Evaluation of Transit Signal Priority Strategies for Bus Rapid Transit on 5600 West Street in Salt Lake County, Utah

Dr. Peter T. Martin
Professor

Milan Zlatkovic
Research Assistant

University of Utah

June 2010

Acknowledgements

The authors thank the Utah Transit Authority employees for the data they furnished and their assistance with this study, especially Julianne Sabula and Hal Johnson. The authors also thank Ivan Hooper from RSG Inc. for providing the necessary traffic data and estimations, and William Stringer from Parsons Brinckerhoff for providing design plans for the studied corridor. Furthermore, the authors thank Eric Rasband from UDOT, and David Thompson and David Bezzant from Avenue Consultants for their advice and suggestions towards completing the project.

Special thanks go to Dr. Aleksandar Stevanovic for his help, guidance, and active involvement in UTL projects that made this project possible.

Disclaimer

ABSTRACT

Bus Rapid Transit (BRT) is a flexible, high performance rapid transit mode that uses buses or specialized rubber tired-based vehicles operating on pavement, and combines a variety of physical, operating, and system elements into a permanently integrated system. Because of its benefits and lower costs, Utah Transit Authority (UTA) has decided to begin BRT implementations in Salt Lake County, where a total of 106 miles of BRT lines are planned for construction and implementation in future years.

Transit Signal Priority (TSP) usually supports BRT operations. TSP provides priority for transit vehicles on signalized intersections along a main corridor. Many studies and implementations have proven its efficiency. On the other hand, providing priority along the main corridor has impacts on other vehicular traffic. For each TSP implementation, it is very important that the optimum balance between the priority provided to transit vehicles be weighed against the negative impacts on vehicular traffic.

This research evaluates BRT and TSP implementations along 5600 West Street in Salt Lake County through micro-simulation. This road is an important north–south arterial, and it has been chosen for a full phase BRT implementation. The study area consists of a 5-mile corridor with seven signalized intersections along 5600 W that represents the busiest section of the arterial, and where special design changes, with center running BRT lanes, are planned for construction. Evaluations are based on VISSIM simulation models, which were created for this network, based on the real traffic and transit data from the field, and planned design changes and traffic estimations for the target year 2030.

Full phase BRT will be implemented along the 5-mile corridor, from 2700 S to 6200 S. It will consist of a dedicated center running BRT guideway and six BRT stations, each direction located near signalized intersections. This study analyzes the effects of the design changes, BRT implementation, and different TSP strategies on general purpose traffic and future transit operations. The study also analyzes two separate TSP strategies, the Green Extension/Early Green and Phase Rotation strategies, and a combination of these two.

The final results show that if no action is taken along this corridor, a major worsening in traffic conditions can be expected. Minor improvements bring certain benefits to traffic operations. With the planned design changes and BRT implementation, the negative effects of the No Action alternative will be minimized, especially along the busiest corridor segments. An implementation of the Green Extension/Early Green TSP strategy creates the most benefits for BRT operations, when:

1. The BRT travel times are approximately 7% lower than if no TSP were provided.
2. Intersection delays for BRT are significantly reduced.
3. The impacts on general purpose traffic would be minor to neutral.

Some of the methods and techniques applied in this project were used in presentations given at the National BRT Institute Workshop, held June 23, 2009, in Salt Lake City, Utah, Solutions Summit Public Transportation Workforce Development, held September 10, 2009, in Fargo, N.D., and a paper titled Evaluation of Transit Signal Priority in RBC and ASC/3 Software-in-the-Loop Simulation Environment, presented at the 89th TRB Annual Meeting in Washington, D.C., January 12, 2010.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

ASC/2 (3)	Advanced System Controllers series 2 (3)
AVI	Automatic Vehicle Identification
AVL	Automatic Vehicle Location
BRT	Bus Rapid Transit
DSRC	Dedicated Short Range Communications
GPS	Global Positioning Systems
ITS	Intelligent Transportation Systems
MVC	Mountain View Corridor
PHF	Peak Hour Factor
RSG	Resource Systems Group Inc.
SIL	Software-In-The-Loop
TSP	Transit Signal Priority
UDOT	Utah Department of Transportation
UTA	Utah Transit Authority
UTL	Utah Traffic Laboratory
VISSIM	Traffic in Towns – Simulation (German Acronym)
WFRC	Wasatch Front Regional Council

1. INTRODUCTION

With overall traffic growth on urban highways and arterials, congestion is becoming a significant problem with major negative impacts on transit vehicles, which do not have exclusive rights-of-way. These negative impacts often result in increased travel times, poor reliability, unpredictable on-time performance, bus crowding, and longer waiting times at transit stops. In order to overcome these impacts, transit agencies have begun introducing new, high capacity rapid transit modes, such as Bus Rapid Transit (BRT), along with technology and enhanced transit operational strategies.

In recent years, BRT has become one of the most commonly used rapid transit modes. According to the National BRT Institute (*1)* BRT is an innovative, high capacity, lower cost public transit solution that can significantly improve mobility. This permanent, integrated system uses buses or specialized vehicles on roadways or dedicated lanes to quickly and efficiently transport passengers to their destinations, while offering the flexibility to meet dynamic transit demands. BRT systems can easily be customized to community needs and incorporate state-of-the-art, low-cost technologies that result in more passengers and less congestion than traditional modes. Levinson et al. (*2*) defined BRT as an integrated system with a strong, transit-oriented identity, which consists of running ways (very often exclusive lanes), specially designed rail-like stations, high-capacity low-floor vehicles, improved services, and state-of-the-art Intelligent Transportation Systems (ITS). Further, it provides similar quality of service as rail transit, at much lower construction and operational costs to the transit organization, and retains the flexibility of buses.

Studies and designs, using buses to provide rapid transit, have been conducted since the 1930s. Some of the notable early implementations were in Chicago in 1937, Washington, D.C., from 1956 to 1959, St. Louis in 1959, and Milwaukee in 1970. However, BRT systems installed in the last 15 years are often far more advanced than the early systems. Some of these BRT implementations exceeded initial expectations regarding ridership increase, travel time savings, cost effectiveness, safety, attractiveness, etc.

A BRT line called TransMilenio in Bogota, Colombia, was introduced in 2000. So far, it has more than 50 miles of dedicated bus lanes, and it carries more than one million passengers per day *(3, 4)*. Travel time decreased by more than 30% compared with the previous system. Metro Orange Line in Los Angeles County, California, was opened in 2005. It consists of a 14-mile dedicated busway. During the first seven months of operating, it achieved the 2020 ridership predictions, with constant increase in ridership and lower travel times than any other travel mode along the corridor *(5)*. The implementation of a BRT line in Vancouver and Richmond, Canada, led to a 20% travel time decrease compared with the previous bus line, an increase in ridership of about 1.2 million passengers per year and a 23% mode shift from private cars to BRT; and the annualized benefits has exceeded annual cost *(6)*. Tables 1.1 and 1.2 represent some of the benefits of the existing BRT systems from the standpoint of travel time savings and ridership increase *(7)*. The comparison is made with respect to the transit solutions that preceded the BRT systems.

Table 1.1 Benefits of BRT: Travel Time Savings

City / BRT System	Travel Time Savings (%)
Cleveland	20
Eugene	46
Hartford	42
Honolulu	43
Houston	47
Los Angeles	23 – 38
Pittsburg	41 – 44
Seattle	33
Vancouver	20
Adelaide	38
Bogota	32
Porto Alegre	29

Table 1.2 Benefits of BRT: Ridership Increase

City / BRT System	Ridership Increase (%)
Boston	100
Charlotte	55
Cleveland	13
Houston	90 – 100
Los Angeles	26 – 33
Pittsburg	38
Vancouver	100
Adelaide	76
Brisbane	42
Leeds	50
Bogota	64 – 70

The most important part of ITS that accompanies BRT systems is Transit Signal Priority (TSP). TSP is an operational strategy that facilitates the movement of transit vehicles (usually those in service), either buses or streetcars, through traffic-signal-controlled intersections. It makes transit faster, more reliable, and more cost-effective (*8*). Expected benefits of TSP vary depending on the application, but include improved schedule adherence and reliability and reduced travel time for buses, leading to increased transit quality of service. Potential negative impacts consist primarily of delays to non-priority traffic. These delays have proven to be minimal.

