	-1	-99.6%	273	6	150	-145	-96.3%
		LRT EB	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
		EBT	835	835	809	837	0.2	0.4	-0.2	-50.0%	A	A	0	1	-1	-99.3%	273	6	141	-135	-96.1%
		EBL	N/A	N/A	164	165	N/A	4.8	N/A	N/A	N/A	A	N/A	4	N/A	N/A	150	N/A	179	N/A	N/A
		NBL	N/A	N/A	31	31	N/A	15.8	N/A	N/A	N/A	C	N/A	3	N/A	N/A	150	N/A	76	N/A	N/A
		NBT	N/A	N/A	0	0	N/A	0.0	N/A	N/A	N/A	A	N/A	2	-2	-100.0%	150	N/A	72	-72	-100.0%
		NBR	2	2	1	1	1.2	7.5	-6.3	-83.7%	A	A	0	0	N/A	N/A	150	0	26	N/A	N/A
		SBR	107	107	136	136	8.9	11.3	-2.4	-21.5%	A	B	0	1	-1	-70.0%	304	39	80	-41	-51.8%
		SBT	N/A	N/A	5	4	N/A	16.8	N/A	N/A	N/A	C	N/A	8	N/A	N/A	304	N/A	127	N/A	N/A
		SBL	N/A	N/A	4	5	N/A	12.7	N/A	N/A	N/A	B	N/A	8	N/A	N/A	304	N/A	129	N/A	N/A
		LRT WB	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
		WBT	546	546	523	523	2.4	3.5	-1.1	-32.6%	A	A	1	5	-5	-85.3%	1130	75	170	-96	-56.2%
		WBR	6	6	15	9	0.7	6.0	-5.4	-88.9%	A	A	1	5	-5	0.0%	1015	75	170	-96	-56.2%
		WBL	N/A	N/A	23	28	N/A	3.5	N/A	N/A	N/A	A	N/A	0	N/A	N/A	1130	N/A	2	N/A	N/A
		All	1562	1567	1752	1781	1.6	3.0	-1.5	-48.5%	A	A	0	3	-3	-92.7%		90	221	-131	-59.3%
7	University Drive at Shannon Road[2]	EBR	1	1	3	3	6.6	6.0	0.6	10.6%	A	A	11	4	7	192.7%	1448	293	163	129	79.3%
		LRT EB	6	6	N/A	N/A	0.4	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
		EBL	22	24	37	37	11.8	9.8	2.0	20.9%	B	A	1	1	0	-34.7%	1230	36	60	-24	-39.9%
		EBT	685	679	633	671	11.4	8.9	2.4	27.3%	B	A	26	19	7	37.3%	1448	369	244	125	51.1%
		NBL	121	125	5	6	64.2	48.3	15.9	33.0%	E	D	48	1	47	3950.4%	667	269	30	240	807.2%
		NBT	23	23	41	41	75.0	47.8	27.3	57.1%	E	D	24	10	14	136.1%	667	266	94	171	182.2%
		NBR	121	117	134	132	25.9	8.8	17.1	193.0%	C	A	9	0	9	0.0%	238	210	30	180	602.6%
		LRT WB	6	6	N/A	N/A	0.4	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
		SBR	56	55	76	72	11.5	6.6	4.9	73.5%	B	A	1	0	0	217.9%	720	37	22	15	68.5%
		SBT	8	7	13	15	79.7	29.3	50.3	171.7%	E	C	5	3	2	81.8%	720	92	78	14	18.6%
		SBL	117	117	120	122	74.2	34.6	39.6	114.2%	E	C	54	24	30	123.2%	620	256	177	79	44.4%
		WBT	379	372	387	390	14.3	7.9	6.4	80.3%	B	A	26	14	12	83.6%	1668	262	178	84	47.0%
		WBL	62	63	42	41	17.4	11.8	5.6	47.2%	B	B	5	2	3	121.5%	1657	128	88	40	44.7%
		WBR	50	51	60	60	12.4	5.8	6.6	113.3%	B	A	26	1	25	4828.0%	1668	263	80	184	230.0%
		All	1656	1646	1550	1590	22.8	11.8	10.9	92.3%	C	B	17	7	10	153.1%		384	245	140	57.1%

University Drive 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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
8	Pickett Road at Petty Road[2]	EBR	18	21	22	21	29.7	14.4	15.3	106.7%	C	B	162	66	96	146.6%	408	366	308	58	18.9%
		EBL	134	136	136	136	32.5	21.4	11.0	51.5%	C	C	162	95	68	71.4%	408	366	367	-1	-0.3%
		EBT	623	623	614	623	29.7	17.0	12.8	75.3%	C	B	162	95	67	71.3%	408	366	367	-1	-0.3%
		NBL	13	13	13	13	42.0	24.1	18.0	74.7%	D	C	15	8	7	88.3%	862	130	100	31	31.0%
		NBT	43	43	45	43	41.9	26.4	15.6	59.0%	D	C	15	8	7	86.4%	862	130	100	31	30.9%
		NBR	12	14	13	14	25.2	12.6	12.5	99.2%	C	B	1	0	1	0.0%	862	60	31	29	95.7%
		SBR	172	174	175	174	45.1	22.3	22.8	102.1%	D	C	74	25	49	199.8%	507	275	265	10	3.8%
		SBT	93	88	89	88	54.0	31.4	22.6	72.1%	D	C	116	54	62	113.5%	507	338	327	11	3.3%
		SBL	103	103	99	103	63.0	31.1	31.9	102.7%	E	C	116	54	62	113.5%	507	338	327	11	3.3%
		WBT	454	453	449	453	12.0	10.3	1.7	17.1%	B	B	47	31	16	50.4%	377	597	400	197	49.2%
		WBL	1	1	1	1	29.4	9.1	20.3	221.8%	C	A	47	31	16	50.2%	377	597	400	197	49.1%
		WBR	35	36	35	36	10.8	7.2	3.6	49.1%	B	A	35	19	16	86.0%	377	556	363	193	53.2%
		All	1701	1705	1692	1705	30.1	17.7	12.4	70.1%	C	B	79	40	39	96.0%		597	427	170	39.8%
9	Pickett Road at Tower Boulevard[2]	EBR	282	281	274	281	22.8	2.7	20.1	741.0%	C	A	168	0	168	0.0%	410	593	0	593	0.0%
		EBT	455	459	451	459	22.8	3.0	19.7	650.3%	C	A	168	0	168	0.0%	410	593	0	593	0.0%
		NBL	122	120	120	120	77.7	18.5	59.2	320.7%	E	C	114	1	113	9625.7%	250	343	103	240	233.4%
		LRT NB	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
		NBR	108	109	109	109	20.3	14.4	6.0	41.6%	C	B	3	1	2	132.6%	250	122	103	19	18.4%
		LRT SB	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
		WBT	369	370	368	370	15.7	0.8	15.0	1942.3%	B	A	44	0	44	0.0%	600	411	0	411	0.0%
		WBL	97	99	100	99	36.7	9.3	27.4	295.3%	D	A	13	1	11	812.6%	120	321	94	228	243.8%
		All	1444	1450	1422	1438	30.6	5.0	25.6	511.7%	C	A	78	1	77	12366.8%		593	118	475	402.1%
	University Drive Corridor	**EB LRT**	6	6			0.6														
	University Drive Corridor	**WB LRT**	6	6			0.4														
		All	19944	19990	19868	20239	17.3	15.8	1.5	9.7%	B	B	22.6	29.9	-7	-24.3%		366.5	386.7	-20	-5.2%

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 13: D-O LRT: University Drive Segment – Vissim Intersection Analysis Output Summary - 2040 Build Alternative 1 (NHC 1) 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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
1	University Drive at Snowcrest Trail/Ivy Creek Boulevard[2]	EBR	15	15	17	20	2.4	17.0	-14.6	-86.0%	A	B	0	0	0	0.0%	268	70	78	-8	-10.1%
		EBL	55	53	48	55	13.0	31.3	-18.4	-58.6%	B	C	1	1	0	0.0%	320	79	97	-18	-18.5%
		EBT	921	916	796	918	6.0	42.8	-36.7	-85.9%	A	D	21	156	-136	-86.8%	423	330	442	-112	-25.3%
		NBL	133	133	117	137	66.3	68.4	-2.1	-3.1%	E	E	61	98	-37	-37.3%	308	302	215	87	40.3%
		NBT	2	2	3	3	55.9	69.3	-13.5	-19.4%	E	E	61	98	-37	-37.3%	308	302	215	87	40.3%
		NBR	413	415	358	419	15.3	42.0	-26.7	-63.6%	B	D	61	98	-37	-37.3%	205	302	215	87	40.3%
		SBR	9	9	9	10	30.9	34.4	-3.5	-10.2%	C	C	4	19	-15	-78.8%	333	86	139	-53	-38.3%
		SBT	0	0	1	1	0.0	30.7	-30.7	-100.0%	A	C	17	19	-2	-12.2%	333	122	139	-17	-12.4%
		SBL	46	45	47	48	59.9	58.9	0.9	1.6%	E	E	16	19	-3	-13.4%	333	121	139	-18	-12.8%
		WBT	1023	1062	925	1067	3.9	29.2	-25.3	-86.8%	A	C	13	127	-114	-90.1%	632	424	579	-155	-26.8%
		WBL	11	13	12	17	6.8	25.1	-18.3	-73.0%	A	C	0	1	-1	-93.7%	450	11	34	-24	-69.2%
		WBR	42	49	43	50	3.9	27.2	-23.3	-85.7%	A	C	13	139	-126	-90.7%	632	455	604	-149	-24.7%
		All	2668	2712	2375	2745	10.8	37.7	-26.9	-71.5%	B	D	22	65	-42	-65.3%		459	604	-146	-24.1%
2	University Drive at Larchmont Road[2] (Unsignalized)	EBL	6	6	8	8	6.8	18.9	-12.1	-64.2%	A	C	2	48	-46	-95.9%	517	216	493	-277	-56.2%
		EBT	1380	1486	1153	1337	19.6	82.3	-62.7	-76.2%	C	F	18	303	-285	-94.1%	725	325	829	-505	-60.8%
		SBR	18	19	13	22	24.7	223.1	-198.4	-88.9%	C	F	10	204	-194	-95.0%	350	128	373	-245	-65.7%
		SBL	117	116	65	117	46.5	422.5	-376.0	-89.0%	E	F	10	269	-259	-96.2%	180	128	458	-330	-72.1%
		WBT	1061	1105	972	1112	0.7	0.9	-0.2	-19.2%	A	A	0	0	0	-11.8%	314	46	87	-41	-47.1%
		WBR	102	108	100	111	0.9	1.0	-0.2	-15.1%	A	A	0	0	0	74.0%	314	46	45	1	2.4%
		All	2685	2685	2311	2707	10.1	41.1	-31.0	-75.4%	B	E	7	160	-154	-95.9%		357	829	-472	-56.9%
3	University Drive at Martin Luther King Jr Parkway[1]	EBR	178	173	139	175	17.2	24.4	-7.2	-29.5%	B	C	18	17	1	6.3%	1050	251	355	-104	-29.4%
		EBL	601	618	518	620	51.1	71.6	-20.5	-28.6%	D	E	152	286	-134	-46.8%	810	508	508	0	0.0%
		EBT	717	695	549	699	51.6	81.9	-30.3	-37.0%	D	F	231	271	-41	-15.0%	1050	546	446	100	22.4%
		NBL	131	126	125	128	71.4	40.7	30.7	75.6%	E	D	49	26	23	89.0%	311	258	192	66	34.6%
		NBT	396	385	367	388	65.9	51.6	14.3	27.7%	E	D	90	66	24	36.8%	1056	317	309	8	2.4%
		NBR	258	260	255	263	17.2	18.1	-0.9	-4.9%	B	B	7	24	-17	-71.2%	381	168	187	-19	-10.3%
		SBR	329	337	319	341	16.2	15.3	0.9	6.0%	B	B	189	479	-290	-60.5%	1248	711	1162	-451	-38.8%
		SBT	831	839	789	852	51.9	46.9	5.0	10.6%	D	D	189	479	-290	-60.5%	1248	711	1162	-451	-38.8%
		SBL	290	299	237	302	65.6	144.9	-79.2	-54.7%	E	F	135	546	-412	-75.4%	333	633	1240	-607	-48.9%
		WBT	705	750	631	754	50.3	48.3	2.0	4.1%	D	D	271	413	-141	-34.2%	403	608	569	39	6.8%
		WBL	471	507	430	512	62.6	84.5	-21.9	-25.9%	E	F	221	407	-186	-45.6%	350	571	556	15	2.6%
		WBR	263	275	227	276	15.3	18.3	-3.0	-16.3%	B	B	28	107	-79	-74.1%	270	314	357	-42	-11.9%
		All	5169	5264	4585	5310	47.9	56.8	-8.9	-15.7%	D	E	132	260	-128	-49.4%		712	1264	-543	-42.9%

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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
4	University Drive at Lyckan Parkway[2] (Unsignalized)	EBR	94	95	83	99	4.5	13.9	-9.4	-67.5%	A	B	76	356	-280	-78.7%	395	467	548	-81	-14.7%
		EBL	175	176	124	157	28.9	49.0	-20.1	-41.1%	D	E	71	251	-180	-71.6%	135	546	547	-1	-0.3%
		EBT	946	1034	771	964	17.5	45.6	-28.1	-61.6%	C	E	76	356	-280	-78.7%	395	467	548	-81	-14.7%
		LRT EB	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
		NBL	182	187	166	183	61.9	40.5	21.4	52.8%	F	E	15	37	-23	-60.8%	390	62	130	-68	-52.3%
		NBR	10	8	18	12	30.2	24.0	6.2	25.7%	D	C	15	19	-5	-23.9%	390	62	102	-40	-39.0%
		SBR	220	222	187	192	45.8	30.5	15.4	50.4%	E	D	62	17	45	270.6%	1037	180	161	19	11.8%
		SBL	21	21	4	7	72.2	68.9	3.3	4.8%	F	F	62	17	45	270.6%	1037	180	161	19	11.8%
		WBT	970	1064	923	1283	9.5	12.2	-2.7	-21.8%	A	B	7	34	-26	-78.7%	375	270	410	-140	-34.2%
		LRT WB	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	79	77	69	78	12.2	24.0	-11.9	-49.3%	B	C	7	5	3	56.5%	195	270	179	91	50.8%
		WBR	35	38	8	13	3.9	6.6	-2.7	-40.4%	A	A	7	34	-26	-78.7%	375	270	410	-140	-34.2%
		All	2744	2934	2352	2988	20.3	29.0	-8.6	-29.8%	C	D	33	98	-65	-66.3%		555	550	5	0.9%
5	University Drive at Westgate Drive[2]	EBR	19	19	15	16	15.2	16.4	-1.2	-7.3%	B	B	37	89	-52	-58.3%	800	428	523	-95	-18.2%
		EBL	457	450	370	476	92.5	65.3	27.2	41.7%	F	E	242	340	-97	-28.7%	400	545	552	-7	-1.2%
		EBT	476	482	370	473	17.0	20.0	-3.0	-15.1%	B	B	51	89	-38	-42.5%	800	461	523	-62	-11.9%
		LRT EB	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
		NBL	42	43	13	15	47.0	53.9	-6.9	-12.9%	D	D	24	15	9	63.6%	75	130	112	18	15.9%
		NBT	46	46	53	53	93.2	56.2	37.0	65.9%	F	E	24	15	9	63.6%	375	130	112	18	15.9%
		NBR	22	19	26	26	59.7	25.4	34.3	135.4%	E	C	24	15	9	63.6%	375	130	112	18	15.9%
		SBR	496	492	457	490	25.5	18.4	7.1	38.7%	C	B	92	48	44	92.7%	468	627	502	126	25.1%
		SBT	94	93	64	73	86.2	37.0	49.2	132.8%	F	D	279	48	231	482.8%	468	744	502	242	48.3%
		SBL	527	529	471	516	84.2	42.3	41.9	98.9%	F	D	279	176	103	58.5%	468	744	533	211	39.5%
		LRT WB	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	507	624	496	670	62.1	43.9	18.2	41.5%	E	D	262	277	-15	-5.5%	265	411	385	26	6.8%
		WBL	64	76	32	44	9.5	38.6	-29.1	-75.5%	A	D	3	8	-5	-58.9%	265	52	87	-34	-39.5%
		WBR	420	498	382	519	22.1	26.8	-4.7	-17.7%	C	C	109	227	-118	-51.9%	265	357	332	25	7.6%
		All	3245	3383	2747	3371	51.9	36.4	15.5	42.6%	D	D	113	112	0	0.4%		747	553	194	35.2%

University Drive 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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
6	University Drive at Westgate Shopping Center[2] (Unsignalized)	EBR	205	204	190	225	0.9	1.0	0.0	-4.7%	A	A	0	29	-29	-99.9%	273	25	211	-186	-88.3%
		LRT EB	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	819	825	607	706	0.3	0.6	-0.4	-57.5%	A	A	0	32	-32	-99.9%	273	25	227	-203	-89.1%
		EBL	N/A	N/A	67	84	N/A	48.2	N/A	N/A	N/A	E	N/A	44	N/A	N/A	150	N/A	256	N/A	N/A
		NBL	N/A	N/A	28	32	N/A	77.3	N/A	N/A	N/A	F	N/A	37	N/A	N/A	150	N/A	143	N/A	N/A
		NBT	N/A	N/A	8	9	N/A	49.3	N/A	N/A	N/A	E	N/A	35	N/A	N/A	150	N/A	141	N/A	N/A
		NBR	55	55	57	62	1.4	28.9	-27.5	-95.1%	A	D	0	18	-18	-100.0%	150	7	99	22	22.2%
		SBR	82	99	86	125	57.8	127.4	-69.6	-54.7%	F	F	11	75	-64	-85.6%	304	121	128	-7	-5.7%
		SBT	N/A	N/A	5	9	N/A	152.4	N/A	N/A	N/A	F	N/A	122	N/A	N/A	304	N/A	181	N/A	N/A
		SBL	N/A	N/A	24	35	N/A	164.4	N/A	N/A	N/A	F	N/A	124	N/A	N/A	304	N/A	182	N/A	N/A
		LRT WB	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	916	1099	805	1076	56.9	55.1	1.8	3.3%	F	F	631	883	-253	-28.6%	1130	1314	1327	-13	-1.0%
		WBR	64	76	71	96	45.5	60.0	-14.5	-24.2%	E	F	631	883	-253	-28.6%	1015	1314	1327	-13	-1.0%
		WBL	N/A	N/A	22	30	N/A	33.0	N/A	N/A	N/A	D	N/A	101	N/A	N/A	1130	N/A	264	N/A	N/A
		All	2154	2370	1969	2489	27.9	36.5	-8.5	-23.4%	D	E	159	199	-40	-19.9%		1314	1327	-13	-1.0%
7	University Drive at Shannon Road[2]	EBR	55	55	46	56	35.2	17.2	18.0	104.9%	D	B	89	19	70	364.0%	1448	639	260	379	146.0%
		LRT EB	6	6	N/A	N/A	0.3	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		EBL	179	187	75	98	78.0	41.3	36.7	88.9%	E	D	85	35	51	145.1%	1230	505	202	303	149.8%
		EBT	681	685	548	690	38.2	23.7	14.5	61.0%	D	C	131	50	81	161.3%	1448	716	341	374	109.7%
		NBL	219	248	37	44	97.4	65.6	31.8	48.5%	F	E	171	37	134	365.8%	667	368	128	241	188.4%
		NBT	185	202	193	206	88.4	59.7	28.7	48.0%	F	E	155	75	80	107.4%	667	378	378	0	-0.1%
		NBR	237	266	256	269	66.7	31.6	35.1	111.3%	E	C	114	37	77	207.9%	238	323	314	9	2.8%
		LRT WB	6	6	N/A	N/A	0.4	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		SBR	40	40	40	42	49.7	43.7	5.9	13.6%	D	D	12	10	2	15.3%	720	232	130	102	78.5%
		SBT	134	133	129	135	66.0	39.6	26.3	66.4%	E	D	41	33	7	22.2%	720	284	183	101	55.1%
		SBL	172	176	151	178	55.7	82.3	-26.5	-32.3%	E	F	61	130	-69	-52.9%	620	335	443	-108	-24.4%
		WBT	748	887	802	948	66.7	50.3	16.5	32.8%	E	D	335	268	67	24.9%	1668	593	595	-2	-0.3%
		WBL	226	265	183	217	63.0	29.4	33.7	114.6%	E	C	124	31	93	297.7%	1657	575	489	87	17.7%
		WBR	191	222	187	220	58.0	38.6	19.4	50.1%	E	D	336	201	135	66.8%	1668	595	498	97	19.4%
		All	3080	3378	2648	3103	62.1	42.0	20.1	47.8%	E	D	118	77	41	53.0%		717	595	122	20.5%

University Drive 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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
8	Pickett Road at Petty Road[2]	EBR	8	8	8	8	5.9	6.6	-0.7	-10.3%	A	A	13	13	0	3.0%	408	278	269	9	3.4%
		EBL	137	136	137	136	10.7	13.0	-2.3	-17.9%	B	B	25	29	-4	-13.5%	408	337	328	9	2.6%
		EBT	398	401	398	401	9.4	9.8	-0.4	-4.4%	A	A	26	29	-4	-13.1%	408	337	328	9	2.7%
		NBL	17	17	16	17	33.0	15.3	17.7	116.0%	C	B	8	3	5	169.3%	862	98	63	35	55.3%
		NBT	23	22	23	22	36.7	16.5	20.2	122.5%	D	B	8	3	5	172.2%	862	98	63	35	55.9%
		NBR	15	15	15	15	12.7	7.9	4.9	61.8%	B	A	0	0	0	0.0%	862	50	2	48	2657.2%
		SBR	82	80	81	80	26.0	10.8	15.2	140.3%	C	B	10	1	9	816.2%	507	176	96	80	82.9%
		SBT	15	16	15	16	42.0	18.7	23.3	125.2%	D	B	39	12	27	223.0%	507	245	158	87	55.0%
		SBL	97	98	97	98	44.1	17.9	26.2	146.9%	D	B	39	12	27	224.2%	507	245	158	87	55.1%
		WBT	342	347	347	347	5.9	6.5	-0.6	-8.8%	A	A	13	11	2	19.2%	377	427	208	219	105.6%
		WBL	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	13	11	2	17.8%	377	427	208	219	105.6%
		WBR	74	76	74	76	5.0	4.7	0.3	7.4%	A	A	8	4	5	126.2%	377	392	171	220	128.6%
		All	1205	1216	1211	1216	13.5	9.9	3.6	36.2%	B	A	17	11	6	57.9%		448	328	119	36.3%
9	Pickett Road at Tower Boulevard[2]	EBR	277	278	276	278	17.5	1.6	15.9	964.3%	B	A	64	0	64	0.0%	410	535	0	535	0.0%
		EBT	234	237	233	237	24.9	1.8	23.1	1287.9%	C	A	88	0	88	0.0%	410	592	0	592	0.0%
		NBL	139	142	142	142	79.8	15.4	64.3	416.8%	E	C	76	1	75	8501.8%	250	340	88	252	287.1%
		LRT NB	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
		NBR	102	103	102	103	16.2	11.9	4.3	36.3%	B	B	2	1	1	110.0%	250	87	88	-1	-0.7%
		LRT SB	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
		WBT	278	283	279	283	13.2	0.4	12.7	2999.8%	B	A	19	0	19	0.0%	600	417	0	417	0.0%
		WBL	135	137	137	137	54.6	5.6	49.0	875.2%	D	A	64	1	63	8414.4%	120	438	92	347	379.0%
		All	1176	1192	1169	1180	29.2	4.4	24.8	562.0%	C	A	39	0	39	9203.2%		592	112	480	428.7%
	University Drive Corridor	**EB LRT**	6	6			0.3														
	University Drive Corridor	**WB LRT**	6	6			0.4														
		All	24126	25134	21368	25109	26.8	39.9	-13.1	-32.8%	C	D	75.4	138.7	-63	-45.7%		659.4	817.6	-158	-19.3%

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 14: D-O LRT: University Drive Segment – Vissim Intersection Analysis Output Summary - 2040 Build Alternative 2 (NHC 2) 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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
1	University Drive at Snowcrest Trail/Ivy Creek Boulevard[2]	**LRT EB**	6	6	N/A	N/A	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
		EBR	163	168	172	175	14.8	5.1	9.7	187.9%	B	A	5	3	2	0.0%	268	188	126	62	49.2%
		EBL	7	8	8	9	35.5	7.5	28.0	372.6%	D	A	0	0	0	0.0%	320	26	13	13	98.8%
		EBT	1073	1090	1098	1098	30.5	8.2	22.3	270.3%	C	A	137	35	102	294.8%	423	440	415	26	6.2%
		NBL	40	44	46	49	60.9	65.2	-4.2	-6.5%	E	E	14	12	2	18.6%	308	103	112	-9	-7.8%
		NBT	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	14	12	2	18.6%	308	103	112	-9	-7.8%
		NBR	52	50	57	55	5.1	6.5	-1.4	-21.9%	A	A	14	12	2	18.6%	205	103	112	-9	-7.8%
		SBR	22	23	23	23	59.8	34.6	25.2	72.8%	E	C	113	21	91	425.7%	333	244	175	69	39.5%
		SBT	1	1	1	1	30.1	48.1	-18.0	-37.5%	C	D	113	21	91	425.7%	333	244	175	69	39.5%
		SBL	238	247	59	60	67.2	65.5	1.7	2.6%	E	E	113	21	91	425.7%	333	244	175	69	39.5%
		LRT WB	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
		WBT	754	775	768	776	19.3	5.1	14.2	277.5%	B	A	55	10	45	448.2%	632	524	296	228	77.2%
		WBL	188	190	185	198	35.2	14.0	21.2	151.3%	D	B	32	8	24	289.5%	450	430	166	264	159.0%
		WBR	13	12	13	15	12.9	4.5	N/A	N/A	B	A	0	11	-10	-95.5%	632	53	317	-263	-83.2%
		All	2562	2620	2430	2459	29.9	10.2	19.8	194.6%	C	B	44	14	30	212.7%		536	417	118	28.4%
2	University Drive at Larchmont Road[2] (Unsignalized)	EBL	N/A	N/A	15	13	N/A	15.8	N/A	N/A	N/A	C	N/A	21	N/A	N/A	517	N/A	454	N/A	N/A
		EBT	1344.4	1387	1183	1200	57.6	22.2	35.4	159.4%	F	C	152	21	130	614.6%	725	746	454	292	64.2%
		LRT EB	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
		SBR	57	57	60	71	7.7	71.6	-63.9	-89.3%	A	F	0	161	-161	-100.0%	350	6	377	-371	-98.3%
		SBL1	N/A	N/A	179	213	N/A	138.9	N/A	N/A	N/A	F	N/A	221	N/A	N/A	180	N/A	452	N/A	N/A
		WBT	906	920	906	918	0.6	0.3	0.2	68.2%	A	A	0	0	0	0.0%	314	10	0	10	0.0%
		LRT WB	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
		WBR	1	3	24	21	0.2	0.4	-0.2	-52.7%	A	A	0	0	0	0.0%	314	10	0	10	0.0%
		All	2320	2379	2367	2436	14.9	19.4	-4.5	-23.3%	B	C	19	73	-54	-74.1%		746	528	218	41.3%

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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
3	University Drive at Martin Luther King Jr Parkway[1]	EBR	98	102	102	107	21.8	10.9	10.9	100.4%	C	B	21	5	16	334.2%	1050	391	151	240	159.3%
		EBL	555	582	562	594	79.8	69.0	10.8	15.6%	E	E	282	242	39	16.3%	810	527	511	16	3.1%
		EBT	685	703	678	712	30.9	31.3	-0.4	-1.3%	C	C	66	107	-41	-38.1%	1050	412	440	-28	-6.4%
		LRT EB	6	6	N/A	N/A	0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A	N/A	40	N/A	N/A	N/A
		NBL	66	65	69	67	39.8	31.3	8.5	27.3%	D	C	8	11	-3	-26.2%	311	121	106	15	14.1%
		NBT	539	554	557	558	59.4	51.0	8.4	16.5%	E	D	116	99	17	17.0%	1056	499	366	133	36.4%
		NBR	176	177	176	177	8.4	8.3	0.1	0.7%	A	A	1	0	1	800.0%	381	65	29	36	124.3%
		SBR	431	434	442	443	16.9	12.4	4.5	36.3%	B	B	229	89	139	156.0%	1248	940	415	525	126.6%
		SBT	652	647	670	663	50.4	38.3	12.0	31.4%	D	D	229	89	N/A	N/A	1248	940	415	N/A	N/A
		SBL	332	350	339	349	101.4	40.9	60.5	147.7%	F	D	343	86	258	301.1%	333	982	482	500	103.7%
		WBT	411	424	419	429	52.7	45.2	7.5	16.5%	D	D	109	74	35	46.8%	403	504	444	60	13.6%
		LRT WB	6	6	N/A	N/A	5.8	N/A	N/A	N/A	A	N/A	8	N/A	N/A	N/A	N/A	220	N/A	N/A	N/A
		WBL	261	284	287	289	241.7	71.1	170.5	239.8%	F	E	301	97	204	210.2%	350	539	473	66	14.0%
		WBR	96	107	105	107	11.5	15.2	-3.7	-24.4%	B	B	109	0	109	0.0%	370	504	31	473	1501.7%
		All	4315	4441	4406	4495	61.0	40.7	20.3	50.0%	E	D	130	75	55	73.4%		985	531	454	85.4%
4	University Drive at Lyckan Parkway[2] (Unsignalized)	EBR	28	33	36	37	5.1	2.1	3.0	146.8%	A	A	62	6	56	895.7%	395	448	262	186	71.0%
		EBL	N/A	N/A	148	158	N/A	3.8	N/A	N/A	N/A	A	N/A	0	N/A	N/A	135	N/A	47	N/A	N/A
		EBT	1164	1216	1029	1059	20.2	3.9	16.3	418.0%	C	A	62	6	56	895.7%	395	448	262	186	71.0%
		LRT EB	6	6	N/A	N/A	6.3	N/A	N/A	N/A	A	N/A	9	N/A	N/A	N/A	N/A	233	N/A	N/A	N/A
		NBL	N/A	N/A	8	8	N/A	11.7	N/A	N/A	N/A	B	N/A	1	N/A	N/A	390	N/A	58	N/A	N/A
		NBT	N/A	N/A	0	0	N/A	0.0	N/A	N/A	N/A	A	N/A	1	N/A	N/A	390	N/A	58	N/A	N/A
		NBR	2	5	11	10	8.2	11.4	-3.2	-28.0%	A	B	0	0	0	0.0%	390	0	10	-10	-100.0%
		SBR	105	105	94	93	8.0	7.5	0.6	7.4%	A	A	0	0	0	-33.3%	1037	11	28	-18	-62.2%
		SBT	N/A	N/A	0	0	N/A	0.0	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	1037	N/A	28	N/A	N/A
		SBL	N/A	N/A	6	7	N/A	11.1	N/A	N/A	N/A	B	N/A	0	N/A	N/A	1037	N/A	28	N/A	N/A
		WBT	677	710	579	586	53.9	1.5	52.4	3606.9%	F	A	27	0	27	0.0%	375	274	31	242	772.6%
		LRT WB	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
		WBL	N/A	N/A	16	14	N/A	9.3	N/A	N/A	N/A	A	N/A	0	N/A	N/A	195	N/A	0	N/A	N/A
		WBR	22	22	10	11	2.9	1.9	1.0	52.4%	A	A	27	0	27	0.0%	375	274	31	242	772.6%
		All	2011	2103	1936	1983	20.1	3.4	16.6	483.8%	C	A	24	1	23	1853.4%		459	264	195	74.0%

University Drive 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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
5	University Drive at Westgate Drive[2]	EBR	0	0	0	1	0.0	0.0	0.0	0.0%	A	A	51	42	9	20.6%	800	489	429	60	13.9%
		EBL	530	550	262	262	75.2	21.2	54.0	254.9%	E	C	250	42	209	499.2%	400	548	457	92	20.1%
		EBT	624	671	719	747	18.4	16.2	2.2	13.8%	B	B	66	55	11	19.7%	800	522	498	24	4.8%
		LRT EB	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
		NBL	238	244	2	4	53.2	74.4	-21.2	-28.5%	D	E	62	15	47	312.2%	75	141	106	36	33.6%
		NBT	35	37	27	27	75.6	71.3	4.3	6.1%	E	E	62	15	47	309.6%	375	141	105	36	34.2%
		NBR	34	33	30	28	44.3	26.9	17.4	64.7%	D	C	48	15	33	216.4%	375	123	106	17	15.9%
		SBR	301	299	305	304	9.4	9.1	0.3	3.5%	A	A	1	9	-8	-93.3%	468	84	147	-62	-42.6%
		SBT	30	32	18	20	83.4	45.4	38.0	83.6%	F	D	125	9	116	1280.4%	468	562	147	416	283.5%
		SBL	277	281	266	269	70.2	50.7	19.4	38.2%	E	D	125	87	38	43.9%	468	562	398	164	41.3%
		LRT WB	6	6	N/A	N/A	0.5	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A	N/A	40	N/A	N/A	N/A
		WBT	251	259	357	358	19.2	22.8	-3.6	-15.9%	B	C	36	65	-29	-45.2%	265	287	354	-67	-18.9%
		WBL	71	70	8	8	23.7	26.2	-2.5	-9.4%	C	C	10	1	9	848.3%	265	171	39	132	341.6%
		WBR	324	324	321	324	11.9	15.9	-4.0	-25.0%	B	B	36	74	-39	-52.0%	265	287	373	-85	-22.9%
		All	2726	2812	2314	2352	37.9	21.9	16.0	73.1%	D	C	62	36	26	73.8%		571	501	71	14.1%
6	University Drive at Westgate Shopping Center[2] (Unsignalized)	EBR	58	59	41	42	0.6	0.6	0.0	-4.3%	A	A	0	1	-1	-91.3%	273	27	150	-123	-81.9%
		LRT EB	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
		EBT	877	926	809	837	0.2	0.4	-0.2	-39.5%	A	A	0	1	-1	-85.2%	273	27	141	-114	-80.7%
		EBL	N/A	N/A	164	165	N/A	4.8	N/A	N/A	N/A	A	N/A	4	N/A	N/A	150	N/A	179	N/A	N/A
		NBL	N/A	N/A	31	31	N/A	15.8	N/A	N/A	N/A	C	N/A	3	N/A	N/A	150	N/A	76	N/A	N/A
		NBT	N/A	N/A	0	0	N/A	0.0	N/A	N/A	N/A	A	N/A	2	-2	-100.0%	150	N/A	72	-72	-100.0%
		NBR	2	2	1	1	2.1	7.5	-5.5	-72.5%	A	A	0	0	N/A	N/A	150	0	26	N/A	N/A
		SBR	107	107	136	136	6.2	11.3	-5.2	-45.7%	A	B	0	1	-1	-96.8%	304	33	80	-47	-59.0%
		SBT	N/A	N/A	5	4	N/A	16.8	N/A	N/A	N/A	C	N/A	8	N/A	N/A	304	N/A	127	N/A	N/A
		SBL	N/A	N/A	4	5	N/A	12.7	N/A	N/A	N/A	B	N/A	8	N/A	N/A	304	N/A	129	N/A	N/A
		LRT WB	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
		WBT	542	546	523	523	1.0	3.5	-2.5	-72.1%	A	A	0	5	-5	-94.0%	1130	74	170	-96	-56.7%
		WBR	6	6	15	9	0.6	6.0	-5.4	-89.4%	A	A	0	5	-5	0.0%	1015	30	170	-140	-82.5%
		WBL	N/A	N/A	23	28	N/A	3.5	N/A	N/A	N/A	A	N/A	0	N/A	N/A	1130	N/A	2	N/A	N/A
		All	1604	1658	1752	1781	0.9	3.0	-2.1	-70.4%	A	A	0	3	-3	-97.4%		99	221	-121	-55.0%

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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
7	University Drive at Shannon Road[2]	EBR	0	1	3	3	0.0	6.0	-6.0	-100.0%	A	A	6	4	2	57.3%	1448	215	163	52	31.8%
		LRT EB	6	6	N/A	N/A	0.4	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A	N/A	20	N/A	N/A	N/A
		EBL	112	115	37	37	9.0	9.8	-0.8	-8.1%	A	A	4	1	3	200.2%	1230	154	60	93	154.3%
		EBT	643	679	633	671	9.0	8.9	0.1	1.2%	A	A	19	19	0	-0.9%	1448	292	244	47	19.4%
		NBL	120	125	5	6	57.9	48.3	9.6	20.0%	E	D	43	1	42	3493.0%	667	304	30	275	925.7%
		NBT	22	23	41	41	79.4	47.8	31.6	66.3%	E	D	10	10	0	-4.1%	667	99	94	5	5.4%
		NBR	120	117	134	132	9.2	8.8	0.3	3.6%	A	A	1	0	0	221.7%	238	38	30	8	27.0%
		LRT WB	6	6	N/A	N/A	0.4	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A	N/A	40	N/A	N/A	N/A
		SBR	56	55	76	72	10.9	6.6	4.3	65.4%	B	A	0	0	0	130.5%	720	36	22	15	66.9%
		SBT	7	7	13	15	68.7	29.3	39.4	134.3%	E	C	4	3	1	51.2%	720	93	78	15	19.6%
		SBL	113	117	120	122	67.5	34.6	32.9	94.9%	E	C	47	24	23	97.4%	620	241	177	64	36.1%
		WBT	372	372	387	390	10.2	7.9	2.3	28.5%	B	A	17	14	3	21.6%	1668	210	178	32	17.8%
		WBL	64	63	42	41	14.8	11.8	3.0	25.1%	B	B	4	2	2	74.5%	1657	106	88	17	19.8%
		WBR	51	51	60	60	7.6	5.8	1.8	31.1%	A	A	17	1	17	3154.5%	1668	211	80	131	164.7%
		All	1693	1737	1550	1590	18.0	11.8	6.2	52.0%	B	B	12	7	6	85.3%		328	245	83	34.0%
8	Pickett Road at Petty Road[2]	EBR	22	21	22	21	14.1	14.4	-0.3	-1.9%	B	B	64	66	-2	-3.3%	408	301	308	-7	-2.2%
		EBL	136	136	136	136	20.5	21.4	-0.9	-4.4%	C	C	91	95	-4	-4.1%	408	363	367	-3	-1.0%
		EBT	613	623	614	623	17.5	17.0	0.6	3.4%	B	B	91	95	-4	-4.2%	408	363	367	-4	-1.0%
		NBL	13	13	13	13	42.9	24.1	18.8	78.2%	D	C	15	8	7	95.4%	862	124	100	25	24.7%
		NBT	45	43	45	43	41.6	26.4	15.2	57.8%	D	C	15	8	7	93.4%	862	124	100	25	24.6%
		NBR	13	14	13	14	29.0	12.6	16.3	129.2%	C	B	1	0	1	480.8%	862	54	31	23	75.3%
		SBR	176	174	175	174	40.3	22.3	18.0	80.6%	D	C	63	25	38	156.4%	507	272	265	7	2.7%
		SBT	89	88	89	88	50.4	31.4	19.0	60.6%	D	C	103	54	48	89.1%	507	335	327	8	2.4%
		SBL	99	103	99	103	53.5	31.1	22.4	72.0%	D	C	103	54	48	89.1%	507	335	327	8	2.4%
		WBT	449	453	449	453	10.8	10.3	0.5	5.0%	B	B	39	31	8	26.4%	377	543	400	143	35.7%
		WBL	1	1	1	1	22.1	9.1	13.0	141.9%	C	A	36	31	5	17.2%	377	543	400	142	35.6%
		WBR	35	36	35	36	9.4	7.2	2.2	29.7%	A	A	28	19	9	49.1%	377	502	363	139	38.3%
		All	1689	1705	1692	1705	22.9	17.7	5.2	29.2%	C	B	54	40	14	33.7%		543	427	116	27.1%

University Drive 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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
9	Pickett Road at Tower Boulevard[2]	EBR	272	281	274	281	9.9	2.7	7.2	264.2%	A	A	41	0	41	0.0%	410	516	0	516	0.0%
		EBT	450	459	451	459	12.5	3.0	9.5	313.1%	B	A	65	0	65	0.0%	410	608	0	608	0.0%
		NBL	117	120	120	120	87.6	18.5	69.2	374.6%	F	C	73	1	72	6099.1%	250	341	103	238	231.5%
		LRT NB	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
		NBR	108	109	109	109	20.3	14.4	6.0	41.6%	C	B	3	1	2	132.6%	250	122	103	19	18.4%
		LRT SB	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
		WBT	368	370	368	370	7.5	0.8	6.7	874.3%	A	A	17	0	17	0.0%	600	358	0	358	0.0%
		WBL	99	99	100	99	19.1	9.3	9.8	105.7%	B	A	4	1	2	162.4%	120	183	94	89	95.4%
		All	1426	1450	1422	1438	17.9	5.0	12.9	257.1%	B	A	25	1	25	3965.9%		608	118	490	414.5%
	University Drive Corridor	**EB LRT**	6	6			7.1														
	University Drive Corridor	**WB LRT**	6	6			6.8														
		All	20347	20905	19868	20239	26.1	15.8	10.3	65.4%	C	B	41.6	29.9	12	39.3%		532.1	386.7	145	37.6%

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 15: D-O LRT: University Drive Segment – Vissim Intersection Analysis Output Summary - 2040 Build Alternative 2 (NHC 2) 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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
1	University Drive at Snowcrest Trail/Ivy Creek Boulevard[2]	**LRT EB**	6	6	N/A	N/A	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
		EBR	15	15	17	20	8.8	17.0	-8.2	-48.3%	A	B	0	0	0	0.0%	268	73	78	-4	-5.8%
		EBL	55	59	48	55	28.4	31.3	-2.9	-9.4%	C	C	5	1	4	0.0%	320	121	97	24	25.1%
		EBT	908	910	796	918	21.8	42.8	-20.9	-48.9%	C	D	78	156	-79	-50.3%	423	427	442	-15	-3.3%
		NBL	117	133	117	137	71.1	68.4	2.7	4.0%	E	E	67	98	-31	-32.0%	308	209	215	-6	-2.7%
		NBT	2	2	3	3	50.1	69.3	-19.2	-27.8%	D	E	67	98	-31	-32.0%	308	209	215	-6	-2.7%
		NBR	412	415	358	419	16.7	42.0	-25.3	-60.2%	B	D	67	98	-31	-32.0%	205	209	215	-6	-2.7%
		SBR	9	9	9	10	77.0	34.4	42.6	123.7%	E	C	84	19	65	344.3%	333	242	139	103	74.1%
		SBT	0	0	1	1	0.0	30.7	-30.7	-100.0%	A	C	84	19	65	344.3%	333	242	139	103	74.1%
		SBL	156	161	47	48	84.4	58.9	25.5	43.2%	F	E	84	19	65	344.3%	333	242	139	103	74.1%
		LRT WB	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	959	1062	925	1067	22.3	29.2	-6.9	-23.6%	C	C	91	127	-36	-28.5%	632	673	579	95	16.3%
		WBL	9	13	12	17	24.6	25.1	-0.5	-2.0%	C	C	1	1	0	-1.9%	450	36	34	1	3.9%
		WBR	45	49	43	50	14.5	27.2	N/A	N/A	B	C	1	139	-138	-99.4%	632	54	604	-551	-91.1%
		All	2696.9	2840	2375	2745	27.0	37.7	-10.7	-28.4%	C	D	45	65	-20	-30.5%		673	604	69	11.4%
2	University Drive at Larchmont Road[2] (Unsignalized)	EBL	N/A	N/A	8	8	N/A	18.9	N/A	N/A	N/A	C	N/A	48	N/A	N/A	517	N/A	493	N/A	N/A
		EBT	1453	1486	1153	1337	55.6	82.3	-26.7	-32.5%	F	F	133	303	-170	-56.1%	725	743	829	-86	-10.4%
		LRT EB	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
		SBR	19	19	13	22	8.5	223.1	-214.5	-96.2%	N/A	F	0	204	-204	-100.0%	350	2	373	-371	-99.4%
		SBL1	N/A	N/A	65	117	N/A	422.5	N/A	N/A	N/A	F	N/A	269	N/A	N/A	180	N/A	458	N/A	N/A
		WBT	1010	1105	972	1112	1.2	0.9	0.4	42.3%	A	A	0	0	0	19.8%	314	87	87	1	0.6%
		LRT WB	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	97	108	100	111	0.9	1.0	-0.1	-13.9%	A	A	0	0	0	136.3%	314	87	45	42	94.7%
		All	2590.9	2730	2311	2707	14.2	41.1	-26.9	-65.4%	B	E	17	160	-144	-89.6%		743	829	-86	-10.4%

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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
3	University Drive at Martin Luther King Jr Parkway[1]	EBR	168	173	139	175	27.3	24.4	2.9	11.9%	C	C	86	17	69	414.8%	1050	458	355	103	29.2%
		EBL	590	618	518	620	78.2	71.6	6.6	9.3%	E	E	276	286	-10	-3.6%	810	526	508	18	3.5%
		EBT	688	695	549	699	33.4	81.9	-48.5	-59.2%	C	F	86	271	-186	-68.4%	1050	458	446	12	2.8%
		LRT EB	6	6	N/A	N/A	0	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		NBL	138	126	125	128	64.2	40.7	23.5	57.8%	E	D	42	26	16	63.8%	311	241	192	49	25.4%
		NBT	406	385	367	388	55.6	51.6	4.0	7.8%	E	D	78	66	12	18.8%	1056	303	309	-6	-1.9%
		NBR	224	205	255	263	7.8	18.1	-10.3	-57.0%	A	B	0	24	-24	-98.1%	381	62	187	-125	-66.7%
		SBR	337	337	319	341	15.2	15.3	-0.1	-0.6%	B	B	225	479	-254	-53.1%	1248	814	1162	-348	-30.0%
		SBT	818	839	789	852	57.4	46.9	10.5	22.3%	E	D	225	479	-254	-53.1%	1248	814	1162	-348	-30.0%
		SBL	277	299	237	302	87.2	144.9	-57.7	-39.8%	F	F	202	546	-344	-62.9%	333	746	1240	-493	-39.8%
		WBT	634	750	631	754	59.5	48.3	11.2	23.2%	E	D	321	413	-91	-22.2%	403	572	569	3	0.6%
		LRT WB	6	6	N/A	N/A	5.8	N/A	N/A	N/A	A	N/A	8	N/A	N/A	N/A		220	N/A	N/A	N/A
		WBL	336	507	430	512	196.7	84.5	112.1	132.7%	F	F	434	407	27	6.6%	350	563	556	7	1.3%
		WBR	235	275	227	276	22.4	18.3	4.1	22.3%	C	B	376	107	270	253.5%	370	632	357	275	77.1%
		All	4861	5221	4585	5310	60.1	56.8	3.3	5.9%	E	E	169	260	-91	-35.2%		814	1264	-450	-35.6%
4	University Drive at Lyckan Parkway[2] (Unsignalized)	EBR	92	95	83	99	2.6	13.9	-11.3	-81.3%	A	B	37	356	-319	-89.6%	395	374	548	-174	-31.8%
		EBL	N/A	N/A	124	157	N/A	49.0	N/A	N/A	N/A	E	N/A	251	N/A	N/A	135	N/A	547	N/A	N/A
		EBT	1009	1115	771	964	16.0	45.6	-29.6	-64.9%	C	E	37	356	-319	-89.6%	395	374	548	-174	-31.8%
		LRT EB	6	6	N/A	N/A	6.3	N/A	N/A	N/A	A	N/A	9	N/A	N/A	N/A		233	N/A	N/A	N/A
		NBL	N/A	N/A	166	183	N/A	40.5	N/A	N/A	N/A	E	N/A	37	N/A	N/A	390	N/A	130	N/A	N/A
		NBT	N/A	N/A	2	2	N/A	21.3	N/A	N/A	N/A	C	N/A	37	N/A	N/A	390	N/A	130	N/A	N/A
		NBR	17	21	18	12	13.6	24.0	-10.4	-43.2%	B	C	0	19	-19	-99.9%	390	32	102	-70	-68.9%
		SBR	222	222	187	192	10.1	30.5	-20.4	-67.0%	B	D	1	17	-16	-96.3%	1037	73	161	-87	-54.3%
		SBT	N/A	N/A	1	1	N/A	24.4	N/A	N/A	N/A	C	N/A	17	N/A	N/A	1037	N/A	161	N/A	N/A
		SBL	N/A	N/A	4	7	N/A	68.9	N/A	N/A	N/A	F	N/A	17	N/A	N/A	1037	N/A	161	N/A	N/A
		WBT	1031	1310	923	1283	20.9	12.2	8.7	71.4%	C	B	198	34	164	488.3%	375	479	410	69	16.8%
		LRT WB	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	N/A	N/A	69	78	N/A	24.0	N/A	N/A	N/A	C	N/A	5	N/A	N/A	195	N/A	179	N/A	N/A
		WBR	31	38	8	13	12.3	6.6	5.7	86.7%	B	A	198	34	164	488.3%	375	479	410	69	16.8%
		All	2414	2813	2355	2991	32.1	29.0	3.1	10.8%	D	D	75	98	-23	-23.4%		480	550	-69	-12.6%

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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
5	University Drive at Westgate Drive[2]	EBR	19	19	15	16	24.6	16.4	8.2	50.1%	C	B	73	89	-17	-18.7%	800	506	523	-17	-3.2%
		EBL	515	562	370	476	78.5	65.3	13.2	20.2%	E	E	240	340	-100	-29.3%	400	543	552	-8	-1.5%
		EBT	479	500	370	473	31.9	20.0	12.0	59.8%	C	B	90	89	1	1.0%	800	542	523	19	3.7%
		LRT EB	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
		NBL	223	288	13	15	81.6	53.9	27.7	51.5%	F	D	97	15	82	555.1%	75	146	112	34	30.2%
		NBT	47	59	53	53	86.0	56.2	29.8	53.0%	F	E	97	15	82	555.1%	375	146	112	34	30.2%
		NBR	15	19	26	26	55.0	25.4	29.6	116.9%	E	C	75	15	60	405.5%	375	123	112	10	9.1%
		SBR	487	492	457	490	21.3	18.4	2.9	15.9%	C	B	54	48	6	12.1%	468	547	502	46	9.1%
		SBT	101	99	64	73	92.5	37.0	55.5	149.8%	F	D	308	48	260	543.1%	468	743	502	241	48.1%
		SBL	562	565	471	516	69.3	42.3	26.9	63.7%	E	D	308	176	132	74.9%	468	743	533	210	39.3%
		LRT WB	6	6	N/A	N/A	0.3	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		40	N/A	N/A	N/A
		WBT	395	543	496	670	91.8	43.9	48.0	109.2%	F	D	220	277	-57	-20.5%	265	339	385	-46	-11.9%
		WBL	117	157	32	44	58.6	38.6	20.0	51.9%	E	D	141	8	133	1740.8%	265	333	87	246	284.2%
		WBR	371	498	382	519	31.2	26.8	4.4	16.4%	C	C	220	227	-7	-3.1%	265	339	332	7	2.1%
		All	3342	3813	2747	3371	57.5	36.4	21.1	57.9%	E	D	137	112	25	22.4%		743	553	190	34.3%
6	University Drive at Westgate Shopping Center[2] (Unsignalized)	EBR	190.9	205	190	225	0.9	1.0	0.0	-4.1%	A	A	0	29	-29	-99.8%	273	32	211	-179	-85.0%
		LRT EB	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	864	879	607	706	0.3	0.6	-0.4	-55.4%	A	A	0	32	-32	-99.8%	273	32	227	-196	-86.1%
		EBL	N/A	N/A	67	84	N/A	48.2	N/A	N/A	N/A	E	N/A	44	N/A	N/A	150	N/A	256	N/A	N/A
		NBL	N/A	N/A	28	32	N/A	77.3	N/A	N/A	N/A	F	N/A	37	N/A	N/A	150	N/A	143	N/A	N/A
		NBT	N/A	N/A	8	9	N/A	49.3	N/A	N/A	N/A	E	N/A	35	N/A	N/A	150	N/A	141	N/A	N/A
		NBR	59	55	57	62	1.7	28.9	-27.1	-93.9%	A	D	0	18	-18	-99.9%	150	26	99	-88	-88.8%
		SBR	99	99	86	125	5.2	127.4	-122.2	-95.9%	A	F	0	75	-75	-99.9%	304	11	128	-117	-91.4%
		SBT	N/A	N/A	5	9	N/A	152.4	N/A	N/A	N/A	F	N/A	122	N/A	N/A	304	N/A	181	N/A	N/A
		SBL	N/A	N/A	24	35	N/A	164.4	N/A	N/A	N/A	F	N/A	124	N/A	N/A	304	N/A	182	N/A	N/A
		LRT WB	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	831	1099	805	1076	69.5	55.1	14.4	26.2%	F	F	745	883	-138	-15.6%	1130	1385	1327	58	4.3%
		WBR	56.3	76	71	96	53.3	60.0	N/A	N/A	F	F	694	883	-138	-15.6%	1015	1319	1327	58	4.3%
		WBL	N/A	N/A	22	30	N/A	33.0	N/A	N/A	N/A	D	N/A	101	N/A	N/A	1130	N/A	264	N/A	N/A
		All	2111	2425	1969	2489	29.1	36.5	-7.3	-20.1%	D	E	180	199	-19	-9.4%		1385	1327	58	4.3%

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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
7	University Drive at Shannon Road[2]	EBR	56	55	46	56	29.9	17.2	12.7	73.9%	C	B	65	19	46	242.5%	1448	551	260	292	112.2%
		LRT EB	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
		EBL	220	241	75	98	42.3	41.3	1.0	2.3%	D	D	58	35	23	65.7%	1230	459	202	257	126.9%
		EBT	672	685	548	690	33.4	23.7	9.6	40.6%	C	C	104	50	54	107.4%	1448	628	341	287	84.0%
		NBL	196	248	37	44	100.3	65.6	34.7	52.9%	F	E	149	37	112	305.7%	667	359	128	231	180.9%
		NBT	222	257	193	206	81.7	59.7	22.0	36.8%	F	E	121	75	47	62.5%	667	370	378	-9	-2.3%
		NBR	224	266	256	269	52.8	31.6	21.3	67.3%	D	C	83	37	46	123.7%	238	316	314	2	0.6%
		LRT WB	6	6	N/A	N/A	0.2	N/A	N/A	N/A	A	N/A	0	N/A	N/A	N/A		0	N/A	N/A	N/A
		SBR	41	40	40	42	56.9	43.7	13.2	30.1%	E	D	10	10	0	-3.9%	720	132	130	2	1.6%
		SBT	137	133	129	135	64.6	39.6	24.9	62.9%	E	D	41	33	7	22.4%	720	186	183	3	1.6%
		SBL	171	176	151	178	64.1	82.3	-18.2	-22.1%	E	F	67	130	-62	-48.0%	620	332	443	-111	-25.1%
		WBT	708	887	802	948	69.5	50.3	19.2	38.3%	E	D	314	268	46	17.1%	1668	582	595	-13	-2.1%
		WBL	211	265	183	217	52.8	29.4	23.4	79.8%	D	C	93	31	62	199.9%	1657	578	489	89	18.2%
		WBR	176	222	187	220	61.0	38.6	22.3	57.7%	E	D	314	201	113	55.9%	1668	582	498	84	17.0%
		All	3045	3487	2648	3103	57.7	42.0	15.7	37.3%	E	D	101	77	24	31.4%		643	595	48	8.1%
8	Pickett Road at Petty Road[2]	EBR	8	8	8	8	5.9	6.6	-0.7	-10.3%	A	A	13	13	0	3.0%	408	278	269	9	3.4%
		EBL	137	136	137	136	10.7	13.0	-2.3	-17.9%	B	B	25	29	-4	-13.5%	408	337	328	9	2.6%
		EBT	398	401	398	401	9.4	9.8	-0.4	-4.4%	A	A	26	29	-4	-13.1%	408	337	328	9	2.7%
		NBL	17	17	16	17	33.0	15.3	17.7	116.0%	C	B	8	3	5	169.3%	862	98	63	35	55.3%
		NBT	23	22	23	22	36.7	16.5	20.2	122.5%	D	B	8	3	5	172.2%	862	98	63	35	55.9%
		NBR	15	15	15	15	12.7	7.9	4.9	61.8%	B	A	0	0	0	0.0%	862	50	2	48	2657.2%
		SBR	82	80	81	80	26.0	10.8	15.2	140.3%	C	B	10	1	9	816.2%	507	176	96	80	82.9%
		SBT	15	16	15	16	42.0	18.7	23.3	125.2%	D	B	39	12	27	223.0%	507	245	158	87	55.0%
		SBL	97	98	97	98	44.1	17.9	26.2	146.9%	D	B	39	12	27	224.2%	507	245	158	87	55.1%
		WBT	342	347	347	347	5.9	6.5	-0.6	-8.8%	A	A	13	11	2	19.2%	377	427	208	219	105.6%
		WBL	0	0	0	0	0.0	0.0	0.0	0.0%	A	A	13	11	2	17.8%	377	427	208	219	105.6%
		WBR	74	76	74	76	5.0	4.7	0.3	7.4%	A	A	8	4	5	126.2%	377	392	171	220	128.6%
		All	1205	1216	1211	1216	13.5	9.9	3.6	36.2%	B	A	17	11	6	57.9%		448	328	119	36.3%

University Drive 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	Build	No-Build	Difference Absolute	Difference %
			Model	Demand	Model	Demand															
9	Pickett Road at Tower Boulevard[2]	EBR	277	278	276	278	17.5	1.6	15.9	964.3%	B	A	64	0	64	0.0%	410	535	0	535	0.0%
		EBT	234	237	233	237	24.9	1.8	23.1	1287.9%	C	A	88	0	88	0.0%	410	592	0	592	0.0%
		NBL	139	142	142	142	79.8	15.4	64.3	416.8%	E	C	76	1	75	8501.8%	250	340	88	252	287.1%
		LRT NB	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
		NBR	102	103	102	103	16.2	11.9	4.3	36.3%	B	B	2	1	1	110.0%	250	87	88	-1	-0.7%
		LRT SB	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
		WBT	278	283	279	283	13.2	0.4	12.7	2999.8%	B	A	19	0	19	0.0%	600	417	0	417	0.0%
		WBL	135	137	137	137	54.6	5.6	49.0	875.2%	D	A	64	1	63	8414.4%	120	438	92	347	379.0%
		All	1176	1192	1169	1180	29.2	4.4	24.8	562.0%	C	A	39	0	39	9203.2%		592	112	480	428.7%
	University Drive Corridor	**EB LRT**	6	6			6.5														
	University Drive Corridor	**WB LRT**	6	6			6.3														
		All	23442	25737	21371	25112	39.7	39.9	-0.2	-0.6%	D	D	103.4	138.7	-35	-25.4%		783.1	817.6	-34	-4.2%

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 Threshold

Based on the identified improvements all Build Alternative intersections are expected to operate at LOS E or better, which meets the City of Durham traffic impact criteria for 2040 Build conditions. However, queuing and increase in delay at movement level were also considered in determining if mitigation was warranted. The impacts at all the intersections along the University Drive and Pickett Road segments were assessed in regards to the City of Durham criteria except that the Martin Luther King Parkway was assessed based on the NCDOT criteria. The movements that do not meet the NCDOT thresholds or the City of Durham thresholds are listed and discussed below for each intersection.

