

**Evaluating the Transit Signal Priority Impacts along the
U.S. 1 Corridor in Northern Virginia**

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Abstract

Heavy traffic volumes in peak hours accompanied by closely located signalized intersections and nearside bus stops on U.S. 1, result in congestion and traffic delays that bus transit may be able to alleviate to some extent. The capital investment and operating costs of other transit solutions such as “Bus Rapid Transit” and “Heavy Rail Transit” projects were found to be cost prohibitive compared to bus transit signal priority (TSP) options. Successful implementation of a limited TSP pilot project led local authorities to conclude that TSP should be extended to the full length of the Fairfax Connector bus routes on U.S. 1.

This research focused on testing the impacts of a ten second green extension priority strategy for all the northbound transit buses in the morning peak period at twenty-six signalized intersections along U.S. 1. A micro simulation model VISSIM 3.7 was used to analyze the impacts of TSP.

The simulation analysis indicates that the Fairfax Connector buses might benefit from the green extension strategy. Overall, improvements of up to 4% for transit travel time savings and 5-13% reduction in control delay for transit vehicles were observed. Considering all side street traffic, the total increase in maximum queue length might be up to 1.23%.

Future research possibilities proposed include the evaluation of different priority strategies such as an early green, red truncation and queue jumps. Impacts of using a dedicated lane for transit buses along with TSP can also be evaluated. Conditional transit signal priority may also include bus occupancy levels and bus latenesses.

Dedication

I would like to dedicate this work to my son, Hiranya Kamdar for his love that gave me eternal encouragement to follow my dream.

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CHAPTER 1: INTRODUCTION

In major urban areas with increasing population and advances in automobile technologies, the traffic congestion problem has spread from the central business district (CBD) to suburban streets. Extending the road network cannot solve transportation problems. Since 1991, when Congress invoked ITS initiatives, very helpful ITS technologies have been used in different traffic control systems. ITS technologies such as TSP are found to be low cost and effective means for enhancing public transit systems. This fact was also observed in other parts of world like, Brazil and Japan (Garcia and Yamamoto, 1998)

If public transit becomes reliable and efficient more commuters and passengers may be encouraged to ride the public transit and there may be less congestion on urban streets. Public transit operations are affected adversely by many factors such as nearside bus stops, closely located intersections, and other factors. Past research shows that the stopped delay at intersections comprises about 20 percent of overall transit delay (Zhang, 2001). TSP is one of the promising technologies that may help reduce intersection delay and in turn total transit travel time. This was evidenced by the implementation of bus priority in SELKENT bus district of South East London and Kent in which 56 traffic signals and 1000 London buses had been equipped for active bus priority (Hounsell, 1988).

U.S. 1, a major 6 lane arterial highway with intersections spaced at an average of 500 ft apart, suffers heavy traffic congestion during morning and evening peak hours. During the morning peak period (6:00-9:00 AM), the major transit traffic destination is northbound towards the intramodal facility, i.e. Huntington Metro Station and during evening peak period (4:00-7:00 PM) the major transit traffic is southbound from Huntington Metro Station to the residential areas. Fairfax Connector bus routes currently serving the section of U.S. 1 south of Huntington Metro are Route: 105, 106 and 107.

1.1 Problem Definition

Heavy traffic volumes in peak hours accompanied by closely located signalized intersections and nearside bus stops on U.S. 1, result in congestion and traffic delays that bus transit may be able to alleviate to some extent. The capital investment and operating costs of other transit solutions such as “Bus Rapid Transit” and “Heavy Rail Transit” projects were found to be cost prohibitive compared to bus transit signal priority (TSP) options. Successful implementation of a limited TSP pilot project (Deshpande, Collura, Teodorovic, and Tignor, 2004) led local authorities to conclude that TSP should be extended to the full length of the Fairfax Connector bus routes on U.S. 1.

This research paper addresses the issue of assessing the impacts of bus priority. Reduction in bus control delay and bus travel time along with the increase in side street queue lengths will be the measures of effectiveness under focus for this research. VISSIM 3.7 the micro simulation software will be used for this research work.

1.2 Existing Conditions

The simulation outcomes as well as the field results of ten second green extension - TSP implementation on U.S. 1 pilot project for the six intersections from North Kings Highway to Popkins Lane, indicate a reduction in transit travel time with negligible impacts to side street traffic (Deshpande, Collura, Teodorovic, and Tignor, 2004). Government officials assume 10% increase in transit ridership as a result of TSP implementation on U.S. 1 corridor as stated on commuter pages website (<http://www.commuterpage.com/cnews/column.cfm?ID=4333>). The increase in the transit demand may result in revenue generated for Fairfax Connector.

According to the information provided by Virginia Department of Transportation (VDOT), TSP needs to be extended on U.S. 1 corridor from North Kings Highway in the north to Fairfax County Parkway in the south.

1.3 Research Objectives

The main goal of this research is to analyze the results of TSP, i.e. benefits to transit traffic and probable adverse impact on non-transit traffic.

Considering stakeholders' problems and expectations from TSP implementation, certain performance measures were established during the U.S. 1 TSP pilot project. The preliminary objective is to derive what benefits can be achieved in terms of these performance measures, if TSP is extended for the whole U.S. 1 corridor.

The secondary objective is to illustrate the pros and cons of using new technologies in the world of traffic simulation.

1.4 Scope of Research

The first step is to understand and discuss the transportation problems on the major arterial U.S.1. The research then presents in depth literature review for:

- a) Need of TSP as a solution to these problems
- b) Various TSP strategies
- c) Different technologies used to provide TSP
- d) Previous experiences with TSP implementation.
- e) Pilot project done on U.S.1 with respect to the TSP technology

The research work includes learning efforts required for the simulation software. Next step was to authenticate the results of this effort with the results of the pilot project.

The research focuses on simulation study for TSP on the extended intersections on U.S.1. The SYNCHRO files provided by VDOT were the source of information for U.S.1 road geometry, volumes, traffic signal timing and phasing. VISSIM 3.7 imports traffic data from SYNCHRO files in "Universal Traffic Data Format (UTDF)". In this research, the UTDF feature is used to prepare the VISSIM network. The transit network was prepared using Fairfax Connector schedules and field data. The field data was collected about bus

stops locations and turn out lengths information. TSP of ten second green extension was emulated at the twenty-six signalized intersections of U.S. 1 corridor covering entire Fairfax Connector bus route.

The simulation results were analyzed to reflect TSP effectiveness with respect to total travel time on U.S. 1 corridor, reduction in intersection delays and adverse effect on side street traffic.

1.5 Importance of Thesis

To alleviate the congestion problems and to make the mass transit service more usable, it is being considered to provide preferential treatment to the buses on the U.S. 1 corridor in Northern Virginia. It is very important to know the impacts of vast implementation of this TSP project. This research gains high significance because for the first time, the extensive U.S. 1 corridor with twenty intersections was simulated for TSP in VISSIM 3.7.

The research illustrates how useful Universal Traffic Data Format (UTDF) – the new standard can be in preparing extensive urban network in VISSIM. Finally this thesis gives analysis and probability of various impacts of the TSP implementation.

1.6 Thesis Organization

This thesis consists of seven chapters. The following Chapter 2 is about literature review of the work done in the area of TSP systems. It gives basic idea of various TSP strategies, different detection technologies, the impacts of priority on the transportation system and signal priority experiences in the United States as well as in other parts of the world.

Chapter 3 discusses evaluation plan and research approach for assessing the TSP deployment on U.S.1 in Northern Virginia.

Chapter 4 describes challenges and assumptions made for replicating work done previously. It also describes use of VISSIM 3.7 capabilities such NEMA controller for modeling signal controls and TSP for the U.S.1 Pilot project

Chapter 5 details location of U.S.1 corridor, the traffic and transit data, concept and implementation of TSP used for this research.

Chapter 6 discusses VISSIM model data, calibration method and network modeling. It also introduces use of UTDF for exchanging data across simulation packages. It also discusses TSP logic used in NEMA controller PEEK LMD9200.

Chapter 7 reviews the results based on VISSIM simulations. This chapter also summarizes the major conclusions of the research and identifies the areas for future research.

CHAPTER 2: LITERATURE REVIEW

An in depth literature review of numerous research papers and articles gave the author a broad perspective and firm foundation for undertaking this research work and writing this thesis. It is important to understand the state-of-art transit signal priority by reviewing all aspects of transit signal priority.

This chapter gives a clear idea about difference between transit priority and emergency vehicle preemption, results of various field studies as well as simulation studies, U.S. 1 traffic congestion problems and U.S. 1 TSP pilot project study.

2.1 Overview of Traffic Signal Priority Systems

2.1.1 Need of TSP

The primary objective of TSP is to reduce the transit travel time by reducing delay at signalized intersections. It is believed that with the amount of congestion along a major arterial, a system like this can greatly increase the operational efficiency of the transit vehicle and maintain a better schedule adherence. Another anticipated benefit of TSP is to increase the overall vehicular flow along the corridor. If the transit vehicles are able to move more smoothly, then their effectiveness will affect the flow of traffic behind them. These facts are proven in the study done for “Superbus”, where it is indicated that the ITS enhanced bus priority can substitute the need of segregation of guideway for improving public transport operations (Jones, 1998).

A TSP system would be especially beneficial to the far-side bus stops rather than those on the nearside. The buses that are able to clear an intersection and then make a pick-up/drop-off at a far-side bus stop has to stop only once. However, if the bus has to make a stop, before the intersection to pick-up passengers, there is a good chance the bus will have to stop again at the red light.

Major requirements to meet one or more of these objectives must be defined. One requirement is to be able to detect a bus before it reaches the intersection, and then modify the signal timings in some prescribed manner (e.g. extending the green interval to allow a local bus to clear the intersection.). Another requirement is to grant priority only to those busses that are behind schedule or within a specified time frame. This could prevent bus bunching and also maintain a better schedule adherence.

2.1.2 Difference between Preemption and Transit Signal Priority

At this point it is important to understand difference between the priority treatment given to emergency vehicles and the transit vehicles. Priority and preemption are often used synonymously, when in fact they are different systems (Chang, Collura, Dion, Rakha, Tignor, and Triantis, 2002)

Both systems can use identical technologies that are implemented in the same manner. But the objectives of preemption and priority are quite different (Chang, Collura, Dion, Rakha, Tignor, and Triantis, 2002). TSP is meant for some priority service within the coordinated operation of traffic signals that can reduce delay for the transit vehicles with minimal impact to other traffic.

On the other hand emergency vehicles get preemption because high degree of priority is necessary for safety and performance reasons. For example, at railroad crossings railways get preemption and at signalized intersections emergency vehicles get preemption. Preemption can disrupt the normal traffic operation. Only restrictions in providing the preemption could be the “Pedestrian Phase” or when there is work zone located at intersection.

2.1.3 Transit Signal Priority - Deployment Issues

TSP deployment issues discussed below are well presented in past work done (Gifford, Pelletiere, and Collura, 2002). There can be many factors that affect implementation of traffic signal priority systems (ITS America, 2002).

Factors affecting implementation of traffic signal priority systems can be categorized in two major categories: traffic related factors and transit related factors.

Traffic related factors are:

Roadway Geometry

- Directly dictates the capability of the system and types of possible operations.
- Impacted by the surrounding land development, which dictates the number and location of the intersections and the transit stops.
- Offers challenges such as plane of vision e.g. for the detection technologies.

Traffic Volumes

- Varies with time for any given intersection or segment.
- High traffic volumes during peak hours for general as well as transit vehicles impacts traffic signal priority

Traffic Signal System

- An operating factor, which governs the extent to which the traffic signal priority system can be achieved
- Capability of signal hardware and software to deploy intended priority strategies and to store and transfer the data in the required format is important.

Pedestrians

- Time required for a pedestrian to safely cross the street at a signalized intersections limits the time available for the signal priority.

Adjacent Intersection Operations

- Important for understanding the progression for the transit vehicles.
- Very crucial in case of closely spaced intersection for maintaining coordination.
- Study corridor consists of 26 intersections within 8.8 miles stretch, which make this issue important.

Transit Related Issues are:

Type of transit systems

- Could be heavy rail transit or light rail transit or bus transit
- Easy to implement TSP for rail-based transit than for road-based transit as rail systems are generally on exclusive (or semi exclusive) right of ways and are more reliable for the prediction of vehicle arrival times at the intersections
- Dwell time affects the arrival for bus transit to the intersection and that is why express bus services benefit more from transit priority system than local buses.

Transit stops

- Location of transit stops relative to signalized intersection impacts transit signal priority effectiveness.
- Nearside bus stops make transit detection challenging for providing transit priority and it is challenging to provide detectors for nearside bus stops such that given priority is not wasted in passenger boarding and alighting at bus stop
- Farside stops are more compatible with priority systems.

2.1.3 Transit Priority Strategies

The transit signal priority could be “Passive priority strategy” or “Active priority strategy”. All of these strategies are described in depth in previous research done at Virginia Tech (Deshpande, Collura, Teodorovic, and Tignor, 2004). TSP implementation methods are available in UK since the 1970’s and different strategies are wellknown there but somehow most of the development work has been related to active priority systems (Hounsell, McLeod, and Shrestha, 2004).

Passive Priority strategies can be listed as below:

- Adjustment of Cycle Length
- Area-wide Timing Plans
- Phase Splitting
- Metering Vehicles

Active priority strategies need bus detection in some form and three known different detection categories are “Infrastructure Equipment only”, “On-bus and local infrastructure”, and “On-bus and central infrastructure” (Hounsell, McLeod, and Shrestha, 2004). The detection systems are discussed in the next chapter.

- Phase Extension (Green Extension)
- Early Green (Red Truncation)
- Actuated Transit Phase (Red Interruption)
- Phase Insertion
- Green Truncation
- Phase Rotation

In U.S. 1 TSP project green extension the active priority strategy is used. In addition to above Adaptive or Real-time Strategies also are in use, which combines some of the above listed strategies. Bus priority integrated with adaptive traffic signal control can optimize the assignment of the traffic flow and reduce the time wasted on the way (Shuyan, Zhiheng, and Deyun, 2003).

Conditional Bus Priority:

Conditional transit priority can be provided using advanced detection technologies such as AVL. A simulation and field study undertaken for London Transport Buses by the Transportation Research Group (TRG) at Southampton University compared and showed that more benefits occurs in terms of average delay savings for headway based selective bus priority (Hounsell, McLeod, Gardner, Head, and Cook, 2000). The different scenarios for comparison were use of SCOOT for traffic signal coordination and signal timing optimization, use of SCOOT with bus priority, and use of SCOOT with selective i.e. headway based bus priority. AVL was used for the headway information.

Recent study done on bus management with improved passenger situations (Lu and Viegas, 2003) shows the way to provide better environment to the bus passengers on

roadside, takes into account the estimation of their waiting time, and combines the time into the weight coefficient of objective function on the detected and predicted bus message through some kinds of AVL technologies and prediction models. The bus priority signals then can be adjusted on this obtained function.

2.1.4 Detection Technologies

The detection technology is backbone of transit signal priority systems as it is the communication link between approaching transit vehicle and signal controller. Primarily it consists of a message conveyer. Detection technologies should serve the following purposes:

1. The transit vehicle should be detected
2. The signal controller should receive this information in time.

There are different types of media to carry these messages to the signal controller namely light, sound, radio frequencies and others (Deshpande, Collura, Teodorovic, and Tignor, 2004). There has been extensive research performed at Virginia Tech to study different technologies, system requirements and past deployments (Collura, Chang, Willhaus, and Gifford, 2001), which are provided in Appendix B.

Advanced detection technology like global positioning systems (GPS) is widely used for bus priority and it has also made centrally integrated traffic control more sophisticated in European countries (Purdie H, 2002). The bus data gathered for this purpose can also be supplied to the traveling public to encourage the modal shift towards public transport.

2.1.5 Results from TSP implementations within USA and outside USA

The City of Portland performed a detailed operational analysis of the effect of transit preferential strategies on five corridors. They found that on average, only 34% of the total bus travel time was attributable to driving. The remaining 66% was distributed as: 22% at traffic signals, 16% at bus stops, and 28% in traffic congestion (City of Portland-Final report, 1997). Findings from Wilshire and Whittier Boulevards in Los Angeles showed that traffic signal delay was 20% and bus stop delay was 25% (Los Angeles Metro Rapid

Demonstration Program, 2001). These results suggest that the maximum transit travel time reduction attainable by transit priority alone is in the order of 20%.

Table 1 in Appendix A, (Soo, Collura, Hobeika, and Teodorovic, 2004), gives good comparison for results of various transit signal priority strategies implemented in previous field and simulation studies.

Research papers (Deshpande, Collura, Teodorovic, and Tignor, 2004), (Soo, Collura, Hobeika, and Teodorovic, 2004), (Ngan, Sayed, and Abdelfatah, 2004), (Hongchao, Meng, and Skabardonis, 2004) show favorable outcomes of TSP implementation, which are summarized in Table 1.

The simulation study done in VISSIM, for Granville Street in Vancouver British Columbia (Ngan, Sayed, and Abdelfatah, 2004) gave in depth analysis of the effects of various factors of network components on TSP results. The considered factors are bus detector location, near side and far side bus stops, traffic density and others. This study gives pretty good idea of VISSIM capabilities for modeling transit signal priority and related minute field details.

A research paper discusses the behavioral responses of travelers following the implementation of strong bus priority measures (where road capacity is deliberately removed from general traffic and given to buses). The results of the different behavioral responses based on two commercial transport modeling packages (CONTRAM and TRIPS) suggest firstly that the effect of implementing such strong bus priority measures is as dependent on the characteristics of the local travelers as on the scheme itself and secondly that implementing too strong a scheme may not benefit public transport overall (Waterson, Rajbhandari, and Hounsell, 2003).

The research study done using VISSIM for bus priority with highly interruptible traffic signal control - simulation of San Juan's Avenida Ponce de Leon showed the results indicating significant transit travel time savings without slowing general traffic compared with the existing strategy of fixed time control with progression (Janos and Furth, 2002).

Along with all these results, an implementation of conditional bus priority done in Eindhoven, the Netherlands showed that conditional priority given to the buses with lateness only gave better results than the absolute priority given to all buses (Furth and Muller, 2000).

Efforts are made to provide TSP without causing the controller to drop from coordination and disturbing the progression. In a research study (Balke, Dudek, and Urbanik, 2000), implementation of the bus priority strategies was accomplished through normal traffic-signal controller commands such as (Ring Force Offs and Phase Holds). Phase extension, phase insertion, and early return strategies were used to provide priority.

Effective use of dedicated bus lanes along with the bus priority is important in making transit operations more efficient. A study (Viegas and Lu, 2001) gives the concept of Intermittent Bus Lane (IBL). As an enhancement of transit priority, pre-signals are used on bus lanes in U.K., particularly in London and a research paper (Wu and Hounsell, 1998) describes decisive factors, characteristics, analytical approach for using pre-signals, and the benefits of implementing that.

Transport Research Laboratory worked on the signal control method microprocessor optimized vehicle actuation (MOVA), for providing the priority treatment to cater for emergency and/or priority vehicles. Three sites were studied for this research, two in South West London and one just outside Winchester. Research results indicated that in all cases, buses had benefited from the introduction of bus priority with varying degrees depending on site characteristics (Crabtree and Vincent, 1998).

Table 1-A. Recent Results of TSP Projects in U.S.

U.S. Experiences	Measure	Result
Field Studies		
Fairfax, VA – U.S. 1 VISSIM	Travel time	4 – 10 % decrease

U.S. Experiences	Measure	Result
Field Studies		
(Projected for entire corridor)	Project Cost: Estimated Payback Period	Decrease from 50.5 to 11 years
El Camino Real, San Francisco Bay area PARAMICS	Travel Time (TT) (sec)	Decrease from 576 to the range of 491 - 509
	Speed (mph)	Increase from 21 to the range of 25 -26 mph
	Dwell Time (% of TT)	Increase from 21.7 to the range of 24.5-25.5 %
	Signal Delay	Decrease from 131 to the range of 46 to 63 sec
		Decrease from 22.7 to 9.3 – 12.3 %
	Travel Savings	68 to 85 sec decrease
		11.8 to 14.7 % decrease
Deviation of Bus Headway	Almost 50 % decrease	
U.S. Experiences	Measure	Result
Simulation Studies		
Hypothetical Isolated Intersection	Delay for Bus	28.7 to 44.7 % decrease
	Delay for Passenger Vehicles	0.09 to 1.4 % decrease
	System wide Impacts (delay, vehicle stops, fuel consumption)	1.3 to 4.3 % decrease

Table 1-B. Recent Results of TSP Projects Outside U.S.

Experiences Outside the U.S.	Measure		Result
Field Studies			
Granville Street, Vancouver British Columbia VISSIM	Green Extension (GE) Success Rate (GESR)	Far side bus-stop	100% for detector location between 50- 200m
			Decreases for detector- location \geq 250m
		Nearside bus-stop	61% for detector location between 50-150m
			Decreases for detector location \geq 200m
		Main-line v/c ratio 0-0.475	100%
		$0.475 < v/c < 1.0$	Decrease by almost 25 %
	Bus Travel time	Main line v/c ratio 0.6-0.9 beneficial	Decrease from 14 to 13.4 minutes
		Bus headway 2-20 minute	Decrease by 1.9 to 5.1 %
	Total Delay	Entire Corridor	Decrease 2 %
		Major Traffic	Decrease 2 %
		Cross Street Traffic	0 %
		Northbound B- Line Buses	Decrease 6 %
		Northbound all Traffic	Decrease 17 %
		Southbound B- Line Buses	0 %
Southbound all Traffic		Increase 21 %	

Table 1-B. Recent Results of TSP Projects Outside U.S.

Experiences Outside the U.S.	Measure			Result
Field Studies				
Granville Street, Vancouver British Columbia VISSIM	Bus Delay	Main line v/c from 0.2 to 0.95	Far side bus-stop	Increase from 4.4 to 9.2 sec
			Nearside bus-stop	Increase from 8.1 to 13.1 sec
			% Change	Decrease from 85% to 42%
		Detector location 50- 300m	Far side bus stop	Marginal increase from 10.5 to almost 11.0 sec
			Nearside bus stop	Decrease from 9.0 to 4.0 sec
		Left Turn volume 0 – 200 veh/h	Opp. Th. v/c 0.37	Increase 0 to 32.3 Permissive LT Phase, shared LT-TH Lane
				Increase 0 to 2.0 Permissive LT Phase, Exclusive LT Lane
				Increase 0 to 0.4 Protected LT Phase, Exclusive LT Lane
			0.55	Increase 0 to 83.9 Permissive LT Phase, shared LT-TH Lane
				Increase 0 to 49.8 Permissive LT Phase, Exclusive LT Lane
				Decrease 0 to -0.1 Protected LT Phase, Exclusive LT Lane
		0.74	Increase 0 to 103.2 Permissive LT Phase, shared LT-TH Lane	
			Increase 0 to 58.7 Permissive LT Phase, Exclusive LT Lane	
Increase 0 to 0.5 and at LT volume =200, delay = 0.0 for Protected LT Phase, Exclusive LT Lane				

2.2 Review of TSP Pilot Project on U.S. 1

2.2.1 Pilot Project Description

The transit signal priority pilot project has been in operation since 2002. Eight Fairfax County Connector busses have been equipped with emitter devices. Eight bus stops in each direction have been considered, spanning across six intersections all equipped with signal detectors. The intersections start from North King's Highway / Shields Avenue from the north and run down to Popkins Lane to the south, covering a distance of about 1.3 miles as listed in Table 1 in Appendix B. All transit signal priority hardware such as signal emitters and detectors are from 3M Opticom. The system has been programmed to give a 10 second green extension to those buses equipped with emitters.

Analysis of the project was handled using the traffic simulation software VISSIM as shown in Figure 1 in Appendix B. Virginia Department of Transportation's (VDOT) provided SYNCHRO files as shown in Table 2 in Appendix D. The systems uses a Signal Control Junction based approach to model the six intersections. In VISSIM 3.6, the concept of a "time based actuated coordinated signal control system" and transit signal priority were modeled using "Vehicle Actuated Programming" (VAP). The speed of the buses comes out to 13.4 mph. Based on the field observations; the range of 12.4 to 15.5 mph was chosen for buses this analysis. Results of the analysis are used to compare to results collected in the field.

Favorable simulation results

Overall, improvements of 3.61% were found for bus service reliability and 2.64% for bus efficiency, while negative impacts were found in the form of increases in queue lengths on side streets by a maximum value of approximately one vehicle (Deshpande, Collura, Teodorovic, and Tignor, 2004).

A report about a public hearing held in February 2004 reports that according to the metro officials, the restructuring of metro buses for Route 1 will increase the transit ridership by 500 passengers per weekday (Commuter news, <http://www.commuterpage.com/cnews/column.cfm?ID=4333>).

2.2.2 Impacts of Extended Priority for the Pilot Project

The study of 20 and 30 sec green extension strategies through VISSIM 3.6 is described in this paper. For bus service reliability, there is a significant rise in the reduction percentage for the 20 second green extension as compared to the 10 second green extension; the reduction in the standard deviation is almost 26% and 37% respectively for the AM and PM peak period. Whereas for the 30 second green extension the reduction in the standard deviation is 15 % and 9 % respectively for the AM and PM peak period, comparing it with the travel time savings for 20 second green extension. Measure of bus service efficiency i.e. travel time reduction shows the similar results. There is a significant rise in the travel time savings for the 20 second green extension as compared to the 10 second green extension; the rise in the travel time savings is almost 97% and 61% respectively for the AM and PM peak period. Whereas for the 30 second green extension the rise in travel time savings is only 4% and 14% respectively for the AM and PM peak period, comparing it with the travel time savings for 20 second green extension. (Awar, Collura, Teodorovic, and Tignor, 2004)

2.2.3 Transit Operating Costs and Benefits

One studied and analyzed the economic impacts of transit signal priority on U.S. 1, at Virginia Tech (Soo, Collura, Hobeika, and Teodorovic, 2004). Transit travel time reduction of 3.61% (Deshpande, Collura, Teodorovic, and Tignor, 2004) was considered as base and the results for transit operating costs were extrapolated for entire stretch of U.S. 1. The study also gives plan for reduction in transit operating costs for different percentage reduction in transit travel times.

2.3 Objectives of Priority on extended stretch of U.S. 1 corridor

The principal objective of this traffic signal priority system is to improve the operation of the public transit system by reducing the delay it incurs at the signalized intersections. In the peak hours, whole U.S. 1 stretch suffers congestion and low serviceability for buses. With favorable results from the pilot project, TSP will be extended to include nineteen more traffic signals with detectors in 2004 (Virginia Department of Transportation, <http://www.mwcog.org/transportation/activities/clrp/descriptions/study-va-18.pdf>). In the U.S. 1 pilot project, the stakeholders including the Virginia Department of Transportation (VDOT) and Fairfax County established the following objectives. The objectives remain the same except for transit service reliability because of lack of sufficient data.

1. The system should improve the bus efficiency at which the Fairfax Connector buses operate in the corridor
2. TSP implementation should reduce delay at intersections for the transit vehicles.
3. The system should have minimal impacts on the other facility users including traffic on side streets; and,
4. The priority system should be a part of larger ITS system that includes preemption system for emergency vehicles. Provision of a safer interaction between buses and emergency vehicles is very important considering high frequency bus service along the main line during rush hours and emergency vehicle entering from the side street.

These objectives form the basis for the evaluation framework and selected measures and that are presented in this research.

2.4 Stake Holders

In this big project many stakeholders with different, conflicting interests are there. They are listed as below:

1.	Virginia Department of Transportation - (VDOT)	Traffic operational behavior i.e. traffic flows, signal timings, etc., is taken care of by VDOT
2.	Fairfax County	Fairfax County controls Fairfax Connector bus service.
3.	Metropolitan Planning Organization (MPO)	Funding of transportation projects and necessary planning is provided by MPO.
4.	Federal Agencies	Federal agencies such as federal Transit Agency, give guidance with respect to technical assistance, training available and implementation of standards, and also how to manage the limited transit funds.
5.	Traffic Engineers and Traffic Signal Operators	Traffic engineers and traffic signal operators are very important for proper implementation, operations and maintenance of bus transit priority.
6.	Bus Drivers	The implementation affects them with regards to travel time, efficiency and reliability of transit bus service
7.	Public/Riders	All of these efforts are aimed to make the transportation infrastructure more useful such that to serve public in a better way.
8.	Elected Officials	Elected Officials want to satisfy needs of their voters

2.5 Challenges in simulating extensive transportation network

Producing an extensive network like U.S. 1 stretch from North Kings Highway to Fairfax County Parkway manually can be time consuming and the minute details can become very challenging.

Big challenge lies in use of innovative Universal Traffic Data Format (UTDF) feature when majority of the network details were imported and many were missing in preparing the network this way. Completion of such network required thorough traffic engineering knowledge.

2.6 Traffic simulation Software

For beforehand study and planning of large transportation projects, traffic simulation software give in depth, faster idea to the transportation engineers. This software is faster than traditional mathematical, analytical tools. Simulation technologies have replaced traditional mathematical models and graphical user interface and animations in this field; have helped transportation engineers and planners show transportation problems to decision makers for understanding and foreseeing the dynamics of traffic movements and control operations. Many such tools are available in market and transportation professionals need to use good engineering judgment for adopting appropriate, efficient simulation tool for particular type of project.

Here, we discuss the need of traffic simulation software, different available options and widely used software, and the one, which is used in this research in depth.

2.6.1 Need of Traffic Simulation

Prior to simulation techniques, we had to use expensive, time-consuming resources in field experiments for evaluating alternative strategies. For transportation projects, different probabilities are associated with roadway geometries, traffic volumes, intersection locations, and driver behavior. Simulation tools facilitate transportation engineers analyze complex traffic situations, which cannot be provided by other traditional methods. Simulation tools provide the most detailed objective operational analysis technique available for evaluating design and traffic control features (Clark and Daigle, 1997).

A project called MUSIC was done in London, UK, which was aimed to demonstrate that by managing and optimizing the overall performance of the network using new, cost effective, traffic control strategies it will be possible to: reduce congestion; improve the efficiency of public transport; and influence mode choice. The described objectives could be achieved by using the MUSIC software package, which calculates area-wide traffic signal timings (Routledge and Smith, 1996).

2.6.2 Comparison of Some Traffic Simulation Softwares with VISSIM

The differences of various software packages are very well discussed in many of the papers referred and some of these are compared here (Deshpande, Collura, Teodorovic, and Tignor, 2004), (Soo, Collura, Hobeika, and Teodorovic, 2004), (Moen, Fitts, Carter, and Ouyang, 2000), and (Fujimoto and Leonard, 2002).

NETSIM: NETSIM is a powerful microscopic simulation tool but in a study (Chin, Cheu, and Chandrasekar, 2002) it seemed that there are few attempts of its use in studying bus priority. In the study done in Singapore, one of the possible reasons was experienced to be the difficulty in modeling some of the unique characteristics of bus operations.

TRANSYT 7F: Modeling of transit bus turning movements needs to be done by turning bus counts into passenger car equivalents, which is not the case in VISSIM.

CORSIM: Even though in CORSIM, modeling time is lesser than that in VISSIM and CORSIM is less expensive than VISSIM; the studies (Moen, Fitts, Carter, and Ouyang, 2000), have found VISSIM more capable and accurate in modeling complex roadway geometry, transit vehicles, minute field parameters like pedestrians, bus stops, trees etc. In CORSIM to simulate transit signal priority, additional C++ module needs to be developed. This means extensive programming knowledge is needed to simulate TSP in CORSIM.

VISSIM: VISSIM is stochastic microscopic simulation model. Network editing in VISSIM is done completely through graphical user interface, which gives exact idea of how your network will look like in the end. This feature is found very useful for traffic engineers (Moen, Fitts, Carter, and Ouyang, 2000). On comparison of field results to simulation results for U.S. 1 project, it was realized that VISSIM is a reliable tool for TSP simulation. VISSIM

is required in this study because it has good capabilities in providing detailed information regarding measures of effectiveness. Simulation in VISSIM 3.6 also needed use of Vehicle Actuated Programming (VAP) for modeling Transit Signal Priority. Not all transportation engineers know programming.

Why VISSIM 3.7? VISSIM 3.7 has in built feature called NEMA controller, which eliminates need for VAP for simulating TSP for specified time of green extension. For providing advanced traffic simulation VAP coding is needed. VAP comes as separate module with VISSIM 3.7 (PTV America Marketing website).

Summary

- After analyzing other available software in market, VISSIM was chosen for simulating transit signal priority on U.S. 1 pilot project. This is an extension of the previous research, so the same micro simulation software VISSIM but its new version was used here
- As discussed above, it was found that the green extension of twenty second, yields better results for transit traffic but in interest of all stake holders ten second green extension is the implemented TSP strategy for initial six intersections on U.S. 1

CHAPTER 3: RESEARCH APPROACH AND EVALUATION PLAN

In this chapter, the evaluation framework and research approach are discussed.

3.1 Evaluation Plan

The evaluation framework is needed to determine whether a project or a strategy meets the intended purposes. In U.S. 1 pilot project, the evaluation framework prepared at Virginia Tech (Chang, Collura, Dion, Rakha, Tignor, and Triantis, 2002), was used to assess the impacts of transit signal priority deployment. This research study uses the same evaluation plan.

The overall idea of this evaluation framework is explained in Figure 1.

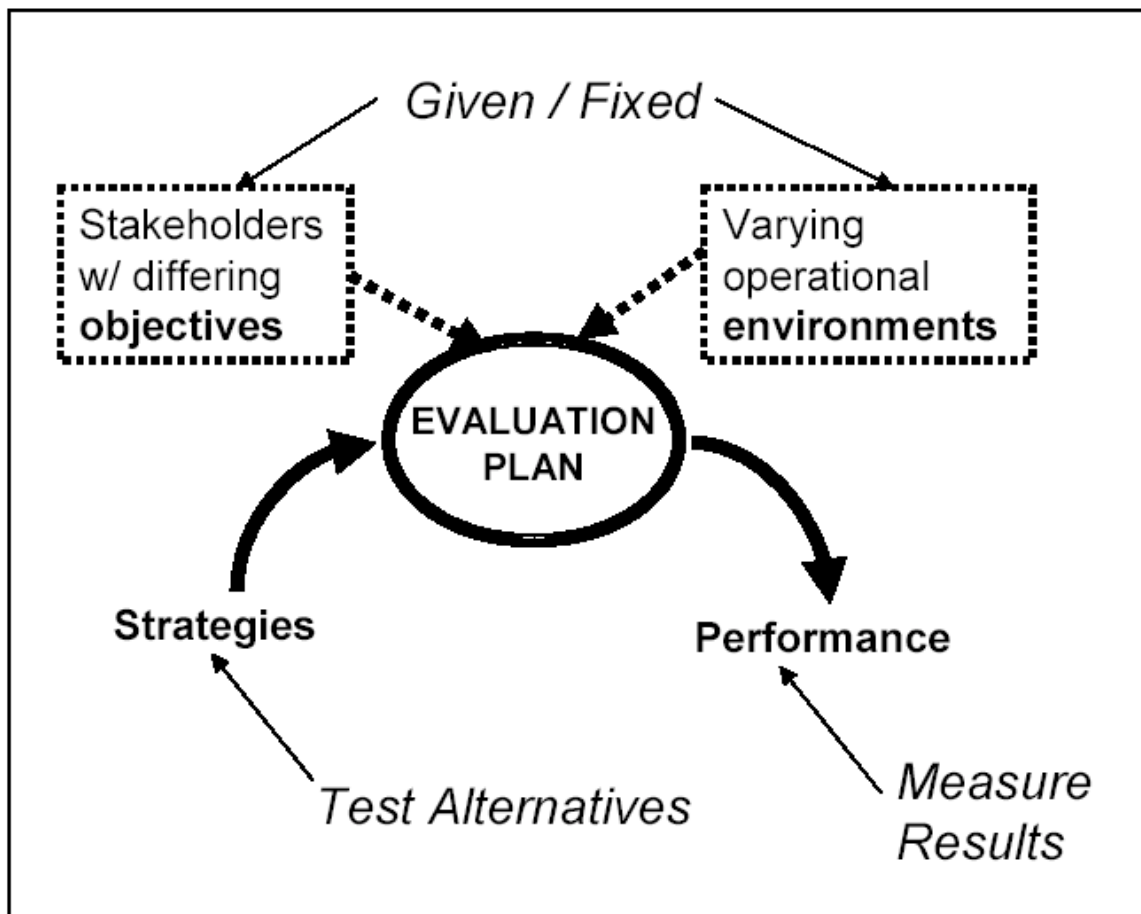


Figure 1. Evaluation Framework Concepts

In U.S. 1 transit signal priority project, there are two major stakeholders: one is Fairfax County which provides the local public transit system i.e. Fairfax Connector buses on U.S. 1; and another stakeholder is Virginia Department of Transportation (VDOT) which decides the operational environment i.e. the traffic flow pattern and traffic signal timing plans. Other stakeholders and their roles in TSP implementation are described in Chapter 2.