Generally, a transit agency has two objectives for using TSP: improve service and decrease costs. Through customer service enhancements, transit agencies could ultimately attract more customers. Fewer stops also mean reductions in drivers' workload, travel time, fuel consumption, vehicle emissions, and maintenance costs. Greater vehicle fuel economy and reduced maintenance costs can increase the efficiency of transit operations. TSP can also help reduce transit operation costs, as reductions in transit vehicle travel times may allow a given level of service to be offered with fewer transit vehicles. Reductions in bus running time and number of stops may also lower vehicle wear and tear, and consequently lead to deferred vehicle maintenance and new vehicle purchases (*9*). Local transportation

agencies also can benefit from TSP strategies when improved transit service encourages more auto users to switch to public transportation. Finally, reduced demand for personal car travel can help improve roadway service level.

TSP can be implemented in different ways, including passive, active, and adaptive TSP (*8*). Passive TSP is the simplest type of TSP. It does not require any hardware or software installations, but the priority operates continuously, based on knowledge of transit route and ridership patterns, and does not require a transit detection or priority request. This can be an efficient form of TSP when transit operations are predictable. A simple passive priority strategy is establishing signal progression for transit, where the signal timings plan takes into account transit operational characteristics such as the average dwell time at transit stops; or considering that dwell times are highly variable, use the lowest cycle length possible. Sometimes, a simple retiming of signal plans in order to improve progression along a corridor can be beneficial for transit vehicles, too.

Active priority strategies provide priority treatment to a specific transit vehicle following detection and subsequent priority request activation. There are different types of active priority strategies that may be used within the specific traffic control environment. A green extension strategy extends the green time for the TSP movement when a TSP equipped vehicle is approaching. This strategy only applies when the signal is green for the approaching transit vehicle. This is one of the most effective forms of TSP since a green extension does not require additional clearance intervals, yet allows a transit vehicle to be served and significantly reduces the delay to that vehicle relative to waiting for an early green or special transit phase. An early green strategy, also known as red truncation, shortens the green time of preceding phases to expedite the return to green for the movement where a TSP equipped vehicle has been detected. This strategy only applies when the signal is red for the approaching transit vehicle. Usually, green extension and early green strategies are implemented simultaneously within TSP enhanced control environments, and the controller uses one of them depending on the specific situation. Some other active TSP strategies are actuated transit phases, where a specific phase, usually a left turn phase, is displayed only when a transit vehicle is detected; phase insertion, where a special priority phase is inserted within the normal signal sequence when a transit vehicle is detected and a call for priority is placed; and phase rotation, where a normal sequence of signal phases is rotated when a priority call is placed, in order to serve the priority phase first. Any one, or a combination of, active priority strategies can be used depending on the specific situation and traffic and transit operations.

Adaptive TSP is the most comprehensive strategy that takes into consideration the trade-offs between transit and traffic delay and allows graceful adjustments of signal timing by adapting the movement of the transit vehicle and the prevailing traffic condition. It can also consider some other inputs, such as if the transit vehicle is running on time or late, the headway between two successive transit vehicles, the number of passengers on board, etc.

The first studies on TSP in the United States were conducted by Ludwick in 1975, in Washington, D.C. (*10*). Yet, successful TSP systems in the United States were implemented by the end of 1990s and after the year 2000 with development of new technologies, such as Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Global Positioning Systems (GPS), and systems for communication between buses and controllers. The 2006 survey found that 38 metropolitan areas in the United States were using TSP technology *(11)*.

A TSP implementation is not a straightforward process. Each TSP deployment faces unique problems, which depend on the actual traffic and transit system. Factors affecting a TSP implementation can be ordered in two major categories: traffic related factors and transit related factors (*12, 13*).

Traffic related factors are:

1) Roadway geometry
   - Directly dictates the capability of the system and types of possible operations
   - It is impacted by the surrounding land development
   - It can dictate the implementation of ITS technology (e.g., detection technologies)
2) Traffic volumes
   - Can be highly variable in time for each given intersection
   - High traffic volumes during peak periods can impact TSP operations
   - The direction of the peak period traffic must also be considered
3) Traffic signal systems
   - As an operating factor, they govern the extent to which the TSP system can be achieved
   - The capability of the signal control hardware and software can be a limitation factor in the deployment of designed TSP strategies
4) Pedestrians
   - The time needed for pedestrian clearance at the intersection can limit the time available for TSP
   - Heavy pedestrian flows can limit a TSP implementation
5) Adjacent intersection operations
   - Important for understanding the progression of transit vehicles
   - Can be a significant problem in case of closely spaced intersections

Transit related factors are:

1) Type of transit systems
   - Different forms of TSP can be implemented for heavy rail, light rail, streetcars, and bus transit systems
   - Generally, it is easier to implement TSP for rail based systems, mainly because of the exclusive rights of way
   - For bus transit, the type of bus service can have effects on TSP implementation and benefits (e.g., BRT, express buses, local buses, etc.)
2) Transit stops
   - Location of transit stops with respect to signalized intersections can impact the effectiveness of TSP
   - Nearside bus stops are more complex from the transit vehicle detection standpoint, and they can reduce the effectiveness of TSP
   - Far side bus stops are more compatible with priority systems

Another important part of a TSP system is the detection technology (*13*). It must detect a transit vehicle and transfer the information to the traffic controller in time. The information carriers can be different, such as light, sound, laser beams, radio frequencies, and others. The most widely used are Dedicated Short Range Communication (DSRC) technologies. GPS can also be very effective for this purpose, and they also can provide quality data about transit operations.

The effects of TSP are proven in the field and documented in numerous studies. They include reductions in transit travel times, vehicle delays and person delays, increased reliability and on-time performance, reductions in fuel consumption and emissions, and other benefits (*8 – 13*).

According to the Regional Transportation Plan: 2007 – 2030 (2030 RTP), adopted by the Wasatch Front Regional Council (WFRC), 106 miles of BRT lines are planned for construction in Salt Lake, Davis, and Weber Counties in Utah *(14)*. The first BRT Phase I line was implemented along 3500 South Street in Salt Lake County in July 2008. The next BRT project is a BRT line in West Valley, along the 5600 West corridor. This line is a part of the Mountain View Corridor (MVC) project, and it includes a full BRT system.

The goal of this study is to evaluate 5600 W BRT operations and impacts of BRT and TSP implementations on transit and vehicular traffic through microsimulation, as well as to explore whether the planned design changes along the corridor are justified. The objectives of the study are traffic analysis of the vehicular travel times along the corridor, transit travel times, intersection performance and network performance. The test-bed for the research is a 5-mile long BRT line planned for implementation along the 5600 W corridor from 2700 S to 6200 S street, and the target year is 2030. This study uses VISSIM simulation models to estimate planned design changes and BRT operations, as well as impacts that BRT and TSP implementations will have on transit and general purpose traffic.

The report is organized as follows: Section 2 describes the project corridor and gives the basic traffic inputs, as well as the planned implementation of BRT elements; Section 3 describes the modeling methodology for the existing 2009 VISSIM model and provides the overview of the model; Section 4 describes the modeling methodology for the 2030 models; Section 5 provides major results and findings obtained through the models; Section 6 discusses the given results; and Section 7 provides the major conclusions of the study.