6.1.1 University Drive at Ivy Creek Boulevard/ Snowcrest Trail

The City of Durham – Compact Neighborhood traffic impact criteria are applied to the intersection of University Drive at Ivy Creek Boulevard/Snowcrest Trail, as both roadways are under city jurisdiction. Due to alignment differences, the two Build LRT Alternatives report different delays, LOS, and queue lengths at this intersection. For both the 2040 LRT NHC 1 and 2040 LRT NHC 2/NHC LPA Alternatives, the overall intersection delays during both peak hours would meet the City of Durham thresholds.

For the LRT NHC 1 Alternative, all of the individual intersection movements are expected to meet the City of Durham thresholds in both peak hours. Under the LRT NHC 2/NHC LPA Alternative, the southbound Snowcrest Trail left turn is expected to degrade from a No-Build LOS E to Build LOS F.

For the 2040 LRT NHC 1 Alternative, the maximum queue length for 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:

- Northbound Ivy Creek Boulevard right turn exceeds storage space by 97 feet in PM only

For the NHC 1 Alternative, the northbound Ivy Creek Boulevard right turn queue is impacted due to downstream congestion at University Drive and Martin Luther King Jr. Parkway. Although the maximum queue length exceeds the northbound Ivy Creek Boulevard right bay storage space, it would be contained by the northbound approach before reaching the roundabout to the south. Additionally, the maximum queue events are considered infrequent occurrences, whereas the movement's average queue is expected to be far shorter and would be contained within the northbound right turn bay storage space.

For the 2040 LRT NHC 2/NHC LPA 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:

- Eastbound University Drive through movement exceeds storage space by 17 feet in AM only
- Northbound Ivy Creek Boulevard right turn exceeds storage space by 23 feet in AM and by 129 feet in PM
- Westbound University Drive through movement exceeds storage space by 41 feet in PM only

For the NHC 2/NHC LPA Alternative, the maximum queues for the eastbound and westbound through movements are expected to slightly exceed the available storage space, although the additional queue will reach unsignalized intersections and should not cause gridlock at signalized intersections further

upstream. Additionally, the maximum queues are expected to be infrequent events; however, the average queues for all three movements would be well below the storage space and would not reach the upstream signalized intersections. Under the NHC 2/NHC LPA Alternative, two roadway modifications were proposed and included in the design including a dedicated westbound University Drive right turn bay and adding a third eastbound through lane starting on the east side of Ivy Creek Boulevard and continuing through Martin Luther King Jr Parkway. With these lane additions, the width of University Drive with the LRT located in the median would be approximately 135 feet. Adding an additional westbound through lane would increase the crossing distance of University Drive further and would also cause the LRT preemption events to have a longer duration; as such, this is not recommended.

6.1.2 University Drive at Larchmont Road

The City of Durham - Compact Neighborhood traffic impact criteria are applied to the unsignalized intersection of University Drive at Larchmont Drive, as both roadways are under city jurisdiction. Due to alignment differences, the two Build LRT Alternatives report different delays, LOS, and queue lengths at this intersection. For both the 2040 LRT NHC 1 and 2040 LRT NHC 2/NHC LPA Alternatives, the overall intersection delays during both peak hours would meet the City of Durham thresholds.

The NHC 1 Alternative meets all City of Durham traffic impact criteria for individual movements including delay, LOS, and maximum queue lengths during the AM and PM Peak Hours.

The NHC 2/NHC LPA Alternative's eastbound University Drive through movement would experience a degradation to LOS F during the AM peak hour only, due to downstream congestion and queuing expected at University Drive and Martin Luther King Jr Parkway.

There are no maximum queue impacts expected under the NHC 1 Alternative.

For the 2040 NHC 2/NHC LPA 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:

- Eastbound University Drive through movement exceeds storage space by 21 feet in AM only

The maximum queue length, which would be an infrequent occurrence, for the eastbound through movement would slightly exceed the available storage space by the length of a car to reach the upstream signalized intersection of University Drive and Ivy Creek Boulevard. However, the average queue for this movement is well below the available storage space.

6.1.3 University Drive at Martin Luther King Jr. Parkway

The NCDOT traffic impact criteria are applied to the intersection of University Drive at Martin Luther King Jr. Parkway, as Martin Luther King Jr. Parkway is under NCDOT jurisdiction. Due to alignment differences, the two Build LRT Alternatives report different delays, LOS, and queue lengths at this intersection. For the 2040 LRT NHC 1 Alternative, the overall intersection delays during both peak hours would meet the NCDOT delay/LOS thresholds. The 2040 LRT NHC 2/NHC LPA Alternative is expected to experience an overall LOS degradation from LOS D to E in the AM peak hour only.

For the LRT NHC 1 Alternative, three individual movements are expected to operate with degraded LOS of middle D or worse including the northbound Martin Luther King Jr. Parkway left turn in the PM peak hour only, the northbound Martin Luther King Jr. Parkway through movement in the AM and PM peak hours, and the westbound University Drive through movement in the AM peak hour only.

For the LRT NHC 2/NHC LPA Alternative, several individual movements are expected to operate with degraded LOS of middle D or worse including the northbound Martin Luther King Jr. Parkway left turn in the PM peak hour only, the northbound Martin Luther King Jr. Parkway through movement in the AM and PM peak hours, the southbound Martin Luther King Jr. Parkway through movement in the PM peak hour only, the southbound Martin Luther King Jr. Parkway left turn in the AM peak hour, the westbound University Drive through movement in the PM peak hour only, and the westbound University Drive left turn in the AM and PM peak hours. The southbound Martin Luther King Jr. Parkway left turn experiences an increase in delay greater than 25% in the PM peak hour while maintaining the same LOS F as in the No-Build Conditions.

For the 2040 LRT NHC 1 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 Martin Luther King Jr. Parkway left turn exceeds storage space by 176 feet in AM only
- Westbound University Drive through movement exceeds storage space by 205 feet in PM only
- Westbound University Drive left turn exceeds storage space by 221 feet in PM only

The southbound Martin Luther King Jr. Parkway left turn maximum queue length would exceed the dedicated turn bay, but it would be contained within the southbound approach. The westbound approach's maximum queue lengths could potentially block the unsignalized intersection with Lyckan Parkway; however, the maximum queues would not interfere with the LRT as it crosses westbound University Drive between Lyckan Parkway and Westgate Drive. The 2040 NHC 1 Alternative PM peak hour would experience increased maximum queue lengths, however, the increase in maximum queue lengths would be less than 40 feet compared to the No-Build Conditions. The eastbound University Drive left turn to northbound Martin Luther King Jr. Parkway would realize an LOS improvement and the overall intersection LOS would improve from E to D. Additionally, all three movements that indicated maximum queue impacts report average queue lengths well below the available storage space except for the westbound University Drive through movement during the PM peak hour, which has an average queue that exceeds the storage space by only 10 feet.

Modifications to the roadway to address traffic operations issues have been included in the NHC 1 design, including the provision of a dedicated westbound University Drive right turn bay. It was also assumed that some volume would divert from northbound Martin Luther King Jr. Parkway right turn to the northbound Shannon Road movement at University Drive due to substantial congestion expected at Westgate Drive and University Drive to the east. To prevent the southbound Martin Luther King Jr. Parkway left turn maximum queue from spilling into the adjacent lane, there are three options: increase the storage space of the existing single left turn bay, add a second southbound left turn bay, or prohibit the southbound left turn movement. The first two options would require the realignment of Martin Luther King Jr. Parkway, while the left turn prohibition could potentially be accomplished by rerouting vehicles originating from the north to Chapel Hill Boulevard (US 15-501 Business). These and other

mitigation strategies can be evaluated during the Engineering phase of the project to determine the appropriate strategy at University Drive and Martin Luther King Jr. Parkway.

For the 2040 LRT NHC 2/NHC LPA 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 Martin Luther King Jr. Parkway left turn exceeds storage space by 649 feet in AM only
- Westbound University Drive through movement exceeds storage space by 101 feet in AM only
- Westbound University Drive left turn exceeds storage space by 189 feet in AM only
- Westbound University Drive right turn exceeds storage space by 134 feet in AM and by 262 feet in PM

For the Westbound University Drive through and left turn movements, their average queue lengths are expected to be well below the available storage space, however, the southbound MLK Jr. Parkway left turn in the AM peak hour, and the westbound University Drive right turn in the PM peak hour only report average queue lengths that would slightly exceed the storage space by 10 feet or less. The southbound Martin Luther King Jr. Parkway left turn maximum and average queues may exceed the available turn bay storage space, but the queues would be contained by the adjacent southbound through movement before reaching the merge of the eastbound US 15-501 Business on-ramp and mainline US 15-501. The westbound right turn maximum and average queue lengths may extend beyond the unsignalized Lyckan Parkway intersection in the 2040 PM peak hour, however, it would be contained by the westbound approach without reaching a signalized intersection upstream.

Modifications to the roadway to address traffic operations issues have been included in the NHC 2/NHC LPA design, including the provision of a dedicated westbound University Drive right turn bay that would extend east to Westgate Drive. It was also assumed that some volume would divert from the northbound Martin Luther King Jr. Parkway right turn to the northbound Shannon Road movement at University Drive due to substantial congestion expected at Westgate Drive and University Drive to the east. To prevent the southbound Martin Luther King Jr. Parkway left turn maximum queue from spilling into the adjacent lane, there are three remaining options: increase the storage space of the existing single left turn bay; add a second southbound left turn bay; or prohibit the southbound left turn movement. The first two options would require the realignment of Martin Luther King Jr. Parkway, while the left turn prohibition could potentially be accomplished by rerouting vehicles originating from the north to Chapel Hill Boulevard (US 15-501). These and other mitigation strategies can be evaluated during the Engineering phase of the project to determine the appropriate strategy at University Drive and Martin Luther King Jr. Parkway.

It should be noted that all of these impacted movements also exceed the available storage space under the No-Build Conditions.

6.1.4 University Drive at Lyckan Parkway

The City of Durham - Compact Neighborhood traffic impact criteria are applied to the unsignalized intersection of University Drive at Lyckan Parkway, as both roadways are under city jurisdiction. Due to alignment differences, the two Build LRT Alternatives report different delays, LOS, and queue lengths at

this intersection. For both the 2040 LRT NHC 1 and 2040 LRT NHC 2/NHC LPA Alternatives, the overall intersection delays during both peak hours would meet the City of Durham thresholds.

Under the LRT NHC 1 Alternative, only the northbound Parkway Plaza driveway left turn would degrade from LOS E in the No-Build to LOS F in the Build PM peak hour only.

For the LRT NHC 2/NHC LPA Alternative, only the westbound University Drive through movement would experience a degradation in LOS from A to F.

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

- Eastbound University Drive left turn exceeds storage space by 214 feet in AM only

The eastbound University Drive left turn to northbound Lyckan Parkway would share a turn bay with the eastbound University Drive left turn to northbound Westgate Drive, which would experience substantial congestion and queueing in the future Build and No-Build Conditions. The two queues from the consecutive left turns would combine to create a larger queue. Secondly, preemption events that would occur at the crossing of Lyckan Parkway would provide more delay to the eastbound University Drive left turn. To increase storage capacity for these consecutive eastbound University Drive left turns, a third eastbound University Drive travel lane is proposed between Martin Luther King Jr. Parkway and Lyckan Parkway, which would then transition to become the outer of two eastbound left turn lanes at Westgate Drive.

For the 2040 LRT NHC 2/NHC LPA 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:

- Eastbound University Drive right turn exceeds storage space by 53 feet in AM only
- Eastbound University Drive through movement exceeds storage space by 53 feet in AM only
- Westbound University Drive through movement exceeds storage space by 104 feet in PM only
- Westbound University Drive right turn exceeds storage space by 104 feet in PM only

Although the maximum queues for the above movements could potentially reach the upstream intersections of Westgate Drive and Martin Luther King Jr. Parkway, the maximum queue events are infrequent occurrences. The average queue lengths for these impacted movements would be well below the available storage space. It should be noted that the westbound through and right turn movements also exceed the available storage space under the No-Build conditions.

Similar to the NHC 1 Alternative, the congestion expected at the downstream intersection of University Drive and Westgate Drive would impact the intersection at Lyckan Parkway. For the NHC 2/NHC LPA Alternative, a third eastbound travel lane is proposed along University Drive between Martin Luther King Jr. Parkway and Lyckan Parkway, which would then transition to become the outer of two eastbound left turn lanes at Westgate Drive. An additional westbound shared through/right lane is also proposed between Westgate Drive and Martin Luther King Jr. Parkway.

6.1.5 University Drive at Westgate Drive

The City of Durham - Compact Neighborhood traffic impact criteria are applied to the signalized intersection of University Drive at Westgate Drive, as both roadways are under city jurisdiction. Due to alignment differences, the two Build LRT Alternatives report different delays, LOS, and queue lengths at this intersection. For both the 2040 LRT NHC 1 and 2040 LRT NHC 2/NHC LPA Alternatives, the overall intersection delays during both peak hours would meet the City of Durham thresholds.

Under the LRT NHC 1 Alternative, the eastbound University Drive left turn in the PM peak hour only, the northbound Westgate Drive through movement in the AM and PM peak hours, and the southbound Westgate Drive through movement in the AM and PM peak hours would degrade to LOS F and be considered traffic impacts according to city criteria.

For the LRT NHC 2/NHC LPA Alternative, the northbound Westgate Drive left turn in the PM peak hour only, the northbound Westgate Drive through movement in the PM peak hour only, the southbound Westgate Drive through movement in the AM and PM peak hours, and the westbound University Drive through movement would all degrade to LOS F and be considered traffic impacts according to City of Durham criteria.

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

- Eastbound University Drive left turn exceeds storage space by 94 feet in AM, however, the maximum queue is only 37 feet longer than the No-Build queue length
- Northbound Westgate Drive left turn exceeds storage space by 62 feet in AM and 55 feet in the PM, however, the No-Build queue is only 17 feet shorter in the PM
- Southbound Westgate Drive right turn exceeds storage space by 159 feet in PM only
- Southbound Westgate Drive through movement exceeds storage space by 25 feet in AM and 276 feet in PM
- Southbound Westgate Drive left turn movement exceeds storage space by 25 feet in AM and 276 feet in PM
- Westbound University Drive through movement exceeds storage space by 146 feet in PM only, however, the Build PM queue is only 26 feet longer than the No-Build maximum queue length
- Westbound University Drive through movement exceeds storage space by 92 feet in PM only, however, the Build PM queue is only 25 feet longer than the No-Build maximum queue length

The northbound Westgate left turn is below 75 vehicles per hour, the southbound Westgate Drive through movement is less than 20 vehicles per hour in AM and less than 100 in PM. The average queues for the impacted movements can be accommodated within the available storage space. All practical roadway modifications were included in the NHC 1 Alternative including the addition of a second eastbound University Drive left turn and extending the bay's length to Martin Luther King Jr. Parkway. In the westbound direction, a dedicated right turn bay is proposed between the Westgate Shopping Center driveway and Westgate Drive. Lastly, it was assumed that as the eastbound University Drive left turn delays and queues increase, drivers would divert to another street to continue north. The eastbound University Drive left turn volumes were reduced to provide a volume-to-capacity ratio that was less than 1.05. During the PM peak hour, 92 total vehicles were deducted from the eastbound University Drive left turn to northbound Westgate Drive and were reassigned to the eastbound University Drive left turn

to northbound Shannon Road. The diverted vehicles would be expected to divert to Shannon Road and continue to points north by either making an eastbound left turn or northbound through movement.

For the 2040 LRT NHC 2/NHC LPA 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:

- Eastbound University Drive left turn exceeds storage space by 148 feet in AM only
- Northbound Westgate Drive left turn exceeds storage space by 66 feet in AM and by 71 feet in PM
- Southbound Westgate Drive right turn exceeds storage space by 79 feet in PM only
- Southbound Westgate Drive through movement exceeds storage space by 94 feet in AM and by 275 feet in PM
- Southbound Westgate Drive left turn exceeds storage space by 94 feet in AM and by 275 feet in PM
- Westbound University Drive left turn exceeds storage space by 68 feet in PM only

All of the above movements' average queues will be less than the available storage space except that the northbound Westgate Drive left turn average queue exceeds the driveway storage space in the PM peak hour only; however, the average and maximum queues will be contained within the larger parking lot. The southbound maximum queue may extend beyond the unsignalized intersection with the South Square Mall southern frontage road; however, the maximum queue would not reach the signalized intersection with the northern South Square Mall driveway. The queue and delay impacts experienced at the north and southbound approaches are partially due to the primary allocation of green time to the major east/west phases to minimize queueing along University Drive, while sacrificing traffic operations for the north/southbound approaches. The westbound University Drive left turn maximum queue length may extend beyond the upstream unsignalized intersection at Westgate Shopping Center, however, this is an unsignalized intersection with right-in/right-out access only and therefore gridlock should not occur.

As with the NHC 1 Alternative, all practical roadway modifications were included in the NHC 2/NHC LPA Alternative including adding a second eastbound University Drive left turn and extending the bay's length to Martin Luther King Jr. Parkway. In the westbound direction, a dedicated right turn bay is proposed between the Westgate Shopping Center driveway and Westgate Drive. Lastly, it was assumed that as the eastbound University Drive left turn delays and queues increase, drivers would divert to another street to continue north. The eastbound University Drive left turn volumes were reduced to provide a volume-to-capacity ratio that was less than 1.05. During the AM and PM peak hours, 92 vehicles and 201 vehicles, respectively, were deducted from the eastbound University Drive left turn to northbound Westgate Drive and were reassigned to the eastbound University Drive left turn to northbound Shannon Road. The diverted vehicles would be expected to divert to Shannon Road and continue to points north by either making an eastbound University Drive left turn or northbound through movement at Shannon Road.

It is should be noted that majority of the movements listed above also exceed the available storage space under the 2040 No-Build Conditions.

6.1.6 University Drive at Westgate Shopping Center

The City of Durham - Compact Neighborhood traffic impact criteria are applied to the unsignalized intersection of University Drive at Westgate Shopping Center, as both roadways are under city jurisdiction. The alignment and roadway configurations for LRT NHC Alternative 1 and LRT NHC Alternative 2/LPA are consistent at this intersection. For both the 2040 LRT NHC 1 and 2040 LRT NHC 2/NHC LPA Alternatives, the overall intersection and individual movement delays during both peak hours would meet the City of Durham thresholds.

For the 2040 LRT NHC 2/NHC LPA Alternative only, the maximum queue length for 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 University Drive through movement exceeds storage space by 255 feet in the PM only, however, the Build PM queue is only 57 feet longer than the No-Build maximum queue length

Although the maximum queue length exceeds the storage space for the westbound University Drive through movement, this is considered a rare occurrence and the same movement's average queue would be far shorter than the available storage space. A third westbound University Drive lane is proposed between Westgate Shopping Center and Westgate Drive to provide additional capacity and storage space for both NHC 1 and NHC 2/NHC LPA Alternatives. As this is an unsignalized intersection, the added queues are a result of downstream congestion at Westgate Drive.

It should be noted that the westbound through movement exceeds the available storage space under the 2040 No-Build conditions.

6.1.7 University Drive at Shannon Road

The City of Durham - Compact Neighborhood traffic impact criteria are applied to the intersection of University Drive at Shannon Road, as both roadways are under city jurisdiction. The alignment and roadway configurations for LRT NHC Alternative 1 and LRT NHC Alternative 2/NHC LPA are consistent at this intersection. For both the 2040 LRT NHC 1 and 2040 LRT NHC 2/NHC LPA Alternatives, the overall intersection delays during both peak hours would meet the City of Durham thresholds.

For both 2040 LRT Alternatives, two individual movements are expected to operate with degraded LOS of middle D or worse including the northbound Shannon Road left turn in the PM peak hour and the northbound Shannon Road through movement in the PM peak hour. The additional delay experienced is partially caused by the LRT crossing, and partially due to the additional volume expected to divert from the eastbound University Drive left turn volume from Westgate Drive to Shannon Road. The overall intersection would experience a degradation to a low LOS E; however, this grade is acceptable under City of Durham traffic impact criteria. Additionally, there are no maximum queue impacts expected at the intersection of University Drive and Shannon Road.

6.1.8 Pickett Road at Petty Road

The City of Durham - Compact Neighborhood traffic impact criteria are applied to the intersection of Pickett Road at Petty Road, as both roadways are under city jurisdiction. The alignment and roadway configurations for LRT NHC Alternative 1 and LRT NHC Alternative 2/NHC LPA are consistent at this

intersection. For both the 2040 LRT NHC 1 and 2040 LRT NHC 2/NHC LPA Alternatives, the overall intersection and individual movement delays during both peak hours would meet the City of Durham thresholds.

For both 2040 LRT Alternatives, the maximum queue length for 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 Pickett Road through movement exceeds the shared left/through/right lane storage space by 220 feet in the AM and by 50 feet in the PM
- Westbound Pickett Road left turn exceeds the shared left/through/right lane storage space by 220 feet in the AM and by 50 feet in the PM
- Westbound Pickett Road right turn exceeds the shared left/through/right lane storage space by 220 feet in the AM and by 15 feet in the PM

The intersection of Pickett Road and Petty Road is located approximately 450 feet from the LRT tracks proposed to cross Pickett Road to the east near Tower Boulevard. During LRT preemption events, the eastbound Pickett Road through movement at Tower Boulevard would be stopped to allow the train to cross the roadway uninterrupted, and as a result eastbound Pickett Road vehicles queue at Tower Boulevard and spillback to Petty Road preventing southbound Petty Road left turn, eastbound Pickett road through movement, and the northbound Petty Road right turn vehicles from continuing onto eastbound Pickett Road. The westbound approach movements with maximum queue lengths in excess of the storage space have average queue lengths that are all less than 15 feet. If required, a dedicated westbound Pickett Road right bay could be evaluated during the Engineering phase of the project.

6.1.9 Pickett Road at Tower Boulevard

The City of Durham - Compact Neighborhood traffic impact criteria are applied to the intersection of Pickett Road at Tower Boulevard, as both roadways are under city jurisdiction. The alignment and roadway configurations for LRT NHC Alternative 1 and LRT NHC Alternative 2/NHC LPA are consistent at this intersection. The intersection control is proposed to be modified from the existing one-way stop control to signalized control to improve the northbound approach performance under the 2040 Build conditions. For both the 2040 LRT NHC 1 and 2040 LRT NHC 2/NHC LPA Alternatives, the overall intersection delays during both peak hours would meet the City of Durham thresholds.

For the LRT NHC 2/NHC LPA Alternative, the northbound Tower Boulevard left turn in the AM peak hour only, would degrade to LOS F and be considered a traffic impact.

For both 2040 LRT Alternatives, the maximum queue length for 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:

- Eastbound Pickett Road right turn exceeds the shared through/right lane storage space by 183 feet in the AM and by 125 feet in the PM
- Eastbound Pickett Road through movement exceeds the shared through/right lane storage space by 198 feet in the AM and by 182 feet in the PM
- Northbound Tower Boulevard left turn exceeds the storage space by 93 feet in the AM and by 90 feet in the PM

- Westbound Pickett Road left turn exceeds the storage space by 201 feet in the AM and by 318 feet in the PM

During LRT preemption events, the eastbound Pickett Road through movement, the eastbound Pickett Road right turn, the westbound Pickett Road left turn, the westbound Pickett Road through movement and the northbound Tower Boulevard right turn would all be stopped to allow the train to cross the roadway uninterrupted, and as a result many of these movements will experience queuing. Although the maximum queue lengths exceed the storage space for the above movements, these are considered rare occurrences and the same movements average queue lengths would be far shorter than the available storage space. The northbound Tower Boulevard left turn maximum queue may extend beyond the unsignalized intersection of Tower Boulevard and Conifer Glen Lane to the south; however, the queue would not reach the signalized intersection to the south over 1,000 feet away. Similarly, the westbound Pickett Road left turn maximum queue may extend upstream beyond the unsignalized intersection at Pickett Park; however, the queue could be contained in the two-way left turn lane or the westbound through lanes across the intersection. A dedicated northbound Tower Boulevard right turn bay is proposed in the NHC 1 and NHC 2/NHC LPA designs. If mitigation is required for the eastbound approach, a dedicated eastbound Pickett Road right bay could be evaluated during the Engineering phase of the project to determine if the maximum queue lengths would be reduced.

7. Conclusions/Recommendations

To address the vehicular traffic operations issues identified during the course of the Vissim analysis, this report recommends substantial roadway modifications such as additional through lanes on segments of University Drive and additional turn bays at intersections, which are presented in Table ES-1. With these modifications, the 2040 Build LRT Alternatives' Vissim results indicate that the majority of overall intersections will not result in traffic impacts according to NCDOT or City of Durham guidelines, and the majority of maximum queues would be contained within the proposed turn lanes as described in the following paragraphs.

It should be noted that the subject segment of University Drive is within an LRT station area and the station area is expected to be designated as a compact neighborhood with design district building standards. As such, it is important to balance roadway modifications to increase traffic capacity with the need to build a transportation network that is conducive to multi-modal travel, and is safe and inviting for people who are walking, riding bicycles, or riding transit both along University Drive and across it. Additional analyses and coordination with the City of Durham and NCDOT will be completed during the Engineering phase of the project in order to refine the recommendations contained in this report.

The Build LRT Alternatives Vissim analysis indicates that the anticipated delay and queue increases are primarily caused by three factors:

- Minimum green times and clearance intervals required increases for 2040 Build conditions due to larger intersection widths required to accommodate the LRT.
- Due to the proposed Park-and-Ride lot and multiple turn restrictions, future demand Build vehicular volumes will increase beyond the already substantial No-Build volumes for the eastbound University Drive left turn to Westgate Drive and several other critical movements at this intersection. These heavier build volumes are anticipated to worsen the bottleneck expected under No-Build Conditions along the University Drive corridor. Prior to the incorporation of mitigation measures, the eastbound University Drive left turn queues were observed to spill back to Martin Luther King Jr. Parkway and would frequently block the southbound Martin Luther King Jr. Parkway left turn and eastbound University Drive through traffic at Martin Luther King Jr. Parkway.
- Signal preemption events would interrupt signal coordination along University Drive due to LRT operations. The signal preemption that allows the LRT to travel through intersections without stopping would incur delay for conflicting movements; however, decreasing signal LRT priority by allowing LRV stops at signalized intersections would not noticeably improve vehicular operations as the same conflicting vehicular phases must be stopped during the LRT crossing.

As noted previously, the roadway modifications presented in Table ES-1 are recommended to address these traffic operations issues.

The overall intersection results of the No-Build versus Build Vissim analysis are shown in Table ES-2. The majority of intersections would operate in accordance with NCDOT and City of Durham standards under the Build LRT Alternatives with the roadway modifications recommended in Table ES-1. Only under the NHC 2/NHC LPA Alternative is a single overall intersection expected to be considered a traffic impact:

- University Drive at Martin Luther King Jr. Parkway (NHC 2/NHC LPA), which is expected to degrade from LOS D to LOS E in the AM peak hour

The Vissim results also indicate that the traffic impacts and operational efficiencies are comparable at most of the intersections along University Drive and Pickett Road between the NHC 1 and NHC 2/NHC LPA alternatives. There are several more individual movements that report delay and maximum queue impacts along University Drive at Ivy Creek Boulevard, Larchmont Road, and Martin Luther King Jr. Parkway due to the alignment of the LRT under NHC 2/NHC LPA Alternatives.

Maximum queues would exceed available storage in several locations; however these are considered infrequent occurrences and additional roadway modifications are not recommended at these locations due to the limited operational benefits that would require large capital expenditures via impractical right-of-way acquisitions and would further increase roadway widths. Many of the turn bay maximum queues would also be contained within their overall approaches' storage space and therefore would not impact upstream intersections. For both alternatives, the expected average queues would be accommodated by the available storage at all locations except for the westbound University Drive through movement at Martin Luther King Jr. Parkway in the PM peak hour for Alternative 1, the westbound University Drive right turn at Martin Luther King Jr. Parkway in the PM peak hour under Alternative 2, the southbound Martin Luther King Jr. Parkway left turn at University Drive in the AM peak hour for Alternative 2, and the northbound Westgate Drive left turn at University Drive in the PM peak hour under Alternative 2. However, all of these average queue lengths mentioned above exceed the respective storage space by 10 feet or less.

As noted previously, extensive mitigation measures were incorporated into the LRT designs including additional University Drive through lanes and new turn bays, and additional roadway expansion is not recommended. Additional analysis of traffic impacts and the potential for additional traffic diversion from University Drive may be investigated during the Engineering phase of the project. In addition, proposed roadway modifications will be coordinated with the Durham City-County Planning Department during the Engineering phase to incorporate the forthcoming urban street standards for compact design districts. Other non-geometric mitigation strategies will also be explored by Triangle Transit and coordinated with the City of Durham, including evaluation and development of Travel Demand Management programs to encourage further mode shifts from driving to transit and non-motorized travel in the station areas.

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 sunsequently 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 anysis.

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

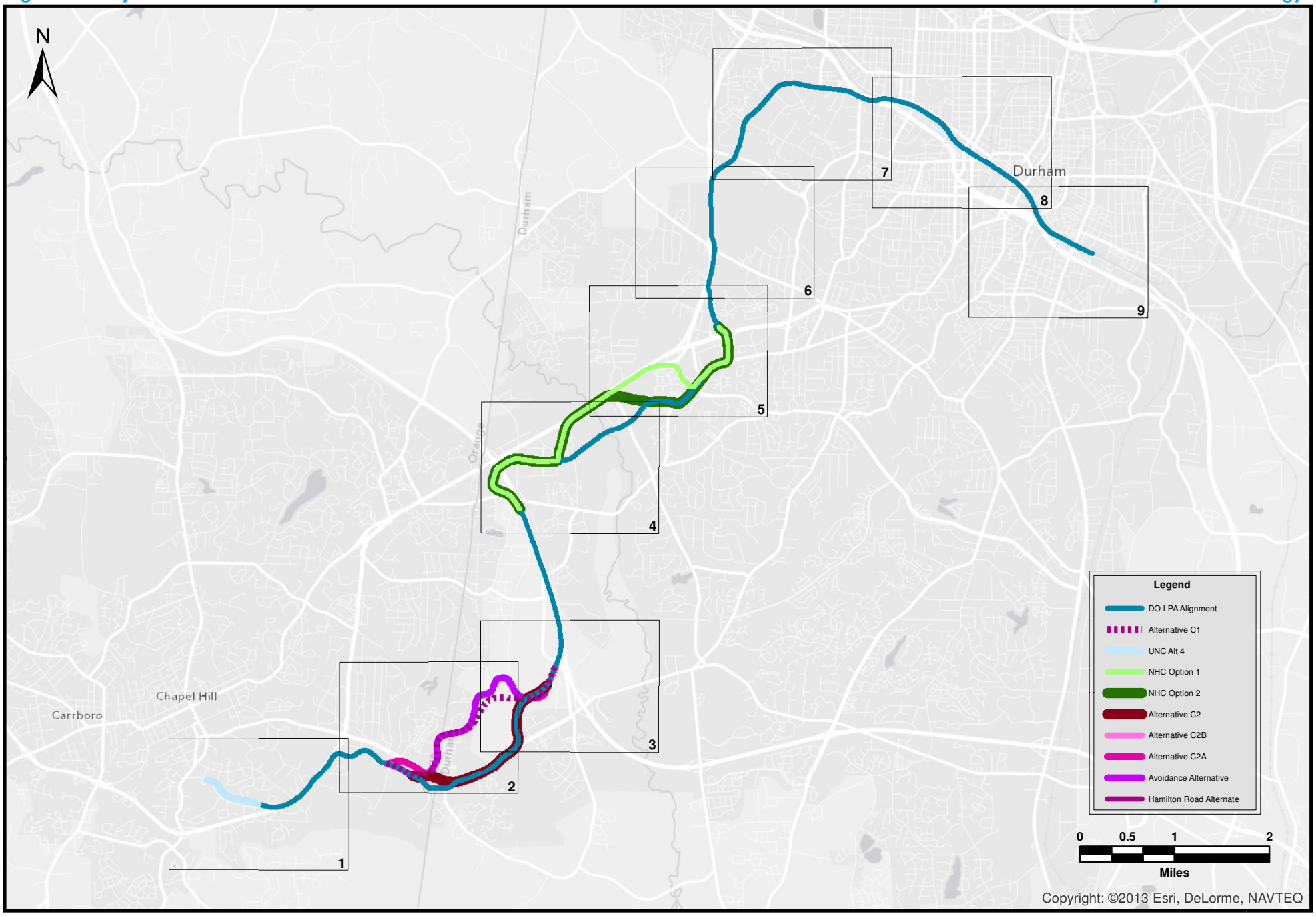
Where necessary, pedestrian and bicycle data will be collected and utilized in the model stream. To guide this effort, *Effects of Pedestrians on Capacity of Signalized Inersections* by Milazzo et al published in Transportation Research Record 1646 was reviewed. This article serves as the basis for determining 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 pedestrains 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.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WOODBINE DR
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PUREFOY RD
HOWELL ST
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GRAY BLUFF TRL
AZALEA DR
MT CARMEL CHURCH RD
MORGAN CREEK RD
BOTANICAL WAY
HAWTHORNE LN
BEAR LN
SOURWOOD CIR
BARTRAM DR
ARBORETUM DR
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PINE LN
BUTTONS RD
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GRAVELY DR
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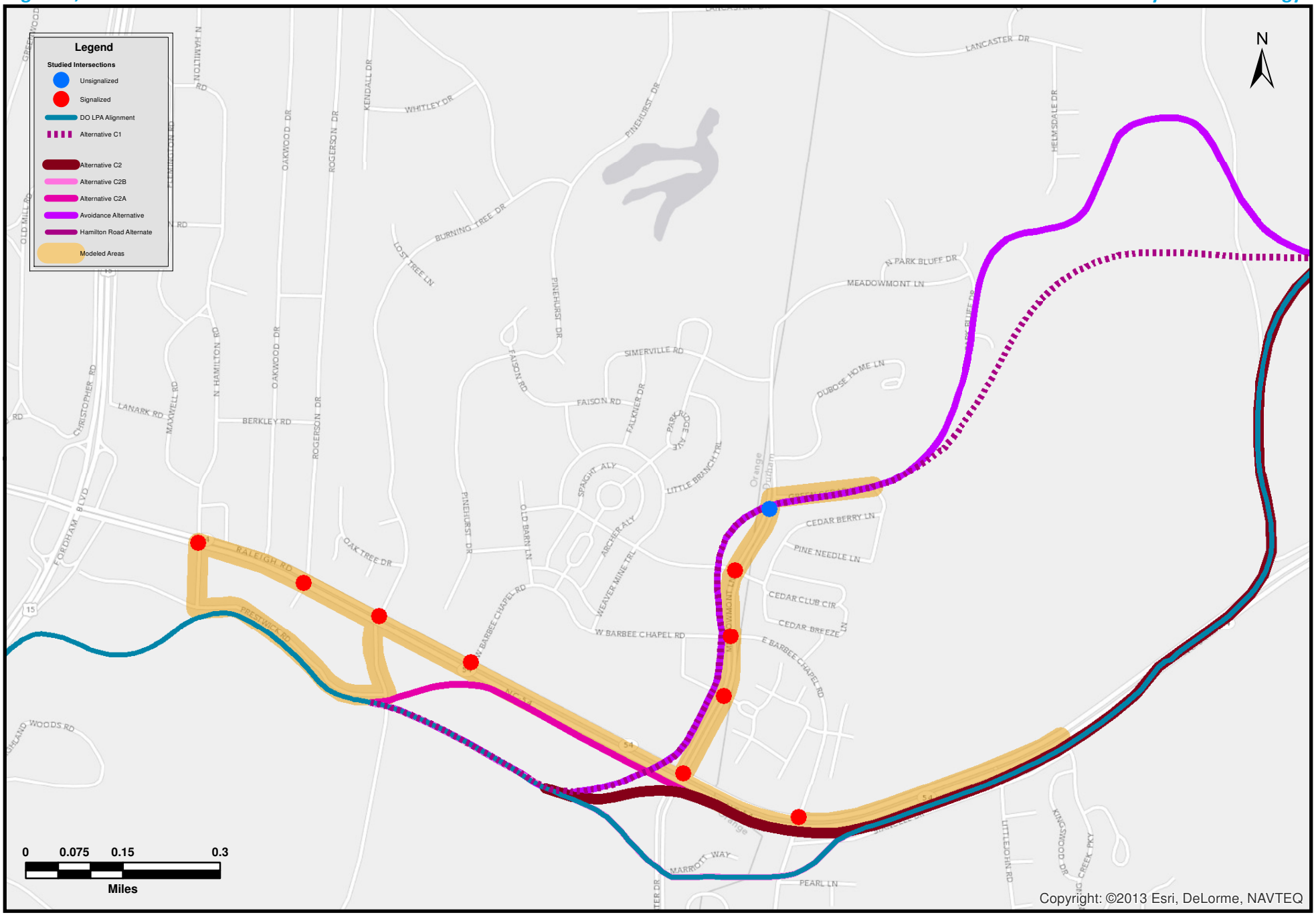
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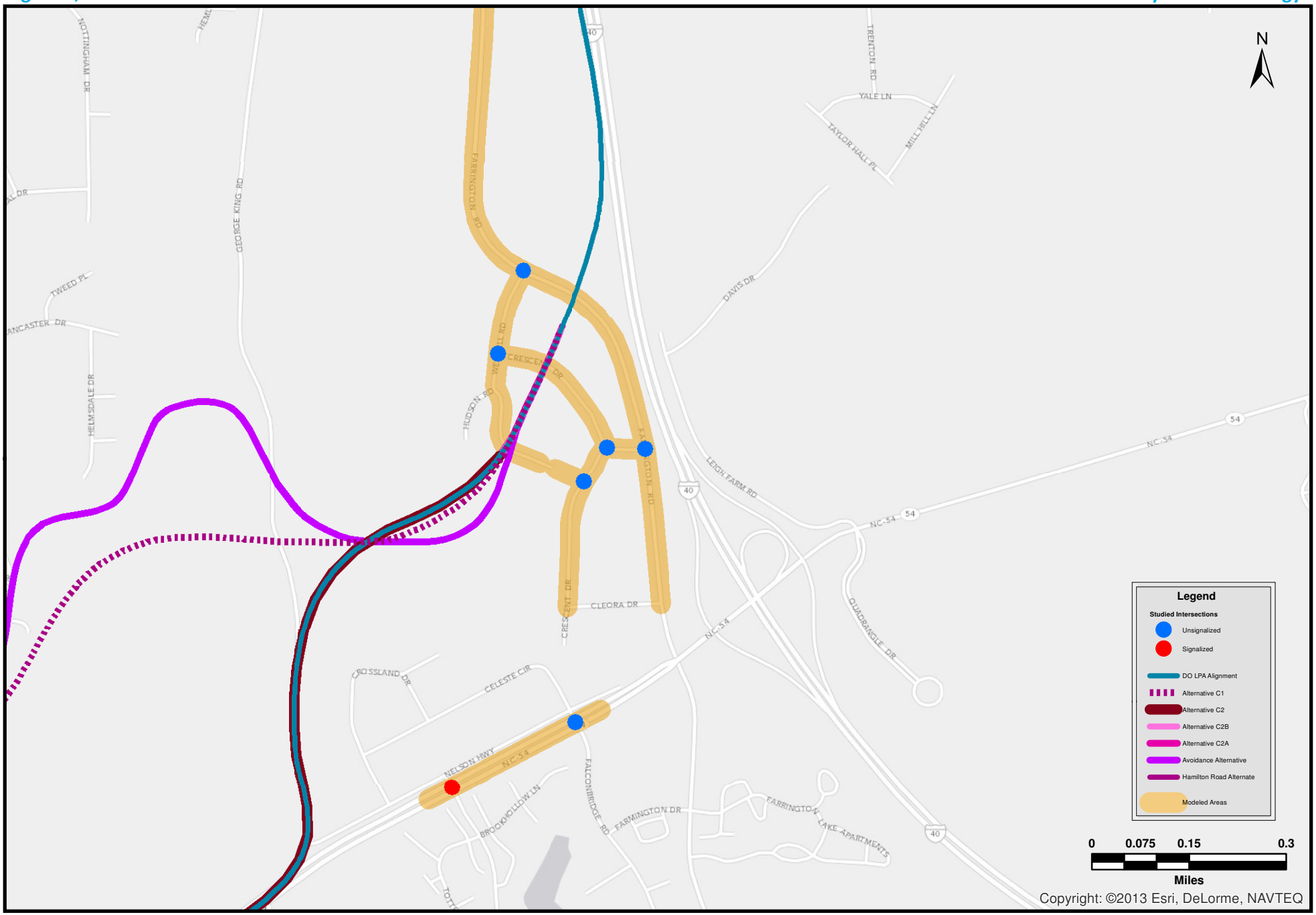
BERKLEY RD
CHRISTOPHER RD
FORDHAM BLVD
OAK TREE DR
OLD BARN LN
SPAIGHT ALY
ARCHER ALY
WEAVER MINE TRL
LITTLE BRANCH TRL
FALKNER DR
PARK RIDGE AVE
LANCASTER DR
HELMSDALE DR
MARRIOTT WAY
PEARL LN
LITTLEJOHN RD
KINGSWOOD DR
CREEK PKY
WOODS RD
Orange
Durham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DO LPA Alignment
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Avoidance Alternative
Hamilton Road Alternate
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Miles
Copyright: ©2013 Esri, DeLorme, NAVTEQ
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GEORGE KING RD
TRENTON RD
YALE LN
TAYLOR HALL PL
MILL HILL LN
DAVIS DR
LEIGH FARM RD
NC 54
CRESCENT DR
CLEORA DR
QUADRANGLE DR
CROSSLAND DR
CELESTE CIR
NELSON HWY
BROOKHOLLOW LN
FALCONBRIDGE RD
FARMINGTON DR
FARRINGTON LAKE APARTMENTS
HUDSON RD
TWEED PL
HELMSDALE DR
NOTTINGHAM DR
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NHC Option 2
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Copyright: ©2013 Esri, DeLorme, NAVTEQ
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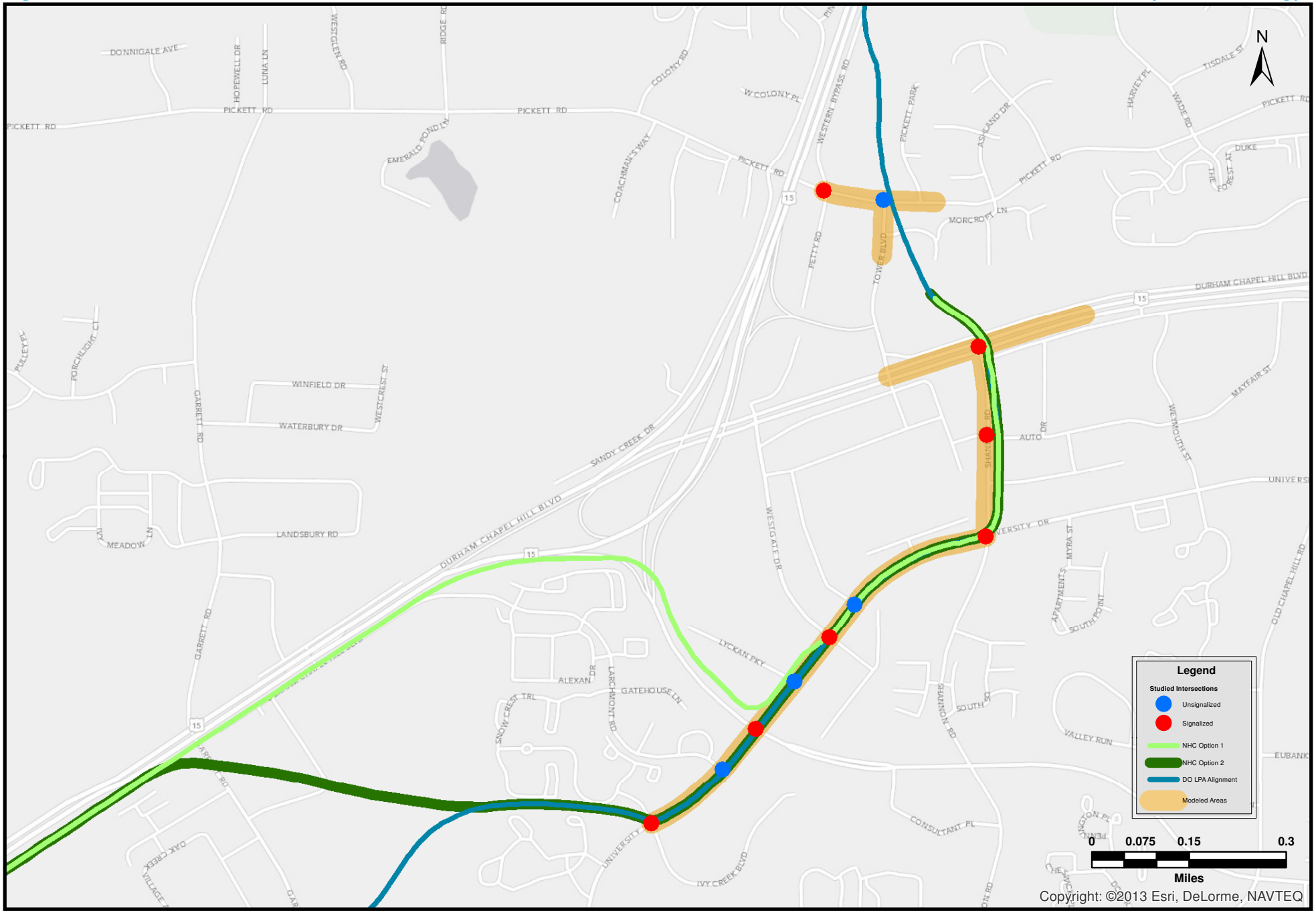
NEW HOPE COMMONS DR
WATKINS RD
SW DURHAM DR
SW DURHAM PKY
WITHERSPOON BLVD
NORTHCREEK DR
HARKNESS CT
SAYWARD DR
DANZIGER DR
THE VERGE
ROSE GARDEN LN
FIVE OAKS DR
FARRINGTON RD
MARVIN DR
BUCHANAN DR
PINE CONE DR
BUTTERNUT RD
PIN OAK DR
CRICKET GROUND
OLDE COACH RD
CLARK LAKE RD
HUSE ST
POPE RD
JEAN AVE
GARRETT RD
SCOTTISH LN
STROLLING W
OAK CREEK VILLAGE APARTMENTS
E LAKEVIEW DR
15-501 S SERVICE RD
Durham
Orange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Copyright: ©2013 Esri, DeLorme, NAVTEQ
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PICKETT RD
WESTERN BYPASS RD
TOWER BLVD
MORCROFT LN
SANDY CREEK DR
LANDSBURY RD
WINFIELD DR
WATERBURY DR
GARRETT RD
LYCKAN PKY
GATEHOUSE LN
IVY CREEK BLVD
CONSULTANT PL
VALLEY RUN
SOUTH POINT
MAYFAIR ST
WEYMOUTH ST
OLD CHAPEL HILL RD
EUBANK
DONNIGALE AVE
COLONY RD
W COLONY PL
PETTY RD
ASHLAND DR
HARVEY PL
WADE RD
TISDALE ST
DUKE
MEADOW LN
SNOW CREST TRL
LARCHMONT RD
ALEXAN DR
WESTGATE DR
SHANNON RD
OAK CREEK VILLAGE
15

N
W CORNWALLIS RD
LANIER PL
EVANS ST
WELCOME CIR
EASTIS DR
RIDGE RD
TRYON RD
FRIENDSHIP RD
GRANVILLE RD
WESTERN BYPASS RD
TANGLEWOOD RD
ROLLING HILL RD
STONERIDGE RD
PINNACLE RD
COLONY RD
WESTGLEN RD
GREYMAR DR
FACULTY CLUB DR
FRANK BASSETT DR
SCIENCE DR
SCOREBOARD LN
CAMERON BLVD
751
ACADEMY RD
PINECREST RD
SEVIER ST
MARION AVE
WOODBURN RD
LEARNED PL
SCOTT PL
HEATH PL
MONTGOMERY ST
SPENCER ST
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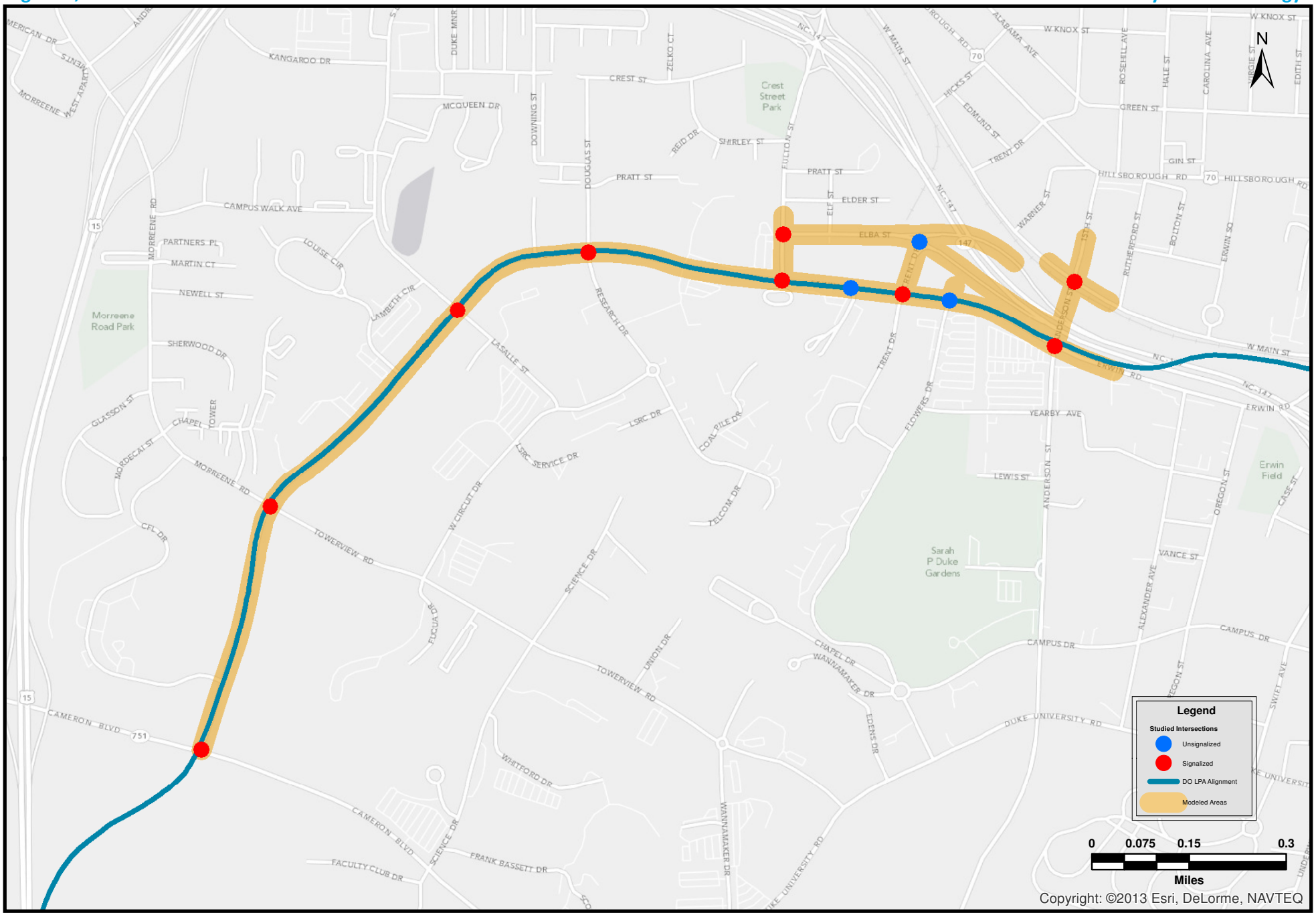
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Copyright: ©2013 Esri, DeLorme, NAVTEQ
Crest Street Park
Morreene Road Park
Sarah P Duke Gardens
Erwin Field
W KNOX ST
KANGAROO DR
MCQUEEN DR
CREST ST
PRATT ST
ELDER ST
ELBA ST
SHIRLEY ST
GIN ST
HILLSBOROUGH RD
GREEN ST
W MAIN ST
CAMPUS WALK AVE
PARTNERS PL
MARTIN CT
NEWELL ST
SHERWOOD DR
GLASSON ST
CHAPEL TOWER
MORDECAI ST
MORREENE RD
LOUISE CIR
LAMBETH CIR
RESEARCH DR
LASALLE ST
LSRC DR
LSRC SERVICE DR
COAL PILE DR
TELCOM DR
W CIRCUIT DR
TOWERVIEW RD
SCIENCE DR
FUCUA DR
UNION DR
CFL DR
CAMERON BLVD
751
WHITFORD DR
FACULTY CLUB DR
FRANK BASSETT DR
WANNAMAKER DR
EDENS DR
CHAPEL DR
DUKE UNIVERSITY RD
CAMPUS DR
YEARBY AVE
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FLOWERS DR
TRENT DR
ERWIN RD
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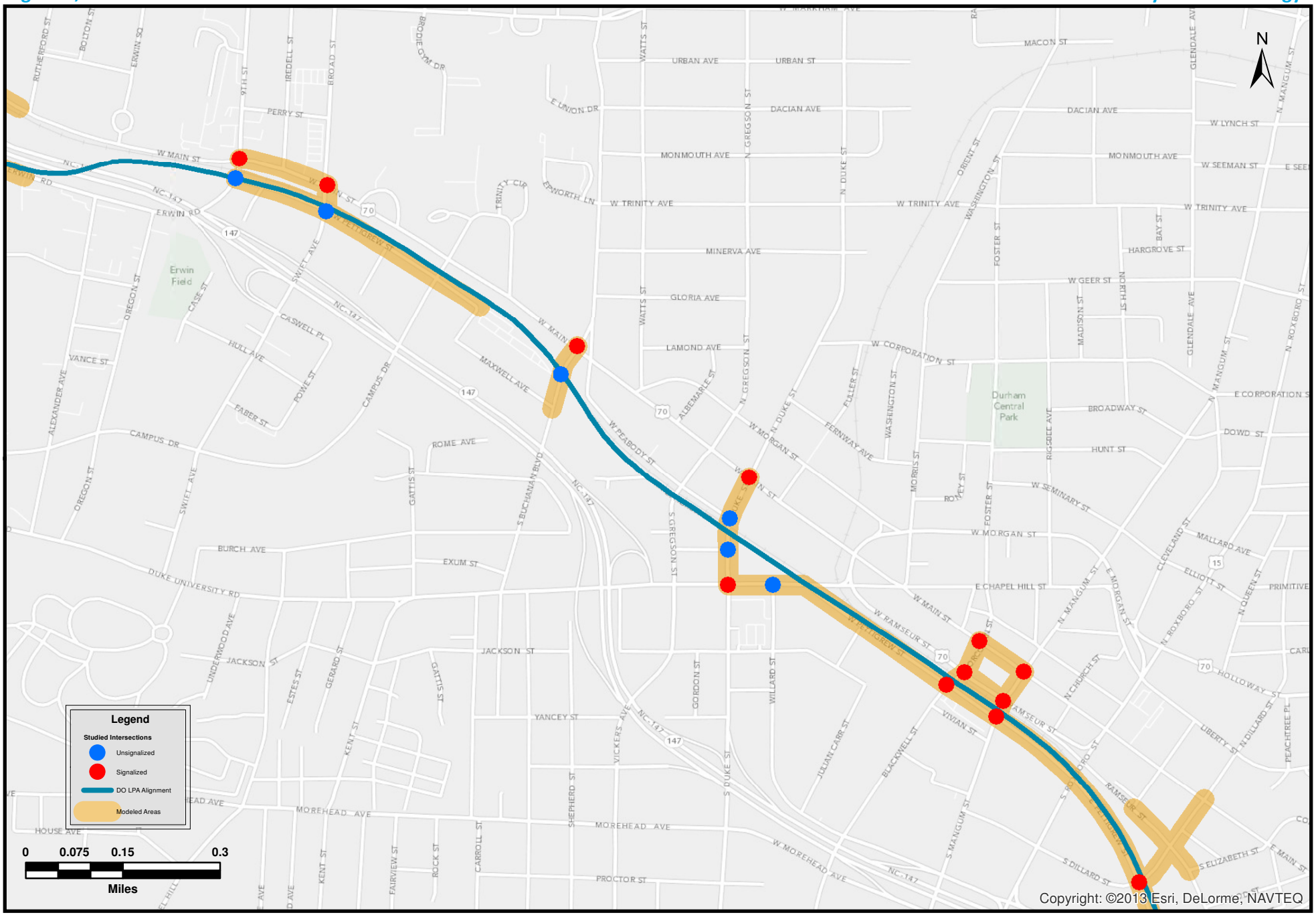

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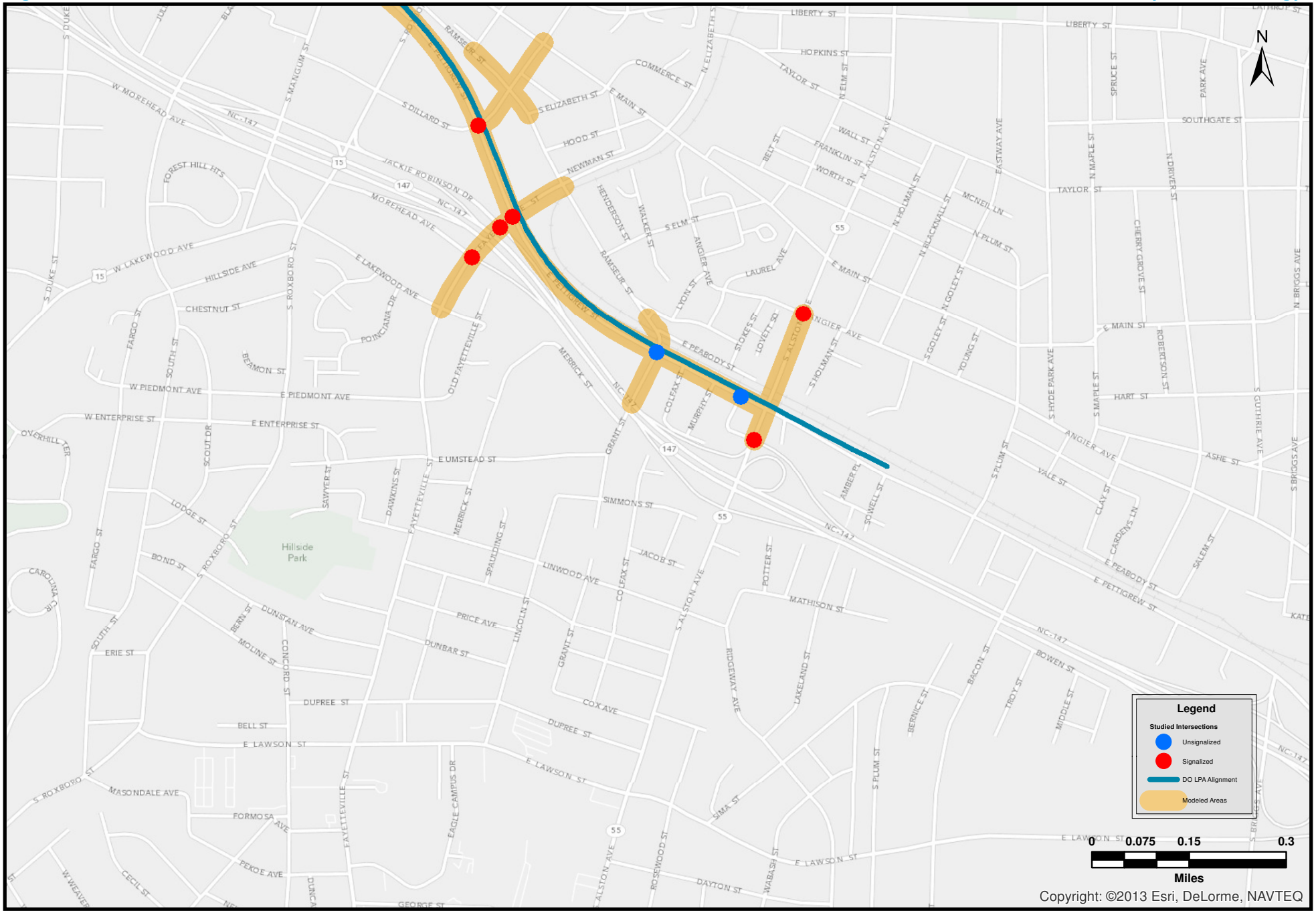
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Copyright: ©2013 Esri, DeLorme, NAVTEQ
Hillside Park
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HOPKINS ST
TAYLOR ST
COMMERCE ST
E MAIN ST
S ELIZABETH ST
HOOD ST
NEWMAN ST
S DILLARD ST
W MOREHEAD AVE
JACKIE ROBINSON DR
MOREHEAD AVE
W LAKEWOOD AVE
E LAKEWOOD AVE
HILLSIDE AVE
CHESTNUT ST
W PIEDMONT AVE
E PIEDMONT AVE
W ENTERPRISE ST
E ENTERPRISE ST
E UMSTEAD ST
E PEABODY ST
E PETTIGREW ST
ANGIER AVE
SIMMONS ST
LINWOOD AVE
JACOB ST
MATHISON ST
DUNSTAN AVE
PRICE AVE
DUNBAR ST
DUPREE ST
COX AVE
E LAWSON ST
MASONDALE AVE
FORMOSA AVE
PEKOE AVE
DAYTON ST
SOUTHGATE ST
HART ST
ASHE ST
VALE ST
BOWEN ST
NC-147
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147
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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.kittelson.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 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.kittelson.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 locatoins. 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.