All the stakeholders have differing objectives. It is challenging to decide what will be achieved, how much of that will be achieved and what negative outcomes should be expected from this deployment. All possible TSP related objectives and different measures of effectiveness are shown in the Table 1 in Appendix C (Chang, Collura, Dion, Rakha, Tignor, and Triantis, 2002).

In the extensive research carried out at Virginia Tech (Deshpande, Collura, Teodorovic, and Tignor, 2004), focus was on

- The extent to which TSP could improve the schedule reliability of Fairfax Connector buses on U.S. 1 corridor.
- The extent to which TSP could improve main line i.e. U.S. 1 traffic flow
- The extent to which the TSP implementation could adversely affect the side street traffic for the U.S. 1 corridor; from Popkins Lane in the south to North Kings Highway in the north.

Depending upon the objectives and operational environment, the quantitative and qualitative measures of effectiveness were chosen in the evaluation plan. The objectives were addressed in the following categories:

Measures of Effectiveness (MOE): Following is the discussion about MOE.

- Bus Service Reliability can be measured as standard deviation of elapsed time between time points/endpoints.

- Bus Efficiency can be measured as total travel time for a passenger for a single trip measuring the travel time between end points.
- Bus control delay can be measured as average stopped delay for transit vehicles at the intersection.

The performance measures are total travel time, delay at intersection, and side street queue lengths.

Evaluation plan for the entire bus route of Fairfax Connector on U.S. 1 will be implemented through simulation using VISSIM 3.7. Evaluation of the TSP ten second green extension strategy implementation, with emitters on all Fairfax Connector buses and detectors at all the U.S. 1 signalized intersections in northbound direction can be done based on following hypothesis:

- | | |
|---------------|--|
| Hypothesis #1 | Providing priority to the Fairfax Connector buses will increase bus efficiency. |
| Hypothesis #2 | Average control delay for transit vehicle with TSP in northbound direction will be less than the average control delay for transit vehicles without TSP. |
| Hypothesis #3 | There will be very little increase in the side street queue lengths by providing the priority to Fairfax Connector buses on main line. |

3.2 Research Approach

To implement the above evaluation plan, following steps were taken:

1. Studied various solutions to U.S. 1 congestion problems, among which improvements to existing mass-transit services were in focus.
2. Understood the importance of various ITS technologies in improving the mass transit operations.
3. Transit Signal Priority - ITS technology and strategy was studied in depth for its positive results in alleviating the congestion and transit operation problems.
4. Studied the importance of micro simulation tools, compared various existing softwares for traffic engineering and selected VISSIM 3.7 for modeling the U.S. 1 traffic flow characteristics.
5. Got acquainted to VISSIM 3.7 by working U.S. 1 pilot project.
6. Used SYNCHRO and TEAPAC/PRESYNCHRO interface for importing and preparing the U.S. 1 network.
7. Configured missing NEMA signal control files, other network elements such as missing links, connectors and routing decisions.
8. Prepared the transit network with TSP elements according to field study and bus-schedules for Fairfax Connector routes 105, 106, 107 on whole U.S. 1 corridor.
9. Model was run for two basic scenarios i.e. without TSP and with TSP and also different random number seed were used to reflect different traffic patterns on the network.
10. The simulation results were compared with previously collected field data.

CHAPTER 4: Modeling U.S. 1 Pilot Project in VISSIM 3.7

Before using new VISSIM 3.7 functionality-NEMA signal controllers for a large number of intersections of U.S. 1, its' operation needed to be checked. Therefore all the traffic data of U.S. 1 pilot project network was kept the same for preparing and testing its' functionality in VISSIM 3.7. The simulation results of VISSIM 3.7 were compared with collected field data and the simulation results from VISSIM 3.6.

4.1 Assumptions for Traffic Network

In the absence of proper information and knowledge transfer, author struggled to find out the basic model parameters. Assumptions made by author are given and discussed as below.

1. The basic VISSIM network file: “AMwp20.inp”

- The six “.inp” files provided are AMwp20.inp, AMwp20hv.inp, AMwp20lv.inp, pmwp20.inp, pmwp20hv.inp, pmwp20lv.inp. There was no description provided regarding contents of these files.
- Another confusion was regarding, appending “20” in the file name. Did it mean priority for 20 seconds? VAP files provide priority. There was no significance seen of this “20”, so it was ignored.
- “wp” could mean ‘with priority ‘or ‘without priority ‘ a confusing situation. In VISSIM 3.6 transit priority is modeled through VAP files only, so the network file name did not affect other traffic characteristics. Therefore it was ignored.
- The above-mentioned files were checked for the traffic volumes and there were some differences in the traffic volumes for similar turning movement counts that were provided by the SYNCHRO file. Only traffic data from “AMwp20.inp” file matched with the SYNCHRO files data. Therefore “AMwp20.inp” was chosen as basic VISSIM network file.

2. Simulation parameters:

- Simulation parameters were changing for all six VISSIM-network files provided so the default values were used as found from the VISSIM Manual
- The random number seed was taken as 42 and the simulation speed was taken as 10 sim-second/sec

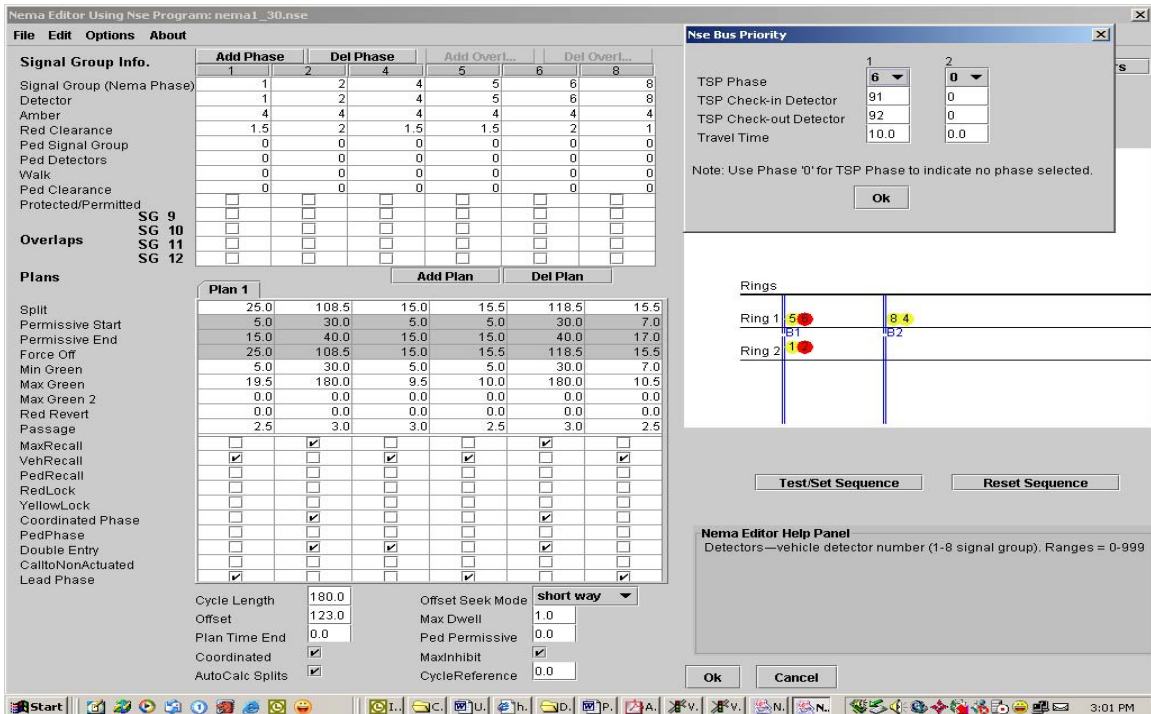
3. Signal Coordination:

- Controller Type: Fully Actuated Coordinated. There was confusion about controller type and it was believed to be semi-actuated coordinated type. As a result of discussions with VDOT representatives it became clear that the controllers were of type fully actuated coordinated.
- For majority of the intersections from Popkins to Shields, the starting phase was number “6”. Therefore for the simplicity, the network file was modified to have the phase “6” as the coordinated phase throughout the network.

4. Signal Controllers: The signal controller files were created for the U.S. 1 intersections from Shields to Popkins. For this,

- VISSIM Manual was used, the examples were studied and VISSIM help was used.
- Certain phases and the detectors, which appeared in VISSIM 3.6 work, were not considered in VISSIM 3.7 work, as they did not exist according to the SYNCHRO file.
- The phasing and traffic flow direction of given network files and that of SYNCHRO did not match fully. Initially, this mismatch was kept the same. Finally, when VISSIM nomenclature became available the mismatches were fixed.
- The pedestrian detectors and the details of the pedestrian phases were there in the SYNCHRO files but they were not found in the given network files. Even though this network did not replicate the field situation truly, to keep the data similar; it was ignored at this time. All of the SYNCHRO data was modeled in final VISSIM network.

- The terms in NEMA controller were interpreted, after studying the manual, examples and SYNCHRO files, for example:
 - Passage = minimum gap (values from SYNCHRO file)
 - Maximum Green = Total Split (VAP files' text was studied and as the information sometimes changed from SYNCHRO values, the SYNCHRO file values were used)
- The detailed timing, phasing sequence were modeled using ring and barrier diagram in NEMA signal control files. The ring-barrier diagram is shown in following NEMA file for North Kings Highway. Other NEMA files are depicted in Appendix E.



NEMA File: North Kings Highway / Shields Avenue

5. **Transit Signal Priority Detector Location:** 3M Opticom detectors are used on the field. The normal detection length ranges between 200 feet to 1000 feet (VISSIM Manual)
 - The detector range for the detectors is 200 to 300 feet as per the information provided by VDOT.

- These transit detectors are provided in such a way that checkout detector is on the intersection signal control head and the check-in detector is placed on upstream side so that the travel time between the two will be the same as the desired green extension time.
- For simulating this, the distance between the check-in and checkout detectors was kept as 200 feet uniform throughout the network.

6. Configuration of the files:

Configuration files for vehicle records, travel time, delay, green time distribution, signal controller i.e. information for phasing, and detectors were missing. Therefore using the VISSIM Manual, these files were created.

7. Initial Simulation Run:

1. Simulation ran for 750 seconds out of 3600 seconds of total simulation time.
2. Many errors for accumulation of vehicles in network on some links were found and solved as the project proceeded.

4.2 Assumptions for Transit Network

- For the project corridor, all of the routes are assumed to run for the same length and serving the same bus stops.
- Other important assumption is that only "Inbound buses" will get priority
- Bus details are given as:

Route	Number of Buses per One Hour Simulation Run
105	4
106	2
107	2

As discussed before and following the demo example "TSP_Chicago",

- Vehicle types and vehicle classes for 105, 106 and 107, for inbound buses were created.
- For outbound buses separate vehicle type and vehicle class were created.

- In field not all buses have emitters so to replicate that it was assumed that route 106 and 107 buses had emitters.
- Route 106 and 107 were grouped in one vehicle class named "TSP_Buses" as done in demo example.
- In VISSIM 3.6 network files, the travel time end points were there but the section did not capture the bus data so it was modified according to transit line in VISSIM 3.7 network file.

4.3 Transit Signal Priority Strategy

- The basic 3 M Opticom emitters and detection systems are shown in the Figure 8 and 9.
- Depending upon the travel time between the check-in and checkout detectors, the transit signal priority is given in NEMA controller logic. Travel Time was set as ten seconds.
- To determine the travel time, the average transit speed was assumed as 13.4 mph (Deshpande, Collura, Teodorovic, and Tignor, 2004).

The “NEMA bus priority” input window for TSP parameters is shown the previous NEMA file.

4.4 Comparison of the Simulation Results

Tables 2 to 6, show comparison of field and simulation results for northbound traffic, along U.S. 1 for A.M. Peak Period (6-00 to 9-00am). The traffic data was taken from year 2002 morning peak period SYNCHRO files. The field data represents data collected during the same time period.

Table 2. Results for Northbound Buses Without TSP

Description	Field Results	VISSIM 3.7 Results	VISSIM 3.6 Results:
Range of Northbound Transit Travel Time (sec)	236 to 525	531 to 610	553 to 725
Average Northbound Transit Travel Time (sec)	366	565.9	632

Table 3. Results for Northbound Buses With TSP

Description	Field Results	VISSIM 3.7 Results	VISSIM 3.6 Results		
		10 sec	10 sec	20 sec	30 sec
Range of Northbound Transit Travel Time (sec)	227 to 444	446 to 541	464 to 519	425 to 518	404 to 520
Average Northbound Transit Travel Time (sec)	351	509	492	481	480

Table 4. Results for Non-transit Vehicles

Description	Field Results	VISSIM 3.7 Results
Total Travel Time for Non-Transit Northbound Vehicles (sec)	140 to 257	200.4
Total Travel Time for Non-Transit Southbound Vehicles (sec)	112 to 250	184.33

Table 5. Results for Network Speed considering All Vehicles

Description	Field Results	VISSIM 3.7 Results
Network Speed for All Vehicles (mph)	17.12 to 27.915	27.374

Table 6. % Difference of travel time between field data and simulation results

Field Data and VISSIM 3.6 w/o priority	37 %
Field Data and VISSIM 3.6 with priority	40 %
Field Data and VISSIM 3.7 w/o priority	54 %
Field Data and VISSIM 3.7 with priority	48 %

Comments:

1. If the travel time for the south bound buses is considered, the VISSIM 3.7 simulation results match with the bus travel times from field data as well as VISSIM 3.6 simulation results
2. Considering the travel times for the northbound buses, there is significant difference observed between the field data and the simulation results of VISSIM 3.6 as well as VISSIM 3.7.
3. This difference could be reasoned by considering the dwell time of the buses, which stop at almost all the bus stops in the northbound direction. In fact at some of the bus stops, buses might not be stopping at all in the field.
4. The difference in the results from two simulation models can be reasoned mainly by considering the following facts.
 - i. In VISSIM 3.6 simulation models for TSP with 10, 20, and 30 sec green extension, all the northbound buses were given priority.
 - ii. In VISSIM 3.7, assumption was made that out of 8 northbound buses 4 buses are with emitters so in the simulation model 4 buses are assumed to get TSP.

Other VISSIM 3.7 Results:

- The average speed of all non-transit vehicles in the network falls in the range of the field results.
- The travel times of all non-transit vehicles in both the directions fall in the range of the field results.

CHAPTER 5: U.S. 1 Traffic and TSP Characteristics

5.1 Location

The study area is located on U.S. 1 from the Fairfax County Parkway in the south, to the North Kings Highway in the north. This 8.8mile stretch covers the longest Fairfax Connector bus route107. Geographic location of U.S. 1 is shown in Figure 2.

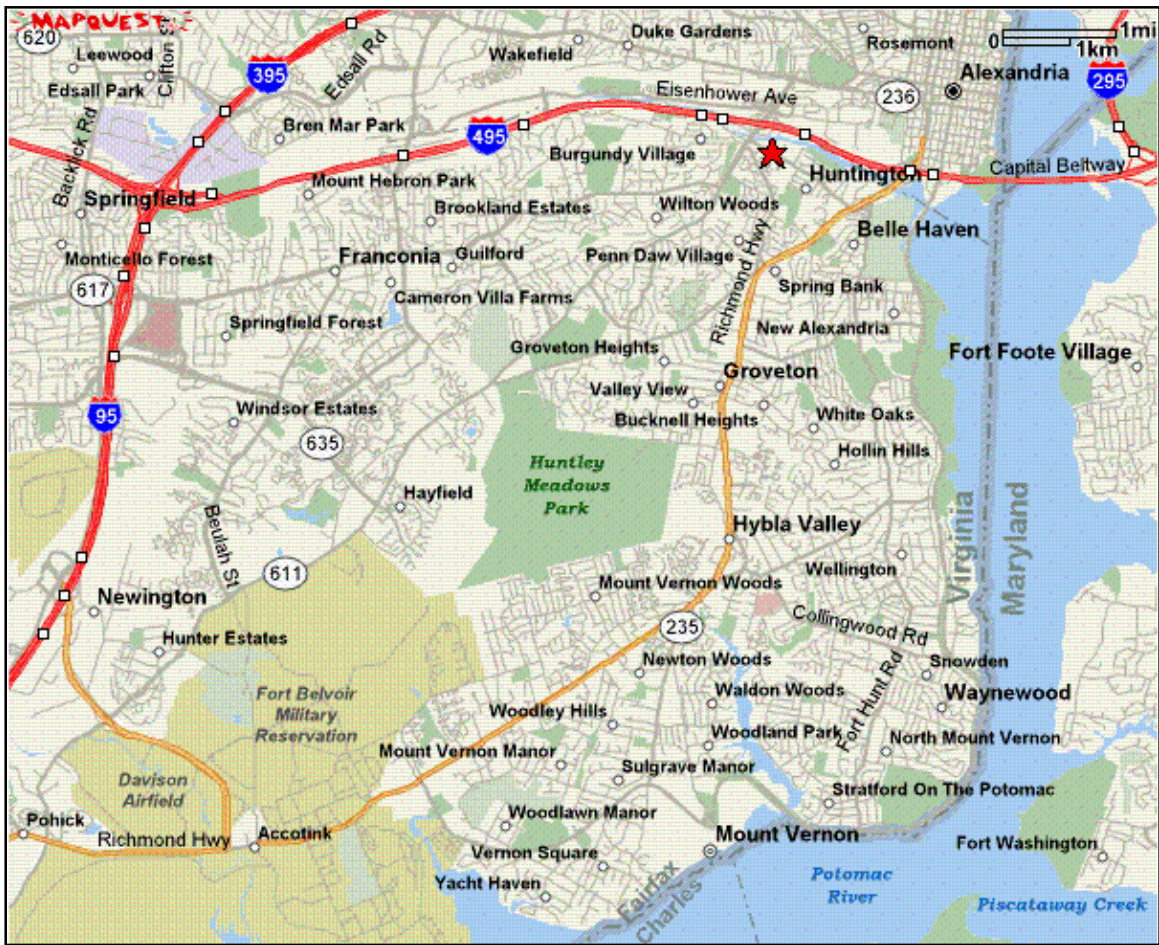


Figure 2. U.S. 1 Study Corridor

The study corridor consists of twenty-six signalized intersections listed in Table 7.

Table 7 U.S. 1 signalized Intersections

Number of Intersection (North to South)	Name Description
1	North King/Shields @ U.S. 1
2	South Kings Hwy @ U.S. 1
3	Southgate Dr @ U.S. 1
4	Beacon Hill Rd @ U.S. 1
5	Memorial St @ U.S. 1
6	Collard @ U.S. 1
7	Popkins @ U.S. 1
8	Lockheed Blvd/Dart Dr. @ U.S. 1
9	Arlington Dr. @ U.S. 1
10	Boswell/Fordson @ U.S. 1
11	Fordson Rd@ U.S. 1
12	Hybla Vally (Belford) @ U.S. 1
13	Sherwood Hall Lane @ U.S. 1
14	Ladson Lane @ U.S. 1
15	Buckman/Mt. Vernon @ U.S. 1
16	Russell/Reddick @ U.S. 1
17	Mohawk Lane @ U.S. 1
18	Buckman (South) @ U.S. 1
19	Frye Rd @ U.S. 1
20	Lukens Lane @ U.S. 1
21	Cooper St @ U.S. 1
22	Sacramento Dr. @ U.S. 1
23	Mt. Vernon Hwy/Old Mill @ U.S. 1
24	Woodlawn Rd @ U.S. 1
25	Belvoir Rd @ U.S. 1
26	Backlick Rd @ U.S. 1
27	Fairfax County Parkway @ U.S. 1

5.1.1 SYNCHRO Model

The overall SYNCHRO traffic network model supplied by VDOT is shown in Figure 3. The transportation network is broken and shown in separate SYNCHRO files for giving clear idea to the U.S. 1 intersections under consideration.

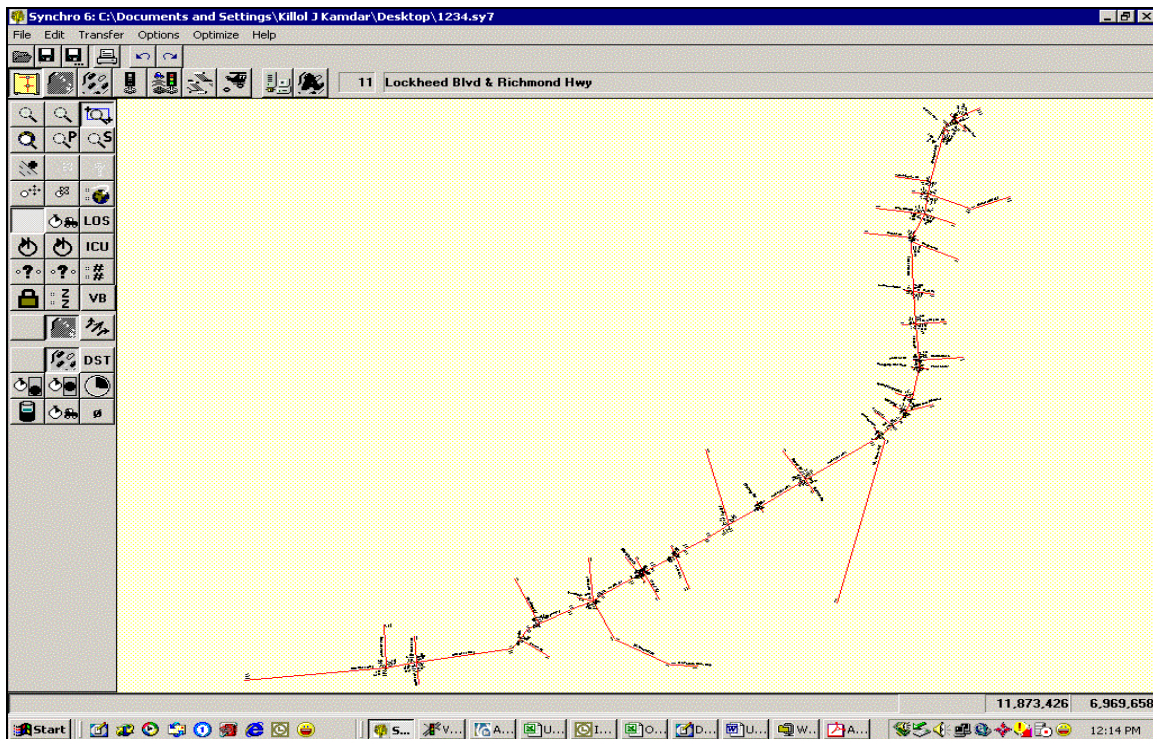
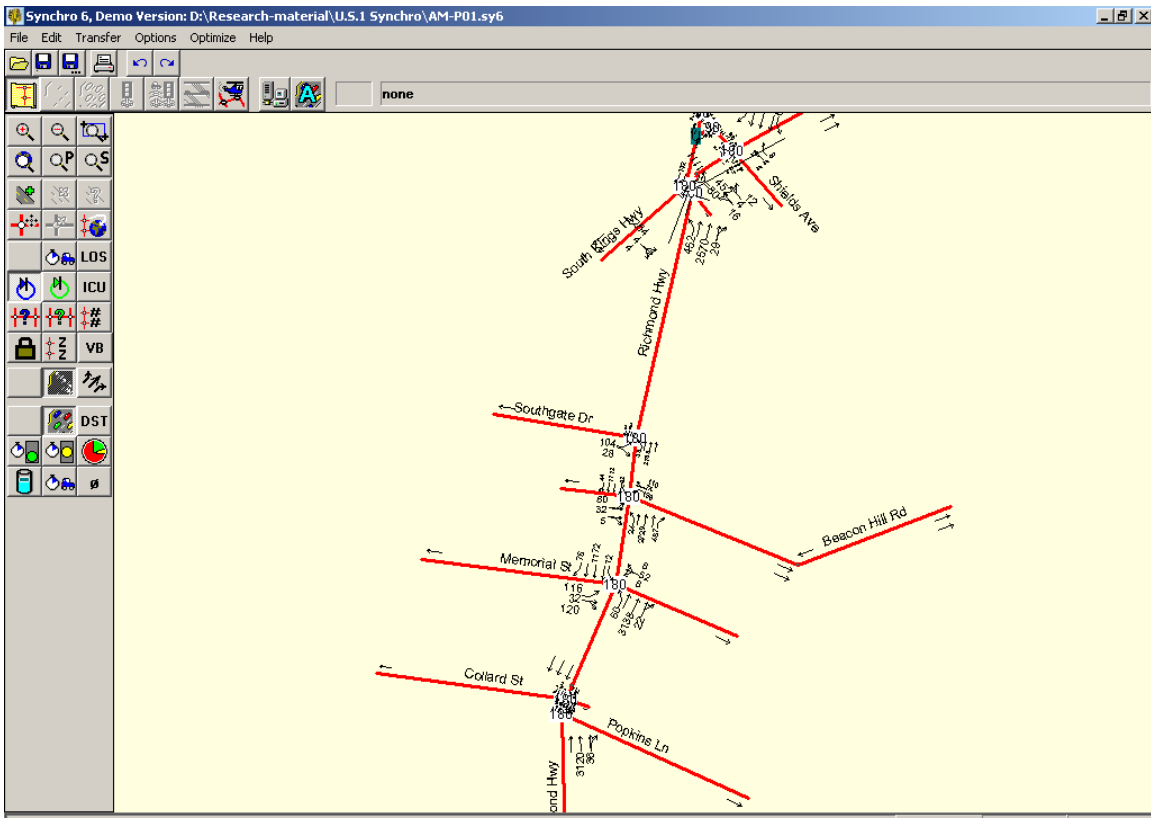


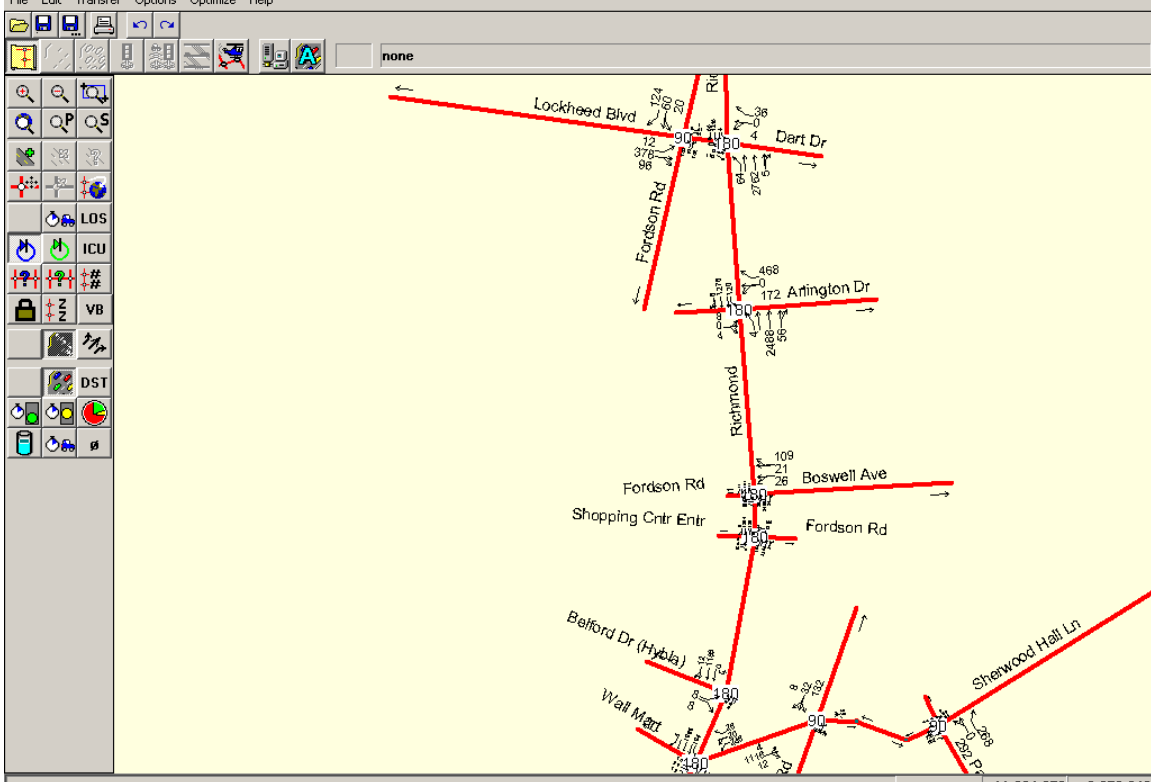
Figure 3. U.S. 1 SYNCHRO model

Timing plans for all of the signals were adjusted to start at the beginning of the green of the coordinated phases as required for the input of VISSIM NEMA control files. The details are discussed in following chapter.

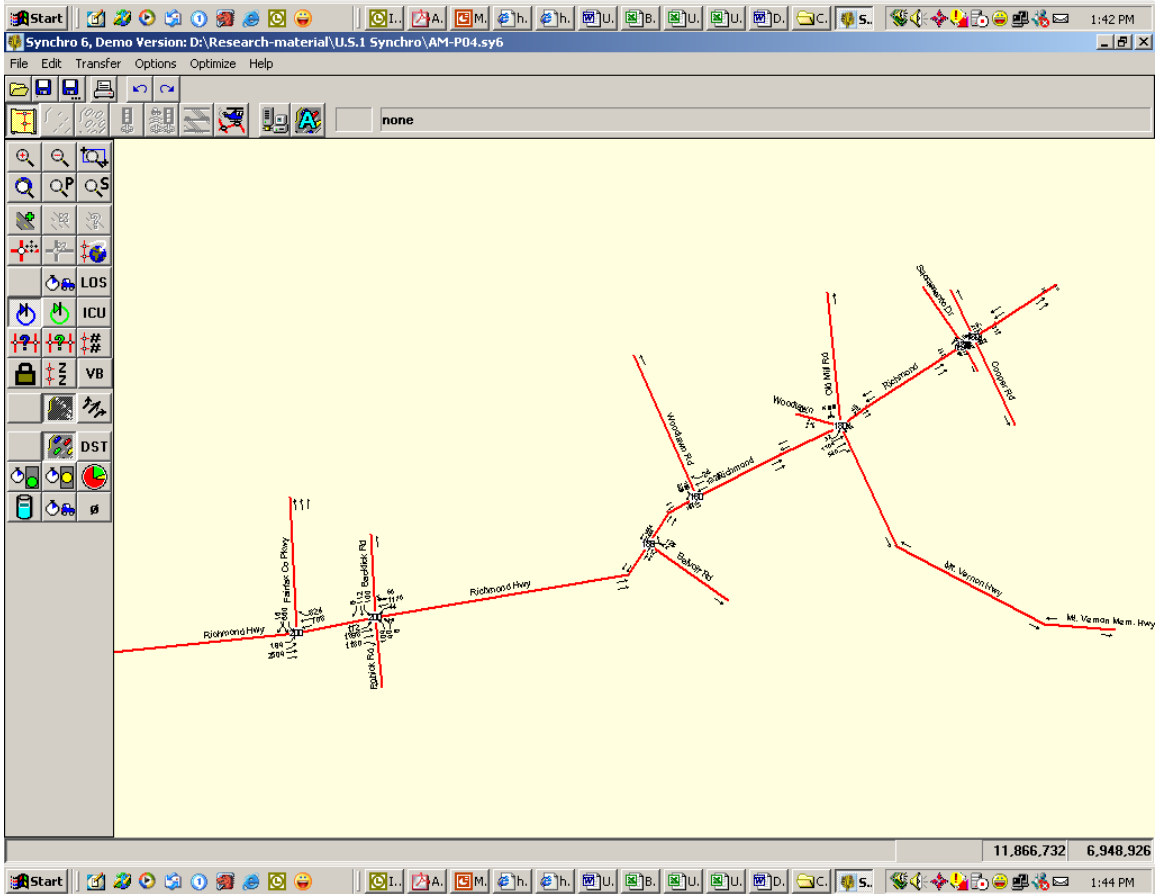
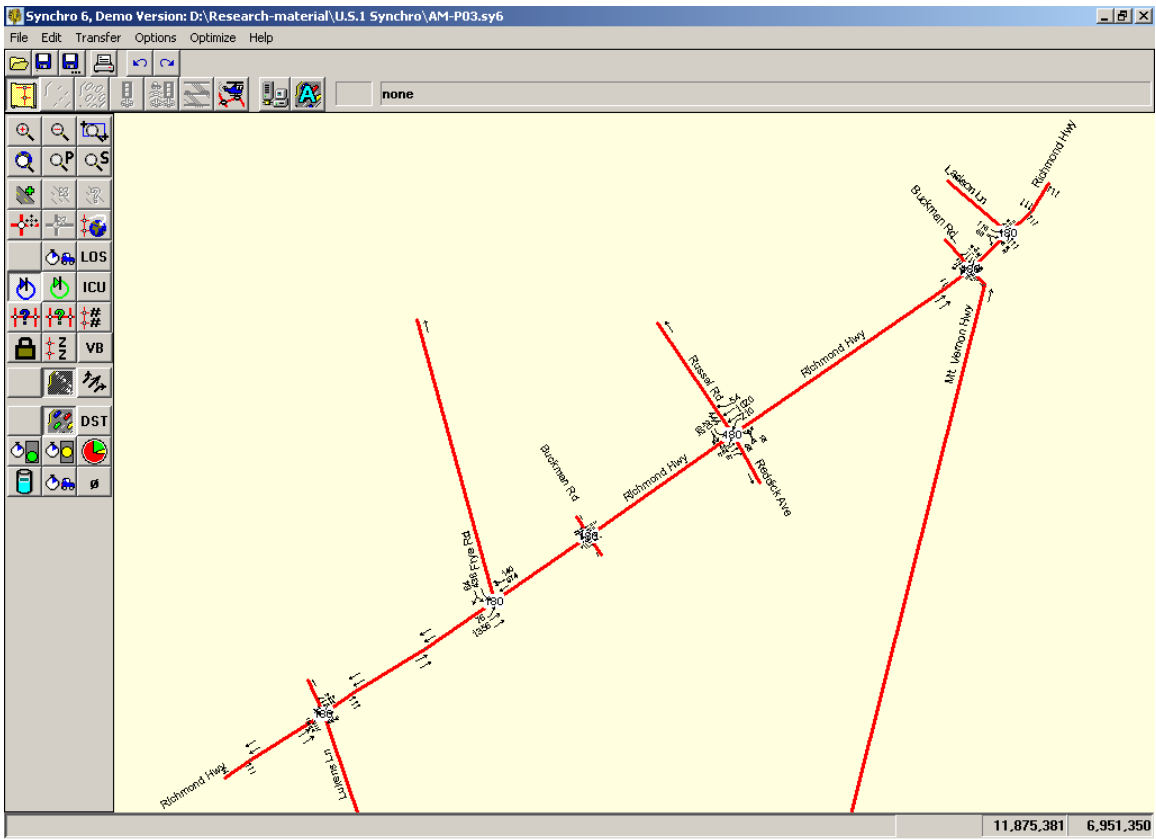


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Synchro 6, Demo Version: D:\Research-material\U.S.1 Synchro\AM-P02.sy6



Select point to center on.. 11,884,959 6,959,640



5.2 Data Collection

This research uses previously collected field data by graduate students at Virginia Tech and is used for basic comparison. Field data collected was for traffic operations during the morning peak period from 6-00a.m. to 9-00a.m. and from Popkins Lane to North Kings Highway/ Shields Avenue only. Table 8 gives some details of that study.

Table 8. Comparative Travel Characteristics-NB-AM Peak Period

Parameter	Run 1		Run 2		Run 3		Run 4		Run 5	
	Transit Vehicle	Non-Transit Vehicle	Transit Vehicle	Non-Transit Vehicle	Transit Vehicle	Non-Transit Vehicle	Transit Vehicle	Non-Transit Vehicle	Transit Vehicle	Non-Transit Vehicle
Total Travel Time(sec)	302	210	392	200	345	148	305	123	278	120
Number of Stops	7	2	7	2	6	1	6	0	4	0
Control Delay(sec)	31	87	40	64	48	17	35	0	53	0
Total Dwell Time(sec)	77	NA	91	NA	104	NA	1	NA	65	NA
Total Delay	108	87	131	64	152	17	36	0	118	0
Total Run Time	194	123	261	138	193	131	269	123	160	120
Avg. Run Speed(mph)	24.1237113	38.04878	17.931034	34.411765	24.248705	35.725191	17.39777	38.0487805	29.25	39
Avg. route Operating Speed(mph)	15.4966887	22.285714	11.938776	23.4	13.565217	31.621622	15.344262	38.0487805	16.834532	39

5.2.1 Transit Network

The transit network was prepared using Fairfax Connector schedules (Appendix G) and other data shown in Table 9, 10 and 11. Table 9 shows the travel times for different bus route, which is only the assumption and there is no field data to support it.