2. PROJECT DESCRIPTION

2.1 Project Corridor

A full BRT line is proposed along the 5600 W corridor in West Valley City, Utah. This is a major arterial that makes connections between the SR 201 highway and Magna, West Valley City, and West Jordan. The arterial carries more than 30,000 vehicles per day along its busiest corridors. The 5600 W arterial passes through fast developing areas, so traffic growth is expected along it in future years. This arterial is a part of the MVC, which is a planned freeway, transit, and rail system in western Salt Lake and northwestern Utah counties (*15, 16*).

The planned 5600 W BRT line involves five miles of dedicated center-running BRT lanes from 2700 S to 6200 S, with six BRT stations along it. This BRT line will be extended as a mixed traffic service along Lake Park Boulevard, and an express line to downtown Salt Lake City (*16*). This study evaluates future BRT and traffic operations along the segment from 2700 S to 6200 S, where the full phase BRT is planned for implementation. The project map is shown in Figure 2.1.

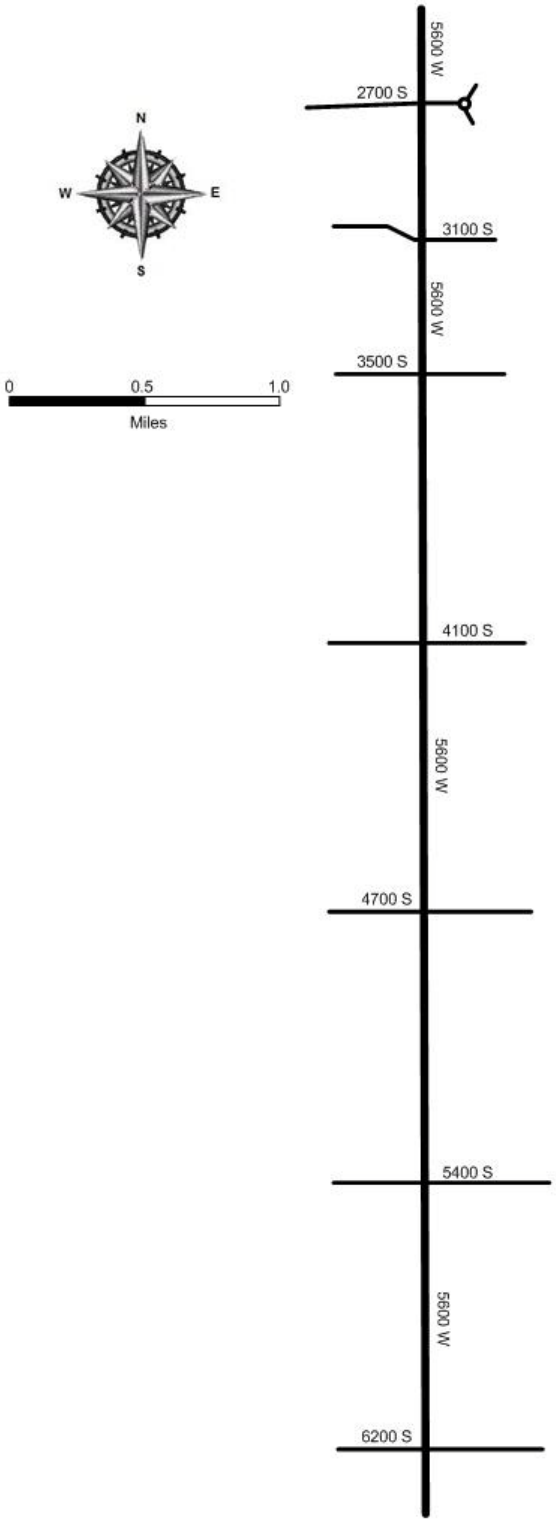


Figure 2.1 5600 W Study Corridor

2.2 Traffic Operations on Project Corridor

The project corridor incorporates the busiest segments and intersections along 5600 W. There are seven signalized intersections along the project corridor: 2700 S (Lake Park Boulevard), 3100 S, 3500 S, 4100 S, 4700 S, 5400 S, and 6200 S. Table 2.1 shows intersection movements for 15-minute periods during the PM peak period (4:00 pm – 6:00 pm), collected in Fall 2008 by RSG Inc.

Table 2.1 Intersection Movements for PM Peak Period in vehicles/15 min

2700 S		Southbound			Westbound			Northbound			Eastbound		
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R
4:00	4:15	6	386	107	21	19	10	23	208	5	41	8	21
4:15	4:30	8	430	110	19	29	9	16	204	7	42	8	24
4:30	4:45	10	426	134	21	26	15	18	221	2	44	8	22
4:45	5:00	17	417	125	25	45	9	17	166	2	35	7	13
5:00	5:15	10	451	145	17	50	15	15	153	3	30	7	18
5:15	5:30	11	441	144	35	49	17	14	176	4	35	7	24
5:30	5:45	16	417	141	26	43	19	16	183	2	40	11	16
5:45	6:00	10	390	123	19	46	14	19	151	5	22	9	14

3100 S		Southbound			Westbound			Northbound			Eastbound		
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R
4:00	4:15	42	331	75	42	86	32	43	183	33	47	64	60
4:15	4:30	45	335	55	51	62	30	55	152	45	52	56	39
4:30	4:45	38	325	71	48	93	36	38	179	36	49	76	39
4:45	5:00	47	360	71	52	114	34	42	150	38	39	67	53
5:00	5:15	45	333	64	56	85	21	45	128	46	32	67	40
5:15	5:30	32	376	74	51	118	29	40	161	34	33	64	51
5:30	5:45	47	349	56	59	106	33	40	161	44	43	59	36
5:45	6:00	48	342	67	48	119	28	40	138	53	43	68	47

3500 S		Southbound			Westbound			Northbound			Eastbound		
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R
4:00	4:15	67	305	31	27	75	33	14	175	20	0	128	17
4:15	4:30	54	307	42	33	76	36	31	183	27	3	105	18
4:30	4:45	47	315	50	30	83	33	26	194	21	0	109	14
4:45	5:00	54	350	35	22	87	24	27	165	33	0	96	21
5:00	5:15	56	361	36	30	81	26	28	187	21	1	98	19
5:15	5:30	42	392	52	36	75	17	31	193	24	0	97	14
5:30	5:45	53	372	39	36	78	23	30	186	18	2	78	13
5:45	6:00	53	353	44	23	93	24	48	197	25	2	105	12

Table 2.1 Intersection Movements for PM Peak Period in vehicles/15 min (continued)

4100 S		Southbound			Westbound			Northbound			Eastbound		
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R
4:00	4:15	68	284	59	37	155	32	56	153	36	49	140	33
4:15	4:30	53	244	49	49	205	44	50	129	23	28	138	39
4:30	4:45	66	273	62	40	169	46	51	184	40	23	115	39
4:45	5:00	54	213	47	53	184	48	68	116	31	45	128	28
5:00	5:15	72	317	61	54	155	48	56	141	39	42	138	29
5:15	5:30	55	274	68	58	209	39	71	149	38	34	118	34
5:30	5:45	69	317	52	44	175	42	60	132	24	37	136	18
5:45	6:00	46	273	60	57	210	46	51	124	41	32	122	34

4700 S		Southbound			Westbound			Northbound			Eastbound		
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R
4:00	4:15	43	281	8	59	36	53	9	155	29	5	25	15
4:15	4:30	31	215	3	70	52	48	19	134	49	11	35	17
4:30	4:45	36	288	8	78	41	57	16	169	33	35	58	19
4:45	5:00	28	217	15	83	48	37	13	152	29	10	30	13
5:00	5:15	47	331	9	73	52	46	12	153	57	11	33	22
5:15	5:30	32	262	8	90	49	50	19	162	34	20	35	24
5:30	5:45	41	322	5	71	48	43	19	171	45	10	18	14
5:45	6:00	24	249	7	90	36	44	17	145	42	6	29	18