Appendix B

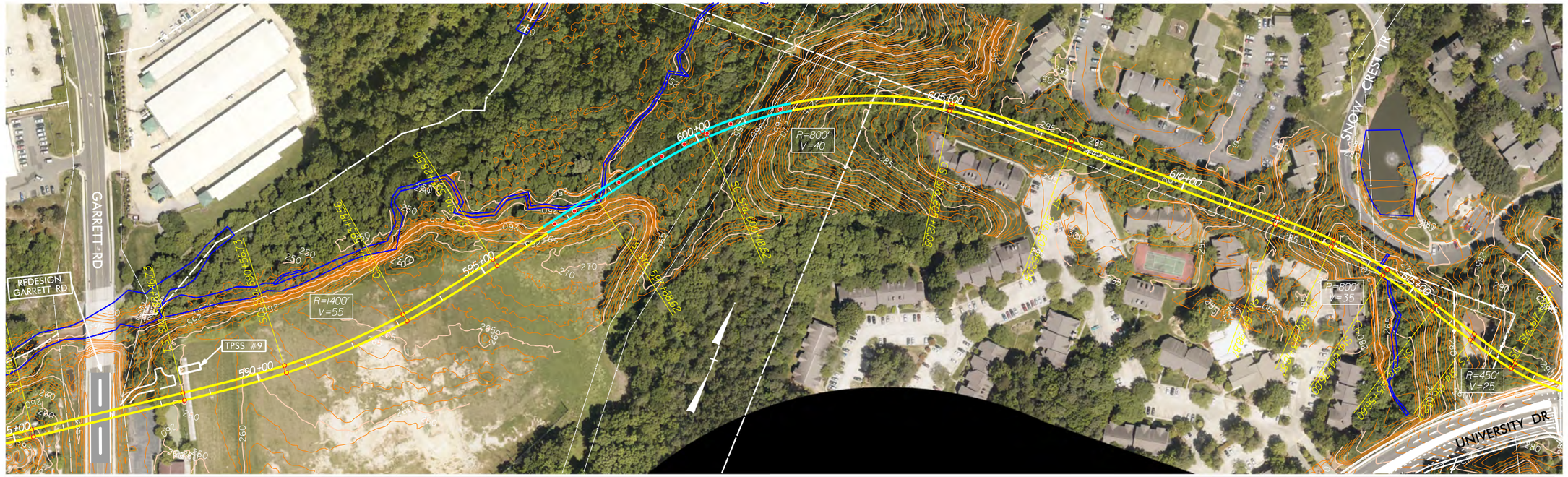
Basis for Engineering Plans
(LRT Alternatives Design Plans)

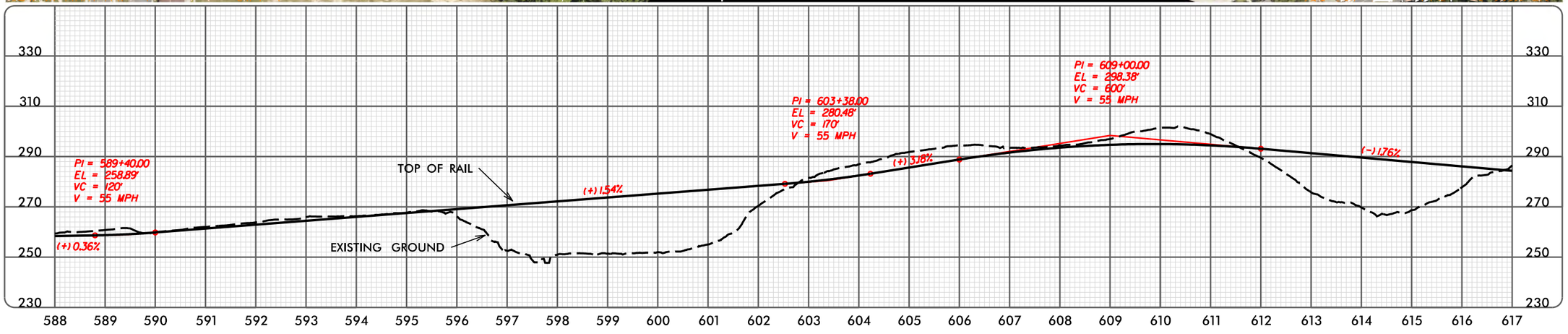
NHC LPA
NHC 1
NHC 2
South Square Station (Common to all Alternatives)

SEGMENT D – NEW HOPE CREEK LOCALLY PREFERRED ALTERNATIVE

PLAN AND PROFILE SHEETS

GARRETT ROAD – NEW HOPE CREEK LPA





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PROFILE (VERTICAL): 20 10 0 20 40

CONCEPT PLANS ONLY
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

LEGEND

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

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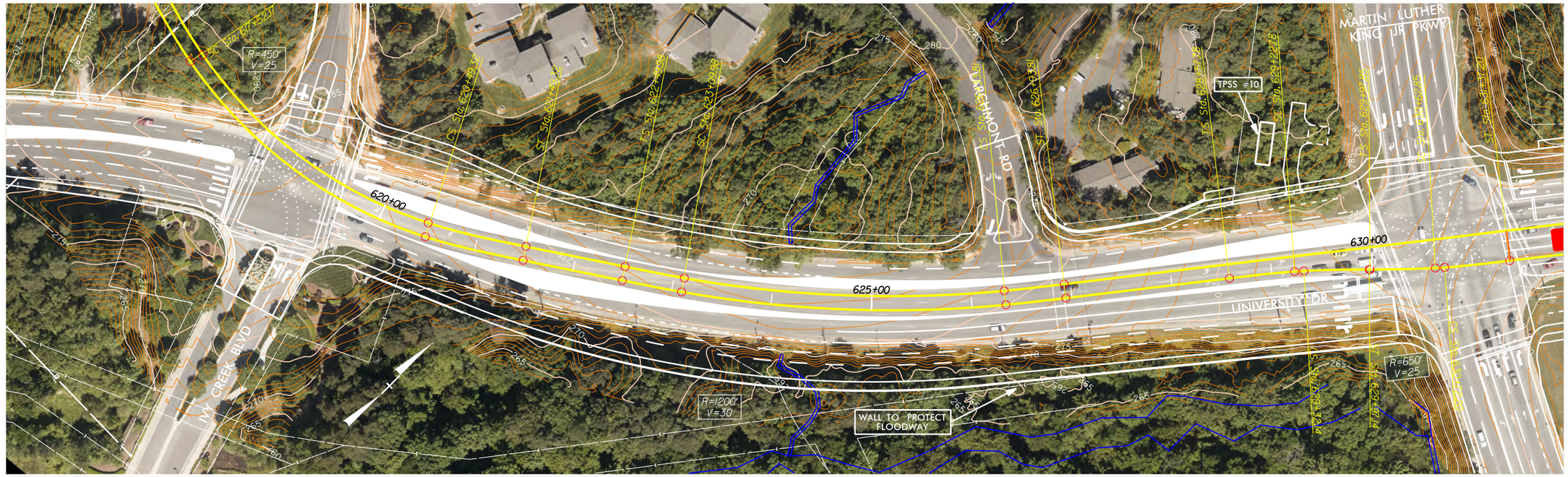
SEGMENT D

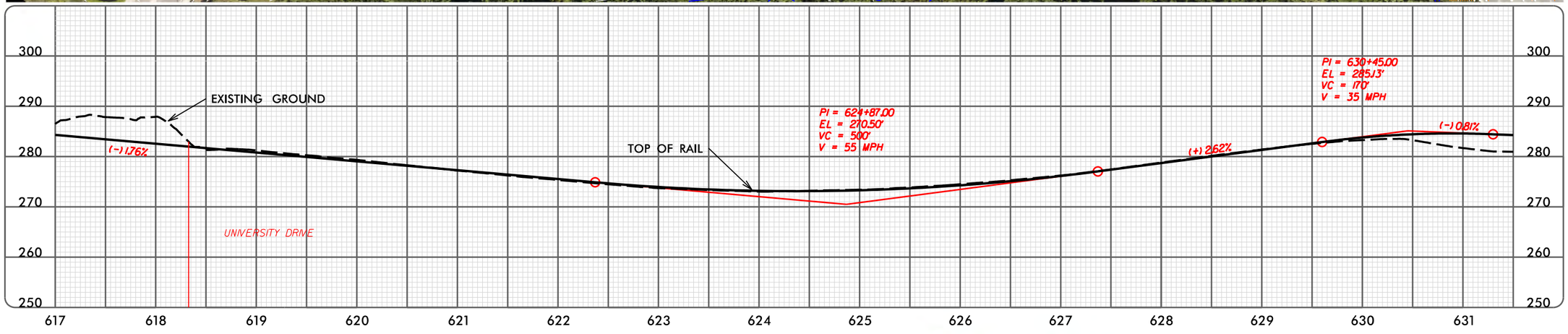
PLAN & PROFILE

SHEET: D – 08

4/6/2015

UNIVERSITY DRIVE – NEW HOPE CREEK LPA





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PLAN AND PROFILE

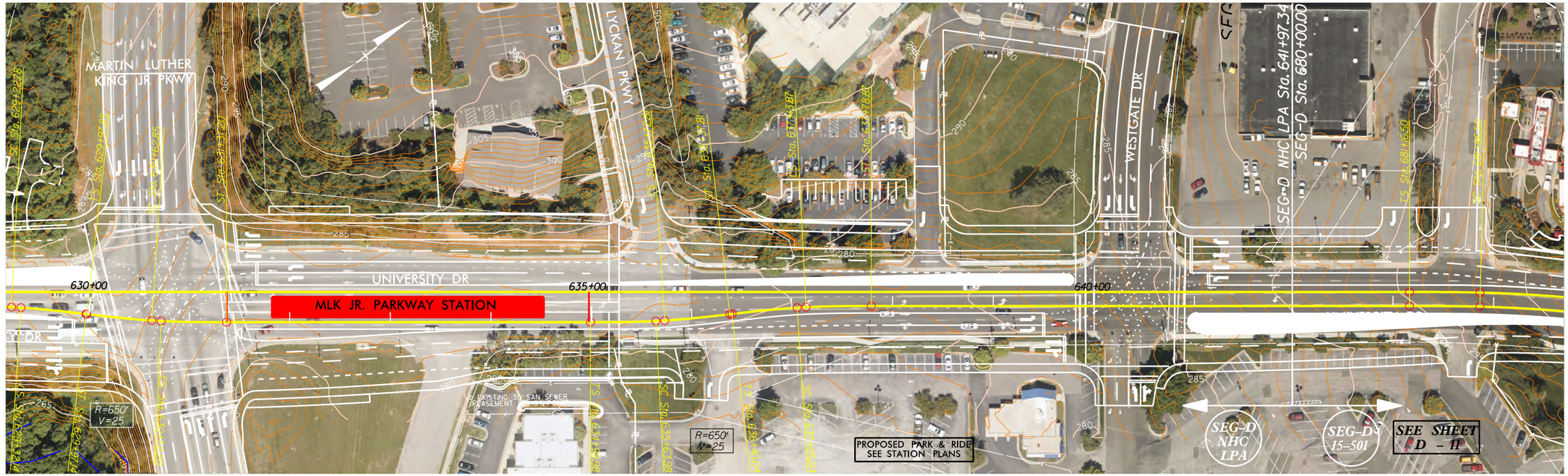
SEGMENT D

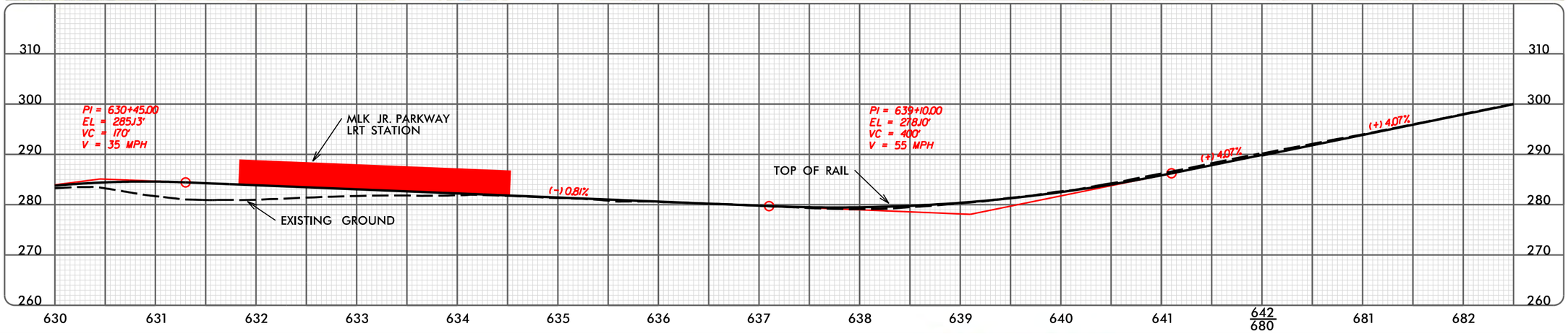
PLAN & PROFILE

SHEET: D – 09

4/6/2015

MLK JR. PARKWAY STATION – NEW HOPE CREEK LPA





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PLAN AND PROFILE

SEGMENT D

PLAN & PROFILE

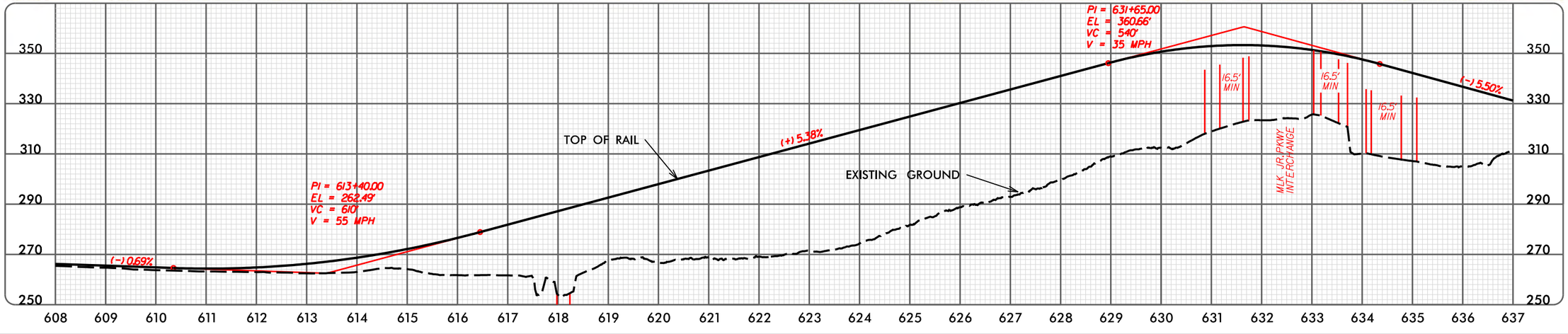
SHEET: D – 10

4/6/2015

SEGMENT D – NEW HOPE CREEK 1 ALTERNATIVE

PLAN AND PROFILE SHEETS

SHANNON PLAZA – NEW HOPE CREEK 1 ALTERNATIVE



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SEGMENT D

PLAN & PROFILE

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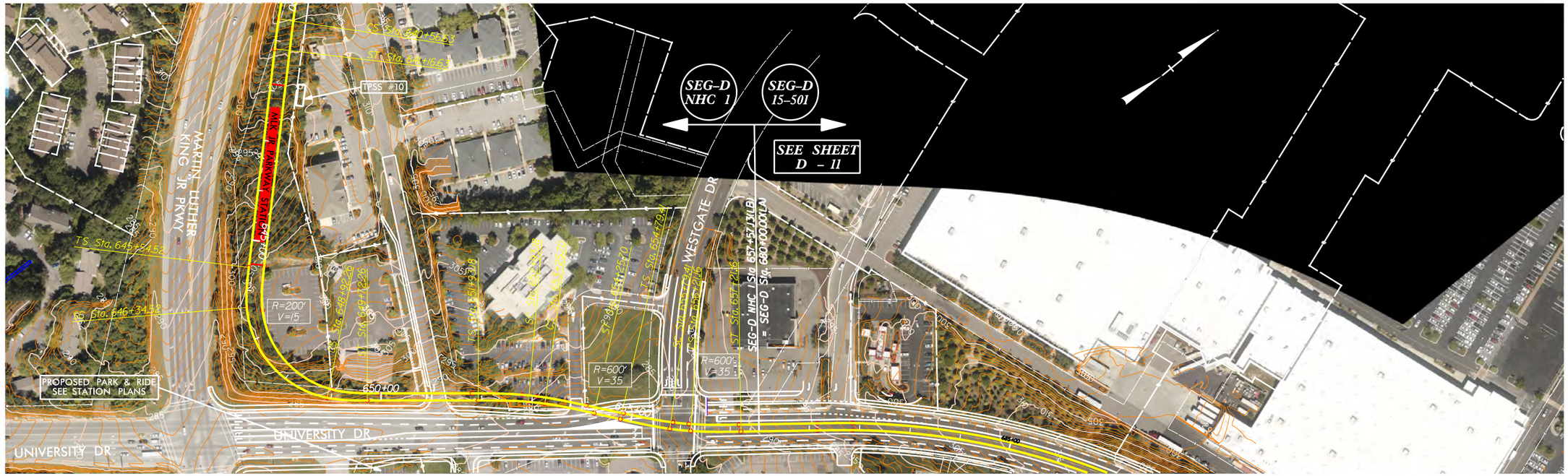
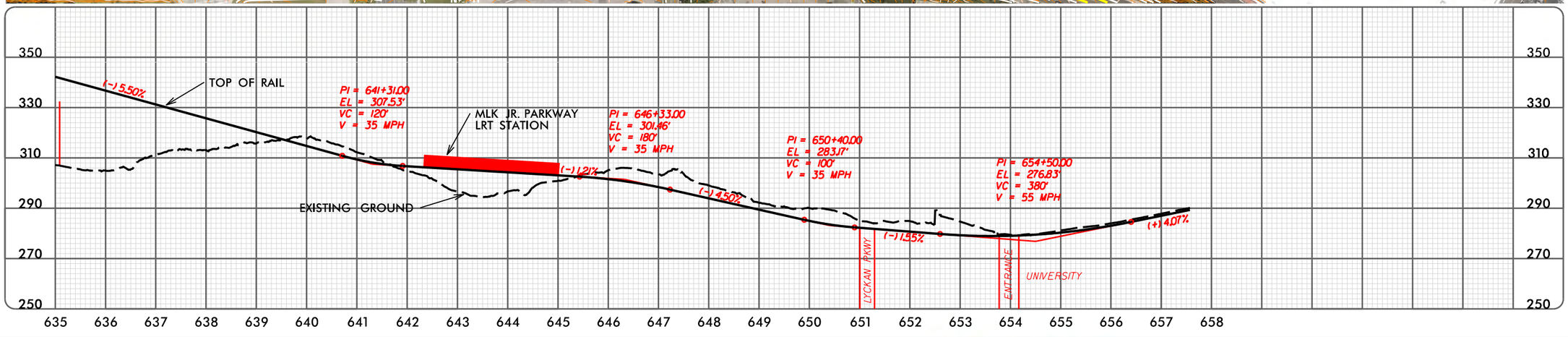
3/30/2015

MLK JR. PARKWAY STATION – NEW HOPE CREEK 1 ALTERNATIVE





GRAPHIC SCALES

PLAN: 100 0 100 200

PROFILE (HORIZONTAL): 100 0 100 200

PROFILE (VERTICAL): 20 10 0 20 40

CONCEPT PLANS ONLY
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

LEGEND

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

OurTransit FUTURE

Prepared In the Office of

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1600 Perimeter Park Drive, Suite 400
Morrisville, North Carolina 27560
Phone (919)461-1100 Fax (919)461-1415
NC Lic.# C-2243

CH ENGINEERING

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NC LICENSE #P-0189

PLAN AND PROFILE

SEGMENT D

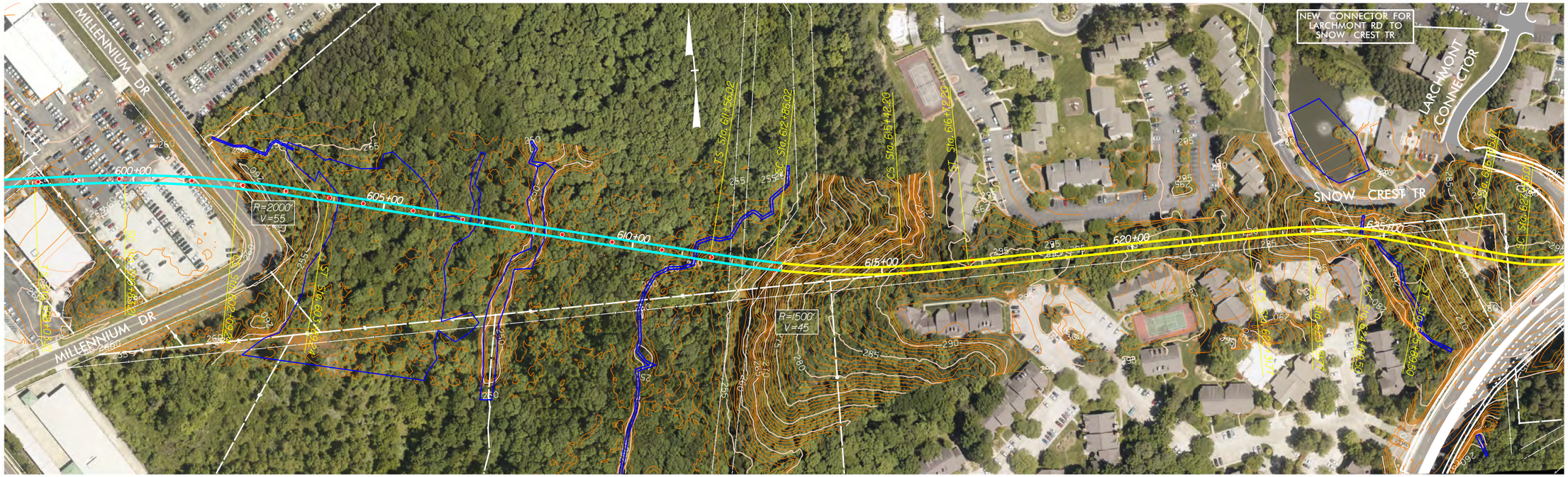
PLAN & PROFILE	SHEET: D1 – 10

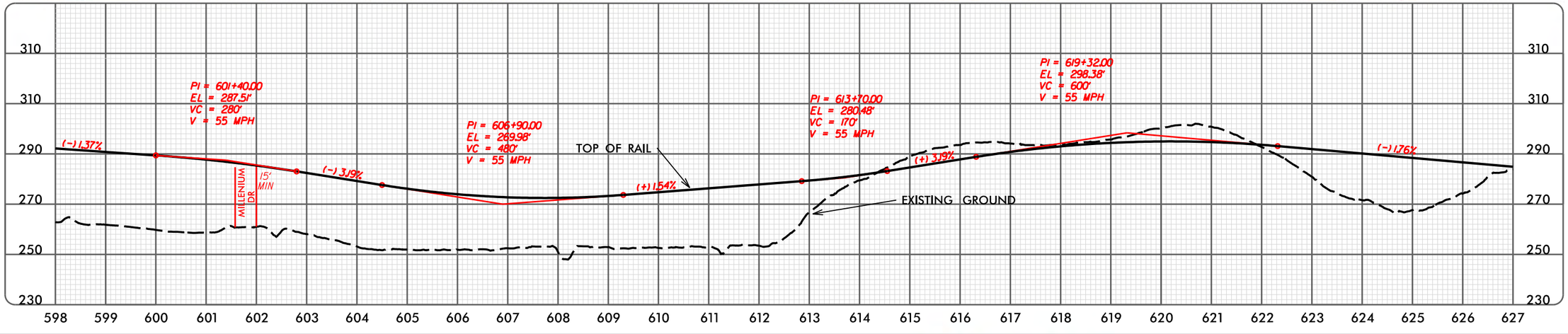
3/30/2015

SEGMENT D – NEW HOPE CREEK 2 ALTERNATIVE

PLAN AND PROFILE SHEETS

SHANNON PLAZA – NEW HOPE CREEK 2 ALTERNATIVE





GRAPHIC SCALES

PLAN: 100 0 100 200

PROFILE (HORIZONTAL): 100 0 100 200

PROFILE (VERTICAL): 20 10 0 20 40

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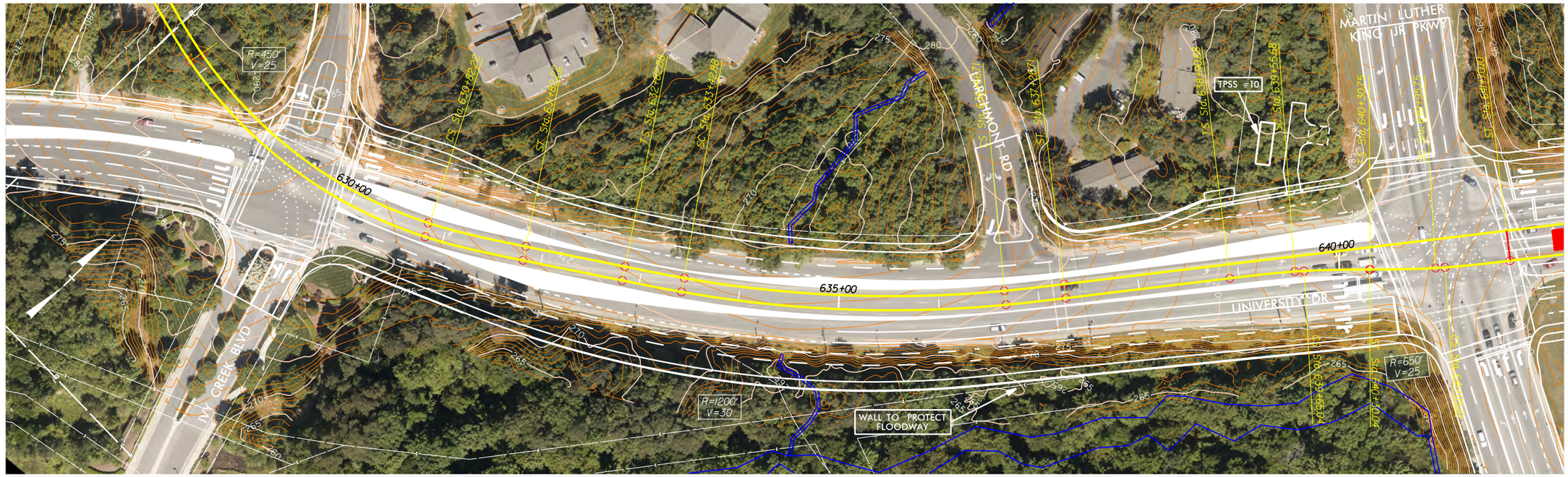
PLAN AND PROFILE

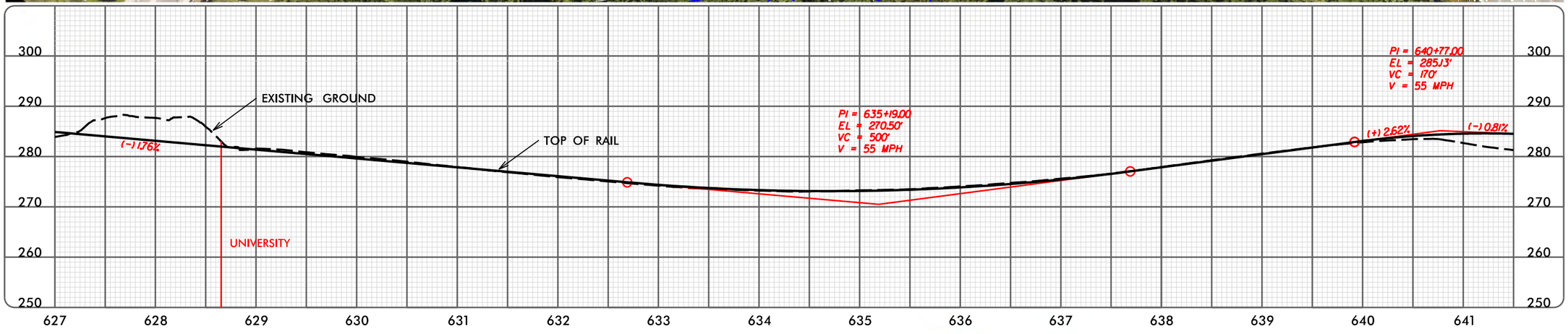
SEGMENT D

	PLAN & PROFILE	SHEET: D2 – 09

3/30/2015

UNIVERSITY DRIVE – NEW HOPE CREEK 2 ALTERNATIVE





GRAPHIC SCALES

PLAN: 50 0 50 100

PROFILE (HORIZONTAL): 50 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

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PLAN AND PROFILE

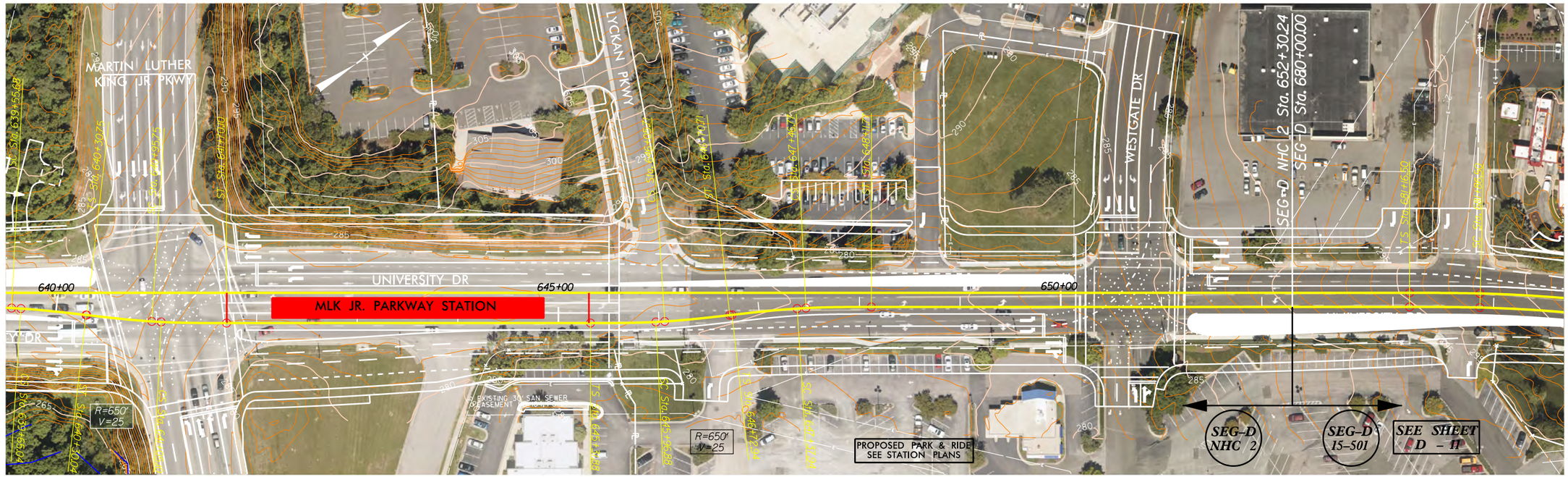
SEGMENT D

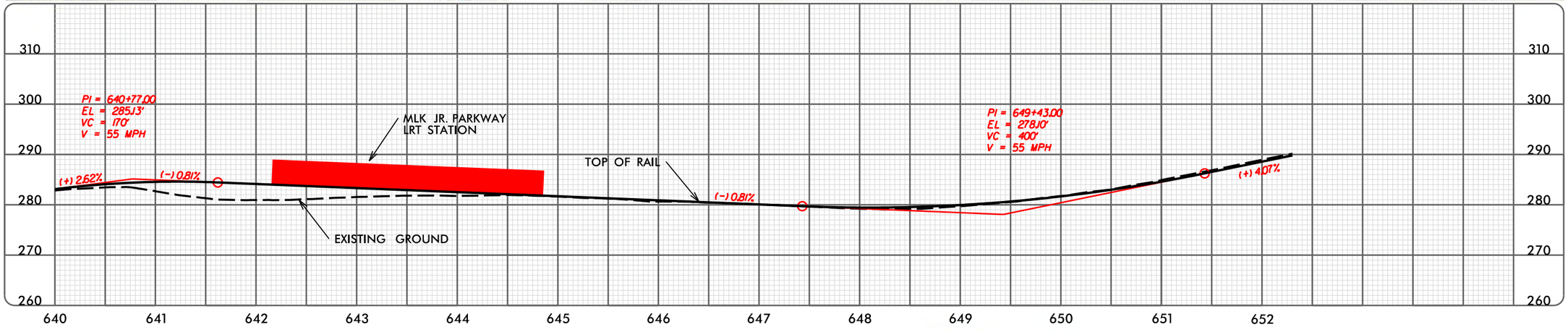
PLAN & PROFILE

SHEET: D2 – 10

4/6/2015

MLK JR. PARKWAY STATION – NEW HOPE CREEK 2 ALTERNATIVE





GRAPHIC SCALES

PLAN: 50 0 50 100

PROFILE (HORIZONTAL): 50 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

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PLAN AND PROFILE

SEGMENT D

PLAN & PROFILE

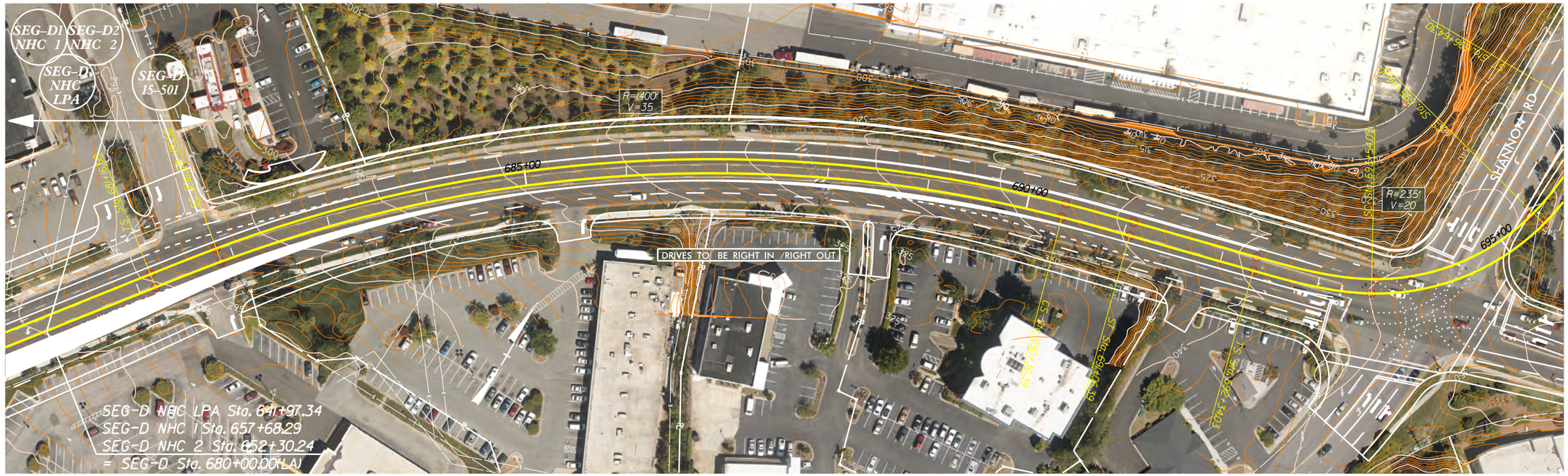
SHEET: D2 – 11

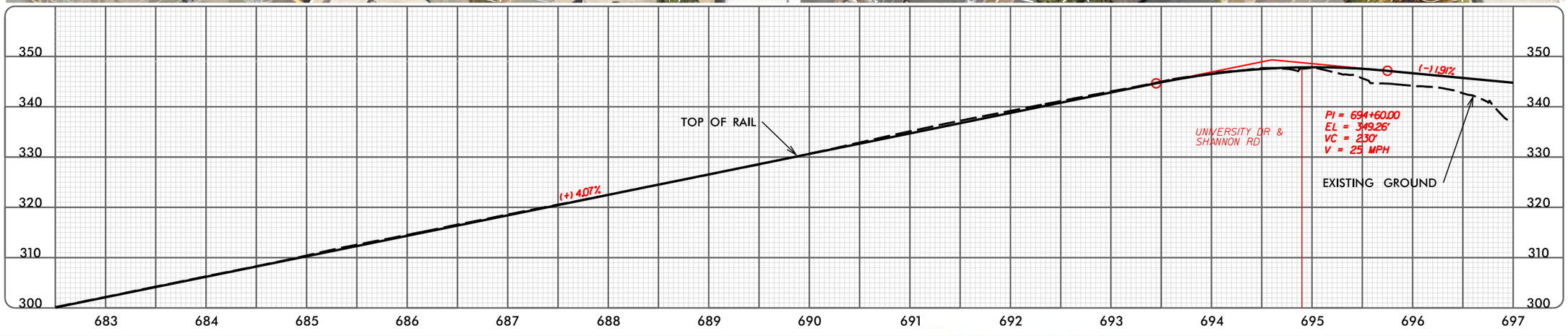
4/6/2015

SEGMENT D – SOUTH SQUARE / US 15-501

PLAN AND PROFILE SHEETS

UNIVERSITY DRIVE





GRAPHIC SCALES

50 0 50 100
PLAN

50 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

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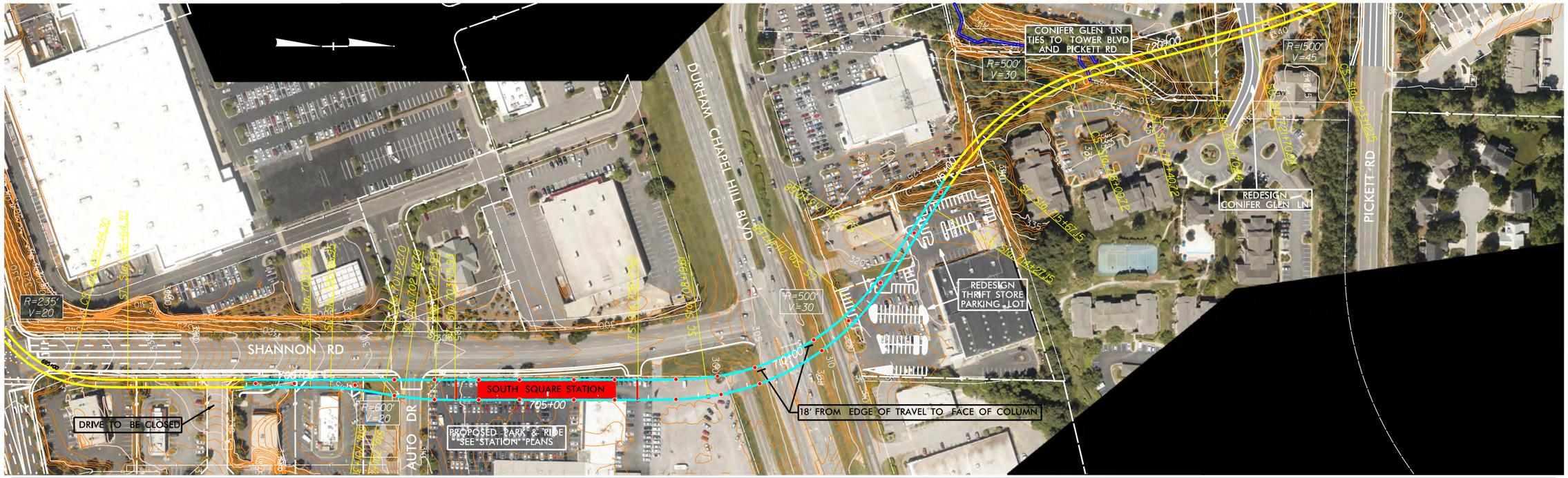
PLAN AND PROFILE

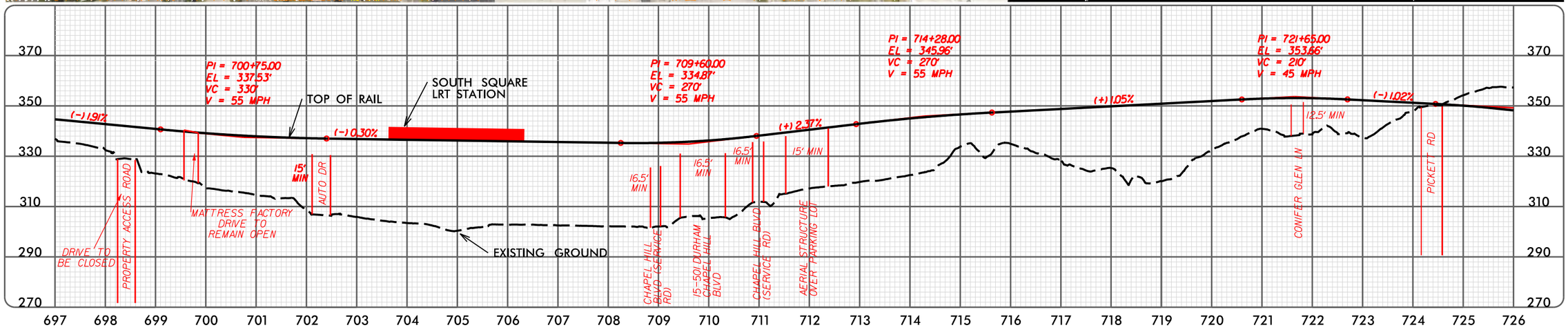
SEGMENT D

PLAN & PROFILE	SHEET: D – 11

3/30/2015

SOUTH SQUARE STATION





GRAPHIC SCALES

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PROFILE (HORIZONTAL): 100 0 100 200

PROFILE (VERTICAL): 20 10 0 20 40

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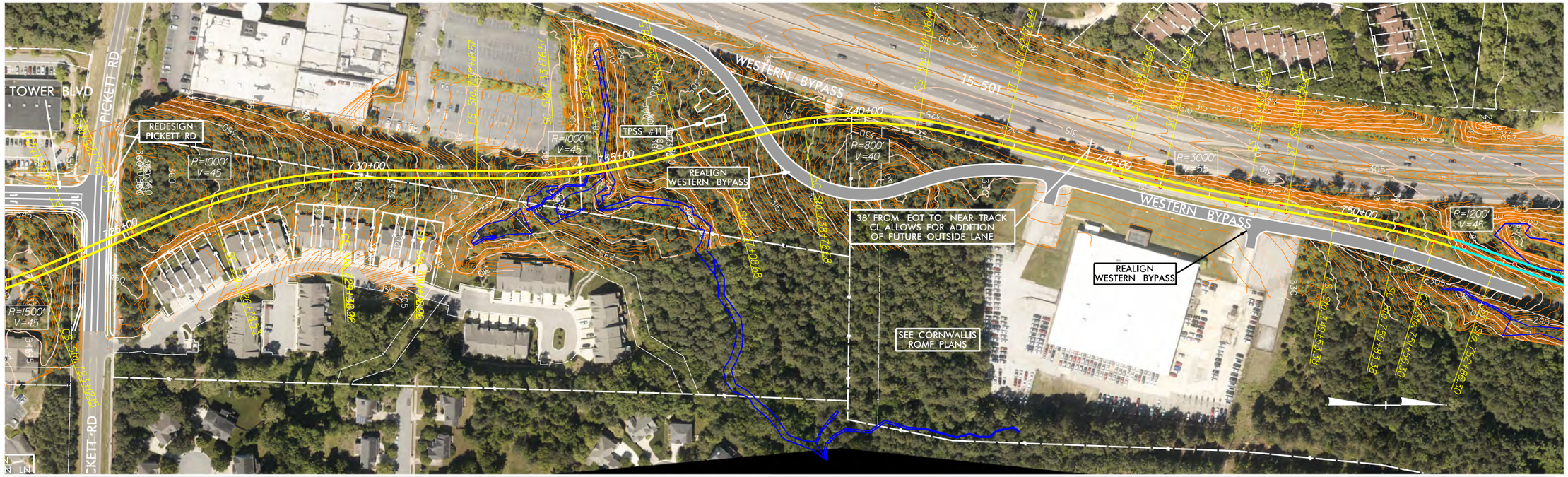
PLAN AND PROFILE

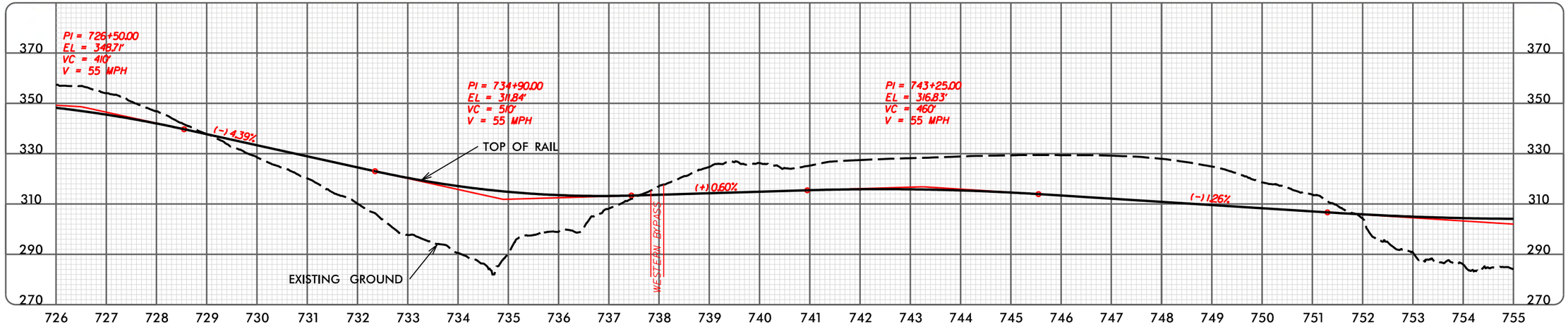
SEGMENT D

	PLAN & PROFILE	SHEET: D – 12

4/6/2015

ALONG U.S. ROUTE 15–501





GRAPHIC SCALES

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PROFILE (HORIZONTAL): 100 0 100 200

PROFILE (VERTICAL): 20 10 0 20 40

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PLAN AND PROFILE

SEGMENT D

PLAN & PROFILE

SHEET: D – 13

4/6/2015

ROADWAY MODIFICATIONS

LARCHMONT CONNECTOR

GRAPHIC SCALES

50 0 50 100
PLAN

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PLAN

SEGMENT D

LARCHMONT CONNECTOR

DWG: PLAN

SHEET: RD – 02

3/31/2015

Appendix C
Existing Traffic Signal Timing Plans

University Drive at Ivy Creek Boulevard/Snow Crest Trail

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: C0957-Snowcrest Ivy & Univ

Group Assignment: **p**
Field Master Assignment: **NONE**
System Reference Number: **82**

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

Last Database Change: **11/7/2013 10:51**

Change Record					
Change	By	Date	Change	By	Date

Notes: ***Don't mess with Pedestrian Times (set up for special needs person) - LDM 3/28/07***
10/26/07 LT Downloaded new AM plan (Sch D)

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	**15**	<C/0+0+0>
Zone Number	**1**	<C/0+0+1>
Area Number	**1**	<C/0+0+2>
Area Address	**82**	<C/0+0+3>
QuicNet Channel	**COM104:**	(QuicNet)

Communication Addresses
[Configuration not in timing menus]

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

Manual Selection
[Set Manual Plan/Offset not timing]

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

Start / Revert Times
[Miscellaneous Timing]

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

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

Row	Column Numbers ---->	Phase 1	2	3	4	5	6	7	8	Row
	Phase Names ---->	0	0	0	0	0	0	0	0	
0	Ped Walk	0	7	0	7	0	7	0	7	0
1	Ped FDW	0	24	0	30	0	24	0	30	1
2	Min Green	7	10	0	7	0	10	0	7	2
3	Type 3 Disconnect	0	0	0	0	0	0	0	0	3
4	Added per Vehicle	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0	4
5	Veh Extension	2.0	3.0	0.0	2.0	0.0	3.0	0.0	2.0	5
6	Max Gap	2.0	3.0	0.0	2.0	0.0	3.0	0.0	2.0	6
7	Min Gap	2.0	3.0	0.0	2.0	0.0	3.0	0.0	2.0	7
8	Max Limit	9	31	0	37	0	31	0	37	8
9	Max Limit 2	30	50	0	40	0	50	0	40	9
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0	A
B	PE Min Ped FDW	7	7	0	7	0	7	0	7	B
C	Cond Serv Min	10	10	0	10	0	10	0	10	C
D	Reduce Every	1.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	D
E	Yellow Change	4.2	4.2	0.0	4.0	0.0	4.2	0.0	4.0	E
F	Red Clear	2.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0	F

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	20	0	0	0	0.0
Phase 3	0	0	0	0	0.0
Phase 4	20	0	0	0	0.0
Phase 5	0	0	0	0	0.0
Phase 6	20	0	0	0	0.0
Phase 7	0	0	0	0	0.0
Phase 8	20	0	0	0	0.0
Max Initial					
Alternate Walk					
Alternate FDW					
Alternate Initial					
Alternate Extension					

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]

Row		F	Row
0	Permit	12_4_6_8	0
1	Red Lock	_____	1
2	Yellow Lock	_2___6__	2
3	Min Recall	_2___6__	3
4	Ped Recall	_____	4
5	*View Set Peds*	- - - - -	5
6	Rest In Walk	_____	6
7	Red Rest	_____	7
8	Dual Entry	___4___8	8
9	Max Recall	_____	9
A	Soft Recall	_____	A
B	Max 2	_____	B
C	Cond. Service	_____	C
D	Ext Cont Calls	_____	D
E	Yellow Start	_____	E
F	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: C0957-Snowcrest Ivy & Univ

		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 =

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

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

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**
5	Flash to PE Circuits	
6	Flash Entry Phases	
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	**_2_4_6_8**
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 Reservice	
Semi-Actuated	
Start-up Overlap Yellow	
Start-up Vehicle Calls	**12345678**
Start-up Ped Calls	**12345678**

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

Row		**2**	Row
0			**0**
1	Phase 1	**5**	**1**
2	Phase 2	**5**	**2**
3	Phase 3	**5**	**3**
4	Phase 4	**5**	**4**
5	Phase 5	**5**	**5**
6	Phase 6	**5**	**6**
7	Phase 7	**5**	**7**
8	Phase 8	**5**	**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=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: C0957-Snowcrest Ivy & Univ

Row	Plan Name ---->	Plan 1	Plan 2	Plan 3	Plan 4	Plan 5	Plan 6	Plan 7	Plan 8	Plan 9	Row
	Column Numbers ---->	1	2	3	4	5	6	7	8	9	
0	Cycle Length	110	0	105	0	0	0	0	0	0	0
1	Phase 1 - ForceOff	64	0	62	0	0	0	0	0	0	1
2	Phase 2 - ForceOff	0	0	0	0	0	0	0	0	0	2
3	Phase 3 - ForceOff	0	0	0	0	0	0	0	0	0	3
4	Phase 4 - ForceOff	44	0	44	0	0	0	0	0	0	4
5	Phase 5 - ForceOff	0	0	0	0	0	0	0	0	0	5
6	Phase 6 - ForceOff	0	0	0	0	0	0	0	0	0	6
7	Phase 7 - ForceOff	0	0	0	0	0	0	0	0	0	7
8	Phase 8 - ForceOff	44	0	44	0	0	0	0	0	0	8
9	Ring Offset	0	0	0	0	0	0	0	0	0	9
A	Offset A	73	0	38	0	0	0	0	0	0	A
B	Offset B	73	0	38	0	0	0	0	0	0	B
C	Offset C	73	0	38	0	0	0	0	0	0	C
D	Perm 1 - End	7	0	3	0	0	0	0	0	0	D
E	Hold Release	255	255	255	255	255	255	255	255	255	E
F	Zone Offset	0	0	0	0	0	0	0	0	0	F

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

Row		Plan 1	Plan 2	Plan 3	Plan 4	Plan 5	Plan 6	Plan 7	Plan 8	Plan 9	Row
0	Ped Adjustment	0	0	0	0	0	0	0	0	0	0
1	Perm 2 - Start	7	0	3	0	0	0	0	0	0	1
2	Perm 2 - End	25	0	30	0	0	0	0	0	0	2
3	Perm 3 - Start	25	0	30	0	0	0	0	0	0	3
4	Perm 3 - End	50	0	50	0	0	0	0	0	0	4
5	Reservice Time	0	0	0	0	0	0	0	0	0	5
6	Reservice Phases										6
7											7
8	Pretimed Phases										8
9	Max Recall										9
A	Perm 1 Veh Phase	4 8		4 8							A
B	Perm 1 Ped Phase	4 8		4 8							B
C	Perm 2 Veh Phase	4 8		4 8							C
D	Perm 2 Ped Phase										D
E	Perm 3 Veh Phase	1		1							E
F	Perm 3 Ped Phase										F