Table 9. U.S. 1 Bus Route Details

Fairfax Connector route	North End	South End	Route Length (mile)	Estimated Travel Time (Minutes)
105	North Kings / Shields	Buckman / Mt. Vernon	3.0	18
106	North Kings / Shields	Fordson Rd	2.0	14
107	North Kings / Shields	Backlick Rd	8.8	44

Table 10 gives statistics for total number of bus stops, number of farside and nearside bus stops and also the number of bus stops with turnout lanes.

Table 10. Bus Stop Details

Description	Northbound	Southbound
Total Number of stops	31	31
Turnout Lanes	12	7
Far side Bus Stops	9	5
Nearside Bus Stops	7	8

For an hourly simulation period, the frequency of the U.S. 1 routes 105, 106 and 107 was determined according to different route lengths as depicted in Table 11.

Table 11. Bus Start Times for the Hourly Simulation

Bus Routes	Fairfax Connector Schedule	Model
		Bus Starting Time
Route 105 NB	6:11	660
Route 105 NB	6:26	1560
Route 105 NB	6:41	2460
Route 105 NB	6:56	3360
Route 106 NB	6:14	840
Route 106 NB	6:44	2640
Route 107 NB	6:00	00
Route 107 NB	6:30	1800

The end times are given here, as they are not required in VISSIM transit coding. The total travel times and so the end times depend upon the length of the bus route, number of bus stops served, and other traffic conditions.

U.S. 1 bus stops were created using field data collected by graduate students at Virginia Tech as depicted in Figure 4.

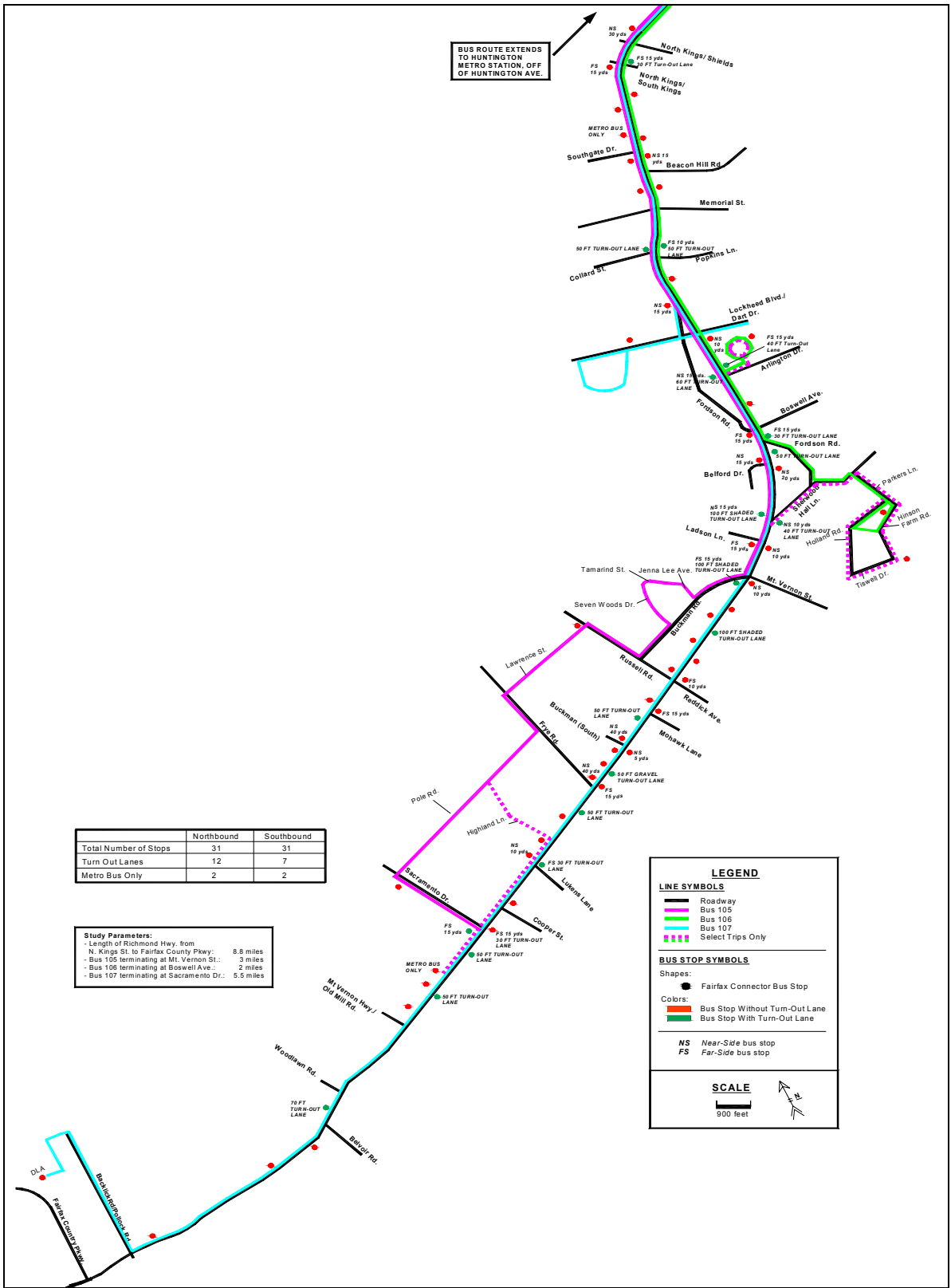


Figure 4. Field Details of U.S. 1 bus stops

5.3 Concept of U.S. 1 TSP

This section provides the perception of transit signal priority provided on U.S. 1 corridor. The concept encompasses logical and physical architecture of TSP as discussed in the following paragraphs.

5.3.1 Logical Architecture

For implementing any ITS technology, it is required to know the logical flow of information transfer at the macro level, the graphical presentation of which is called the logical architecture. Emergency vehicle preemption is often a part of this signal priority process. Therefore, in the logical architecture for TSP in Figure 5 transit signal priority and emergency vehicle preemption are shown.

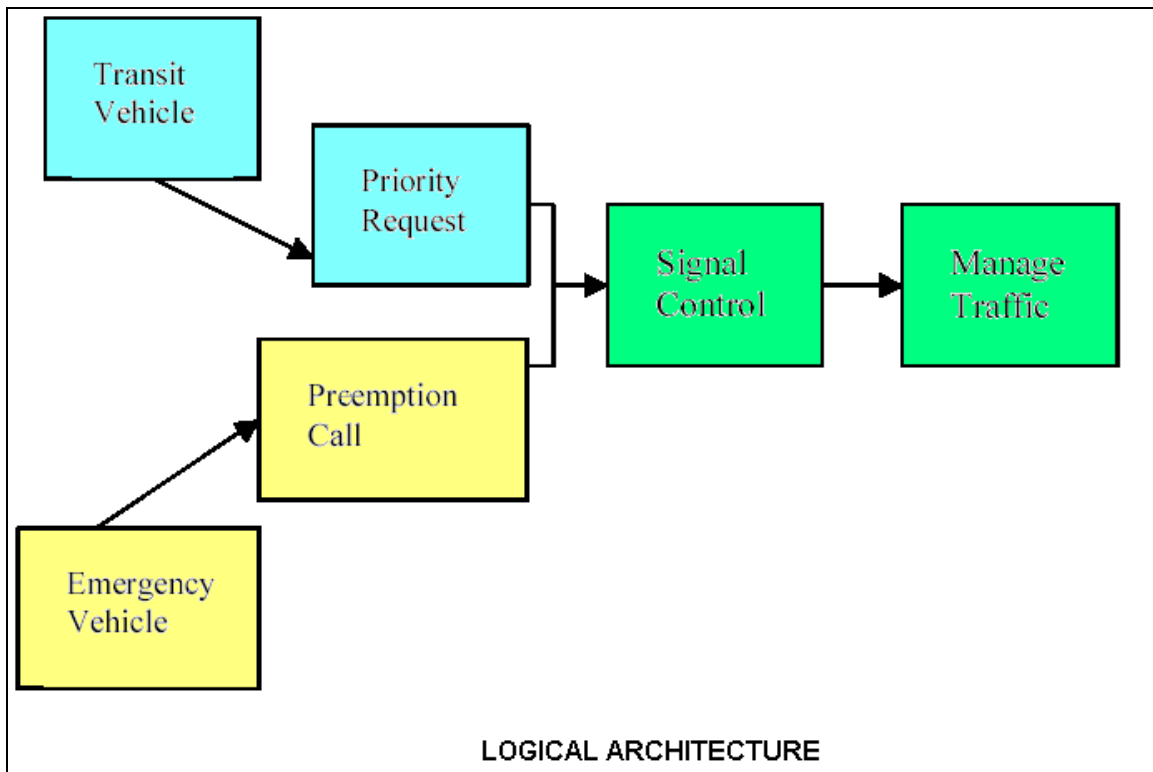


Figure 5. Logical Architecture

5.3.2 Physical Architecture

The physical architecture gives broader sense about the main systems involved in transit signal priority implementation. This can define roles and responsibilities for various stakeholders involved in particular ITS implementation. Standard ITS system architecture is comprised of four systems i.e. traveler, center, vehicle and roadside. These systems consist of a number of one or more components that are connected by a series of wire line and wireless communication systems (Chang, Collura, Dion, Rakha, Tignor, and Triantis, 2002). The primary sub-systems involved in transit signal priority technology are highlighted in Figure 6.

The center sub-systems are traffic management, transit management. They are responsible for deciding the priority strategies, the most appropriate detection technology, particular signal controller software, and finally purchasing and implementing the required equipments.

The vehicle subsystem is transit vehicle, and roadside subsystem is roadway (which contain traffic signals). With probable addition of other ITS technologies such as Automatic Vehicle Location (AVL) and Automatic Passenger Counter (APC) to this project, fleet management sub-system is also involved in this system architecture.

A study was done for three European cities - London, Turin and Gothenburg to link the transit priority at traffic signals within traffic responsive urban traffic control (UTC) systems with AVL and also includes the assessment of the potential for integration of TSP and UTC systems (Burton and Hounsell, 1993). A recent research paper (Hounsell, McLeod, and Shrestha, 2004) discusses several different system architectures for bus priority enhanced with AVL that are used in Europe.

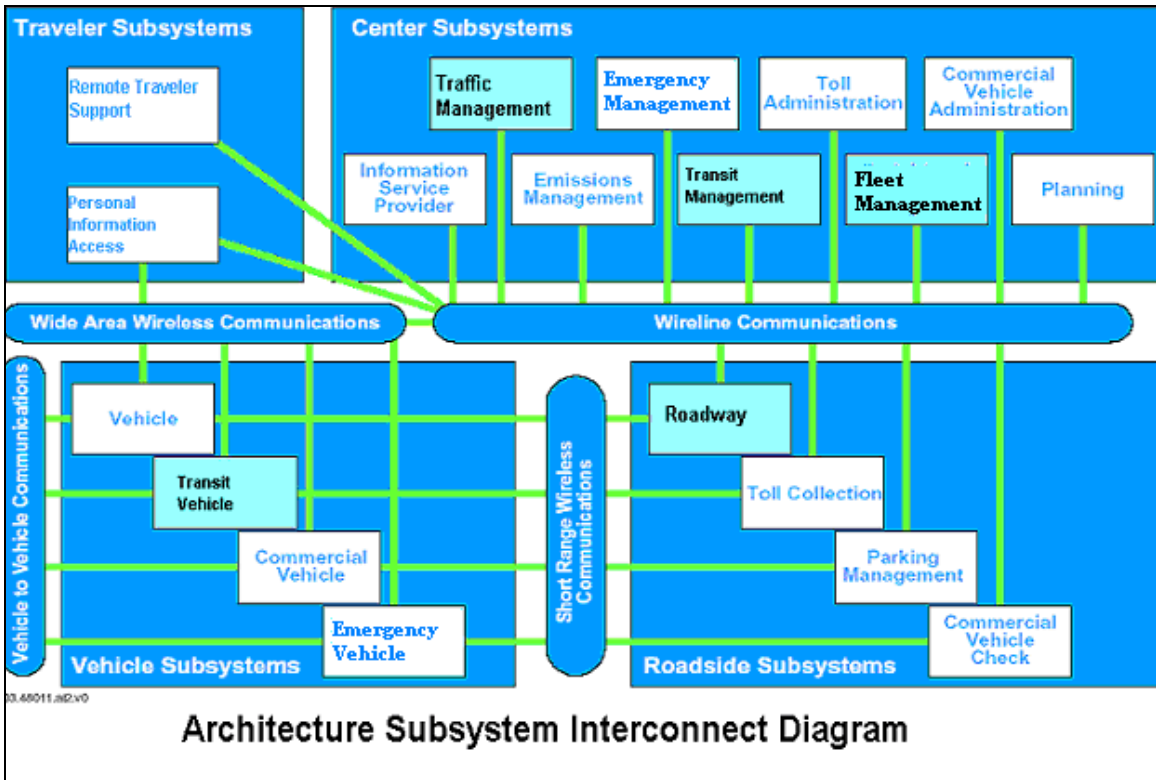


Figure 6. Physical Architecture of Transit Signal Priority Systems

5.3.3 Final System Architecture

Considering all of above factors and existence of emergency vehicle request and transit signal priority call, the system architecture shown in Figure 7 was considered for implementing this project. This shows information flow of the 3M Opticom detection technologies.

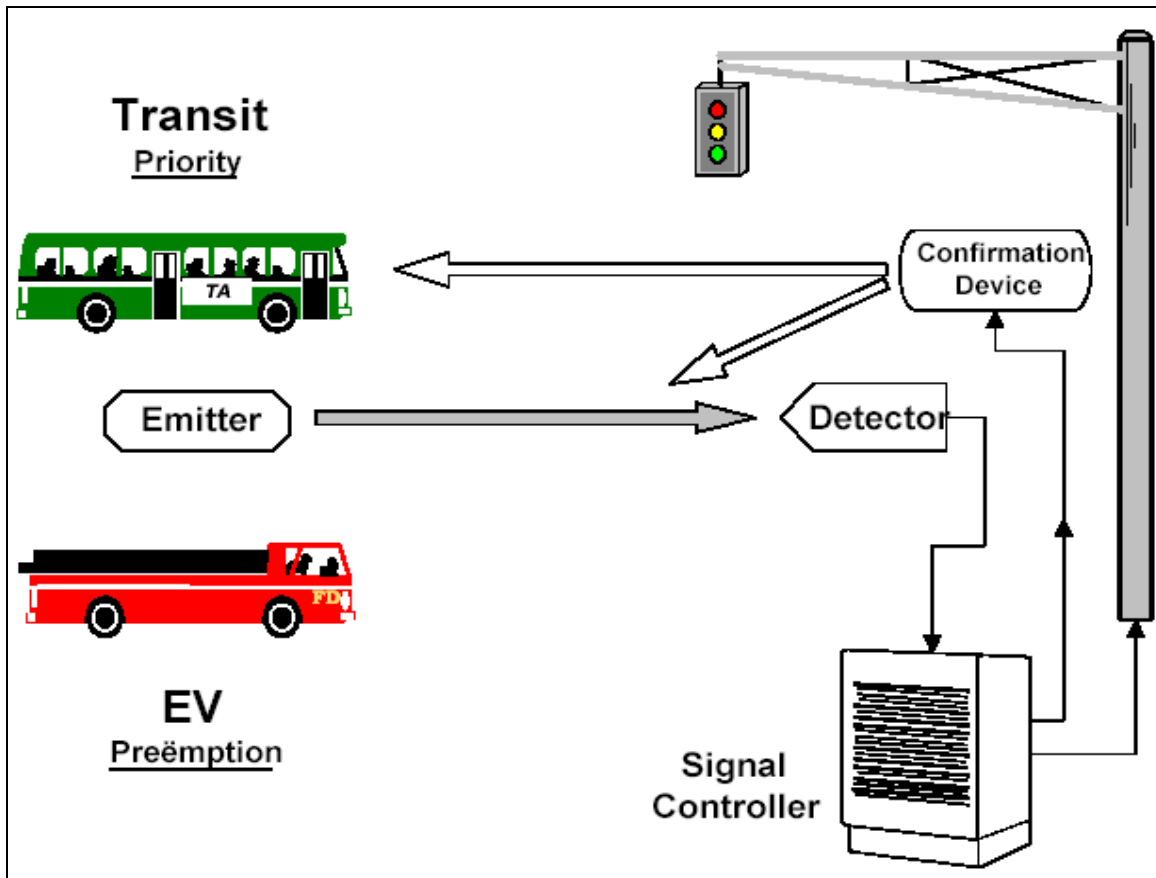


Figure 7. System Architecture for 3M Opticom Emitter Detection Systems

5.4 Implementation of U.S. 1 TSP

U.S. 1 bus priority is based on local detection of transit vehicle at every intersection. The detection is achieved through 3M Opticom emitter systems. The position of emitter on vehicle is as shown in Figure 8 and position of detector on signal head is kept as depicted in Figure 9.



Figure 8. Photographs to show 3M Opticom Emitters



Figure 9. 3M Detectors and Confirmation Light

CHAPTER 6: VISSIM Model For Extended Corridor

Based on previous studies it became clear that VISSIM, a stochastic microscopic simulation model is appropriate to use to model traffic flow characteristics as required in this study. Desired measures of effectiveness are provided as simulation results in VISSIM.

VISSIM was developed in Germany in research originating at the University of Karlsruhe, Karlsruhe, Germany. VISSIM is a German acronym for “traffic in towns – simulation”. Two major components of the VISSIM model are the traffic simulator and signal state generator.

The traffic simulator uses car following and lane changing logic, which are based upon a psychophysical driver behavior model developed by Wiedemann (1974, ITC, 2000b). Basically, this model uses perception thresholds for drivers approaching a moving vehicle and the reaction of the driver once a reaction must be taken. This reaction is then an iterative process of acceleration and deceleration of the vehicle until passing of the vehicle takes place or the paths of the two vehicles diverge. The model can process vehicle locations up to 10 time steps per second

The signal state generator operates by acquiring detector information and signal head status from the traffic simulator, processes the data, and then returns a new value for a signal head (i.e., green, yellow, or red). This process allows for greater flexibility when creating simulation networks. The signal state generator uses a language called VAP, an English acronym for Vehicle Actuated Program. This language is similar to BASIC in using an IF THEN logic structure. The VAP polls information and returns signal status to the traffic simulator once per second.

Currently efforts are being made to make simulation software more users friendly; extending the usability of these simulation tools (Clark and Daigle, 1997). VISSIM 3.7 and more recent versions provide such facility i.e. NEMA signal controllers. These

signal controllers are user friendly and eliminate the use of vehicle-actuated programming (VAP) to some extent in designing traffic signal controls and provide TSP. Of course, for emulating some other advance features, VAP is inevitable. This research uses NEMA signal controller capabilities, for simulating TSP at all twenty-six signalized intersections.

“A companion effort is underway to create a standard “Traffic Software Data Dictionary” and a database to combine the disparate roadway definitions and terms into one cohesive structure to allow the exchange of data between the models and also ease the burden of generating the input data sets” (Clark and Daigle, 1997). Today, VISSIM 3.7 imports traffic data from SYNCHRO files in “Universal Traffic Data Format (UTDF)”. In this research, the UTDF feature is used to prepare VISSIM network from SYNCHRO files provided by VDOT.

6.1 VISSIM Model Data

Table 12. Data resources

Data Elements	Data Source
Roadway Geometry	SYNCHRO file from VDOT
Traffic Characteristics	SYNCHRO file from VDOT and Previous Field Observations
Traffic Signal Control Information	SYNCHRO file from VDOT
Transit Network	Fairfax Connector Bus Schedules and Field Observations

Data resources for preparing the model are given as in Table 12. The major data requirements of the model are detailed below:

- Roadway Geometry: number of lanes, grades, reduced speed areas, pavement markings, detector locations, yield areas, stop signs, and parking areas.
- Traffic characteristics speed distributions, volumes, turning percentages, percentage of heavy vehicles, vehicle classifications, and acceleration/ deceleration distributions.
- Signal control Information: green times, clearance intervals, maximum and minimum green times, offsets, and permissive periods.

- Transit network includes routes, schedule, ridership levels, transit vehicle characteristics, and bus dwell times.

6.2 Network Modeling

Progression of the traffic on U.S. 1, at the signalized intersections in the morning peak period is from the south to the north. The performance of the network is important as more than 3000 non-transit vehicles and considerable amount of transit buses enter into the network in northbound direction.

U.S. 1 stretch of 8.8 miles from Fairfax County Parkway in south to North Kings Highway / Shields in north, is modeled for morning peak period. U.S. 1 transit network is more detailed for northbound direction for the reasons described above. Overall VISSIM Network is as shown in Figure 10.

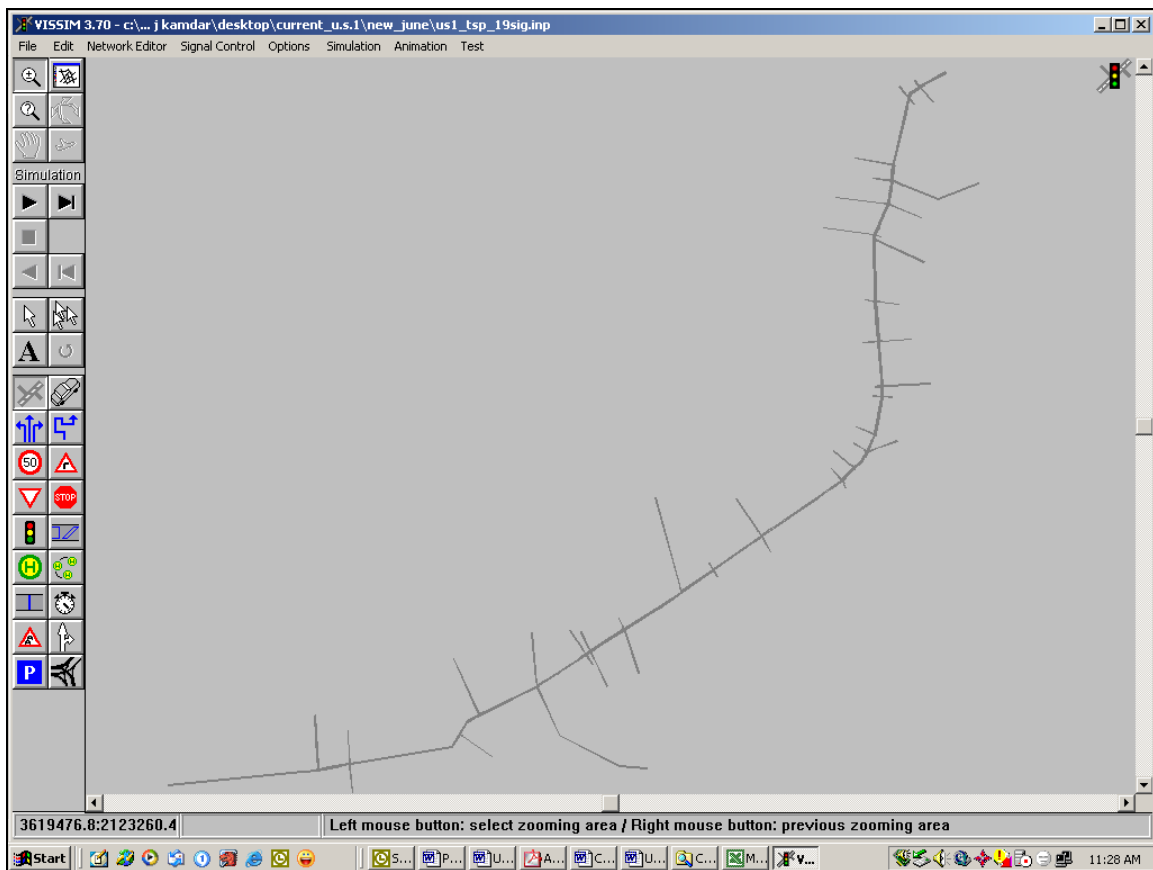


Figure 10. VISSIM Model

6.2.1 Universal Traffic Data Format

For this project Virginia Department of Transportation (VDOT) provided the traffic data through SYNCHRO files. SYNCHRO file contains the basic transportation network such as network geometry, traffic volumes, travel decisions, signal control timing and phasing information.

Usually the basic VISSIM network is prepared by using “*.bmp” or other image files as background. Then it is scaled and links and connectors are placed to create the transportation network, which is time consuming. For this research with limited time and considerably big network, new concept of importing the network through the UTDF was used in hope of saving time and avoiding duplicate work.

6.2.2 Network Import

In SYNCHRO 6.0 we can create 5 types of UTDF “*.dat” files named “layout.dat”, “lane.dat”, “volume.dat”, “timing.dat”, “phasing.dat”, which are included in Appendix H. VISSIM 3.7 requires “movement.dat” file for intersections with diagonal legs and also when the number of legs are more than four. In case of U.S. 1 almost all of the intersections have legs that are diagonally placed and some of the intersections have legs more than four. In import process VISSIM started to give all sort of errors and the network was not getting imported. With the help of SYNCHRO and VISSIM technical help, “movement.dat” file was created and the SYNCHRO file was also modified in a way to overcome difficulties. The network geometries were modified such that the other traffic data would not be affected. But in the resulting network, the original cycle lengths and the phasing times of original SYNCHRO file were dissimilar. The other effects were the links were broken and the related vehicle routing decisions were lost. Some of the examples of these errors can be seen in Figure 11. All of these errors were fixed using the VISSIM manual, technical help, and authors engineering skills.

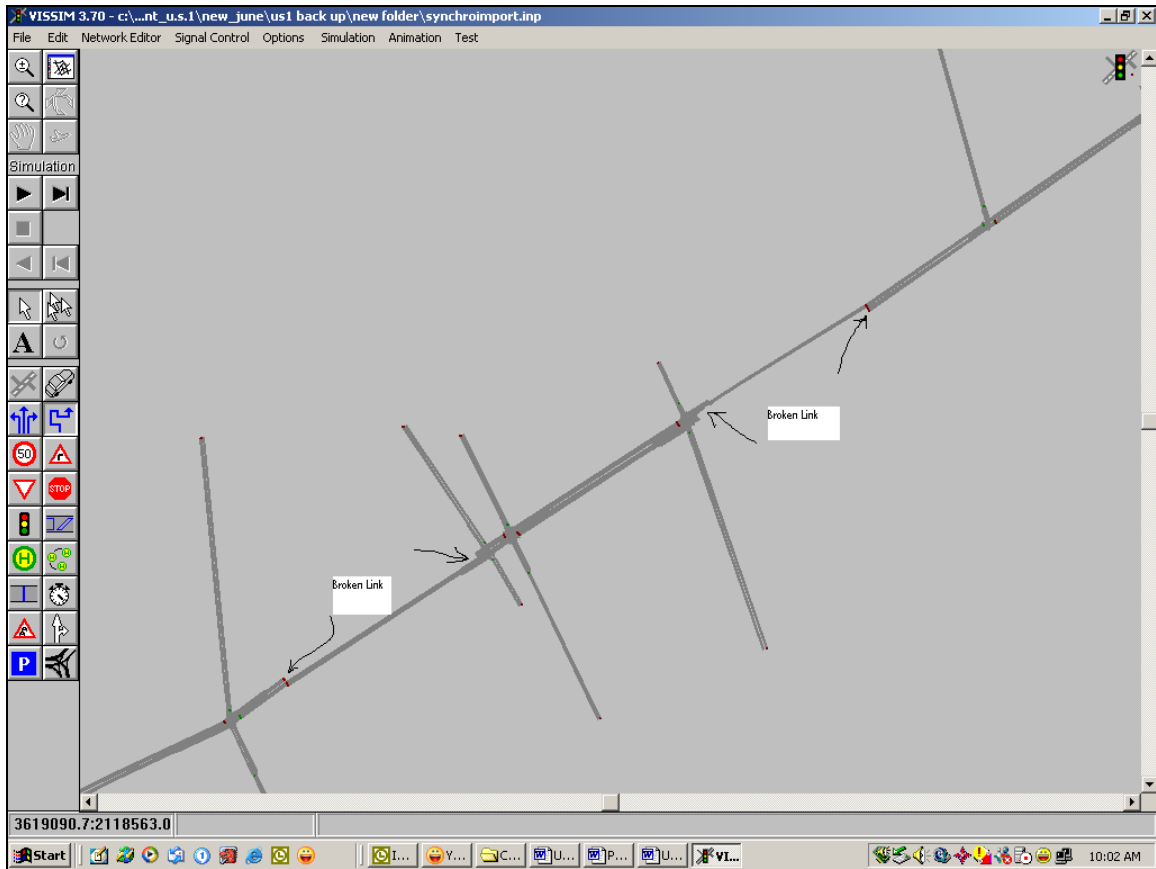


Figure 11. Examples of Errors in the Imported VISSIM Network

6.2.3 NEMA Signal Control Files and Signal Timing Plan

The signal controls, which exist in the field that regulate the signal timing and phasing plan were simulated using NEMA signal controllers.

General Signal Timing Plan Facts and Remedies:

1. The cycle lengths in the imported VISSIM network were different than found in the VDOT SYNCHRO file.
2. The zero point in SYNCHRO and VISSIM are different, so the offset values are different even though the resulting timing remains same. VISSIM default zero point is the start of green of the coordinated phase in the first ring of the ring barrier diagram in signal timing plans. SYNCHRO zero point is at the

start of green phases 1 and 6. As a result of this the imported network showed difficulties in representing these details.

3. As a result of the modification of the road direction or the intersection geometry there occurred change in the signal number, detector number, and signal phase number. This changed the phase sequence, the coordinated phase number and finally the transit signal priority phase.

The required NEMA signal control files were prepared accommodating all these facts and then also reflecting the field conditions. Following modifications were made to do this:

- The cycle lengths, the phase timing and the phase sequence for the VISSIM network were modified manually, as per the original SYNCHRO timing plan
- The SYNCHRO files modified to give the intersection offsets referenced to “Beginning of Green” for the coordinated phase in the first ring. These values were input manually in the NEMA files
- For most of the intersections, phase number two remained coordinated and the phase for transit signal priority in the northbound direction. For some of the signals, where the intersection geometry changed, phase number four became the coordinated and so it was made transit signal priority phase.

Most of the traffic signal controls were imported as NEMA files but some of the signal control files had to be created from scratch.

- In field and SYNCHRO file closely located intersection with different signal control numbers share the timing and phasing plan. But in import process, information for signal control with only the lower number gets imported.
- Two pairs of such intersections are there: (SC #10, SC #229) and (SC #23, SC #561). Signal control plans for SC #10 and SC #23 only, got imported.
- NEMA files for SC #229 and SC #561 were created using SYNCHRO file information and matching phases with imported signal control head, detector information.

Timing plans for all of the signals used in VISSIM NEMA control files, are shown in Appendix I. The related SYNCHRO files are provided in Appendix J.

6.3 Transit Signal Priority Logic

Following the system architecture, ten second green extension priority strategy was emulated by using the concept of Check-In and Check-Out detectors on network and as discussed in section 4.2.1.

Initially basic TSP emulator in NEMA controller was available so it was used for checking pilot project TSP results. But it had less functionality to limit the green extension of ten seconds. Later in this research, license for advance features of transit signal priority became available from PTV America. The signal controller logic was emulated using PEEK LMD9200 firmware running on a NEMA signal controller for each intersection. The PEEK LMD9200 was used to provide ten second green extensions if the transit service call is requested. The transit request was only served after fulfilling the emergency request call and pedestrian phase on signal control cycle.

There are some differences with regard to providing priority, between the field controller and PEEK LMD 9200. However, it was not found to be the critical issue because PEEK LMD 9200 was the controller with the least difference in providing priority compared to other available controllers. Snap shot of NEMA Controller - PEEK LMD9200 is shown in Figure 12.

In TSP implementation, the recovery time of signal control is very important to know. It is the time that the signal controller takes to transition back to its normal timing plan, after serving TSP call or preemption or time-of-day plan changes. PEEK uses the most common and the most efficient transition recovery method - SHORT WAY OFFSET SEEKING.

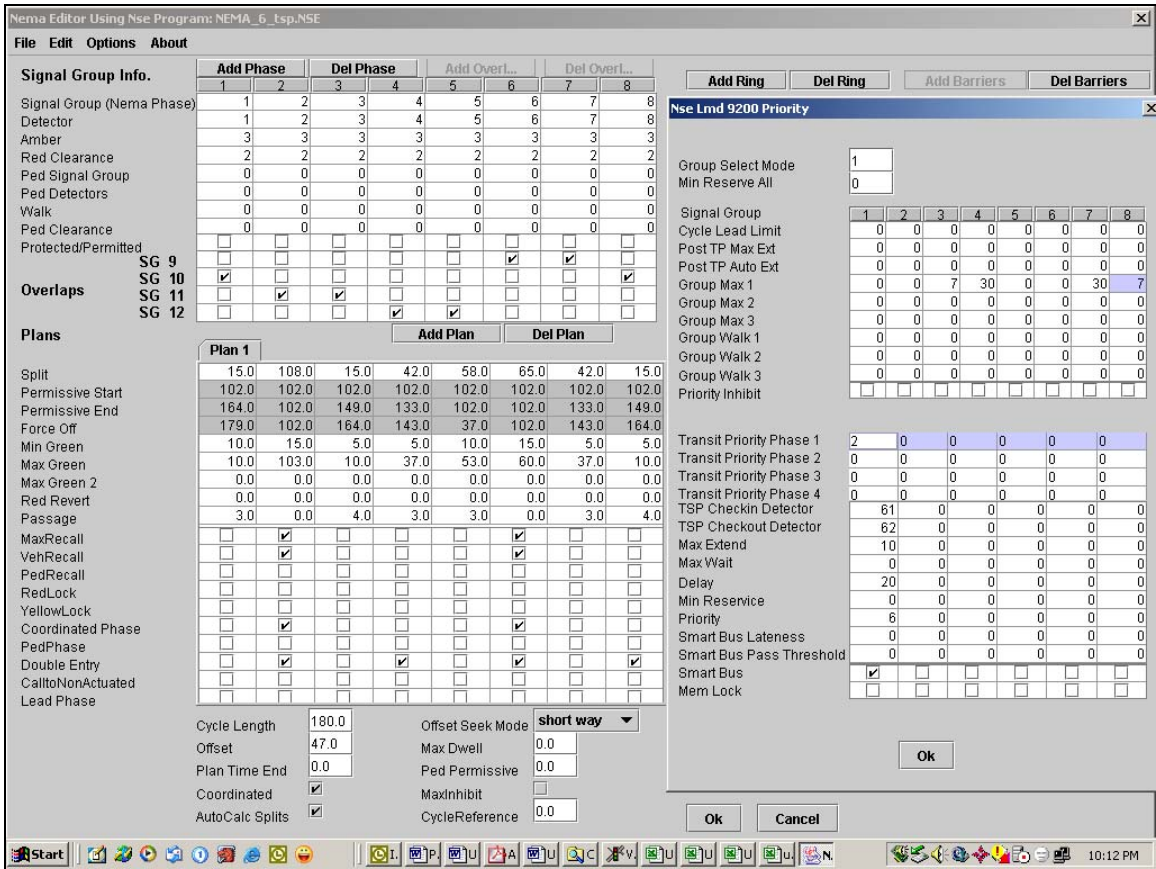


Figure 12. NEMA Controller - PEEK LMD9200

The main components used here are Group Select Mode, Group Max 1, Transit Priority Phase 1, Transit Checkin Detector, Transit Checkout Detector, Max Extend Delay, Priority and Mem Lock. Because of bug in the program (VISSIM 3.7 Technical Help), Smart Bus is checked here.

6.4 Calibration of Model

6.4.1 Traffic Network

The vehicular speeds in the network are resembled to the actual ones in the field, which was given through the SYNCHRO files.

Detection ranges of the 3M Opticom detectors that are employed in the field vary. So the detection points were assumed according to the roadway geometry and the check-in detectors were placed accordingly.

For near side bus stops, the check-in detectors needed to be placed after the bus stop is passed. By doing this the erroneous green extension and also the time wastage in passenger alighting was eliminated.

6.4.2 Transit Network

Network Transit Speed

Network transit speed was kept as 12.4 mph to 15.5 mph, similar to the field speed found from previous work done (Deshpande, Collura, Teodorovic, and Tignor, 2004).

Transit Routes

The transit network is calibrated according to the information given in Table 9, 10 and 11.

Bus stops

Bus stops are coded only for the northbound direction. Figure 13 shows how the on-street bus stops and bus stops on turn out bay are included on transit line in the VISSIM model.