5400 S		Southbound			Westbound			Northbound			Eastbound		
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R
4:00	4:15	49	194	36	58	75	53	21	92	28	39	87	30
4:15	4:30	47	193	24	47	62	36	26	120	28	42	84	50
4:30	4:45	62	227	27	58	83	45	21	105	23	45	100	35
4:45	5:00	43	207	32	53	66	36	29	123	28	30	85	41
5:00	5:15	66	268	28	66	70	44	24	102	27	42	101	49
5:15	5:30	53	265	24	56	68	38	25	136	39	32	86	33
5:30	5:45	39	237	31	74	91	43	25	124	21	30	78	39
5:45	6:00	48	254	37	58	66	35	32	140	33	22	87	23

6200 S		Southbound			Westbound			Northbound			Eastbound		
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R
4:00	4:15	87	87	69	45	101	57	6	56	21	35	59	3
4:15	4:30	83	109	54	43	98	66	4	53	31	48	80	3
4:30	4:45	95	140	74	52	97	72	4	52	22	39	73	7
4:45	5:00	81	105	65	55	81	101	8	54	30	43	72	4
5:00	5:15	104	161	93	53	101	68	8	61	21	41	64	2
5:15	5:30	90	139	75	47	112	83	8	62	37	53	82	4
5:30	5:45	90	156	79	61	107	95	4	53	29	46	77	3
5:45	6:00	80	124	65	40	111	102	7	79	33	45	98	0

These data were used to determine the peak hour, the peak 15-minute period, and the Peak Hour Factor (PHF) for each intersection. The results are presented in Table 2.2, and they were used to account for traffic flow oscillations for the 2030 models.

Table 2.2 Peak Periods and Peak Hour Factor (PHF)

Intersection	Peak Hour	Peak 15-minute period	PHF
2700 S	4:30 – 5:30	5:15 – 5:30	0.97
3100 S	4:45 – 5:45	4:45 – 5:00	0.97
3500 S	5:00 – 6:00	5:45 – 6:00	0.98
4100 S	5:00 – 6:00	5:00 – 5:15	0.98
4700 S	5:00 – 6:00	5:00 – 5:15	0.93
5400 S	4:45 – 5:45	5:00 – 5:15	0.96
6200 S	5:00 – 6:00	5:30 – 5:45	0.99

In June 2009, Utah Traffic Lab (UTL) conducted a travel time study for the project corridor along 5600 W. Table 2.3 gives travel times for each segment (between two signalized intersections), and the total travel time along the corridor, in both southbound and northbound directions. The travel times are averaged from a total of 12 travel time measurements during the PM peak period (4:00 – 6:00 PM). Using these measurements, the Highway Capacity Manual HCM *(17)* methodology was applied to determine the Level of Service (LOS) for arterial segments, based on travel speed for urban streets class II, and the LOS is given in the table.

Table 2.3 Average Field Travel Times, Speeds and Level of Service

Southbound	Travel Time (s)		Speed (mph)		LOS
Segment	Average	Standard deviation	Average	Standard deviation	
2700 S - 3100 S	108.6	33.8	18.3	7.2	D
3100 S - 3500 S	76.6	20.5	24.6	7.3	C
3500 S - 4100 S	137.4	15.3	26.7	3.1	C
4100 S - 4700 S	106.0	9.9	37.4	2.3	A
4700 S - 5400 S	107.8	36.5	35.3	8.9	A
5400 S - 6200 S	89.2	27.2	37.4	8.0	A
Total	**625.6**	**48.3**	**29.9**	**2.7**	**B**

Northbound	Travel Time (s)		Speed (mph)		LOS
Segment	Average	Standard deviation	Average	Standard deviation	
6200 S - 5400 S	86.7	20.7	41.2	5.8	A
5400 S - 4700 S	133.3	15.8	27.2	3.1	C
4700 S - 4100 S	147.3	7.4	25.3	1.0	C
4100 S - 3500 S	105.4	13.8	33.5	3.5	B
3500 S - 3100 S	58.0	12.6	35.5	5.1	A
3100 S - 2700 S	40.0	13.3	39.2	5.9	A
Total	**570.7**	**11.7**	**33.6**	**1.2**	**B**

The seven signalized intersections operate as actuated coordinated. During the PM peak period, intersections operate on a 120-second cycle (except the intersection 2700 S, which operates on a 90-second cycle). Detailed signal timing settings were downloaded using UDOT's i2 software, which enables a direct communication link to each of the controllers in the field. The type of the installed field controllers is Econolite ASC/2, except the intersection 3500 S, where an Eagle controller is installed. The type of field controller is important for selecting a traffic control emulator within the VISSIM simulation. An important characteristic of signal timings, especially regarding the future center-running BRT lanes, is the left turn treatment along 5600 W. Currently, all the left turns are protected/permitted, except 2700 S, where only these left turns are permitted (time simultaneously with through movements). Using a calibrated and validated VISSIM model and the HCM methodology, the LOS for each intersection is determined based on intersection delays. The intersection LOS is given in Table 2.4, for each 15-minute period during the PM peak period.

Table 2.4 Intersection Delays and Level of Service

Intersection	Time period	Delay (s)	LOS
2700 S	4:00 - 4:15	17.7	B
	4:15 - 4:30	19.4	B
	4:30 - 4:45	18.8	B
	4:45 - 5:00	17.4	B
	5:00 - 5:15	18.9	B
	5:15 - 5:30	19.5	B
	5:30 - 5:45	20.6	C
	5:45 - 6:00	18.0	B

Intersection	Time period	Delay (s)	LOS
3100 S	4:00 - 4:15	43.7	D
	4:15 - 4:30	45.6	D
	4:30 - 4:45	44.0	D
	4:45 - 5:00	43.5	D
	5:00 - 5:15	44.2	D
	5:15 - 5:30	44.8	D
	5:30 - 5:45	50.3	D
	5:45 - 6:00	46.5	D

Intersection	Time period	Delay (s)	LOS
3500 S	4:00 - 4:15	21.4	C
	4:15 - 4:30	25.8	C
	4:30 - 4:45	23.3	C
	4:45 - 5:00	22.9	C
	5:00 - 5:15	24.9	C
	5:15 - 5:30	24.7	C
	5:30 - 5:45	26.8	C
	5:45 - 6:00	28.2	C

Table 2.4 Intersection Delays and Level of Service (continued)

Intersection	Time period	Delay (s)	LOS
4100 S	4:00 - 4:15	36.6	D
	4:15 - 4:30	40.7	D
	4:30 - 4:45	38.7	D
	4:45 - 5:00	41.5	D
	5:00 - 5:15	42.0	D
	5:15 - 5:30	46.7	D
	5:30 - 5:45	44.4	D
	5:45 - 6:00	46.3	D

Intersection	Time period	Delay (s)	LOS
4700 S	4:00 - 4:15	20.9	C
	4:15 - 4:30	21.0	C
	4:30 - 4:45	24.9	C
	4:45 - 5:00	22.1	C
	5:00 - 5:15	25.9	C
	5:15 - 5:30	30.8	C
	5:30 - 5:45	25.7	C
	5:45 - 6:00	24.0	C

Intersection	Time period	Delay (s)	LOS
5400 S	4:00 - 4:15	21.4	C
	4:15 - 4:30	21.5	C
	4:30 - 4:45	22.2	C
	4:45 - 5:00	21.8	C
	5:00 - 5:15	22.9	C
	5:15 - 5:30	23.8	C
	5:30 - 5:45	22.1	C
	5:45 - 6:00	23.8	C

Intersection	Time period	Delay (s)	LOS
6200 S	4:00 - 4:15	21.2	C
	4:15 - 4:30	22.7	C
	4:30 - 4:45	24.0	C
	4:45 - 5:00	23.0	C
	5:00 - 5:15	24.0	C
	5:15 - 5:30	26.6	C
	5:30 - 5:45	26.6	C
	5:45 - 6:00	23.9	C

2.3 BRT Implementation

The Phase I transit project of the MVC project is center-running fixed-guideway BRT that runs five miles from 2700 S to 6200 S and incorporates six stations. This line will be extended as mixed-traffic service along Lake Park Boulevard, and an express line to downtown Salt Lake City. The project construction is

planned to begin in 2010 and substantially completed by early 2012. A typical mid-block section with 28' fixed BRT guideway is given in Figure 2.2.