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

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

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

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	200	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	0	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	0	NOT-1	0	Spec. Event 2	0	8
9	OR-7 (b)	0	Fig 4 Diamond	0	Max Inhibit (nema)	0	Plan 9	0	External Alarm	0	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)	66	AND-1 (a)	0	A
B	OR-7 (d)	0	AND-4 (b)	0	Force B (nema)	0	DELAY-B	0	Phase Bank 3	0	OR-1 (b)	67	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 <C=0+E=126>

[Input Assignments]

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	0	NOT-1	0	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	0	OR-1	200	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	0	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	0	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	0	AND-1	0	TOD Out 5	0	Offset 3 (7-Wire)	0	4
5	Phase ON - 6	0	Sp Evnt Out 5	0			Plan 5	0	AND-2	0	TOD Out 6	0	Free (7-Wire)	0	5
6	Phase ON - 7	0	Sp Evnt Out 6	0			Plan 6	0	AND-3	0	TOD Out 7	0	Flash (7-Wire)	0	6
7	Phase ON - 8	0	Sp Evnt Out 7	0			Plan 7	0	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	0	EV-A	0	Adv. Warn - 1	0	Low Priority A	0	8
9	Ph. Check - 2	0			NOT-4	0	Plan 9	0	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 <C=0+E=127>

[Output Assignments]

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

		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	7	0	7	0	7	0	7
1	Ped FDW	0	15	0	15	0	15	0	15
2	Min Green	4	7	4	4	4	7	4	4
3	Type 3 Disconnect	0	20	0	20	0	20	0	20
4	Added per Vehicle	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
5	Veh Extension	2.0	4.0	2.0	2.5	2.0	4.0	2.0	2.5
6	Max Gap	3.0	6.0	3.0	3.0	3.0	6.0	3.0	3.0
7	Min Gap	0.5	2.0	0.5	1.5	0.5	2.0	0.5	1.5
8	Max Limit	20	30	20	25	20	30	20	25
9	Max Limit 2	30	50	30	40	30	50	30	40
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	7	7	7	7	7	7	7	7
C	Cond Serv Min	10	10	10	10	10	10	10	10
D	Reduce Every	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
E	Yellow Change	3.0	4.0	3.0	3.0	3.0	4.0	3.0	3.0
F	Red Clear	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0

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

	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

Max Initial
Alternate Walk
Alternate FDW
Alternate Initial
Alternate Extension

Alternate Timing
[Phase Timing Bank2]

Row		1	2	3	4	5	6	7	8
0	Ped Walk	0	7	0	7	0	7	0	7
1	Ped FDW	0	24	0	30	0	24	0	30
2	Min Green	7	10	0	7	0	10	0	7
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
5	Veh Extension	2.0	3.0	0.0	2.0	0.0	3.0	0.0	2.0
6	Max Gap	2.0	3.0	0.0	2.0	0.0	3.0	0.0	2.0
7	Min Gap	2.0	3.0	0.0	2.0	0.0	3.0	0.0	2.0
8	Max Limit	9	31	0	37	0	31	0	37
9	Max Limit 2	30	50	0	40	0	50	0	40
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	7	7	0	7	0	7	0	7
C	Cond Serv Min	10	10	0	10	0	10	0	10
D	Reduce Every	1.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0
E	Yellow Change	4.2	4.2	0.0	4.0	0.0	4.2	0.0	4.0
F	Red Clear	2.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0

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

	9	A	B	C	D
	- - -	- - -	- - -	- - -	- - -
Phase 1	0	0	0	0	0.0
Phase 2	20	0	0	0	0.0
Phase 3	0	0	0	0	0.0
Phase 4	20	0	0	0	0.0
Phase 5	0	0	0	0	0.0
Phase 6	20	0	0	0	0.0
Phase 7	0	0	0	0	0.0
Phase 8	20	0	0	0	0.0

Max Initial
Alternate Walk
Alternate FDW
Alternate Initial
Alternate Extension

Alternate Timing
[Phase Timing Bank 3]

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

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

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

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	**0.0**	<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

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	___45_7_	1_____	123___8	5.0	0.0
1	2		56	1__45_78	_____6__	123___8	3.0	0.0
2	3		46	___45_7_	1_____	123___8	10.0	0.0
3	4		39	___45_7_	_2_____	123___8	0.0	0.0
4	5		43	1__45_7_	_2_____	123___8	0.0	0.0
5	6		40	___45_7_	_____6__	123___8	0.0	0.0
6	7		41	___45_7_	__4____	123___8	5.0	0.0
7	8		42	___45_7_	_____8	123___8	5.0	0.0
8	9		47	_____67_	_____	123____	0.0	0.0
9	10		48	_____67_	_____	123____	0.0	0.0
A	11		49	_____67_	_____	123____	0.0	0.0
B	12		50	_____67_	_____	123____	0.0	0.0
C	13		55	___45_7_	_____	123____	0.0	0.0
D	14		56	___45_7_	_____	123____	0.0	0.0
E	15		57	___45_7_	_____	123____	0.0	0.0
F	16		58	___45_7_	_____	123____	0.0	0.0

Detector Assignments <C+0+E=126> *[Detector Attributes]*

			4	5	6	7	2	4
Row	Det Num	*Detector Name*	C1 Pin Number	Attributes	Phase(s)	Assign	Delay	Carry-over
0	17		59	___45_7_	_____	123____	0.0	0.0
1	18		60	___45_7_	_____	123____	0.0	0.0
2	19		61	___45_7_	_____	123____	0.0	0.0
3	20		62	___45_7_	_____	123____	0.0	0.0
4	21		63	___45_7_	_____	123____	0.0	0.0
5	22		64	___45_7_	_____	123____	0.0	0.0
6	23		65	___45_7_	_____	123____	0.0	0.0
7	24		66	___45_7_	_____	123____	0.0	0.0
8	25		67	_2_____	_2_____	123____	0.0	0.0
9	26		68	_2_____	_____6__	123____	0.0	0.0
A	27		69	_2_____	___4____	123____	0.0	0.0
B	28		70	_2_____	_____8	123____	0.0	0.0
C	29		76	___45_7_	_____	123____	0.0	0.0
D	30		77	___45_7_	_____	123____	0.0	0.0
E	31		78	___45_7_	_____	123____	0.0	0.0
F	32		79	___45_7_	_____	123____	0.0	0.0

Detector Assignments <C+0+E=126> *[Detector Attributes]*

<C+0+D=0> *[Detector Timing]*

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

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

Column Numbers ---->	Ped / Phase / Overlap 1	2	3	4	5	6	7	8	Row
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>

Enable Redirection
(Enable Redirection = 30)
[Phase Output Redirection]

Max OFF (minutes)	255	<D/0+0+1>
Max ON (minutes)	7	<D/0+0+2>

Detector Failure Monitor
[Miscellaneous Timing]

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

Dimming <C+0+E=125>
[Output Dimming]

	D
Number of Digits	0
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

<C+0+C=5>

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 =

Row	B
DELAY-A	0
DELAY-B	0
DELAY-C	0
DELAY-D	0
DELAY-E	0
DELAY-F	0

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]

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

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	07 : 00	1	C	_23456_
5	08 : 30	E	0	_23456_
6	00 : 00	0	0	_____
7	16 : 00	3	C	_23456_
8	18 : 00	E	0	_23456_
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	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	_____	_____

TOD Function <C+0+7=0.1> <C+0+E=27>
[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	0	0	123____
00 : 00	0	0	123____
00 : 00	0	0	123____
00 : 00	0	0	_____
07 : 00	1	0	_2_____
09 : 00	E	0	_2_____
12 : 00	3	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	_____

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>
[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	1	0	__3____
09 : 00	E	0	__3____
16 : 00	3	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	_____
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

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								

Notes:

Special Event Schedule -- Table 1 <C+0+E=27>
[Special Event Sequence 1]

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								

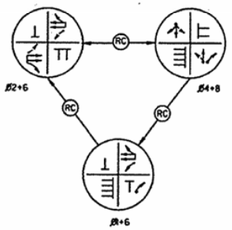
Notes:

Special Event Schedule -- Table 2 <C+0+E=28>
[Special Event Sequence 2]

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

PREPARED BY	SHEET No.	TOTAL SHEETS
J STEWART	1	3
STATE PROJ. No.	F.A. PROJ. No.	DESCRIPTION

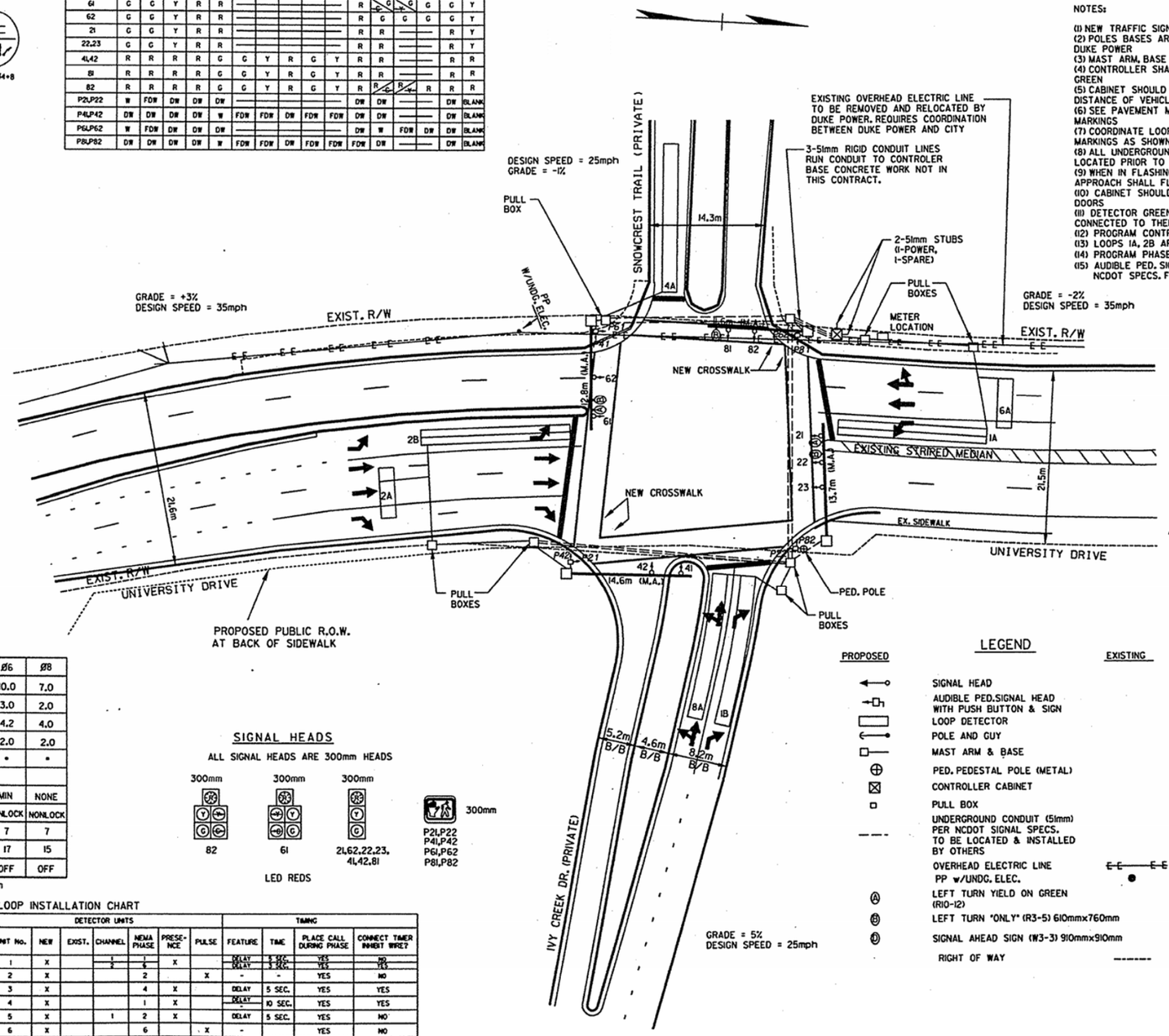
PHASING DIAGRAM



3-PHASE MINIMUM RECALL EXCLUSIVE (ISOLATED)

COLOR SEQUENCE CHART

SIGNAL FACE	R/W	Ø2+6 CLEAR Ø4+8 1	2	3	R/W	Ø4+8 CLEAR Ø2+6 1	2	3	Ø6+8 1	2	3	R/W	Ø1+6 CLEAR Ø2+6 1	2	3	FLASH
61	G	G	Y	R	R							R	G	G	G	Y
62	G	G	Y	R	R							R	G	G	G	Y
21	G	G	Y	R	R							R	R		R	Y
22,23	G	G	Y	R	R							R	R		R	Y
41,42	R	R	R	R	G	G	Y	R	G	Y	R	R			R	R
81	R	R	R	R	G	G	Y	R	G	Y	R	R			R	R
82	R	R	R	R	G	G	Y	R	G	Y	R	R	R	R	R	R
P2,P22	W	FDW	DW	DW	DW							DW	DW		DW	BLANK
P4,P42	DW	DW	DW	DW	W	FDW	FDW	DW	FDW	FDW	DW	DW			DW	BLANK
P6,P62	W	FDW	DW	DW	DW							DW	W	FDW	DW	BLANK
P8,P82	DW	DW	DW	DW	W	FDW	FDW	DW	FDW	FDW	DW	DW			DW	BLANK



NOTES:

(1) NEW TRAFFIC SIGNAL CITY INV. 957
(2) POLES BASES ARE NOT EXACT, SHALL BE FIELD LOCATED BY DUKE POWER
(3) MAST ARM, BASE INSTALLATION BY OTHERS
(4) CONTROLLER SHALL BE PROGRAMMED TO START UP/AT Ø2+6 GREEN
(5) CABINET SHOULD BE PLACED SO AS NOT TO OBSTRUCT SIGHT DISTANCE OF VEHICLES TURNING RIGHT ON RED
(6) SEE PAVEMENT MARKING PLANS FOR LOCATION OF PAVEMENT MARKINGS
(7) COORDINATE LOOP DETECTOR PLACEMENT WITH PAVEMENT MARKINGS AS SHOWN ON PAVEMENT MARKING PLANS
(8) ALL UNDERGROUND UTILITIES AND CULVERTS SHOULD BE LOCATED PRIOR TO ANY INSTALLATION
(9) WHEN IN FLASHING MODE, ALL SIGNALS HEADS FOR THE SAME APPROACH SHALL FLASH CONCURRENTLY
(10) CABINET SHOULD BE MOUNTED TO PERMIT ACCESS FROM ALL DOORS
(11) DETECTOR GREEN OVERRIDE ON LOOPS 3A, 3C SHALL BE CONNECTED TO THEIR GIVEN GREEN PHASE
(12) PROGRAM CONTROLLER FOR ANTIBACKUP ON Ø2+5, Ø1+6
(13) LOOPS 1A, 2B ARE QUADRUPOLE
(14) PROGRAM PHASE 4 &8 FOR DUAL ENTRY.
(15) AUDIBLE PED. SIGNAL SHALL CONFORM TO NCDOT SPECS. FOR SOUNDS.

SIGNAL TIMING (SEC)

PHASE	Ø1	Ø2	Ø4	Ø6	Ø8
INITIAL INTERVAL	7.0	10.0	7.0	10.0	7.0
VEHICLE INTERVAL	2.0	3.0	2.0	3.0	2.0
YELLOW CLEARANCE	4.2	4.2	4.0	4.2	4.0
RED CLEARANCE	2.0	2.0	2.0	2.0	2.0
MAX. 1 (AM PEAK)	*	*	*	*	*
MAX. 2 (PM PEAK)					
RECALL POSITION	NONE	MIN	NONE	MIN	NONE
VEHICLE CALL MEMOR	NONLOCK	NONLOCK	NONLOCK	NONLOCK	NONLOCK
PEDESTRIAN WALK	NONE	7	7	7	7
PEDESTRIAN CLEAR	NONE	17	15	17	15
PEDESTRIAN RECALL	NONE	OFF	OFF	OFF	OFF

* Timing to be determined by the City of Durham

SIGNAL HEADS

ALL SIGNAL HEADS ARE 300mm HEADS

LOOP INSTALLATION CHART

INDUCTIVE LOOPS						DETECTOR UNITS							TIMING			
LOOP No.	SIZE IN METERS	TURNS	DIST. FROM STOPBAR	NEW	EXIST.	UNIT No.	NEW	EXIST.	CHANNEL	NEMA PHASE	PRESENCE	PULSE	FEATURE	TIME	PLACE CALL DURING PHASE	CONNECT TIMER INHIBIT WIRE?
1A	L82 x 18.2	2-4-2	0.0m	X		1	X		1	1	X		DELAY	5 SEC.	YES	NO
									2	6			DELAY	5 SEC.	YES	YES
2A	L82 x 6.09	2	+21.3m	X		2	X			2		X	-	-	YES	NO
4A	L82 x 18.2	2	0.0m	X		3	X			4	X		DELAY	5 SEC.	YES	YES
1B	L82 x 18.2	2	0.0m	X		4	X			1	X		DELAY	10 SEC.	YES	YES
2B	L82 x 18.2	2-4-2	0.0m	X		5	X		1	2	X		DELAY	5 SEC.	YES	NO
6A	L82 x 6.09	2	+21.3m	X		6	X			6		X	-		YES	NO
8A	L82 x 18.2	2	0.0m	X		7	X			8	X		DELAY	5 SEC.	YES	YES

LEGEND

PROPOSED		EXISTING
⟵○	SIGNAL HEAD	
→□h	AUDIBLE PED. SIGNAL HEAD WITH PUSH BUTTON & SIGN	
▭	LOOP DETECTOR	
⟵●	POLE AND GUY	
□—	MAST ARM & BASE	
⊕	PED. PEDESTAL POLE (METAL)	
⊠	CONTROLLER CABINET	
▫	PULL BOX	
----	UNDERGROUND CONDUIT (51mm) PER NCDOT SIGNAL SPECS. TO BE LOCATED & INSTALLED BY OTHERS	
	OVERHEAD ELECTRIC LINE PP w/UNDG. ELEC.	E E E E
Ⓐ	LEFT TURN YIELD ON GREEN (R10-12)	
Ⓑ	LEFT TURN "ONLY" (R3-5) 610mmx760mm	
Ⓓ	SIGNAL AHEAD SIGN (W3-3) 910mmx910mm	
	RIGHT OF WAY	-------

2.5m 0 5m
SCALE 1:250

METRIC

TYPE 170 CONTROLLER A-082

UNIVERSITY DRIVE AT SNOWCREST TRAIL / ACCESS ROAD

SIGNAL PLAN

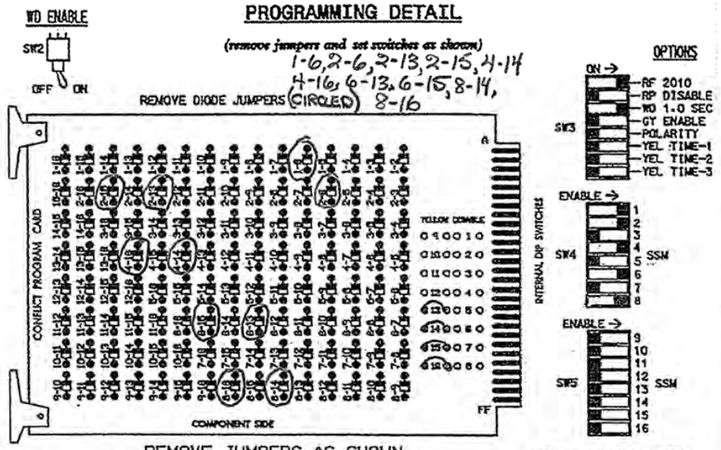
City of Durham
Transportation Engineering
101 CITY HALL PLAZA
DURHAM, NC 27701 TELEPHONE (919) 5604366

C-0957

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

1-6, 2-6, 2-13, 2-15, 4-14, 4-16, 6-13, 6-15, 8-14, 8-16



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL1-SEL5 are present on the monitor board.

NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, INSERT RED FLASH PROGRAM BLOCKS FOR ALL UNUSED VEHICLE LOAD SWITCHES IN OUTPUT FILE. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
2. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, SEE RED MONITOR BOARD PROGRAMMING DETAIL THIS SHEET.
3. PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
4. SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT WITHIN THE CONTROLLER PROGRAMMING.
5. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
6. PROGRAM PHASES 4 AND 8, ON CONTROLLER UNIT, FOR DOUBLE ENTRY.
7. THE CONTROLLER AND CABINET ARE PROGRAMMED AND WIRED INTO THE CITY OF DURHAM'S COMPUTERIZED SIGNAL SYSTEM. THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER INTERCONNECTION AND OPERATION OF THIS SIGNAL WITHIN THE SYSTEM.

PROJ. REFERENCE No.	SHEET No.	TOTAL SHEETS
	1	

STATE PROJ. No.	F.A. PROJ. No.	DESCRIPTION

EQUIPMENT INFORMATION

CONTROLLER.....McCAIN TRAFFIC TYPE 170E*
CABINET .....McCAIN TRAFFIC MODEL 332* (DWG.NO.M30117 REV.B)
SOFTWARE .....BI TRANS 233NC2
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....Ø1, Ø2, P2, Ø4, P4, Ø6, P6, Ø8, P8
PHASES USED.....1, 2, 4, 6, 8
OVERLAPS.....NONE

*EXISTING TO REMAIN IN USE

FIELD CONNECTION HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	61 82	21 22 23	P21 P22		41 42	P41 P42		61 62	P61 P62		81 82	P81 P82
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW	126											
GREEN ARROW	127											
🚶			115			106		121				112
✋			113			104		119				110

NU = NOT USED

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	P2	P6	FS DC ISOLATOR
	L	NOT USED	Ø2 2B				NOT USED						P4	P8	ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	Ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	Ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		NOT USED				Ø1 1B								

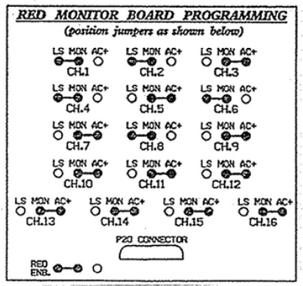
FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	DETECTOR NO.	PIN NO.	ATTRIBUTES	NEMA PHASE
1A	TB2-1,2	I1U	1	56	5 7	1
2A	TB2-5,6	I2U	2	39	5 7	2
4A	TB4-9,10	I6U	3	41	5 7	4
1B	TB5-11,12	J6L	4	45	5 7	1
2B	TB2-7,8	I2L	5	43	5 7	2
6A	TB2-3,6	J2U	6	40	5 7	6
8A	TB5-9,10	J6U	7	42	5 7	8
					5 7	
PED PUSH BUTTONS						
P21, P22	TB3-4,6	I12U	8	67	2	2
P41, P42	TB3-5,6	I12L	9	69	2	4
P61, P62	TB3-7,9	I13U	10	68	2	6
P81, P82	TB3-8,9	I13L	11	90	2	8

RED MONITOR BOARD PROGRAMMING

(position jumpers as shown below)



TYPE 170 CONTROLLER

UNIVERSITY DRIVE AT SNOWCREST TRAIL / ACCESS ROAD

SIGNAL PLAN

PB PARSONS BRINCKERHOFF

C-0957

University Drive at MLK Parkway

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: 1635-University Dr & MLK Pkwy

Group Assignment: **NONE**
Field Master Assignment: **NONE**
System Reference Number: **83**

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

Last Database Change: **12/27/2013 10:10**

Change Record					
Change	By	Date	Change	By	Date

Notes: *10/26/07 LT Downloaded new AM plan (Sch D)12/11/07 BE Ph 3 & 7 were not clear*

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	3	<C/0+0+0>
Zone Number	1	<C/0+0+1>
Area Number	1	<C/0+0+2>
Area Address	83	<C/0+0+3>
QuicNet Channel	COM104:	(QuicNet)

Communication Addresses
[Configuration not in timing menus]

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

Manual Selection
[Set Manual Plan/Offset not timing]

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

Start / Revert Times
[Miscellaneous Timing]

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

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

Row	Column Numbers ---->	Phase 1	2	3	4	5	6	7	8
	Phase Names ---->	0	0	0	0	0	0	0	0
0	Ped Walk	0	4	0	4	0	4	0	4
1	Ped FDW	0	25	0	27	0	25	0	31
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	30	20	40	20	30	20	40
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	5.0	4.5	5.3	4.8	5.0	4.5	5.3	4.8
F	Red Clear	1.9	1.8	2.0	1.7	1.9	1.8	2.0	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
Max Initial					
Alternate Walk					
Alternate FDW					
Alternate Initial					
Alternate Extension					

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]

Row		F
0	Permit	12345678
1	Red Lock	_____
2	Yellow Lock	_2___6__
3	Min Recall	_2___6__
4	Ped Recall	_____
5	*View Set Peds*	- - - - -
6	Rest In Walk	_____
7	Red Rest	_____
8	Dual Entry	___4___8
9	Max Recall	_____
A	Soft Recall	_____
B	Max 2	_____
C	Cond. Service	_____
D	Ext Cont Calls	_____
E	Yellow Start	_____
F	First Phases	_2___6__

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

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

Row	Column Numbers ---->	Overlap 1	2	3	4	5	6	7	8
	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

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 =

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

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

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 Reservice	
Semi-Actuated	
Start-up Overlap Yellow	
Start-up Vehicle Calls	12345678
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

Row		2
0		
1	Phase 1	4
2	Phase 2	10
3	Phase 3	4
4	Phase 4	7
5	Phase 5	4
6	Phase 6	10
7	Phase 7	4
8	Phase 8	7

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=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

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		Plan									
	Column Numbers ---->	1	2	3	4	5	6	7	8	9	
Row	*Plan Name ---->*										Row
0	Cycle Length	110	0	105	0	0	0	0	0	0	0
1	Phase 1 - ForceOff	70	0	70	0	0	0	0	0	0	1
2	Phase 2 - ForceOff	0	0	0	0	0	0	0	0	0	2
3	Phase 3 - ForceOff	18	0	17	0	0	0	0	0	0	3
4	Phase 4 - ForceOff	55	0	53	0	0	0	0	0	0	4
5	Phase 5 - ForceOff	79	0	72	0	0	0	0	0	0	5
6	Phase 6 - ForceOff	0	0	0	0	0	0	0	0	0	6
7	Phase 7 - ForceOff	20	0	20	0	0	0	0	0	0	7
8	Phase 8 - ForceOff	55	0	53	0	0	0	0	0	0	8
9	Ring Offset	0	0	0	0	0	0	0	0	0	9
A	Offset A	100	0	14	0	0	0	0	0	0	A
B	Offset B	100	0	14	0	0	0	0	0	0	B
C	Offset C	100	0	14	0	0	0	0	0	0	C
D	Perm 1 - End	9	0	8	0	0	0	0	0	0	D
E	Hold Release	255	255	255	255	255	255	255	255	255	E
F	Zone Offset	0	0	0	0	0	0	0	0	0	F

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

Row											Row
0	Ped Adjustment	0	0	0	0	0	0	0	0	0	0
1	Perm 2 - Start	9	0	8	0	0	0	0	0	0	1
2	Perm 2 - End	27	0	25	0	0	0	0	0	0	2
3	Perm 3 - Start	27	0	25	0	0	0	0	0	0	3
4	Perm 3 - End	57	0	57	0	0	0	0	0	0	4
5	Reservice Time	0	0	0	0	0	0	0	0	0	5
6	Reservice Phases										6
7											7
8	Pretimed Phases										8
9	Max Recall										9
A	Perm 1 Veh Phase	3 7		3 7			12345678	12345678	12345678	12345678	A
B	Perm 1 Ped Phase						12345678	12345678	12345678	12345678	B
C	Perm 2 Veh Phase	4 8		4 8							C
D	Perm 2 Ped Phase	4 8		4 8							D
E	Perm 3 Veh Phase	1 5		1 5							E
F	Perm 3 Ped Phase										F

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

		E	
			0
Plan 1 - Sync	2 6		1
Plan 2 - Sync	2 6		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]

		F	
Free Lag	2 4 6 8		0
Plan 1 - Lag	2 4 6 8		1
Plan 2 - Lag	2 4 6 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
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

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	60	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	62	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

<C=0+E=126>

[Input Assignments]

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

<C=0+E=127>

[Output Assignments]

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

		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	4	0	4	0	4	0	4
1	Ped FDW	0	20	0	24	0	20	0	24
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	1.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0
6	Max Gap	1.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0
7	Min Gap	1.0	2.0	1.0	1.0	1.0	2.0	1.0	1.0
8	Max Limit	20	30	20	40	20	30	20	40
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	5.0	4.5	5.3	4.8	5.0	4.5	5.3	4.8
F	Red Clear	1.9	1.8	2.0	1.7	0.0	1.8	2.0	1.7

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

	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

Max Initial
Alternate Walk
Alternate FDW
Alternate Initial
Alternate Extension

Alternate Timing
[Phase Timing Bank2]

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

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

Row		1	2	3	4	5	6	7	8
0	Ped Walk	0	4	0	4	0	4	0	4
1	Ped FDW	0	25	0	27	0	25	0	31
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	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	5.0	4.5	5.3	4.8	5.0	4.5	5.3	4.8
F	Red Clear	1.9	1.8	2.0	1.7	1.9	1.8	2.0	1.7

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

	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

Max Initial
Alternate Walk
Alternate FDW
Alternate Initial
Alternate Extension

Alternate Timing
[Phase Timing Bank 3]

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

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
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: 1635-University Dr & MLK Pkwy

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	0.0	0.0
1	2		56	___5_7_	1_____	123___8	0.0	0.0
2	3		56	___5_7_	1_____	123___8	0.0	0.0
3	4		39	___5_7_	_2____	123___8	0.0	0.0
4	5		58	___5_7_	__3___	123___8	0.0	0.0
5	6		41	___5_7_	___4__	123___8	0.0	0.0
6	7		55	___5_7_	____5__	123___8	0.0	0.0
7	8		55	___5_7_	____5__	123___8	0.0	0.0
8	9		55	___5_7_	____5__	123___8	0.0	0.0
9	10		40	___5_7_	_____6_	123___8	0.0	0.0
A	11		57	___5_7_	_____7_	123___8	0.0	0.0
B	12		42	___5_7_	_____8	123_6_8	0.0	0.0
C	13		67	_2_____	_2_____	123____	0.0	0.0
D	14		68	_2_____	_____6_	123____	0.0	0.0
E	15		69	_2_____	___4___	123____	0.0	0.0
F	16		70	_2_____	_____8	123____	0.0	0.0

Detector Assignments <C+0+E=126>
[Detector Attributes]

			4	5	6	7	2	4
Row	Det Num	*Detector Name*	C1 Pin Number	Attributes	Phase(s)	Assign	Delay	Carry-over
0	17		65	____5___	___4____	123___8	0.0	2.8
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 Assignments <C+0+D=0>
[Detector Timing]

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

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

Column Numbers ---->	Ped / Phase / Overlap 1	2	3	4	5	6	7	8	Row
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]

			D	Row
Cabinet Type	0	<E/125+D+0>	Output Bit:	12345678	0
			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

Enable Redirection
(Enable Redirection = 30)
[Phase Output Redirection]

Max OFF (minutes)	255	<D/0+0+1>
Max ON (minutes)	7	<D/0+0+2>

Detector Failure Monitor
[Miscellaneous Timing]

Dimming <C+0+E=125>
[Output Dimming]

	D
Number of Digits	0
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

<C+0+C=5>

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 =

	B	Row
DELAY-A	0	A
DELAY-B	0	B
DELAY-C	0	C
DELAY-D	0	D
DELAY-E	0	E
DELAY-F	0	F

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]

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: 1635-University Dr & MLK Pkwy

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	07 : 00	1	C	_23456_
5	08 : 30	E	C	_23456_
6	00 : 00	0	0	_____
7	16 : 30	3	C	_23456_
8	18 : 00	E	0	_23456_
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	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	_____	_____

TOD Function <C+0+7=0.1> <C+0+E=27>
[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]

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	0	0	_2_____
09 : 00	E	0	_2_____
12 : 00	0	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	_____

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>
[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_____
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
05 : 30	0	0	__3____
09 : 00	E	0	__3____
11 : 30	0	0	__3____
13 : 30	E	0	__3____
16 : 00	0	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]

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								

Notes:

Special Event Schedule -- Table 1 <C+0+E=27>

[Special Event Sequence 1]

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								

Notes:

Special Event Schedule -- Table 2 <C+0+E=28>

[Special Event Sequence 2]

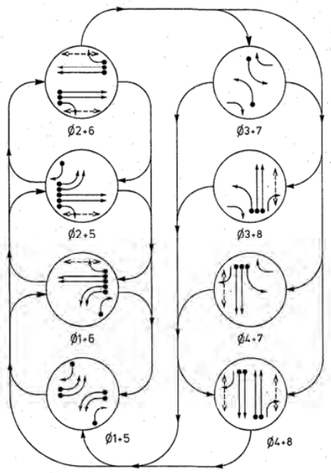
0 <E/28+5+F>

Limited Service Interval

[Special Event Sequence 2]

PROJECT REFERENCE NO.	SHEET NO.
	SIG. 1

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

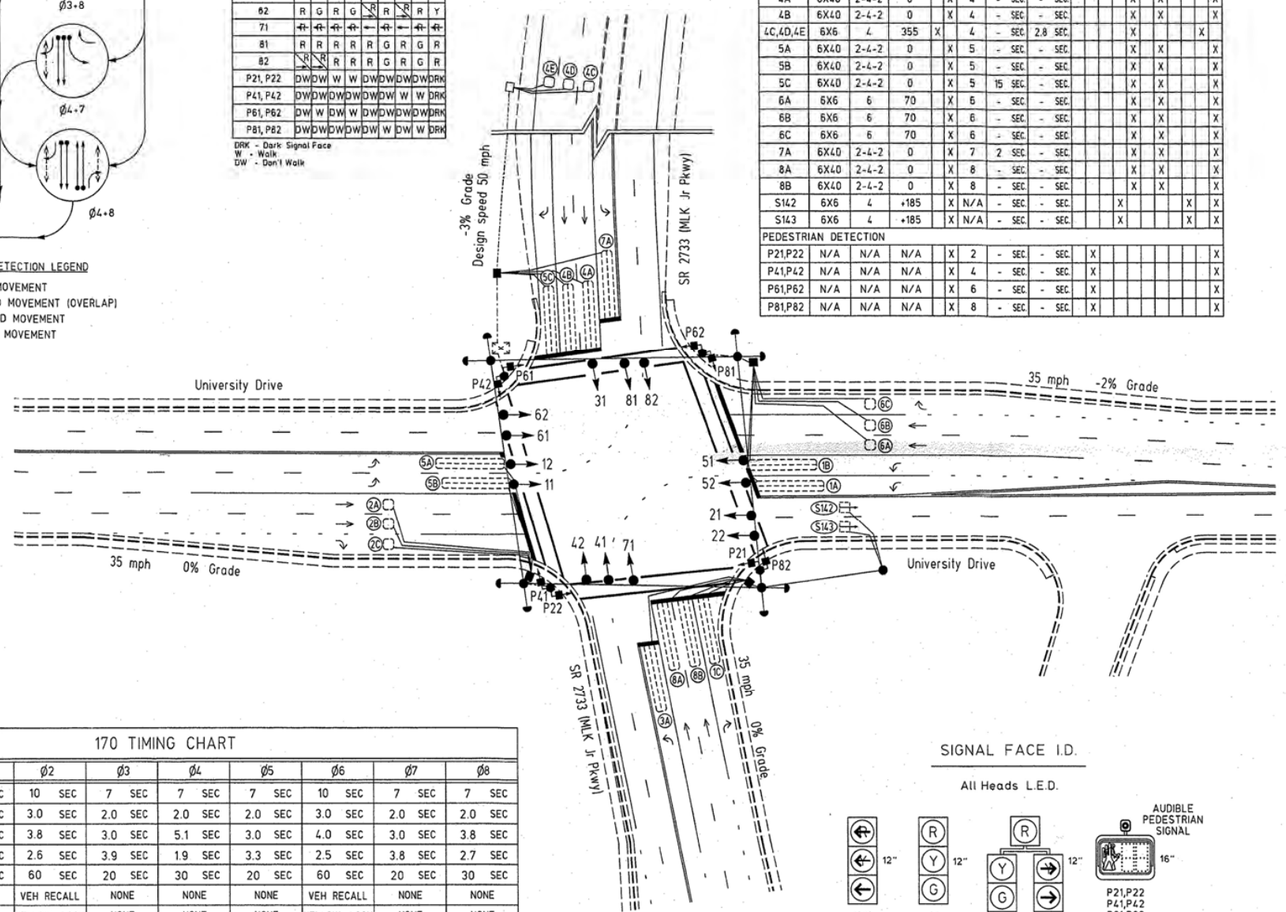
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
11, 12	←	←	←	←	←	←	←	←	←
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R	R	R	R	Y
31	←	←	←	←	←	←	←	←	←
41	R	R	R	R	R	R	G	G	R
42	R	R	R	R	R	R	G	G	R
51, 52	←	←	←	←	←	←	←	←	←
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R	R	R	R	Y
71	←	←	←	←	←	←	←	←	←
81	R	R	R	R	R	G	R	G	R
82	R	R	R	R	R	G	R	G	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DRK

DRK - Dark Signal Face
W - Walk
DW - Don't Walk

170 LOOP & DETECTOR UNIT INSTALLATION CHART

INDUCTIVE LOOPS						DETECTOR PROGRAMMING														
							TIMING		ATTRIBUTES										STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	NEMA PHASE	DELAY	CARRY (STRETCH)	1 DELAY OR PULSE/TIME CALL	2 PULSE/TIME PROPORTIONAL	3 RESERVED	4 QUEUE	5 EXTENSION	6 TYPE 3	7 CALLING	8 ALTERNATE	SYSTEM LOOPS		NEW	EXISTING
1A	6X40	2-4-2	0		X	1	- SEC.	- SEC.					X	X						X
1B	6X40	2-4-2	0		X	1	- SEC.	- SEC.					X	X						X
1C	6X40	2-4-2	0		X	1	15 SEC.	- SEC.					X	X						X
2A	6X6	6	70		X	2	- SEC.	- SEC.					X	X						X
2B	6X6	6	70		X	2	- SEC.	- SEC.					X	X						X
2C	6X6	6	70		X	2	- SEC.	- SEC.					X	X						X
3A	6X40	2-4-2	0		X	3	2 SEC.	- SEC.					X	X						X
4A	6X40	2-4-2	0		X	4	- SEC.	- SEC.					X	X						X
4B	6X40	2-4-2	0		X	4	- SEC.	- SEC.					X	X						X
4C,4D,4E	6X6	4	355	X		4	- SEC.	2.8 SEC.					X					X		
5A	6X40	2-4-2	0		X	5	- SEC.	- SEC.					X	X						X
5B	6X40	2-4-2	0		X	5	- SEC.	- SEC.					X	X						X
5C	6X40	2-4-2	0		X	5	15 SEC.	- SEC.					X	X						X
6A	6X6	6	70		X	6	- SEC.	- SEC.					X	X						X
6B	6X6	6	70		X	6	- SEC.	- SEC.					X	X						X
6C	6X6	6	70		X	6	- SEC.	- SEC.					X	X						X
7A	6X40	2-4-2	0		X	7	2 SEC.	- SEC.					X	X						X
8A	6X40	2-4-2	0		X	8	- SEC.	- SEC.					X	X						X
8B	6X40	2-4-2	0		X	8	- SEC.	- SEC.					X	X						X
S142	6X6	4	+185		X	N/A	- SEC.	- SEC.				X						X		X
S143	6X6	4	+185		X	N/A	- SEC.	- SEC.				X						X		X
PEDESTRIAN DETECTION																				
P21,P22	N/A	N/A	N/A		X	2	- SEC.	- SEC.		X										X
P41,P42	N/A	N/A	N/A		X	4	- SEC.	- SEC.		X										X
P61,P62	N/A	N/A	N/A		X	6	- SEC.	- SEC.		X										X
P81,P82	N/A	N/A	N/A		X	8	- SEC.	- SEC.		X										X



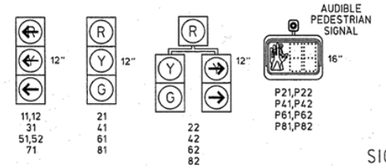
170 TIMING CHART

PHASE	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
MINIMUM INITIAL×	7 SEC	10 SEC	7 SEC	7 SEC	7 SEC	10 SEC	7 SEC	7 SEC
VEHICLE EXTENSION×	2.0 SEC	3.0 SEC	2.0 SEC	2.0 SEC	2.0 SEC	3.0 SEC	2.0 SEC	2.0 SEC
YELLOW CHANGE INTERVAL	3.0 SEC	3.8 SEC	3.0 SEC	5.1 SEC	3.0 SEC	4.0 SEC	3.0 SEC	3.8 SEC
RED CLEARANCE	3.4 SEC	2.6 SEC	3.9 SEC	1.9 SEC	3.3 SEC	2.5 SEC	3.8 SEC	2.7 SEC
MAXIMUM LIMIT×	20 SEC	60 SEC	20 SEC	30 SEC	20 SEC	60 SEC	20 SEC	30 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	OFF	OFF	OFF	OFF	OFF
WALK×	- SEC	4 SEC	- SEC	4 SEC	- SEC	4 SEC	- SEC	4 SEC
FLASHING DON'T WALK	- SEC	25 SEC	- SEC	27 SEC	- SEC	25 SEC	- SEC	31 SEC
TYPE 3 LIMIT	- 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×	2.0 SEC	3.0 SEC	2.0 SEC	2.0 SEC	2.0 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×	2.0 SEC	3.0 SEC	2.0 SEC	2.0 SEC	2.0 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 phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

SIGNAL FACE I.D.

All Heads L.E.D.



NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
FINAL DRAWING Date: 8/8/2012
Traffic Engineering Branch

DURHAM
L-8-8-9
City of Durham
101 City Hall Plaza
Durham, NC 27701
(919) 560-4366

8 Phase
Fully Actuated
(Durham Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012, 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/itss/
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Pavement markings are existing.
4. Phase 1 and/or phase 5 may be lagged.
5. Phase 3 and/or phase 7 may be lagged.
6. Set all detector units to presence mode.
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. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
10. Program pedestrian heads to count down the flashing "Don't Walk" time only.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
12. This intersection features audible pedestrian signals, which should conform to all standards set forth in the American with Disabilities Act. The north/south crossings (phases 2 and 6) will emit a "cuckoo" sound, and the east/west crossings (phases 4 and 8) will emit a "peep-peep" sound.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Microloop System Detector	
	Controller & Cabinet	
	Pull Box	
	2 in. Underground Conduit	
	Directional Arrow	
	Signal Pedestal	
	Optical Detector	
	Stop Bar	
	Wheelchair Ramp	

SIGNAL UPGRADE

Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 Greenfield Pkwy, Garner, NC 27529

SCALE 0 40
1" = 40'

University Drive at SR 2733 (Martin Luther King Jr. Parkway)

DIVISION 5 DURHAM COUNTY DURHAM
PLAN DATE: SEPTEMBER 2011 REVIEWED BY: P NICHOLAS
PREPARED BY: L TRACEY REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032040 ENGINEER PETER JOSEPH NICHOLAS IV
SIGNATURE 7-3-12 DATE
SIG. INVENTORY NO. 05-1635

PROJECT REFERENCE NO.	SHEET NO.
	SIG. 2

EDI MODEL 2010ECL CONFLICT MONITOR PROGRAMMING DETAIL

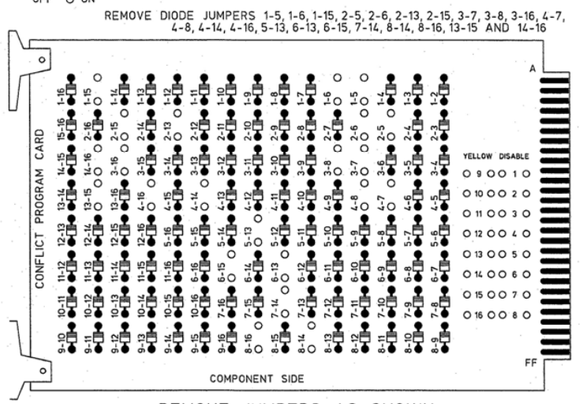
(remove jumpers and set switches as shown)

WD ENABLE

SW2

OFF ON

REMOVE DIODE JUMPERS 1-5, 1-6, 1-15, 2-5, 2-6, 2-13, 2-15, 3-7, 3-8, 3-16, 4-7, 4-8, 4-14, 4-16, 5-13, 6-13, 6-15, 7-14, 8-14, 8-16, 13-15 AND 14-16



OPTIONS

SW3

- ON →
- RF 2010
- RP DISABLE
- WD 1.0 SEC
- GY ENABLE
- POLARITY
- YEL TIME-1
- YEL TIME-2
- YEL TIME-3

SW4 SSM

- ENABLE →
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

SW5 SSM

- ENABLE →
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

■ = DENOTES POSITION OF SWITCH

REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. To prevent red failures on unused monitor channels, see Red Monitor Board Programming this sheet.
3. Program controller to start up in phases 2 and 6 green.
4. Set power-up flash time to 7 seconds and implement within the controller programming.
5. Enable simultaneous gap-out feature, on the controller unit, for all phases.
6. Ensure start up flash phases are coordinated with flash program block assignments.
7. This controller and cabinet are part of the Durham City System.

EQUIPMENT INFORMATION

CONTROLLER.....McCAIN TRAFFIC TYPE 170E
CABINET .....McCAIN TRAFFIC MODEL 332
(Dwg No.: M30117/REV. C)
SOFTWARE .....BI TRANS 233NC2×
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS.....12
LOAD SWITCHES USED.....S1,S2,S2P,S3,S4,S4P,S5,S6,S6P,S7,S8,S8P
PHASES USED.....1,2,2PED,3,4,4PED,5,6,6PED,7,8,8PED
OVERLAPS.....NONE

×Software to be supplied by City of Durham.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S2P	S3		S4	S4P	S5		S6	S6P	S7		S8	S8P
PHASE	1		2	2 PED	3		4	4 PED	5		6	6 PED	7		8	8 PED
SIGNAL HEAD NO.	11,12	82	21,22	P21, P22	31	22	41,42	P41, P42	51,52	42	61,62	P61, P62	71	62	81,82	P81, P82
RED			128				101				134				107	
YELLOW			129				102				135				108	
GREEN			130				103				136				109	
RED ARROW	125				116				131				122			
YELLOW ARROW	126	126			117	117			132	132			123	123		
GREEN ARROW	127	127			118	118			133	133			124	124		
✋				113			104				119				110	
🚶				115			106				121				112	

PEDESTRIAN PHASE PROGRAMMING

PROGRAM PEDESTRIAN OUTPUTS 2P,4P,6P AND 8P
AT KEYPAD INPUT E/125+F+5=Ø2,
AT KEYPAD INPUT E/125+F+6=Ø6,
AT KEYPAD INPUT E/125+F+7=Ø4,
AT KEYPAD INPUT E/125+F+8=Ø8.

COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	Ø2 2C	SLOT EMPTY	Ø3 3A	Ø4 4A	Ø4 4C,4D,4E	SLOT EMPTY	Ø1 1B	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	NOT USED	Ø2 2B	NOT USED		NOT USED	Ø4 4B	NOT USED		Ø1 1C			Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø6 6A	Ø6 6C	SLOT EMPTY	Ø7 7A	Ø8 8A	SYS. DET. S14.2	SLOT EMPTY	Ø5 5B	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø6 6B	NOT USED		NOT USED	Ø8 8B	SYS. DET. S14.3		Ø5 5C					

EX.: 1A, 2A, ETC. = LOOP NO.'S

× NOTE: OPTICAL DETECTORS SHALL BE WIRED TO INPUT FILE PER MANUFACTURER'S INSTRUCTIONS.

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	DETECTOR NO.	PIN NO.	ATTRIBUTES	NEMA PHASE
1A	TB2-1,2	I1U	1	56	5, 7	1
1B	TB6-9,10	I9U	2	60	5, 7	1
1C	TB6-11,12	I9L	3	62	5, 7	1
2A	TB2-5,6	I2U	4	39	5, 7	2
2B	TB2-7,8	I2L	5	43	5, 7	2
2C	TB2-9,10	I3U	6	63	5, 7	2
3A	TB4-5,6	I5U	7	58	5, 7	3
4A	TB4-9,10	I6U	8	41	5, 7	4
4B	TB4-11,12	I6L	9	45	5, 7	4
4C,4D,4E	TB6-1,2	I7U	10	65	5	4
5A	TB3-1,2	J1U	11	55	5, 7	5
5B	TB7-9,10	J9U	12	59	5, 7	5
5C	TB7-11,12	J9L	13	61	5, 7	5
6A	TB3-5,6	J2U	14	40	5, 7	6
6B	TB3-7,8	J2L	15	44	5, 7	6
6C	TB3-9,10	J3U	16	64	5, 7	6
7A	TB5-5,6	J5U	17	57	5, 7	7
8A	TB5-9,10	J6U	18	42	5, 7	8
8B	TB5-11,12	J6L	19	46	5, 7	8
×S14.2	TB7-1,2	J7U	20	66	4	SYS
×S14.3	TB7-3,4	J7L	21	79	4	SYS
PEDESTRIAN PUSHBUTTONS						
P21,P22	TB8-4,6	I12U	22	67	2	2
P41,P42	TB8-5,6	I12L	23	69	2	4
P61,P62	TB8-7,9	I13U	24	68	2	6
P81,P82	TB8-8,9	I13L	25	70	2	8

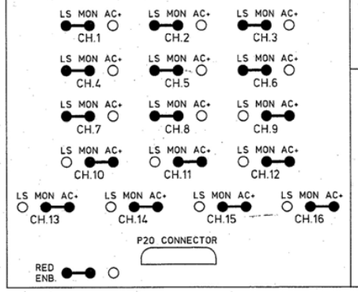
NOTE: Program detector delay and carryover times as specified on signal design plans.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

DETECTOR ATTRIBUTES LEGEND:
1-FULL TIME DELAY
2-PED CALL
3-RESERVED
4-COUNTING
5-EXTENSION
6-TYPE 3
7-CALLING
8-ALTERNATE

RED MONITOR BOARD PROGRAMMING

(position jumpers as shown below)



×SYSTEM DETECTOR PROGRAMMING NOTES

In order for system loops to operate properly, their pin assignments will have to be re-assigned on 170E controller as described below.