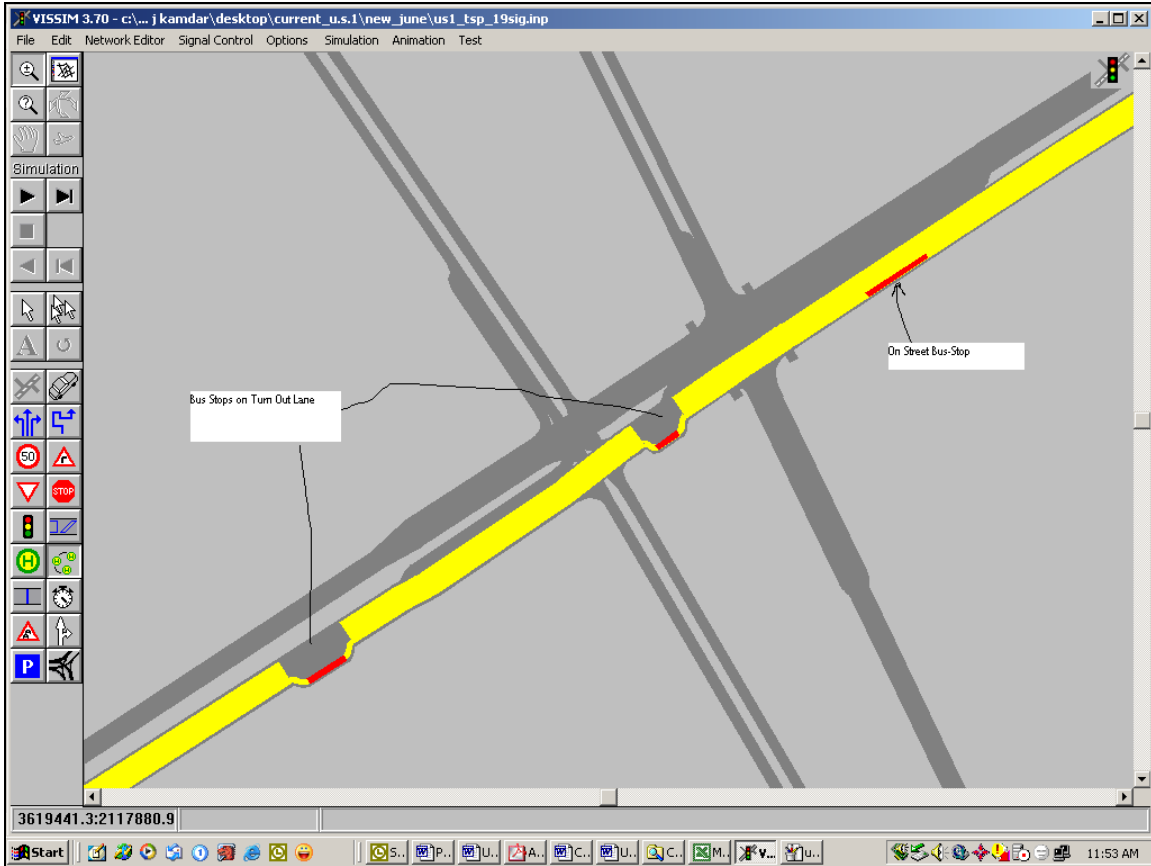


Figure 13. Bus stops on a Transit Line

Average bus occupancy from previous observations is 30 out of 50 total number of seats i.e. 60 percent, which was also used for this model.

6.5 Simulation Scenarios

The simulation was run mainly for two conditions: (1) With transit signal priority and (2) Without transit signal priority.

Different random number seeds were used to generate different traffic patterns for the network.

Table 13 details the Simulation scenarios.

Table 13. Simulation Scenarios

Distinguishing Characteristics of Simulation Runs		
Distinguishing Characteristics	Possible Values	Number of Possible Values
Priority Capability	Yes or No	2
Random Runs	3 Random Number Seeds -50, 100, 150	3
	Total Runs =	6

CHAPTER 7: RESULTS, CONCLUSIONS AND RECOMMENDATIONS

The simulation results of this research are presented in this chapter. Statistical tests were also run for the observation datasets and results of which are discussed here. Important conclusions will also be presented along with recommendations for future research.

Results

Bus Efficiency / Reduced transit travel Time

Average travel times for the buses along three different bus routes were calculated from three pairs of simulation runs. The travel time comparison between the buses without TSP and with TSP is as shown in Figure 14.

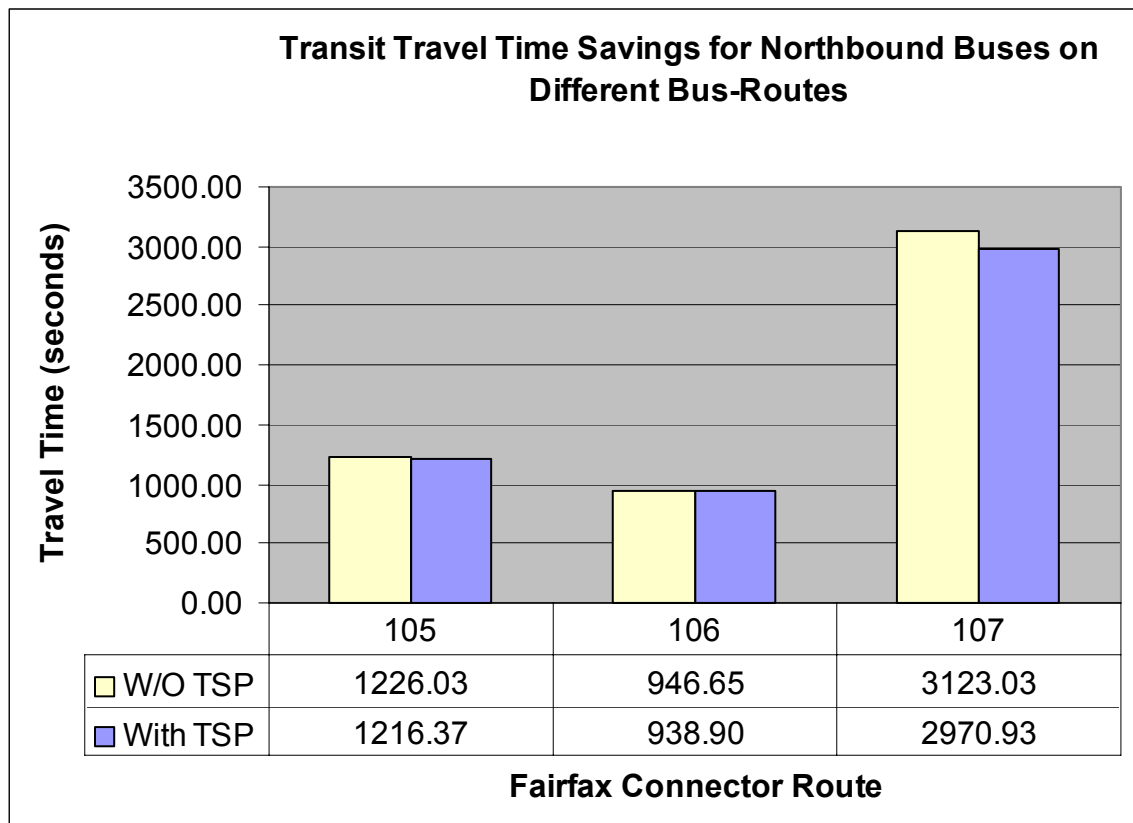


Figure 14. Comparison of Transit Travel Time

Comments:

- Simulation results show that TSP implementation can save transit travel time from 0.8% to 4%.
- The amount of the travel time saved on different bus routes depends upon
 - 1) Number of bus stops served
 - 2) Dwell time at bus stopsBoth were kept variable for different bus routes.
- The Kolmogorov-Smirnov (K-S) test showed the maximum difference between the cumulative distributions, absolute observed difference D , is 0.34. According to the formula: $D_{max} = 1.36 * \text{SQRT} ((n1 + n2) / (n1*n2))$ at the 0.05 significance level, $D_{max} = 0.56$. Here, $D < D_{max}$. Therefore the engineer cannot find a statistically significant difference (at the 0.05 significance level) when the TSP is used and is not used.
- The number of data points was 12 in comparing the without TSP results to with TSP results for route 105 travel times. The datasets and the calculations are given in Appendix K.

Reduced Bus Control Delay

VISSIM records the waiting time for transit excluding the dwell time at transit stops. Author correlated the links on which the northbound buses stopped due to red light at the intersection. Average of these waiting times gives average delay in seconds per stop at intersection, for buses on the VISSIM network. The reduced intersection / control delay for buses due to the TSP implementation is shown in Figure 15.

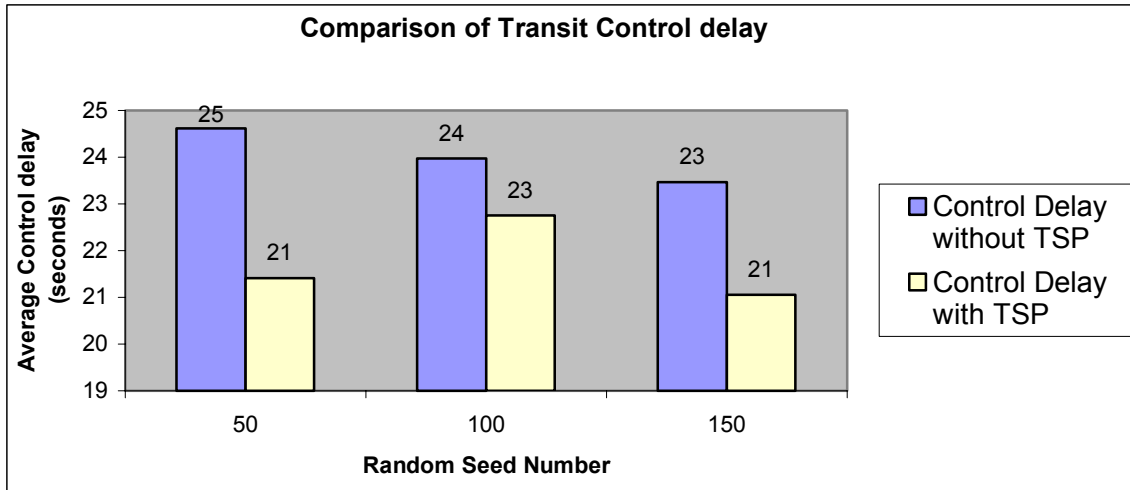


Figure 15. Reduced Bus Control Delay

Comments:

- In all of the simulation runs average control delay for transit buses with priority was found to be less than the average control delay for transit buses without priority.
- Simulation results suggest that the time saved because of reduced control delay varies between 5% to 16%
- The K-S test showed the maximum difference between the cumulative distributions, absolute observed difference D , is 0.19. According to the formula: D_{max} at the 0.05 significance level, $D_{max} = 0.35$. Here, $D < D_{max}$. Therefore the engineer cannot find a statistically significant difference (at the 0.05 significance level) when the TSP is used and is not used.
- The number of data points was 31 in comparing the simulation run results of random seed 50. The datasets and the calculations are given in Appendix K.

Other Traffic Related Impacts

Impacts on queue length on the side streets are shown in Figure 16 and the data values are shown in Table 14. The number of observations was 44 instead of $26 \times 2 = 52$ because the U.S. 1 network contains many 3-legged intersections in which case one side street needs to be observed instead of two.

Comments:

- As shown in Figure 16 on majority of the side streets the queue length was found to be more in case TSP condition compared to without TSP condition. However, on some of the links the queue lengths were found to be less in case TSP condition compared to that of without TSP condition.
- Analysis of simulation results for queue length shows that there is no increase in average queue length on the side streets over the entire U.S. 1 corridor.
- Analysis of simulation results for queue length shows that there is increase of one foot in average maximum queue length on the side streets over the entire U.S. 1 corridor.
- Considering entire U.S. 1 corridor the adverse impact i.e. increase in total queue length, for all side street traffic occurred around 1.23% for with TSP implementation.
- The K-S test results are: the maximum difference between the cumulative distributions, absolute observed difference D , is 0.09 with a corresponding $D_{max} = 0.33$. Here, $D < D_{max}$. Therefore the engineer cannot find a statistically significant difference (at the 0.05 significance level) when the TSP is used and is not used.
- The number of data points used was 44. Average queue length results without TSP and with TSP conditions was compared. The datasets and the calculations are given in Appendix K.

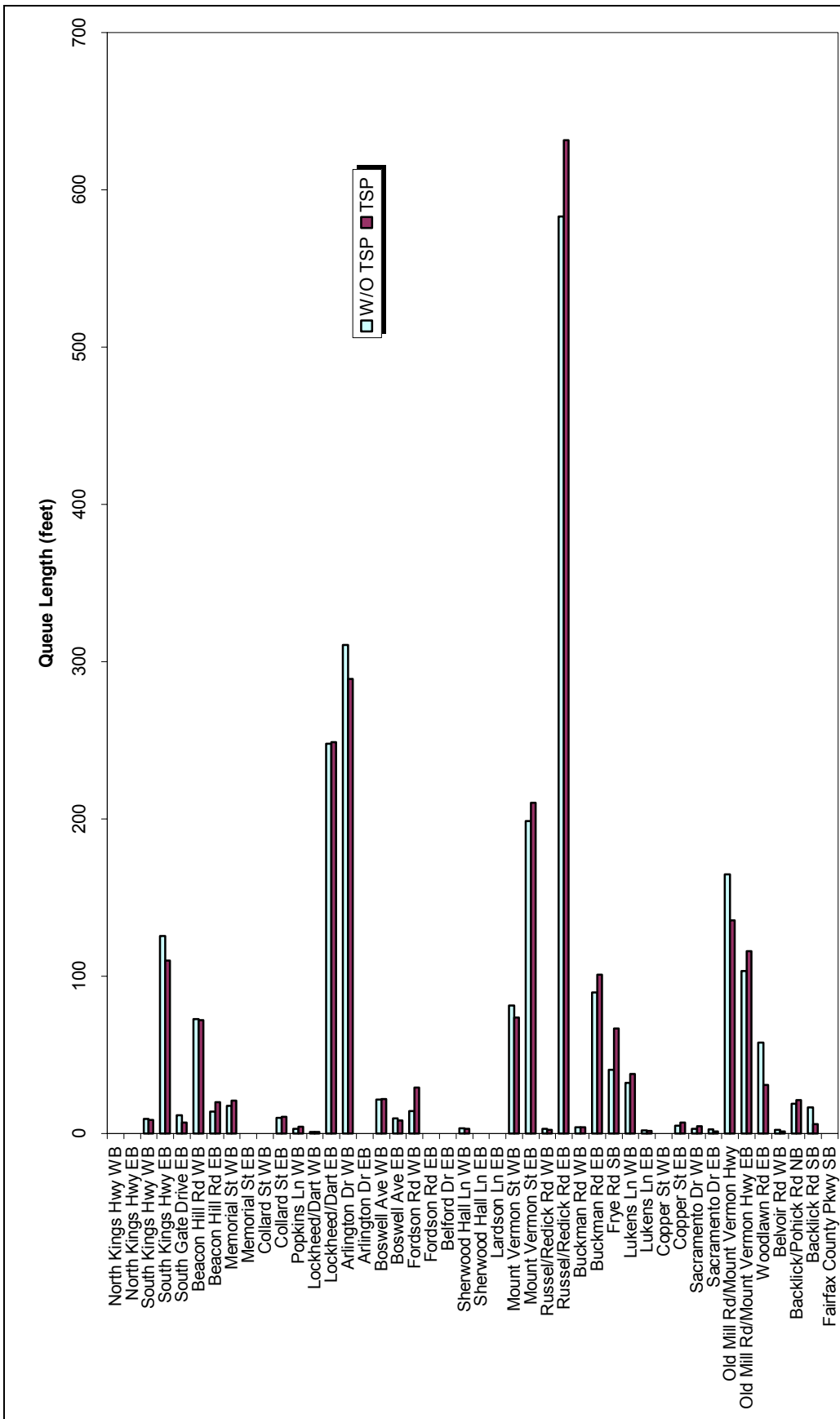


Figure 16. Side Street Queue Length Comparison

Table 14 Comparison of Queue Lengths (feet) On Side Street

Queue Counter	Name	Average Side Street Queue Length		Maximum Side Street Queue Length	
		W/O TSP	TSP	W/O TSP	TSP
1	North Kings Hwy WB	0	0	0.00	0.00
2	North Kings Hwy EB	0	0	40.89	43.19
3	South Kings Hwy WB	9	9	40.56	40.19
4	South Kings Hwy EB	126	110	359.83	343.94
6	South Gate Drive EB	12	7	99.22	66.69
7	Beacon Hill Rd WB	73	72	250.94	253.70
8	Beacon Hill Rd EB	14	20	80.11	95.65
9	Memorial St WB	18	21	77.28	81.09
10	Memorial St EB	0	0	13.33	14.56
11	Collard St WB	0	0	0.00	0.00
12	Collard St EB	10	11	60.17	59.56
13	Popkins Ln WB	3	4	44.78	67.65
15	Lockheed/Dart WB	1	1	7.00	8.22
16	Lockheed/Dart EB	248	249	330.11	333.48
17	Arlington Dr WB	311	289	817.28	805.98
18	Arlington Dr EB	0	0	6.06	3.85
19	Boswell Ave WB	22	22	110.67	119.78
20	Boswell Ave EB	10	8	43.94	45.48
21	Fordson Rd WB	14	29	101.61	152.81
22	Fordson Rd EB	0	0	0.00	0.00
24	Belford Dr EB	0	0	0.00	0.00
25	Sherwood Hall Ln WB	3	3	47.50	44.44
26	Sherwood Hall Ln EB	0	0	0.00	0.00
28	Lardson Ln EB	0	0	0.00	0.00
29	Mount Vernon St WB	81	74	204.56	210.96
30	Mount Vernon St EB	199	210	351.72	352.07
31	Russel/Redick Rd WB	3	2	33.22	27.41
32	Russel/Redick Rd EB	583	632	1056.50	1122.83
33	Buckman Rd WB	4	4	28.11	26.20
34	Buckman Rd EB	90	101	203.67	223.50
36	Frye Rd SB	40	67	301.89	361.30
37	Lukens Ln WB	32	38	134.28	148.59
38	Lukens Ln EB	2	2	28.56	21.52
39	Copper St WB	0	0	0.00	0.00
40	Copper St EB	5	7	68.89	87.19
41	Sacramento Dr WB	3	5	26.11	31.65
42	Sacramento Dr EB	3	1	46.00	26.28
43	Old Mill Rd/Mount Vernon Hwy WB	165	136	571.00	484.61
44	Old Mill Rd/Mount Vernon Hwy EB	103	116	261.50	321.72
46	Woodlawn Rd EB	58	31	319.61	225.37
47	Belvoir Rd WB	2	1	26.61	22.98
49	Backlick/Pohick Rd NB	19	21	132.39	143.91
50	Backlick Rd SB	17	6	72.78	33.93
52	Fairfax County Pkwy SB	0	0	3.94	3.04
	Average	52	52	146	147

Conclusions

An evaluation plan for TSP was developed (Chang, Collura, Dion, Rakha, Tignor, and Triantis, 2002) and implemented in a pilot project including six intersections on U.S. 1 (Deshpande, Collura, Teodorovic, and Tignor, 2004). In the research reported in this thesis the impacts of TSP on the entire U.S. 1 corridor including 26 intersections were examined.

Based on the simulation analysis, the following conclusions can be drawn:

- TSP implementation may be able to save transit travel time varying from 0.8% to 4%, which may improve the bus efficiency.
- Reduction in intersection delay for the transit vehicles varies from 5% to 16%; this suggests that with TSP implementation, there may be a reduction in transit control delay that may lead to an overall reduction in transit travel time; this tends to support the first two hypotheses.
- Total increase in maximum queue lengths, considering all side street traffic may be in the order of 1.23% with TSP implementation.
- The above conclusions are consistent with the results and conclusions reported in other TSP deployments studies (Soo, Collura, Hobeika, and Teodorovic, 2004).
- The travel time reduction can reduce the transit operating costs, which in turn can reduce recovery period for transit investments (Soo, Collura, Hobeika, and Teodorovic, 2004).

The above findings suggest that TSP is beneficial. In order to assess them statistical Kolmogorov-Smirnov tests were run for each of the performance measures, transit travel time, intersection delay, and side street queue lengths. For each of the performance measures between TSP and Non TSP results were non-significant at the 0.05 significance level. The author believes the main reason for this finding was the limited sample size of the simulation runs.

It was also concluded that when using VISSIM traffic-engineering software one should utilize a universal traffic data format to its optimum extent. This will make the simulation process faster, more effective and easier for traffic engineers and transportation planners.

Recommendations for Future Research

In this research, impacts of a ten second TSP green extension were evaluated along the entire U.S. 1 corridor for the Fairfax Connector bus routes. Future research possibilities are as:

- The results of the three performance measures was encouraging, however, it is recommended that more simulation runs be performed on the 10 second green extension strategy in the future given the statistical tests found no significant difference between the TSP and Non TSP system.
- Evaluating this network for different priority strategies such as early green, red truncation and queue jumps.
- Analyzing the impacts of using a dedicated lane for transit buses along with TSP.
- Integrating other ITS technologies such as GPS based Automatic Vehicle Location (AVL), Automatic Passenger Counters (APC), and some advanced transportation software for bus scheduling along with TSP.
- Modeling these ITS features, conditional TSP can be provided to the buses with a certain number of passengers or buses running late by some desired time.

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Appendix A: Transit Signal Priority Results

Table #1 Previous Transit Signal Priority Impacts

Strategy	Deployment	Simulation
Signal Optimization	2% - 5% ⁽¹⁾⁽²⁾⁽³⁾	None
Green Extension Only	0% - 9.7% ⁽²⁾⁽³⁾⁽⁴⁾	0% - 6% ⁽⁴⁾⁽¹⁵⁾⁽¹⁶⁾⁽¹⁷⁾⁽¹⁸⁾
Red Truncation Only	None	1% - 10.6% ⁽¹⁸⁾
GE + RT	1.4% - 20% ⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾⁽⁵⁾⁽⁶⁾⁽⁷⁾⁽⁸⁾⁽⁹⁾	1.6% - 14.2% ⁽⁴⁾⁽¹⁸⁾
GE + RT + Queue Jump	0% - 18% ⁽¹⁰⁾⁽¹¹⁾⁽¹²⁾	None
Combinations	1.8% - 28% ⁽³⁾⁽⁷⁾⁽¹¹⁾⁽¹³⁾⁽¹⁴⁾	2.7% - 17.6% ⁽¹⁸⁾⁽¹⁹⁾

Appendix B: Detection Technologies

Table 1: Detection Technologies used for Transit Signal Priority

Media And Vendor.	Components	Activation	Strengths	Limitations	Special Feature or Notes
Light (Infrared light) 3M	<ul style="list-style-type: none"> • Infrared strobe emitters. • Infrared detectors. • Phase selector card 	By a switch or automatic mechanism.	Popular technology, Readily available, Separate high and low priorities for emergency and non-emergency vehicles. Individual vehicle logging	Dependent on good visibility conditions, Possibility of interference with neighboring intersections, limited transfer capability	Optional conformati on light, Vehicle identificati on numbers are coded in the message for particular emitter.
Light (Infrared light) Optronics/To mar Strobecom	<ul style="list-style-type: none"> • Infrared strobe emitters. • Infrared detector. • Interface device. 	By switch or automatic mechanism.	Compatibilit y with Opticom Vehicle level control, used for different vehicle classes.	Performanc e hampered by visibility issues, low data transfer potential.	Optional Confirmati on light, Vehicle identificati on numbers are coded in the message for particular emitter.

Light (Infrared light) Novax Bus System.	<ul style="list-style-type: none"> • Infrared transceiver(“VTM”) • Detection modules (“VDMs”) • Receiver unit (“VIL”). 	By a switch or automatic mechanism.	No wiring required from the detector to controller. Infrared technology is resistant to RF and EMI interference.	Receiver needs an RF antenna. Getting AC power for detector is difficult.	Uses “Sidefire” configuration with curbside detectors.
Sound. Sonem 2000	<ul style="list-style-type: none"> • Directional microphone array. • Controller card 	By sirens of different types, frequencies and periods.	Does not depend on visibility, No additional equipment on transit vehicle, facilitates interjurisdictional deployment.	Does need some audible signal from the vehicle. Susceptible to false alarms.	Conformati on light, operates on sirens in yelp, wail, or hi-lo frequencies .
Sound. EPS-II	<ul style="list-style-type: none"> • Digital sound wave recognition system. • Phase selector unit. 	Special siren emitters or electronic sirens.	Does not depend on line of sight or visibility issues. No modifications needed for emergency	No data transfer capability. Susceptible to false alarms.	

			systems.		
Loop-detector. IDC Loopcom.	<ul style="list-style-type: none"> • Low frequency transponders • Standard pavement loops connected to a special amplifier. 	Pavement Loops.	Does not depend on line of sight or visibility issues. Can be used for high and low priority.	Depends on the performance of appropriately placed loops.	
Push-button.	<ul style="list-style-type: none"> • Push-button activation device. 	By a button.	No additional equipment on the vehicles. Simple and reliable hardware. Performs in all weather.	No remote activation is possible. Human activation dependent. May be untimely due to travel time to the intersection.	Can only be used for Emergency vehicles.
Radio. TOTE	<ul style="list-style-type: none"> • RF tag readers. • Amtech AVI185 read/write tags 	By radio frequency tags.	Does not depend on line of sight or visibility issues. Can be used for high and low priority.	No phase selector functionality. All tags need suitable mounting location, power, and communication	

				ions capability.	
Radio. Econolite EMTRAC	<ul style="list-style-type: none"> • Intersection-mounted antenna. • Receiver. • Bus-mounted spread spectrum transmitter. 	Transmitter.	Individual logging possible. Can be used for high and low priority.	Non-directional nature requires vehicle to provide approach direction. Potential for malfunction due to compass failures.	
Radio / GPS-AVL. Priority One.	<ul style="list-style-type: none"> • Radio transmitters placed on vehicles. • Radio receivers at intersection. • The GPS-AVL component 	Radio transmitter.	Predetermination of intersections is possible.	Susceptible to accuracy issues. Not good for closely spaced intersections.	
Orbtrac 300	<ul style="list-style-type: none"> • Complete bus management system. 	Relays or On-bus processors.	Does not depend on line of sight or visibility issues.	Central management system is needed.	

Appendix C: Evaluation Measures

Table 1 Evaluation Measures

Objective	Measure	Measurement
<i>1.0</i> Bus Service Reliability (transit schedule adherence)	<i>1.1</i> On Time Performance	% of arrivals in on-time window at timepoint(s)
	<i>1.2</i> Time Reliability	Standard deviation of elapsed time between timepoints / endpoints
	<i>1.3</i> Perceived OTP	Survey measure of rider opinion
	<i>1.4</i> Spacing	Maximum headway measured at timepoint(s)
	<i>1.5</i> Arrival Reliability	Standard deviation of delta (actual time vs. scheduled) at timepoint(s)
<i>2.0</i> Bus Efficiency (transit travel time savings)	<i>2.1</i> Run Time	Elapsed time(mean) between start and end points
	<i>2.2</i> 95%-ile RT	95%-ile elapsed time between start and end points
	<i>2.3</i> Trip Time	Weighted passenger time on board / in-vehicle
	<i>2.4</i> Perceived Travel Time	Survey of change in riders' opinions before & after
<i>3.0</i> Other Traffic-Related Impacts	<i>3.1</i> Overall Delay	Delay by [corridor/intersection], [person/vehicle]
	<i>3.2</i> # of stops	Stops by [corridor/intersection], [person/vehicle]
	<i>3.3</i> Mainline Travel Time	%-ile / average operating speed
	<i>3.4</i> Cross Street Delay	Maximum / 95%-ile delay, average delay
	<i>3.5</i> Fuel Consumption / Emissions	Model output for corridor, average per vehicle
	<i>3.6</i> Overall System Efficiency	Throughput achieved vehicles per hour, persons per hour
	<i>3.7</i> Intersection Safety	Red light running / accident frequency

Appendix D: U.S. 1 Pilot Project Features

Table #1 List of Intersections for Pilot Project

1	Popkins Lane @ U.S. 1 and Collard Streets @ U.S. 1
2	Memorial Drive @ U.S. 1
3	Beacon Hill Road @ U.S. 1
4	Southgate Drive @ U.S. 1
5	South Kings Highway @ U.S. 1
6	North Kings Highway/ Shields Avenue @ U.S. 1.

Note: Popkins Lane @ U.S. 1 and Collard Streets @ U.S. 1 are very close and same signal control works for both, so we'll consider them as one intersection

Table #2 the data requirements for the model and its sources are provided below:

Data Requirements	Data Sources
Geometric Characteristics	Synchro file from VDOT
Traffic Characteristics	Synchro file from VDOT & Field Observations
Traffic Signal Control	Synchro file from VDOT
Transit Information	Fairfax Connector Buses & Field Observations

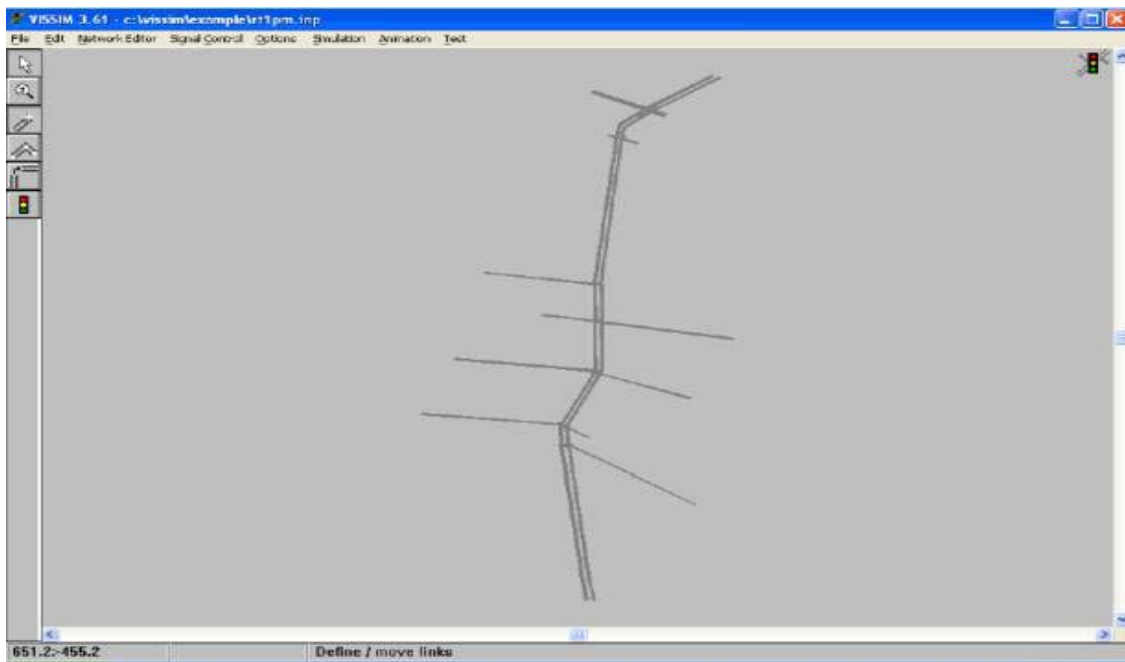


Figure 1. VISSIM Model for U.S. 1 pilot Project

Appendix E: NEMA Control Files for the Pilot Project

North Kings Highway / Shields Avenue

Nema Editor Using Nse Program: nema1_30.nse

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add Over...		Del Over...	
	1	2	4	4	5	6	8	8
Signal Group (Nema Phase)	1	2	4	4	5	6	6	8
Detector	1	2	4	4	5	6	6	8
Amber	4	4	4	4	4	4	4	4
Red Clearance	1.5	2	1.5	1.5	2	2	1	1
Ped Signal Group	0	0	0	0	0	0	0	0
Ped Detectors	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0
Ped Clearance	0	0	0	0	0	0	0	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SG 9
SG 10
SG 11
SG 12

Overlaps

	1	2	4	4	5	6	8	8
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Plans

	Add Plan		Del Plan	
Plan 1	1	2	4	4
Split	25.0	108.5	15.0	15.5
Permissive Start	5.0	30.0	5.0	5.0
Permissive End	15.0	40.0	15.0	15.0
Force Off	25.0	108.5	15.0	15.5
Min Green	5.0	30.0	5.0	5.0
Max Green	19.5	180.0	9.5	10.0
Max Green 2	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0
Passage	2.5	3.0	3.0	2.5
MaxRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Double Entry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 123.0 Max Dwell: 1.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Nse Bus Priority

TSP Phase: 6 0
 TSP Check-in Detector: 91 0
 TSP Check-out Detector: 92 0
 Travel Time: 10.0 0.0

Note: Use Phase '0' for TSP Phase to indicate no phase selected.

Ok

Rings

Ring 1: 5, 8, 4, 1, 81, 82
 Ring 2: 1, 8, 4, 1, 81, 82

Test/Set Sequence Reset Sequence

Nema Editor Help Panel
 Detectors—vehicle detector number (1-8 signal group). Ranges = 0-999

Ok Cancel

South Kings Highway

Nema Editor Using Nse Program: nema2_29.nse

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add Over...		Del Over...	
	1	2	4	4	5	6	8	8
Signal Group (Nema Phase)	1	2	4	4	5	6	6	8
Detector	1	2	4	4	5	6	6	8
Amber	4	4	4	4	4	4	4	4
Red Clearance	1	1	1	1	1	1	1	1
Ped Signal Group	0	0	0	0	0	0	0	0
Ped Detectors	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0
Ped Clearance	0	0	0	0	0	0	0	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SG 9
SG 10
SG 11
SG 12

Overlaps

	1	2	4	4	5	6	8	8
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Plans

	Add Plan		Del Plan	
Plan 1	1	2	4	4
Split	32.0	41.0	15.0	15.0
Permissive Start	0.0	0.0	0.0	0.0
Permissive End	10.0	10.0	10.0	10.0
Force Off	0.0	0.0	0.0	0.0
Min Green	10.0	15.0	10.0	10.0
Max Green	27.0	110.0	10.0	10.0
Max Green 2	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0
Passage	3.0	4.0	4.0	3.0
MaxRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Double Entry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 110.0 Offset Seek Mode: short way
 Offset: 0.0 Max Dwell: 1.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Nse Bus Priority

TSP Phase: 6 0
 TSP Check-in Detector: 91 0
 TSP Check-out Detector: 92 0
 Travel Time: 10.0 0.0

Note: Use Phase '0' for TSP Phase to indicate no phase selected.

Ok

Rings

Ring 1: 5, 8, 4, 1, 81, 82
 Ring 2: 1, 8, 4, 1, 81, 82

Test/Set Sequence Reset Sequence

Nema Editor Help Panel
 Click on a label to view help contents.

Ok Cancel

Southgate Drive

Nema Editor Using Nse Program: nema3_31_actuation.nse

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add Overl...		Del Overl...	
	1	2	6	8	4	5		
Signal Group (Nema Phase)	1	2	6	8	4	5		
Detector	1	2	6	8	4	5	0	0
Amber	4	4	4	4	0	0	0	0
Red Clearance	1	1	1	1	0	0	0	0
Ped Signal Group	0	0	0	0	0	0	0	0
Ped Detectors	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0
Ped Clearance	0	0	0	0	0	0	0	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overlaps

SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Plans

	Add Plan		Del Plan			
	1	2	6	8	4	5
Split	15.0	133.0	148.0	32.0	1.0	1.0
Permissive Start	0.0	0.0	0.0	0.0	0.0	0.0
Permissive End	10.0	10.0	10.0	10.0	0.0	0.0
Force Off	0.0	0.0	0.0	0.0	0.0	0.0
Min Green	5.0	20.0	20.0	7.0	0.0	0.0
Max Green	10.0	180.0	180.0	27.0	1.0	1.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0
Passage	3.0	4.0	4.0	0.0	0.0	0.0
MaxRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Double Entry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way

Offset: 55.0 Max Dwell: 1.0

Plan Time End: 0.0 Ped Permissive: 0.0

Coordinated: MaxInhibit:

AutoCalc Splits: CycleReference: 0.0

Nse Bus Priority

TSP Phase: 6 0

TSP Check-in Detector: 91 0

TSP Check-out Detector: 92 0

Travel Time: 10.0 0.0

Note: Use Phase '0' for TSP Phase to indicate no phase selected.

Ok

Rings

Test/Set Sequence Reset Sequence

Nema Editor Help Panel
Click on a label to view help contents.

Ok Cancel

Beacon Hill Road

Nema Editor Using Nse Program: nema4_31_actuation.nse

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add Overl...		Del Overl...	
	1	2	4	5	6	8		
Signal Group (Nema Phase)	1	2	4	5	6	8		
Detector	1	2	4	5	6	8	0	0
Amber	4	4	4	4	4	4	0	0
Red Clearance	1	1	1	1	1	1	0	0
Ped Signal Group	0	0	0	0	0	0	0	0
Ped Detectors	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0
Ped Clearance	0	0	0	0	0	0	0	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overlaps

SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Plans

	Add Plan		Del Plan			
	1	2	4	5	6	8
Split	20.0	109.0	31.0	20.0	109.0	20.0
Permissive Start	0.0	0.0	0.0	0.0	0.0	0.0
Permissive End	10.0	10.0	10.0	10.0	10.0	10.0
Force Off	0.0	0.0	0.0	0.0	0.0	0.0
Min Green	5.0	20.0	5.0	5.0	20.0	5.0
Max Green	15.0	180.0	26.0	15.0	180.0	15.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0
Passage	3.0	3.0	3.0	3.0	3.0	3.0
MaxRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Double Entry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way

Offset: 46.0 Max Dwell: 1.0

Plan Time End: 0.0 Ped Permissive: 0.0

Coordinated: MaxInhibit:

AutoCalc Splits: CycleReference: 0.0

Nse Bus Priority

TSP Phase: 6 0

TSP Check-in Detector: 91 0

TSP Check-out Detector: 92 0

Travel Time: 10.0 0.0

Note: Use Phase '0' for TSP Phase to indicate no phase selected.