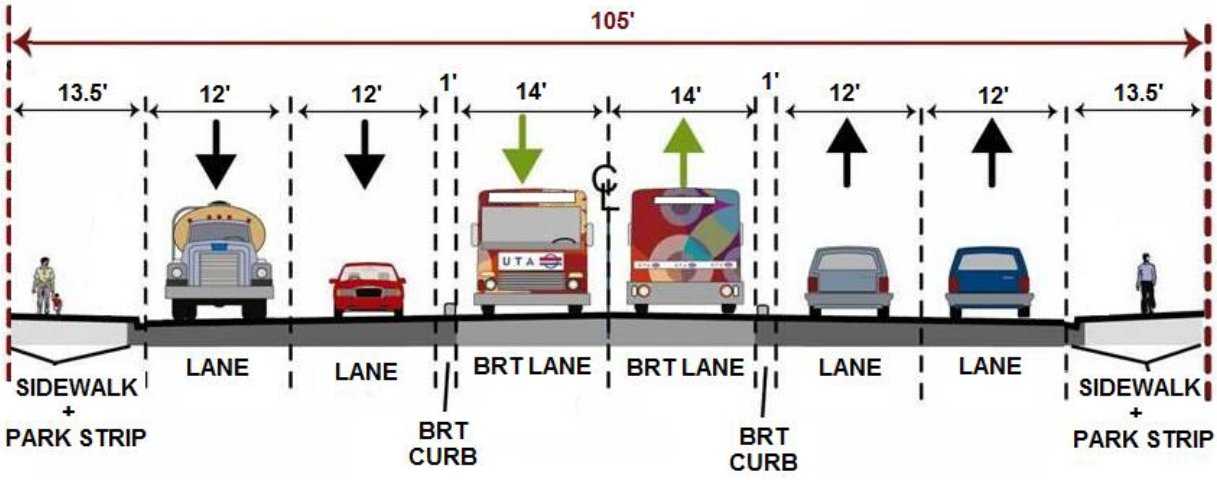


Figure 2.2 Typical Mid-Block Section of 5600 W with 28' BRT Guideway

Six BRT stations are planned on this section of the line. They will be located at the following intersections: 2100 S, 3500 S, 4200 S, 4700 S, 5400 S, and 6200 S. They are designed as split stations, which means they will be located on the far side of the intersection for each direction of travel (except 4700 S, where both SB and NB stations will be located on the south side of the intersection). An example of split stations, adopted from the 5600 W design plans, design by Parsons Brinckerhoff, is shown in Figure 2.3.

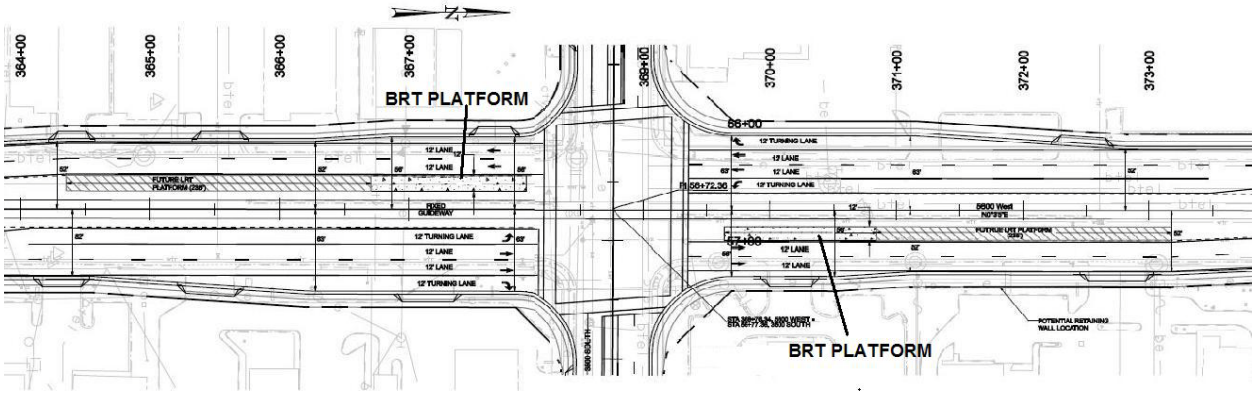


Figure 2.3 Split BRT Stations Design

The estimated ridership for the 5600 W BRT line in the year 2030 is 8,830 boardings per day. For the purpose of the study, an estimated 25% of the ridership will be realized during the PM peak period (4:00 – 6:00 PM). This ridership is used to model BRT operations. The BRT buses on this line will run on a headway-based schedule, with 10-minute headways.

3. MODELING METHODOLOGY: 2009 BASE CASE

BRT operations and the benefits and impacts of BRT and TSP implementations are evaluated through a VISSIM microsimulation model. Modeling and evaluations are performed for the PM peak period, from 4:00 to 6:00 PM. Three general models are used in the process: 2009 Base Case model, 2030 No Action model, and 2030 Transit model with two scenarios, which will be addressed in more detail later in the text.

The simulation network includes the corridor along 5600 W from 2700 S to 6200 S, where the BRT line will be implemented, as described in the Project Corridor section. This corridor is five miles long with seven signalized intersections along it.

3.1 Modeling Process

VISSIM simulation software is used for network modeling. VISSIM is a microscopic, time step, and behavior-based simulation model of urban traffic and public transit operations, and VISSIM Version 5.00 is used for this study.

The existing network is modeled, calibrated, and validated based on the field data, including network geometry and traffic operations. The final output from this process is a validated and calibrated simulation model of the existing conditions for PM peak period (4:00 to 6:00 PM, with 15-minute build-up time). The same model is later used for the 2030 No Action alternative, and it also is transformed based on the design plans for 2030 Transit alternatives. All VISSIM simulations are run for ten random seeds, and all the results represent averaged values from ten measurements.

The main sources of data for network geometry were aerial maps and images, roadview maps, and field observations. Each intersection is modeled with as much detail as possible, such as lane configuration, lane widths, turning pockets for right and left turns, and the position of stop bars and pedestrian crossings. The network is loaded with traffic according to the data collection performed by RSG Inc. in fall 2008. The traffic is generated and distributed on the network using static assignment. The traffic composition is defined as 98% passenger cars and 2% heavy vehicles, with average vehicle occupancy of 1.2 persons per vehicle for passenger cars and 1.0 person per vehicle for heavy vehicles. The speed distribution for vehicles along the corridor is defined according to the posted speed limits (45 mph along the main corridor), as well as field observations and measurements.

The traffic controllers on intersections are Econolite ASC/2 type (except 3500 S, where an Eagle controller is installed), which determined the choice of the signal control emulator within the VISSIM simulation model. In this study, the ASC/3 Software-in-the-Loop was used to model the actual traffic control, because ASC/3 uses the same traffic control algorithm as ASC/2. The signal timing settings for the intersections are downloaded using UDOT's i2 software, which enables a direct communication link to the field controllers, and the databases are transferred for use in the simulation.

3.2 Calibration and Validation of the Model

The 2009 Base Case model had to be calibrated and validated. Calibration and validation are based on the traffic data collected in the field. Model calibration is performed based on traffic movement counts for each signalized intersection in the network. Travel times between each pair of signalized intersections, which were collected using GPS and floating vehicle technique, have been used to validate the model.

3.2.1 Calibration

Traffic movements for each signalized intersection are used to calibrate the model. RSG Inc. collected traffic counts for each intersection in fall 2008. VISSIM was programmed to collect the same data on all signalized intersections. Calibration was performed by comparing data from the field counts to the data from the simulation.