A. To assure that these pins are cleared from their default function, program as follows:

Keypad input E/126+4+7 = 0
Keypad input E/126+4+F = 0

B. Program pins for system detectors as follows:

Keypad input E/126+B+1 = 66
Keypad input E/126+B+2 = 79

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-1635
DESIGNED: September 2011
SEALED: July 3, 2012
REVISED:

SIGNAL SYSTEM DATA:	
Drop	3
Area	1
Area Address	83
Comm Channel	C-4

SIGNAL UPGRADE

DURHAM
1868
CITY OF MEDICINE

City of Durham
101 City Hall Plaza
Durham, NC 27701
(919) 560-4366

Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Traffic Engineering Branch
Signals Management Section

750 Greenfield Pkwy, Garner, NC 27529

University Drive
at SR 2733 (Martin Luther King Jr. Parkway)

DIVISION 5 DURHAM COUNTY DURHAM

PLAN DATE: SEPTEMBER 2011	REVIEWED BY: P NICHOLAS
PREPARED BY: L TRACEY	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032040 ENGINEER PETER JOSEPH NICHOLAS

SIGNATURE 7-31-12 DATE

SIG. INVENTORY NO. 05-1635

University Drive at Westgate Drive

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: C0256-Westgate & University

Group Assignment: **p**
Field Master Assignment: **NONE**
System Reference Number: **84**

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

Last Database Change: **11/7/2013 10:51**

Change Record					
Change	By	Date	Change	By	Date

Notes: *10/26/07 LT Downloaded new AM plan (Sch D)*

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	1	<C/0+0+0>
Zone Number	1	<C/0+0+1>
Area Number	1	<C/0+0+2>
Area Address	84	<C/0+0+3>
QuicNet Channel	COM104:	(QuicNet)

Communication Addresses
[Configuration not in timing menus]

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

Manual Selection
[Set Manual Plan/Offset not timing]

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

Start / Revert Times
[Miscellaneous Timing]

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

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

Row	Column Numbers ----> / 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	7	17	7	14	7	17	7	14
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	3.0	4.0	3.0	3.0	3.0	4.0	3.0	3.0
6	Max Gap	3.0	4.0	3.0	3.0	3.0	4.0	3.0	3.0
7	Min Gap	3.0	4.0	3.0	3.0	3.0	4.0	3.0	3.0
8	Max Limit	18	30	15	25	18	45	15	25
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	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 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
Max Initial					
Alternate Walk					
Alternate FDW					
Alternate Initial					
Alternate Extension					

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]

Row		F
0	Permit	12345678
1	Red Lock	_____
2	Yellow Lock	_2___6__
3	Min Recall	_2___6__
4	Ped Recall	_____
5	*View Set Peds*	- - - - -
6	Rest In Walk	_____
7	Red Rest	_____
8	Dual Entry	___4___8
9	Max Recall	_____
A	Soft Recall	_____
B	Max 2	_____
C	Cond. Service	_____
D	Ext Cont Calls	12345678
E	Yellow Start	_____
F	First Phases	_2___6__

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

Display Indications:
0=Walk
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A=Stop Time

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

INTERSECTION: C0256-Westgate & University

Row	Column Numbers ---->	Overlap 1	2	3	4	5	6	7	8
	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 =

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

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

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	
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	
Ped for 6P Output	
Ped for 4P Output	
Ped for 8P Output	
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 Reservice	
Semi-Actuated	
Start-up Overlap Yellow	
Start-up Vehicle Calls	12345678
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

Row		2
0		
1	Phase 1	7
2	Phase 2	10
3	Phase 3	7
4	Phase 4	7
5	Phase 5	7
6	Phase 6	10
7	Phase 7	7
8	Phase 8	7

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

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: C0256-Westgate & University

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

Row	Column Numbers ----> / Plan Name ---->	Plan 1	Plan 2	Plan 3	Plan 4	Plan 5	Plan 6	Plan 7	Plan 8	Plan 9	Row
0	Cycle Length	110	65	105	0	0	0	0	0	0	0
1	Phase 1 - ForceOff	61	43	62	0	0	0	0	0	0	1
2	Phase 2 - ForceOff	0	0	0	0	0	0	0	0	0	2
3	Phase 3 - ForceOff	15	13	16	0	0	0	0	0	0	3
4	Phase 4 - ForceOff	43	29	45	0	0	0	0	0	0	4
5	Phase 5 - ForceOff	67	43	70	0	0	0	0	0	0	5
6	Phase 6 - ForceOff	0	0	0	0	0	0	0	0	0	6
7	Phase 7 - ForceOff	19	13	18	0	0	0	0	0	0	7
8	Phase 8 - ForceOff	43	29	45	0	0	0	0	0	0	8
9	Ring Offset	0	0	0	0	0	0	0	0	0	9
A	Offset A	4	0	78	0	0	0	0	0	0	A
B	Offset B	4	0	78	0	0	0	0	0	0	B
C	Offset C	4	0	78	0	0	0	0	0	0	C
D	Perm 1 - End	7	0	7	0	0	0	0	0	0	D
E	Hold Release	255	255	255	255	255	255	255	255	255	E
F	Zone Offset	0	0	0	0	0	0	0	0	0	F

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

Row		E	Row
0			0
1	Plan 1 - Sync	_2___6__	1
2	Plan 2 - Sync	_2___6__	2
3	Plan 3 - Sync	_2___6__	3
4	Plan 4 - Sync	_____	4
5	Plan 5 - Sync	_____	5
6	Plan 6 - Sync	_____	6
7	Plan 7 - Sync	_____	7
8	Plan 8 - Sync	_____	8
9	Plan 9 - Sync	_____	9
A	NEMA Sync	_____	A
B	NEMA Hold	_____	B
C			C
D			D
E	Coord Extra	_____	E
F			F

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

Row		Plan 1	Plan 2	Plan 3	Plan 4	Plan 5	Plan 6	Plan 7	Plan 8	Plan 9	Row
0	Ped Adjustment	0	0	0	0	0	0	0	0	0	0
1	Perm 2 - Start	7	0	7	0	0	0	0	0	0	1
2	Perm 2 - End	30	15	31	0	0	0	0	0	0	2
3	Perm 3 - Start	30	15	31	0	0	0	0	0	0	3
4	Perm 3 - End	47	29	50	0	0	0	0	0	0	4
5	Reservice Time	0	0	0	0	0	0	0	0	0	5
6	Reservice Phases	_____	_____	_____	_____	_____	_____	_____	_____	_____	6
7											7
8	Pretimed Phases	_____	_____	_____	_____	_____	_____	_____	_____	_____	8
9	Max Recall	_____	_____	_____	_____	_____	_____	_____	_____	_____	9
A	Perm 1 Veh Phase	__3___7_	__3___7_	__3___7_	_____	_____	12345678	12345678	12345678	12345678	A
B	Perm 1 Ped Phase	_____	_____	_____	_____	_____	12345678	12345678	12345678	12345678	B
C	Perm 2 Veh Phase	___4___8	___4___8	___4___8	_____	_____	_____	_____	_____	_____	C
D	Perm 2 Ped Phase	_____	_____	_____	_____	_____	_____	_____	_____	_____	D
E	Perm 3 Veh Phase	1___5___	1___5___	1___5___	_____	_____	_____	_____	_____	_____	E
F	Perm 3 Ped Phase	_____	_____	_____	_____	_____	_____	_____	_____	_____	F

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

Row		F	Row
0	Free Lag	_2_4_6_8	0
1	Plan 1 - Lag	_2_4_6_8	1
2	Plan 2 - Lag	_2_4_6_8	2
3	Plan 3 - Lag	_2_4_6_8	3
4	Plan 4 - Lag	_____	4
5	Plan 5 - Lag	_____	5
6	Plan 6 - Lag	_____	6
7	Plan 7 - Lag	_____	7
8	Plan 8 - Lag	_____	8
9	Plan 9 - Lag	_____	9
A	External Lag	_____	A
B			B
C			C
D			D
E			E
F			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

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	79	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	63	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	76	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	66	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	62	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	60	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	65	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	61	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

<C=0+E=126>

[Input Assignments]

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

<C=0+E=127>

[Output Assignments]

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

		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	7	17	7	14	7	17	7	14
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	3.0	4.0	3.0	3.0	3.0	4.0	3.0	3.0
6	Max Gap	3.0	4.0	3.0	3.0	3.0	4.0	3.0	3.0
7	Min Gap	3.0	4.0	3.0	3.0	3.0	4.0	3.0	3.0
8	Max Limit	18	45	15	25	18	45	15	25
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	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	0.0	2.0	2.0	2.0

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

	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

Max Initial
Alternate Walk
Alternate FDW
Alternate Initial
Alternate Extension

Alternate Timing
[Phase Timing Bank2]

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

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

Row		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	7	14	7	7	7	14	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	3.0	4.0	3.0	3.0	3.0	4.0	3.0	3.0
6	Max Gap	3.0	4.0	2.0	3.0	3.0	4.0	3.0	3.0
7	Min Gap	3.0	4.0	3.0	3.0	3.0	4.0	3.0	3.0
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	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 3 <C=0+F=3>
[Phase Timing Bank 3]

	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

Max Initial
Alternate Walk
Alternate FDW
Alternate Initial
Alternate Extension

Alternate Timing
[Phase Timing Bank 3]

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

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: C0256-Westgate & University

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	10.0	0.0
2	3		56	_____7_	_____8	123___8	5.0	0.0
3	4		39	___5_7_	_2_____	123___8	0.0	0.0
4	5		46	___5_7_	__3____	123___8	15.0	0.0
5	6		46	___5_7_	_____8	123___8	10.0	0.0
6	7		0	_____	_____	_____	5.0	0.0
7	8		41	___5_7_	___4___	123___8	0.0	0.0
8	9		43	___5_7_	____5__	123___8	15.0	0.0
9	10		43	___5_7_	_2_____	123___8	10.0	0.0
A	11		43	_____7_	___4___	123___8	5.0	0.0
B	12		40	___5_7_	____6__	123___8	0.0	0.0
C	13		45	___5_7_	_____7_	123___8	15.0	0.0
D	14		45	___5_7_	___4___	123___8	10.0	0.0
E	15		45	_____7_	____6__	123___8	5.0	0.0
F	16		42	___5_7_	_____8	123___8	0.0	0.0

Detector Assignments <C+0+E=126>
[Detector Attributes]

			4	5	6	7	2	4
Row	Det Num	*Detector Name*	C1 Pin Number	Attributes	Phase(s)	Assign	Delay	Carry-over
0	17		65	___4___	_____	123____	0.0	0.0
1	18		78	___4___	_____	123____	0.0	0.0
2	19		63	___4___	_____	123____	0.0	0.0
3	20		60	___4___	_____	123____	0.0	0.0
4	21		62	___4___	_____	123____	0.0	0.0
5	22		66	___4___	_____	123____	0.0	0.0
6	23		79	___4___	_____	123____	0.0	0.0
7	24		59	___4___	_____	123____	0.0	0.0
8	25		61	___4___	_____	123____	0.0	0.0
9	26		55	___5_7_	____5__	123____	0.0	0.0
A	27		58	___5_7_	__3____	123____	0.0	0.0
B	28		57	___5_7_	_____7_	123____	0.0	0.0
C	29		76	___4___	_____	123____	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 Timing <C+0+D=0>
[Detector Timing]

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

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

Column Numbers ---->	Ped / Phase / Overlap 1	2	3	4	5	6	7	8	Row
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>

Enable Redirection
(Enable Redirection = 30)
[Phase Output Redirection]

Max OFF (minutes)	255	<D/0+0+1>
Max ON (minutes)	7	<D/0+0+2>

Detector Failure Monitor
[Miscellaneous Timing]

	D	Row
Output Bit:	12345678	0
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

Dimming <C+0+E=125>
[Output Dimming]

	D
Number of Digits	0
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

<C+0+C=5>

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 =

	B	Row
DELAY-A	0	A
DELAY-B	0	B
DELAY-C	0	C
DELAY-D	0	D
DELAY-E	0	E
DELAY-F	0	F

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]

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: C0256-Westgate & University

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	07 : 00	1	C	_23456_
5	08 : 30	E	0	_23456_
6	12 : 00	E	C	_23456_
7	13 : 15	E	0	_23456_
8	16 : 30	3	C	_23456_
9	18 : 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	_____	_____

TOD Function <C+0+7=0.1> <C+0+E=27>
[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]

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	C	_2_____
09 : 00	E	0	_2_____
12 : 00	3	C	_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	_____

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>
[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_____
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
05 : 30	1	C	__3____
09 : 00	E	0	__3____
11 : 30	2	C	__3____
13 : 30	E	0	__3____
16 : 00	3	C	__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]

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

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								

Notes:

Special Event Schedule -- Table 1 <C+0+E=27>

[Special Event Sequence 1]

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								

Notes:

Special Event Schedule -- Table 2 <C+0+E=28>

[Special Event Sequence 2]

0 <E/28+5+F>

Limited Service Interval

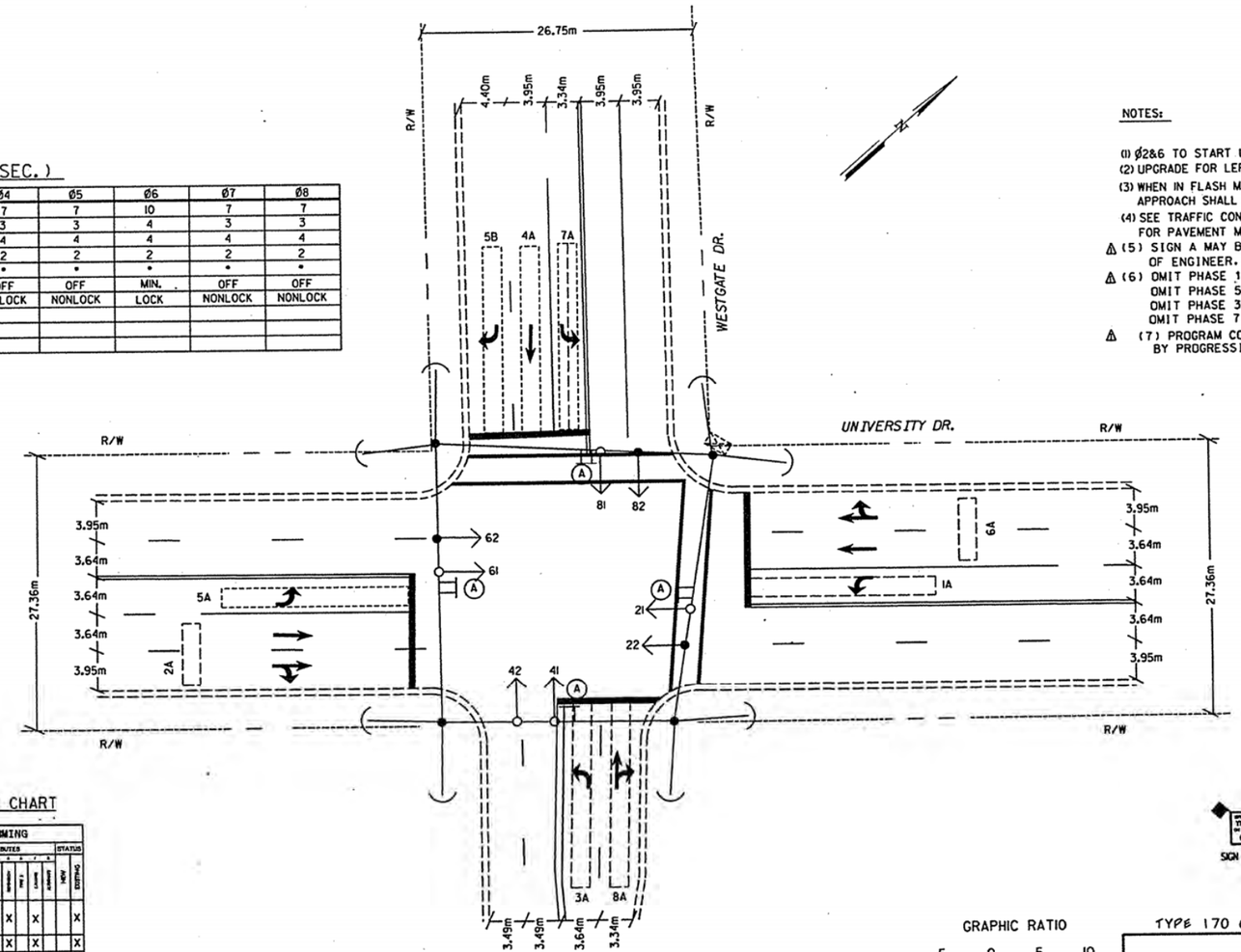
[Special Event Sequence 2]

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2927	1	2
F. A. PROJ. NO.			
PROJECT C. NO.	8.235801		

SIGNAL TIMING (SEC.)

PHASE	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
INITIAL INTERVAL	7	10	7	7	7	10	7	7
VEHICLE INTERVAL	3	4	3	3	3	4	3	3
YELLOW CLEARANCE	4	4	4	4	4	4	4	4
RED CLEARANCE	2	2	2	2	2	2	2	2
MAXIMUM INTERVAL	•	•	•	•	•	•	•	•
RECALL POSITION	OFF	MIN.	OFF	OFF	OFF	MIN.	OFF	OFF
VEHICLE CALL MEM.	NONLOCK	LOCK	NONLOCK	NONLOCK	NONLOCK	LOCK	NONLOCK	NONLOCK
PED. WALK								
PED. CLEAR								
PED. RECALL								

• Timing to be determined by the City of Durham



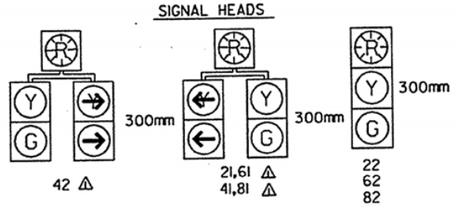
NOTES:

(1) Ø2&6 TO START UP IN GREEN.
(2) UPGRADE FOR LEFT TURN HEADS . AND S/B WESTGATE RIGHT TURN HEAD.
(3) WHEN IN FLASH MODE , ALL SIGNAL FACES FOR THE SAME APPROACH SHALL FLASH CONCURRENTLY
(4) SEE TRAFFIC CONTROL PLANS AND/OR PAVEMENT MARKING PLANS FOR PAVEMENT MARKING.
⚠ (5) SIGN A MAY BE REMOVED AT THE DISCRETION OF ENGINEER.
⚠ (6) OMIT PHASE 1 DURING PHASE 2 ON.
OMIT PHASE 5 DURING PHASE 6 ON.
OMIT PHASE 3 DURING PHASE 4 ON.
OMIT PHASE 7 DURING PHASE 8 ON.
⚠ (7) PROGRAM CONTROLLER TO CLEAR FROM PHASE 2&6 TO PHASE 1&5 BY PROGRESSING THROUGH PHASE 4 & 8

TYPE 170 CONTROLLER LOOP & DETECTION CHART

	INDUCTIVE LOOPS						DETECTOR PROGRAMMING													
								TIMING		ATTRIBUTES								STATUS	
	LOOP NO.	SIZE (m)	TURNS	DIST. FROM STOPBAR (m)	NEW	EXISTING	NEMA PHASE	DELAY	CARRY OVER (STRETCH)	1 Call/2 Call	Add/Max	Max/Max2	Ped Recall	Min Recall	Slow/Rest	Ped Delay	Call to Non-Actuated 2	Lock/Non-Lock	NEW	EXISTING
	1A	L.82X18.24	2	——		X	01	15 SEC.	- SEC.							X	X			X
							06	3 SEC.	- SEC.											
	2A	L.82X18	3	- 21.5		X	02	- SEC.	- SEC.							X	X			X
	3A	L.82X18.24	2	——		X	03	15 SEC.	- SEC.							X	X			X
							08	3 SEC.	- SEC.											
	4A	L.82X18.24	2	——		X	04	- SEC.	- SEC.							X	X			X
	5A	L.82X18.24	2	——		X	05	15 SEC.	- SEC.							X	X			X
							02	3 SEC.	- SEC.											
⚠	5B	L.82X18.24	2	——		X	05	- SEC.	- SEC.							X	X			X
	6A	L.82X18	3	- 21.5		X	06	- SEC.	- SEC.							X	X			X
	7A	L.82X18.24	2	——		X	07	15 SEC.	- SEC.							X	X			X
							04	3 SEC.	- SEC.											
	8A	L.82X18.24	2	——		X	08	- SEC.	- SEC.							X	X			X

SIGNAL HEADS



GRAPHIC RATIO
5 0 5 10

PLANS

METRIC

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

LEGEND

PROPOSED		EXISTING
⊸	TRAFFIC SIGNAL HEAD	⊸
	MODIFIED TRAFFIC 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	
	LOOP DETECTOR PULL BOX	
	50mm UNDERGROUND CONDUIT	
	INTERCONNECT CABLE (HARDWIRE)	
	RIGHT OF WAY WITH MARKER	

SIGN (A) ⚠ — (A) "LEFT TURN YIELD ON GREEN" SIGN (R10-12)

TYPE 170 CONTROLLER

UNIVERSITY DR. & WESTGATE DR.

DURHAM CO. DURHAM

REVISIONS	INIT.	DATE
⚠ UPGRADE TO PROTECTED-PERMITTED ON ALL APPROACHES		
CHANGE THROUGH RIGHT TO RIGHT	JS	98

City of Durham
Transportation Engineering
101 CITY HALL PLAZA
DURHAM,NC 27701 TELEPHONE: (919) 5604366

SEAL

This document was originally sealed by Edward B. Sirgany, Registration # 8814 on 3/25/99

SIGNATURE

DATE

SCALE: 1:250 DATE: 12/7/98

PREPARED BY: J. STEWART

REVIEWED BY:

REVIEWED BY:

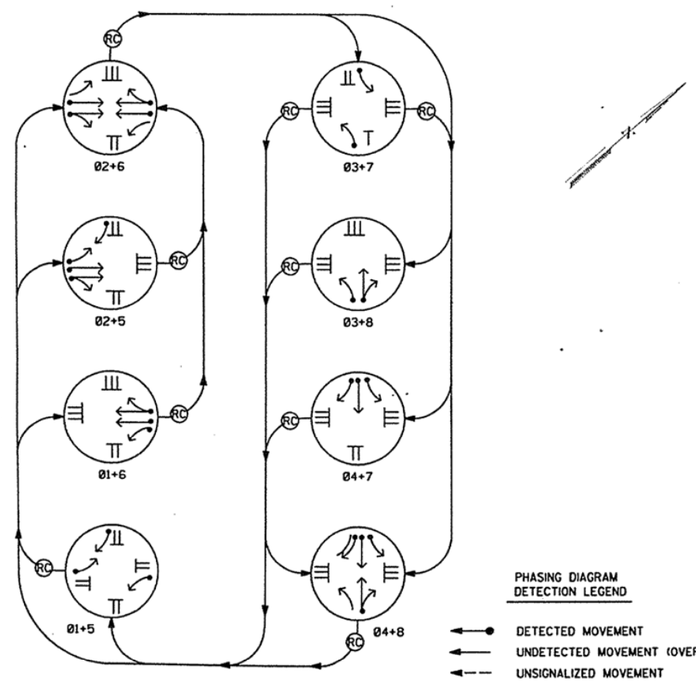
SHEET NO. C-0256

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2927	1	2
F. A. PROJ. NO.			
PROJECT I.D. NO.	8.2351801		

COLOR SEQUENCE CHART

SIGNAL FACE	R/W	Ø2+6 CLEAR Ø3+7	Ø2+6 CLEAR Ø3+8	Ø2+6 CLEAR Ø4+7	Ø2+6 CLEAR Ø4+8	Ø3+7 CLEAR Ø2+6	Ø3+7 CLEAR Ø3+8	Ø3+7 CLEAR Ø4+7	Ø3+7 CLEAR Ø4+8	Ø3+7 CLEAR Ø1+5	Ø3+7 CLEAR Ø1+6	Ø3+7 CLEAR Ø2+5	Ø3+8 CLEAR Ø2+6	Ø3+8 CLEAR Ø4+8	Ø3+8 CLEAR Ø1+5	Ø3+8 CLEAR Ø1+6	Ø3+8 CLEAR Ø2+5	Ø4+7 CLEAR Ø2+6	Ø4+7 CLEAR Ø4+8	Ø4+7 CLEAR Ø1+5	Ø4+7 CLEAR Ø1+6	Ø4+7 CLEAR Ø2+5	Ø4+8 CLEAR Ø2+6	Ø4+8 CLEAR Ø1+5	Ø4+8 CLEAR Ø1+6	Ø4+8 CLEAR Ø2+5	Ø1+5 CLEAR Ø2+6	Ø1+5 CLEAR Ø1+6	Ø1+5 CLEAR Ø2+5	Ø1+6 CLR Ø2+6	Ø2+5 CLR Ø2+6	FLASH	SIGNAL FACE
		1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	
22	G	Y R	Y R	Y R	Y R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	G G	G Y	22
⚠ 21	G	Y R	Y R	Y R	Y R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	G G	G Y	21
62	G	Y R	Y R	Y R	Y R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	G G	G Y	62
⚠ 61	G	Y R	Y R	Y R	Y R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	R R	G G	G Y	61
42	R					R R	R R	R R	R R	R R	R R	R R	G Y	R G	G Y	R Y	R Y	G Y	R Y	R Y	R Y	G Y	R Y	R Y	R Y	R Y	R Y	R R	R R	R R	R R	42
⚠ 41	R					R R	R R	R R	R R	R R	R R	R R	G Y	R G	G Y	R Y	R Y	G Y	R Y	R Y	R Y	G Y	R Y	R Y	R Y	R Y	R Y	R R	R R	R R	R R	41
82	R					R R	R R	R R	R R	R R	R R	R R	G Y	R G	G Y	R Y	R Y	G Y	R Y	R Y	R Y	G Y	R Y	R Y	R Y	R Y	R Y	R R	R R	R R	R R	82
⚠ 81	R					R R	R R	R R	R R	R R	R R	R R	G Y	R G	G Y	R Y	R Y	G Y	R Y	R Y	R Y	G Y	R Y	R Y	R Y	R Y	R Y	R R	R R	R R	R R	81

PHASING DIAGRAM

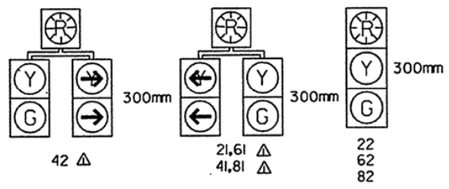


80 FULLY ACTUATED ⚠ SYSTEM

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL HEADS



TYPE 170 CONTROLLER

METRIC

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

UNIVERSITY DR. & WESTGATE DR.

DURHAM CO. DURHAM

REVISIONS	INT.	DATE
⚠ UPGRADE TO PROTECTED-PERMITTED ON ALL APPROACHES		
CHANGE THROUGH RIGHT TO RIGHT	JS	98

City of Durham
Transportation Engineering
101 CITY HALL PLAZA
DURHAM, NC 27701 TELEPHONE: (919) 5604366

SEAL

This document was originally sealed by Edward W. Sirgany, Registration # 8174 on 3/25/99

A-0824

SIGNATURE DATE

SCALE: NOT TO SCALE DATE: 12/7/98

PREPARED BY: J STEWART

REVISED BY:

REVISED BY:

SHEET NO. C-0256

University Drive at Shannon Road

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: C0222-Shannon Rd & University Dr

Group Assignment: **p**
Field Master Assignment: **NONE**
System Reference Number: **78**

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

Last Database Change: **11/7/2013 10:51**

Change Record					
Change	By	Date	Change	By	Date

Notes: ***Changed End Perm 1 to 4. (11-7-06) 1:30p.m.***
10/26/07 LT Downloaded new AM plan (Sch D)

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	**9**	<C/0+0+0>
Zone Number	**1**	<C/0+0+1>
Area Number	**1**	<C/0+0+2>
Area Address	**78**	<C/0+0+3>
QuicNet Channel	**COM104:**	(QuicNet)

Communication Addresses
[Configuration not in timing menus]

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

Manual Selection
[Set Manual Plan/Offset not timing]

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

Start / Revert Times
[Miscellaneous Timing]

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

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

Row	Column Numbers ---->	Phase 1	2	3	4	5	6	7	8
	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	**7**	**10**	**7**	**7**	**7**	**10**	**7**	**10**
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	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
6	Max Gap	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
7	Min Gap	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**	**2.5**
8	Max Limit	**12**	**24**	**14**	**14**	**15**	**24**	**14**	**14**
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	**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 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**

Max Initial
Alternate Walk
Alternate FDW
Alternate Initial
Alternate Extension

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]

Row		F
0	Permit	**12345678**
1	Red Lock	_____
2	Yellow Lock	**_2___6__**
3	Min Recall	**_2___6_8**
4	Ped Recall	_____
5	*View Set Peds*	**- - - - -**
6	Rest In Walk	_____
7	Red Rest	_____
8	Dual Entry	**___4___8**
9	Max Recall	_____
A	Soft Recall	_____
B	Max 2	_____
C	Cond. Service	_____
D	Ext Cont Calls	**12345678**
E	Yellow Start	_____
F	First Phases	**_2___6__**

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: C0222-Shannon Rd & University Dr

		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 =

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

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

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__5__**
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	
Ped for 6P Output	
Ped for 4P Output	
Ped for 8P Output	
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 Reservice	
Semi-Actuated	
Start-up Overlap Yellow	
Start-up Vehicle Calls	**12345678**
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

Row		**2**	Row
0			**0**
1	Phase 1	**7**	**1**
2	Phase 2	**10**	**2**
3	Phase 3	**7**	**3**
4	Phase 4	**7**	**4**
5	Phase 5	**7**	**5**
6	Phase 6	**10**	**6**
7	Phase 7	**7**	**7**
8	Phase 8	**7**	**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=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: C0222-Shannon Rd & University Dr

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

Row	Column Numbers ----> / Plan Name ---->	Plan 1	2	3	4	5	6	7	8	9	Row
0	Cycle Length	110	65	105	0	0	0	0	0	100	0
1	Phase 1 - ForceOff	65	46	67	0	0	0	0	0	55	1
2	Phase 2 - ForceOff	0	0	0	0	0	0	0	0	0	2
3	Phase 3 - ForceOff	17	13	18	0	0	0	0	0	20	3
4	Phase 4 - ForceOff	48	33	52	0	0	0	0	0	40	4
5	Phase 5 - ForceOff	80	46	69	0	0	0	0	0	55	5
6	Phase 6 - ForceOff	0	0	0	0	0	0	0	0	0	6
7	Phase 7 - ForceOff	22	13	25	0	0	0	0	0	20	7
8	Phase 8 - ForceOff	48	33	52	0	0	0	0	0	40	8
9	Ring Offset	0	0	0	0	0	0	0	0	0	9
A	Offset A	0	31	0	0	0	0	0	0	0	A
B	Offset B	0	31	0	0	0	0	0	0	0	B
C	Offset C	0	31	0	0	0	0	0	0	0	C
D	Perm 1 - End	8	4	8	0	0	0	0	0	15	D
E	Hold Release	255	255	255	255	255	255	255	255	255	E
F	Zone Offset	0	0	0	0	0	0	0	0	0	F

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

Row		E	Row
0			0
1	Plan 1 - Sync	_2___6__	1
2	Plan 2 - Sync	_2___6__	2
3	Plan 3 - Sync	_2___6__	3
4	Plan 4 - Sync	_____	4
5	Plan 5 - Sync	_____	5
6	Plan 6 - Sync	_____	6
7	Plan 7 - Sync	_____	7
8	Plan 8 - Sync	_____	8
9	Plan 9 - Sync	_____	9
A	NEMA Sync	_____	A
B	NEMA Hold	_____	B
C			C
D			D
E	Coord Extra	_____	E
F			F

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

Row		1	2	3	4	5	6	7	8	9	Row
0	Ped Adjustment	0	0	0	0	0	0	0	0	0	0
1	Perm 2 - Start	8	0	8	0	0	0	0	0	0	1
2	Perm 2 - End	35	19	38	0	0	0	0	0	0	2
3	Perm 3 - Start	35	19	38	0	0	0	0	0	0	3
4	Perm 3 - End	52	32	55	0	0	0	0	0	0	4
5	Reservice Time	0	0	0	0	0	0	0	0	0	5
6	Reservice Phases	_____	_____	_____	_____	_____	_____	_____	_____	_____	6
7											7
8	Pretimed Phases	_____	_____	_____	_____	_____	_____	_____	_____	_____	8
9	Max Recall	_____	_____	_____	_____	_____	_____	_____	_____	_____	9
A	Perm 1 Veh Phase	__3___7_	__3___7_	__3___7_	_____	_____	12345678	12345678	12345678	12345678	A
B	Perm 1 Ped Phase	_____	_____	_____	_____	_____	12345678	12345678	12345678	12345678	B
C	Perm 2 Veh Phase	___4___8	___4___8	___4___8	_____	_____	_____	_____	_____	_____	C
D	Perm 2 Ped Phase	_____	_____	_____	_____	_____	_____	_____	_____	_____	D
E	Perm 3 Veh Phase	1___5___	1___5___	1___5___	_____	_____	_____	_____	_____	_____	E
F	Perm 3 Ped Phase	_____	_____	_____	_____	_____	_____	_____	_____	_____	F

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

Row		F	Row
0	Free Lag	_2_4_6_8	0
1	Plan 1 - Lag	_2_4_6_8	1
2	Plan 2 - Lag	_2_4_6_8	2
3	Plan 3 - Lag	_2_4_6_8	3
4	Plan 4 - Lag	_____	4
5	Plan 5 - Lag	_____	5
6	Plan 6 - Lag	_____	6
7	Plan 7 - Lag	_____	7
8	Plan 8 - Lag	_____	8
9	Plan 9 - Lag	_____	9
A	External Lag	_____	A
B			B
C			C
D			D
E			E
F			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

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 <C=0+E=126>

[Input Assignments]

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 <C=0+E=127>

[Output Assignments]

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

		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	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	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
6	Max Gap	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
7	Min Gap	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
8	Max Limit	15	24	14	14	15	24	14	14
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	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	0.0	2.0	2.0	2.0

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

	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

Max Initial
Alternate Walk
Alternate FDW
Alternate Initial
Alternate Extension

Alternate Timing
[Phase Timing Bank2]

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

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

Row		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	7	14	7	7	7	14	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	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
6	Max Gap	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
7	Min Gap	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
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	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 3 <C=0+F=3>
[Phase Timing Bank 3]

	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

Max Initial
Alternate Walk
Alternate FDW
Alternate Initial
Alternate Extension

Alternate Timing
[Phase Timing Bank 3]

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

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
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: C0222-Shannon Rd & University Dr

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		44	___5_7_	1_____	123___8	10.0	0.0
1	2		44	___5_7_	____6__	123___8	3.0	0.0
2	3		44	_____7_	___4___8	123___8	10.0	0.0
3	4		39	___5_7_	_2_____	123___8	0.0	0.0
4	5		46	___5_7_	_____8	123___8	0.0	0.0
5	6		41	___5_7_	___4___	123___8	0.0	0.0
6	7		43	___5_7_	___5___	123___8	10.0	0.0
7	8		43	___5_7_	_2_____	123___8	3.0	0.0
8	9		43	_____7_	___4___8	123___8	10.0	0.0
9	10		40	___5_7_	____6__	123___8	0.0	0.0
A	11		45	___5_7_	_____7_	123___8	0.0	0.0
B	12		42	___5_7_	_____8	123___8	0.0	0.0
C	13		58	___5_7_	__3____	123___8	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 Assignments <C+0+E=126>
[Detector Attributes]

			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 Timing <C+0+D=0>
[Detector Timing]

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

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

Column Numbers ---->	Ped / Phase / Overlap 1	2	3	4	5	6	7	8	Row
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>

Enable Redirection
(Enable Redirection = 30)
[Phase Output Redirection]

Max OFF (minutes)	255	<D/0+0+1>
Max ON (minutes)	255	<D/0+0+2>

Detector Failure Monitor
[Miscellaneous Timing]

	D	Row
Output Bit:	12345678	0
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

Dimming <C+0+E=125>
[Output Dimming]

	D
Number of Digits	0
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

<C+0+C=5>

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 =

	B	Row
DELAY-A	0	A
DELAY-B	0	B
DELAY-C	0	C
DELAY-D	0	D
DELAY-E	0	E
DELAY-F	0	F

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]

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

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	07 : 00	1	C	_23456_
5	08 : 30	E	0	_23456_
6	00 : 00	0	0	_____
7	00 : 00	0	0	_____
8	16 : 30	3	C	_23456_
9	18 : 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	_____	_____

TOD Function <C+0+7=0.1> <C+0+E=27>
[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]

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	C	_2_____
09 : 00	E	0	_2_____
12 : 00	3	C	_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	_____

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>
[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_____
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
05 : 30	1	C	__3____
09 : 00	E	0	__3____
11 : 30	2	C	__3____
13 : 30	E	0	__3____
16 : 00	3	C	__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]

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

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								

Notes:

Special Event Schedule -- Table 1 <C+0+E=27>
[Special Event Sequence 1]

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

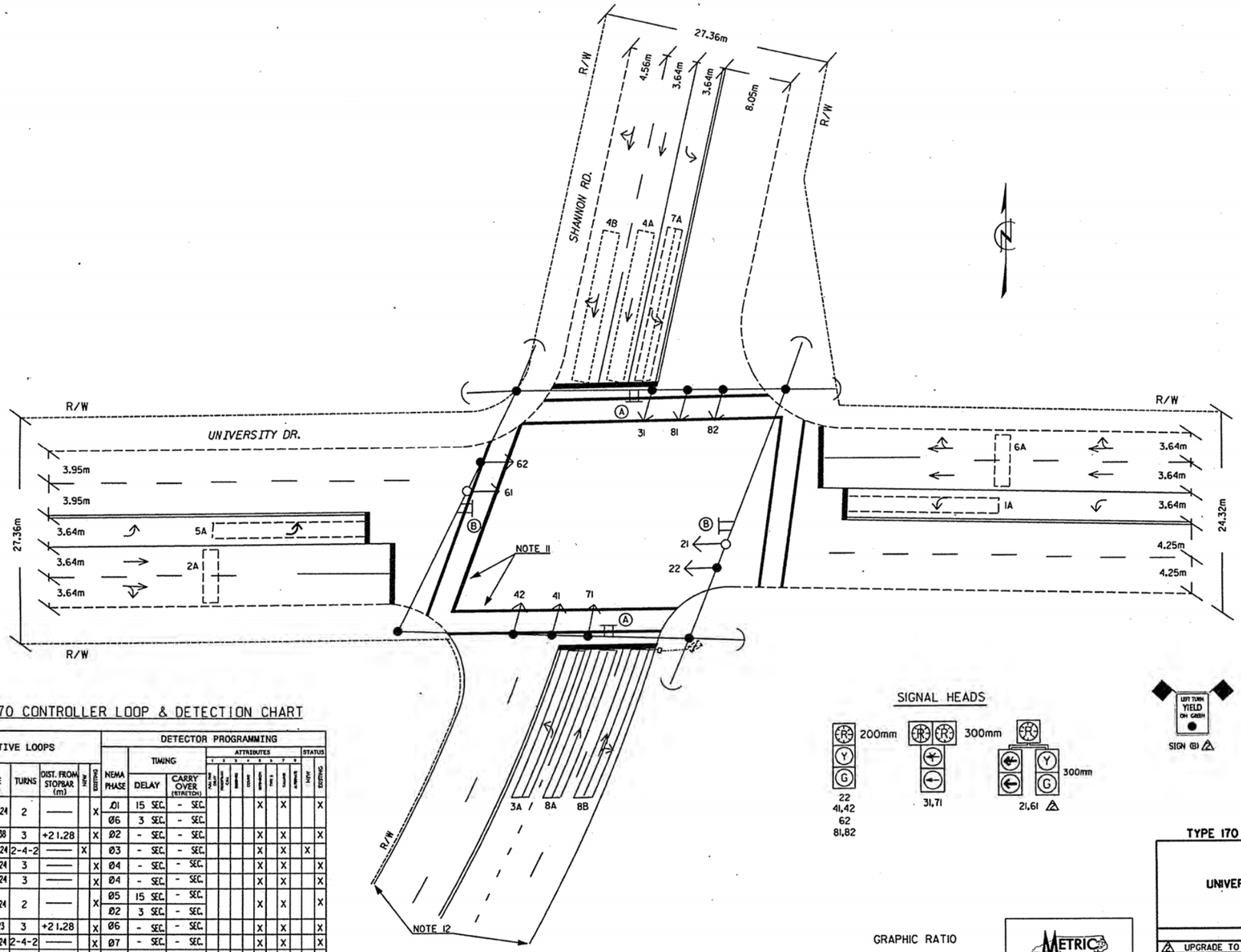
Row	6 Clear	7 Time	8 Ped Call	9 Hold	A Advance	B Force Off	C Vehicle Call	D Permit Phases	E Ped Omit	F Circuit
0		0								
1		0								
2		0								
3		0								
4		0								
5		0								
6		0								
7		0								
8		0								
9		0								
A		0								
B		0								
C		0								
D		0								
E		0			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

Notes:

Special Event Schedule -- Table 2 <C+0+E=28>
[Special Event Sequence 2]

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

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2927	1	2
F. A. PROJ. NO.			
PROJECT ID. NO.	8.2351801		



NOTES

1. THIS SIGNAL IS TO BE PART OF THE DURHAM COMPUTERIZED SIGNAL SYSTEM.
2. PAVEMENT MARKINGS ARE EXISTING.
3. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE 1993 NCDOT TRAFFIC SIGNAL SPECIFICATIONS, AND ANY SUBSEQUENT ADDENDA.
4. MAXIMUM TIMES SHOWN IN TIMING CHART ARE FOR FREE-RUN OPERATION ONLY. COORDINATED SIGNAL SYSTEM TIMING VALUES SHALL SUPERSEDE THESE VALUES.
5. SIGNAL TO FLASH FROM 11:00 PM UNTIL 6:00 AM UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
6. WHEN IN FLASH MODE, ALL SIGNAL HEADS FOR THE SAME APPROACH SHALL FLASH CONCURRENTLY.
7. SIGNAL TIMINGS ARE COORDINATED BY THE DURHAM'S CITY SYSTEM
9. LOOP TO BE LOCATED SLIGHTLY BEHIND LEADING EDGE OF STOP LINE.
10. THESE 2 CROSSWALKS TO BE INSTALLED AFTER WIDENING OF THE SOUTH LEG OF THE INTERSECTION.
11. PROPOSED WIDENING OF SOUTH LEG OF INTERSECTION LOOPS 3A,8A & 8B NOT TO BE INSTALLED UNTIL SOUTH LEG OF INTERSECTION IS COMPLETED.
12. OMIT PHASE 1 DURING PHASE 2 ON, OMIT PHASE 5 DURING PHASE 6 ON.
13. CONTROLLER SHALL BE PROGRAM TO CLEAR FROM PHASE 2 & 6 TO PHASE 1& 5 BY PROGRESSING THROUGH PHASE 4 & 8 (SEE ELECTRICAL DETAILS FOR PROGRAM.)
14. SIGN B MAY BE REMOVED AT THE DISCRETION OF ENGINEER.

LEGEND

PROPOSED		PROPOSED
	TRAFFIC SIGNAL HEAD	
	MODIFIED TRAFFIC SIGNAL HEAD	
	SIGNAL POLE WITH GUY	
	SIGNAL POLE WITH SIDEWALK GUY	
	INDUCTIVE LOOP DETECTOR	
	CONTROLLER & CABINET	
	LOOP DETECTOR PULL BOX	
	50mm UNDERGROUND CONDUIT	
	INTERCONNECT CABLE (HARDWIRE)	
	RIGHT OF WAY WITH MARKER	
	DIRECTIONAL ARROW	
	PAVEMENT MARKING ARROW	
	LEFT TURN SIGNAL	A
B	"LEFT TURN YIELD ON GREEN" SIGN (R10-12)	

TYPE 170 CONTROLLER LOOP & DETECTION CHART

	INDUCTIVE LOOPS					DETECTOR PROGRAMMING																
							TIMING		ATTRIBUTES												STATUS	
	LOOP NO.	SIZE (m)	TURNS	DIST. FROM STOPBAR (m)	NEW	EXISTING	NEMA PHASE	DELAY	CARRY OVER (STRETCH)	1 MAX RECALL	2 PED RECALL	3 SOFT CALL	4 SLOW	5 NON LOCK	6 NON LOCK	7 TYPE 1	8 QUEUE	9 MAX 2	10 EXTEND	NEW	EXISTING
⚠	1A	L.82X18.24	2	——		X	01	15 SEC.	- SEC.							X		X			X
							06	3 SEC.	- SEC.												
	2A	L.82X6.38	3	+2 1.28		X	02	- SEC.	- SEC.							X		X			X
⚠	3A	L.82X18.24	2-4-2	——	X		03	- SEC.	- SEC.							X		X		X	
	4A	L.82X18.24	3	——		X	04	- SEC.	- SEC.							X		X			X
	4B	L.82X18.24	3	——		X	04	- SEC.	- SEC.							X		X			X
⚠	5A	L.82X18.24	2	——		X	05	15 SEC.	- SEC.							X		X			X
							02	3 SEC.	- SEC.												
	6A	L.82X6.23	3	+2 1.28		X	06	- SEC.	- SEC.							X		X			X
	7A	L.82X18.24	2-4-2	——		X	07	- SEC.	- SEC.							X		X			X
⚠	8A	L.82X18.24	2-4-2	——	X		08	- SEC.	- SEC.							X		X		X	
⚠	8B	L.82X18.24	2-4-2	——	X		08	- SEC.	- SEC.							X		X		X	

SIGNAL HEADS

GRAPHIC RATIO

5 0 5 10

PLANS

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

TYPE 170 CONTROLLER

UNIVERSITY DR. & SHANNON RD.

DURHAM CO. DURHAM

REVISIONS	INIT.	DATE
⚠ UPGRADE TO PROTECTED-PERMITTED ON UNIVERSITY DR.	JS	98
⚠ LOOPS 3A,8A & 8B NOT TO BE INSTALLED UNTIL WIDENING OF SOUTH LEG IS COMPLETED		

SEAL

This document was originally sealed by Edward W. Sirgany, Registration # 8814 on 3/25/99

A-078

SIGNATURE DATE

SCALE: 1:250 DATE: 11/27/98

PREPARED BY: J STEWART

REVISED BY:

REVISED BY:

SHEET NO. C-0222

City of Durham
Transportation Engineering
101 CITY HALL PLAZA
DURHAM, NC 27701 TELEPHONE: (919) 5604366

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2927	2	2
F. A. PROJ. NO.			
PROJECT ID. NO.	8.2351801		

COLOR SEQUENCE CHART

| SIGNAL HEADS | Ø2+6 | | | | | | | | | Ø3+7 | | | | | | | | | | Ø4+7 | | | | | | | | | | Ø3+8 | | | | | | | | | | Ø4+8 | | | | | | | | | | Ø1+5 | | | | | | | | | | Ø1+6 CLR Ø2+6 | | | Ø2+5 CLR Ø2+6 | | | FLASH | SIGNAL HEADS |
|---|---|---|---

Pickett Road at Petty Road

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: 2328-Pickett @ Western

Group Assignment: **NONE**
Field Master Assignment: **NONE**
System Reference Number: **365**

N/S Street Name: **Western Blvd (SR 1358) ? Petty Rd**
E/W Street Name: **Pickett Road (SR 1303)**

Last Database Change: **11/7/2013 10:51**

Change Record					
Change	By	Date	Change	By	Date

Notes: ***6/28/10 del all reporting #8 Detector Attributes, paving season.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	**14**	<C/0+0+0>
Zone Number	**1**	<C/0+0+1>
Area Number	**3**	<C/0+0+2>
Area Address	**68**	<C/0+0+3>
QuicNet Channel	**COM104:**	(QuicNet)

Communication Addresses
[Configuration not in timing menus]

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

Manual Selection
[Set Manual Plan/Offset not timing]

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

Start / Revert Times
[Miscellaneous Timing]

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

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

Row	Column Numbers ----> / Phase Names ---->	Phase 1	2	3	4	5	6	7	8	Row
0	Ped Walk	0	0	0	0	0	0	0	0	0
1	Ped FDW	0	0	0	0	0	0	0	0	1
2	Min Green	0	10	0	7	0	10	0	7	2
3	Type 3 Disconnect	0	0	0	0	0	0	0	0	3
4	Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4
5	Veh Extension	0.0	3.0	0.0	3.0	0.0	3.0	0.0	2.0	5
6	Max Gap	0.0	3.0	0.0	3.0	0.0	3.0	0.0	2.0	6
7	Min Gap	0.0	3.0	0.0	3.0	0.0	3.0	0.0	2.0	7
8	Max Limit	0	45	0	30	0	45	0	15	8
9	Max Limit 2	0	0	0	0	0	0	0	0	9
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0	A
B	PE Min Ped FDW	0	0	0	0	0	0	0	0	B
C	Cond Serv Min	0	0	0	0	0	0	0	0	C
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	D
E	Yellow Change	0.0	3.7	0.0	3.7	0.0	4.1	0.0	4.0	E
F	Red Clear	0.0	1.4	0.0	1.4	0.0	1.4	0.0	1.0	F

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
Max Initial					
Alternate Walk					
Alternate FDW					
Alternate Initial					
Alternate Extension					

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]

Row		F	Row
0	Permit	_2_4_6_8	0
1	Red Lock	_____	1
2	Yellow Lock	_2___6__	2
3	Min Recall	_2___6__	3
4	Ped Recall	_____	4
5	*View Set Peds*	- - - - -	5
6	Rest In Walk	_____	6
7	Red Rest	_____	7
8	Dual Entry	___4___8	8
9	Max Recall	_____	9
A	Soft Recall	_____	A
B	Max 2	_____	B
C	Cond. Service	_____	C
D	Ext Cont Calls	_2_4_6_8	D
E	Yellow Start	_____	E
F	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: 2328-Pickett @ Western

		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 =

Row		**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 Prarameters]

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	
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)	

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

	F
Ext. Permit 1 Phases	**_2_4_6_8**
Ext. Permit 2 Phases	**_2_4_6_8**
Exclusive Ped Assign	
Preempt Non-Lock	
Ped for 2P Output	
Ped for 6P Output	
Ped for 4P Output	
Ped for 8P Output	
Yellow Flash Phases	
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	**12345678**
Advance Walk Phases	
Delay Walk Phases	
External Recall	
Start-up Overlap Green	
Max Extension	
Inhibit Ped Reservice	
Semi-Actuated	
Start-up Overlap Yellow	
Start-up Vehicle Calls	**_2_4_6_8**
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

Row		**2**	Row
	Phase 1	**5**	**0**
	Phase 2	**5**	**1**
	Phase 3	**5**	**2**
	Phase 4	**5**	**3**
	Phase 5	**5**	**4**
	Phase 6	**5**	**5**
	Phase 7	**5**	**6**
	Phase 8	**5**	**7**

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=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

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

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

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

Row		**E**	Row
1	Plan 1 - Sync	**_2___6__**	**1**
2	Plan 2 - Sync	**_2___6__**	**2**
3	Plan 3 - Sync	**_2___6__**	**3**
4	Plan 4 - Sync	**_2___6__**	**4**
5	Plan 5 - Sync	**_2___6__**	**5**
6	Plan 6 - Sync	**_2___6__**	**6**
7	Plan 7 - Sync	**_2___6__**	**7**
8	Plan 8 - Sync	**_2___6__**	**8**
9	Plan 9 - Sync	**_2___6__**	**9**
A	NEMA Sync	_____	**A**
B	NEMA Hold	_____	**B**
C			**C**
D			**D**
E	Coord Extra	_____	**E**
F			**F**

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

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

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

Row		**F**	Row
	Free Lag	**_2_4_6_8**	**0**
1	Plan 1 - Lag	**_2_4_6_8**	**1**
2	Plan 2 - Lag	**_2_4_6_8**	**2**
3	Plan 3 - Lag	**_2_4_6_8**	**3**
4	Plan 4 - Lag	**_2_4_6_8**	**4**
5	Plan 5 - Lag	**_2_4_6_8**	**5**
6	Plan 6 - Lag	**_2_4_6_8**	**6**
7	Plan 7 - Lag	**_2_4_6_8**	**7**
8	Plan 8 - Lag	**_2_4_6_8**	**8**
9	Plan 9 - Lag	**_2_4_6_8**	**9**
A	External Lag	_____	**A**
B			**B**
C			**C**
D			**D**
E			**E**
F			**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: 2328-Pickett @ Western

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	60	Plan 1	0	Ext. Perm 1	0	Dial 3 (7-Wire)	0	EV-A	0	1
2	Spec. Funct. 3	0	OR-4 (a)	0	System Det 2	62	Plan 2	0	Ext. Perm 2	0	Offset 1 (7-Wire)	0	EV-B	0	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	0	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	0	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	0	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	0	Spec. Event 2	0	8
9	OR-7 (b)	0	Fig 4 Diamond	0	Max Inhibit (nema)	0	Plan 9	0	External Alarm	0	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	0	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 <C=0+E=126>

[Input Assignments]

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	0	NOT-1	0	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	0	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	0	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	0	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	0	AND-1	0	TOD Out 5	0	Offset 3 (7-Wire)	0	4
5	Phase ON - 6	0	Sp Evnt Out 5	0			Plan 5	0	AND-2	0	TOD Out 6	0	Free (7-Wire)	0	5
6	Phase ON - 7	0	Sp Evnt Out 6	0			Plan 6	0	AND-3	0	TOD Out 7	0	Flash (7-Wire)	0	6
7	Phase ON - 8	0	Sp Evnt Out 7	0			Plan 7	0	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	0	EV-A	0	Adv. Warn - 1	0	Low Priority A	0	8
9	Ph. Check - 2	0			NOT-4	0	Plan 9	0	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 <C=0+E=127>

[Output Assignments]

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

		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	7	0	7	0	7	0	7
1	Ped FDW	0	15	0	15	0	15	0	15
2	Min Green	4	7	4	4	4	7	4	4
3	Type 3 Disconnect	0	20	0	20	0	20	0	20
4	Added per Vehicle	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
5	Veh Extension	2.0	4.0	2.0	2.5	2.0	4.0	2.0	2.5
6	Max Gap	3.0	6.0	3.0	3.0	3.0	6.0	3.0	3.0
7	Min Gap	0.5	2.0	0.5	1.5	0.5	2.0	0.5	1.5
8	Max Limit	20	30	20	25	20	30	20	25
9	Max Limit 2	30	50	30	40	30	50	30	40
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	7	7	7	7	7	7	7	7
C	Cond Serv Min	10	10	10	10	10	10	10	10
D	Reduce Every	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
E	Yellow Change	3.0	4.0	3.0	3.0	3.0	4.0	3.0	3.0
F	Red Clear	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0

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

	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

Max Initial
Alternate Walk
Alternate FDW
Alternate Initial
Alternate Extension

Alternate Timing
[Phase Timing Bank2]

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

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

Row		1	2	3	4	5	6	7	8
0	Ped Walk	0	7	0	7	0	7	0	7
1	Ped FDW	0	15	0	15	0	15	0	15
2	Min Green	4	7	4	4	4	7	4	4
3	Type 3 Disconnect	0	20	0	20	0	20	0	20
4	Added per Vehicle	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0
5	Veh Extension	2.0	4.0	2.0	2.5	2.0	4.0	2.0	2.5
6	Max Gap	3.0	6.0	3.0	3.0	3.0	6.0	3.0	3.0
7	Min Gap	0.5	2.0	0.5	1.5	0.5	2.0	0.5	1.5
8	Max Limit	20	30	20	25	20	30	20	25
9	Max Limit 2	30	50	30	40	30	50	30	40
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	PE Min Ped FDW	7	7	7	7	7	7	7	7
C	Cond Serv Min	10	10	10	10	10	10	10	10
D	Reduce Every	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
E	Yellow Change	3.0	4.0	3.0	3.0	3.0	4.0	3.0	3.0
F	Red Clear	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

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

	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

Max Initial
Alternate Walk
Alternate FDW
Alternate Initial
Alternate Extension

Alternate Timing
[Phase Timing Bank 3]

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

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: 2328-Pickett @ Western

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		41	___5_7_	__4____	123___8	5.0	0.0
2	3		40	___5_7_	_____6__	123___8	0.0	0.0
3	4		42	___5_7_	_______8	123___8	5.0	0.0
4	5		0				0.0	0.0
5	6		0				0.0	0.0
6	7		0				0.0	0.0
7	8		0				0.0	0.0
8	9		0				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 Assignments <C+0+E=126>
[Detector Attributes]

Detector Timing <C+0+D=0>

			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 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

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

Column Numbers ---->	Ped / Phase / Overlap 1	2	3	4	5	6	7	8	Row
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>

Enable Redirection
(Enable Redirection = 30)
[Phase Output Redirection]

Max OFF (minutes)	255	<D/0+0+1>
Max ON (minutes)	7	<D/0+0+2>

Detector Failure Monitor
[Miscellaneous Timing]

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

Dimming <C+0+E=125>
[Output Dimming]

	D
Number of Digits	0
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

<C+0+C=5>

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 =

Row	B
DELAY-A	0
DELAY-B	0
DELAY-C	0
DELAY-D	0
DELAY-E	0
DELAY-F	0

Delay Logic Times
<C+0+D=0> (seconds)
[Miscellaneous Timing]

Omit Alarm	_____	<C/5+F+0>

Disable Alarm Reporting
[Dialback and Daylight Saving]

Time	10	<C/5+C+0>

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

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	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		

TOD Function <C+0+7=0.1> <C+0+E=27>
[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	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	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>
[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
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

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 <C+0+E=27>
[Special Event Sequence 1]

Notes:

2 <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								

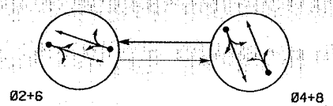
Special Event Schedule -- Table 2 <C+0+E=28>
[Special Event Sequence 2]

Notes:

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

PROJECT REFERENCE NO.	SHEET NO.
B-4109	Sig.2

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

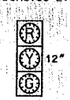
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21, 22	G	R	Y
41, 42, 43	R	G	R
61, 62	G	R	Y
81, 82	R	G	R

SIGNAL FACE I.D.

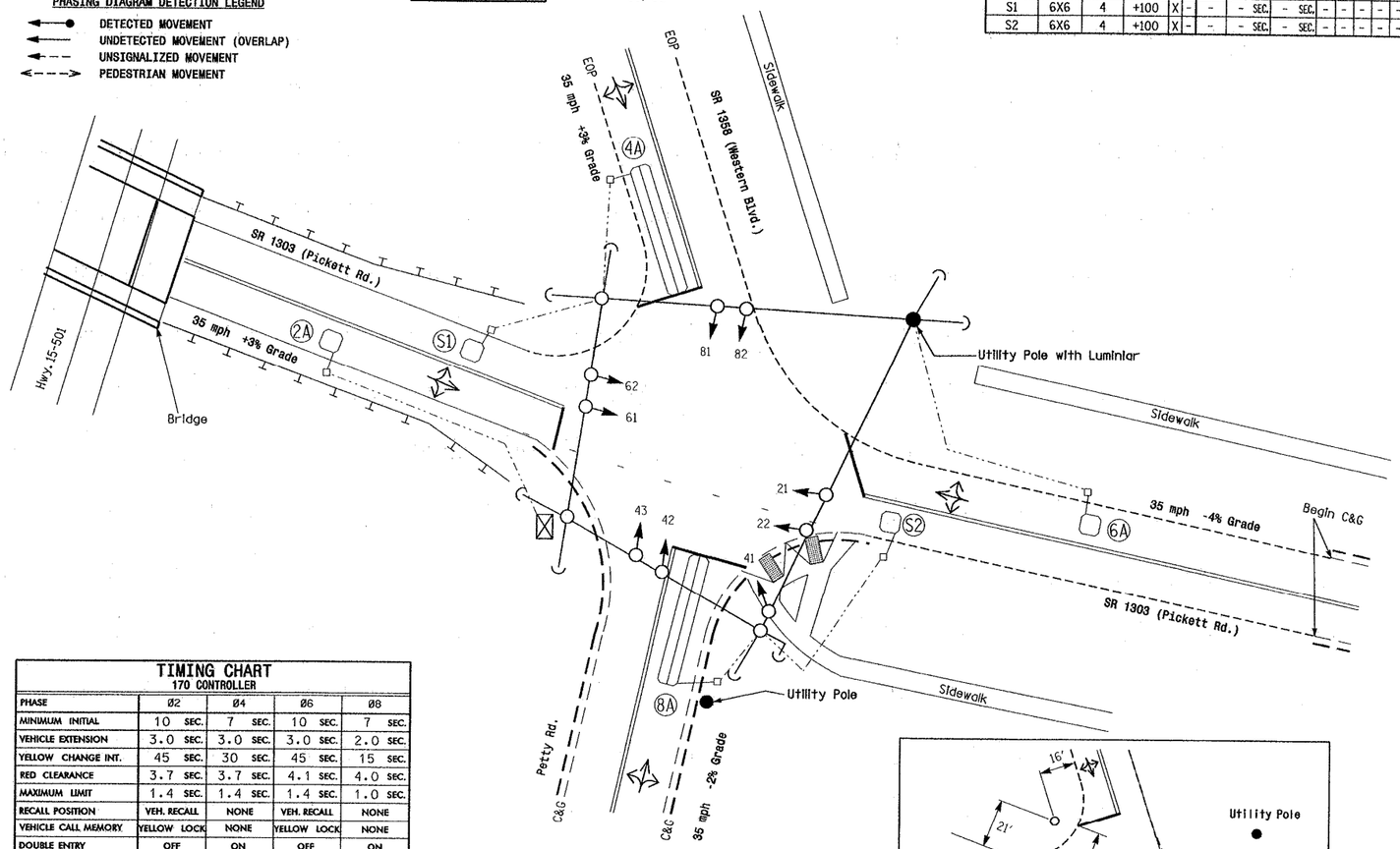
Denotes L.E.D.

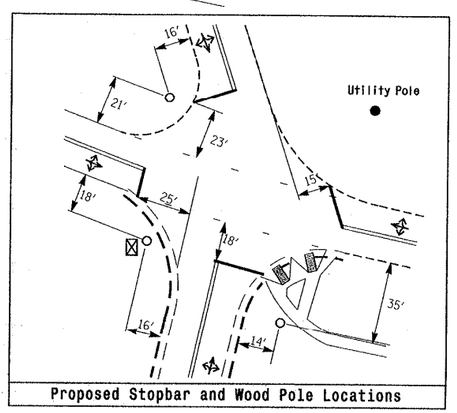


21, 22
41, 42, 43
61, 62
81, 82

LOOP & DETECTOR UNIT INSTALLATION CHART
170 CONTROLLER AND CABINET

INDUCTIVE LOOPS						DETECTOR PROGRAMMING															
							TIMING		ATTRIBUTES										STATUS	
LOOP NO.	SIZE (ft)	TURNS	DIST. FROM STOPBAR (ft)	NEW	EXISTING	NEMA PHASE	DELAY	CARRY (STRETCH)	1 FULL TIME DELAY	2 PROGRAMMED CALL	3 DETECTED	4 COUNT	5 EXTENSION	6 TYPE 3	7 CALLING	8 ALTERNATE	LOOPS SYSTEM	NEW	EXISTING
2A	6X6	4	70	X	-	2	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
4A	6X40	2-4-2	0	X	-	4	5 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
6A	6X6	4	70	X	-	6	- SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
8A	6X40	2-4-2	0	X	-	8	5 SEC.	- SEC.	-	-	-	-	X	-	X	-	-	X	-
S1	6X6	4	+100	X	-	-	- SEC.	- SEC.	-	-	-	-	-	-	-	-	X	X	-
S2	6X6	4	+100	X	-	-	- SEC.	- SEC.	-	-	-	-	-	-	-	-	X	X	-





Proposed Stopbar and Wood Pole Locations

TIMING CHART
170 CONTROLLER

PHASE	Ø2	Ø4	Ø6	Ø8
MINIMUM INITIAL	10 SEC.	7 SEC.	10 SEC.	7 SEC.
VEHICLE EXTENSION	3.0 SEC.	3.0 SEC.	3.0 SEC.	2.0 SEC.
YELLOW CHANGE INT.	45 SEC.	30 SEC.	45 SEC.	15 SEC.
RED CLEARANCE	3.7 SEC.	3.7 SEC.	4.1 SEC.	4.0 SEC.
MAXIMUM LIMIT	1.4 SEC.	1.4 SEC.	1.4 SEC.	1.0 SEC.
RECALL POSITION	VEH. RECALL	NONE	VEH. RECALL	NONE
VEHICLE CALL MEMORY	YELLOW LOCK	NONE	YELLOW LOCK	NONE
DOUBLE ENTRY	OFF	ON	OFF	ON
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.
ADD PER VEHICLE	- SEC.	- SEC.	- SEC.	- SEC.
MAXIMUM INITIAL	- SEC.	- SEC.	- SEC.	- SEC.
MAXIMUM GAP	3.0 SEC.	3.0 SEC.	3.0 SEC.	2.0 SEC.
REDUCE 0.1 SEC EVERY	- SEC.	- SEC.	- SEC.	- SEC.
MINIMUM GAP	3.0 SEC.	3.0 SEC.	3.0 SEC.	2.0 SEC.