Ok

Rings

Test/Set Sequence Reset Sequence

Nema Editor Help Panel
Click on a label to view help contents.

Ok Cancel

Memorial Street

Nema Editor Using Nse Program: nema5_31_actuation.nse

File Edit Options About

Signal Group Info.

	Add Phase	Del Phase	Add OverL...	Del OverL...
	1	2	4	5
Signal Group (Nema Phase)	1	2	4	5
Detector	1	2	4	5
Amber	4	4	4	4
Red Clearance	1	2	1	1
Ped Signal Group	0	0	0	0
Ped Detectors	0	0	0	0
Walk	0	0	0	0
Ped Clearance	0	0	0	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SG 9
SG 10
SG 11
SG 12

Overlaps

Plans

	1	2	4	5	6	8
Split	20.0	123.0	37.0	15.0	128.0	37.0
Permissive Start	0.0	0.0	0.0	0.0	0.0	0.0
Permissive End	10.0	10.0	10.0	10.0	10.0	10.0
Force Off	0.0	0.0	0.0	0.0	0.0	0.0
Min Green	5.0	20.0	7.0	5.0	20.0	7.0
Max Green	15.0	180.0	32.0	10.0	180.0	32.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0
Passage	3.0	5.0	3.0	3.0	5.0	3.0

MaxRecall VehRecall PedRecall RedLock YellowLock Coordinated Phase PedPhase Double Entry CalltoNonActuated Lead Phase

Cycle Length: 180.0 Offset Seek Mode: short way
Offset: 36.0 Max Dwell: 1.0
Plan Time End: 0.0 Ped Permissive: 0.0
Coordinated: MaxInhibit:
AutoCalc Splits: CycleReference: 0.0

Nse Bus Priority

TSP Phase: 6
TSP Check-in Detector: 91
TSP Check-out Detector: 92
Travel Time: 10.0

Note: Use Phase '0' for TSP Phase to indicate no phase selected.

Ok

Rings

Ring 1: 5, 8
Ring 2: 1, 4

Test/Set Sequence Reset Sequence

Nema Editor Help Panel
Click on a label to view help contents.

Ok Cancel

Collard

Nema Editor Using Nse Program: nema6_31_actuation.nse

File Edit Options About

Signal Group Info.

	Add Phase	Del Phase	Add OverL...	Del OverL...
	2	4	5	6
Signal Group (Nema Phase)	2	4	5	6
Detector	2	4	5	6
Amber	4	4	4	4
Red Clearance	1	1	1	1
Ped Signal Group	0	0	0	0
Ped Detectors	0	0	0	0
Walk	0	0	0	0
Ped Clearance	0	0	0	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SG 9
SG 10
SG 11
SG 12

Overlaps

Plans

	1	2	4	5	6	8
Split	125.0	30.0	22.0	103.0	25.0	
Permissive Start	0.0	0.0	0.0	0.0	0.0	0.0
Permissive End	10.0	10.0	10.0	10.0	10.0	10.0
Force Off	0.0	0.0	0.0	0.0	0.0	0.0
Min Green	20.0	5.0	7.0	20.0	5.0	
Max Green	180.0	25.0	17.0	125.0	10.0	
Max Green 2	0.0	0.0	0.0	0.0	0.0	
Red Revert	0.0	0.0	0.0	0.0	0.0	
Passage	0.0	0.0	0.0	0.0	0.0	

MaxRecall VehRecall PedRecall RedLock YellowLock Coordinated Phase PedPhase Double Entry CalltoNonActuated Lead Phase

Cycle Length: 180.0 Offset Seek Mode: short way
Offset: 13.0 Max Dwell: 1.0
Plan Time End: 0.0 Ped Permissive: 0.0
Coordinated: MaxInhibit:
AutoCalc Splits: CycleReference: 0.0

Add Ring Del Ring Add Barriers Del Barriers

Start Phases Drag Signal Groups, Barriers to Rings

Rings

Ring 1: 5, 8
Ring 2: 1, 4

Test/Set Sequence Reset Sequence

Nema Editor Help Panel
Click on a label to view help contents.

Ok Cancel

Popkins Lane

Nema Editor Using Nse Program: nema7_29.nse

File Edit Options About

Signal Group Info.

	Add Phase	Del Phase	Add Overl...	Del Overl...
Signal Group (Nema Phase)	2	4	5	6
Detector	2	4	5	6
Amber	4	4	4	4
Red Clearance	1	1	1	1
Ped Signal Group	0	0	0	0
Ped Detectors	0	0	0	0
Walk	0	0	0	0
Ped Clearance	0	0	0	0
Protected/Permitted	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overlaps

	Add Plan	Del Plan
Plan 1	<input type="checkbox"/>	<input type="checkbox"/>

Plans

	Plan 1	Plan 2	Plan 3	Plan 4	Plan 5
Split	125.0	30.0	22.0	103.0	25.0
Permissive Start	0.0	0.0	0.0	0.0	0.0
Permissive End	10.0	10.0	10.0	10.0	10.0
Force Off	0.0	0.0	0.0	0.0	0.0
Min Green	20.0	5.0	7.0	20.0	5.0
Max Green	125.0	25.0	17.0	103.0	20.0
Max Green 2	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0
Passage	0.0	0.0	0.0	0.0	0.0
MaxRecall	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Double Entry	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way

Offset: 13.0 Max Dwell: 1.0

Plan Time End: 0.0 Ped Permissive: 0.0

Coordinated: MaxInhibit:

AutoCalc Splits: CycleReference: 0.0

Add Ring Del Ring Add Barriers Del Barriers

Start Phases Drag Signal Groups, Barriers to Rings

Test/Set Sequence Reset Sequence

Nema Editor Help Panel
Click on a label to view help contents.

Ok Cancel

Appendix F: Signal Timing Plans for U.S. 1 Pilot Project

Phasings

5: Richmond Hwy & Shields Ave

1/29/2003



	5	2	1	6	3	3	3	4	4
Protected Phases									
Permitted Phases							3		4
Minimum Initial (s)	5.0	30.0	5.0	30.0	7.0	7.0	7.0	5.0	5.0
Minimum Split (s)	11.5	36.0	10.5	36.0	12.0	12.0	12.0	35.5	35.5
Total Split (s)	25.0	118.5	15.0	108.5	31.0	31.0	31.0	15.5	15.5
Total Split (%)	14%	66%	8%	80%	17%	17%	17%	9%	9%
Maximum Green (s)	11.5	112.5	9.5	102.5	26.0	26.0	26.0	10.0	10.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	5	2.0	1.5	2.0	1.0	1.0	1.0	1.5	1.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?									
Vehicle Extension (s)	2.5	3.0	2.5	3.0	2.5	2.5	2.5	3.0	3.0
Minimum Gap (s)	2.5	3.0	2.5	3.0	2.5	2.5	2.5	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Coord	None	Coord	None	None	None	None	None
Walk Time (s)								7.0	7.0
Flash Don't Walk (s)								23.0	23.0
Pedestrian Calls (#/hr)								0	0
90th %ile Green (s)	11.0	116.6	7.5	108.1	26.0	26.0	26.0	7.9	7.9
90th %ile Term Code	Cap	Coord	Gap	Coord	Max	Max	Max	Gap	Gap
70th %ile Green (s)	11.0	134.0	6.5	126.5	10.5	10.5	10.5	7.0	7.0
70th %ile Term Code	Cap	Coord	Gap	Coord	Gap	Gap	Gap	Gap	Gap
50th %ile Green (s)	11.5	148.0	0.0	130.0	9.2	9.2	9.2	6.3	6.3
50th %ile Term Code	Cap	Coord	Skip	Coord	Gap	Gap	Gap	Gap	Gap
30th %ile Green (s)	11.1	161.3	0.0	144.7	7.7	7.7	7.7	0.0	0.0
30th %ile Term Code	Cap	Coord	Skip	Coord	Gap	Gap	Gap	Skip	Skip
10th %ile Green (s)	1.9	162.0	0.0	147.6	7.0	7.0	7.0	0.0	0.0
10th %ile Term Code	Cap	Coord	Skip	Coord	Min	Min	Min	Skip	Skip

Cycle Length: 180

Actualized Cycle Length: 180

Offset: 123 (68%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow

Control Type: Actuated-Coordinated

Phasings

6: Richmond Hwy & S Kings Hwy

1/29/2003



	5	2	1	6	3	3	4
Protected Phases							
Permitted Phases							
Minimum Initial (s)	10.0	15.0	10.0	15.0	5.0	5.0	10.0
Minimum Split (s)	10.0	20.0	15.0	20.0	10.0	10.0	15.0
Total Split (s)	30.0	58.0	15.0	41.0	22.0	22.0	15.0
Total Split (%)	21%	53%	14%	37%	20%	20%	14%
Maximum Green (s)	27.0	53.0	10.0	36.0	17.0	17.0	10.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	0.0	4.0	3.0	4.0	3.0	3.0	4.0
Minimum Gap (s)	3.0	4.0	3.0	4.0	3.0	3.0	4.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Coord	None	Coord	None	None	None
Walk Time (s)							
Flash Dont Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	27.0	53.0	10.0	36.0	17.0	17.0	10.0
90th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max
70th %ile Green (s)	27.0	53.0	10.0	36.0	17.0	17.0	10.0
70th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max
50th %ile Green (s)	27.0	53.0	10.0	36.0	17.0	17.0	10.0
50th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max
30th %ile Green (s)	27.0	53.0	10.0	36.0	17.0	17.0	10.0
30th %ile Term Code	Max	Coord	Max	Coord	Max	Max	Max
10th %ile Green (s)	27.0	68.0	0.0	36.0	17.0	17.0	10.0
10th %ile Term Code	Max	Coord	Skip	Coord	Max	Max	Max

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow

Control Type: Actuated-Coordinated

Phasings
7: Southgate Dr & Richmond Hwy

1/29/2003



	4	4	1	6	2
Protected Phases					
Permitted Phases			6		
Minimum Initial (s)	7.0	7.0	5.0	20.0	20.0
Minimum Split (s)	32.0	32.0	10.0	25.0	25.0
Total Split (s)	32.0	32.0	15.0	148.0	133.0
Total Split (%)	18%	18%	8%	82%	74%
Maximum Green (s)	27.0	27.0	10.0	143.0	128.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lead/Lag			Lead		Lag
Lead-Lag Optimize?					
Vehicle Extension (s)	4.0	4.0	3.0	4.0	4.0
Minimum Gap (s)	4.0	4.0	3.0	4.0	4.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	Coord	Coord
Walk Time (s)	7.0	7.0			
Flash Don't Walk (s)	2.0	2.0			
Pedestrian Calls (#/hr)	0	0			
90th %ile Green (s)	22.4	22.4	5.8	147.8	136.8
90th %ile Term Code	Gap	Gap	Gap	Coord	Coord
70th %ile Green (s)	18.9	18.9	5.7	151.1	140.4
70th %ile Term Code	Gap	Gap	Gap	Coord	Coord
50th %ile Green (s)	16.5	16.5	5.7	153.5	142.8
50th %ile Term Code	Gap	Gap	Gap	Coord	Coord
30th %ile Green (s)	14.1	14.1	5.8	155.9	145.3
30th %ile Term Code	Gap	Gap	Gap	Coord	Coord
10th %ile Green (s)	10.8	10.8	6.0	159.2	159.2
10th %ile Term Code	Gap	Gap	Skip	Coord	Coord

Cycle Length: 180
 Actuated Cycle Length: 180
 Offset: 55 (31%), Referenced to phase 2:SBT and 6:NBTL, Start of Yellow
 Control Type: Actuated-Coordinated

Phasings
8: Beacon Hill Rd & Richmond Hwy

1/29/2003



	3	4	4	1	6	4	5	2
Protected Phases								
Permitted Phases						6		
Minimum Initial (s)	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	35.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	20.0	31.0	31.0	20.0	109.0	31.0	20.0	109.0
Total Split (%)	11%	17%	17%	11%	61%	17%	11%	61%
Maximum Green (s)	15.0	26.0	26.0	15.0	104.0	26.0	15.0	104.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	None	None	Coord	None	None	Coord
Walk Time (s)	7.0							
Flash Don't Walk (s)	25.0							
Pedestrian Calls (#/hr)	0							
90th %ile Green (s)	13.2	26.0	26.0	10.6	105.8	26.0	15.0	110.2
90th %ile Term Code	Gap	Max	Max	Gap	Coord	Max	Max	Coord
70th %ile Green (s)	11.5	24.7	24.7	8.9	100.9	24.7	15.0	114.9
70th %ile Term Code	Gap	Gap	Gap	Gap	Coord	Gap	Max	Coord
50th %ile Green (s)	11.3	21.0	21.0	7.6	114.5	21.0	14.2	120.9
50th %ile Term Code	Gap	Gap	Gap	Gap	Coord	Gap	Gap	Coord
30th %ile Green (s)	10.1	17.6	17.6	0.0	120.6	17.6	12.5	156.3
30th %ile Term Code	Gap	Gap	Gap	Skip	Coord	Gap	Gap	Coord
10th %ile Green (s)	7.4	13.3	13.3	0.0	130.6	13.3	8.7	144.3
10th %ile Term Code	Gap	Gap	Gap	Skip	Coord	Gap	Gap	Coord

Cycle Length: 180
 Actuated Cycle Length: 180
 Offset: 46 (26%), Reference d to phase 2:SBT and 6:NBT, Start of Yellow
 Control Type: Actuated-Coordinated



Protected Phases	4	4	3 6	6	1	2	3
Permitted Phases	4	3 6					
Minimum Initial (s)	5.0	5.0		20.0	7.0	20.0	5.0
Minimum Split (s)	10.0	10.0		25.0	12.0	25.0	10.0
Total Split (s)	25.0	25.0	155.0	125.0	22.0	103.0	30.0
Total Split (%)	14%	14%	88%	88%	12%	57%	17%
Maximum Green (s)	20.0	20.0		120.0	17.0	98.0	25.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0
Lead/Lag	Lag	Lag		Lead	Lag	Lead	
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0		3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0	0.0	0.0
Recall Mode	None	None		Coord	None	Coord	None
Walk Time (s)							
Flash Don't Walk (s)							
Pedestrian Calls (#/hr)							
90th %ile Green (s)	16.0	16.0		124.0	7.0	112.0	25.0
90th %ile Term Code	Gap	Gap		Coord	Min	Coord	Max
70th %ile Green (s)	13.0	13.0		127.0	7.0	115.0	25.0
70th %ile Term Code	Gap	Gap		Coord	Min	Coord	Max
50th %ile Green (s)	11.1	11.1		132.2	7.0	120.2	21.7
50th %ile Term Code	Gap	Gap		Coord	Min	Coord	Gap
30th %ile Green (s)	9.2	9.2		140.1	7.0	128.1	15.7
30th %ile Term Code	Gap	Gap		Coord	Min	Coord	Gap
10th %ile Green (s)	6.4	6.4		149.6	0.0	149.6	9.0
10th %ile Term Code	Gap	Gap		Coord	Skip	Coord	Gap

Cycle Length: 180
 Actuated Cycle Length: 180
 Offset: 13 (7%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Control Type: Actuated-Coordinated

Phasings
10: Popkins Ln & Richmond Hwy

1/29/2003



	3	1 3 4	2	1 4	4 6	1	4	6
Protected Phases	3	1 3 4	2	1 4	4 6	1	4	6
Permitted Phases				6				
Minimum Initial (s)	5.0		20.0			7.0	5.0	20.0
Minimum Split (s)	10.0		25.0			12.0	10.0	25.0
Total Split (s)	30.0	77.0	103.0	47.0	150.0	22.0	25.0	125.0
Total Split (%)	17%	43%	57%	26%	83%	12%	14%	59%
Maximum Green (s)	25.0		98.0			17.0	20.0	120.0
Yellow Time (s)	4.0		4.0			4.0	4.0	4.0
All-Red Time (s)	1.0		1.0			1.0	1.0	1.0
Lead/Lag	Lead		Lag			Lead	Lag	
Lead-Lag Optimize?								
Vehicle Extension (s)	3.0		3.0			3.0	3.0	3.0
Minimum Gap (s)	3.0		3.0			3.0	3.0	3.0
Time Before Reduce (s)	0.0		0.0			0.0	0.0	0.0
Time To Reduce (s)	0.0		0.0			0.0	0.0	0.0
Recall Mode	None		Coord			None	None	Coord
Walk Time (s)								
Flash-Don't Walk (s)								
Pedestrian Calls (#/hr)								
90th %ile Green (s)	26.0		112.0			7.0	16.0	124.0
90th %ile Term Code	Max		Coord			Min	Gap	Coord
70th %ile Green (s)	26.0		115.0			7.0	13.6	127.0
70th %ile Term Code	Max		Coord			Min	Gap	Coord
50th %ile Green (s)	21.7		120.2			7.0	11.1	132.2
50th %ile Term Code	Gap		Coord			Min	Gap	Coord
30th %ile Green (s)	16.7		128.1			7.0	9.2	140.1
30th %ile Term Code	Gap		Coord			Min	Gap	Coord
10th %ile Green (s)	1.0		149.8			0.0	6.4	149.8
10th %ile Term Code	Gap		Coord			Skip	Gap	Coord

Cycle Length: 180
 Actuated Cycle Length: 180
 Offset: 13 (7%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Control Type: Actuated-Coordinated

Northbound in AM Peak Period

Name of the stop	Initial No. of passengers	Stop time	Go time	On count	Off count	Schedule Time	Deviance	Occupancy
Mt.Vernon hospital	3		8:08:15	0	1	8:05:00	0:03:15	3
1		8:13:55	8:14:00	1	0			
2		8:14:48	8:15:00	5	0			
3		8:15:10	8:15:40	5	0			
4		8:15:50	8:15:50	4				
Mt Vernon Sq .Apt		8:16:05	8:16:20	1	0	8:12:00	0:04:05	19
1		8:17:00	8:17:05	1	0			
2		8:17:50	8:17:56	1	0			
At Signal		8:19:10	8:19:20	1	0			
3		8:20:25	8:20:35	6	2			
4		8:21:13	8:21:20	1	0			
5		8:23:00	8:23:15	1	1			
Beacon Hill Road		8:24:10	8:24:26	4	0	8:19:00	0:08:10	31
1		8:25:25	8:25:47	0	2			
2		8:27:56	8:28:05	0	1			
3		8:28:35	8:28:46	1	0			
Huntington Metro		8:38:25				8:29:00	0:09:25	29

Table 1: Occupancy Data for Rt.106 -NB-AM Peak Period

Appendix H: Universal Transportation Data Format Files

Layout Data: "LAYOUT.DAT"

INTID	TYPE	X	Y	NID	SID	EID	WID	NEID	NWID	SEID	SWID
1	1	11885435	6955219							18	
2	1	11858184	6943030		28						
4	1	11889542	6971761			5					
5	0	11888492	6971181	54	855	4	107				
6	0	11888050	6970727	107	7	355	533				
7	0	11887438	6968058	6	8	704					
8	0	11887364	6967427	7	9	131	168				
9	0	11887224	6966466	8	151	84	133				
10	0	11886638	6965059	229	11	91					
11	0	11886700	6962550	10	12	233	46				
12	0	11886816	6960931	11	13	217	567				
13	0	11886961	6959122	12	14	93	224				
14	0	11886977	6958704	13	15	537	536				
15	0	11886685	6957174	14	16	89					
16	0	11886387	6956494	15	100	47	566				
17	0	11885842	6955825	80	100	18					
18	0	11885347	6955325	83	1	17	163				
19	0	11882107	6953088	87	88	163	20				
20	0	11880150	6951721	85	160	19	21				
21	0	11878872	6950829	90	20	164					
22	0	11876554	6949314	565	92	171	185				
23	0	11875207	6948445	563	94	179	561				
24	0	11873046	6947012	96	159	73	166				
25	0	11870719	6945858	317	166	152					
26	0	11869929	6945089	152	153	539					
27	0	11865489	6943908	221	508	153	28				
28	0	11864221	6943645	414	27	2					
44	1	11877492	6943716			98					
45	1	11890868	6967308			131					
46	1	11886271	6962609		11						
47	1	11887573	6956910			16					
54	1	11888271	6971448				5				
73	2	11873474	6947323		180			24			
80	1	11885025	6956527				17				
83	1	11884994	6955733				18				
84	1	11888539	6965907			9					
85	1	11879988	6951983		20						
86	1	11884608	6965505		229						
87	1	11881091	6954594		19						
88	1	11882477	6952440	19							
89	1	11885906	6957486			15					
90	1	11877825	6954641		21						

91	1	11888667	6964135					10	
92	1	11877156	6947573	22					
93	1	11888896	6959229					13	
94	1	11875884	6947035	23					
96	1	11872836	6949190	24					
98	2	11876344	6943800			44	159		
99	1	11886930	6965129				229		
100	2	11886151	6956091	16					17
107	2	11888107	6970930	6	5				
131	2	11889210	6966678			45	8		
133	1	11885105	6966738			9			
151	2	11886743	6965370	9	229				
152	2	11870250	6945608	26	25				
153	2	11869606	6944595	26			27		
159	2	11873956	6945061	24		98			
160	1	11880316	6951453	20					
163	2	11884970	6955061				18		19
164	2	11877942	6950188			171	21		
166	2	11872078	6946552	24	25				
168	1	11886623	6967509			8			
171	2	11876970	6949592			164	22		
179	2	11875564	6948679			185	23		
180	2	11874694	6948109			561	73		
185	2	11876344	6949177			22	179		
217	1	11888160	6961030				12		
221	1	11865416	6945259	27					
224	1	11886693	6959105			13			
229	0	11886679	6965224	151	10	99	86		
233	1	11887624	6962424			11			
317	1	11869689	6948156	25					
355	1	11888253	6970486					6	
414	1	11864096	6945854	28					
508	1	11865606	6942768	27					
533	1	11887671	6971196						6
536	1	11886609	6958721			14			
537	1	11887371	6958685			14			
539	1	11871217	6944188					26	
561	0	11875032	6948328	564	568	23	180		
563	1	11874829	6949213	23					
564	1	11874387	6949281	561					
565	1	11876341	6949765	22					
566	1	11885814	6956823			16			
567	1	11886187	6960892			12			
568	1	11875278	6947909	561					
704	1	11885887	6968314			7			
855	1	11889026	6970590						5

Turning Movement Count: "VOLUME.DAT"

60 Minute Counts

DATE	TIME	INTID	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
5/19/2004	1700	5	4	4	8	54	5	497	147	2728	10	8	764	36	
5/19/2004	1700	6	452	2570	29	60	1152	80	264	4	4	16	4	12	
5/19/2004	1700	7	36	2768		1208	28	104	28						
5/19/2004	1700	8	24	2729	487	92	1112	44	60	32	5	156	74	110	
5/19/2004	1700	9	60	3138	22	12	1172	76	116	32	120	8	52	8	
5/19/2004	1700	10	31	20	36	44	1255			60	48				
5/19/2004	1700	11	64	2762	5	4	1216	60	454	6	116	4	36		
5/19/2004	1700	12	4	2488	56	120	1276	5	8	4	172	468			
5/19/2004	1700	13	36	2490	24	76	1266	16	40	48	60	26	21	109	
5/19/2004	1700	14	104	2500	8	136	1204	5	8	8	16	4	12	100	
5/19/2004	1700	15	24	2521		1188	12	8	8						
5/19/2004	1700	16	36	2423	1016	104	1096	5	16	20	12	248	20	28	
5/19/2004	1700	17			116	68	56	3296		1350	44				
5/19/2004	1700	18	56	32	396	612	32	10	8	2282	52	192	1154	148	
5/19/2004	1700	19	48	6	18	444	20	92	68	1794	27	210	1020	54	
5/19/2004	1700	20	4	4	4	60	16	60	44	1768	10	12	1084		
5/19/2004	1700	21			436	64	76	1356		974	140				
5/19/2004	1700	22	52	16	52	40	8	40	100	1300	100	32	970	10	
5/19/2004	1700	23	36	20	56	84	8	16	4	1278	24	72	972	32	
5/19/2004	1700	24	440	28	52	60	88	24	32	1164	540	204	836	32	
5/19/2004	1700	25			160	228	188	1500		1328	24				
5/19/2004	1700	26	1560	208		360	1236			44	128				
5/19/2004	1700	27	104	40	5	100	112	8	172	1696	1160	44	1170	60	
5/19/2004	1700	28			560	16	184	2504		706	624				
5/19/2004	1700	229	20	3148		1299	5	48		5					
5/19/2004	1700	561	24	12	4	124	16	60	48	1178	60	944	80		

Timing Plans: "TIMING.DAT"

PLANID	INTID	S1	S2	S3	S4	S5	S6	S7	S8	CL	OFF	LD	REF	CLR
DEFAULT	5	13.5	116.5	30	35.5	23.5	106.5		195.5	0	135	26		
DEFAULT	6	15	107	41	21	57	64		184	0	135	26		
DEFAULT	7	14	132	32	147			179	0	1	26			
DEFAULT	8	19	108	35	30	19	108		192	0	135	26		
DEFAULT	9	14	126	37	19	121		36	177	0	15	26		
DEFAULT	10	21	102	29	24	124			177	0	13	26		
DEFAULT	11	23	95	33	44	12	106		195	0	135	26		
DEFAULT	12	14	123	40	34	103			177	0	15	26		
DEFAULT	13	20	108	19	30	20	108		177	0	135	26		
DEFAULT	14	19	114	14	30	25	108		177	0	135	26		
DEFAULT	15	27	121	30	149			179	0	1	26			
DEFAULT	16	14	117	14	42	23	108		187	0	135	26		
DEFAULT	17	19	126	33	146			179	0	1	26			
DEFAULT	18	22	88	17.5	47	14	96		174.5	0	135	26		
DEFAULT	19	24	93	59	14	103		59	176	0	15	26		
DEFAULT	20	18	104	15	35	18	104		172	0	235	26		
DEFAULT	21	24	97	55	122			177	0	1	26			
DEFAULT	22	24	118	34	24	118		34	176	0	15	26		
DEFAULT	23	23	96	26	31	23	96		176	0	135	26		
DEFAULT	24	29	52	54	18	63	24		159	0	167	26		
DEFAULT	25	135	43	29	105			178	0	5	26			
DEFAULT	26	49.5	100.5	22.5	152.5			175	0	1	26			
DEFAULT	27	19	118	31	28	24	113		196	0	135	26		
DEFAULT	28	29	121	46	151			197	0	1	26			

Phasing Data: "PHASING.DAT"

(This is a very long file so only the first few points are shown here.)

RECORDNAME	INTID	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16
BRP	5	111	112	211	212	121	122	213	214	311	312	411	412	321	322		
421	422																
MinGreen	5	5	30	7	5	5	30										
MaxGreen	5	8110.5	25	30	18100.5												
VehExt	5	2.5	3	2.5	3	2.5	3										
TimeBeforeReduce	5	0	0	0	0	0	0										
TimeToReduce	5	0	0	0	0	0	0										
MinGap	5	2.5	3	2.5	3	2.5	3										
Yellow	5	4	4	4	4	4	4										
AllRed	5	1.5	2	1	1.5	1.5	2										
Recall	5	0	3	0	0	0	0										
Walk	5			7													
DontWalk	5			23													
PedCalls	5			0													
MinSplit	5	10.5	36	12	35.5	10.5	36										
BRP	6	111	112	211	212	121	122	213	214	311	312	411	412	321	322		
421	422																
MinGreen	6	10	15	5	10	10	15										
MaxGreen	6	10	102	36	16	52	59										
VehExt	6	3	4	3	4	3	4										
TimeBeforeReduce	6	0	0	0	0	0	0										
TimeToReduce	6	0	0	0	0	0	0										
MinGap	6	3	4	3	4	3	4										
Yellow	6	4	4	4	4	4	4										
AllRed	6	1	1	1	1	1	1										
Recall	6	0	3	0	0	0	3										
Walk	6																
DontWalk	6																
PedCalls	6																
MinSplit	6	15	20	10	15	15	20										
BRP	7	111	112	211	212	121	122	221	222	311	312	411	412	321	322		
421	422																
MinGreen	7	5	20		7		20										
MaxGreen	7	9	127		27		142										
VehExt	7	3	4		4		4										
TimeBeforeReduce	7	0	0		0		0										
TimeToReduce	7	0	0		0		0										
MinGap	7	3	4		4		4										
Yellow	7	4	4		4		4										
AllRed	7	1	1		1		1										

Lane Group Data: "LANES.DAT"

(This is a very long file so only the first few points are shown here.)

RECORDNAME	INTID	NBL	NBT	NBR	SBU	SBL	SBT	SBR	EBL	EBT	EBR			
WBL	WBT	WBR												
Lanes	5	0	1	1	0	1	1	1	2	3	0	1	4	0
Shared	5	0	1		0	2		0	2		0	2		
Width	5	12	12	12	12	12	12	12	12	12	12	12	12	12
Storage	5				175			400		140		310		
StLanes	5				1			2		1		1		
Grade	5		0		0			0		0				
Speed	5		25		35			45		45				
FirstDetect	5	50	35	35	35	35	35	35	0	35	0			
LastDetect	5	0	-5	-5	-5	-5	-5	-5	0	-5	0			
Phase1	5	4	4		3	3		5	2	1	6			
PermPhase1	5			4				3						
DetectPhase1	5	4	4	4		3	3	3	5	2		1	6	
IdealFlow	5	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
1900														
LostTime	5	3	3	3	4	3	3	3	3	3	3	3	3	3
SatFlow	5	0	1818	1583	0	1770	1513	1504	3433	5080	0	1770	6363	0
SatFlowPerm	5	0	1818	1583	0	1770	1513	1504	3433	5080	0	1770	6363	0
SatFlowRTOR	5	0	0	8	0	0	158	339	0	0	0	0	7	0
HeadwayFact	5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Volume	5	4	4	8	0	54	5	497	147	2728	10	8	764	36
Peds	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	5	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	5	1.00	1.00	1.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth	5	100	100	100	100	100	100	100	100	100	100	100	100	100
HeavyVehicles	5	2	2	2	2	2	2	2	2	2	2	2	2	2
BusStops	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Midblock	5		0		0			0		0				
Distance	5		797		*300			*443		1200				
TravelTime	5		21.7		5.8			6.7		18.2				
Lanes	6	1	3	0	0	1	3	1	0	1	0	0	2	0
Shared	6	0	2		0	0		0	3		0	3		
Width	6	12	12	12	12	12	12	12	12	12	12	12	12	12
Storage	6	480			140									
StLanes	6	1			1									
Grade	6		0		0			0		0				
Speed	6		45		45			25		15				
FirstDetect	6	35	0		35	0	35	50	50	50	73			
LastDetect	6	-5	0		-5	0	-5	0	0	0	0			
Phase1	6	5	2		1	6	3	3	3	4	4			
PermPhase1	6							3						

**Appendix I: NEMA Signal Control Files for U.S. 1
Extended Corridor**

North Kings Highway / Shields Avenue

Nema Editor Using Nse Program: NEMA_5_Esp.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	1	2	3	4	5	6	7	8
Signal Group (Nema Phase)	1	2	3	4	5	6	7	8
Detector	1	2	3	4	5	6	7	8
Amber	3	3.5	3.5	4	3.5	3	3.5	4
Red Clearance	2	2	2	2	2	2	2	2
Ped Signal Group	0	102	0	0	0	0	0	0
Ped Detectors	0	102	0	0	0	0	0	0
Walk	0	5	0	0	0	0	0	0
Ped Clearance	0	25	0	0	0	0	0	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overlaps

Plans

	Add Plan				Del Plan			
	1	2	3	4	5	6	7	8
Split	31.0	15.5	15.0	118.5	15.5	31.0	25.0	108.5
Permissive Start	110.5	110.5	110.5	110.5	110.5	110.5	110.5	110.5
Permissive End	128.5	160.5	179.0	110.5	165.5	128.5	189.0	110.5
Force Off	141.5	176.5	190.0	110.5	176.5	141.5	4.5	110.5
Min Green	7.0	5.0	5.0	30.0	5.0	7.0	5.0	30.0
Max Green	25.0	10.0	8.0	110.5	10.0	25.0	18.0	100.5
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passage	2.5	3.0	2.5	0.0	3.0	2.5	2.5	3.0
MaxRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Double Entry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 20.5 Max Dwell: 1.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated MaxInhibit:
 AutoCalc Splits CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Ok, Cancel

Nema Editor Help Panel
Click on a label to view help contents.

South Kings Highway

Nema Editor Using Nse Program: NEMA_6_Esp.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	1	2	3	4	5	6	7	8
Signal Group (Nema Phase)	1	2	3	4	5	6	7	8
Detector	1	2	3	4	5	6	7	8
Amber	3	3	3	3	3	3	3	3
Red Clearance	2	2	2	2	2	2	2	2
Ped Signal Group	0	0	0	0	0	0	0	0
Ped Detectors	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0
Ped Clearance	0	0	0	0	0	0	0	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overlaps

Plans

	Add Plan				Del Plan			
	1	2	3	4	5	6	7	8
Split	15.0	108.0	15.0	42.0	58.0	65.0	42.0	15.0
Permissive Start	102.0	102.0	102.0	102.0	102.0	102.0	102.0	102.0
Permissive End	164.0	102.0	149.0	133.0	102.0	102.0	133.0	149.0
Force Off	179.0	102.0	164.0	143.0	37.0	102.0	143.0	164.0
Min Green	10.0	15.0	5.0	5.0	10.0	15.0	5.0	5.0
Max Green	10.0	102.0	10.0	36.0	52.0	60.0	36.0	10.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passage	3.0	0.0	4.0	3.0	3.0	0.0	3.0	4.0
MaxRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Double Entry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 47.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated MaxInhibit:
 AutoCalc Splits CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Ok, Cancel

Nema Editor Help Panel
Click on a label to view help contents.

Southgate Drive

Nema Editor Using Nse Program: NEMA_7_Tsp.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	2	4	5	6	8			
Signal Group (Nema Phase)	2	4	5	6	8			
Detector	2	4	5	6	8			
Amber	3	3	3	3	3			
Red Clearance	2	2	2	2	2			
Ped Signal Group	0	104	0	0	0			
Ped Detectors	0	104	0	0	0			
Walk	0	5	0	0	0			
Ped Clearance	0	20	0	0	0			
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 9	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SG 11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overlaps

Plans

Plan 1

	148.0	32.0	15.0	133.0	32.0
Split	142.0	142.0	142.0	142.0	142.0
Permissive Start	142.0	159.0	178.0	142.0	169.0
Permissive End	142.0	174.0	9.0	142.0	174.0
Force Off	20.0	10.0	5.0	20.0	0.0
Min Green	142.0	27.0	9.0	128.0	27.0
Max Green	0.0	0.0	0.0	0.0	0.0
Max Green 2	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0
Passage	4.0	4.0	3.0	4.0	4.0
MaxRecall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
VehRecall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Double Entry	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 107.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Nema Editor Help Panel, Ok, Cancel

Beacon Hill Road

Nema Editor Using Nse Program: NEMA_8_Tsp.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	1	2	3	4	5	6	7	8
Signal Group (Nema Phase)	1	2	3	4	5	6	7	8
Detector	1	2	3	4	5	6	7	8
Amber	3	3	3	3	3	3	3	3
Red Clearance	2	2	2	2	2	2	2	2
Ped Signal Group	0	0	0	104	0	0	0	0
Ped Detectors	0	0	0	104	0	0	0	0
Walk	0	0	0	5	0	0	0	0
Ped Clearance	0	0	0	25	0	0	0	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overlaps

Plans

Plan 1

	20.0	109.0	31.0	20.0	20.0	109.0	20.0	31.0
Split	103.0	103.0	103.0	103.0	103.0	103.0	103.0	103.0
Permissive Start	177.0	103.0	158.0	123.0	177.0	103.0	128.0	158.0
Permissive End	187.0	103.0	168.0	138.0	187.0	103.0	138.0	168.0
Force Off	5.0	20.0	5.0	10.0	5.0	20.0	5.0	5.0
Min Green	14.0	103.0	25.0	15.0	14.0	103.0	15.0	25.0
Max Green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passage	3.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0
MaxRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Double Entry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 122.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Nema Editor Help Panel, Ok, Cancel

Memorial Street

Nema Editor Using Nse Program: NEMA_9_Tsp.NSE

File Edit Options About

Signal Group Info.