Figure 3.1 shows this comparison after the calibration was completed. The high R Square value shows a very good correlation between the two data sets.

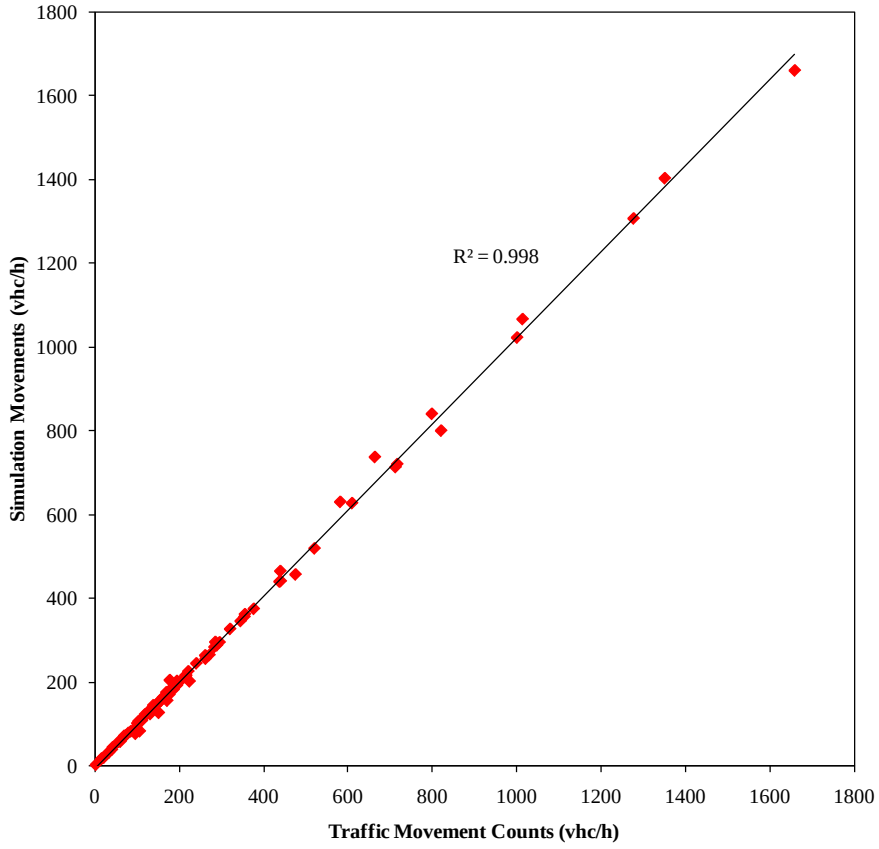
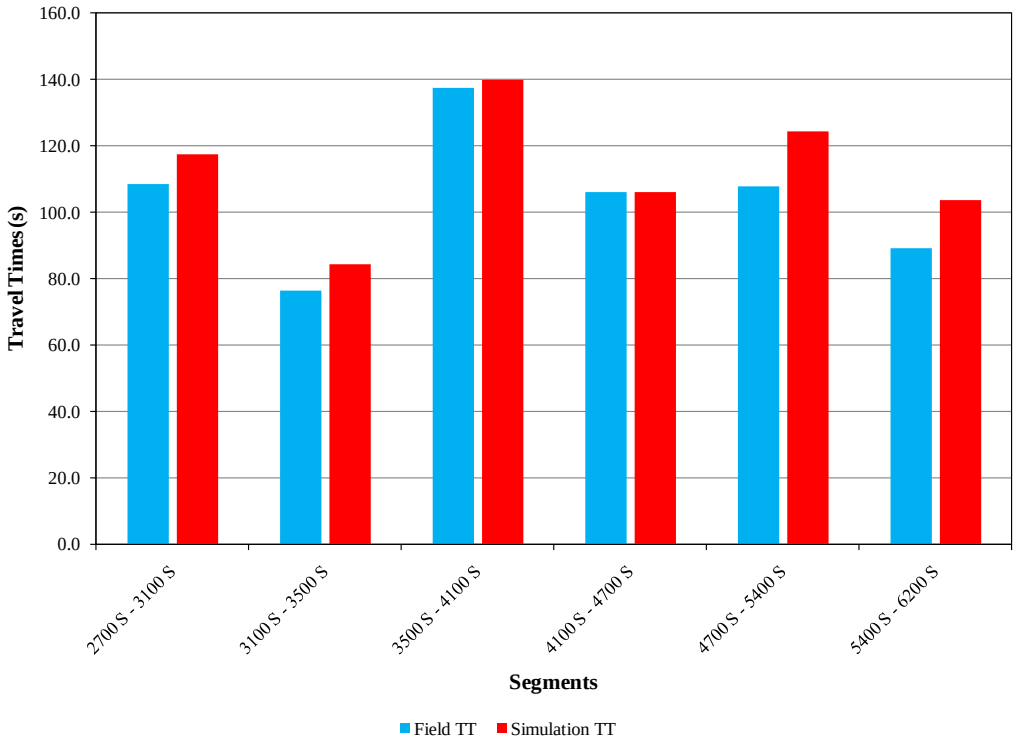


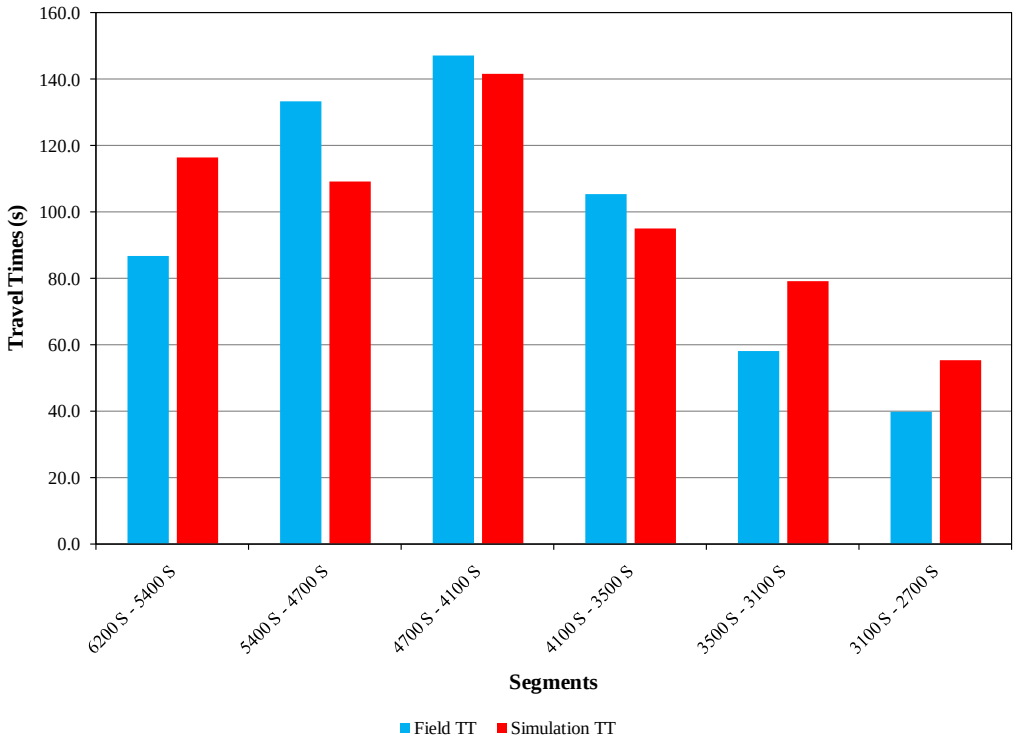
Figure 3.1 Model Calibration Results – Traffic Movement Comparison

3.2.2 Validation

The corridor along 5600 W, from 2700 S to 6200 S, was split up into 12 segments (6 in each direction). These segments are parts of the corridor between each pair of signalized intersections. Travel times for each segment were measured in the field using GPS in PM peaks. Travel time measuring points in VISSIM were set for the same segments. Travel times from the field were used to validate those from the model. Figure 3.2 shows comparison of travel times after the validation was completed. In the southbound direction (which is the peak direction in the PM peak period) the R Square value is close to 0.91, while in the northbound direction this value is 0.78. For the critical section of the corridor (2100 S to 4700 S), the R Square values are 0.98 in the southbound direction, and 0.95 in the northbound direction.



a)



b)

Figure 3.2 Model Validation – Travel Times Comparison a) Southbound; b) Northbound

4. MODELING METHODOLOGY: 2030 SCENARIOS

4.1 2030 No Action Scenario

The 2030 No Action scenario represents a no-build alternative for the 5600 W corridor, as well as for the MVC project. This alternative is addressed through a VISSIM microsimulation model in order to determine the changes in traffic conditions along the corridor, considering the traffic growth estimated for 2030.