2 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.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Program all timing information into phase banks 1, 2, and 3 unless otherwise noted.
6. Set phase bank 3 maximum limit to 250 seconds for phases used.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
8. Durham Signal System: Intersection Number 2328, Local telemetry address number 68, Channel number C-4.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	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	
N/A	Right of Way	
	Directional Arrow	
	Pavement Marking Arrow	
	Wheelchair Ramp	

New Installation

Prepared in the Offices of the Traffic Engineering and Public Transportation Division of the NC DEPARTMENT OF TRANSPORTATION Signal and Geometrics Section
750 N. Greenfield Pkwy, Garner, NC 27529

SR 1303 (Pickett Rd.) at SR 1358 (Western Blvd.) / Petty Rd.

Division 5 Durham County Durham

PLAN DATE: December 2007 REVIEWED BY: T. Thigpen

PREPARED BY: C. Pierce REVIEWED BY:

SCALE 0 20 1"=20'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 24393 ENGINEER TIMOTHY D. WILLIAMS

SIGNATURE 1/16/08 DATE

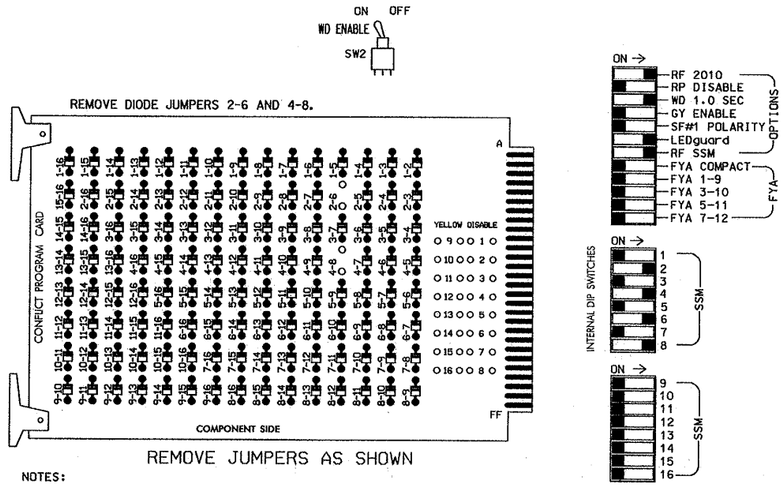
SIG. INVENTORY NO. 05-2328

15-JAN-2008 08:51
s:\#ts signal\workgroups\#ip projects\#b-4109\signal sheets\gmk\signal sheet b405-2328 #52328_sig_dsn_2006mod.dgn
cabrera

PROJECT REFERENCE NO.	SHEET NO.
B-4109	Sig. 3

EDI MODEL 2010ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Make sure jumpers SEL2-SEL5 are present on the monitor board.

NOTES

1. TO PREVENT "FLASH-CONFLICT" PROBLEMS, INSERT RED FLASH PROGRAM BLOCKS FOR ALL UNUSED VEHICLE LOAD SWITCHES IN THE OUTPUT FILE. VERIFY THAT SIGNAL HEADS FLASH IN ACCORDANCE WITH THE SIGNAL PLANS.
2. ENSURE THAT RED ENABLE IS ACTIVE AT ALL TIMES DURING NORMAL OPERATION. TO PREVENT RED FAILURES ON UNUSED MONITOR CHANNELS, TIE UNUSED RED MONITOR INPUTS 1,3,5, 7,9,10,11,12,13,14,15 & 16 TO LOAD SWITCH AC+ PER THE CABINET MANUFACTURER'S INSTRUCTIONS.
3. PROGRAM CONTROLLER TO START UP IN PHASES 2 AND 6 GREEN.
4. SET POWER-UP FLASH TIME TO 10 SECONDS AND IMPLEMENT WITHIN THE CONTROLLER PROGRAMMING.
5. ENABLE SIMULTANEOUS GAP-OUT FEATURE, ON CONTROLLER UNIT, FOR ALL PHASES.
6. PROGRAM PHASES 4 AND 8, ON CONTROLLER UNIT, FOR DOUBLE ENTRY.
7. SET ALL DETECTOR CARD CHANNELS TO 'PRESENCE' MODE.
8. THIS CABINET AND CONTROLLER ARE TO BE WIRED AND PROGRAMMED AS PART OF THE DURHAM CITY SIGNAL SYSTEM.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S2P	S3	S4	S4P	S5	S6	S6P	S7	S8	S8P
PHASE	1	2	2 PED	3	4	4 PED	5	6	6 PED	7	8	8 PED
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42 43	NU	NU	61,62	NU	NU	81,82	NU
RED		128			101			134			107	
YELLOW		129			102			135			108	
GREEN		130			103			136			109	
RED ARROW												
YELLOW ARROW												
GREEN ARROW												

NU = Not Used

EQUIPMENT INFORMATION

CONTROLLER.....CONTRACTOR SUPPLIED 170E
CABINET .....CONTRACTOR SUPPLIED 332
SOFTWARE .....BI TRANS 233NC2
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...12
LOAD SWITCHES USED.....S2,S4,S6,S8
PHASES USED.....2,4,6,8
OVERLAPS.....NONE

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	SLOT EMPTY	ø2 2A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø4 4A	SLOT EMPTY	SLOT EMPTY	SYS. DET. S1	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L		NOT USED				NOT USED			SYS. DET. S2					ST DC ISOLATOR
FILE "J"	U	SLOT EMPTY	ø6 6A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	ø8 8A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L		NOT USED				NOT USED								

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	DETECTOR NO.	PIN NO.	ATTRIBUTES	NEMA PHASE	
2A	TB2-5,6	I2U	1	39	5 7	2	
4A	TB4-9,10	I6U	2	41	5 7	4	
6A	TB3-5,6	J2U	3	40	5 7	6	
8A	TB5-9,10	J6U	4	42	5 7	8	
SYSTEM LOOPS							
S1	TB6-9,10	I9U	—	60	—	SYS1	*
S2	TB6-11,12	I9L	—	62	—	SYS2	*

NOTE: PROGRAM DETECTOR DELAY AND CARRYOVER TIMES AS SPECIFIED ON SIGNAL DESIGN PLANS.

*SYSTEM DETECTOR PROGRAMMING NOTES

IN ORDER FOR SYSTEM LOOPS TO OPERATE PROPERLY, THEIR PIN ASSIGNMENTS WILL HAVE TO BE RE-ASSIGNED ON I70E CONTROLLER AS DESCRIBED BELOW.

A. IN ORDER TO ASSURE THAT THESE PINS ARE CLEARED FROM THEIR DEFAULT FUNCTION, PROGRAM AS FOLLOWS:
PIN 60 - E/126+4+1=0
PIN 62 - E/126+4+3=0

B. AFTER FOLLOWING STEP 'A' ABOVE, PROGRAM PINS FOR SYSTEM DETECTORS AS FOLLOWS:
SYS1 - E/126+B+1=60
SYS2 - E/126+B+2=62

DETECTOR ATTRIBUTES LEGEND:

1-FULL TIME DELAY
2-PED CALL
3-RESERVED
4-COUNTING
5-EXTENSION
6-TYPE 3
7-CALLING
8-ALTERNATE

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 05-2328
DESIGNED: DECEMBER 2007
SEALED: 1/16/08
REVISED: N/A

SIGNAL SYSTEM DATA :	
INTERSECTION NUMBER	2328
LOCAL TELEMETRY ADDRESS	68
CHANNEL NUMBER	C-4

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared in the Offices of
Kimley-Horn and Associates, Inc.
250 N. Greenfield Pkwy, Garner, NC 27529

SR 1303 (Pickett Rd.) at SR 1358 (Western Blvd.) /Petty Rd.

Division 05 Durham County Durham
PLAN DATE: January 2008 REVIEWED BY: YGW
PREPARED BY: F.E. Russ REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 008453 ENGINEER JOHN T. ROWE, JR.
SIGNATURE 1-22-08 DATE
SIG. INVENTORY NO. 05-2328

22-JAN-2008 08:40
S:\ITS\Signal\Working\Projects\Sig Mods\Russell\700wgs\m2328_smlete_2006010xx.dgn

PROJECT REFERENCE NO.	SHEET NO.
B4109	SIG 4

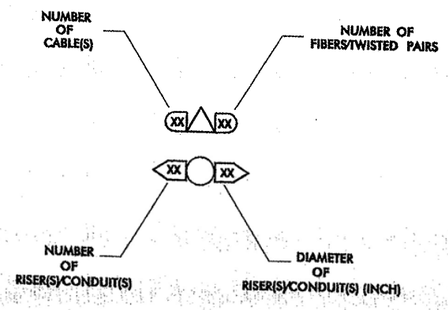
1. INSTALL REA, PE – 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
2. INSTALL REA, PE – 38, (FIGURE 8) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
3. INSTALL REA, PE – 39, (UNDERGROUND) SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
4. INSTALL SMFO CABLE
5. INSTALL MMFO CABLE
6. INSTALL FIBER OPTIC DROP CABLE
7. INSTALL TRACER WIRE
8. TRENCH
9. INSTALL PVC CONDUIT
10. INSTALL RIGID, GALVANIZED STEEL CONDUIT
11. INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
12. INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
13. INSTALL OUTER-DUCT POLYETHYLENE CONDUIT
14. INSTALL POLYETHYLENE CONDUIT
15. DIRECTIONAL DRILL CONDUIT
16. BORE AND JACK CONDUIT
17. INSTALL CABLE(S) IN EXISTING CONDUIT
18. INSTALL CABLE(S) IN NEW CONDUIT
19. INSTALL CABLE(S) IN EXISTING RISER
20. INSTALL CABLE(S) IN NEW RISER
21. INSTALL CABLE(S) IN EXISTING CONDUIT STUB-OUTS
22. INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
23. INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
24. INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
25. INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
26. TERMINATE COMMUNICATIONS CABLE ON EXISTING TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
27. INSTALL NEW TELEMETRY INTERFACE PANEL IN TRAFFIC SIGNAL CONTROLLER CABINET
28. INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS AND FUSION SPLICE CABLE IN CABINET
29. INSTALL UNDERGROUND SPLICE ENCLOSURE
30. INSTALL AERIAL SPLICE ENCLOSURE
31. INSTALL POLE MOUNTED SPLICE CABINET
32. INSTALL BASE MOUNTED SPLICE CABINET
33. REMOVE EXISTING SPLICE CABINET
34. INSTALL CABINET FOUNDATION
35. REMOVE EXISTING CABINET FOUNDATION
36. INSTALL CCTV CAMERA ASSEMBLY
37. INSTALL CCTV CAMERA WOOD POLE
38. INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
39. INSTALL JUNCTION BOX
40. INSTALL OVERSIZED JUNCTION BOX
41. REMOVE EXISTING JUNCTION BOX
42. INSTALL WOOD POLE
43. REMOVE EXISTING WOOD POLE
44. INSTALL AERIAL GUY ASSEMBLY
45. INSTALL STANDARD GUY ASSEMBLY
46. INSTALL SIDEWALK GUY ASSEMBLY
47. INSTALL MESSENGER CABLE
48. REMOVE EXISTING COMMUNICATIONS AND MESSENGER CABLE
49. REMOVE EXISTING MESSENGER CABLE
50. INSTALL TELEPHONE SERVICE
51. INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
52. INSTALL DELINEATOR MARKER
53. STORE 20 FEET OF COMMUNICATIONS CABLE
54. LASH CABLE(S) TO EXISTING SIGNAL/COMMUNICATIONS CABLE
55. LASH CABLE(S) TO EXISTING MESSENGER CABLE
56. LASH CABLE(S) TO NEW MESSENGER CABLE
57. MODIFY EXISTING ELECTRICAL SERVICE
58. INSTALL NEW ELECTRICAL SERVICE

LEGEND

- FO — NEW FIBER OPTIC COMMUNICATIONS CABLE
- TWIST PR — NEW TWISTED PAIR COMMUNICATIONS CABLE
- EXI — EXISTING COMMUNICATIONS CABLE
- REM — EXISTING COMMUNICATIONS CABLE TO BE REMOVED
- NEW AERIAL GUY ASSEMBLY
- NEW CONDUIT
- EXISTING CONDUIT
- DD — NEW DIRECTIONAL DRILLED CONDUIT
- B&J — NEW BORED AND JACKED CONDUIT
- NEW JUNCTION BOX
- EXISTING JUNCTION BOX
- NEW WOOD POLE
- EXISTING WOOD POLE
- AERIAL SPLICE ENCLOSURE
- NEW METAL POLE
- EXISTING METAL POLE
- NEW CCTV ASSEMBLY
- NEW STANDARD GUY ASSEMBLY
- NEW SIDEWALK GUY ASSEMBLY
- NEW CABLE STORAGE RACKS (SNOW SHOES)
- EXISTING CONTROLLER AND CABINET
- S — EXISTING SPLICE CABINET
- S — NEW SPLICE CABINET
- SP — SIGNAL POLE
- XX-XXXX — SIGNAL INVENTORY NUMBER

CONSTRUCTION NOTE SYMBOLOGY KEY

- XX — INDICATES NUMBER OF CABLES, LOOPS, ETC.
- XX — INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.
- XX — INDICATES NUMBER OF RISER(S)/CONDUIT(S)
- XX — INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (INCH)



Prepared in the Office of:
[illegible]
333 N. McDowell St., Raleigh, NC 27601

CONSTRUCTION NOTES

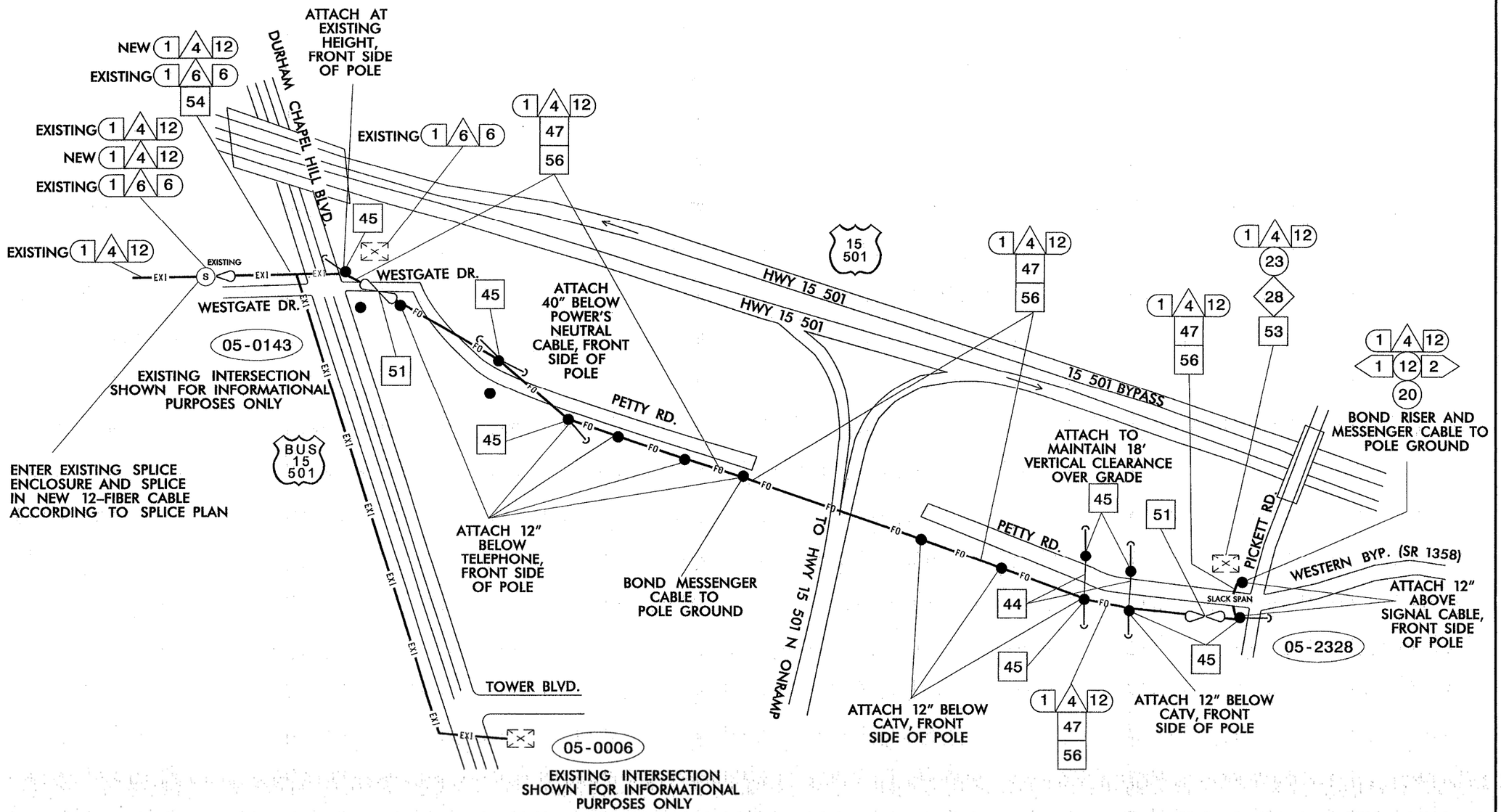
PLAN DATE:	REVIEWED BY:
PREPARED BY:	REVIEWED BY: G. A. FULLER

REVISIONS	INIT.	DATE

SCALE: 0

SEAL
NORTH CAROLINA
PROFESSIONAL
SEAL
023919
ENGINEER
GREGORY A. FULLER
Gregory A. Fuller 10/9/02
SIGNATURE DATE

PROJECT REFERENCE NO.	SHEET NO.
B-4109	SIG. 5



Prepared in the Office of:
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation
1520 S. Gilmerton Blvd., Capitol, NC 27529

COMMUNICATIONS CABLE ROUTING
PICKETT RD. AT WESTERN BYPASS/PETTY RD.
DIVISION 05 WAKE CO. DURHAM
PLAN DATE: JANUARY 2008 REVIEWED BY: I. N. AVERY
PREPARED BY: HEIDI TONA BERGGREN REVIEWED BY: G.O. MURR JR., PE.
REVISIONS | INIT. | DATE
SCALE: 0
N
CADD File(s):

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE O. MURR JR.
SIGNATURE 1-24-08 DATE

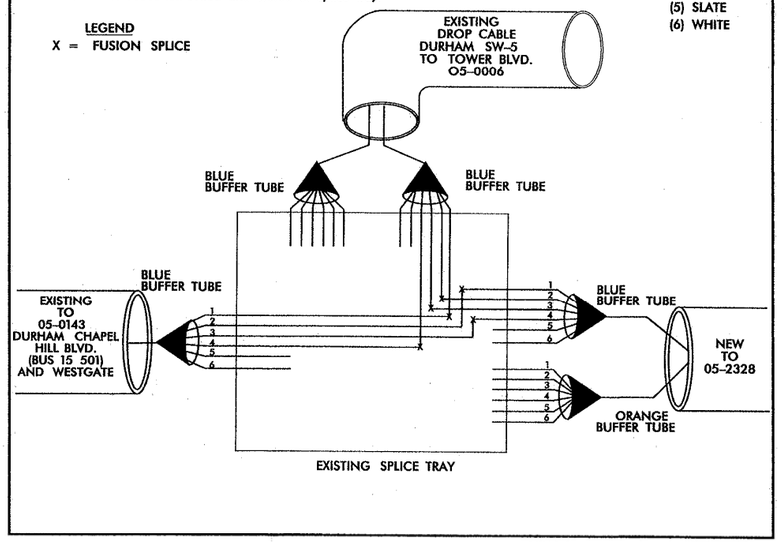
PROJECT REFERENCE NO.	SHEET NO.
B 4109	SIG.6

EXISTING SPLICE ENCLOSURE
DURHAM SE–SWE–506
DURHAM CHAPEL HILL BLVD. (BUS 15 501) AND WESTGATE

COLOR CODE TIA/EIA 598–A
(1) BLUE
(2) ORANGE
(3) GREEN
(4) BROWN
(5) SLATE
(6) WHITE

Notes:
Unused fibers left coiled and stored in splice tray.
Unused Buffer Tubes left coiled and stored in splice tray.

LEGEND
X = FUSION SPLICE

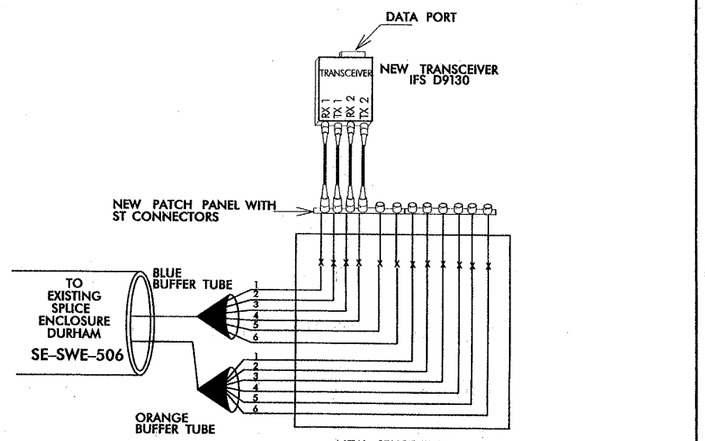


PICKETT RD. AT WESTERN BYPASS / PETTY RD. SIG. INV. #05–2328

COLOR CODE TIA/EIA 598–A
(1) BLUE
(2) ORANGE
(3) GREEN
(4) BROWN
(5) SLATE
(6) WHITE

Notes:
Unused fibers left coiled and stored in splice tray.
Unused Buffer Tubes left coiled and stored in splice tray.

LEGEND
X = FUSION SPLICE



NOTES:

1. THE CONTRACTOR SHALL INSTALL TRANSCEIVER MODEL IFS D9130 FOR COMPATIBILITY WITH EXISTING SYSTEM.
2. TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING / ENSURING PROPER TERMINATIONS.
3. THE CONTRACTOR SHALL NOTIFY THE CITY OF DURHAM TRAFFIC ENGINEERING DEPARTMENT (LARRY McGLOTHLIN, 919–560–4366) PRIOR TO BEGINNING WORK. ANY REVISIONS TO THE CABLE ROUTING AND SPLICE PLANS SHALL BE APPROVED BY THE ENGINEER PRIOR TO BEGINNING WORK. THE CONTRACTOR SHALL PROVIDE ALL AS–BUILT CABLE ROUTING AND SPLICE PLANS TO THE CITY OF DURHAM BEFORE ACCEPTANCE OF THE PROJECT.
4. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING / ASSURING STABLE COMMUNICATIONS FROM PICKETT DR. AT WESTERN BYPASS UP TO DURHAM CHAPEL HILL BLVD. (BUS 15 501) AND WESTGATE. AND BACK TO THE DURHAM TRAFFIC OPERATIONS CENTER DURING CONSTRUCTION OF CABLE ROUTING, SPLICING, AND UPON COMPLETION OF THE PROJECT.

Prepared in the Offices of: NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
750 N. Greenfield Pkwy., Garner, NC 27529

SPLICE PLAN
PICKETT RD. AT
WESTERN BYPASS/PETTY RD.

DIVISION 05 DURHAM CO. DURHAM
PLAN DATE: JANUARY 2008 REVIEWED BY: I. M. AVERY
PREPARED BY: HEIDI T. BERGGREN REVIEWED BY: G.C. MUIR, JR., PE

REVISIONS	INIT.	DATE

SCALE: 0

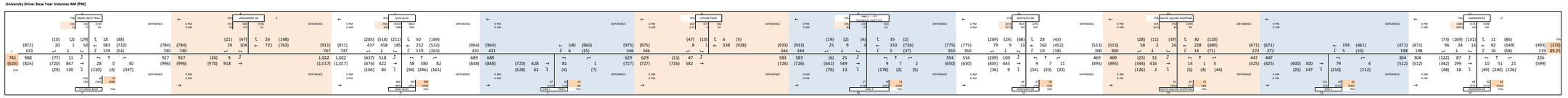
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 14543 ENGINEER GENE C. MUIR, JR.
SIGNATURE 1-24-08 DATE
CADD Filename:

Appendix D

Balanced Peak Hour Volumes

2040 No-Build AM
2040 No-Build PM
2040 Build AM – NHC 1
2040 Build PM – NHC 1
2040 Build AM – NHC 2/NHC LPA
2040 Build PM – NHC 2/NHC LPA

University Drive: Base Year Volumes AM (PM)



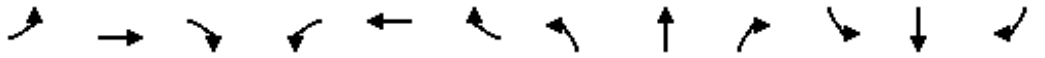
Appendix E

2040 Synchro Outputs

2040 No-Build AM
2040 No-Build PM
2040 Build AM – NHC 1
2040 Build PM – NHC 1
2040 Build AM – NHC 2/NHC LPA
2040 Build PM – NHC 2/NHC LPA

2040 No-Build AM

1. University Drive at Ivy Creek Blvd.
2. University Drive at Larchmont Rd.
3. University Drive at Martin Luther King Parkway
4. University Drive at Lyckan Parkway
5. University Drive at Westgate Dr.
6. University Drive at Westgate Shopping Center
7. University Drive at Shannon Road
8. Pickett Road at Petty Road
9. Pickett Road at Tower Blvd.



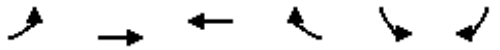
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	1098	175	198	776	15	49	0	55	60	1	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	12	12	11	11	11	13	13	13
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	150		65	130		0	0		85	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.997				0.850		0.963	
Flt Protected	0.950			0.950				0.950			0.966	
Satd. Flow (prot)	1718	3322	1537	1718	3426	0	0	1661	1486	0	1739	0
Flt Permitted	0.323			0.159				0.704			0.754	
Satd. Flow (perm)	584	3322	1537	288	3426	0	0	1231	1486	0	1357	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			80		3				29		12	
Link Speed (mph)		35			35			25			15	
Link Distance (ft)		916			714			479			412	
Travel Time (s)		17.8			13.9			13.1			18.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	10	1220	194	220	862	17	54	0	61	67	1	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	1220	194	220	879	0	0	54	61	0	94	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.06	1.01	1.01	1.01	1.01	1.06	1.06	1.06	0.97	0.97	0.97
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases		2		1	6			8	1		4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6			8		8	4		
Detector Phase	2	2	2	1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	39.0	39.0	39.0	14.0	31.0		42.0	42.0	14.0	42.0	42.0	
Total Split (s)	73.0	73.0	73.0	35.0	108.0		42.0	42.0	35.0	42.0	42.0	
Total Split (%)	48.7%	48.7%	48.7%	23.3%	72.0%		28.0%	28.0%	23.3%	28.0%	28.0%	
Maximum Green (s)	66.0	66.0	66.0	28.0	101.0		35.0	35.0	28.0	35.0	35.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0			-2.0	-2.0		-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Lead/Lag	Lag	Lag	Lag	Lead					Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)	6.0	6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Flash Dont Walk (s)	26.0	26.0	26.0		18.0		29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)	15	15	15		15		15	15		15	15	
Act Effct Green (s)	94.6	94.6	94.6	117.3	117.3			22.7	45.4		22.7	
Actuated g/C Ratio	0.63	0.63	0.63	0.78	0.78			0.15	0.30		0.15	
v/c Ratio	0.03	0.58	0.19	0.56	0.33			0.29	0.13		0.44	
Control Delay	18.2	21.3	10.2	24.9	5.5			56.0	17.4		53.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Delay	18.2	21.3	10.2	24.9	5.5			56.0	17.4		53.2	
LOS	B	C	B	C	A			E	B		D	
Approach Delay		19.7			9.4			35.5			53.2	
Approach LOS		B			A			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 2 (1%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 17.4 Intersection LOS: B
Intersection Capacity Utilization 65.3% ICU Level of Service C
Analysis Period (min) 15

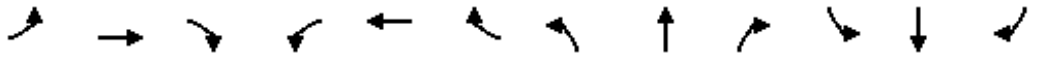
Splits and Phases: 27: Ivy Creek Blvd./Snowcrest Tr. & University Dr.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	13	1200	918	21	213	71
Sign Control		Free	Free		Stop	
Grade		2%	2%		2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	14	1333	1020	23	237	79
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		714	441			
pX, platoon unblocked	0.88				0.88	0.88
vC, conflicting volume	1043				1394	522
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	782				1179	191
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				0	89
cM capacity (veh/h)	722				156	717

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	SB 1
Volume Total	205	381	381	381	680	363	316
Volume Left	14	0	0	0	0	0	237
Volume Right	0	0	0	0	0	23	79
cSH	722	1700	1700	1700	1700	1700	195
Volume to Capacity	0.02	0.22	0.22	0.22	0.40	0.21	1.62
Queue Length 95th (ft)	2	0	0	0	0	0	519
Control Delay (s)	0.9	0.0	0.0	0.0	0.0	0.0	343.9
Lane LOS	A						F
Approach Delay (s)	0.1				0.0		343.9
Approach LOS							F

Intersection Summary			
Average Delay	40.2		
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

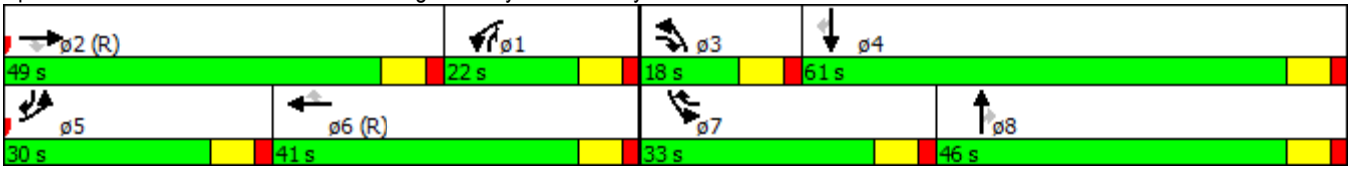


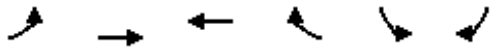
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	594	712	107	289	429	107	67	558	177	349	663	443
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	12	11	12	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	0		120	105		115	165		220	180		0
Storage Lanes	0		1	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3333	3436	1537	3333	3436	1537	1661	3436	1486	1718	3436	1537
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3333	3436	1537	3333	3436	1537	1661	3436	1486	1718	3436	1537
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131			80			182			159
Link Speed (mph)		35			35			35			55	
Link Distance (ft)		441			485			1060			1216	
Travel Time (s)		8.6			9.4			20.6			15.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	660	791	119	321	477	119	74	620	197	388	737	492
Shared Lane Traffic (%)												
Lane Group Flow (vph)	660	791	119	321	477	119	74	620	197	388	737	492
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.06	1.01	1.06	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
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

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			2			6			8			4
Detector Phase	5	2	3	1	6	7	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0	7.0	7.0	10.0	7.0	7.0	7.0	7.0	7.0	14.0	7.0
Minimum Split (s)	14.0	40.0	14.0	14.0	40.0	14.0	14.0	46.0	14.0	14.0	44.0	14.0
Total Split (s)	30.0	49.0	18.0	22.0	41.0	33.0	18.0	46.0	22.0	33.0	61.0	30.0
Total Split (%)	20.0%	32.7%	12.0%	14.7%	27.3%	22.0%	12.0%	30.7%	14.7%	22.0%	40.7%	20.0%
Maximum Green (s)	23.0	42.0	11.0	15.0	34.0	26.0	11.0	39.0	15.0	26.0	54.0	23.0
Yellow 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
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
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
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None	None	None	None
Walk Time (s)		6.0			6.0			6.0			6.0	
Flash Dont Walk (s)		27.0			27.0			33.0			31.0	
Pedestrian Calls (#/hr)		15			15			15			15	
Act Effct Green (s)	30.6	49.6	61.6	17.0	36.0	69.0	12.1	35.4	52.4	28.0	51.4	86.9
Actuated g/C Ratio	0.20	0.33	0.41	0.11	0.24	0.46	0.08	0.24	0.35	0.19	0.34	0.58
v/c Ratio	0.97	0.70	0.17	0.85	0.58	0.16	0.56	0.76	0.31	1.21	0.63	0.51
Control Delay	95.1	59.3	7.5	80.3	48.0	8.6	82.4	59.7	3.9	170.8	43.6	14.4
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	95.1	59.3	7.5	80.3	48.0	8.6	82.4	59.7	3.9	170.8	43.6	14.4
LOS	F	E	A	F	D	A	F	E	A	F	D	B
Approach Delay		70.4			54.2			49.3			65.2	
Approach LOS		E			D			D			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 2 (1%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green			
Natural Cycle: 155			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.21			
Intersection Signal Delay: 62.0		Intersection LOS: E	
Intersection Capacity Utilization 80.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 29: Martin Luther King Jr. Pkwy. & University Dr.





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	158	1096	578	11	7	93
Sign Control		Free	Free		Stop	
Grade		2%	2%		2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	176	1218	642	12	8	103
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		485	476			
pX, platoon unblocked					0.81	
vC, conflicting volume	654				1608	327
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	654				1287	327
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	81				92	84
cM capacity (veh/h)	915				100	663

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	176	609	609	428	226	111
Volume Left	176	0	0	0	0	8
Volume Right	0	0	0	0	12	103
cSH	915	1700	1700	1700	1700	476
Volume to Capacity	0.19	0.36	0.36	0.25	0.13	0.23
Queue Length 95th (ft)	18	0	0	0	0	22
Control Delay (s)	9.9	0.0	0.0	0.0	0.0	14.8
Lane LOS	A					B
Approach Delay (s)	1.2			0.0		14.8
Approach LOS						B

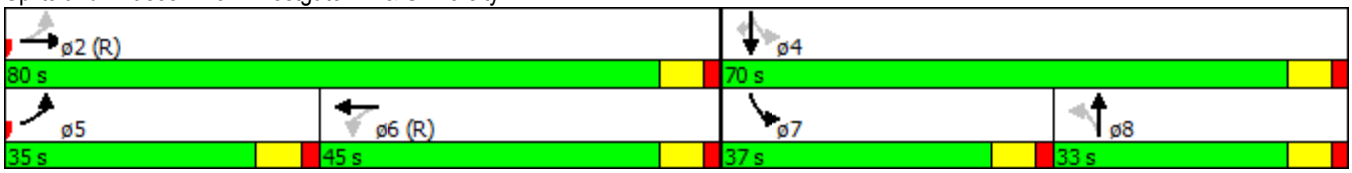
Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

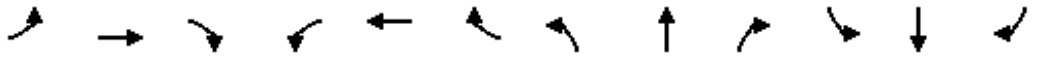
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	262	747	1	8	358	324	4	27	28	269	20	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	0		0	125		0	0		50	425		0
Storage Lanes	0		0	1		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.929			0.924				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1718	3436	0	1718	3192	0	1718	1671	0	1661	1809	1537
Flt Permitted	0.225			0.339			0.743			0.541		
Satd. Flow (perm)	407	3436	0	613	3192	0	1344	1671	0	946	1809	1537
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					149			30				338
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		476			335			440			975	
Travel Time (s)		9.3			6.5			8.6			19.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	291	830	1	9	398	360	4	30	31	299	22	338
Shared Lane Traffic (%)												
Lane Group Flow (vph)	291	831	0	9	758	0	4	61	0	299	22	338
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.06	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	5	2			6			8		7	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		8	8		7	4	4
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	14.0	37.0		37.0	37.0		33.0	33.0		14.0	33.0	33.0
Total Split (s)	35.0	80.0		45.0	45.0		33.0	33.0		37.0	70.0	70.0
Total Split (%)	23.3%	53.3%		30.0%	30.0%		22.0%	22.0%		24.7%	46.7%	46.7%
Maximum Green (s)	28.0	73.0		38.0	38.0		26.0	26.0		30.0	63.0	63.0
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max		None	None		None	None	None
Walk Time (s)		6.0		6.0	6.0		6.0	6.0			6.0	6.0
Flash Dont Walk (s)		24.0		24.0	24.0		20.0	20.0			20.0	20.0
Pedestrian Calls (#/hr)		15		15	15		15	15			15	15
Act Effct Green (s)	90.5	90.5		62.6	62.6		16.8	16.8		49.5	49.5	49.5
Actuated g/C Ratio	0.60	0.60		0.42	0.42		0.11	0.11		0.33	0.33	0.33
v/c Ratio	0.65	0.40		0.04	0.53		0.03	0.29		0.65	0.04	0.46
Control Delay	38.3	31.3		62.1	43.6		52.5	34.7		46.2	27.9	4.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	38.3	31.3		62.1	43.6		52.5	34.7		46.2	27.9	4.6
LOS	D	C		E	D		D	C		D	C	A
Approach Delay		33.1			43.8			35.8			24.3	
Approach LOS		C			D			D			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 98 (65%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 34.1		Intersection LOS: C	
Intersection Capacity Utilization 68.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 31: Westgate Dr. & University Dr.

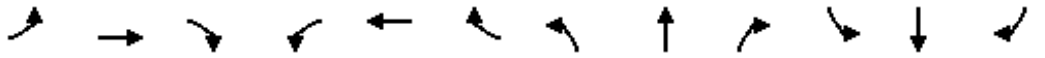




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	165	837	42	28	523	9	31	0	1	5	4	136
Sign Control		Free			Free			Stop			Stop	
Grade		2%			2%			2%			2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	183	930	47	31	581	10	34	0	1	6	4	151
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		335			1231							
pX, platoon unblocked	1.00			0.88			0.88	0.88	0.88	0.88	0.88	1.00
vC, conflicting volume	591			977			1826	1973	488	1481	1992	296
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	591			706			1668	1835	152	1277	1856	295
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	81			96			0	100	100	94	91	78
cM capacity (veh/h)	967			772			33	50	759	88	49	695

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	183	620	357	31	387	204	36	6	156
Volume Left	183	0	0	31	0	0	34	6	0
Volume Right	0	0	47	0	0	10	1	0	151
cSH	967	1700	1700	772	1700	1700	34	88	504
Volume to Capacity	0.19	0.36	0.21	0.04	0.23	0.12	1.05	0.06	0.31
Queue Length 95th (ft)	17	0	0	3	0	0	94	5	32
Control Delay (s)	9.6	0.0	0.0	9.9	0.0	0.0	346.4	48.4	15.3
Lane LOS	A			A			F	E	C
Approach Delay (s)	1.5			0.5			346.4	16.4	
Approach LOS							F	C	

Intersection Summary				
Average Delay	8.6			
Intersection Capacity Utilization	53.1%	ICU Level of Service		A
Analysis Period (min)	15			



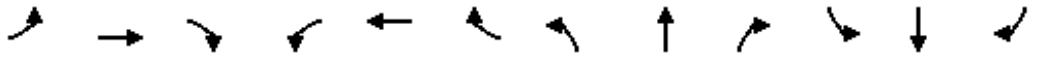
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	37	671	3	41	390	60	6	41	132	122	15	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	12	12	11	10	10	11	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	600		0	600		0	130		120	350		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.999			0.980			0.886			0.876	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1718	3433	0	1661	3368	0	1661	2842	0	1661	3010	0
Flt Permitted	0.439			0.314			0.691			0.410		
Satd. Flow (perm)	794	3433	0	549	3368	0	1208	2842	0	717	3010	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					14			147			80	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1231			1020			255			809	
Travel Time (s)		24.0			19.9			5.0			15.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	41	746	3	46	433	67	7	46	147	136	17	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	749	0	46	500	0	7	193	0	136	97	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane								Yes				
Headway Factor	1.01	1.01	1.01	1.06	1.01	1.01	1.06	1.11	1.11	1.06	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	14.0	42.0		14.0	42.0		35.0	35.0		14.0	37.0	
Total Split (s)	16.0	69.0		17.0	70.0		41.0	41.0		23.0	64.0	
Total Split (%)	10.7%	46.0%		11.3%	46.7%		27.3%	27.3%		15.3%	42.7%	
Maximum Green (s)	9.0	62.0		10.0	63.0		34.0	34.0		16.0	57.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		6.0			6.0		6.0	6.0			6.0	
Flash Dont Walk (s)		29.0			29.0		22.0	22.0			24.0	
Pedestrian Calls (#/hr)		15			15		15	15			15	
Act Effct Green (s)	96.5	88.8		96.7	89.0		17.6	17.6		39.4	39.4	
Actuated g/C Ratio	0.64	0.59		0.64	0.59		0.12	0.12		0.26	0.26	
v/c Ratio	0.07	0.37		0.11	0.25		0.05	0.42		0.46	0.11	
Control Delay	9.4	19.8		11.8	17.0		52.2	17.8		47.4	9.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	9.4	19.8		11.8	17.0		52.2	17.8		47.4	9.9	
LOS	A	B		B	B		D	B		D	A	
Approach Delay		19.3			16.6			19.0			31.8	
Approach LOS		B			B			B			C	

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, Master Intersection
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.46
Intersection Signal Delay: 20.0 Intersection LOS: C
Intersection Capacity Utilization 53.7% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 33: Shannon Rd. & University Dr.

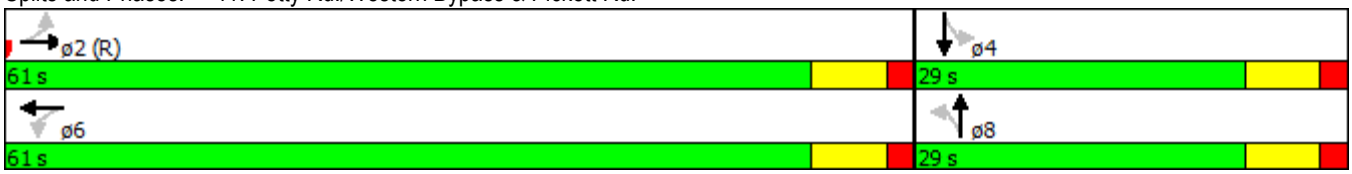


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	623	21	1	453	36	13	43	14	103	88	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	14	14	14	12	12	12
Grade (%)		2%			2%			2%			2%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.990			0.972			0.936	
Flt Protected		0.991						0.991			0.986	
Satd. Flow (prot)	0	1785	0	0	1791	0	0	1858	0	0	1669	0
Flt Permitted		0.809			0.999			0.889			0.889	
Satd. Flow (perm)	0	1457	0	0	1789	0	0	1667	0	0	1505	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			35	
Link Distance (ft)		962			490			657			938	
Travel Time (s)		18.7			9.5			17.9			18.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	151	692	23	1	503	40	14	48	16	114	98	193
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	866	0	0	544	0	0	78	0	0	405	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	0.93	0.93	0.93	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	17.0	17.0		17.0	17.0		14.0	14.0		14.0	14.0	
Total Split (s)	61.0	61.0		61.0	61.0		29.0	29.0		29.0	29.0	
Total Split (%)	67.8%	67.8%		67.8%	67.8%		32.2%	32.2%		32.2%	32.2%	
Maximum Green (s)	54.0	54.0		54.0	54.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0			-2.0			-2.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		Max	Max		None	None		None	None	
Act Effct Green (s)		56.0			56.0			24.0			24.0	
Actuated g/C Ratio		0.62			0.62			0.27			0.27	
v/c Ratio		0.96			0.49			0.18			1.01	
Control Delay		38.8			11.1			26.8			82.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		38.8			11.1			26.8			82.5	
LOS		D			B			C			F	
Approach Delay		38.8			11.1			26.8			82.5	
Approach LOS		D			B			C			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of 1st Green, Master Intersection			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 39.7		Intersection LOS: D	
Intersection Capacity Utilization 107.8%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 41: Petty Rd./Western Bypass & Pickett Rd.



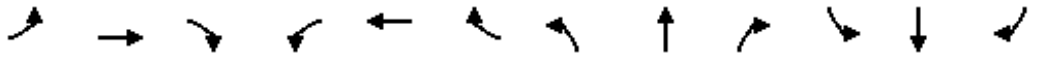
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	472	268	92	378	112	98
Sign Control	Free			Free	Stop	
Grade	2%			2%	2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	524	298	102	420	124	109
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	490					
pX, platoon unblocked			0.66		0.66	0.66
vC, conflicting volume			822		1298	673
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			471		1193	245
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			86		0	79
cM capacity (veh/h)			712		115	520

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	822	102	420	233
Volume Left	0	102	0	124
Volume Right	298	0	0	109
cSH	1700	712	1700	181
Volume to Capacity	0.48	0.14	0.25	1.29
Queue Length 95th (ft)	0	12	0	330
Control Delay (s)	0.0	10.9	0.0	215.7
Lane LOS		B		F
Approach Delay (s)	0.0	2.1		215.7
Approach LOS				F

Intersection Summary			
Average Delay	32.6		
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

2040 No-Build PM

1. University Drive at Ivy Creek Blvd.
2. University Drive at Larchmont Rd.
3. University Drive at Martin Luther King Parkway
4. University Drive at Lyckan Parkway
5. University Drive at Westgate Dr.
6. University Drive at Westgate Shopping Center
7. University Drive at Shannon Road
8. Pickett Road at Petty Road
9. Pickett Road at Tower Blvd.



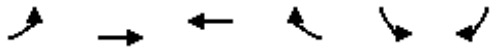
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	918	20	17	1067	50	137	3	419	48	1	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	12	12	11	11	11	13	13	13
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	150		65	130		0	0		85	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.993				0.850		0.977	
Flt Protected	0.950			0.950				0.953			0.961	
Satd. Flow (prot)	1718	3322	1537	1718	3412	0	0	1666	1486	0	1755	0
Flt Permitted	0.210			0.186				0.705			0.555	
Satd. Flow (perm)	380	3322	1537	336	3412	0	0	1233	1486	0	1013	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131		6				42		6	
Link Speed (mph)		35			35			25			15	
Link Distance (ft)		916			714			479			412	
Travel Time (s)		17.8			13.9			13.1			18.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	61	1020	22	19	1186	56	152	3	466	53	1	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	1020	22	19	1242	0	0	155	466	0	65	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.06	1.01	1.01	1.01	1.01	1.06	1.06	1.06	0.97	0.97	0.97
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6			8		8	4		
Detector Phase	5	2	2	1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	14.0	39.0	39.0	14.0	31.0		42.0	42.0	14.0	42.0	42.0	
Total Split (s)	14.0	68.0	68.0	40.0	94.0		42.0	42.0	40.0	42.0	42.0	
Total Split (%)	9.3%	45.3%	45.3%	26.7%	62.7%		28.0%	28.0%	26.7%	28.0%	28.0%	
Maximum Green (s)	7.0	61.0	61.0	33.0	87.0		35.0	35.0	33.0	35.0	35.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0			-2.0	-2.0		-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag				Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes				Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Flash Dont Walk (s)		26.0	26.0		18.0		29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)		15	15		15		15	15		15	15	
Act Effct Green (s)	90.3	81.3	81.3	112.1	100.9			27.9	58.7		27.9	
Actuated g/C Ratio	0.60	0.54	0.54	0.75	0.67			0.19	0.39		0.19	
v/c Ratio	0.20	0.57	0.02	0.04	0.54			0.68	0.77		0.34	
Control Delay	10.1	26.0	0.1	11.9	32.0			70.3	43.8		50.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Delay	10.1	26.0	0.1	11.9	32.0			70.3	43.8		50.1	
LOS	B	C	A	B	C			E	D		D	
Approach Delay		24.6			31.7			50.4			50.1	
Approach LOS		C			C			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 49 (33%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 33.3 Intersection LOS: C
Intersection Capacity Utilization 69.7% ICU Level of Service C
Analysis Period (min) 15

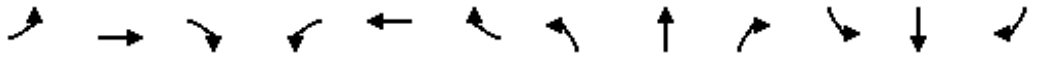
Splits and Phases: 27: Ivy Creek Blvd./Snowcrest Tr. & University Dr.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	8	1377	1112	111	117	22
Sign Control		Free	Free		Stop	
Grade		2%	2%		2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	9	1530	1236	123	130	24
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		714	441			
pX, platoon unblocked	0.77				0.77	0.77
vC, conflicting volume	1359				1698	679
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	861				1303	0
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				0	97
cM capacity (veh/h)	586				113	827

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	SB 1
Volume Total	227	437	437	437	824	535	154
Volume Left	9	0	0	0	0	0	130
Volume Right	0	0	0	0	0	123	24
cSH	586	1700	1700	1700	1700	1700	132
Volume to Capacity	0.02	0.26	0.26	0.26	0.48	0.31	1.17
Queue Length 95th (ft)	1	0	0	0	0	0	229
Control Delay (s)	0.6	0.0	0.0	0.0	0.0	0.0	197.7
Lane LOS	A						F
Approach Delay (s)	0.1				0.0		197.7
Approach LOS							F

Intersection Summary			
Average Delay	10.1		
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

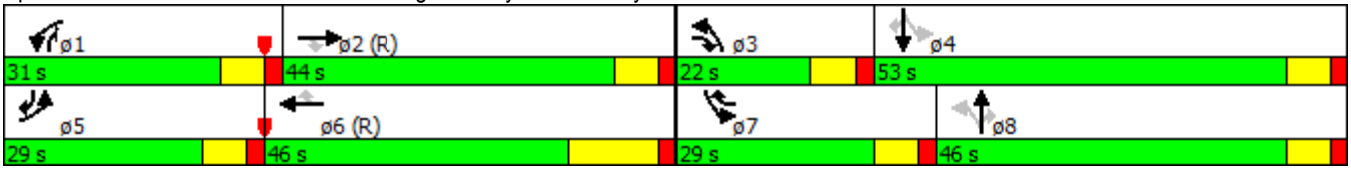


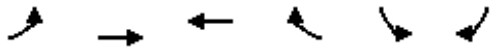
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	620	699	175	512	754	276	128	388	263	302	852	341
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	12	11	12	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	0		120	105		115	165		220	180		0
Storage Lanes	0		1	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3333	3436	1537	3333	3436	1537	1661	3436	1486	1718	3436	1537
Flt Permitted	0.950			0.950			0.104			0.315		
Satd. Flow (perm)	3333	3436	1537	3333	3436	1537	182	3436	1486	570	3436	1537
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			80			88			116			116
Link Speed (mph)		35			35			35			55	
Link Distance (ft)		441			485			1060			1216	
Travel Time (s)		8.6			9.4			20.6			15.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	689	777	194	569	838	307	142	431	292	336	947	379
Shared Lane Traffic (%)												
Lane Group Flow (vph)	689	777	194	569	838	307	142	431	292	336	947	379
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.06	1.01	1.06	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	3	1	6	7	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0	7.0	7.0	10.0	7.0	7.0	7.0	7.0	7.0	14.0	7.0
Minimum Split (s)	14.0	40.0	14.0	14.0	45.0	14.0	14.0	46.0	14.0	14.0	44.0	14.0
Total Split (s)	29.0	44.0	22.0	31.0	46.0	29.0	22.0	46.0	31.0	29.0	53.0	29.0
Total Split (%)	19.3%	29.3%	14.7%	20.7%	30.7%	19.3%	14.7%	30.7%	20.7%	19.3%	35.3%	19.3%
Maximum Green (s)	22.0	37.0	15.0	24.0	34.0	22.0	15.0	39.0	24.0	22.0	46.0	22.0
Yellow Time (s)	5.0	5.0	5.0	5.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	10.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None	None	None	None
Walk Time (s)		6.0			6.0			6.0			6.0	
Flash Dont Walk (s)		27.0			27.0			33.0			31.0	
Pedestrian Calls (#/hr)		15			15			15			15	
Act Effct Green (s)	27.3	40.4	60.3	28.0	36.0	69.4	53.2	38.3	71.2	66.7	46.7	79.1
Actuated g/C Ratio	0.18	0.27	0.40	0.19	0.24	0.46	0.35	0.26	0.47	0.44	0.31	0.53
v/c Ratio	1.14	0.84	0.29	0.92	1.02	0.41	0.67	0.49	0.38	0.78	0.89	0.44
Control Delay	125.4	62.5	17.2	85.4	79.8	11.5	49.0	49.3	16.0	41.9	59.9	16.6
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	125.4	62.5	17.2	85.4	79.8	11.5	49.0	49.3	16.0	41.9	59.9	16.6
LOS	F	E	B	F	E	B	D	D	B	D	E	B
Approach Delay		83.3			69.4			38.0			46.4	
Approach LOS		F			E			D			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 125 (83%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green			
Natural Cycle: 140			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.14			
Intersection Signal Delay: 62.2		Intersection LOS: E	
Intersection Capacity Utilization 90.0%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 29: Martin Luther King Jr. Pkwy. & University Dr.

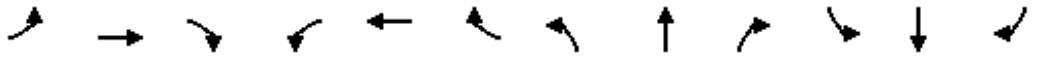




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	157	1063	1296	13	7	192
Sign Control		Free	Free		Stop	
Grade		2%	2%		2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	174	1181	1440	14	8	213
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		485	476			
pX, platoon unblocked	0.73				0.83	0.73
vC, conflicting volume	1454				2387	727
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	873				1180	0
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	68				92	73
cM capacity (veh/h)	549				101	783

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	174	591	591	960	494	221
Volume Left	174	0	0	0	0	8
Volume Right	0	0	0	0	14	213
cSH	549	1700	1700	1700	1700	633
Volume to Capacity	0.32	0.35	0.35	0.56	0.29	0.35
Queue Length 95th (ft)	34	0	0	0	0	39
Control Delay (s)	14.6	0.0	0.0	0.0	0.0	13.7
Lane LOS	B					B
Approach Delay (s)	1.9			0.0		13.7
Approach LOS						B

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		

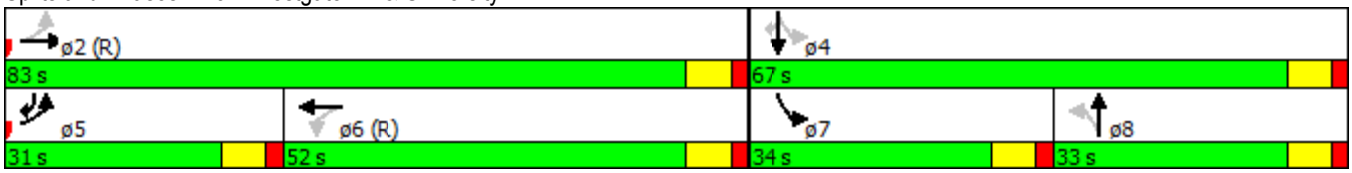


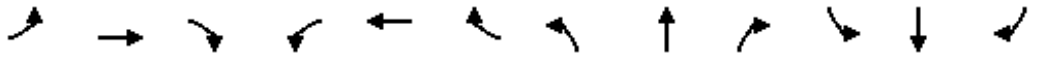
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	476	473	16	44	670	519	15	53	26	516	73	490
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	0		0	125		0	0		50	425		0
Storage Lanes	0		0	1		0	0		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.934			0.951				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1718	3419	0	1718	3210	0	1718	1720	0	1661	1809	1537
Flt Permitted	0.077			0.449			0.704			0.494		
Satd. Flow (perm)	139	3419	0	812	3210	0	1273	1720	0	864	1809	1537
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			136			15				45
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		476			335			440			975	
Travel Time (s)		9.3			6.5			8.6			19.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	529	526	18	49	744	577	17	59	29	573	81	544
Shared Lane Traffic (%)												
Lane Group Flow (vph)	529	544	0	49	1321	0	17	88	0	573	81	544
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.06	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	pm+ov
Protected Phases	5	2			6			8		7	4	5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		6	6		8	8		7	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	14.0	37.0		37.0	37.0		33.0	33.0		14.0	33.0	14.0
Total Split (s)	31.0	83.0		52.0	52.0		33.0	33.0		34.0	67.0	31.0
Total Split (%)	20.7%	55.3%		34.7%	34.7%		22.0%	22.0%		22.7%	44.7%	20.7%
Maximum Green (s)	24.0	76.0		45.0	45.0		26.0	26.0		27.0	60.0	24.0
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max		None	None		None	None	None
Walk Time (s)		6.0		6.0	6.0		6.0	6.0			6.0	
Flash Dont Walk (s)		24.0		24.0	24.0		20.0	20.0			20.0	
Pedestrian Calls (#/hr)		15		15	15		15	15			15	
Act Effct Green (s)	87.9	87.9		47.0	47.0		18.1	18.1		52.1	52.1	93.0
Actuated g/C Ratio	0.59	0.59		0.31	0.31		0.12	0.12		0.35	0.35	0.62
v/c Ratio	1.15	0.27		0.19	1.20		0.11	0.40		1.26	0.13	0.56
Control Delay	120.7	31.4		38.9	140.9		55.5	53.2		172.8	31.9	17.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	120.7	31.4		38.9	140.9		55.5	53.2		172.8	31.9	17.7
LOS	F	C		D	F		E	D		F	C	B
Approach Delay		75.4			137.2			53.6			92.8	
Approach LOS		E			F			D			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 150			
Offset: 61 (41%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 180			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.26			
Intersection Signal Delay: 103.0		Intersection LOS: F	
Intersection Capacity Utilization 109.3%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 31: Westgate Dr. & University Dr.