	Add Phase	Del Phase	Add OverL...	Del OverL...
	1	2	4	5
Signal Group (Nema Phase)	1	2	4	5
Detector	1	2	4	5
Amber	3	4	3	3
Red Clearance	2	2	2	2
Ped Signal Group	0	0	104	0
Ped Detectors	0	0	104	0
Walk	0	0	5	0
Ped Clearance	0	0	27	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SG 9
SG 10
SG 11
SG 12

Overlaps

	1	2	4	5
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Plans

	Add Plan		Del Plan	
	1	2	3	4
Split	15.0	128.0	37.0	20.0
Permissive Start	120.0	120.0	120.0	120.0
Permissive End	161.0	120.0	142.0	166.0
Force Off	172.0	120.0	158.0	0.0
Min Green	5.0	20.0	10.0	5.0
Max Green	9.0	120.0	32.0	14.0
Max Green 2	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0
Passage	3.0	0.0	3.0	3.0
MaxRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Double Entry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 99.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Ok, Cancel

Nema Editor Help Panel
 Ped Detectors—pedestrian detector number (101-108 signal group).
 Ranges = 0-999

Collard

Nema Editor Using Nse Program: NEMA_229_Tsp.nse

File Edit Options About

Signal Group Info.

	Add Phase	Del Phase	Add OverL...	Del OverL...
	2	6	7	8
Signal Group (Nema Phase)	2	6	7	8
Detector	2	6	7	8
Amber	4	4	4	4
Red Clearance	1	1	1	1
Ped Signal Group	0	0	0	0
Ped Detectors	0	0	0	0
Walk	0	0	0	0
Ped Clearance	0	0	0	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SG 9
SG 10
SG 11
SG 12

Overlaps

	2	6	7	8
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Plans

	Add Plan		Del Plan	
	1	2	3	4
Split	155.0	125.0	25.0	25.0
Permissive Start	0.0	0.0	0.0	0.0
Permissive End	0.0	0.0	0.0	0.0
Force Off	0.0	0.0	0.0	0.0
Min Green	20.0	20.0	7.0	5.0
Max Green	155.0	125.0	25.0	30.0
Max Green 2	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0
Passage	0.0	0.0	0.0	0.0
MaxRecall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Double Entry	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 95.0 Max Dwell: 1.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Ok, Cancel

Nema Editor Help Panel
 Click on a label to view help contents.

Popkins Lane

Nema Editor Using Nse Program: NEMA_10_tsp.NSE

File Edit Options About

Signal Group Info.

	Add Phase	Del Phase	Add OverL...	Del OverL...	
	1	2	4	6	8
Signal Group (Nema Phase)	1	2	4	6	8
Detector	1	2	4	6	8
Amber	3	3	3	3	3
Red Clearance	2	2	2	2	2
Ped Signal Group	0	0	0	0	0
Ped Detectors	0	0	0	0	0
Walk	0	0	0	0	0
Ped Clearance	0	0	0	0	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overlaps

Plans

Plan 1

	1	2	4	6	8
Split	22.0	103.0	25.0	125.0	30.0
Permissive Start	97.0	97.0	97.0	97.0	97.0
Permissive End	135.0	97.0	121.0	97.0	121.0
Force Off	147.0	97.0	126.0	97.0	126.0
Min Green	7.0	20.0	0.0	5.0	0.0
Max Green	16.0	97.0	24.0	118.0	24.0
Max Green 2	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0
Passage	3.0	0.0	0.0	3.0	0.0
MaxRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Double Entry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way

Offset: 95.0 Max Dwell: 0.0

Plan Time End: 0.0 Ped Permissive: 0.0

Coordinated: MaxInhibit:

AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence

Nema Editor Help Panel: Click on a label to view help contents.

Ok Cancel

Lockheed / Dart

Nema Editor Using Nse Program: NEMA_11_tsp.NSE

File Edit Options About

Signal Group Info.

	Add Phase	Del Phase	Add OverL...	Del OverL...				
	1	2	3	4	5	6	7	8
Signal Group (Nema Phase)	1	2	3	4	5	6	7	8
Detector	1	2	3	4	5	6	7	8
Amber	3	3	3	3	3	3	3	3
Red Clearance	2	2	2	2	2	2	2	2
Ped Signal Group	0	0	0	104	0	106	0	108
Ped Detectors	0	0	0	104	0	106	0	108
Walk	0	0	0	5	0	5	0	5
Ped Clearance	0	0	0	23	0	30	0	23
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overlaps

Plans

Plan 1

	1	2	3	4	5	6	7	8
Split	13.0	107.0	15.0	45.0	24.0	96.0	45.0	15.0
Permissive Start	101.0	101.0	101.0	101.0	101.0	101.0	101.0	101.0
Permissive End	180.0	101.0	121.0	163.0	191.0	101.0	165.0	119.0
Force Off	190.0	101.0	134.0	178.0	6.0	101.0	178.0	134.0
Min Green	5.0	20.0	8.0	10.0	5.0	10.0	8.0	10.0
Max Green	7.0	101.0	10.0	39.0	18.0	90.0	39.0	10.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passage	3.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0
MaxRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Double Entry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way

Offset: 67.0 Max Dwell: 0.0

Plan Time End: 0.0 Ped Permissive: 0.0

Coordinated: MaxInhibit:

AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence

Nema Editor Help Panel: Click on a label to view help contents.

Ok Cancel

Arlington Drive

Nema Editor Using Nse Program: NEMA_12_tsp.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	1	2	4	5	6	8		
Signal Group (Nema Phase)	1	2	4	5	6	8		
Detector	1	2	4	5	6	8		
Amber	3	3	3	3	3	3		
Red Clearance	2	2	2	2	2	2		
Ped Signal Group	0	0	104	0	0	108		
Ped Detectors	0	0	104	0	0	108		
Walk	0	0	5	0	0	5		
Ped Clearance	0	0	20	0	0	20		
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overlaps

Plans

	Add Plan				Del Plan			
	1	2	4	5	6	8		
Split	35.0	104.0	41.0	15.0	124.0	41.0		
Permissive Start	98.0	98.0	98.0	98.0	98.0	98.0		
Permissive End	162.0	98.0	123.0	142.0	98.0	123.0		
Force Off	172.0	98.0	138.0	152.0	98.0	138.0		
Min Green	5.0	20.0	10.0	5.0	20.0	10.0		
Max Green	29.0	98.0	35.0	9.0	118.0	35.0		
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0		
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0		
Passage	3.0	0.0	3.0	3.0	0.0	3.0		
MaxRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
Double Entry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 45.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated MaxInhibit:
 AutoCalc Splits CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Ok, Cancel

Rings

Nema Editor Help Panel
Click on a label to view help contents.

2:54 PM

Boswell

Nema Editor Using Nse Program: NEMA_13_tsp.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	1	2	3	4	5	6	7	8
Signal Group (Nema Phase)	1	2	3	4	5	6	7	8
Detector	1	2	3	4	5	6	7	8
Amber	3	3	3	3	3	3	3	3
Red Clearance	2	2	2	2	2	2	2	2
Ped Signal Group	0	0	0	0	0	0	0	108
Ped Detectors	0	0	0	0	0	0	0	108
Walk	0	0	0	0	0	0	0	5
Ped Clearance	0	0	0	0	0	0	0	20
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overlaps

Plans

	Add Plan				Del Plan			
	1	2	3	4	5	6	7	8
Split	21.0	109.0	30.0	20.0	21.0	109.0	20.0	30.0
Permissive Start	103.0	103.0	103.0	103.0	103.0	103.0	103.0	103.0
Permissive End	159.0	103.0	139.0	109.0	159.0	103.0	109.0	137.0
Force Off	172.0	103.0	152.0	122.0	172.0	103.0	122.0	152.0
Min Green	8.0	20.0	8.0	8.0	8.0	20.0	8.0	10.0
Max Green	15.0	103.0	25.0	14.0	15.0	103.0	14.0	25.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passage	3.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0
MaxRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Double Entry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 25.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated MaxInhibit:
 AutoCalc Splits CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Ok, Cancel

Rings

Nema Editor Help Panel
Click on a label to view help contents.

2:56 PM

Fordson

Nema Editor Using Nse Program: NEMA_14_tsp.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	1	2	3	4	5	6	7	8
Signal Group (Nema Phase)	1	2	3	4	5	6	7	8
Detector	1	2	3	4	5	6	7	8
Amber	3	3	3	3	3	3	3	3
Red Clearance	2	2	2	2	2	2	2	2
Ped Signal Group	0	0	0	0	0	0	0	108
Ped Detectors	0	0	0	0	0	0	0	108
Walk	0	0	0	0	0	0	0	5
Ped Clearance	0	0	0	0	0	0	0	20
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

SG 9
SG 10
SG 11
SG 12

Overlaps

SG 9	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 10	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 11	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Plans

	Add Plan				Del Plan			
Plan 1	1	2	3	4	5	6	7	8
Split	26.0	109.0	30.0	15.0	20.0	115.0	15.0	30.0
Permissive Start	103.0	103.0	103.0	103.0	103.0	103.0	103.0	103.0
Permissive End	162.0	103.0	137.0	107.0	156.0	103.0	107.0	132.0
Force Off	172.0	103.0	147.0	117.0	166.0	103.0	117.0	147.0
Min Green	5.0	20.0	5.0	5.0	5.0	20.0	5.0	10.0
Max Green	20.0	103.0	25.0	9.0	14.0	109.0	9.0	25.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passage	3.0	0.0	3.0	3.0	3.0	0.0	3.0	3.0
MaxRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Double Entry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 25.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Nema Editor Help Panel, Ok, Cancel

Belford

Nema Editor Using Nse Program: NEMA_15_tsp.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	2	4	5	6	8			
Signal Group (Nema Phase)	2	4	5	6	8			
Detector	2	4	5	6	8			
Amber	3	3	3	3	3			
Red Clearance	1	1	1	1	1			
Ped Signal Group	0	104	0	0	0			
Ped Detectors	0	104	0	0	0			
Walk	0	7	0	0	0			
Ped Clearance	0	18	0	0	0			
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SG 9
SG 10
SG 11
SG 12

Overlaps

SG 9	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 10	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Plans

	Add Plan				Del Plan			
Plan 1	1	2	3	4	5	6	7	8
Split	150.0	30.0	28.0	122.0	30.0			
Permissive Start	144.0	144.0	144.0	144.0	144.0			
Permissive End	144.0	159.0	144.0	144.0	169.0			
Force Off	144.0	174.0	22.0	144.0	174.0			
Min Green	20.0	10.0	8.0	20.0	0.0			
Max Green	144.0	25.0	22.0	117.0	25.0			
Max Green 2	0.0	0.0	0.0	0.0	0.0			
Red Revert	0.0	0.0	0.0	0.0	0.0			
Passage	3.0	3.0	3.0	3.0	3.0			
MaxRecall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
VehRecall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
PedRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Coordinated Phase	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
PedPhase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Double Entry	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 19.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Nema Editor Help Panel, Ok, Cancel

Sherwood Lane

Nema Editor Using Nse Program: NEMA_16_tsp.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	1	2	3	4	5	6	7	8
Signal Group (Nema Phase)	1	2	3	4	5	6	7	8
Detector	1	2	3	4	5	6	7	8
Amber	3	3	3	3	3	3	3	3
Red Clearance	2	2	2	2	2	2	2	2
Ped Signal Group	0	0	0	0	0	0	0	108
Ped Detectors	0	0	0	0	0	0	0	108
Walk	0	0	0	0	0	0	0	5
Ped Clearance	0	0	0	0	0	0	0	32
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

SG 9 SG 10 SG 11 SG 12

Overlaps

SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Plans

	Add Plan				Del Plan			
Plan 1	1	2	3	4	5	6	7	8
Split	24.0	108.0	32.0	15.0	15.0	118.0	15.0	32.0
Permissive Start	103.0	103.0	103.0	103.0	103.0	103.0	103.0	103.0
Permissive End	172.0	103.0	147.0	105.0	163.0	103.0	105.0	144.0
Force Off	182.0	103.0	159.0	117.0	173.0	103.0	117.0	159.0
Min Green	5.0	20.0	7.0	7.0	5.0	20.0	7.0	10.0
Max Green	18.0	103.0	27.0	9.0	9.0	112.0	9.0	27.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passage	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0
MaxRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Double Entry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 166.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Ok, Cancel

Rings Diagram: Ring 1 (1, 2, 3, 4, 5, 6, 7, 8), Ring 2 (1, 2, 3, 4, 5, 6, 7, 8)

Nema Editor Help Panel: Click on a label to view help contents.

Windows Taskbar: Start, 3:02 PM

Ladson

Nema Editor Using Nse Program: NEMA_17_tsp.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	2	4	6	7	8			
Signal Group (Nema Phase)	2	4	6	7	8			
Detector	2	4	6	7	8			
Amber	3	3	3	3	3			
Red Clearance	2	2	2	2	2			
Ped Signal Group	0	0	106	0	0			
Ped Detectors	0	0	106	0	0			
Walk	0	0	7	0	0			
Ped Clearance	0	0	21	0	0			
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SG 9 SG 10 SG 11 SG 12

Overlaps

SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Plans

	Add Plan				Del Plan			
Plan 1	1	2	3	4	5	6	7	8
Split	33.0	147.0	33.0	20.0	127.0			
Permissive Start	141.0	141.0	141.0	141.0	141.0			
Permissive End	169.0	141.0	159.0	141.0	141.0			
Force Off	174.0	141.0	174.0	14.0	141.0			
Min Green	0.0	20.0	10.0	7.0	20.0			
Max Green	28.0	141.0	28.0	14.0	122.0			
Max Green 2	0.0	0.0	0.0	0.0	0.0			
Red Revert	0.0	0.0	0.0	0.0	0.0			
Passage	3.0	4.0	3.0	3.5	4.0			
MaxRecall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
VehRecall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Coordinated Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Double Entry	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 6.0 Max Dwell: 1.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Ok, Cancel

Rings Diagram: Ring 1 (7, 2, 3, 4, 5, 6, 8), Ring 2 (1, 6)

Nema Editor Help Panel: Click on a label to view help contents.

Windows Taskbar: Start, 3:04 PM

Mount Vernon / Buckman

Nema Editor Using Nse Program: NEMA_18_tsp.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	1	2	3	4	5	6	7	8
Signal Group (Nema Phase)	1	2	3	4	5	6	7	8
Detector	1	2	3	4	5	6	7	8
Amber	3	3	3	4.5	3	3	3	4.5
Red Clearance	2	2	2	2	2	2	2	2
Ped Signal Group	0	0	0	0	0	0	0	0
Ped Detectors	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0
Ped Clearance	0	0	0	0	0	0	0	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overlaps

Plans

	Add Plan		Del Plan	
	1	2	3	4
Split	48.0	18.5	23.0	90.0
Permissive Start	81.5	81.5	81.5	81.5
Permissive End	135.0	88.0	158.0	81.5
Force Off	147.5	100.5	168.5	81.5
Min Green	6.0	6.0	5.0	15.0
Max Green	42.0	12.5	17.0	81.5
Max Green 2	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0
Passage	3.0	3.0	2.5	4.0
MaxRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Double Entry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 159.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Nema Editor Help Panel, Ok, Cancel

Russell / Reddick

Nema Editor Using Nse Program: NEMA_19_tsp.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	2	3	4	6	7	8		
Signal Group (Nema Phase)	2	3	4	6	7	8		
Detector	2	3	4	6	7	8		
Amber	3	3	4	3	3	4		
Red Clearance	2	2	2	2	2	2		
Ped Signal Group	102	0	0	0	0	0		
Ped Detectors	102	0	0	0	0	0		
Walk	5	0	0	0	0	0		
Ped Clearance	20	0	0	0	0	0		
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
SG 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
SG 11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Overlaps

Plans

	Add Plan		Del Plan	
	1	2	3	4
Split	60.0	15.0	105.0	60.0
Permissive Start	87.0	87.0	87.0	87.0
Permissive End	131.0	160.0	87.0	136.0
Force Off	147.0	171.0	87.0	147.0
Min Green	10.0	5.0	20.0	5.0
Max Green	54.0	10.0	87.0	54.0
Max Green 2	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0
Passage	3.0	2.5	0.0	3.0
MaxRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Double Entry	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 89.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Nema Editor Help Panel, Ok, Cancel

Buckman

Nema Editor Using Nse Program: NEMA_20_Oct.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	1	2	3	4	5	6	7	8
Signal Group (Nema Phase)	1	2	3	4	5	6	7	8
Detector	1	2	3	4	5	6	7	8
Amber	4	4	4	4	4	4	4	4
Red Clearance	2	2	2	2	2	2	2	2
Ped Signal Group	0	0	0	0	0	0	0	0
Ped Detectors	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0
Ped Clearance	0	0	0	0	0	0	0	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Overlaps

	SG 9	SG 10	SG 11	SG 12
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Plans

	Plan 1		Add Plan		Del Plan	
Split	37.0	17.0	20.0	106.0	17.0	37.0
Permissive Start	116.0	116.0	98.0	116.0	116.0	116.0
Permissive End	153.0	118.0	118.0	116.0	118.0	171.0
Force Off	166.0	131.0	118.0	98.0	131.0	186.0
Min Green	7.0	7.0	7.0	20.0	7.0	7.0
Max Green	29.0	9.0	12.0	98.0	9.0	29.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0
Passage	3.0	3.0	3.0	0.0	3.0	3.0

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 77.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Ok, Cancel

Rings

Nema Editor Help Panel
Click on a label to view help contents.

Windows Taskbar: 5:57 PM

Frye Road

Nema Editor Using Nse Program: NEMA_21_Oct.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	2	4	6	7	8			
Signal Group (Nema Phase)	2	4	6	7	8			
Detector	2	4	6	7	8			
Amber	3	4	3	3	4			
Red Clearance	2	2	2	2	2			
Ped Signal Group	0	0	106	0	0			
Ped Detectors	0	0	106	0	0			
Walk	0	0	5	0	0			
Ped Clearance	0	0	0	0	0			
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			

Overlaps

	SG 9	SG 10	SG 11	SG 12
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SG 10	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Plans

	Plan 1		Add Plan		Del Plan	
Split	56.0	124.0	56.0	25.0	99.0	
Permissive Start	116.0	116.0	116.0	116.0	116.0	
Permissive End	166.0	116.0	156.0	116.0	116.0	
Force Off	172.0	116.0	172.0	19.0	116.0	
Min Green	0.0	20.0	10.0	7.0	20.0	
Max Green	50.0	116.0	50.0	19.0	92.0	
Max Green 2	0.0	0.0	0.0	0.0	0.0	
Red Revert	0.0	0.0	0.0	0.0	0.0	
Passage	0.0	4.0	0.0	3.0	4.0	

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 95.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Ok, Cancel

Rings

Nema Editor Help Panel
Click on a label to view help contents.

Windows Taskbar: 6:16 PM

Lukens Lane

Nema Editor Using Nse Program: NEMA_22_Oct.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	2	3	4	6	7	8		
Signal Group (Nema Phase)	2	3	4	6	7	8		
Detector	2	3	4	6	7	8		
Amber	3	3	4	3	3	4		
Red Clearance	2	2	2	2	2	2		
Ped Signal Group	102	0	0	0	0	0		
Ped Detectors	102	0	0	0	0	0		
Walk	5	0	0	0	0	0		
Ped Clearance	23	0	0	0	0	0		
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overlaps

SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 11	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Plans

Plan 1

	2	3	4	6	7	8
Split	35.0	25.0	120.0	35.0	25.0	120.0
Permissive Start	112.0	112.0	112.0	112.0	112.0	112.0
Permissive End	131.0	158.0	112.0	133.0	158.0	112.0
Force Off	147.0	171.0	112.0	147.0	171.0	112.0
Min Green	10.0	7.0	20.0	8.0	7.0	20.0
Max Green	29.0	19.0	112.0	29.0	19.0	112.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0
Passage	3.0	3.0	0.0	3.0	3.0	0.0
MaxRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PedPhase	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Double Entry	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 147.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Ok, Cancel

Nema Editor Help Panel
Click on a label to view help contents.

6:25 PM

Cooper Road

Nema Editor Using Nse Program: NEMA_23_Oct.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	2	3	4	6	7	8	1	5
Signal Group (Nema Phase)	2	3	4	6	7	8	1	5
Detector	2	3	4	6	7	8	0	0
Amber	3	3	4	3	3	4	4	4
Red Clearance	1	1	2	1	1	2	1	1
Ped Signal Group	102	0	0	106	0	0	0	0
Ped Detectors	102	0	0	106	0	0	0	0
Walk	5	0	0	5	0	0	0	0
Ped Clearance	21	0	0	0	0	0	0	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overlaps

SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 11	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Plans

Plan 1

	2	3	4	6	7	8	1	5
Split	31.0	24.0	98.0	31.0	24.0	98.0	27.0	27.0
Permissive Start	90.0	90.0	90.0	90.0	90.0	90.0	0.0	0.0
Permissive End	106.0	134.0	90.0	106.0	134.0	90.0	0.0	0.0
Force Off	122.0	145.0	90.0	122.0	145.0	90.0	0.0	0.0
Min Green	5.0	5.0	20.0	5.0	5.0	20.0	5.0	5.0
Max Green	26.0	18.0	90.0	26.0	18.0	90.0	0.0	0.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passage	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
MaxRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Double Entry	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 161.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Ok, Cancel

Nema Editor Help Panel
Click on a label to view help contents.

6:33 PM

Sacramento Drive

Nema Editor Using Nse Program: NEMA_561_Tsp.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	2	3	4	6	7	8	1	5
Signal Group (Nema Phase)	2	3	4	6	7	8	1	5
Detector	2	3	4	6	7	8	0	0
Amber	3	3	4	3	3	4	0	0
Red Clearance	2	2	2	2	2	2	0	0
Ped Signal Group	0	0	0	0	0	0	0	0
Ped Detectors	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0
Ped Clearance	0	0	0	0	0	0	0	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SG 9 SG 10 SG 11 SG 12

Overlaps

	2	3	4	6	7	8	1	5
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Plans

Plan 1

	2	3	4	6	7	8	1	5
Split	27.0	24.0	98.0	27.0	24.0	98.0	31.0	31.0
Permissive Start	90.0	90.0	90.0	90.0	90.0	90.0	0.0	0.0
Permissive End	106.0	134.0	90.0	106.0	134.0	90.0	0.0	0.0
Force Off	122.0	145.0	90.0	122.0	145.0	90.0	0.0	0.0
Min Green	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0
Max Green	22.0	16.0	92.0	22.0	18.0	92.0	31.0	31.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passage	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0
MaxRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Double Entry	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 73.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Ok, Cancel

Nema Editor Help Panel
Click on a label to view help contents.

7:04 PM

Old Mill Road

Nema Editor Using Nse Program: NEMA_24_Oct.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	2	3	4	6	7	8	1	5
Signal Group (Nema Phase)	2	3	4	6	7	8	1	5
Detector	2	3	4	6	7	8	0	0
Amber	3	4	4	3	4	4	0	0
Red Clearance	2	2	2	2	2	2	0	0
Ped Signal Group	0	0	0	0	0	0	0	0
Ped Detectors	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0
Ped Clearance	0	0	0	0	0	0	0	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SG 9 SG 10 SG 11 SG 12

Overlaps

	2	3	4	6	7	8	1	5
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SG 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 11	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Plans

Plan 1

	2	3	4	6	7	8	1	5
Split	70.0	31.0	54.0	25.0	20.0	65.0		
Permissive Start	153.0	153.0	153.0	153.0	153.0	153.0		
Permissive End	153.0	153.0	153.0	153.0	153.0	153.0		
Force Off	125.0	153.0	46.0	125.0	46.0	153.0		
Min Green	5.0	5.0	10.0	5.0	5.0	5.0		
Max Green	65.0	25.0	48.0	20.0	14.0	59.0		
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0		
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0		
Passage	3.0	3.0	0.0	3.0	3.0	3.0		
MaxRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
VehRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Coordinated Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Double Entry	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 151.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Ok, Cancel

Nema Editor Help Panel
Click on a label to view help contents.

7:10 PM

Woodlawn Road

Nema Editor Using Nse Program: NEMA_25_Oct.NSE

File Edit Options About

Signal Group Info.

	Add Phase	Del Phase	Add Overl...	Del Overl...
Signal Group (Nema Phase)	2	4	6	7
Detector	2	4	6	7
Amber	3	3	3	3
Red Clearance	2	2	2	2
Ped Signal Group	0	0	106	0
Ped Detectors	0	0	106	0
Walk	0	0	5	0
Ped Clearance	0	0	0	23
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SG 10	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SG 11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Overlaps

Plans

	Plan 1			
Split	44.0	136.0	44.0	30.0
Permissive Start	130.0	130.0	130.0	130.0
Permissive End	168.0	130.0	158.0	130.0
Force Off	173.0	130.0	173.0	24.0
Min Green	10.0	20.0	10.0	7.0
Max Green	39.0	131.0	39.0	25.0
Max Green 2	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0
Passage	0.0	3.0	0.0	3.0
MaxRecall	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
VehRecall	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Double Entry	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 119.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Ok, Cancel

Rings

Nema Editor Help Panel
Click on a label to view help contents.

Belvoir

Nema Editor Using Nse Program: NEMA_26_Oct.NSE

File Edit Options About

Signal Group Info.

	Add Phase	Del Phase	Add Overl...	Del Overl...
Signal Group (Nema Phase)	1	2	4	6
Detector	1	2	4	6
Amber	4.5	5	4.5	4.5
Red Clearance	2	2	2	2
Ped Signal Group	0	0	0	0
Ped Detectors	0	0	0	0
Walk	0	0	0	0
Ped Clearance	0	0	0	0
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Overlaps

Plans

	Plan 1			
Split	52.0	103.5	24.5	155.5
Permissive Start	96.0	96.0	96.0	96.0
Permissive End	156.5	96.0	112.0	96.0
Force Off	168.5	96.0	119.0	96.0
Min Green	5.0	10.0	0.0	10.0
Max Green	45.5	96.5	18.0	148.0
Max Green 2	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0
Passage	3.0	0.0	0.0	0.0
MaxRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Double Entry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 180.0 Offset Seek Mode: short way
 Offset: 54.5 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Buttons: Add Ring, Del Ring, Add Barriers, Del Barriers, Start Phases, Drag Signal Groups, Barriers to Rings, Test/Set Sequence, Reset Sequence, Ok, Cancel

Rings

Nema Editor Help Panel
Click on a label to view help contents.

Backlick Road / Pohik Road

Nema Editor Using Nse Program: NEMA_27_Oct.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	1	2	3	4	5	6	7	8
Signal Group (Nema Phase)	1	2	3	4	5	6	7	8
Detector	1	2	3	4	5	6	7	8
Amber	3	3	3	3	3	3	3	3
Red Clearance	2	2	2	2	2	2	2	2
Ped Signal Group	0	0	0	0	0	106	0	108
Ped Detectors	0	0	0	0	0	106	0	108
Walk	0	0	0	0	0	5	0	5
Ped Clearance	0	0	0	0	0	18	0	25
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overlaps

SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SG 11	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Plans

	Add Plan				Del Plan			
Plan 1	1	2	3	4	5	6	7	8
Split	32.0	29.0	20.0	119.0	29.0	32.0	25.0	114.0
Permissive Start	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0
Permissive End	129.0	162.0	181.0	113.0	162.0	129.0	186.0	113.0
Force Off	144.0	172.0	191.0	113.0	172.0	144.0	0.0	113.0
Min Green	10.0	5.0	5.0	30.0	5.0	10.0	5.0	10.0
Max Green	27.0	24.0	15.0	114.0	24.0	27.0	20.0	109.0
Max Green 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Revert	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Passage	4.0	4.0	4.0	0.0	4.0	4.0	4.0	0.0
MaxRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
VehRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coordinated Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Double Entry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Cycle Length: 200.0 Offset Seek Mode: short way
 Offset: 131.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Add Ring Del Ring Add Barriers Del Barriers

Start Phases Drag Signal Groups, Barriers to Rings

Test/Set Sequence Reset Sequence

Nema Editor Help Panel
Click on a label to view help contents.

Ok Cancel

Fairfax County Parkway

Nema Editor Using Nse Program: NEMA_28_Oct.NSE

File Edit Options About

Signal Group Info.

	Add Phase		Del Phase		Add OverL...		Del OverL...	
	2	4	6	7	8			
Signal Group (Nema Phase)	2	4	6	7	8			
Detector	2	4	6	7	8			
Amber	3	4	3	3	4			
Red Clearance	2	2	2	2	2			
Ped Signal Group	0	0	0	0	0			
Ped Detectors	0	0	0	0	0			
Walk	0	0	0	0	0			
Ped Clearance	0	0	0	0	0			
Protected/Permitted	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overlaps

SG 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 11	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SG 12	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Plans

	Add Plan				Del Plan			
Plan 1	1	2	3	4	5	6	7	8
Split	47.0	153.0	47.0	30.0	123.0			
Permissive Start	145.0	145.0	145.0	145.0	145.0			
Permissive End	186.0	145.0	186.0	145.0	145.0			
Force Off	192.0	145.0	192.0	24.0	145.0			
Min Green	8.0	25.0	8.0	5.0	25.0			
Max Green	42.0	146.0	42.0	25.0	117.0			
Max Green 2	0.0	0.0	0.0	0.0	0.0			
Red Revert	0.0	0.0	0.0	0.0	0.0			
Passage	0.0	0.0	0.0	3.0	5.0			
MaxRecall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
VehRecall	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
PedRecall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
RedLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
YellowLock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Coordinated Phase	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
PedPhase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Double Entry	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
CalltoNonActuated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
Lead Phase	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			

Cycle Length: 200.0 Offset Seek Mode: short way
 Offset: 107.0 Max Dwell: 0.0
 Plan Time End: 0.0 Ped Permissive: 0.0
 Coordinated: MaxInhibit:
 AutoCalc Splits: CycleReference: 0.0

Add Ring Del Ring Add Barriers Del Barriers

Start Phases Drag Signal Groups, Barriers to Rings

Test/Set Sequence Reset Sequence

Nema Editor Help Panel
Click on a label to view help contents.

Ok Cancel

Appendix J: Synchro Files for U.S 1 Corridor

#5 North Kings Highway and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

File Edit Transfer Options Optimize Help

5 Richmond Hwy & Shields Ave

Options >

Controller Type: Actuated-Coordin

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 125.0

Max v/c Ratio: 0.74

Int. Delay: 9.8

Int. LOS: A

ICU: 77.6%

ICU LOS: D

Lock Timings

Offset Settings

Offset: 20.5

Begin of Green

2+6 - EBT WBT

Master

Single

TIMING WINDOW	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR	PED	HOLD
Lanes and Sharing (#RL)	↔↔	↔↔	↔↔	↔↔↔↔	↔↔↔↔	↔↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	147	2728	10	8	764	36	54	5	497	4	4	8		
Turn Type	Prot			Prot			Split		Perm	Split		Perm		
Protected Phases	5	2		1	6		3	3		4	4			
Permitted Phases								3				4		
Detector Phases	5	2		1	6		3	3		4	4			
Minimum Initial (s)	5.0	30.0		5.0	30.0		7.0	7.0	7.0	5.0	5.0	5.0		
Minimum Split (s)	10.5	36.0		10.5	36.0		12.0	12.0	12.0	35.5	35.5	35.5		
Total Split (s)	25.0	118.5		15.0	108.5		31.0	31.0	31.0	15.5	15.5	15.5		
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0		
All-Red Time (s)	1.5	2.0		1.5	2.0		1.0	1.0	1.0	1.5	1.5	1.5		
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lead	Lead	Lag	Lag	Lag		
Allow Lead/Lag Optimize?	Fixed	Fixed		Fixed	Fixed		Fixed	Fixed	Fixed	Fixed	Fixed	Fixed		
Recall Mode	None	C-Max		None	C-Max		None	None	None	None	None	None		
Actuated Effct. Green (s)	15.1	148.1		8.4	134.9		13.4	13.4	13.4		9.0	9.0		
Actuated g/C Ratio	0.08	0.82		0.05	0.75		0.07	0.07	0.07		0.05	0.05		
Volume to Capacity Ratio	0.51	0.65		0.10	0.17		0.41	0.74	0.73		0.09	0.09		
Control Delay (s)	97.7	2.5		83.0	7.5		79.8	13.9	12.8		82.2	39.9		
Queue Delay (s)	0.0	0.7		0.0	0.0		0.0	0.0	0.0		0.0	0.0		
Total Delay (s)	97.7	3.2		83.0	7.5		79.8	13.9	12.8		82.2	39.9		
Level of Service	F	A		F	A		E	B	B		F	D		
Approach Delay (s)		8.0			8.2			19.8			61.1			
Approach LOS		A			A			B			E			
Queue Length 50th (ft)	94	96		9	76		63	6	0		9	0		
Queue Length 95th (ft)	m118	111		30	119		109	107	100		30	21		
Stops (vph)	146	214		10	222		50	30	26		10	4		

v/c ok Min Err

10:30 PM

#6 South Kings Highway and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

6 Richmond Hwy & S Kings Hwy

Options >

Controller Type: Actuated-Coord

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 100.0

Max v/c Ratio: 0.89

Int. Delay: 50.8

Int. LOS: D

ICU: 90.4%

ICU LOS: E

Lock Timings

Offset Settings

Offset: 47.0

Begin of Green

2+6 - NBT SBT

Master

Single

TIMING WINDOW	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR	PED	HOLD
Lanes and Sharing (#RL)	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Traffic Volume (vph)	452	2570	29	60	1152	80	264	4	4	16	4	12		
Turn Type	Prot			Prot	Over		Split			Split				
Protected Phases	5	2		1	6	3	3	3		4	4			
Permitted Phases														
Detector Phases	5	2		1	6	3	3	3		4	4			
Minimum Initial (s)	10.0	15.0		10.0	15.0	5.0	5.0	5.0		10.0	10.0			
Minimum Split (s)	15.0	20.0		15.0	20.0	10.0	10.0	10.0		15.0	15.0			
Total Split (s)	58.0	108.0		15.0	65.0	42.0	42.0	42.0		15.0	15.0			
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0			
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0			
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lead		Lag	Lag			
Allow Lead/Lag Optimize?	Fixed	Fixed		Fixed	Fixed	Fixed	Fixed	Fixed		Fixed	Fixed			
Recall Mode	None	C-Max		None	C-Max	None	None	None		None	None			
Actuated Effct. Green (s)	51.7	113.7		12.5	74.4	32.8							12.1	
Actuated g/C Ratio	0.29	0.63		0.07	0.41	0.18				0.18			0.07	
Volume to Capacity Ratio	0.89	0.81		0.49	0.55	0.28				0.84			0.14	
Control Delay (s)	66.5	19.8		109.0	41.2	62.1				81.0			56.8	
Queue Delay (s)	118.8	1.1		1.1	13.0	0.0				0.0			0.0	
Total Delay (s)	185.3	20.9		110.0	54.2	62.1				81.0			56.8	
Level of Service	F	C		F	D	E				F			E	
Approach Delay (s)		45.3			57.3					81.0			56.8	
Approach LOS		D			E					F			E	
Queue Length 50th (ft)	452	1024		73	396	85				313			12	
Queue Length 95th (ft)	#640	973		128	491	128				415			33	
Stops (vph)	385	2222		58	878	67				259			21	

Timeline: e1 (15s), e2 (108s), e3 (42s), e4 (15s), e5 (58s), e6 (55s)

v/c ok Mins ok

10:33 PM

#7 Southgate Drive and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

7 Southgate Dr & Richmond Hwy

Options >

Controller Type: Actuated-Coord

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 80.0

Max v/c Ratio: 0.63

Int. Delay: 5.5

Int. LOS: A

ICU: 66.0%

ICU LOS: C

Lock Timings

Offset Settings

Offset: 107.0

Begin of Green

2+6 - SBT NBT

Master

Single

TIMING WINDOW	EBL	EBR	NBL	NBT	SBT	SBR	PED	HOLD
Lanes and Sharing (#RL)	2	2	2	2	2	2	2	2
Traffic Volume (vph)	104	28	36	2768	1208	28		
Turn Type			Prot	pm+pt				
Protected Phases	4	4	1	6	2			
Permitted Phases			6					
Detector Phases	4	4	1	6	2			
Minimum Initial (s)	7.0	7.0	5.0	20.0	20.0			
Minimum Split (s)	32.0	32.0	10.0	25.0	25.0			
Total Split (s)	32.0	32.0	15.0	148.0	133.0			
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0			
Lead/Lag			Lead		Lag			
Allow Lead/Lag Optimize?			Fixed		Fixed			
Recall Mode	None	None	None	C-Max	C-Max			
Actuated Effct. Green (s)	18.5	18.5	155.5	155.5	147.0			
Actuated g/C Ratio	0.10	0.10	0.86	0.86	0.82			
Volume to Capacity Ratio	0.57	0.15	0.10	0.63	0.24			
Control Delay (s)	79.8	21.2	0.8	0.9	7.8			
Queue Delay (s)	0.0	0.0	0.0	0.6	0.0			
Total Delay (s)	79.8	21.2	0.8	1.5	7.8			
Level of Service	E	C	A	A	A			
Approach Delay (s)	67.3			1.5	7.8			
Approach LOS	E			A	A			
Queue Length 50th (ft)	119	0	1	34	347			
Queue Length 95th (ft)	184	34	m1	39	303			
Stops (vph)	97	7	0	96	858			