The 2030 No Action model uses the same network geometry as the 2009 Base Case model. In this case, the network is loaded with traffic that is estimated for the year 2030 (the estimation was performed by RSG Inc.). Table 4.1 shows estimated intersection movements for the seven signalized intersections along the corridor. The data were available only as hourly volumes, so it was transformed into 15-minute flows using the peak period and PHF data given in Table 2.2.

Table 4.1 Estimated 2030 Intersection Movements (vhc/15 min)

2700 S		Southbound			Westbound			Northbound			Eastbound		
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R
4:00	4:15	38	335	123	63	125	25	33	100	20	48	123	80
4:15	4:30	38	335	123	63	125	25	33	100	20	48	123	80
4:30	4:45	38	335	123	63	125	25	33	100	20	48	123	80
4:45	5:00	38	335	123	63	125	25	33	100	20	48	123	80
5:00	5:15	38	335	123	63	125	25	33	100	20	48	123	80
5:15	5:30	39	345	127	65	129	26	34	103	21	49	127	82
5:30	5:45	38	335	123	63	125	25	33	100	20	48	123	80
5:45	6:00	38	335	123	63	125	25	33	100	20	48	123	80

3100 S		Southbound			Westbound			Northbound			Eastbound		
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R
4:00	4:15	58	335	78	70	173	33	35	85	40	35	100	50
4:15	4:30	58	335	78	70	173	33	35	85	40	35	100	50
4:30	4:45	58	335	78	70	173	33	35	85	40	35	100	50
4:45	5:00	60	345	80	72	178	34	36	88	41	36	103	52
5:00	5:15	58	335	78	70	173	33	35	85	40	35	100	50
5:15	5:30	58	335	78	70	173	33	35	85	40	35	100	50
5:30	5:45	58	335	78	70	173	33	35	85	40	35	100	50
5:45	6:00	58	335	78	70	173	33	35	85	40	35	100	50

3500 S		Southbound			Westbound			Northbound			Eastbound		
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R
4:00	4:15	35	340	98	40	513	23	83	90	15	98	338	70
4:15	4:30	35	340	98	40	513	23	83	90	15	98	338	70
4:30	4:45	35	340	98	40	513	23	83	90	15	98	338	70
4:45	5:00	35	340	98	40	513	23	83	90	15	98	338	70
5:00	5:15	35	340	98	40	513	23	83	90	15	98	338	70
5:15	5:30	35	340	98	40	513	23	83	90	15	98	338	70
5:30	5:45	35	340	98	40	513	23	83	90	15	98	338	70
5:45	6:00	36	347	100	41	523	23	85	92	15	100	345	71

Table 4.1 Estimated 2030 Intersection Movements (vhc/15 min) (continued)

4100 S		Southbound			Westbound			Northbound			Eastbound		
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R
4:00	4:15	63	295	90	55	283	35	70	83	30	53	248	55
4:15	4:30	63	295	90	55	283	35	70	83	30	53	248	55
4:30	4:45	63	295	90	55	283	35	70	83	30	53	248	55
4:45	5:00	63	295	90	55	283	35	70	83	30	53	248	55
5:00	5:15	64	301	92	56	289	36	71	85	31	54	253	56
5:15	5:30	63	295	90	55	283	35	70	83	30	53	248	55
5:30	5:45	63	295	90	55	283	35	70	83	30	53	248	55
5:45	6:00	63	295	90	55	283	35	70	83	30	53	248	55

4700 S		Southbound			Westbound			Northbound			Eastbound		
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R
4:00	4:15	60	288	28	153	170	35	60	118	140	35	115	45
4:15	4:30	60	288	28	153	170	35	60	118	140	35	115	45
4:30	4:45	60	288	28	153	170	35	60	118	140	35	115	45
4:45	5:00	60	288	28	153	170	35	60	118	140	35	115	45
5:00	5:15	65	310	30	165	183	38	65	127	151	38	124	48
5:15	5:30	60	288	28	153	170	35	60	118	140	35	115	45
5:30	5:45	60	288	28	153	170	35	60	118	140	35	115	45
5:45	6:00	60	288	28	153	170	35	60	118	140	35	115	45

5400 S		Southbound			Westbound			Northbound			Eastbound		
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R
4:00	4:15	73	325	40	120	150	65	50	183	58	50	175	65
4:15	4:30	73	325	40	120	150	65	50	183	58	50	175	65
4:30	4:45	73	325	40	120	150	65	50	183	58	50	175	65
4:45	5:00	73	325	40	120	150	65	50	183	58	50	175	65
5:00	5:15	76	339	42	125	156	68	52	191	60	52	182	68
5:15	5:30	73	325	40	120	150	65	50	183	58	50	175	65
5:30	5:45	73	325	40	120	150	65	50	183	58	50	175	65
5:45	6:00	73	325	40	120	150	65	50	183	58	50	175	65

6200 S		Southbound			Westbound			Northbound			Eastbound		
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R
4:00	4:15	60	270	540	118	233	70	33	108	53	113	203	15
4:15	4:30	60	270	540	118	233	70	33	108	53	113	203	15
4:30	4:45	60	270	540	118	233	70	33	108	53	113	203	15
4:45	5:00	60	270	540	118	233	70	33	108	53	113	203	15
5:00	5:15	60	270	540	118	233	70	33	108	53	113	203	15
5:15	5:30	60	270	540	118	233	70	33	108	53	113	203	15
5:30	5:45	61	273	545	119	235	71	33	109	54	114	205	15
5:45	6:00	60	270	540	118	233	70	33	108	53	113	203	15

The existing signal timings for these intersections are not the optimal solution for the new intersection volumes. That is why a SYNCHRO optimization is performed for the new volumes. The new cycle length of 130 seconds and intersection phase splits and offsets are adopted from the SYNCHRO optimization and incorporated into the 2030 No Action model signal timings. The new model had to be recalibrated for the new volumes. The calibration results are shown in Figure 4.1, where the estimated intersection

movements are plotted against the movements obtained from the simulation. The R Square value of 0.81 shows a relatively good correlation between the data sets. The biggest problem in this model was the 3500 S intersection which had very high volumes that caused a major congestion in the model.