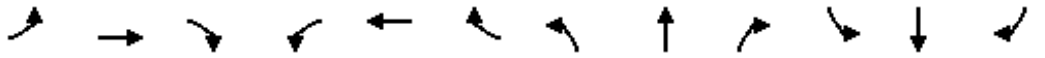




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	84	706	225	30	1076	96	32	9	62	35	9	125
Sign Control		Free			Free			Stop			Stop	
Grade		2%			2%			2%			2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	93	784	250	33	1196	107	36	10	69	39	10	139
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		335			1231							
pX, platoon unblocked	0.73			0.93			0.77	0.77	0.93	0.77	0.77	0.73
vC, conflicting volume	1302			1034			1904	2465	517	1968	2537	651
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	680			890			1169	1901	335	1252	1994	0
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	86			95			43	76	89	36	73	82
cM capacity (veh/h)	655			694			63	42	610	61	36	789

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	93	523	511	33	797	505	114	39	149
Volume Left	93	0	0	33	0	0	36	39	0
Volume Right	0	0	250	0	0	107	69	0	139
cSH	655	1700	1700	694	1700	1700	124	61	330
Volume to Capacity	0.14	0.31	0.30	0.05	0.47	0.30	0.92	0.64	0.45
Queue Length 95th (ft)	12	0	0	4	0	0	149	67	56
Control Delay (s)	11.4	0.0	0.0	10.5	0.0	0.0	126.8	137.9	24.6
Lane LOS	B			B			F	F	C
Approach Delay (s)	0.9			0.3			126.8	48.0	
Approach LOS							F	E	

Intersection Summary				
Average Delay	9.0			
Intersection Capacity Utilization	65.0%	ICU Level of Service		C
Analysis Period (min)	15			

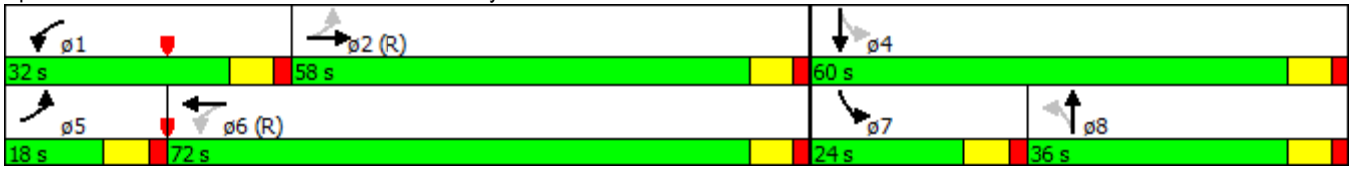


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	98	690	56	217	948	220	44	206	269	178	135	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	12	12	11	10	10	11	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	600		0	600		0	130		120	350		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.989			0.972			0.915			0.964	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1718	3399	0	1661	3340	0	1661	2935	0	1661	3313	0
Flt Permitted	0.106			0.215			0.628			0.132		
Satd. Flow (perm)	192	3399	0	376	3340	0	1098	2935	0	231	3313	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			24			201			31	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1231			1020			255			809	
Travel Time (s)		24.0			19.9			5.0			15.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	109	767	62	241	1053	244	49	229	299	198	150	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	109	829	0	241	1297	0	49	528	0	198	197	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane								Yes				
Headway Factor	1.01	1.01	1.01	1.06	1.01	1.01	1.06	1.11	1.11	1.06	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2		1	6			8		7	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	14.0	42.0		14.0	42.0		35.0	35.0		24.0	37.0	
Total Split (s)	18.0	58.0		32.0	72.0		36.0	36.0		24.0	60.0	
Total Split (%)	12.0%	38.7%		21.3%	48.0%		24.0%	24.0%		16.0%	40.0%	
Maximum Green (s)	11.0	51.0		25.0	65.0		29.0	29.0		17.0	53.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		6.0			6.0		6.0	6.0			6.0	
Flash Dont Walk (s)		29.0			29.0		22.0	22.0			24.0	
Pedestrian Calls (#/hr)		15			15		15	15			15	
Act Effct Green (s)	78.8	67.4		90.7	74.6		25.3	25.3		49.0	49.0	
Actuated g/C Ratio	0.53	0.45		0.60	0.50		0.17	0.17		0.33	0.33	
v/c Ratio	0.50	0.54		0.62	0.78		0.26	0.80		0.78	0.18	
Control Delay	27.5	36.2		22.0	35.6		56.1	45.8		60.5	29.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	27.5	36.2		22.0	35.6		56.1	45.8		60.5	29.6	
LOS	C	D		C	D		E	D		E	C	
Approach Delay		35.2			33.5			46.7			45.1	
Approach LOS		D			C			D			D	

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, Master Intersection			
Natural Cycle: 125			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 37.5		Intersection LOS: D	
Intersection Capacity Utilization 79.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 33: Shannon Rd. & University Dr.

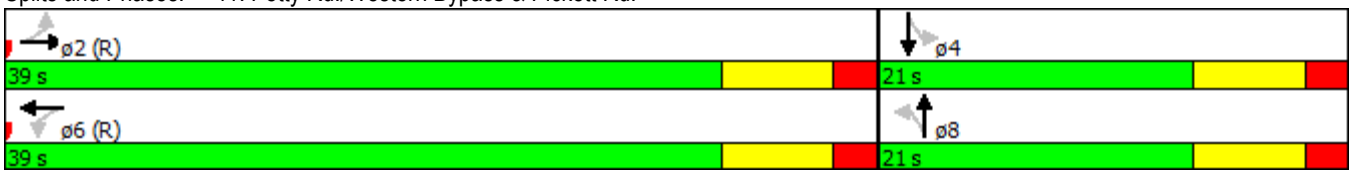


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	351	187	1	400	24	43	14	158	6	27	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	14	14	14	12	12	12
Grade (%)		2%			2%			2%			2%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.954			0.992			0.901			0.993	
Flt Protected		0.999						0.990			0.991	
Satd. Flow (prot)	0	1724	0	0	1794	0	0	1721	0	0	1780	0
Flt Permitted		0.994			0.999			0.925			0.932	
Satd. Flow (perm)	0	1715	0	0	1792	0	0	1608	0	0	1674	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			35	
Link Distance (ft)		962			490			657			938	
Travel Time (s)		18.7			9.5			17.9			18.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	8	390	208	1	444	27	48	16	176	7	30	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	606	0	0	472	0	0	240	0	0	39	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	0.93	0.93	0.93	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	17.0	17.0		17.0	17.0		14.0	14.0		14.0	14.0	
Total Split (s)	39.0	39.0		39.0	39.0		21.0	21.0		21.0	21.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%		35.0%	35.0%		35.0%	35.0%	
Maximum Green (s)	32.0	32.0		32.0	32.0		14.0	14.0		14.0	14.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0			-2.0			-2.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)		35.6			35.6			14.4			14.4	
Actuated g/C Ratio		0.59			0.59			0.24			0.24	
v/c Ratio		0.60			0.44			0.62			0.10	
Control Delay		11.3			8.9			27.7			17.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.3			8.9			27.7			17.5	
LOS		B			A			C			B	
Approach Delay		11.3			8.9			27.7			17.5	
Approach LOS		B			A			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 50			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 13.5		Intersection LOS: B	
Intersection Capacity Utilization 61.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 41: Petty Rd./Western Bypass & Pickett Rd.



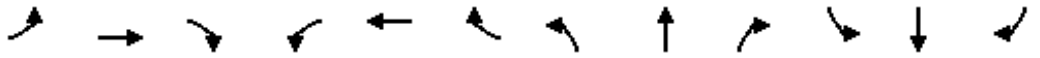
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	237	278	137	283	142	103
Sign Control	Free			Free	Stop	
Grade	2%			2%	2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	263	309	152	314	158	114
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	490					
pX, platoon unblocked			0.92		0.92	0.92
vC, conflicting volume			572		1037	418
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			494		997	326
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			84		24	83
cM capacity (veh/h)			977		208	655

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	572	152	314	272
Volume Left	0	152	0	158
Volume Right	309	0	0	114
cSH	1700	977	1700	292
Volume to Capacity	0.34	0.16	0.18	0.93
Queue Length 95th (ft)	0	14	0	223
Control Delay (s)	0.0	9.4	0.0	75.4
Lane LOS		A		F
Approach Delay (s)	0.0	3.1		75.4
Approach LOS				F

Intersection Summary			
Average Delay	16.7		
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

2040 Build AM – NHC 1

1. University Drive at Ivy Creek Blvd.
2. University Drive at Larchmont Rd.
3. University Drive at Martin Luther King Parkway
4. University Drive at Lyckan Parkway
5. University Drive at Westgate Dr.
6. University Drive at Westgate Shopping Center
7. University Drive at Shannon Road
8. Pickett Road at Petty Road
9. Pickett Road at Tower Blvd.

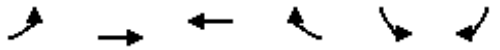


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	1091	168	190	775	12	44	0	50	60	1	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	12	12	11	11	11	13	13	13
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	150		65	130		200	0		85	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.998				0.850		0.963	
Flt Protected	0.950			0.950				0.950			0.966	
Satd. Flow (prot)	1718	3322	1537	1718	3430	0	0	1661	1486	0	1739	0
Flt Permitted	0.325			0.165				0.703			0.757	
Satd. Flow (perm)	588	3322	1537	298	3430	0	0	1229	1486	0	1362	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			123		2				51		11	
Link Speed (mph)		35			35			25			15	
Link Distance (ft)		916			714			479			373	
Travel Time (s)		17.8			13.9			13.1			17.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	8	1212	187	211	861	13	49	0	56	67	1	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	1212	187	211	874	0	0	49	56	0	94	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.06	1.01	1.01	1.01	1.01	1.06	1.06	1.06	0.97	0.97	0.97
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	1	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	50	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	50	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6			8		8	4		
Detector Phase	5	2	2	1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	5.0	10.0		7.0	7.0	5.0	7.0	7.0	
Minimum Split (s)	16.0	39.0	39.0	16.0	31.0		42.0	42.0	16.0	42.0	42.0	
Total Split (s)	16.0	90.0	90.0	27.0	101.0		43.0	43.0	27.0	43.0	43.0	
Total Split (%)	10.0%	56.3%	56.3%	16.9%	63.1%		26.9%	26.9%	16.9%	26.9%	26.9%	
Maximum Green (s)	9.0	83.0	83.0	20.0	94.0		36.0	36.0	20.0	36.0	36.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0			-2.0	-2.0		-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag				Lead			
Lead-Lag Optimize?	Yes											
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Flash Dont Walk (s)		26.0	26.0		18.0		29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)		15	15		15		15	15		15	15	
Act Effct Green (s)	112.2	103.2	103.2	122.9	120.1			27.1	46.8		27.1	
Actuated g/C Ratio	0.70	0.64	0.64	0.77	0.75			0.17	0.29		0.17	
v/c Ratio	0.02	0.57	0.18	0.59	0.34			0.24	0.12		0.39	
Control Delay	7.7	20.0	6.2	12.1	7.9			55.8	9.3		53.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Delay	7.7	20.0	6.2	12.1	7.9			55.8	9.3		53.7	
LOS	A	C	A	B	A			E	A		D	
Approach Delay		18.1			8.7			31.0			53.7	
Approach LOS		B			A			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 42 (26%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 16.1		Intersection LOS: B	
Intersection Capacity Utilization 64.6%		ICU Level of Service C	
Analysis Period (min) 15			

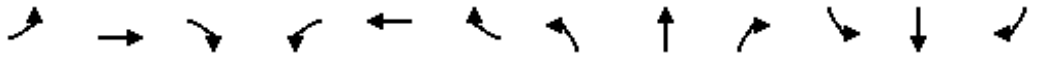
Splits and Phases: 27: Ivy Creek Blvd./Snowcrest Tr. & University Dr.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	1	1200	920	3	187	57
Sign Control		Free	Free		Stop	
Grade		2%	2%		2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1	1333	1022	3	208	63
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		714	441			
pX, platoon unblocked	0.88				0.88	0.88
vC, conflicting volume	1026				1359	513
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	766				1144	186
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				0	91
cM capacity (veh/h)	734				168	723

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	SB 1
Volume Total	192	381	381	381	681	344	271
Volume Left	1	0	0	0	0	0	208
Volume Right	0	0	0	0	0	3	63
cSH	734	1700	1700	1700	1700	1700	207
Volume to Capacity	0.00	0.22	0.22	0.22	0.40	0.20	1.31
Queue Length 95th (ft)	0	0	0	0	0	0	372
Control Delay (s)	0.1	0.0	0.0	0.0	0.0	0.0	216.0
Lane LOS	A						F
Approach Delay (s)	0.0				0.0		216.0
Approach LOS							F

Intersection Summary			
Average Delay	22.3		
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

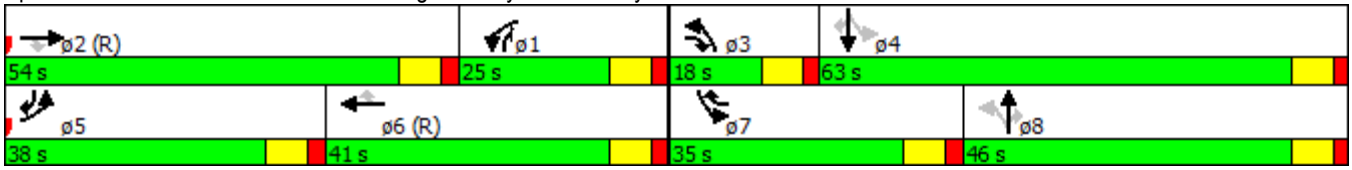


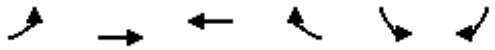
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	582	703	102	284	424	107	65	554	177	350	647	434
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	12	11	12	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	325		120	300		115	165		220	180		0
Storage Lanes	0		1	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3333	3436	1537	3333	3436	1537	1661	3436	1486	1718	3436	1537
Flt Permitted	0.950			0.950			0.334			0.144		
Satd. Flow (perm)	3333	3436	1537	3333	3436	1537	584	3436	1486	260	3436	1537
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			55	
Link Distance (ft)		441			485			1060			1216	
Travel Time (s)		8.6			9.4			20.6			15.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	647	781	113	316	471	119	72	616	197	389	719	482
Shared Lane Traffic (%)												
Lane Group Flow (vph)	647	781	113	316	471	119	72	616	197	389	719	482
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.06	1.01	1.06	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	3	1	6	7	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0	7.0	7.0	10.0	7.0	7.0	7.0	7.0	7.0	14.0	7.0
Minimum Split (s)	18.0	40.0	18.0	18.0	40.0	18.0	18.0	46.0	18.0	18.0	44.0	18.0
Total Split (s)	38.0	54.0	18.0	25.0	41.0	35.0	18.0	46.0	25.0	35.0	63.0	38.0
Total Split (%)	23.8%	33.8%	11.3%	15.6%	25.6%	21.9%	11.3%	28.8%	15.6%	21.9%	39.4%	23.8%
Maximum Green (s)	31.0	47.0	11.0	18.0	34.0	28.0	11.0	39.0	18.0	28.0	56.0	31.0
Yellow 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
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
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
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None	None	None	None
Walk Time (s)		6.0			6.0			6.0			6.0	
Flash Dont Walk (s)		27.0			27.0			33.0			31.0	
Pedestrian Calls (#/hr)		15			15			15			15	
Act Effct Green (s)	35.0	53.7	64.9	20.0	38.7	73.7	47.6	36.3	56.3	71.3	55.1	95.1
Actuated g/C Ratio	0.22	0.34	0.41	0.12	0.24	0.46	0.30	0.23	0.35	0.45	0.34	0.59
v/c Ratio	0.89	0.68	0.18	0.76	0.57	0.17	0.29	0.79	0.38	1.00	0.61	0.53
Control Delay	62.3	41.1	20.1	93.1	69.4	29.3	29.6	65.9	22.1	88.2	45.8	21.6
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	62.3	41.1	20.1	93.1	69.4	29.3	29.6	65.9	22.1	88.2	45.8	21.6
LOS	E	D	C	F	E	C	C	E	C	F	D	C
Approach Delay		48.4			72.4			53.2			48.8	
Approach LOS		D			E			D			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 116 (73%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green			
Natural Cycle: 145			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 53.8		Intersection LOS: D	
Intersection Capacity Utilization 79.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 29: Martin Luther King Jr. Pkwy. & University Dr.





Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	177	1072	559	22	14	105
Sign Control		Free	Free		Stop	
Grade		2%	2%		2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	197	1191	621	24	16	117
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		485	476			
pX, platoon unblocked					0.85	
vC, conflicting volume	646				1424	219
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	646				868	219
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	79				92	85
cM capacity (veh/h)	922				192	779

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1
Volume Total	435	476	476	248	248	149	132
Volume Left	197	0	0	0	0	0	16
Volume Right	0	0	0	0	0	24	117
cSH	922	1700	1700	1700	1700	1700	572
Volume to Capacity	0.21	0.28	0.28	0.15	0.15	0.09	0.23
Queue Length 95th (ft)	20	0	0	0	0	0	22
Control Delay (s)	5.9	0.0	0.0	0.0	0.0	0.0	13.2
Lane LOS	A						B
Approach Delay (s)	1.8			0.0			13.2
Approach LOS							B

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

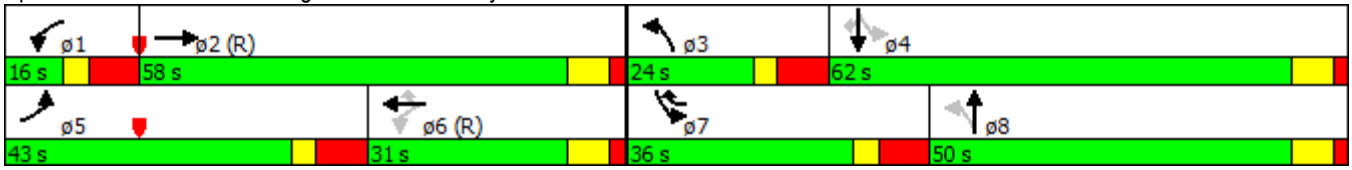
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	396	597	0	41	288	324	72	32	33	264	17	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	200		0	125		0	0		50	425		0
Storage Lanes	1		0	1		1	0		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850		0.924				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3333	3436	0	1718	3436	1537	1718	1671	0	1661	1809	1537
Flt Permitted	0.950			0.400			0.745			0.588		
Satd. Flow (perm)	3333	3436	0	723	3436	1537	1347	1671	0	1028	1809	1537
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		476			335			440			975	
Travel Time (s)		9.3			6.5			8.6			19.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	440	663	0	46	320	360	80	36	37	293	19	332
Shared Lane Traffic (%)												
Lane Group Flow (vph)	440	663	0	46	320	360	80	73	0	293	19	332
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.06	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6	7	3	8		7	4	

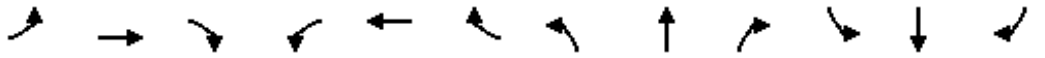
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				6		6	8			4		4
Detector Phase	5	2		1	6	7	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	16.0	31.0		16.0	31.0	16.0	16.0	50.0		16.0	45.0	45.0
Total Split (s)	43.0	58.0		16.0	31.0	36.0	24.0	50.0		36.0	62.0	62.0
Total Split (%)	26.9%	36.3%		10.0%	19.4%	22.5%	15.0%	31.3%		22.5%	38.8%	38.8%
Maximum Green (s)	34.0	51.0		7.0	24.0	27.0	15.0	43.0		27.0	55.0	55.0
Yellow Time (s)	3.0	5.0		3.0	5.0	3.0	3.0	5.0		3.0	5.0	5.0
All-Red Time (s)	6.0	2.0		6.0	2.0	6.0	6.0	2.0		6.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	7.0	5.0		7.0	5.0	7.0	7.0	5.0		7.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?		Yes		Yes			Yes				Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	None	None	None		None	None	None
Walk Time (s)		4.0			4.0			4.0			4.0	4.0
Flash Dont Walk (s)		20.0			20.0			39.0			34.0	34.0
Pedestrian Calls (#/hr)		15			15			15			15	15
Act Effct Green (s)	28.3	67.9		52.5	45.4	77.5	45.2	35.2		67.2	50.2	50.2
Actuated g/C Ratio	0.18	0.42		0.33	0.28	0.48	0.28	0.22		0.42	0.31	0.31
v/c Ratio	0.75	0.45		0.16	0.33	0.48	0.20	0.20		0.54	0.03	0.69
Control Delay	61.6	32.8		23.7	40.5	30.6	28.0	48.7		32.0	29.2	52.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	61.6	32.8		23.7	40.5	30.6	28.0	48.7		32.0	29.2	52.8
LOS	E	C		C	D	C	C	D		C	C	D
Approach Delay		44.3			34.6			37.9			42.7	
Approach LOS		D			C			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 152 (95%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 40.8 Intersection LOS: D
Intersection Capacity Utilization 57.8% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 31: Westgate Dr. & University Dr.

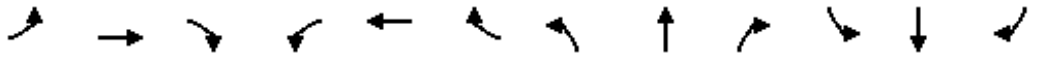




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	835	59	0	546	6	0	0	2	0	0	107
Sign Control		Free			Free			Stop			Stop	
Grade		2%			2%			2%			2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	928	66	0	607	7	0	0	2	0	0	119
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		335			1231							
pX, platoon unblocked	0.98			0.86			0.87	0.87	0.86	0.87	0.87	0.98
vC, conflicting volume	613			993			1383	1574	497	1076	1603	307
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	564			672			1041	1260	96	690	1294	251
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	84
cM capacity (veh/h)	970			777			132	145	806	285	138	728

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	619	375	404	209	2	119
Volume Left	0	0	0	0	0	0
Volume Right	0	66	0	7	2	119
cSH	1700	1700	1700	1700	806	728
Volume to Capacity	0.36	0.22	0.24	0.12	0.00	0.16
Queue Length 95th (ft)	0	0	0	0	0	15
Control Delay (s)	0.0	0.0	0.0	0.0	9.5	10.9
Lane LOS					A	B
Approach Delay (s)	0.0		0.0		9.5	10.9
Approach LOS					A	B

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	35.0%	ICU Level of Service		A
Analysis Period (min)	15			



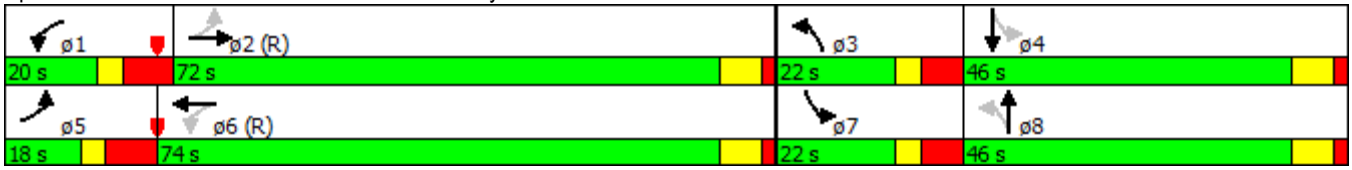
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	679	1	63	372	51	125	23	117	117	7	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	12	12	11	10	10	11	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	200		0	600		200	130		120	350		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt					0.982			0.875			0.867	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1718	3436	0	1661	3375	0	1661	2806	0	1661	2979	0
Flt Permitted	0.469			0.278			0.707			0.624		
Satd. Flow (perm)	848	3436	0	486	3375	0	1236	2806	0	1091	2979	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1231			1020			255			809	
Travel Time (s)		24.0			19.9			5.0			15.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	27	754	1	70	413	57	139	26	130	130	8	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	755	0	70	470	0	139	156	0	130	69	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane								Yes				
Headway Factor	1.01	1.01	1.01	1.06	1.01	1.01	1.06	1.11	1.11	1.06	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	16.0	17.0		16.0	17.0		15.0	42.0		16.0	43.0	
Total Split (s)	18.0	72.0		20.0	74.0		22.0	46.0		22.0	46.0	
Total Split (%)	11.3%	45.0%		12.5%	46.3%		13.8%	28.8%		13.8%	28.8%	
Maximum Green (s)	9.0	65.0		11.0	67.0		14.0	39.0		14.0	39.0	
Yellow Time (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
All-Red Time (s)	6.0	2.0		6.0	2.0		5.0	2.0		5.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	7.0	5.0		7.0	5.0		6.0	5.0		6.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes				Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)								6.0			6.0	
Flash Dont Walk (s)								29.0			29.0	
Pedestrian Calls (#/hr)								15			15	
Act Effct Green (s)	90.8	83.6		96.4	91.4		41.9	27.5		41.7	27.4	
Actuated g/C Ratio	0.57	0.52		0.60	0.57		0.26	0.17		0.26	0.17	
v/c Ratio	0.05	0.42		0.19	0.24		0.38	0.32		0.38	0.14	
Control Delay	12.1	18.2		16.0	20.9		43.8	57.6		45.9	52.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	12.1	18.2		16.0	20.9		43.8	57.6		45.9	52.5	
LOS	B	B		B	C		D	E		D	D	
Approach Delay		18.0			20.3			51.1			48.2	
Approach LOS		B			C			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green, Master Intersection
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.42
Intersection Signal Delay: 27.3 Intersection LOS: C
Intersection Capacity Utilization 56.4% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 33: Shannon Rd. & University Dr.

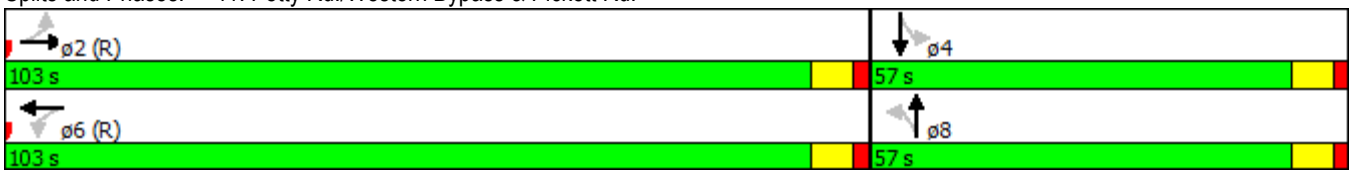


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	623	21	1	453	36	13	43	14	103	88	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	14	14	14	12	12	12
Grade (%)		2%			2%			2%			2%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.990			0.972			0.936	
Flt Protected		0.991						0.991			0.986	
Satd. Flow (prot)	0	1785	0	0	1791	0	0	1858	0	0	1669	0
Flt Permitted		0.770			0.999			0.894			0.873	
Satd. Flow (perm)	0	1387	0	0	1789	0	0	1676	0	0	1478	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			5			9			30	
Link Speed (mph)		35			35			25			35	
Link Distance (ft)		962			490			657			938	
Travel Time (s)		18.7			9.5			17.9			18.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	151	692	23	1	503	40	14	48	16	114	98	193
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	866	0	0	544	0	0	78	0	0	405	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	0.93	0.93	0.93	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	17.0	17.0		17.0	17.0		14.0	14.0		14.0	14.0	
Total Split (s)	103.0	103.0		103.0	103.0		57.0	57.0		57.0	57.0	
Total Split (%)	64.4%	64.4%		64.4%	64.4%		35.6%	35.6%		35.6%	35.6%	
Maximum Green (s)	96.0	96.0		96.0	96.0		50.0	50.0		50.0	50.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0			-2.0			-2.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)		103.3			103.3			46.7			46.7	
Actuated g/C Ratio		0.65			0.65			0.29			0.29	
v/c Ratio		0.97			0.47			0.16			0.90	
Control Delay		50.8			24.2			36.2			72.8	
Queue Delay		2.1			0.8			0.0			0.0	
Total Delay		52.9			25.0			36.2			72.8	
LOS		D			C			D			E	
Approach Delay		52.9			25.0			36.2			72.8	
Approach LOS		D			C			D			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 39 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 48.4		Intersection LOS: D	
Intersection Capacity Utilization 107.8%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 41: Petty Rd./Western Bypass & Pickett Rd.



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	459	281	99	370	120	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	11	11
Grade (%)	2%			2%	2%	
Storage Length (ft)		0	175		0	200
Storage Lanes		0	1		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.949					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1659	0	1718	1809	1661	1486
Flt Permitted			0.226		0.950	
Satd. Flow (perm)	1659	0	409	1809	1661	1486
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	30					121
Link Speed (mph)	35			35	35	
Link Distance (ft)	490			958	1039	
Travel Time (s)	9.5			18.7	20.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	510	312	110	411	133	121
Shared Lane Traffic (%)						
Lane Group Flow (vph)	822	0	110	411	133	121
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	11	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	10			10	10	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.01	1.01	1.06	1.06
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		pm+pt	NA	NA	pm+ov
Protected Phases	2		1	6	8	1

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases			6			8
Detector Phase	2		1	6	8	1
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	7.0	7.0
Minimum Split (s)	27.0		17.0	18.0	14.0	17.0
Total Split (s)	92.0		17.0	109.0	51.0	17.0
Total Split (%)	57.5%		10.6%	68.1%	31.9%	10.6%
Maximum Green (s)	85.0		7.0	101.0	44.0	7.0
Yellow Time (s)	5.0		5.0	5.0	5.0	5.0
All-Red Time (s)	2.0		5.0	3.0	2.0	5.0
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0		8.0	6.0	5.0	8.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	C-Max		None	C-Max	None	None
Walk Time (s)	6.0					
Flash Dont Walk (s)	14.0					
Pedestrian Calls (#/hr)	15					
Act Effct Green (s)	111.7		126.8	128.8	20.2	35.3
Actuated g/C Ratio	0.70		0.79	0.80	0.13	0.22
v/c Ratio	0.70		0.27	0.28	0.64	0.29
Control Delay	9.1		5.9	4.9	80.4	25.8
Queue Delay	3.6		0.0	0.0	0.0	0.0
Total Delay	12.7		5.9	4.9	80.4	25.8
LOS	B		A	A	F	C
Approach Delay	12.7			5.1	54.4	
Approach LOS	B			A	D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 31 (19%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 16.9		Intersection LOS: B	
Intersection Capacity Utilization 68.8%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 40: Tower Blvd. & Pickett Rd.

2040 Build PM – NHC 1

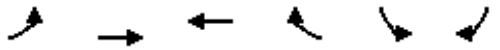
1. University Drive at Ivy Creek Blvd.
2. University Drive at Larchmont Rd.
3. University Drive at Martin Luther King Parkway
4. University Drive at Lyckan Parkway
5. University Drive at Westgate Dr.
6. University Drive at Westgate Shopping Center
7. University Drive at Shannon Road
8. Pickett Road at Petty Road
9. Pickett Road at Tower Blvd.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	53	916	15	13	1062	49	133	2	415	45	0	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	12	12	11	11	11	13	13	13
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	150		65	130		200	0		85	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.993				0.850		0.977	
Flt Protected	0.950			0.950				0.953			0.960	
Satd. Flow (prot)	1718	3322	1537	1718	3412	0	0	1666	1486	0	1753	0
Flt Permitted	0.217			0.191				0.708			0.545	
Satd. Flow (perm)	392	3322	1537	345	3412	0	0	1238	1486	0	995	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			123		5				46		123	
Link Speed (mph)		35			35			25			15	
Link Distance (ft)		916			714			479			373	
Travel Time (s)		17.8			13.9			13.1			17.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	59	1018	17	14	1180	54	148	2	461	50	0	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	59	1018	17	14	1234	0	0	150	461	0	60	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.06	1.01	1.01	1.01	1.01	1.06	1.06	1.06	0.97	0.97	0.97
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2		1	2	1	1	1	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100		20	100	20	20	50	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6		20	6	20	20	50	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6			8		8	4		
Detector Phase	5	2	2	1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	18.0	39.0	39.0	16.0	31.0		42.0	42.0	16.0	42.0	42.0	
Total Split (s)	18.0	74.0	74.0	42.0	98.0		44.0	44.0	42.0	44.0	44.0	
Total Split (%)	11.3%	46.3%	46.3%	26.3%	61.3%		27.5%	27.5%	26.3%	27.5%	27.5%	
Maximum Green (s)	11.0	67.0	67.0	35.0	91.0		37.0	37.0	35.0	37.0	37.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0			-2.0	-2.0		-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0			5.0	5.0		5.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag				Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	
Walk Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Flash Dont Walk (s)		26.0	26.0		18.0		29.0	29.0		29.0	29.0	
Pedestrian Calls (#/hr)		15	15		15		15	15		15	15	
Act Effct Green (s)	98.1	88.7	88.7	121.8	110.1			28.2	61.3		28.2	
Actuated g/C Ratio	0.61	0.55	0.55	0.76	0.69			0.18	0.38		0.18	
v/c Ratio	0.19	0.55	0.02	0.03	0.53			0.69	0.77		0.22	
Control Delay	9.8	26.2	0.1	2.2	13.8			76.7	46.8		1.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Delay	9.8	26.2	0.1	2.2	13.8			76.7	46.8		1.8	
LOS	A	C	A	A	B			E	D		A	
Approach Delay		24.9			13.7			54.1			1.8	
Approach LOS		C			B			D			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 25.7		Intersection LOS: C	
Intersection Capacity Utilization 69.4%		ICU Level of Service C	
Analysis Period (min) 15			

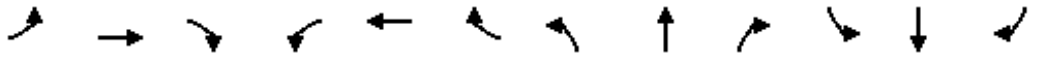
Splits and Phases: 27: Ivy Creek Blvd./Snowcrest Tr. & University Dr.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	6	1370	1105	108	116	19
Sign Control		Free	Free		Stop	
Grade		2%	2%		2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	1522	1228	120	129	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		714	441			
pX, platoon unblocked	0.77				0.77	0.77
vC, conflicting volume	1348				1682	674
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	848				1283	0
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				0	97
cM capacity (veh/h)	593				117	828

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	SB 1
Volume Total	224	435	435	435	819	529	150
Volume Left	7	0	0	0	0	0	129
Volume Right	0	0	0	0	0	120	21
cSH	593	1700	1700	1700	1700	1700	134
Volume to Capacity	0.01	0.26	0.26	0.26	0.48	0.31	1.12
Queue Length 95th (ft)	1	0	0	0	0	0	215
Control Delay (s)	0.5	0.0	0.0	0.0	0.0	0.0	179.2
Lane LOS	A						F
Approach Delay (s)	0.1				0.0		179.2
Approach LOS							F

Intersection Summary			
Average Delay	8.9		
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		



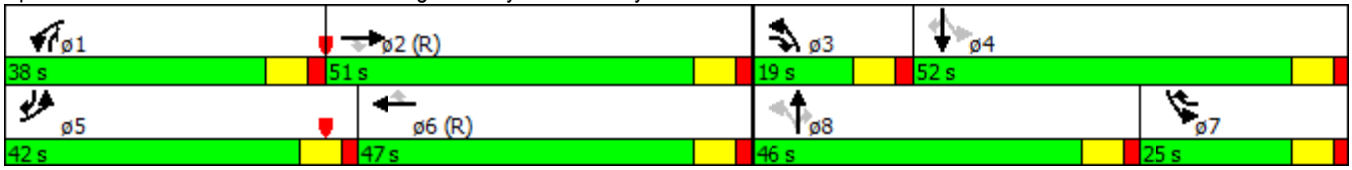
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	618	695	173	507	750	275	126	385	260	299	839	337
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	12	11	12	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	325		120	300		115	165		220	180		0
Storage Lanes	0		1	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3333	3436	1537	3333	3436	1537	1661	3436	1486	1718	3436	1537
Flt Permitted	0.950			0.950			0.234			0.503		
Satd. Flow (perm)	3333	3436	1537	3333	3436	1537	409	3436	1486	910	3436	1537
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			123			123			75			75
Link Speed (mph)		35			35			35			55	
Link Distance (ft)		441			485			1060			1216	
Travel Time (s)		8.6			9.4			20.6			15.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	687	772	192	563	833	306	140	428	289	332	932	374
Shared Lane Traffic (%)												
Lane Group Flow (vph)	687	772	192	563	833	306	140	428	289	332	932	374
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.06	1.01	1.06	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5

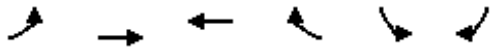
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	3	1	6	7	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0	7.0	7.0	10.0	7.0	7.0	7.0	7.0	7.0	14.0	7.0
Minimum Split (s)	16.0	40.0	16.0	18.0	40.0	16.0	16.0	46.0	18.0	16.0	44.0	16.0
Total Split (s)	42.0	51.0	19.0	38.0	47.0	25.0	19.0	46.0	38.0	25.0	52.0	42.0
Total Split (%)	26.3%	31.9%	11.9%	23.8%	29.4%	15.6%	11.9%	28.8%	23.8%	15.6%	32.5%	26.3%
Maximum Green (s)	35.0	44.0	12.0	31.0	40.0	18.0	12.0	39.0	31.0	18.0	45.0	35.0
Yellow 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
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
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
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	None	None	C-Max	None	None	None	None	None	None	None
Walk Time (s)		6.0			6.0			6.0			6.0	
Flash Dont Walk (s)		27.0			27.0			33.0			31.0	
Pedestrian Calls (#/hr)		15			15			15			15	
Act Effct Green (s)	36.4	47.8	66.8	31.8	43.1	72.4	31.1	31.1	62.9	46.4	46.4	87.9
Actuated g/C Ratio	0.23	0.30	0.42	0.20	0.27	0.45	0.19	0.19	0.39	0.29	0.29	0.55
v/c Ratio	0.91	0.75	0.27	0.85	0.90	0.40	0.74	0.64	0.46	0.81	0.93	0.43
Control Delay	69.0	57.7	19.5	63.7	76.2	10.6	78.4	63.0	15.4	71.7	71.7	18.0
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	69.0	57.7	19.5	63.7	76.2	10.6	78.4	63.0	15.4	71.7	71.7	18.0
LOS	E	E	B	E	E	B	E	E	B	E	E	B
Approach Delay		58.0			60.2			49.4			59.4	
Approach LOS		E			E			D			E	

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 106 (66%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 57.8 Intersection LOS: E
Intersection Capacity Utilization 85.2% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 29: Martin Luther King Jr. Pkwy. & University Dr.

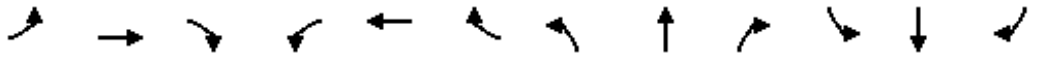




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	176	1034	1256	38	21	222
Sign Control		Free	Free		Stop	
Grade		2%	2%		2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	196	1149	1396	42	23	247
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		485	476			
pX, platoon unblocked	0.87				0.91	0.87
vC, conflicting volume	1438				2191	486
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	962				980	0
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	68				84	74
cM capacity (veh/h)	605				150	933

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1
Volume Total	425	460	460	558	558	321	270
Volume Left	196	0	0	0	0	0	23
Volume Right	0	0	0	0	0	42	247
cSH	605	1700	1700	1700	1700	1700	644
Volume to Capacity	0.32	0.27	0.27	0.33	0.33	0.19	0.42
Queue Length 95th (ft)	35	0	0	0	0	0	52
Control Delay (s)	9.1	0.0	0.0	0.0	0.0	0.0	14.6
Lane LOS	A						B
Approach Delay (s)	2.9			0.0			14.6
Approach LOS							B

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		



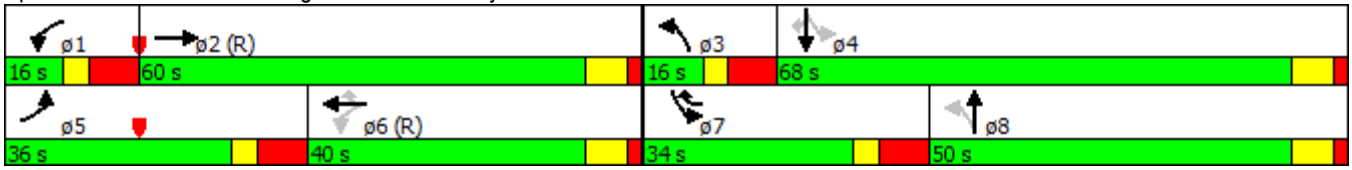
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	450	482	19	76	624	498	43	46	19	529	93	492
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	200		0	125		190	0		50	425		0
Storage Lanes	1		0	1		1	0		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994				0.850		0.956				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3333	3416	0	1718	3436	1537	1718	1729	0	1661	1809	1537
Flt Permitted	0.950			0.443			0.690			0.580		
Satd. Flow (perm)	3333	3416	0	801	3436	1537	1248	1729	0	1014	1809	1537
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				504		13				450
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		476			335			440			975	
Travel Time (s)		9.3			6.5			8.6			19.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	500	536	21	84	693	553	48	51	21	588	103	547
Shared Lane Traffic (%)												
Lane Group Flow (vph)	500	557	0	84	693	553	48	72	0	588	103	547
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.06	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6	7	3	8		7	4	

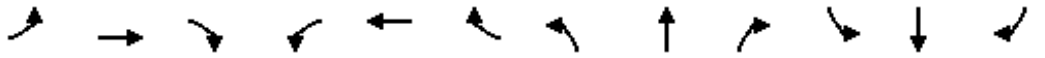
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				6		6	8			4		4
Detector Phase	5	2		1	6	7	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	19.0	39.0		16.0	37.0	17.0	16.0	50.0		17.0	47.0	47.0
Total Split (s)	36.0	60.0		16.0	40.0	34.0	16.0	50.0		34.0	68.0	68.0
Total Split (%)	22.5%	37.5%		10.0%	25.0%	21.3%	10.0%	31.3%		21.3%	42.5%	42.5%
Maximum Green (s)	27.0	53.0		7.0	33.0	25.0	7.0	43.0		25.0	61.0	61.0
Yellow Time (s)	3.0	5.0		3.0	5.0	3.0	3.0	5.0		3.0	5.0	5.0
All-Red Time (s)	6.0	2.0		6.0	2.0	6.0	6.0	2.0		6.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	7.0	5.0		7.0	5.0	7.0	7.0	5.0		7.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?		Yes		Yes			Yes				Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	None	None	None		None	None	None
Walk Time (s)		4.0			4.0			4.0			4.0	4.0
Flash Dont Walk (s)		20.0			20.0			39.0			34.0	34.0
Pedestrian Calls (#/hr)		15			15			15			15	15
Act Effct Green (s)	28.2	68.9		57.0	49.9	81.9	38.0	31.0		63.0	52.2	52.2
Actuated g/C Ratio	0.18	0.43		0.36	0.31	0.51	0.24	0.19		0.39	0.33	0.33
v/c Ratio	0.85	0.38		0.25	0.65	0.54	0.15	0.21		1.16	0.17	0.68
Control Delay	65.0	29.4		37.2	60.6	3.2	28.8	40.5		129.9	37.1	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	65.0	29.4		37.2	60.6	3.2	28.8	40.5		129.9	37.1	11.8
LOS	E	C		D	E	A	C	D		F	D	B
Approach Delay		46.2			35.3			35.8			70.0	
Approach LOS		D			D			D			E	

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
Natural Cycle: 135
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.16
Intersection Signal Delay: 49.9 Intersection LOS: D
Intersection Capacity Utilization 79.7% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 31: Westgate Dr. & University Dr.

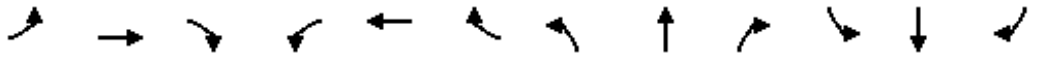




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	825	205	0	1099	76	0	0	55	0	0	99
Sign Control		Free			Free			Stop			Stop	
Grade		2%			2%			2%			2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	917	228	0	1221	84	0	0	61	0	0	110
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		335			1231							
pX, platoon unblocked	0.72			0.89			0.77	0.77	0.89	0.77	0.77	0.72
vC, conflicting volume	1306			1144			1751	2336	572	1783	2408	653
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	640			920			753	1510	278	794	1603	0
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	90	100	100	86
cM capacity (veh/h)	665			647			195	90	636	192	79	774

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	611	533	814	491	61	110
Volume Left	0	0	0	0	0	0
Volume Right	0	228	0	84	61	110
cSH	1700	1700	1700	1700	636	774
Volume to Capacity	0.36	0.31	0.48	0.29	0.10	0.14
Queue Length 95th (ft)	0	0	0	0	8	12
Control Delay (s)	0.0	0.0	0.0	0.0	11.3	10.4
Lane LOS					B	B
Approach Delay (s)	0.0		0.0		11.3	10.4
Approach LOS					B	B

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	45.6%	ICU Level of Service		A
Analysis Period (min)	15			



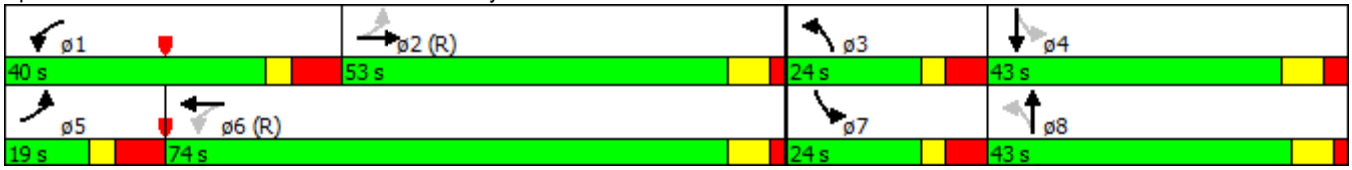
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	187	685	55	265	887	222	248	202	266	176	133	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	12	12	11	10	10	11	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	600		0	600		200	130		120	350		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.989			0.970			0.915			0.966	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1718	3399	0	1661	3333	0	1661	2935	0	1661	3320	0
Flt Permitted	0.089			0.184			0.583			0.155		
Satd. Flow (perm)	161	3399	0	322	3333	0	1019	2935	0	271	3320	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			24			199			23	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1231			1020			255			809	
Travel Time (s)		24.0			19.9			5.0			15.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	208	761	61	294	986	247	276	224	296	196	148	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	208	822	0	294	1233	0	276	520	0	196	192	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane								Yes				
Headway Factor	1.01	1.01	1.01	1.06	1.01	1.01	1.06	1.11	1.11	1.06	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	16.0	14.0		16.0	14.0		15.0	42.0		16.0	43.0	
Total Split (s)	19.0	53.0		40.0	74.0		24.0	43.0		24.0	43.0	
Total Split (%)	11.9%	33.1%		25.0%	46.3%		15.0%	26.9%		15.0%	26.9%	
Maximum Green (s)	10.0	46.0		31.0	67.0		16.0	36.0		16.0	35.0	
Yellow Time (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
All-Red Time (s)	6.0	2.0		6.0	2.0		5.0	2.0		5.0	3.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	7.0	5.0		7.0	5.0		6.0	5.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes				Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)								6.0			6.0	
Flash Dont Walk (s)								29.0			29.0	
Pedestrian Calls (#/hr)								15			15	
Act Effct Green (s)	80.7	63.5		89.9	70.4		45.8	28.8		45.1	27.4	
Actuated g/C Ratio	0.50	0.40		0.56	0.44		0.29	0.18		0.28	0.17	
v/c Ratio	0.75	0.61		0.72	0.83		0.76	0.75		0.86	0.33	
Control Delay	50.6	41.3		31.1	45.2		58.8	44.3		73.3	50.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	50.6	41.3		31.1	45.2		58.8	44.3		73.3	50.7	
LOS	D	D		C	D		E	D		E	D	
Approach Delay		43.2			42.5			49.3			62.1	
Approach LOS		D			D			D			E	

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green, Master Intersection
Natural Cycle: 120
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 46.2 Intersection LOS: D
Intersection Capacity Utilization 85.0% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 33: Shannon Rd. & University Dr.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	401	8	0	347	76	17	22	15	98	16	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	14	14	14	12	12	12
Grade (%)		2%			2%			2%			2%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.976			0.962			0.944	
Flt Protected		0.988						0.984			0.975	
Satd. Flow (prot)	0	1783	0	0	1765	0	0	1826	0	0	1665	0
Flt Permitted		0.723						0.869			0.824	
Satd. Flow (perm)	0	1305	0	0	1765	0	0	1613	0	0	1407	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			35	
Link Distance (ft)		962			490			657			938	
Travel Time (s)		18.7			9.5			17.9			18.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	151	446	9	0	386	84	19	24	17	109	18	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	606	0	0	470	0	0	60	0	0	216	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	0.93	0.93	0.93	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	17.0	17.0		17.0	17.0		14.0	14.0		14.0	14.0	
Total Split (s)	82.0	82.0		82.0	82.0		48.0	48.0		48.0	48.0	
Total Split (%)	63.1%	63.1%		63.1%	63.1%		36.9%	36.9%		36.9%	36.9%	
Maximum Green (s)	75.0	75.0		75.0	75.0		41.0	41.0		41.0	41.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0			-2.0			-2.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)		92.4			92.4			27.6			27.6	
Actuated g/C Ratio		0.71			0.71			0.21			0.21	
v/c Ratio		0.65			0.37			0.18			0.72	
Control Delay		15.9			9.9			40.6			61.0	
Queue Delay		0.4			0.5			0.0			0.0	
Total Delay		16.2			10.5			40.6			61.0	
LOS		B			B			D			E	
Approach Delay		16.2			10.5			40.6			61.0	
Approach LOS		B			B			D			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 22.5		Intersection LOS: C	
Intersection Capacity Utilization 82.3%		ICU Level of Service E	
Analysis Period (min) 15			

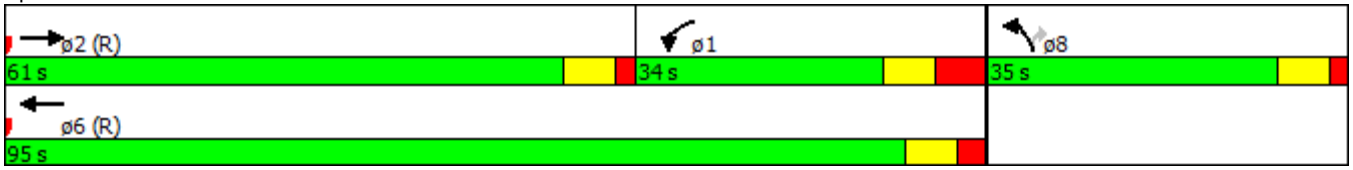
Splits and Phases: 41: Petty Rd./Western Bypass & Pickett Rd.

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	236	278	136	281	142	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	11	11
Grade (%)	2%			2%	2%	
Storage Length (ft)		0	175		0	200
Storage Lanes		0	1		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.927					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1621	0	1718	1809	1661	1486
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1621	0	1718	1809	1661	1486
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	35			35	35	
Link Distance (ft)	490			958	1039	
Travel Time (s)	9.5			18.7	20.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	262	309	151	312	158	113
Shared Lane Traffic (%)						
Lane Group Flow (vph)	571	0	151	312	158	113
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	11	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	10			10	10	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.01	1.01	1.06	1.06
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	NA	Perm
Protected Phases	2		1	6	8	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	7.0	7.0
Minimum Split (s)	27.0		17.0	18.0	14.0	14.0
Total Split (s)	61.0		34.0	95.0	35.0	35.0
Total Split (%)	46.9%		26.2%	73.1%	26.9%	26.9%
Maximum Green (s)	54.0		24.0	87.0	28.0	28.0
Yellow Time (s)	5.0		5.0	5.0	5.0	5.0
All-Red Time (s)	2.0		5.0	3.0	2.0	2.0
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0		8.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	C-Max		None	C-Max	None	None
Walk Time (s)	6.0					
Flash Dont Walk (s)	14.0					
Pedestrian Calls (#/hr)	15					
Act Effct Green (s)	66.4		26.0	99.4	19.6	19.6
Actuated g/C Ratio	0.51		0.20	0.76	0.15	0.15
v/c Ratio	0.69		0.44	0.23	0.63	0.50
Control Delay	25.8		50.3	5.3	62.5	57.6
Queue Delay	2.4		0.0	0.0	0.0	0.0
Total Delay	28.2		50.3	5.3	62.5	57.6
LOS	C		D	A	E	E
Approach Delay	28.2			20.0	60.5	
Approach LOS	C			B	E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 32.0		Intersection LOS: C	
Intersection Capacity Utilization 59.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 40: Tower Blvd. & Pickett Rd.



2040 Build AM – NHC 2

1. University Drive at Ivy Creek Blvd.
2. University Drive at Larchmont Rd.
3. University Drive at Martin Luther King Parkway
4. University Drive at Lyckan Parkway
5. University Drive at Westgate Dr.
6. University Drive at Westgate Shopping Center
7. University Drive at Shannon Road
8. Pickett Road at Petty Road
9. Pickett Road at Tower Blvd.

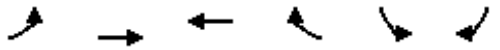
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	1090	168	190	775	12	44	1	50	247	1	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	12	12	11	11	11	13	13	13
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	150		65	130		200	0		85	0		0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.988	
Flt Protected	0.950			0.950				0.953			0.956	
Satd. Flow (prot)	1718	3322	1537	1718	3436	1537	0	1666	1486	0	1765	0
Flt Permitted	0.329			0.109				0.713			0.709	
Satd. Flow (perm)	595	3322	1537	197	3436	1537	0	1247	1486	0	1309	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			164			102			27		3	
Link Speed (mph)		35			35			25			15	
Link Distance (ft)		916			714			479			373	
Travel Time (s)		17.8			13.9			13.1			17.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	9	1211	187	211	861	13	49	1	56	274	1	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	9	1211	187	211	861	13	0	50	56	0	301	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.06	1.01	1.01	1.01	1.01	1.06	1.06	1.06	0.97	0.97	0.97
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	1	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	50	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6		6	8		8	4		
Detector Phase	5	2	2	1	6	6	8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	16.0	39.0	39.0	18.0	36.0	36.0	52.0	52.0	18.0	52.0	52.0	
Total Split (s)	16.0	74.0	74.0	33.0	91.0	91.0	53.0	53.0	33.0	53.0	53.0	
Total Split (%)	10.0%	46.3%	46.3%	20.6%	56.9%	56.9%	33.1%	33.1%	20.6%	33.1%	33.1%	
Maximum Green (s)	7.0	67.0	67.0	24.0	84.0	84.0	44.0	44.0	24.0	44.0	44.0	
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	6.0	2.0	2.0	6.0	2.0	2.0	6.0	6.0	6.0	6.0	6.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		-2.0	
Total Lost Time (s)	7.0	5.0	5.0	7.0	5.0	5.0		7.0	7.0		7.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag			Lead			
Lead-Lag Optimize?	Yes											
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	
Walk Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Flash Dont Walk (s)		26.0	26.0		19.0	19.0	37.0	37.0		37.0	37.0	
Pedestrian Calls (#/hr)		15	15		15	15	15	15		15	15	
Act Effct Green (s)	86.6	79.6	79.6	104.5	103.3	103.3		41.5	68.4		41.5	
Actuated g/C Ratio	0.54	0.50	0.50	0.65	0.65	0.65		0.26	0.43		0.26	
v/c Ratio	0.02	0.73	0.22	0.67	0.39	0.01		0.15	0.09		0.88	
Control Delay	12.9	37.0	5.9	36.8	21.8	0.0		45.1	13.5		82.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	12.9	37.0	5.9	36.8	21.8	0.0		45.1	13.5		82.1	
LOS	B	D	A	D	C	A		D	B		F	
Approach Delay		32.7			24.4			28.4			82.1	
Approach LOS		C			C			C			F	

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 64 (40%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 34.6 Intersection LOS: C
Intersection Capacity Utilization 78.3% ICU Level of Service D
Analysis Period (min) 15

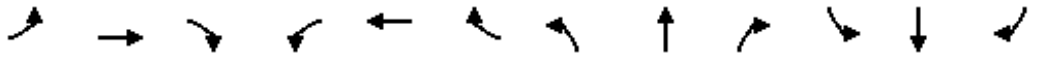
Splits and Phases: 27: Ivy Creek Blvd./Snowcrest Tr. & University Dr.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	1387	920	3	0	57
Sign Control		Free	Free		Stop	
Grade		2%	2%		2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	1541	1022	3	0	63
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		714	441			
pX, platoon unblocked	0.89				0.84	0.89
vC, conflicting volume	1026				1538	513
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	781				267	205
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	91
cM capacity (veh/h)	729				580	708

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	514	514	514	681	344	63
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	3	63
cSH	1700	1700	1700	1700	1700	708
Volume to Capacity	0.30	0.30	0.30	0.40	0.20	0.09
Queue Length 95th (ft)	0	0	0	0	0	7
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	10.6
Lane LOS						B
Approach Delay (s)	0.0			0.0		10.6
Approach LOS						B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	35.7%	ICU Level of Service	A
Analysis Period (min)	15		



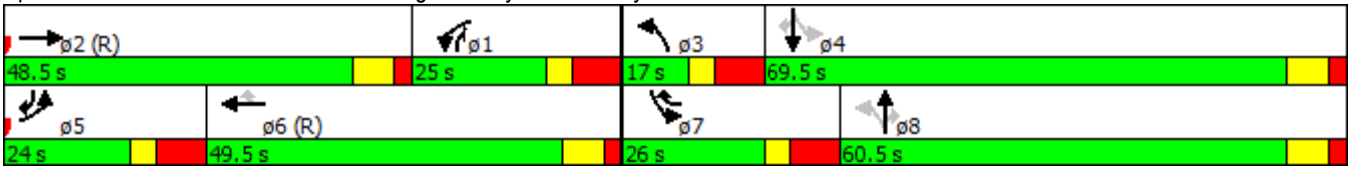
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	582	703	102	284	424	107	65	554	177	350	647	434
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	12	11	12	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	325		120	350		0	165		220	180		0
Storage Lanes	0		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.981				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3333	4844	0	3333	3436	1537	1661	3436	1486	1718	3436	1537
Flt Permitted	0.950			0.950			0.268			0.207		
Satd. Flow (perm)	3333	4844	0	3333	3436	1537	469	3436	1486	374	3436	1537
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			55	
Link Distance (ft)		441			485			1060			1216	
Travel Time (s)		8.6			9.4			20.6			15.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	647	781	113	316	471	119	72	616	197	389	719	482
Shared Lane Traffic (%)												
Lane Group Flow (vph)	647	894	0	316	471	119	72	616	197	389	719	482
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.06	1.01	1.06	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2		1	6	7	3	8	1	7	4	5

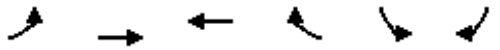
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						6	8		8	4		4
Detector Phase	5	2		1	6	7	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0	7.0	7.0	7.0	7.0	7.0	14.0	7.0
Minimum Split (s)	16.0	37.0		16.0	49.0	17.0	16.0	60.5	16.0	17.0	61.0	16.0
Total Split (s)	24.0	48.5		25.0	49.5	26.0	17.0	60.5	25.0	26.0	69.5	24.0
Total Split (%)	15.0%	30.3%		15.6%	30.9%	16.3%	10.6%	37.8%	15.6%	16.3%	43.4%	15.0%
Maximum Green (s)	15.0	41.5		16.0	42.5	17.0	8.0	53.0	16.0	17.0	62.0	15.0
Yellow Time (s)	3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0	3.0	5.0	3.0
All-Red Time (s)	6.0	2.0		6.0	2.0	6.0	6.0	2.5	6.0	6.0	2.5	6.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	7.0	5.0		7.0	5.0	7.0	7.0	5.5	7.0	7.0	5.5	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	None	None	None	None	None	None	None
Walk Time (s)		6.0			6.0			6.0			6.0	
Flash Dont Walk (s)		24.0			36.0			47.0			47.0	
Pedestrian Calls (#/hr)		15			15			15			15	
Act Effct Green (s)	26.3	52.8		18.0	44.5	68.5	54.0	45.7	62.2	70.2	54.9	86.7
Actuated g/C Ratio	0.16	0.33		0.11	0.28	0.43	0.34	0.29	0.39	0.44	0.34	0.54
v/c Ratio	1.18	0.56		0.84	0.49	0.18	0.31	0.63	0.34	1.20	0.61	0.58
Control Delay	143.3	31.6		95.7	58.2	36.7	28.4	51.8	19.8	147.3	45.2	28.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	143.3	31.6		95.7	58.2	36.7	28.4	51.8	19.8	147.3	45.2	28.0
LOS	F	C		F	E	D	C	D	B	F	D	C
Approach Delay		78.5			68.5			42.8			65.0	
Approach LOS		E			E			D			E	

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 116 (73%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
Natural Cycle: 175
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.20
Intersection Signal Delay: 65.9 Intersection LOS: E
Intersection Capacity Utilization 80.5% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 29: Martin Luther King Jr. Pkwy. & University Dr.