Timeline: e1 (15s), e2 (133s), e4 (32s), e6 (148s)

v/c ok Mins ok

10:33 PM

#8 Beacon Hill Road and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

8 Beacon Hill Rd & Richmond Hwy

Options >	TIMING WINDOW	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	PED	HOLD
Controller Type: Actuated-Coordin	Lanes and Sharing (#RL)	60	32	5	156	74	110	24	2729	487	92	1112	44		
Cycle Length: 180.0	Traffic Volume (vph)	60	32	5	156	74	110	24	2729	487	92	1112	44		
Actuated C.L.: 180.0	Turn Type	Split			Split			Prot		pm+ov	Prot				
Natural C.L.: 140.0	Protected Phases	3	3		4	4		1	6	4	5	2			
Max v/c Ratio: 0.82	Permitted Phases									6					
Int. Delay: 19.4	Detector Phases	3	3		4	4		1	6	4	5	2			
Int. LOS: B	Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	20.0	5.0	5.0	20.0			
ICU: 86.0%	Minimum Split (s)	35.0	35.0		10.0	10.0		10.0	25.0	10.0	10.0	25.0			
ICU LOS: E	Total Split (s)	20.0	20.0		31.0	31.0		20.0	109.0	31.0	20.0	109.0			
Lock Timings	Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0			
Offset Settings	All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0			
Offset: 122.0	Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lag	Lag	Lead	Lag			
Begin of Green	Allow Lead/Lag Optimize?	Fixed	Fixed		Fixed	Fixed		Fixed	Fixed	Fixed	Fixed	Fixed			
2+6 - SBT NBT	Recall Mode	None	None		None	None		None	C-Max	None	None	C-Max			
Master	Actuated Effct. Green (s)	12.3	12.3		22.9	22.9		9.8	117.5	140.4	15.3	127.4			
Single	Actuated g/C Ratio	0.07	0.07		0.13	0.13		0.05	0.65	0.78	0.09	0.71			
	Volume to Capacity Ratio	0.41	0.41		0.69	0.75		0.25	0.82	0.36	0.61	0.26			
	Control Delay (s)	80.7	80.7		82.3	69.8		96.8	11.2	0.8	116.4	6.6			
	Queue Delay (s)	0.0	0.0		0.0	0.0		0.0	3.7	0.0	0.0	0.0			
	Total Delay (s)	80.7	80.7		82.3	69.8		96.8	15.0	0.8	116.4	6.6			
	Level of Service	F	F		F	E		F	B	A	F	A			
	Approach Delay (s)	80.7	80.7		75.5			13.4			14.7				
	Approach LOS	F	F		E			B			B				
	Queue Length 50th (ft)	57	57		179	174		29	308	0	91	5			
	Queue Length 95th (ft)	91	91		255	259		m37	834	30	129	412			
	Stops (vph)	89	89		147	142		24	1232	17	73	699			

v/c ok Min Err

#9 Memorial Street and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

9 Memorial St & Richmond Hwy

Options >	TIMING WINDOW	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	PED	HOLD
Controller Type: Actuated-Coordin	Lanes and Sharing (#RL)	116	32	120	8	52	8	60	3138	22	12	1172	76		
Cycle Length: 180.0	Traffic Volume (vph)	116	32	120	8	52	8	60	3138	22	12	1172	76		
Actuated C.L.: 180.0	Turn Type	Perm			Perm			Prot			Prot		Perm		
Natural C.L.: 130.0	Protected Phases	4	4		8			5	2		1	6			
Max v/c Ratio: 0.78	Permitted Phases												6		
Int. Delay: 9.1	Detector Phases	4	4		8	8		5	2		1	6	6		
Int. LOS: A	Minimum Initial (s)	7.0	7.0		7.0	7.0		5.0	20.0		5.0	20.0	20.0		
ICU: 80.9%	Minimum Split (s)	37.0	37.0		12.0	12.0		10.0	26.0		10.0	26.0	26.0		
ICU LOS: D	Total Split (s)	37.0	37.0		37.0	37.0		20.0	128.0		15.0	123.0	123.0		
Lock Timings	Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0		
Offset Settings	All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	2.0		1.0	2.0	2.0		
Offset: 99.0	Lead/Lag							Lead	Lag		Lead	Lag	Lag		
Begin of Green	Allow Lead/Lag Optimize?							Yes	Yes		Yes	Yes	Yes		
2+6 - NBT SBT	Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max		
Master	Actuated Effct. Green (s)	24.6	24.6		24.6			13.3	144.2		8.9	133.2	133.2		
Single	Actuated g/C Ratio	0.14	0.14		0.14			0.07	0.80		0.05	0.74	0.74		
	Volume to Capacity Ratio	0.72	0.50		0.29			0.46	0.78		0.14	0.31	0.06		
	Control Delay (s)	81.7	30.5		66.1			98.1	4.5		113.8	2.1	0.2		
	Queue Delay (s)	0.0	0.0		0.0			0.7	0.5		0.0	0.0	0.0		
	Total Delay (s)	81.7	30.5		66.1			98.7	5.0		113.8	2.1	0.2		
	Level of Service	F	C		E			F	A		F	A	A		
	Approach Delay (s)	52.7			66.1			6.7			3.0				
	Approach LOS	D			E			A			A				
	Queue Length 50th (ft)	134	65		70			74	28		15	32	0		
	Queue Length 95th (ft)	201	138		118			m102	398		m38	53	3		
	Stops (vph)	108	57		56			59	542		13	150	1		

v/c ok Mins ok

#229 Collard Street and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

File Edit Transfer Options Optimize Help

229 Collard St & Richmond Hwy

Options >

Controller Type: Actuated-Coordin

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 100.0

Max v/c Ratio: 0.89

Int. Delay: 7.2

Int. LOS: A

ICU: 90.6%

ICU LOS: E

Lock Timings

Offset Settings

Offset: 95.0

Begin of Green

2+6 - NBSB

Master

Single

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	PED	HOLD
Lanes and Sharing (#RL)	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	48	0	0	0	0	5	20	3148	0	0	1299	5	--	--
Turn Type	Perm	--	--	Perm	--	--	Perm	--	--	Perm	--	--	--	--
Protected Phases	4	--	--	4	--	--	3 6	--	--	6	--	--	--	--
Permitted Phases	4	--	--	4	--	--	3 6	--	--	6	--	--	--	--
Detector Phases	4 4	--	--	4 4	--	--	3 6 3 6	--	--	6 6	--	--	--	--
Minimum Initial (s)	5.0	5.0	--	5.0	5.0	--	--	--	--	20.0	20.0	--	--	--
Minimum Split (s)	10.0	10.0	--	10.0	10.0	--	--	--	--	25.0	25.0	--	--	--
Total Split (s)	25.0	25.0	--	25.0	25.0	--	155.0	155.0	--	125.0	125.0	--	--	--
Yellow Time (s)	4.0	4.0	--	4.0	4.0	--	--	--	--	4.0	4.0	--	--	--
All-Red Time (s)	1.0	1.0	--	1.0	1.0	--	--	--	--	1.0	1.0	--	--	--
Lead/Lag	Lag	Lag	--	Lag	Lag	--	--	--	--	--	--	--	--	--
Allow Lead/Lag Optimize?	Fixed	Fixed	--	Fixed	Fixed	--	--	--	--	--	--	--	--	--
Recall Mode	None	None	--	None	None	--	--	--	--	C-Max	C-Max	--	--	--
Actuated Effct. Green (s)	13.1	--	--	13.1	--	--	160.8	--	--	136.9	--	--	--	--
Actuated g/C Ratio	0.07	--	--	0.07	--	--	0.89	--	--	0.76	--	--	--	--
Volume to Capacity Ratio	0.45	--	--	0.04	--	--	0.77	--	--	0.27	--	--	--	--
Control Delay (s)	82.7	--	--	36.2	--	--	5.6	--	--	1.0	--	--	--	--
Queue Delay (s)	0.0	--	--	0.0	--	--	2.9	--	--	0.0	--	--	--	--
Total Delay (s)	82.7	--	--	36.2	--	--	8.6	--	--	1.0	--	--	--	--
Level of Service	F	--	--	D	--	--	A	--	--	A	--	--	--	--
Approach Delay (s)	--	82.7	--	--	36.2	--	--	8.6	--	--	1.0	--	--	--
Approach LOS	--	F	--	--	D	--	--	A	--	--	A	--	--	--
Queue Length 50th (ft)	55	--	--	0	--	--	117	--	--	17	--	--	--	--
Queue Length 95th (ft)	103	--	--	14	--	--	127	--	--	27	--	--	--	--

v/c ok Mins ok

Start 10:39 PM

#10 Popkins Lane and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

File Edit Transfer Options Optimize Help

10 Popkins Ln & Richmond Hwy

Options >

Controller Type: Actuated-Coordin

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 100.0

Max v/c Ratio: 0.89

Int. Delay: 101.1

Int. LOS: F

ICU: 73.6%

ICU LOS: D

Lock Timings

Offset Settings

Offset: 95.0

Begin of Green

2+6 - NBT SBTI

Master

Single

	WBL	WBR	NBT	NBR	SBL	SBT	PED	HOLD
Lanes and Sharing (#RL)	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	60	48	3120	36	44	1255	--	--
Turn Type	--	pt+ov	--	--	custom	--	--	--
Protected Phases	3 1 3 4	2	--	1 4	4 6	--	--	--
Permitted Phases	3 1 3 4	2	--	1 4	4 6	--	--	--
Detector Phases	3 3	2	--	1 4	4 6	--	--	--
Minimum Initial (s)	5.0	--	20.0	--	--	--	--	--
Minimum Split (s)	10.0	--	25.0	--	--	--	--	--
Total Split (s)	30.0	77.0	103.0	--	47.0	150.0	--	--
Yellow Time (s)	4.0	--	4.0	--	--	--	--	--
All-Red Time (s)	1.0	--	1.0	--	--	--	--	--
Lead/Lag	Lead	--	Lag	--	--	--	--	--
Allow Lead/Lag Optimize?	Fixed	--	Fixed	--	--	--	--	--
Recall Mode	None	--	C-Max	--	--	--	--	--
Actuated Effct. Green (s)	21.0	46.8	127.3	--	153.0	153.0	--	--
Actuated g/C Ratio	0.12	0.26	0.71	--	0.85	0.85	--	--
Volume to Capacity Ratio	0.29	0.12	0.89	--	0.15	0.29	--	--
Control Delay (s)	72.4	46.5	11.7	--	17.3	0.7	--	--
Queue Delay (s)	0.0	0.0	131.8	--	0.7	0.1	--	--
Total Delay (s)	72.4	46.5	143.5	--	18.0	0.8	--	--
Level of Service	E	D	F	--	B	A	--	--
Approach Delay (s)	60.9	--	143.5	--	--	1.4	--	--
Approach LOS	E	--	F	--	--	A	--	--
Queue Length 50th (ft)	65	42	1297	--	6	9	--	--
Queue Length 95th (ft)	114	75	1917	--	38	9	--	--

v/c ok Mins ok

Start 10:41 PM

#11 Lockheed Blvd and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

File Edit Transfer Options Optimize Help

11 Lockheed Blvd & Richmond Hwy

Options >

Controller Type: Actuated-Coordin

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 150.0

Max v/c Ratio: 1.01

Int. Delay: 30.0

Int. LOS: C

ICU: 95.6%

ICU LOS: F

Lock Timings

Offset Settings

Offset: 67.0

Begin of Green

2+6 - SBT NBT

Master

Single

TIMING WINDOW		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	PED	HOLD
Lanes and Sharing (#RL)															
Traffic Volume (vph)		454	6	116	4	0	36	64	2762	5	4	1216	60		
Turn Type		Split		pm+ov	Split		Perm	Prot			Prot				
Protected Phases		4	4	1	3	3		1	6		5	2			
Permitted Phases				4			3								
Detector Phases		4	4	1	3	3	3	1	6		5	2			
Minimum Initial (s)		8.0	8.0	5.0	8.0	8.0	8.0	5.0	20.0		5.0	20.0			
Minimum Split (s)		33.0	33.0	10.0	33.0	33.0	33.0	10.0	25.0		10.0	40.0			
Total Split (s)		45.0	45.0	24.0	15.0	15.0	15.0	24.0	107.0		13.0	96.0			
Yellow Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0			
All-Red Time (s)		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0			
Lead/Lag		Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag		Lag	Lag			
Allow Lead/Lag Optimize?		Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed		Fixed	Fixed			
Recall Mode		None	None	None	None	None	None	None	C-Max		None	C-Max			
Actuated Effect. Green (s)		46.3	63.3		10.3	10.3		14.0	114.6		8.0	100.0			
Actuated g/C Ratio		0.26	0.35		0.06	0.06		0.08	0.64		0.04	0.56			
Volume to Capacity Ratio		1.01	0.19		0.04	0.29		0.47	0.87		0.05	0.45			
Control Delay (s)		107.9	12.4		80.8	26.0		103.6	15.9		63.5	30.1			
Queue Delay (s)		0.0	0.0		0.0	0.0		0.1	0.0		0.0	0.0			
Total Delay (s)		107.9	12.4		80.8	26.0		103.7	15.9		63.5	30.1			
Level of Service		F	B		F	C		F	B		E	C			
Approach Delay (s)		88.7			31.5			17.9			30.2				
Approach LOS		F			C			B			C				
Queue Length 50th (ft)		594	22		5	0		79	314		5	312			
Queue Length 95th (ft)		845	71		19	42		m96	658		m17	402			
Stops (vph)		393	23		6	9		63	1738		6	666			

Timeline: e1 (0-36s), e2 (36-107s), e3 (107-141s), e4 (141-155s), e5 (0-15s), e6 (15-107s)

v/c > 1 Min Err

10:42 PM

#12 Arlington Drive and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

File Edit Transfer Options Optimize Help

12 Arlington Dr & Richmond Hwy

Options >

Controller Type: Actuated-Coordin

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 90.0

Max v/c Ratio: 0.87

Int. Delay: 19.7

Int. LOS: B

ICU: 92.5%

ICU LOS: F

Lock Timings

Offset Settings

Offset: 45.0

Begin of Green

2+6 - SBT NBT

Master

Single

TIMING WINDOW		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	PED	HOLD
Lanes and Sharing (#RL)															
Traffic Volume (vph)		8	0	4	172	0	468	4	2488	56	120	1276	5		
Turn Type		Perm			Perm		pm+ov	Prot			pm+pt				
Protected Phases				4			4	5	1	6		5	2		
Permitted Phases				4			4	5				2			
Detector Phases		4	4		4	4	5	1	6		5	2			
Minimum Initial (s)		5.0	5.0		5.0	5.0	5.0	5.0	20.0		5.0	20.0			
Minimum Split (s)		30.0	30.0		30.0	30.0	10.0	10.0	25.0		10.0	25.0			
Total Split (s)		41.0	41.0		41.0	41.0	35.0	15.0	104.0		35.0	124.0			
Yellow Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0			
All-Red Time (s)		1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0			
Lead/Lag							Lead	Lead	Lag		Lead	Lag			
Allow Lead/Lag Optimize?							Fixed	Fixed	Fixed		Fixed	Fixed			
Recall Mode		None	None		None	None	None	None	C-Max		None	C-Max			
Actuated Effect. Green (s)		28.8			28.8	61.5		8.1	112.6		145.3	142.9			
Actuated g/C Ratio		0.16			0.16	0.34		0.05	0.63		0.81	0.79			
Volume to Capacity Ratio		0.04			0.77	0.87		0.05	0.80		0.36	0.32			
Control Delay (s)		45.3			79.7	67.7		92.2	12.4		45.3	5.1			
Queue Delay (s)		0.0			0.0	1.5		0.0	0.0		0.0	0.0			
Total Delay (s)		45.3			79.7	69.3		92.2	12.4		45.3	5.1			
Level of Service		D			E	E		F	B		D	A			
Approach Delay (s)		45.3			72.1			12.6			8.5				
Approach LOS		D			E			B			A				
Queue Length 50th (ft)		8			198	514		5	835		108	182			
Queue Length 95th (ft)		28			275	612		m7	545		179	95			
Stops (vph)		8			161	427		6	1862		162	337			

Timeline: e1 (0-15s), e2 (15-124s), e3 (124-141s), e4 (141-155s), e5 (0-35s), e6 (35-104s)

v/c ok Mins ok

10:42 PM

#13 Boswell Road and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

13 Fordson Rd & Richmond Hwy

Options >

Controller Type: Actuated-Coordin

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 115.0

Max v/c Ratio: 0.69

Int. Delay: 8.8

Int. LOS: A

ICU: 82.0%

ICU LOS: D

Lock Timings

Offset Settings

Offset: 25.0

Begin of Green

2+6 - SBT NBT

Master

Single

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	PED	HOLD
Lanes and Sharing (#RL)	4	4	4	2	2	2	3	3	3	3	3	3		
Traffic Volume (vph)	40	48	60	26	21	109	36	2490	24	76	1266	16		
Turn Type	Split	Prot	Split	Prot	Prot	Prot	Prot	Prot	Prot	Prot	pm+ov			
Protected Phases	3	3	3	4	4		1	6		5	2	3		
Permitted Phases														
Detector Phases	3	3	3	4	4		1	6		5	2	3		
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		8.0	20.0		8.0	20.0	8.0		
Minimum Split (s)	13.0	13.0	13.0	30.0	30.0		13.0	25.0		13.0	25.0	13.0		
Total Split (s)	20.0	20.0	20.0	30.0	30.0		21.0	109.0		21.0	109.0	20.0		
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0		
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0		
Lead/Lag	Lead	Lead	Lead	Lag	Lag		Lead	Lag		Lead	Lag	Lead		
Allow Lead/Lag Optimize?	Fixed	Fixed	Fixed	Fixed	Fixed		Fixed	Fixed		Fixed	Fixed	Fixed		
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	None		
Actuated Effct. Green (s)	12.5	12.5	12.5		11.5		11.7	129.1		15.0	135.1	150.5		
Actuated g/C Ratio	0.07	0.07	0.07		0.06		0.07	0.72		0.08	0.75	0.84		
Volume to Capacity Ratio	0.34	0.39	0.37		0.54		0.32	0.69		0.51	0.33	0.01		
Control Delay (s)	82.9	83.8	19.8		28.1		103.6	2.3		75.9	6.7	3.5		
Queue Delay (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.7	0.0	0.0		
Total Delay (s)	82.9	83.8	19.8		28.1		103.6	2.3		76.6	6.7	3.5		
Level of Service	F	F	B		C		F	A		E	A	A		
Approach Delay (s)		57.6			28.1			3.8			10.6			
Approach LOS		E			C			A			B			
Queue Length 50th (ft)	46	56	0		28		44	28		79	178	2		
Queue Length 95th (ft)	90	103	51		69		m70	41		149	228	m10		
Stops (vph)	38	45	11		50		35	203		69	420	6		

v/c ok Mins ok

10:46 PM

#14 Fordson and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

14 Shopping Cntr Entr & Richmond Hwy

Options >

Controller Type: Actuated-Coordin

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 100.0

Max v/c Ratio: 0.65

Int. Delay: 5.2

Int. LOS: A

ICU: 76.5%

ICU LOS: D

Lock Timings

Offset Settings

Offset: 25.0

Begin of Green

2+6 - SBT NBT

Master

Single

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	PED	HOLD
Lanes and Sharing (#RL)	8	8	16	4	12	100	104	2500	8	136	1204	5		
Traffic Volume (vph)	8	8	16	4	12	100	104	2500	8	136	1204	5		
Turn Type	Split	pm+ov	Split	pm+pt	pm+pt		pm+pt	pm+pt		pm+pt	pm+pt			
Protected Phases	3	3	1	4	4		1	6		5	2			
Permitted Phases														
Detector Phases	3	3	1	4	4		1	6		5	2			
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	20.0		5.0	20.0			
Minimum Split (s)	10.0	10.0	10.0	30.0	30.0		10.0	25.0		10.0	25.0			
Total Split (s)	15.0	15.0	20.0	30.0	30.0		20.0	109.0		26.0	115.0			
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0			
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0			
Lead/Lag	Lead	Lead	Lead	Lag	Lag		Lead	Lag		Lead	Lag	Lead		
Allow Lead/Lag Optimize?	Fixed	Fixed	Fixed	Fixed	Fixed		Fixed	Fixed		Fixed	Fixed	Fixed		
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	None		
Actuated Effct. Green (s)		9.3	13.9		10.5		144.1	136.4		155.1	144.7			
Actuated g/C Ratio		0.05	0.08		0.06		0.80	0.76		0.86	0.80			
Volume to Capacity Ratio		0.17	0.12		0.61		0.30	0.65		0.64	0.30			
Control Delay (s)		83.4	21.4		21.4		1.4	1.3		73.5	2.7			
Queue Delay (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.2			
Total Delay (s)		83.4	21.4		21.4		1.4	1.3		73.5	2.9			
Level of Service		F	C		C		A	A		E	A			
Approach Delay (s)		52.4			21.4			1.4			10.0			
Approach LOS		D			C			A			B			
Queue Length 50th (ft)		19	0		19		1	23		107	28			
Queue Length 95th (ft)		47	23		89		3	35		193	71			
Stops (vph)		16	6		26		1	53		225	86			

v/c ok Mins ok

10:46 PM

#15 Belford Drive (Hybla) and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

15 Belford Dr (Hybla) & Richmond Hwy

Options >

Controller Type: Actuated-Coord

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 70.0

Max v/c Ratio: 0.50

Int. Delay: 1.6

Int. LOS: A

ICU: 62.0%

ICU LOS: B

Lock Timings

Offset Settings

Offset: 19.0

Begin of Green

2+6 - SBTU NB

Master

Single

TIMING WINDOW	EBL	EBR	NBL	NBT	SBU	SBT	SBR	PED	HOLD
Lanes and Sharing (#RL)	8	8	24	2521	0	1188	12		
Traffic Volume (vph)									
Turn Type	pm+ov	pm+pt		Perm					
Protected Phases	4	1	1	6		2			
Permitted Phases		4	6		2				
Detector Phases	4	1	1	6	2	2			
Minimum Initial (s)	8.0	8.0	8.0	20.0	20.0	20.0			
Minimum Split (s)	30.0	13.0	13.0	25.0	25.0	25.0			
Total Split (s)	30.0	28.0	28.0	150.0	122.0	122.0			
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0			
Lead/Lag		Lead	Lead		Lag	Lag			
Allow Lead/Lag Optimize?		Fixed	Fixed		Fixed	Fixed			
Recall Mode	None	None	None	C-Max	C-Max	C-Max			
Actuated Effct. Green (s)	10.1	12.7	174.3	176.8		167.8			
Actuated g/C Ratio	0.06	0.07	0.97	0.98		0.93			
Volume to Capacity Ratio	0.09	0.07	0.06	0.50		0.25			
Control Delay (s)	81.4	35.1	0.1	0.4		2.7			
Queue Delay (s)	0.0	0.0	0.0	0.3		0.0			
Total Delay (s)	81.4	35.1	0.1	0.7		2.7			
Level of Service	F	D	A	A		A			
Approach Delay (s)	58.2			0.7		2.7			
Approach LOS	E			A		A			
Queue Length 50th (ft)	9	0	0	2		136			
Queue Length 95th (ft)	30	19	m0	2		118			
Stops (vph)	9	4	0	24		177			

Timeline: e1 (180s), e2 (122s), e4 (120s), e5 (150s)

v/c ok Mins ok

10:47 PM

#16 Sherwood and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

16 Wall Mart & Richmond Hwy

Options >

Controller Type: Actuated-Coord

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 120.0

Max v/c Ratio: 0.80

Int. Delay: 20.7

Int. LOS: C

ICU: 84.5%

ICU LOS: E

Lock Timings

Offset Settings

Offset: 166.0

Begin of Green

2+6 - SBT NBT

Master

Single

TIMING WINDOW	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	PED	HOLD
Lanes and Sharing (#RL)	16	20	12	248	20	28	36	2423	1016	104	1096	5		
Traffic Volume (vph)														
Turn Type	Split		Perm	Split		Perm	Prot		Perm	Prot		Perm		
Protected Phases	3	3		3			1	6		5	2			
Permitted Phases													2	
Detector Phases	3	3	3	4	4	4	1	6	6	5	2	2		
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	5.0	20.0	20.0	5.0	20.0	20.0		
Minimum Split (s)	12.0	12.0	12.0	42.0	42.0	42.0	10.0	25.0	25.0	10.0	25.0	25.0		
Total Split (s)	15.0	15.0	15.0	32.0	32.0	32.0	15.0	109.0	109.0	24.0	118.0	118.0		
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag		
Allow Lead/Lag Optimize?	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed		
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max		
Actuated Effct. Green (s)	9.9	9.9	9.9	21.6	21.6	21.6	10.5	121.6	121.6	17.3	130.4	130.4		
Actuated g/C Ratio	0.06	0.06	0.06	0.12	0.12	0.12	0.06	0.68	0.68	0.10	0.72	0.72		
Volume to Capacity Ratio	0.16	0.19	0.12	0.65	0.67	0.13	0.35	0.71	0.80	0.61	0.30	0.00		
Control Delay (s)	83.2	83.8	34.6	80.8	81.4	20.1	84.2	13.7	6.3	80.1	11.3	10.0		
Queue Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1	0.3	0.0	0.0	0.0		
Total Delay (s)	83.2	83.8	34.6	80.8	81.4	20.1	84.2	19.7	6.6	80.1	11.3	10.0		
Level of Service	F	F	C	F	F	C	F	B	A	F	B	A		
Approach Delay (s)		71.3			75.4			16.6			17.2			
Approach LOS		E			E			B			B			
Queue Length 50th (ft)	18	23	0	157	166	0	42	337	91	123	138	0		
Queue Length 95th (ft)	47	55	24	232	242	33	m59	576	102	200	244	8		
Stops (vph)	16	21	5	124	129	7	35	958	127	101	315	1		

Timeline: e1 (180s), e2 (118s), e3 (15s), e4 (32s), e5 (24s), e6 (109s)

v/c ok Min Err

10:55 PM

#17 Ladson Lane and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

File Edit Transfer Options Optimize Help

17 Ladson Ln & Richmond Hwy

Options >

Controller Type: Actuated-Coordi

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 100.0

Max v/c Ratio: 0.75

Int. Delay: 9.4

Int. LOS: A

ICU: 76.2%

ICU LOS: D

Lock Timings

Offset Settings

Offset: 6.0

Begin of Green

2+6 - SWT NET

Master

Single

TIMING WINDOW	SEL	SER	NEL	NET	SWT	SWR	PED	HOLD
Lanes and Sharing (#RL)	1	1	1	1	1	1	1	1
Traffic Volume (vph)	116	68	56	3296	1350	44		
Turn Type	Prot	pm+pt						
Protected Phases	4	4	1	6	2			
Permitted Phases			6					
Detector Phases	4	4	1	6	2			
Minimum Initial (s)	7.0	7.0	7.0	20.0	20.0			
Minimum Split (s)	33.0	33.0	12.0	25.0	25.0			
Total Split (s)	33.0	33.0	20.0	147.0	127.0			
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0			
Lead/Lag			Lead	Lag				
Allow Lead/Lag Optimize?			Fixed	Fixed				
Recall Mode	None	None	None	C-Max	C-Max			
Actuated Effect. Green (s)	15.2	15.2	158.8	158.8	149.2			
Actuated g/C Ratio	0.08	0.08	0.88	0.88	0.83			
Volume to Capacity Ratio	0.39	0.49	0.18	0.75	0.33			
Control Delay (s)	77.9	80.1	1.0	3.0	3.7			
Queue Delay (s)	0.0	0.0	0.0	5.1	0.0			
Total Delay (s)	77.9	80.1	1.0	8.1	3.7			
Level of Service	E	F	A	A	A			
Approach Delay (s)	78.8			8.0	3.7			
Approach LOS	E			A	A			
Queue Length 50th (ft)	68	78	1	81	190			
Queue Length 95th (ft)	102	133	m5	m93	79			
Stops (vph)	108	64	2	344	255			

Timeline: e1 (90s), e2 (127s), e3 (93s), e4, e5 (147s), e6

v/c ok Mins ok

10:56 PM

#18 Mt. Vernon / Buckman Road and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

File Edit Transfer Options Optimize Help

18 Buckman Rd & Richmond Hwy

Options >

Controller Type: Actuated-Coordi

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 90.0

Max v/c Ratio: 1.64

Int. Delay: 57.5

Int. LOS: E

ICU: 96.7%

ICU LOS: F

Lock Timings

Offset Settings

Offset: 159.0

Begin of Green

2+6 - NETL SW

Master

Single

TIMING WINDOW	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR	PED	HOLD
Lanes and Sharing (#RL)	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	612	32	10	56	32	396	8	2282	52	192	1154	148		
Turn Type	Split			Split		Perm	pm+pt		Perm	pm+pt		pm+ov		
Protected Phases	4	4		3	3		5	2		1	6	4		
Permitted Phases						3	2		2	6		6		
Detector Phases	4	4		3	3	3	5	2	2	1	6	4		
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	5.0	15.0	15.0	5.0	15.0	6.0		
Minimum Split (s)	11.0	11.0		11.0	11.0	11.0	10.0	21.5	21.5	10.0	21.5	11.0		
Total Split (s)	48.0	48.0		18.5	18.5	18.5	15.0	90.5	90.5	23.0	98.5	48.0		
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.5	4.5	4.0	4.5	4.0		
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	2.0	2.0	1.0	2.0	1.0		
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lag	Lag		
Allow Lead/Lag Optimize?	Fixed	Fixed		Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed		
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	None		
Actuated Effect. Green (s)	39.0	39.0		15.5	15.5		100.8	93.6	93.6	116.5	112.3	153.2		
Actuated g/C Ratio	0.22	0.22		0.09	0.09		0.56	0.52	0.52	0.65	0.62	0.85		
Volume to Capacity Ratio	0.86	0.87		0.57	1.64		0.03	0.83	0.06	0.82	0.53	0.11		
Control Delay (s)	78.3	78.8		94.0	337.6		9.0	23.7	9.4	83.6	17.1	0.9		
Queue Delay (s)	0.5	0.6		0.0	0.0		0.0	0.0	0.0	0.0	1.3	0.0		
Total Delay (s)	78.8	79.4		94.0	337.6		9.0	23.7	9.4	83.6	18.4	0.9		
Level of Service	E	E		F	F		A	C	A	F	B	A		
Approach Delay (s)		79.1			293.3			23.4			25.1			
Approach LOS		E			F			C			C			
Queue Length 50th (ft)	387	394		102	~546		2	851	10	187	287	0		
Queue Length 95th (ft)	506	516		168	#774		m2	m853	m11	#313	360	27		
Stops (vph)	307	313		84	161		2	1841	16	215	519	7		

Timeline: e1 (90s), e2 (90.5s), e3 (16.5s), e4 (48s), e5 (15s), e6 (98.5s)

v/c > 1 Mins ok

10:59 PM

#19 Reddick Avenue and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

File Edit Transfer Options Optimize Help

19 Reddick Ave & Richmond Hwy

Options >

Controller Type: Actuated-Coordin

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 100.0

Max v/c Ratio: 1.06

Int. Delay: 59.5

Int. LOS: E

ICU: 102.5%

ICU LOS: G

Lock Timings

Offset Settings

Offset: 89.0

Begin of Green

2+6 - NETL SW

Master

Single

TIMING WINDOW	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR	PED	HOLD
Lanes and Sharing (#RL)	4	6	18	444	20	92	68	1794	27	210	1020	54		
Traffic Volume (vph)	48	6	18	444	20	92	68	1794	27	210	1020	54		
Turn Type	Perm			Perm			pm+pt		Perm	pm+pt		Perm		
Protected Phases		4			8		5	2		1	6			
Permitted Phases	4			8			2		2			6		
Detector Phases	4	4		8	8		5	2	2	1	6	6		
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	20.0	20.0	5.0	20.0	20.0		
Minimum Split (s)	30.0	30.0		10.0	10.0		10.0	26.0	26.0	10.0	26.0	26.0		
Total Split (s)	60.0	60.0		60.0	60.0		15.0	95.0	95.0	25.0	105.0	105.0		
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0		
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	2.0	2.0	1.0	2.0	2.0		
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag		
Allow Lead/Lag Optimize?							Fixed	Fixed	Fixed	Fixed	Fixed	Fixed		
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	C-Max		
Actuated Effect. Green (s)		57.1		57.1	57.1		101.3	93.3	93.3	117.0	106.0	106.0		
Actuated g/C Ratio		0.32		0.32	0.32		0.56	0.52	0.52	0.65	0.59	0.59		
Volume to Capacity Ratio		0.16		1.06	0.19		0.23	0.98	0.03	0.85	0.49	0.06		
Control Delay (s)		39.2		118.1	12.2		5.6	41.6	1.6	53.1	42.4	12.6		
Queue Delay (s)		0.0		0.0	0.0		0.0	0.0	0.0	187.6	0.0	0.0		
Total Delay (s)		39.2		118.1	12.2		5.6	41.6	1.6	240.7	42.4	12.6		
Level of Service		D		F	B		A	D	A	F	D	B		
Approach Delay (s)		39.2			96.8			39.7			73.6			
Approach LOS		D			F			D			E			
Queue Length 50th (ft)		53		574	16		10	1146	7	197	617	20		
Queue Length 95th (ft)		98		807	67		m7	11274	m1	m318	693	m51		
Stops (vph)		45		385	21		14	1631	4	188	916	31		

v/c > 1 Mins ok

10:59 PM

#20 Buckman Road and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

File Edit Transfer Options Optimize Help

20 Buckman Rd & Richmond Hwy

Options >

Controller Type: Actuated-Coordin

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 90.0

Max v/c Ratio: 0.64

Int. Delay: 12.0

Int. LOS: B

ICU: 67.1%

ICU LOS: C

Lock Timings

Offset Settings

Offset: 77.0

Begin of Green

2+6 - NETL SW

Master

Single

TIMING WINDOW	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR	PED	HOLD
Lanes and Sharing (#RL)	4	4	4	60	16	60	44	1768	10	12	1084	0		
Traffic Volume (vph)	4	4	4	60	16	60	44	1768	10	12	1084	0		
Turn Type	Split			Split			Prot		Perm	Prot				
Protected Phases	3	3		4	4		5	2		1	6			
Permitted Phases									2					
Detector Phases	3	3		4	4		5	2	2	1	6			
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	20.0	20.0	7.0	20.0			
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	26.0	26.0	13.0	26.0			
Total Split (s)	17.0	17.0		37.0	37.0		20.0	106.0	106.0	20.0	106.0			
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0			
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0			
Lead/Lag	Lead	Lead		Lag	Lag		Lead	Lead	Lead	Lag	Lag			
Allow Lead/Lag Optimize?	Fixed	Fixed		Fixed	Fixed		Fixed	Fixed	Fixed	Fixed	Fixed			
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max			
Actuated Effect. Green (s)		10.4			20.5		13.0	139.9	139.9	12.8	134.6			
Actuated g/C Ratio		0.06			0.11		0.07	0.78	0.78	0.07	0.75			
Volume to Capacity Ratio		0.11			0.64		0.35	0.64	0.01	0.10	0.41			
Control Delay (s)		62.7			68.0		93.4	11.2	4.8	39.2	2.0			
Queue Delay (s)		0.0			0.0		0.1	0.0	0.0	0.0	0.0			
Total Delay (s)		62.7			68.0		93.4	11.2	4.8	39.2	2.0			
Level of Service		E			E		F	B	A	D	A			
Approach Delay (s)		62.7			68.0			13.2			2.4			
Approach LOS		E			E			B			A			
Queue Length 50th (ft)		9			135		53	263	2	15	34			
Queue Length 95th (ft)		33			208		93	1094	m4	m28	74			
Stops (vph)		9			110		40	900	3	13	70			

v/c ok Mins ok

11:00 PM

#21 Frye Road and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

File Edit Transfer Options Optimize Help

21 Frye Rd & Richmond Hwy

Options >

Controller Type: Actuated-Coord

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 65.0

Max v/c Ratio: 0.81

Int. Delay: 13.5

Int. LOS: B

ICU: 61.7%

ICU LOS: B

Lock Timings

Offset Settings

Offset: 95.0

Begin of Green

2+6 - SWT NET

Master

Single

TIMING WINDOW	SBL	SBR	NEL	NET	SWT	SWR	PED	HOLD
Lanes and Sharing (#RL)	4	4	1	6	2	2	—	—
Traffic Volume (vph)	436	64	76	1356	974	140	—	—
Turn Type	—	—	pm+pt	—	—	—	—	—
Protected Phases	4	—	1	6	2	—	—	—
Permitted Phases	—	—	6	—	—	—	—	—
Detector Phases	4	—	1	6	2	—	—	—
Minimum Initial (s)	8.0	—	7.0	20.0	20.0	—	—	—
Minimum Split (s)	25.0	—	12.0	26.0	26.0	—	—	—
Total Split (s)	56.0	—	25.0	124.0	99.0	—	—	—
Yellow Time (s)	4.0	—	4.0	4.0	4.0	—	—	—
All-Red Time (s)	1.0	—	1.0	2.0	2.0	—	—	—
Lead/Lag	—	—	Lead	—	Lag	—	—	—
Allow Lead/Lag Optimize?	—	—	Fixed	—	Fixed	—	—	—
Recall Mode	None	—	None	C-Max	C-Max	—	—	—
Actuated Effct. Green (s)	32.1	—	141.9	141.9	128.7	—	—	—
Actuated g/C Ratio	0.18	—	0.79	0.79	0.72	—	—	—
Volume to Capacity Ratio	0.81	—	0.25	0.49	0.45	—	—	—
Control Delay (s)	71.0	—	2.4	2.0	2.4	—	—	—
Queue Delay (s)	0.0	—	0.0	0.0	0.0	—	—	—
Total Delay (s)	71.0	—	2.4	2.0	2.4	—	—	—
Level of Service	E	—	A	A	A	—	—	—
Approach Delay (s)	71.0	—	2.1	2.4	—	—	—	—
Approach LOS	E	—	A	A	—	—	—	—
Queue Length 50th (ft)	293	—	5	46	38	—	—	—
Queue Length 95th (ft)	343	—	10	65	43	—	—	—
Stops (vph)	463	—	6	126	93	—	—	—