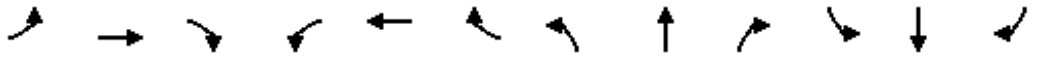




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	1249	710	22	0	105
Sign Control		Free	Free		Stop	
Grade		2%	2%		2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	1388	789	24	0	117
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		485	476			
pX, platoon unblocked					0.87	
vC, conflicting volume	813				1264	275
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	813				764	275
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	84
cM capacity (veh/h)	797				291	716

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1
Volume Total	463	463	463	316	316	182	117
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	24	117
cSH	1700	1700	1700	1700	1700	1700	716
Volume to Capacity	0.27	0.27	0.27	0.19	0.19	0.11	0.16
Queue Length 95th (ft)	0	0	0	0	0	0	14
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	11.0
Lane LOS							B
Approach Delay (s)	0.0			0.0			11.0
Approach LOS							B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	27.5%	ICU Level of Service	A
Analysis Period (min)	15		



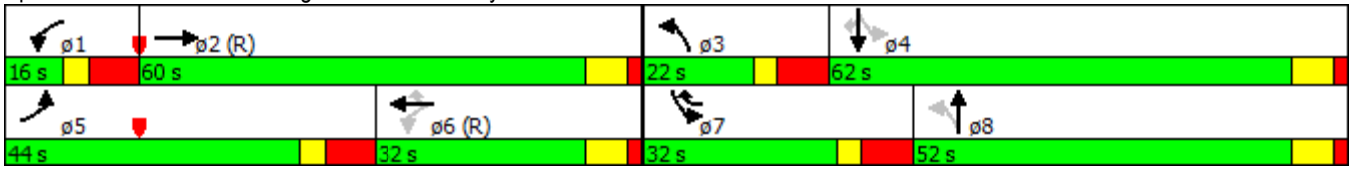
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	550	671	0	70	259	324	244	37	33	281	32	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	200		0	125		0	0		50	425		0
Storage Lanes	1		0	1		1	0		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850		0.929				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3333	3436	0	1718	3436	1537	1718	1680	0	1661	1809	1537
Flt Permitted	0.950			0.368			0.734			0.585		
Satd. Flow (perm)	3333	3436	0	666	3436	1537	1328	1680	0	1023	1809	1537
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		476			335			440			975	
Travel Time (s)		9.3			6.5			8.6			19.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	611	746	0	78	288	360	271	41	37	312	36	332
Shared Lane Traffic (%)												
Lane Group Flow (vph)	611	746	0	78	288	360	271	78	0	312	36	332
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.06	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6	7	3	8		7	4	

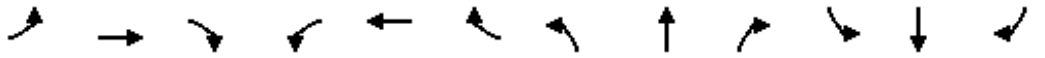
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				6		6	8			4		4
Detector Phase	5	2		1	6	7	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	16.0	31.0		16.0	31.0	16.0	16.0	52.0		16.0	45.0	45.0
Total Split (s)	44.0	60.0		16.0	32.0	32.0	22.0	52.0		32.0	62.0	62.0
Total Split (%)	27.5%	37.5%		10.0%	20.0%	20.0%	13.8%	32.5%		20.0%	38.8%	38.8%
Maximum Green (s)	35.0	53.0		7.0	25.0	23.0	13.0	45.0		23.0	55.0	55.0
Yellow Time (s)	3.0	5.0		3.0	5.0	3.0	3.0	5.0		3.0	5.0	5.0
All-Red Time (s)	6.0	2.0		6.0	2.0	6.0	6.0	2.0		6.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	7.0	5.0		7.0	5.0	7.0	7.0	5.0		7.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?		Yes		Yes			Yes				Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	None	None	None		None	None	None
Walk Time (s)		4.0			4.0			4.0			4.0	4.0
Flash Dont Walk (s)		20.0			20.0			39.0			34.0	34.0
Pedestrian Calls (#/hr)		15			15			15			15	15
Act Effct Green (s)	35.4	63.9		47.2	38.8	68.4	50.2	37.2		66.7	46.7	46.7
Actuated g/C Ratio	0.22	0.40		0.30	0.24	0.43	0.31	0.23		0.42	0.29	0.29
v/c Ratio	0.83	0.54		0.30	0.35	0.55	0.60	0.20		0.60	0.07	0.74
Control Delay	47.3	41.8		26.2	45.8	36.3	40.2	48.0		44.4	45.8	70.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	47.3	41.8		26.2	45.8	36.3	40.2	48.0		44.4	45.8	70.1
LOS	D	D		C	D	D	D	D		D	D	E
Approach Delay		44.3			39.0			42.0			57.0	
Approach LOS		D			D			D			E	

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 152 (95%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
Natural Cycle: 125
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 45.6 Intersection LOS: D
Intersection Capacity Utilization 60.8% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 31: Westgate Dr. & University Dr.

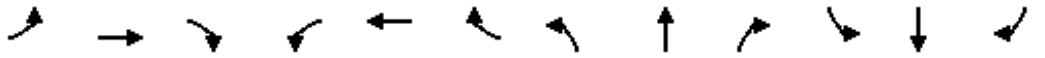




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	926	59	0	546	6	0	0	2	0	0	107
Sign Control		Free			Free			Stop			Stop	
Grade		2%			2%			2%			2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	1029	66	0	607	7	0	0	2	0	0	119
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		335			1231							
pX, platoon unblocked	0.97			0.84			0.85	0.85	0.84	0.85	0.85	0.97
vC, conflicting volume	613			1094			1484	1675	547	1127	1704	307
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	542			718			1061	1286	63	641	1321	226
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	84
cM capacity (veh/h)	980			723			125	136	820	301	130	748

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	686	409	404	209	2	119
Volume Left	0	0	0	0	0	0
Volume Right	0	66	0	7	2	119
cSH	1700	1700	1700	1700	820	748
Volume to Capacity	0.40	0.24	0.24	0.12	0.00	0.16
Queue Length 95th (ft)	0	0	0	0	0	14
Control Delay (s)	0.0	0.0	0.0	0.0	9.4	10.7
Lane LOS					A	B
Approach Delay (s)	0.0		0.0		9.4	10.7
Approach LOS					A	B

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	37.5%	ICU Level of Service		A
Analysis Period (min)	15			



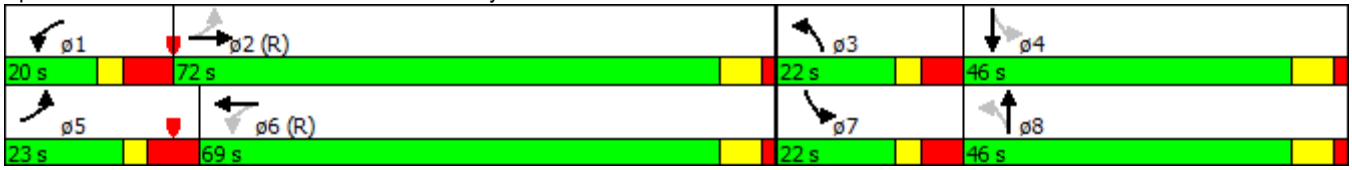
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	679	1	63	372	51	125	23	117	117	7	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	12	12	11	10	10	11	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	200		0	600		200	130		120	350		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt					0.982			0.875			0.867	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1718	3436	0	1661	3375	0	1661	2806	0	1661	2979	0
Flt Permitted	0.427			0.300			0.707			0.624		
Satd. Flow (perm)	772	3436	0	525	3375	0	1236	2806	0	1091	2979	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1231			1020			255			809	
Travel Time (s)		24.0			19.9			5.0			15.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	128	754	1	70	413	57	139	26	130	130	8	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	128	755	0	70	470	0	139	156	0	130	69	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane								Yes				
Headway Factor	1.01	1.01	1.01	1.06	1.01	1.01	1.06	1.11	1.11	1.06	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	16.0	17.0		16.0	17.0		15.0	42.0		16.0	43.0	
Total Split (s)	23.0	72.0		20.0	69.0		22.0	46.0		22.0	46.0	
Total Split (%)	14.4%	45.0%		12.5%	43.1%		13.8%	28.8%		13.8%	28.8%	
Maximum Green (s)	14.0	65.0		11.0	62.0		14.0	39.0		14.0	39.0	
Yellow Time (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
All-Red Time (s)	6.0	2.0		6.0	2.0		5.0	2.0		5.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	7.0	5.0		7.0	5.0		6.0	5.0		6.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes				Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)								6.0			6.0	
Flash Dont Walk (s)								29.0			29.0	
Pedestrian Calls (#/hr)								15			15	
Act Effct Green (s)	94.3	83.6		90.1	81.5		41.9	27.5		41.7	27.4	
Actuated g/C Ratio	0.59	0.52		0.56	0.51		0.26	0.17		0.26	0.17	
v/c Ratio	0.24	0.42		0.19	0.27		0.38	0.32		0.38	0.14	
Control Delay	10.6	16.1		16.3	25.4		43.8	57.6		37.3	47.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.6	16.1		16.3	25.4		43.8	57.6		37.3	47.9	
LOS	B	B		B	C		D	E		D	D	
Approach Delay		15.3			24.3			51.1			41.0	
Approach LOS		B			C			D			D	

Intersection Summary

Area Type: Other
Cycle Length: 160
Actuated Cycle Length: 160
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green, Master Intersection
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.42
Intersection Signal Delay: 26.0 Intersection LOS: C
Intersection Capacity Utilization 56.4% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 33: Shannon Rd. & University Dr.

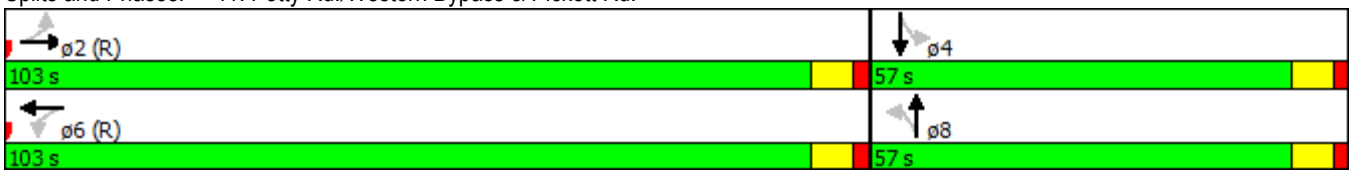


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	623	21	1	453	36	13	43	14	103	88	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	14	14	14	12	12	12
Grade (%)		2%			2%			2%			2%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.990			0.972			0.936	
Flt Protected		0.991						0.991			0.986	
Satd. Flow (prot)	0	1785	0	0	1791	0	0	1858	0	0	1669	0
Flt Permitted		0.770			0.999			0.894			0.873	
Satd. Flow (perm)	0	1387	0	0	1789	0	0	1676	0	0	1478	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			5			9			30	
Link Speed (mph)		35			35			25			35	
Link Distance (ft)		962			490			657			938	
Travel Time (s)		18.7			9.5			17.9			18.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	151	692	23	1	503	40	14	48	16	114	98	193
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	866	0	0	544	0	0	78	0	0	405	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	0.93	0.93	0.93	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	17.0	17.0		17.0	17.0		14.0	14.0		14.0	14.0	
Total Split (s)	103.0	103.0		103.0	103.0		57.0	57.0		57.0	57.0	
Total Split (%)	64.4%	64.4%		64.4%	64.4%		35.6%	35.6%		35.6%	35.6%	
Maximum Green (s)	96.0	96.0		96.0	96.0		50.0	50.0		50.0	50.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0			-2.0			-2.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)		103.3			103.3			46.7			46.7	
Actuated g/C Ratio		0.65			0.65			0.29			0.29	
v/c Ratio		0.97			0.47			0.16			0.90	
Control Delay		50.8			24.2			36.2			72.8	
Queue Delay		2.1			0.8			0.0			0.0	
Total Delay		52.9			25.0			36.2			72.8	
LOS		D			C			D			E	
Approach Delay		52.9			25.0			36.2			72.8	
Approach LOS		D			C			D			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 48.4		Intersection LOS: D	
Intersection Capacity Utilization 107.8%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 41: Petty Rd./Western Bypass & Pickett Rd.



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	459	281	99	370	120	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	11	11
Grade (%)	2%			2%	2%	
Storage Length (ft)		0	175		0	200
Storage Lanes		0	1		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.949					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1659	0	1718	1809	1661	1486
Flt Permitted			0.226		0.950	
Satd. Flow (perm)	1659	0	409	1809	1661	1486
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	30					121
Link Speed (mph)	35			35	35	
Link Distance (ft)	490			958	1039	
Travel Time (s)	9.5			18.7	20.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	510	312	110	411	133	121
Shared Lane Traffic (%)						
Lane Group Flow (vph)	822	0	110	411	133	121
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	11	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	10			10	10	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.01	1.01	1.06	1.06
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		pm+pt	NA	NA	Perm
Protected Phases	2		1	6	8	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases			6			8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	7.0	7.0
Minimum Split (s)	27.0		17.0	18.0	14.0	14.0
Total Split (s)	92.0		17.0	109.0	51.0	51.0
Total Split (%)	57.5%		10.6%	68.1%	31.9%	31.9%
Maximum Green (s)	85.0		7.0	101.0	44.0	44.0
Yellow Time (s)	5.0		5.0	5.0	5.0	5.0
All-Red Time (s)	2.0		5.0	3.0	2.0	2.0
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0		8.0	6.0	5.0	5.0
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	C-Max		None	C-Max	None	None
Walk Time (s)	6.0					
Flash Dont Walk (s)	14.0					
Pedestrian Calls (#/hr)	15					
Act Effct Green (s)	111.7		126.8	128.8	20.2	20.2
Actuated g/C Ratio	0.70		0.79	0.80	0.13	0.13
v/c Ratio	0.70		0.27	0.28	0.64	0.41
Control Delay	9.1		5.9	4.9	80.4	28.3
Queue Delay	3.6		0.0	0.0	0.0	0.0
Total Delay	12.7		5.9	4.9	80.4	28.3
LOS	B		A	A	F	C
Approach Delay	12.7			5.1	55.6	
Approach LOS	B			A	E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 160			
Actuated Cycle Length: 160			
Offset: 152 (95%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 17.1		Intersection LOS: B	
Intersection Capacity Utilization 68.8%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 40: Tower Blvd. & Pickett Rd.

2040 Build PM – NHC 2

1. University Drive at Ivy Creek Blvd.
2. University Drive at Larchmont Rd.
3. University Drive at Martin Luther King Parkway
4. University Drive at Lyckan Parkway
5. University Drive at Westgate Dr.
6. University Drive at Westgate Shopping Center
7. University Drive at Shannon Road
8. Pickett Road at Petty Road
9. Pickett Road at Tower Blvd.

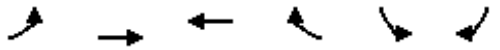
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	910	15	13	1062	49	133	2	415	161	0	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	12	12	12	12	11	11	11	13	13	13
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	150		65	130		200	0		85	0		0
Storage Lanes	1		1	1		1	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.993	
Flt Protected	0.950			0.950				0.953			0.955	
Satd. Flow (prot)	1718	3322	1537	1718	3436	1537	0	1666	1486	0	1772	0
Flt Permitted	0.203			0.185				0.735			0.533	
Satd. Flow (perm)	367	3322	1537	335	3436	1537	0	1285	1486	0	989	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			150			94			38		137	
Link Speed (mph)		35			35			25			15	
Link Distance (ft)		916			714			479			373	
Travel Time (s)		17.8			13.9			13.1			17.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	66	1011	17	14	1180	54	148	2	461	179	0	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	1011	17	14	1180	54	0	150	461	0	189	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.06	1.01	1.01	1.01	1.01	1.06	1.06	1.06	0.97	0.97	0.97
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2	1	1	2	1	1	2	1	1	1	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	20	6	20	20	6	20	20	50	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94				
Detector 2 Size(ft)		6			6			6				
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6		6	8		8	4		
Detector Phase	5	2	2	1	6	6	8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	16.0	39.0	39.0	16.0	32.0	32.0	52.0	52.0	16.0	52.0	52.0	
Total Split (s)	16.0	76.0	76.0	43.0	103.0	103.0	56.0	56.0	43.0	56.0	56.0	
Total Split (%)	9.1%	43.4%	43.4%	24.6%	58.9%	58.9%	32.0%	32.0%	24.6%	32.0%	32.0%	
Maximum Green (s)	7.0	69.0	69.0	34.0	96.0	96.0	47.0	47.0	34.0	47.0	47.0	
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	6.0	2.0	2.0	6.0	2.0	2.0	6.0	6.0	6.0	6.0	6.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		-2.0	
Total Lost Time (s)	7.0	5.0	5.0	7.0	5.0	5.0		7.0	7.0		7.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag			Lead			
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	
Walk Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	
Flash Dont Walk (s)		26.0	26.0		19.0	19.0	37.0	37.0		37.0	37.0	
Pedestrian Calls (#/hr)		15	15		15	15	15	15		15	15	
Act Effct Green (s)	103.3	95.4	95.4	123.9	110.2	110.2		35.8	67.6		35.8	
Actuated g/C Ratio	0.59	0.55	0.55	0.71	0.63	0.63		0.20	0.39		0.20	
v/c Ratio	0.23	0.56	0.02	0.03	0.55	0.05		0.57	0.77		0.61	
Control Delay	13.1	29.6	0.1	10.3	35.7	8.2		69.4	50.9		25.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	13.1	29.6	0.1	10.3	35.7	8.2		69.4	50.9		25.5	
LOS	B	C	A	B	D	A		E	D		C	
Approach Delay		28.1			34.3			55.5			25.5	
Approach LOS		C			C			E			C	

Intersection Summary

Area Type: Other
Cycle Length: 175
Actuated Cycle Length: 175
Offset: 143 (82%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 35.7 Intersection LOS: D
Intersection Capacity Utilization 76.2% ICU Level of Service D
Analysis Period (min) 15

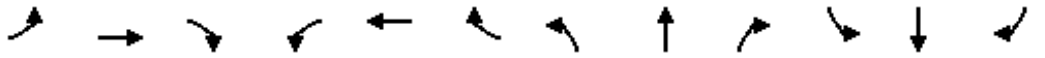
Splits and Phases: 27: Ivy Creek Blvd./Snowcrest Tr. & University Dr.



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	1486	1105	108	0	19
Sign Control		Free	Free		Stop	
Grade		2%	2%		2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	1651	1228	120	0	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		714	441			
pX, platoon unblocked	0.76				0.83	0.76
vC, conflicting volume	1348				1838	674
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	839				630	0
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	97
cM capacity (veh/h)	595				341	824

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	550	550	550	819	529	21
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	120	21
cSH	1700	1700	1700	1700	1700	824
Volume to Capacity	0.32	0.32	0.32	0.48	0.31	0.03
Queue Length 95th (ft)	0	0	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	9.5
Lane LOS						A
Approach Delay (s)	0.0			0.0		9.5
Approach LOS						A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

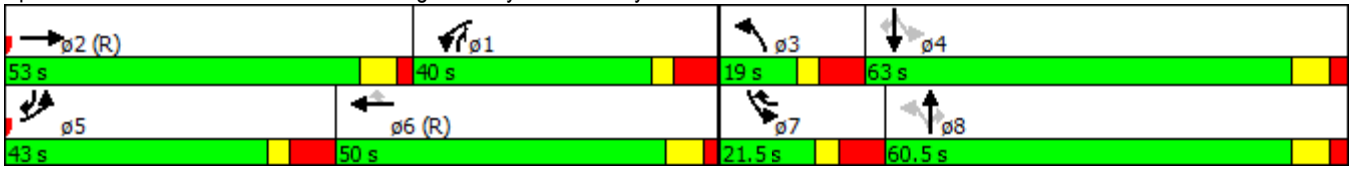


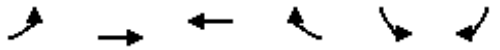
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	618	695	173	507	750	275	126	385	205	299	839	337
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	11	12	11	12	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	320		120	280		0	165		220	180		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.970				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3333	4789	0	3333	3436	1537	1661	3436	1486	1718	3436	1537
Flt Permitted	0.950			0.950			0.085			0.366		
Satd. Flow (perm)	3333	4789	0	3333	3436	1537	149	3436	1486	662	3436	1537
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34				116			137			137
Link Speed (mph)		35			35			35			55	
Link Distance (ft)		441			485			1060			1216	
Travel Time (s)		8.6			9.4			20.6			15.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	687	772	192	563	833	306	140	428	228	332	932	374
Shared Lane Traffic (%)												
Lane Group Flow (vph)	687	964	0	563	833	306	140	428	228	332	932	374
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.06	1.01	1.06	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6	20	20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2		1	6	7	3	8	1	7	4	5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						6	8		8	4		4
Detector Phase	5	2		1	6	7	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0	7.0	7.0	7.0	7.0	7.0	14.0	7.0
Minimum Split (s)	16.0	37.0		16.0	49.0	17.0	16.0	60.5	16.0	17.0	60.5	16.0
Total Split (s)	43.0	53.0		40.0	50.0	21.5	19.0	60.5	40.0	21.5	63.0	43.0
Total Split (%)	24.6%	30.3%		22.9%	28.6%	12.3%	10.9%	34.6%	22.9%	12.3%	36.0%	24.6%
Maximum Green (s)	34.0	46.0		31.0	43.0	12.5	10.0	53.0	31.0	12.5	55.5	34.0
Yellow Time (s)	3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0	3.0	5.0	3.0
All-Red Time (s)	6.0	2.0		6.0	2.0	6.0	6.0	2.5	6.0	6.0	2.5	6.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	7.0	5.0		7.0	5.0	7.0	7.0	5.5	7.0	7.0	5.5	7.0
Lead/Lag	Lead	Lead		Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes				Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	None	None	None	None	None	None	None
Walk Time (s)		6.0			6.0			6.0			6.0	
Flash Dont Walk (s)		24.0			36.0			47.0			47.0	
Pedestrian Calls (#/hr)		15			15			15			15	
Act Effct Green (s)	38.9	51.4		33.0	45.5	65.0	62.1	51.6	83.1	67.1	54.1	98.5
Actuated g/C Ratio	0.22	0.29		0.19	0.26	0.37	0.35	0.29	0.47	0.38	0.31	0.56
v/c Ratio	0.93	0.67		0.90	0.93	0.48	0.90	0.42	0.29	0.97	0.88	0.40
Control Delay	75.6	48.8		97.0	91.1	35.5	90.6	50.7	6.7	86.3	67.6	14.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.6	48.8		97.0	91.1	35.5	90.6	50.7	6.7	86.3	67.6	14.3
LOS	E	D		F	F	D	F	D	A	F	E	B
Approach Delay		59.9			83.1			45.1			59.2	
Approach LOS		E			F			D			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 175			
Actuated Cycle Length: 175			
Offset: 23 (13%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green			
Natural Cycle: 165			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 64.5		Intersection LOS: E	
Intersection Capacity Utilization 87.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 29: Martin Luther King Jr. Pkwy. & University Dr.

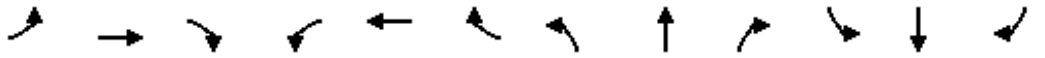




Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	1155	1310	38	0	222
Sign Control		Free	Free		Stop	
Grade		2%	2%		2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	1283	1456	42	0	247
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		485	476			
pX, platoon unblocked	0.88				0.91	0.88
vC, conflicting volume	1498				1904	506
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1099				776	0
tC, single (s)	4.2				6.9	7.0
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	74
cM capacity (veh/h)	547				300	951

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1
Volume Total	428	428	428	582	582	333	247
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	42	247
cSH	1700	1700	1700	1700	1700	1700	951
Volume to Capacity	0.25	0.25	0.25	0.34	0.34	0.20	0.26
Queue Length 95th (ft)	0	0	0	0	0	0	26
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	10.1
Lane LOS							B
Approach Delay (s)	0.0			0.0			10.1
Approach LOS							B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		



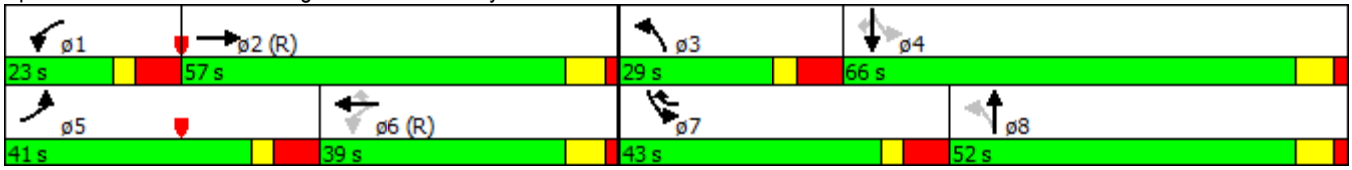
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	562	500	0	157	543	498	288	59	19	565	99	492
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	200		0	125		0	0		50	425		0
Storage Lanes	1		0	1		1	0		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt						0.850		0.964				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3333	3436	0	1718	3436	1537	1718	1744	0	1661	1809	1537
Flt Permitted	0.950			0.444			0.686			0.538		
Satd. Flow (perm)	3333	3436	0	803	3436	1537	1241	1744	0	941	1809	1537
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						532		9				418
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		476			335			440			975	
Travel Time (s)		9.3			6.5			8.6			19.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	624	556	0	174	603	553	320	66	21	628	110	547
Shared Lane Traffic (%)												
Lane Group Flow (vph)	624	556	0	174	603	553	320	87	0	628	110	547
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			12			11	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.06	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6	7	3	8		7	4	

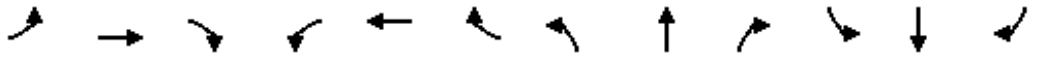
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases				6		6	8			4		4
Detector Phase	5	2		1	6	7	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	16.0	39.0		16.0	33.0	17.0	17.0	52.0		17.0	47.0	47.0
Total Split (s)	41.0	57.0		23.0	39.0	43.0	29.0	52.0		43.0	66.0	66.0
Total Split (%)	23.4%	32.6%		13.1%	22.3%	24.6%	16.6%	29.7%		24.6%	37.7%	37.7%
Maximum Green (s)	32.0	50.0		14.0	32.0	34.0	20.0	45.0		34.0	59.0	59.0
Yellow Time (s)	3.0	5.0		3.0	5.0	3.0	3.0	5.0		3.0	5.0	5.0
All-Red Time (s)	6.0	2.0		6.0	2.0	6.0	6.0	2.0		6.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	7.0	5.0		7.0	5.0	7.0	7.0	5.0		7.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?		Yes		Yes			Yes				Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	None	None	None		None	None	None
Walk Time (s)		6.0			6.0			6.0			6.0	6.0
Flash Dont Walk (s)		20.0			20.0			39.0			34.0	34.0
Pedestrian Calls (#/hr)		15			15			15			15	15
Act Effct Green (s)	35.5	67.7		59.3	46.7	87.7	52.8	32.8		73.8	46.8	46.8
Actuated g/C Ratio	0.20	0.39		0.34	0.27	0.50	0.30	0.19		0.42	0.27	0.27
v/c Ratio	0.92	0.42		0.50	0.66	0.53	0.74	0.26		1.15	0.23	0.76
Control Delay	58.6	45.1		23.3	47.6	19.1	48.4	51.8		130.0	49.3	23.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	58.6	45.1		23.3	47.6	19.1	48.4	51.8		130.0	49.3	23.6
LOS	E	D		C	D	B	D	D		F	D	C
Approach Delay		52.2			32.5			49.1			77.8	
Approach LOS		D			C			D			E	

Intersection Summary

Area Type: Other
Cycle Length: 175
Actuated Cycle Length: 175
Offset: 79 (45%), Referenced to phase 2:EBT and 6:WBTL, Start of 1st Green
Natural Cycle: 145
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.15
Intersection Signal Delay: 53.5 Intersection LOS: D
Intersection Capacity Utilization 81.5% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 31: Westgate Dr. & University Dr.

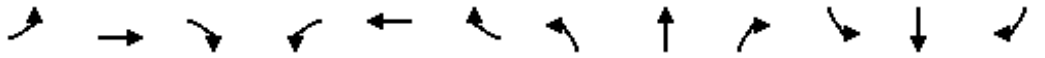




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	879	205	0	1099	76	0	0	55	0	0	99
Sign Control		Free			Free			Stop			Stop	
Grade		2%			2%			2%			2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	977	228	0	1221	84	0	0	61	0	0	110
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		335			1231							
pX, platoon unblocked	0.70			0.88			0.76	0.76	0.88	0.76	0.76	0.70
vC, conflicting volume	1306			1204			1811	2396	602	1813	2468	653
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	572			969			738	1512	288	740	1607	0
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.6	6.6	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	90	100	100	85
cM capacity (veh/h)	686			614			195	88	621	205	77	752

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	651	553	814	491	61	110
Volume Left	0	0	0	0	0	0
Volume Right	0	228	0	84	61	110
cSH	1700	1700	1700	1700	621	752
Volume to Capacity	0.38	0.33	0.48	0.29	0.10	0.15
Queue Length 95th (ft)	0	0	0	0	8	13
Control Delay (s)	0.0	0.0	0.0	0.0	11.4	10.6
Lane LOS					B	B
Approach Delay (s)	0.0		0.0		11.4	10.6
Approach LOS					B	B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	241	685	55	265	887	222	248	257	266	176	133	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	12	12	11	10	10	11	12	12
Grade (%)		2%			2%			2%			2%	
Storage Length (ft)	600		0	600		200	130		120	350		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.989			0.970			0.924			0.966	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1718	3399	0	1661	3333	0	1661	2964	0	1661	3320	0
Flt Permitted	0.061			0.205			0.604			0.119		
Satd. Flow (perm)	110	3399	0	358	3333	0	1056	2964	0	208	3320	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			20			135			20	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		1231			1020			255			809	
Travel Time (s)		24.0			19.9			5.0			15.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	268	761	61	294	986	247	276	286	296	196	148	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	268	822	0	294	1233	0	276	582	0	196	192	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane								Yes				
Headway Factor	1.01	1.01	1.01	1.06	1.01	1.01	1.06	1.11	1.11	1.06	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		3	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	16.0	14.0		16.0	14.0		15.0	42.0		16.0	43.0	
Total Split (s)	38.0	64.0		44.0	70.0		24.0	42.0		25.0	43.0	
Total Split (%)	21.7%	36.6%		25.1%	40.0%		13.7%	24.0%		14.3%	24.6%	
Maximum Green (s)	29.0	57.0		35.0	63.0		16.0	35.0		17.0	35.0	
Yellow Time (s)	3.0	5.0		3.0	5.0		3.0	5.0		3.0	5.0	
All-Red Time (s)	6.0	2.0		6.0	2.0		5.0	2.0		5.0	3.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	7.0	5.0		7.0	5.0		6.0	5.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes				Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)		0.0						6.0			6.0	
Flash Dont Walk (s)		0.0						29.0			29.0	
Pedestrian Calls (#/hr)		0						15			15	
Act Effct Green (s)	96.4	71.1		98.4	72.1		50.6	33.6		52.6	33.6	
Actuated g/C Ratio	0.55	0.41		0.56	0.41		0.29	0.19		0.30	0.19	
v/c Ratio	0.86	0.59		0.71	0.89		0.75	0.86		0.89	0.29	
Control Delay	79.3	43.5		30.3	56.6		63.0	65.3		84.2	41.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	79.3	43.5		30.3	56.6		63.0	65.3		84.2	41.6	
LOS	E	D		C	E		E	E		F	D	
Approach Delay		52.3			51.5			64.6			63.1	
Approach LOS		D			D			E			E	

Intersection Summary

Area Type: Other
Cycle Length: 175
Actuated Cycle Length: 175
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green, Master Intersection
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 55.8 Intersection LOS: E
Intersection Capacity Utilization 89.5% ICU Level of Service E
Analysis Period (min) 15

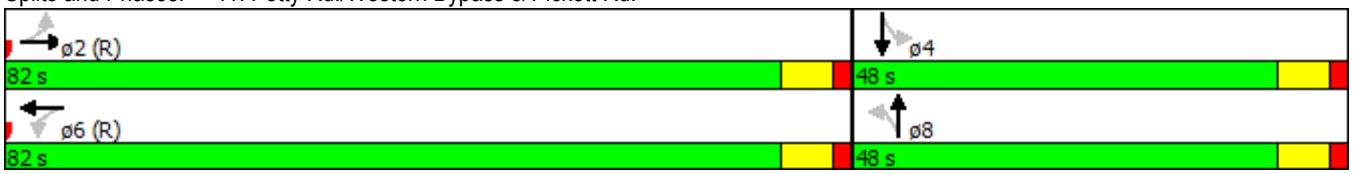
Splits and Phases: 33: Shannon Rd. & University Dr.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	401	8	0	347	76	17	22	15	98	16	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	14	14	14	12	12	12
Grade (%)		2%			2%			2%			2%	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.976			0.962			0.944	
Flt Protected		0.988						0.984			0.975	
Satd. Flow (prot)	0	1783	0	0	1765	0	0	1826	0	0	1665	0
Flt Permitted		0.723						0.869			0.824	
Satd. Flow (perm)	0	1305	0	0	1765	0	0	1613	0	0	1407	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		35			35			25			35	
Link Distance (ft)		962			490			657			938	
Travel Time (s)		18.7			9.5			17.9			18.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	151	446	9	0	386	84	19	24	17	109	18	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	606	0	0	470	0	0	60	0	0	216	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		10			10			10			10	
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	1.01	1.01	1.01	0.93	0.93	0.93	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	17.0	17.0		17.0	17.0		14.0	14.0		14.0	14.0	
Total Split (s)	82.0	82.0		82.0	82.0		48.0	48.0		48.0	48.0	
Total Split (%)	63.1%	63.1%		63.1%	63.1%		36.9%	36.9%		36.9%	36.9%	
Maximum Green (s)	75.0	75.0		75.0	75.0		41.0	41.0		41.0	41.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0			-2.0			-2.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)		92.4			92.4			27.6			27.6	
Actuated g/C Ratio		0.71			0.71			0.21			0.21	
v/c Ratio		0.65			0.37			0.18			0.72	
Control Delay		15.9			9.9			40.6			61.0	
Queue Delay		0.4			0.5			0.0			0.0	
Total Delay		16.2			10.5			40.6			61.0	
LOS		B			B			D			E	
Approach Delay		16.2			10.5			40.6			61.0	
Approach LOS		B			B			D			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green			
Natural Cycle: 55			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 22.5		Intersection LOS: C	
Intersection Capacity Utilization 82.3%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 41: Petty Rd./Western Bypass & Pickett Rd.

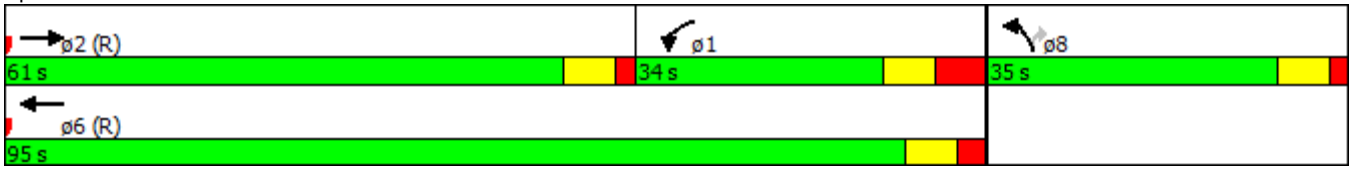


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	236	278	136	281	142	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	11	11
Grade (%)	2%			2%	2%	
Storage Length (ft)		0	175		0	200
Storage Lanes		0	1		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.927					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1621	0	1718	1809	1661	1486
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1621	0	1718	1809	1661	1486
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	35			35	35	
Link Distance (ft)	490			958	1039	
Travel Time (s)	9.5			18.7	20.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	262	309	151	312	158	113
Shared Lane Traffic (%)						
Lane Group Flow (vph)	571	0	151	312	158	113
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	11	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	10			10	10	
Two way Left Turn Lane						
Headway Factor	1.06	1.06	1.01	1.01	1.06	1.06
Turning Speed (mph)		9	15		15	9
Number of Detectors	2		1	2	1	1
Detector Template	Thru		Left	Thru	Left	Right
Leading Detector (ft)	100		20	100	20	20
Trailing Detector (ft)	0		0	0	0	0
Detector 1 Position(ft)	0		0	0	0	0
Detector 1 Size(ft)	6		20	6	20	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	Cl+Ex			Cl+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		Prot	NA	NA	Perm
Protected Phases	2		1	6	8	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						8
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	10.0		7.0	10.0	7.0	7.0
Minimum Split (s)	27.0		17.0	18.0	14.0	14.0
Total Split (s)	61.0		34.0	95.0	35.0	35.0
Total Split (%)	46.9%		26.2%	73.1%	26.9%	26.9%
Maximum Green (s)	54.0		24.0	87.0	28.0	28.0
Yellow Time (s)	5.0		5.0	5.0	5.0	5.0
All-Red Time (s)	2.0		5.0	3.0	2.0	2.0
Lost Time Adjust (s)	-2.0		-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0		8.0	6.0	5.0	5.0
Lead/Lag	Lead		Lag			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	C-Max		None	C-Max	None	None
Walk Time (s)	6.0					
Flash Dont Walk (s)	14.0					
Pedestrian Calls (#/hr)	15					
Act Effct Green (s)	66.4		26.0	99.4	19.6	19.6
Actuated g/C Ratio	0.51		0.20	0.76	0.15	0.15
v/c Ratio	0.69		0.44	0.23	0.63	0.50
Control Delay	25.8		50.3	5.3	62.5	57.6
Queue Delay	2.4		0.0	0.0	0.0	0.0
Total Delay	28.2		50.3	5.3	62.5	57.6
LOS	C		D	A	E	E
Approach Delay	28.2			20.0	60.5	
Approach LOS	C			B	E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 32.0		Intersection LOS: C	
Intersection Capacity Utilization 59.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 40: Tower Blvd. & Pickett Rd.



Appendix F

NHC 1 & NHC 2/NHC LPA Build Alternatives O-D Volumes with & without diversion

2040 Build PM – NHC 1 with 2 EBL @ Westgate Dr without diversion
2040 Build PM – NHC 1 with 2 EBL @ Westgate Dr with diversion
2040 Build AM – NHC 2/NHC LPA with 2 EBL @ Westgate Dr without diversion
2040 Build AM – NHC 2/NHC LPA with 2 EBL @ Westgate Dr with diversion
2040 Build PM – NHC 2/NHC LPA with 2 EBL @ Westgate Dr without diversion
2040 Build PM – NHC 2/NHC LPA with 2 EBL @ Westgate Dr with diversion

NHC 1 PM Peak - Before Volume Diversion

Origin/Destination		Univ Dr. at Snow Crest/Ivy Creek			Univ. Dr. at Larchmont Dr.	Univ. Dr. at MLK Parkway		Univ. Dr. at Plaza	Univ. Dr. at Lyckan	Univ. Dr. at ITT/Plaza 2		Univ. Dr. at Westgate Dr.		Univ. Dr. at Shopping Ctr.		Univ. Dr. at Plaza 3	Univ. Dr. Shannon Road		
		West Leg	North Leg	South Leg	North Leg	North Leg	South Leg	South Leg	North Leg	North Leg	South Leg	South Leg	North Leg	North Leg	South Leg	South Leg	South Leg	North Leg	East Leg
Univ Dr. at Snow Crest/Ivy Creek	West Leg	0	53	15	4	379	106	31	58	10	31	6	170	0	27	10	6	10	70
	North Leg	9	0	0	0	19	5	2	3	1	2	0	8	0	1	0	0	0	3
	South Leg	133	2	0	2	172	48	14	26	5	14	3	77	0	12	4	3	4	32
Univ. Dr. at Larchmont Dr.	North Leg	18	1	0	0	59	14	4	7	1	4	1	21	0	3	1	1	1	9
Univ. Dr. at MLK Parkway	North Leg	290	13	4	30	0	839	21	40	7	21	4	119	0	19	7	4	7	49
	South Leg	109	5	1	11	385	0	19	35	6	19	4	103	0	16	6	3	6	43
Univ. Dr. at Plaza	South Leg	24	1	0	3	10	19	0	7	1	4	1	19	0	3	1	1	1	8
Univ. Dr. at Lyckan	North Leg	93	4	1	10	40	73	1	0	1	2	0	10	0	2	1	0	1	4
Univ. Dr. at ITT/Plaza 2	North Leg	18	1	0	2	8	14	0	1	0	6	0	9	0	1	0	0	0	4
	South Leg	77	4	1	8	33	60	0	5	13	0	0	5	0	1	0	0	0	2
Univ. Dr. at Westgate Dr.	South Leg	16	1	0	2	7	13	0	1	1	3	0	46	0	4	2	1	1	11
	North Leg	184	9	2	19	78	145	1	13	8	33	93	0	0	116	42	24	42	304
Univ. Dr. at Shopping Ctr.	North Leg	19	1	0	2	8	15	0	1	1	3	6	41	0	0	0	0	0	0
	South Leg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	3	6	40
Univ. Dr. at Plaza 3	South Leg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	14	104
Univ. Dr. Shannon Road	South Leg	45	2	1	5	19	36	0	3	2	8	15	96	16	0	0	0	202	266
	North Leg	7	0	0	1	3	6	0	1	0	1	2	15	3	0	0	133	0	176
	East Leg	162	8	2	17	69	127	1	12	7	29	53	345	57	0	0	265	222	0

NHC 1 PM Peak - After Volume Diversion

Origin/Destination		Univ Dr. at Snow Crest/Ivy Creek			Univ. Dr. at Larchmont Dr.	Univ. Dr. at MLK Parkway		Univ. Dr. at Plaza	Univ. Dr. at Lyckan	Univ. Dr. at ITT/Plaza 2		Univ. Dr. at Westgate Dr.		Univ. Dr. at Shopping Ctr.		Univ. Dr. at Plaza 3	Univ. Dr. Shannon Road		
		West Leg	North Leg	South Leg	North Leg	North Leg	South Leg	South Leg	North Leg	North Leg	South Leg	South Leg	North Leg	North Leg	South Leg	South Leg	South Leg	North Leg	East Leg
Univ Dr. at Snow Crest/Ivy Creek	West Leg	0	53	15	4	379	106	31	58	10	31	6	109	0	27	10	6	71	70
	North Leg	9	0	0	0	19	5	2	3	1	2	0	5	0	1	0	0	3	3
	South Leg	133	2	0	2	172	48	14	26	5	14	3	49	0	12	4	3	32	32
Univ. Dr. at Larchmont Dr.	North Leg	18	1	0	0	59	14	4	7	1	4	1	21	0	3	1	1	1	9
Univ. Dr. at MLK Parkway	North Leg	290	13	4	30	0	839	21	40	7	21	4	119	0	19	7	4	7	49
	South Leg	109	5	1	11	385	0	19	35	6	19	4	103	0	16	6	3	6	43
Univ. Dr. at Plaza	South Leg	24	1	0	3	10	19	0	7	1	4	1	19	0	3	1	1	1	8
Univ. Dr. at Lyckan	North Leg	93	4	1	10	40	73	1	0	1	2	0	10	0	2	1	0	1	4
Univ. Dr. at ITT/Plaza 2	North Leg	18	1	0	2	8	14	0	1	0	6	0	9	0	1	0	0	0	4
	South Leg	77	4	1	8	33	60	0	5	13	0	0	5	0	1	0	0	0	2
Univ. Dr. at Westgate Dr.	South Leg	16	1	0	2	7	13	0	1	1	3	0	46	0	4	2	1	1	11
	North Leg	184	9	2	19	78	145	1	13	8	33	93	0	0	116	42	24	42	304
Univ. Dr. at Shopping Ctr.	North Leg	19	1	0	2	8	15	0	1	1	3	6	41	0	0	0	0	0	0
	South Leg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	3	6	40
Univ. Dr. at Plaza 3	South Leg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	14	104
Univ. Dr. Shannon Road	South Leg	45	2	1	5	19	36	0	3	2	8	15	96	16	0	0	0	202	266
	North Leg	7	0	0	1	3	6	0	1	0	1	2	15	3	0	0	133	0	176
	East Leg	162	8	2	17	69	127	1	12	7	29	53	345	57	0	0	265	222	0

Before volume diversion

After volume diversion

NHC 2 AM Peak - Before Volume Diversion

Origin/Destination		Univ Dr. at Snow Crest/Ivy Creek			Univ. Dr. at Larchmont Dr.	Univ. Dr. at MLK Parkway		Univ. Dr. at Plaza	Univ. Dr. at Lyckan	Univ. Dr. at ITT/Plaza 2		Univ. Dr. at Westgate Dr.		Univ. Dr. at Shopping Ctr.		Univ. Dr. at Plaza 3	Univ. Dr. Shannon Road		
		West Leg	North Leg	South Leg	North Leg	North Leg	South Leg	South Leg	North Leg	North Leg	South Leg	South Leg	North Leg	North Leg	South Leg	South Leg	South Leg	North Leg	East Leg
Univ Dr. at Snow Crest/Ivy Creek	West Leg	0	8	168	0	457	80	5	0	0	14	0	279	0	17	48	0	7	181
	North Leg	23	0	1	0	104	18	1	0	0	3	0	63	0	4	11	0	1	41
	South Leg	44	0	0	0	21	4	0	0	0	1	0	13	0	1	2	0	0	8
Univ. Dr. at Larchmont Dr.	North Leg	45	1	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Univ. Dr. at MLK Parkway	North Leg	343	5	84	1	0	647	3	0	0	9	0	177	0	10	31	0	4	115
	South Leg	52	1	13	0	554	0	2	0	0	5	0	90	0	5	16	0	2	58
Univ. Dr. at Plaza	South Leg	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Univ. Dr. at Lyckan	North Leg	43	1	11	0	14	37	0	0	0	0	0	1	0	0	0	0	0	0
Univ. Dr. at ITT/Plaza 2	North Leg	12	0	3	0	4	10	0	1	0	0	0	0	0	0	0	0	0	0
	South Leg	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	2
Univ. Dr. at Westgate Dr.	South Leg	85	1	21	0	27	72	0	6	31	0	0	37	0	2	6	0	1	24
	North Leg	105	2	26	0	33	88	0	8	38	0	32	0	0	19	54	0	7	201
Univ. Dr. at Shopping Ctr.	North Leg	15	0	4	0	5	12	0	1	5	0	11	53	0	0	0	0	0	0
	South Leg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Univ. Dr. at Plaza 3	South Leg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	38
Univ. Dr. Shannon Road	South Leg	17	0	4	0	5	14	0	1	6	0	13	62	1	0	0	0	23	117
	North Leg	7	0	2	0	2	6	0	1	3	0	6	27	1	0	0	7	0	117
	East Leg	51	1	12	0	16	43	0	4	18	0	39	183	4	0	0	63	51	0

NHC 2 AM Peak - After Volume Diversion

Origin/Destination		Univ Dr. at Snow Crest/Ivy Creek			Univ. Dr. at Larchmont Dr.	Univ. Dr. at MLK Parkway		Univ. Dr. at Plaza	Univ. Dr. at Lyckan	Univ. Dr. at ITT/Plaza 2		Univ. Dr. at Westgate Dr.		Univ. Dr. at Shopping Ctr.		Univ. Dr. at Plaza 3	Univ. Dr. Shannon Road		
		West Leg	North Leg	South Leg	North Leg	North Leg	South Leg	South Leg	North Leg	North Leg	South Leg	South Leg	North Leg	North Leg	South Leg	South Leg	South Leg	North Leg	East Leg
Univ Dr. at Snow Crest/Ivy Creek	West Leg	0	8	168	0	457	80	5	0	0	14	0	207	0	17	48	0	79	181
	North Leg	23	0	1	0	104	18	1	0	0	3	0	47	0	4	11	0	17	41
	South Leg	44	0	0	0	21	4	0	0	0	1	0	10	0	1	2	0	3	8
Univ. Dr. at Larchmont Dr.	North Leg	45	1	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Univ. Dr. at MLK Parkway	North Leg	343	5	84	1	0	647	3	0	0	9	0	177	0	10	31	0	4	115
	South Leg	52	1	13	0	554	0	2	0	0	5	0	90	0	5	16	0	2	58
Univ. Dr. at Plaza	South Leg	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Univ. Dr. at Lyckan	North Leg	43	1	11	0	14	37	0	0	0	0	0	1	0	0	0	0	0	0
Univ. Dr. at ITT/Plaza 2	North Leg	12	0	3	0	4	10	0	1	0	0	0	0	0	0	0	0	0	0
	South Leg	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	2
Univ. Dr. at Westgate Dr.	South Leg	85	1	21	0	27	72	0	6	31	0	0	37	0	2	6	0	1	24
	North Leg	105	2	26	0	33	88	0	8	38	0	32	0	0	19	54	0	7	201
Univ. Dr. at Shopping Ctr.	North Leg	15	0	4	0	5	12	0	1	5	0	11	53	0	0	0	0	0	0
	South Leg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Univ. Dr. at Plaza 3	South Leg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	38
Univ. Dr. Shannon Road	South Leg	17	0	4	0	5	14	0	1	6	0	13	62	1	0	0	0	23	117
	North Leg	7	0	2	0	2	6	0	1	3	0	6	27	1	0	0	7	0	117
	East Leg	51	1	12	0	16	43	0	4	18	0	39	183	4	0	0	63	51	0

Before volume diversion

After volume diversion

NHC 2 PM Peak - Before Volume Diversion

Origin/Destination		Univ Dr. at Snow Crest/Ivy Creek			Univ. Dr. at Larchmont Dr.	Univ. Dr. at MLK Parkway		Univ. Dr. at Plaza	Univ. Dr. at Lyckan	Univ. Dr. at ITT/Plaza 2		Univ. Dr. at Westgate Dr.		Univ. Dr. at Shopping Ctr.		Univ. Dr. at Plaza 3	Univ. Dr. Shannon Road		
		West Leg	North Leg	South Leg	North Leg	North Leg	South Leg	South Leg	North Leg	North Leg	South Leg	South Leg	North Leg	North Leg	South Leg	South Leg	South Leg	North Leg	East Leg
Univ Dr. at Snow Crest/Ivy Creek	West Leg	0	59	15	0	378	106	31	0	0	31	6	245	0	25	9	5	9	66
	North Leg	9	0	0	0	67	19	5	0	0	5	1	43	0	4	2	1	2	12
	South Leg	133	2	0	0	173	48	14	0	0	14	3	112	0	11	4	2	4	30
Univ. Dr. at Larchmont Dr.	North Leg	18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Univ. Dr. at MLK Parkway	North Leg	290	13	4	30	0	839	21	0	0	22	4	172	0	17	6	4	6	46
	South Leg	109	5	1	11	385	0	19	0	0	19	4	150	0	15	5	3	5	40
Univ. Dr. at Plaza	South Leg	0	0	0	0	0	0	0	0	0	4	1	28	0	3	1	1	1	8
Univ. Dr. at Lyckan	North Leg	93	4	1	10	40	73	0	0	0	0	0	0	0	0	0	0	0	0
Univ. Dr. at ITT/Plaza 2	North Leg	18	1	0	2	8	14	0	1	0	0	0	0	0	0	0	0	0	0
	South Leg	0	0	0	0	0	0	0	0	0	0	0	14	0	1	1	0	1	4
Univ. Dr. at Westgate Dr.	South Leg	116	5	1	12	50	91	0	8	4	0	0	59	0	4	2	1	1	11
	North Leg	199	9	2	21	85	156	0	14	7	0	99	0	0	123	45	26	45	326
Univ. Dr. at Shopping Ctr.	North Leg	18	1	0	2	8	14	0	1	1	0	13	41	0	0	0	0	0	0
	South Leg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	3	6	40
Univ. Dr. at Plaza 3	South Leg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	14	104
Univ. Dr. Shannon Road	South Leg	42	2	1	4	18	33	0	3	1	0	30	96	16	0	0	0	202	266
	North Leg	7	0	0	1	3	5	0	0	0	0	5	15	3	0	0	133	0	176
	East Leg	152	7	2	16	65	119	0	11	5	0	109	345	57	0	0	265	222	0

NHC 2 PM Peak - After Volume Diversion

Origin/Destination		Univ Dr. at Snow Crest/Ivy Creek			Univ. Dr. at Larchmont Dr.	Univ. Dr. at MLK Parkway		Univ. Dr. at Plaza	Univ. Dr. at Lyckan	Univ. Dr. at ITT/Plaza 2		Univ. Dr. at Westgate Dr.		Univ. Dr. at Shopping Ctr.		Univ. Dr. at Plaza 3	Univ. Dr. Shannon Road		
		West Leg	North Leg	South Leg	North Leg	North Leg	South Leg	South Leg	North Leg	North Leg	South Leg	South Leg	North Leg	North Leg	South Leg	South Leg	South Leg	North Leg	East Leg
Univ Dr. at Snow Crest/Ivy Creek	West Leg	0	59	15	0	378	106	31	0	0	31	6	156	0	25	9	5	98	66
	North Leg	9	0	0	0	67	19	5	0	0	5	1	27	0	4	2	1	18	12
	South Leg	133	2	0	0	173	48	14	0	0	14	3	71	0	11	4	2	45	30
Univ. Dr. at Larchmont Dr.	North Leg	18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Univ. Dr. at MLK Parkway	North Leg	290	13	4	30	0	839	21	0	0	22	4	172	0	17	6	4	6	46
	South Leg	109	5	1	11	385	0	19	0	0	19	4	95	0	15	5	3	5	40
Univ. Dr. at Plaza	South Leg	0	0	0	0	0	0	0	0	0	4	1	28	0	3	1	1	1	8
Univ. Dr. at Lyckan	North Leg	93	4	1	10	40	73	0	0	0	0	0	0	0	0	0	0	0	0
Univ. Dr. at ITT/Plaza 2	North Leg	18	1	0	2	8	14	0	1	0	0	0	0	0	0	0	0	0	0
	South Leg	0	0	0	0	0	0	0	0	0	0	0	14	0	1	1	0	1	4
Univ. Dr. at Westgate Dr.	South Leg	116	5	1	12	50	91	0	8	4	0	0	59	0	4	2	1	1	11
	North Leg	199	9	2	21	85	156	0	14	7	0	99	0	0	123	45	26	45	326
Univ. Dr. at Shopping Ctr.	North Leg	18	1	0	2	8	14	0	1	1	0	13	41	0	0	0	0	0	0
	South Leg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	3	6	40
Univ. Dr. at Plaza 3	South Leg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	14	104
Univ. Dr. Shannon Road	South Leg	42	2	1	4	18	33	0	3	1	0	30	96	16	0	0	0	257	266
	North Leg	7	0	0	1	3	5	0	0	0	0	5	15	3	0	0	133	0	176
	East Leg	152	7	2	16	65	119	0	11	5	0	109	345	57	0	0	265	222	0

Before volume diversion
After volume diversion