Diagram showing phase timing windows: e1 (35s), e2 (39s), e4 (56s), e5 (124s).

v/c ok Mins ok

11:01 PM

#22 Lukens Lane and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

File Edit Transfer Options Optimize Help

22 Richmond Hwy & Lukens Ln

Options >

Controller Type: Actuated-Coord

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 75.0

Max v/c Ratio: 0.68

Int. Delay: 6.8

Int. LOS: A

ICU: 56.2%

ICU LOS: B

Lock Timings

Offset Settings

Offset: 147.0

Begin of Green

2+6 - WBTL EB

Master

Single

TIMING WINDOW	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	PED	HOLD
Lanes and Sharing (#RL)	1	1	1	3	3	3	2	2	2	2	2	2	—	—
Traffic Volume (vph)	100	1300	100	32	970	10	52	16	52	40	8	40	—	—
Turn Type	pm+pt	—	Perm	pm+pt	—	Perm	Perm	—	Perm	—	Perm	—	—	—
Protected Phases	1	6	6	5	2	2	4	4	—	8	8	—	—	—
Permitted Phases	6	—	6	2	2	2	4	4	—	8	8	—	—	—
Detector Phases	1	6	6	5	2	2	4	4	—	8	8	—	—	—
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	8.0	8.0	—	8.0	8.0	—	—	—
Minimum Split (s)	12.0	26.0	26.0	12.0	26.0	26.0	33.0	33.0	—	13.0	13.0	—	—	—
Total Split (s)	25.0	120.0	120.0	25.0	120.0	120.0	35.0	35.0	—	35.0	35.0	—	—	—
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	—	4.0	4.0	—	—	—
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	1.0	—	1.0	1.0	—	—	—
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	—	—	—	—	—	—	—	—
Allow Lead/Lag Optimize?	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	—	—	—	—	—	—	—	—
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	—	None	None	—	—	—
Actuated Effct. Green (s)	152.5	145.2	145.2	151.6	142.6	142.6	—	19.3	—	19.3	19.3	—	—	—
Actuated g/C Ratio	0.85	0.81	0.81	0.84	0.79	0.79	—	0.11	—	0.11	0.11	—	—	—
Volume to Capacity Ratio	0.22	0.32	0.08	0.10	0.35	0.01	—	0.68	—	0.34	0.23	—	—	—
Control Delay (s)	1.7	2.4	0.1	0.9	2.8	0.8	—	68.5	—	75.0	23.8	—	—	—
Queue Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	—	0.0	—	0.0	0.0	—	—	—
Total Delay (s)	1.7	2.4	0.1	0.9	2.8	0.8	—	68.5	—	75.0	23.8	—	—	—
Level of Service	A	A	A	A	A	A	—	E	—	E	C	—	—	—
Approach Delay (s)	—	2.2	—	—	2.7	—	—	68.5	—	—	47.1	—	—	—
Approach LOS	—	A	—	—	A	—	—	E	—	—	D	—	—	—
Queue Length 50th (ft)	5	75	0	3	76	1	—	117	—	45	9	—	—	—
Queue Length 95th (ft)	14	82	1	m2	95	m0	—	187	—	86	52	—	—	—
Stops (vph)	7	156	0	2	139	0	—	95	—	37	13	—	—	—

Diagram showing phase timing windows: e1 (35s), e2 (120s), e4 (35s), e5 (25s), e6 (120s).

v/c ok Mins ok

11:02 PM

#23 Cooper Road and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

23 Richmond Hwy & Cooper Rd

Options >	TIMING WINDOW	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	PED	HOLD
Controller Type: Actuated-Coordin	Lanes and Sharing (#RL)	4	1278	24	72	972	32	36	20	56	84	8	16		
Cycle Length: 180.0	Traffic Volume (vph)	4	1278	24	72	972	32	36	20	56	84	8	16		
Actuated C.L.: 180.0	Turn Type	Prot			Prot			Perm			Perm				
Natural C.L.: 80.0	Protected Phases	1 3	3 6		5	2		4			4		4		
Max v/c Ratio: 0.81	Permitted Phases														
Int. Delay: 10.5	Detector Phases	1 3	3 6		5	2		4	4		4	4			
Int. LOS: B	Minimum Initial (s)				5.0	20.0		5.0	5.0		5.0	5.0			
ICU: 50.7%	Minimum Split (s)				10.0	26.0		31.0	31.0		31.0	31.0			
ICU LOS: A	Total Split (s)	51.0	125.0		24.0	98.0		31.0	31.0		31.0	31.0			
Lock Timings	Yellow Time (s)				4.0	4.0		4.0	4.0		4.0	4.0			
Offset Settings	All-Red Time (s)				1.0	2.0		1.0	1.0		1.0	1.0			
Offset: 161.0	Lead/Lag				Lead	Lag		Lag	Lag		Lag	Lag			
Begin of Green	Allow Lead/Lag Optimize?				Fixed	Fixed		Fixed	Fixed		Fixed	Fixed			
2+6 - WBT EBT	Recall Mode				None	C-Max		None	None		None	None			
Master	Actuated Effct. Green (s)	34.4	138.2		13.7	116.6		19.0	19.0		19.0	19.0			
Single	Actuated g/C Ratio	0.19	0.77		0.08	0.65		0.11	0.11		0.11	0.11			
	Volume to Capacity Ratio	0.01	0.33		0.53	0.31		0.25	0.34		0.69	0.12			
	Control Delay (s)	43.8	0.5		110.7	5.7		73.0	25.6		85.1	35.7			
	Queue Delay (s)	0.0	0.1		0.0	0.0		0.0	0.0		0.0	0.0			
	Total Delay (s)	43.8	0.6		110.7	5.7		73.0	25.6		85.1	35.7			
	Level of Service	D	A		F	A		E	C		F	D			
	Approach Delay (s)		0.7			12.8		40.9			74.1				
	Approach LOS		A			B		D			E				
	Queue Length 50th (ft)	5	1		90	53		40	22		98	9			
	Queue Length 95th (ft)	m10	7		144	123		77	74		157	40			

v/c ok Mins ok

11:04 PM

#561 Sacramento Drive and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

561 Richmond Hwy & Sacramento Dr

Options >	TIMING WINDOW	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	PED	HOLD
Controller Type: Actuated-Coordin	Lanes and Sharing (#RL)	4	1178	60	0	944	80	24	12	4	124	16	60		
Cycle Length: 180.0	Traffic Volume (vph)	4	1178	60	0	944	80	24	12	4	124	16	60		
Actuated C.L.: 180.0	Turn Type	Prot						Perm			Perm		Perm		
Natural C.L.: 80.0	Protected Phases	1	6			2 4		3			3		3		
Max v/c Ratio: 0.81	Permitted Phases														
Int. Delay: 10.5	Detector Phases	1	6			2 4		3	3		3	3	3		
Int. LOS: B	Minimum Initial (s)	5.0	20.0					5.0	5.0		5.0	5.0	5.0		
ICU: 45.1%	Minimum Split (s)	10.0	26.0					10.0	10.0		10.0	10.0	10.0		
ICU LOS: A	Total Split (s)	24.0	98.0			129.0		27.0	27.0		27.0	27.0	27.0		
Lock Timings	Yellow Time (s)	4.0	4.0					4.0	4.0		4.0	4.0	4.0		
Offset Settings	All-Red Time (s)	1.0	2.0					1.0	1.0		1.0	1.0	1.0		
Offset: 161.0	Lead/Lag	Lead	Lag					Lead	Lead		Lead	Lead	Lead		
Begin of Green	Allow Lead/Lag Optimize?	Fixed	Fixed					Fixed	Fixed		Fixed	Fixed	Fixed		
2+6 - WBT EBT	Recall Mode	None	C-Max					None	None		None	None	None		
Master	Actuated Effct. Green (s)	11.3	112.1			136.2		23.1			23.1	23.1			
Single	Actuated g/C Ratio	0.06	0.62			0.76		0.13			0.13	0.13			
	Volume to Capacity Ratio	0.43	0.39			0.27		0.26			0.81	0.23			
	Control Delay (s)	102.1	2.6			0.3		69.1			103.1	16.3			
	Queue Delay (s)	0.0	0.0			0.1		0.0			0.0	0.1			
	Total Delay (s)	102.1	2.6			0.5		69.1			103.1	16.4			
	Level of Service	F	A			A		E			F	B			
	Approach Delay (s)		6.3			0.5		69.1			77.1				
	Approach LOS		A			A		E			E				
	Queue Length 50th (ft)	60	23			0		40			163	0			
	Queue Length 95th (ft)	m62	m27			0		84			m279	48			

v/c ok Mins ok

11:05 PM

#24 Mt Vernon Hwy / Old Mill Road

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

File Edit Transfer Options Optimize Help

24 Woodlawn & Richmond Hwy

Options >

Controller Type: Actuated-Coordin

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 110.0

Max v/c Ratio: 1.04

Int. Delay: 68.3

Int. LOS: E

ICU: 93.7%

ICU LOS: F

Lock Timings

Offset Settings

Offset: 151.0

Begin of Green

2 - NET

Master

Single

TIMING WINDOW	EBL2	EBL	EBR	EBR2	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	NEL2	NEL	NET	NER	SWL	S
Lanes and Sharing (#RL)	4	0	4	0	440	4	28	52	60	88	24	0	0	32	1164	540	204	
Traffic Volume (vph)	4	0	4	0	440	4	28	52	60	88	24	0	0	32	1164	540	204	
Turn Type	Split				Perm	Split	Perm	Split						Prot		Perm	Prot	
Protected Phases	4	4				3	3	3	7	7				5	2	5	1	
Permitted Phases					3			3								2	5	
Detector Phases	4	4			3	3	3	3	7	7				5	2	5	1	
Minimum Initial (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0				5.0			5.0	
Minimum Split (s)	10.0	10.0			10.0	10.0	10.0	10.0	10.0	10.0				11.0			11.0	
Total Split (s)	15.0	15.0			55.0	55.0	55.0	55.0	25.0	25.0				20.0	74.0	74.0	31.0	
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0				5.0			5.0	
All-Red Time (s)	1.0	1.0			1.0	1.0	1.0	1.0	1.0	1.0				1.0			1.0	
Lead/Lag					Lag	Lag	Lag	Lag	Lead	Lead				Lag			Lead	
Allow Lead/Lag Optimize?					Fixed	Fixed	Fixed	Fixed	Fixed	Fixed				Fixed			Fixed	
Recall Mode	None	None			None	None	None	None	None	None				None			None	
Actuated Effct. Green (s)		8.5				50.5	50.5		21.1					16.9	57.0	57.0	34.3	
Actuated g/C Ratio		0.05				0.28	0.28		0.12					0.09	0.32	0.32	0.19	
Volume to Capacity Ratio		0.10				0.95	0.12		0.82					0.19	1.04	0.68	0.61	
Control Delay (s)		83.0				86.4	48.2		100.6					53.1	75.9	16.5	87.9	
Queue Delay (s)		0.0				0.0	0.0		0.0					0.0	0.0	0.0	0.0	
Total Delay (s)		83.0				86.4	48.2		100.6					53.1	75.9	16.5	87.9	
Level of Service		F				F	D		F					D	E	B	F	
Approach Delay (s)		83.0				82.6			100.6						57.0			
Approach LOS		F				F			F						E			
Queue Length 50th (ft)		9				545	46		201					35	856	352	239	
Queue Length 95th (ft)		30				#763	86		#321					#73	#1000	509	335	

Conflict Mins ok

Start 11:06 PM

#25 Richmond highway and Woodlawn Rd.

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

File Edit Transfer Options Optimize Help

25 Richmond Hwy & Woodlawn Rd

Options >

Controller Type: Actuated-Coordin

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 80.0

Max v/c Ratio: 0.71

Int. Delay: 10.9

Int. LOS: B

ICU: 66.0%

ICU LOS: C

Lock Timings

Offset Settings

Offset: 119.0

Begin of Green

2+6 - EBTL WB

Master

Single

TIMING WINDOW	EBL	EBT	WBT	WBR	SBL	SBR	PED	HOLD
Lanes and Sharing (#RL)	188	1500	1328	24	160	228		
Traffic Volume (vph)	188	1500	1328	24	160	228		
Turn Type	pm+pt				Perm	Perm		
Protected Phases	5	2	6		4			
Permitted Phases	2		6		4			
Detector Phases	5	2	6	6	4	4		
Minimum Initial (s)	7.0	20.0	20.0	20.0	7.0	7.0		
Minimum Split (s)	12.0	25.0	33.0	33.0	33.0	33.0		
Total Split (s)	30.0	136.0	106.0	106.0	44.0	44.0		
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0		
Lead/Lag	Lead		Lag	Lag				
Allow Lead/Lag Optimize?	Fixed		Fixed	Fixed				
Recall Mode	None	C-Max	C-Max	C-Max	None	None		
Actuated Effct. Green (s)	151.2	151.2	134.6	134.6	22.9	22.9		
Actuated g/C Ratio	0.84	0.84	0.75	0.75	0.13	0.13		
Volume to Capacity Ratio	0.64	0.50	0.51	0.02	0.71	0.57		
Control Delay (s)	19.7	10.5	1.7	0.2	77.5	9.6		
Queue Delay (s)	0.0	0.7	0.0	0.0	0.0	0.0		
Total Delay (s)	19.7	11.1	1.7	0.2	77.5	9.6		
Level of Service	B	B	A	A	E	A		
Approach Delay (s)		12.1	1.7		37.6			
Approach LOS		B	A		D			
Queue Length 50th (ft)	58	660	23	0	185	0		
Queue Length 95th (ft)	103	462	119	m1	261	84		
Stops (vph)	84	1008	115	0	151	23		

v/c ok Mins ok

Start 11:06 PM

#26 Richmond Highway and Belvoir Road

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

File Edit Transfer Options Optimize Help

26 Richmond Hwy & Belvoir Rd

Options >

Controller Type: Actuated-Coord

Cycle Length: 180.0

Actuated C.L.: 180.0

Natural C.L.: 60.0

Max v/c Ratio: 0.83

Int. Delay: 15.6

Int. LOS: B

ICU: 77.2%

ICU LOS: D

Lock Timings

Offset Settings

Offset: 54.5

Begin of Green

2+6 - NBT SBT1

Master

Single

	NBT	NBR	SBL	SBT	NWL	NWR	PED	HOLD
Lanes and Sharing (#RL)	↑↑	↑	↓	↓↓	←	→		
Traffic Volume (vph)	1560	208	360	1236	44	128		
Turn Type	—	Perm	pm+pt	—	—	Perm		
Protected Phases	2		1	6	4			
Permitted Phases		2		6		4		
Detector Phases	2	2	1	6	4	4		
Minimum Initial (s)	10.0	10.0	5.0	10.0	5.0	5.0		
Minimum Split (s)	17.0	17.0	11.5	17.0	11.5	11.5		
Total Split (s)	103.5	103.5	52.0	155.5	24.5	24.5		
Yellow Time (s)	5.0	5.0	4.5	5.0	4.5	4.5		
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0		
Lead/Lag	Lag	Lag	Lead	—	—	—		
Allow Lead/Lag Optimize?	Fixed	Fixed	Fixed	—	—	—		
Recall Mode	C-Max	C-Max	None	C-Max	None	None		
Actuated Effect. Green (s)	121.0	121.0	160.7	160.7	13.3	13.3		
Actuated g/C Ratio	0.67	0.67	0.89	0.89	0.07	0.07		
Volume to Capacity Ratio	0.66	0.18	0.83	0.39	0.34	0.54		
Control Delay (s)	20.8	2.1	30.4	4.7	80.6	15.4		
Queue Delay (s)	0.0	0.0	0.2	0.0	0.0	0.0		
Total Delay (s)	20.8	2.1	30.6	4.7	80.6	15.4		
Level of Service	C	A	C	A	F	B		
Approach Delay (s)	18.6	—	—	10.6	32.1	—		
Approach LOS	B	—	—	B	C	—		
Queue Length 50th (ft)	533	0	362	453	50	0		
Queue Length 95th (ft)	798	38	369	158	96	71		
Stops (vph)	913	10	398	501	40	18		

Timeline: e1 (52 s), e2 (103.5 s), e4 (24.5 s), e6 (155.5 s)

v/c ok Mins ok

11:07 PM

#27 Pohik Rd / Backlick Rd and Richmond Highway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

File Edit Transfer Options Optimize Help

27 Richmond Hwy & Pohik Rd

Options >

Controller Type: Actuated-Coord

Cycle Length: 200.0

Actuated C.L.: 200.0

Natural C.L.: 105.0

Max v/c Ratio: 0.89

Int. Delay: 29.3

Int. LOS: C

ICU: 94.3%

ICU LOS: F

Lock Timings

Offset Settings

Offset: 131.0

Begin of Green

2+6 - EBTL WB

Master

Single

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	PED	HOLD
Lanes and Sharing (#RL)	↑	↑	↑	←	←	←	←	←	←	↓	↓	↓		
Traffic Volume (vph)	172	1696	1160	44	1170	60	104	40	5	100	112	8		
Turn Type	pm+pt	—	Perm	pm+pt	—	—	Split	—	—	Split	—	Perm		
Protected Phases	5	2	2	1	6	—	4	4	—	3	3	—		
Permitted Phases	2		2	6								3		
Detector Phases	5	2	2	1	6	—	4	4	—	3	3	3		
Minimum Initial (s)	5.0	30.0	30.0	5.0	30.0	—	5.0	5.0	—	10.0	10.0	10.0		
Minimum Split (s)	10.0	35.0	35.0	10.0	35.0	—	10.0	10.0	—	28.0	28.0	28.0		
Total Split (s)	25.0	119.0	119.0	20.0	114.0	—	29.0	29.0	—	32.0	32.0	32.0		
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	—	4.0	4.0	—	4.0	4.0	4.0		
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	—	1.0	1.0	—	1.0	1.0	1.0		
Lead/Lag	Lead	Lag	Lag	Lead	Lag	—	Lag	Lag	—	Lead	Lead	Lead		
Allow Lead/Lag Optimize?	Fixed	Fixed	Fixed	Fixed	Fixed	—	Fixed	Fixed	—	Fixed	Fixed	Fixed		
Recall Mode	None	C-Max	C-Max	None	C-Max	—	None	None	—	None	None	None		
Actuated Effect. Green (s)	152.6	142.2	142.2	146.4	136.5	—	17.0	17.0	—	21.4	21.4	21.4		
Actuated g/C Ratio	0.76	0.71	0.71	0.73	0.68	—	0.09	0.09	—	0.11	0.11	0.11		
Volume to Capacity Ratio	0.61	0.67	0.89	0.30	0.51	—	0.51	0.52	—	0.59	0.63	0.05		
Control Delay (s)	10.7	16.1	13.6	10.4	17.7	—	90.9	89.8	—	90.0	90.8	34.0		
Queue Delay (s)	0.1	20.7	1.5	0.1	0.0	—	0.0	0.0	—	0.1	0.3	0.0		
Total Delay (s)	10.8	36.8	15.1	10.5	17.7	—	90.9	89.8	—	90.1	91.1	34.0		
Level of Service	B	D	B	B	B	—	F	F	—	F	F	C		
Approach Delay (s)	—	27.0	—	—	17.5	—	—	90.3	—	—	88.6	—		
Approach LOS	—	C	—	—	B	—	—	F	—	—	F	—		
Queue Length 50th (ft)	47	610	162	13	390	—	98	101	—	128	144	0		
Queue Length 95th (ft)	m62	817	#599	32	581	—	162	165	—	195	213	20		
Stops (vph)	42	912	178	11	594	—	68	71	—	95	106	4		

Timeline: e1 (20 s), e2 (119 s), e3 (32 s), e4 (29 s), e5 (25 s), e6 (114 s)

v/c ok Mins ok

11:08 PM

#28 Richmond Highway and Fairfax County Parkway

Synchro 6: C:\Documents and Settings\Killol J Kamdar\Desktop\Beginning Green.sy7

File Edit Transfer Options Optimize Help

28 Richmond Hwy & Fairfax Co Pkwy

Options >

Controller Type: Actuated-Coordin

Cycle Length: 200.0

Actuated C.L.: 200.0

Natural C.L.: 75.0

Max v/c Ratio: 0.92

Int. Delay: 29.2

Int. LOS: C

ICU: 91.9%

ICU LOS: F

Lock Timings

Offset Settings

Offset: 107.0

Begin of Green

2+6 - WBT EBT

Master

Single

TIMING WINDOW		EBL	EBT	WBT	WBR	SBL	SBR	PED	HOLD
Lanes and Sharing (#RL)		↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)		184	2504	706	624	560	16	—	—
Turn Type		Prot	—	—	Free	—	Perm	—	—
Protected Phases		1	6	2	—	4	—	—	—
Permitted Phases		—	—	Free	—	4	—	—	—
Detector Phases		1	6	2	None	4	4	—	—
Minimum Initial (s)		5.0	25.0	25.0	—	8.0	8.0	—	—
Minimum Split (s)		10.0	31.0	31.0	—	13.0	13.0	—	—
Total Split (s)		30.0	153.0	123.0	—	47.0	47.0	—	—
Yellow Time (s)		4.0	4.0	4.0	—	4.0	4.0	—	—
All-Red Time (s)		1.0	2.0	2.0	—	1.0	1.0	—	—
Lead/Lag		Lead	—	Lag	—	—	—	—	—
Allow Lead/Lag Optimize?		Fixed	—	Fixed	—	—	—	—	—
Recall Mode		None	C-Max	C-Max	—	None	None	—	—
Actuated Effect. Green (s)		17.8	154.5	133.7	200.0	39.6	39.6	—	—
Actuated g/C Ratio		0.09	0.77	0.67	1.00	0.20	0.20	—	—
Volume to Capacity Ratio		0.60	0.92	0.30	0.39	0.82	0.05	—	—
Control Delay (s)		89.8	25.2	9.6	1.0	83.1	22.4	—	—
Queue Delay (s)		0.0	0.0	0.0	0.0	0.0	0.0	—	—
Total Delay (s)		89.8	25.3	9.6	1.0	83.1	22.4	—	—
Level of Service		F	C	A	A	F	C	—	—
Approach Delay (s)		—	29.7	5.6	—	81.4	—	—	—
Approach LOS		—	C	A	—	F	—	—	—
Queue Length 50th (ft)		122	1262	124	2	368	0	—	—
Queue Length 95th (ft)		166	1506	135	2	432	25	—	—
Stops (vph)		175	1858	170	10	528	4	—	—

v/c ok Mins ok

11:09 PM

Appendix K: Statistical Analysis and Examples of VISSIM Output

Transit Travel Time Data:

Data set 1

1220 1215 1236 1215 1247 1222 1242 1225 1220 1265 1230 1221

Dataset 2

1225 1238 1219 1217 1211 1210 1218 1245 1306 1206 1215 1064

Kolmogorov – Smirnov Test:

	Range of Transit travel Time (seconds)						
	< 1200	1200 - 1220	1220 - 1240	1240 - 1260	1260 - 1280	1280 - 1300	> 1300
With TSP							
Number of Observation	0	4	5	2	1	0	0
Cumulative Number	0	4	9	11	12	12	12
Cumulative Percentage	0	0.33	0.75	0.92	1	1	1
Without TSP							
Number of Observation	1	7	2	1	0	0	1
Cumulative Number	1	8	10	11	11	11	12
Cumulative Percentage	0.08	0.67	0.83	0.92	0.92	0.92	1
Absolute observed difference	0.08	0.34	0.08	0	0.08	0.08	0

Significance Level: 0.05

Significance Level: 0.10

$D_{max} = 1.36 * \text{SQRT} ((n1 + n2) / (n1*n2))$ $D_{max} = 1.22 * \text{SQRT} ((n1 + n2) / (n1*n2))$

$D_{max} = 0.56$

$D_{max} = 0.50$

Here, absolute observed difference $D < D_{max}$. Therefore the engineer cannot find a statistically significant difference (at the 0.05 significance level) when the TSP is used and is not used.

Bus Control Delay Data:

Data set 1

14 17 26 63 36 30 2 34 4 3 42 30 45 8 22 39 5 16 32 14 37 31 3 7 29 23 16 7 20 9 3

Dataset 2

18 1 15 53 3 32 8 38 46 6 2 55 47 27 64 44 52 4 24 4 7 34 28 13 11 2 24 49 1 44 7

Kolmogorov – Smirnov Test:

	Range of Bus Control Delay (seconds)						
	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
With TSP Number of Observation	10	6	6	6	2	0	1
Cumulative Number	10	16	22	28	30	30	31 = n1
Cumulative Percentage	0.32	0.52	0.71	0.90	0.97	0.97	1
Without TSP Number of Observation	11	4	4	3	5	3	1
Cumulative Number	11	15	19	22	27	30	31 = n2
Cumulative Percentage	0.35	0.48	0.61	0.71	0.87	0.97	1
Absolute observed difference	0.03	0.03	0.10	0.19	0.10	0	0

Significance Level: 0.05

Significance Level: 0.10

$$D_{max} = 1.36 * \text{SQRT} ((n1 + n2) / (n1*n2)) \quad D_{max} = 1.22 * \text{SQRT} ((n1 + n2) / (n1*n2))$$

Dmax = 0.35

Dmax = 0.31

Here, absolute observed difference $D < D_{max}$. Therefore the engineer cannot find a statistically significant difference (at the 0.05 significance level) when the TSP is used and is not used.

Side Street Queue Length Data:

Dataset 1

9	126	12	73	14	18	0	0	10	3	1
248	311	0	22	10	14	0	0	3	0	0
81	199	3	583	4	90	40	32	2	0	5
3	3	165	103	58	2	19	17			

Dataset 2

9	110	7	72	20	21	0	0	11	4	1
249	289	0	22	8	29	0	0	3	0	0
74	210	2	632	4	101	67	38	2	0	7
5	1	136	116	31	1	21	6			

Kolmogorov – Smirnov Test:

	Range of Bus Side Street Queue Lengths (feet)					
	< 20	21 - 80	81 - 140	141 - 200	201 - 260	> 261
With TSP						
Number of Observation	19	5	4	2	1	2
Cumulative Number	19	24	28	30	31	33 = n1
Cumulative Percentage	0.58	0.73	0.85	0.91	0.94	1
Without TSP						
Number of Observation	16	9	4	0	2	2
Cumulative Number	16	25	29	29	31	33 = n2
Cumulative Percentage	0.49	0.76	0.88	0.88	0.94	1
Absolute observed difference	0.09	0.03	0.03	0.03	0	0

Significance Level: 0.05

Significance Level: 0.10

$$D_{max} = 1.36 * \text{SQRT} ((n1 + n2) / (n1*n2))$$

$$D_{max} = 1.22 * \text{SQRT} ((n1 + n2) / (n1*n2))$$

Dmax = 0.33

Dmax = 0.30

Here, absolute observed difference $D < D_{max}$. Therefore the engineer cannot find a statistically significant difference (at the 0.05 significance level) when the TSP is used and is not used.

Examples of VISSIM Output for U.S. 1 No-TSP Condition

1) TABLE OF TRAVEL TIMES

U.S. 1 Model for Entire Fairfax Connector us Route

No. 2 (Southbound): from link 149 at 285.1 ft to link 112 at 5000.8 ft, Distance 47963.4 ft
 No. 105 (105_NB): from link 1000144 at 12.2 ft to link 150 at 687.1 ft, Distance 17260.9 ft
 No. 106 (106_NB): from link 134 at 75.9 ft to link 150 at 687.1 ft, Distance 13673.8 ft
 No. 107 (107_NB): from link 111 at 4.3 ft to link 150 at 686.9 ft, Distance 48419.2 ft

Time; Trav;#Veh; Trav;#Veh; Trav;#Veh; Trav;#Veh; Trav;#Veh; Trav;#Veh; Trav;#Veh;
 VehC; All; 105_NB;; Car;; 106_NB;; Car;; 107_NB;; Car;;
 No.;; 2; 2; 105; 105; 106; 106; 106; 106; 107; 107; 107; 107;
 Name;Southbound;Southbound;105_NB;105_NB;105_NB;105_NB;106_NB;106_NB;106_NB;107_NB;107_NB;107_NB;
 600; 0.0; 0; 0.0; 0; 363.5; 11; 0.0; 0; 282.0; 21; 0.0; 0; 0.0; 0;
 1200; 972.5; 1; 0.0; 0; 359.3; 90; 0.0; 0; 269.4; 110; 0.0; 0; 1006.7; 1;
 1800; 958.2; 2; 0.0; 0; 372.7; 145; 914.2; 1; 279.6; 180; 0.0; 0; 1088.4; 10;
 2400; 1121.7; 2; 1220.2; 1; 374.9; 113; 0.0; 0; 282.9; 133; 0.0; 0; 1027.5; 12;
 3000; 1127.2; 2; 1215.3; 1; 373.3; 150; 0.0; 0; 281.5; 172; 2948.4; 1; 1028.0; 8;
 3600; 1114.2; 2; 0.0; 0; 370.0; 117; 907.2; 1; 277.8; 147; 0.0; 0; 1032.5; 5;

2) TABLE OF TRANSIT CONTROL DELAY

U.S. 1 Model for Entire Fairfax Connector us Route

- No. 1: Travel time section(s) 2
- No. 2: Travel time section(s) 105
- No. 3: Travel time section(s) 106
- No. 4: Travel time section(s) 107
- No. 5: Travel time section(s) 107

	Time; Delay; Stopd; #Veh; Pers.; #Pers; Delay; Stopd; Stops; #Veh; Pers.; #Pers; Delay; Stopd; Stops; #Veh; Pers.; #Pers;	Delay; Stopd; Stops; #Veh; Pers.; #Pers;	VehC; All;.....	105_NB;.....	106_NB;.....	107_NB;.....	Car;.....
No. 1;	1800; 202.9; 69.9; 10.00; 2; 202.9; 2; 0.0; 0.0; 0.00; 0; 0.0; 0; 125.8; 79.1; 2.00; 1; 125.8; 33; 0.0; 0.0; 0.00; 0; 0.0; 0; 321.7; 137.6; 14.20; 10;	321.7; 10;					
2400;	361.9; 231.2; 14.00; 2; 361.9; 2; 196.3; 113.5; 8.00; 1; 196.3; 30; 0.0; 0.0; 0.00; 0; 0.0; 0; 0.0; 0; 0.0; 0; 245.2; 125.1; 7.67; 12;	245.2; 12;					
3000;	350.7; 251.3; 7.00; 2; 350.7; 2; 201.1; 126.9; 6.00; 1; 201.1; 35; 0.0; 0.0; 0.00; 0; 0.0; 0; 338.6; 201.5; 8.00; 1; 338.6; 35; 249.5; 124.6; 7.25; 8;	249.5; 8;					
3600;	353.9; 168.6; 9.50; 2; 353.9; 2; 0.0; 0.0; 0.00; 0; 0.0; 0; 129.0; 81.2; 3.00; 1; 129.0; 33; 0.0; 0.0; 0.00; 0; 0.0; 0; 271.0; 137.4; 9.40; 5;	271.0; 5;					
Total;	302.1; 172.6; 9.78; 9; 302.1; 9; 198.7; 120.2; 7.00; 2; 198.9; 65; 127.4; 80.1; 2.50; 2; 127.4; 66; 338.6; 201.5; 8.00; 1; 338.6; 35; 270.7; 129.1; 9.72;	36; 270.7; 36;					

3) QUEUE LENGTH RECORD

U.S. 1 Model for Entire Fairfax Connector us Route

Queue Counter	1: Link	2 At	635.400 ft
Queue Counter	2: Link	1000010 At	85.000 ft
Queue Counter	3: Link	1000015 At	13.900 ft
Queue Counter	4: Link	28 At	503.000 ft
Queue Counter	6: Link	4 At	1426.904 ft
Queue Counter	7: Link	1000035 At	455.600 ft
Queue Counter	8: Link	1000040 At	132.300 ft
Queue Counter	9: Link	1000046 At	151.200 ft
Queue Counter	10: Link	66 At	1763.800 ft
Queue Counter	11: Link	1000272 At	16.000 ft
Queue Counter	12: Link	45 At	1996.400 ft
Queue Counter	13: Link	80 At	2069.800 ft
Queue Counter	18: Link	1000087 At	161.800 ft
Queue Counter	19: Link	1000092 At	155.500 ft
Queue Counter	20: Link	48 At	18.800 ft
Queue Counter	21: Link	24 At	303.400 ft
Queue Counter	22: Link	26 At	213.641 ft
Queue Counter	24: Link	84 At	696.100 ft
Queue Counter	26: Link	10 At	491.800 ft
Queue Counter	28: Link	96 At	841.760 ft
Queue Counter	29: Link	127 At	204.500 ft
Queue Counter	30: Link	1000153 At	40.619 ft
Queue Counter	31: Link	1000160 At	154.000 ft
Queue Counter	32: Link	88 At	1524.400 ft
Queue Counter	33: Link	1000173 At	75.800 ft

Queue Counter	34: Link	1000178 At	85.000 ft
Queue Counter	36: Link	1000186 At	17.500 ft
Queue Counter	37: Link	78 At	1735.200 ft
Queue Counter	38: Link	12 At	343.400 ft
Queue Counter	39: Link	74 At	1240.000 ft
Queue Counter	40: Link	16 At	697.600 ft
Queue Counter	41: Link	6 At	386.400 ft
Queue Counter	42: Link	14 At	882.700 ft
Queue Counter	43: Link	108 At	5531.200 ft
Queue Counter	44: Link	1000224 At	122.700 ft
Queue Counter	46: Link	36 At	2350.400 ft
Queue Counter	47: Link	22 At	1431.900 ft
Queue Counter	49: Link	30 At	977.800 ft
Queue Counter	50: Link	50 At	1100.600 ft
Queue Counter	52: Link	32 At	1732.100 ft
Queue Counter	151: Link	1000070 At	60.100 ft
Queue Counter	152: Link	1000069 At	87.100 ft
Queue Counter	161: Link	1000076 At	50.800 ft
Queue Counter	162: Link	1000075 At	102.700 ft
Queue Counter	171: Link	1000082 At	47.300 ft
Queue Counter	172: Link	1000081 At	74.300 ft
Queue Counter	201: Link	1000100 At	76.900 ft
Queue Counter	202: Link	1000099 At	123.800 ft
Queue Counter	203: Link	1000098 At	98.600 ft
Queue Counter	251: Link	1000123 At	297.800 ft
Queue Counter	252: Link	1000121 At	291.000 ft

Avg.: average queue length [ft] within time interval
 Max.: maximum queue length [ft] within time interval
 Stop: number of stops within queue

3600; 0; 0; 0; 39; 1; 14; 61; 7; 117; 329; 38; 17; 76; 6; 37; 210; 13; 3; 75; 4; 21; 123; 11; 0; 0; 0; 0; 0; 0; 9; 43; 4; 5; 55; 4; 0; 16; 1;
6; 35; 4; 0; 0; 6; 133; 7; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 0; 134; 231; 564; 204; 349; 144; 10; 67; 5; 1192; 1536; 1604; 5; 36; 0; 73; 243; 18; 33;
316; 43; 22; 77; 13; 2; 54; 2; 0; 0; 0; 1; 27; 1; 0; 17; 1; 12; 164; 4; 169; 464; 129; 37; 129; 14; 72; 374; 44; 26; 159; 13; 25; 98; 17; 232; 428; 104;
0; 0; 0; 8; 41; 3; 0; 0; 38; 331; 0; 246; 328; 94; 247; 815; 484; 293; 816; 357; 0; 0; 0; 12; 58; 4; 14; 54; 5; 0; 0; 0; 4; 74; 14;