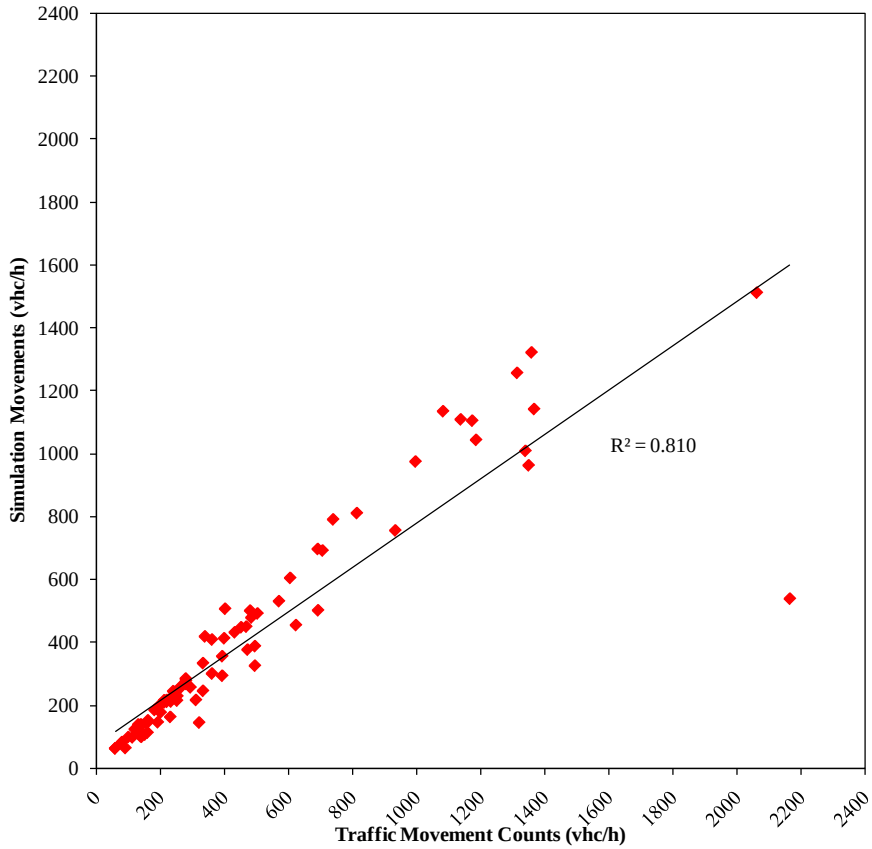


Figure 4.1 2030 No Action Model Calibration

The outputs from this model, such as intersection and network performance, and arterial travel times, are used in evaluations and comparisons among the scenarios.

4.2 2030 Minor Improvements Scenario

The 2030 Minor Improvements scenario represents a transition between the No Action and full-build scenarios. It analyzes traffic conditions in a case of minor design and operational changes, such as no mid-block left turns between signalized intersections, longer left and right turn lanes at intersections, and signal optimization. The analysis is performed for a 45-mph speed limit along the corridor and estimated 2030 traffic flows, given in Table 4.1. Other aspects remained the same as for the 2030 No Action scenario. This model is also calibrated for the new traffic flows. The calibration results are presented in Figure 4.2. The same problem as in the previous scenario occurs for the 3500 S intersection, where the estimated demand could not be served, which lowered the R square value to 0.83.

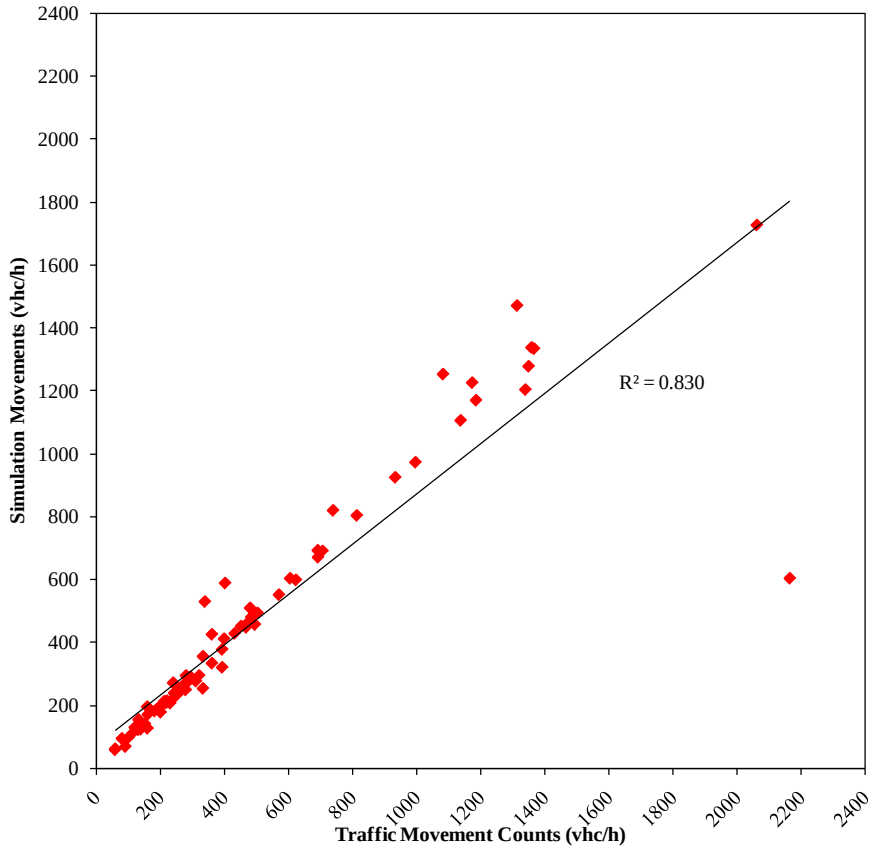


Figure 4.2 2030 Minor Improvements Model Calibration

4.3 2030 No TSP Transit Scenario

This is the basic Transit Build scenario used in analysis and evaluations. For this scenario, major design changes are made within the VISSIM model, according to the 2030 Transit Build design plans, but no priority is given to the BRT vehicles. The design plans imply a 28' center-running fixed guideway for BRT vehicles (a 14' BRT lane in each direction), two 12' traffic lanes in each direction, and intersection reconstructions that will encompass BRT station platforms and redesigned turning lanes (as given in Figures 3.2 and 3.3). The network study corridor, with BRT station locations, is given in Figure 4.3.

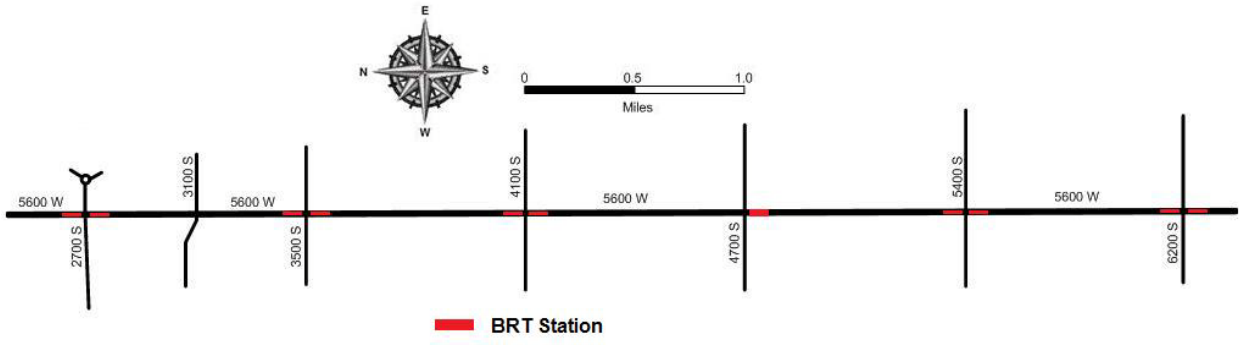


Figure 4.3 BRT Transit Corridor on 5600 West

In this, as well as the TSP scenario, the estimated intersection volumes are used, as given in Table 4.1. A new change in design is a reduced speed limit of 35 mph. SYNCHRO optimization is again used to address the changes in intersection offsets for coordinated phases, for the new speed limit. The cycle lengths and intersection phase splits are the same as for the 2030 No Action scenario. A major change from the 2009 Base Case and 2030 No Action models is the left turn treatment along the main corridor. While in the previous two models the left turns are protected/permitted, in this case, because of the center running BRT lanes, left turns have to be defined as protected only at each intersection, mostly for safety reasons. This can also allow an implementation of a TSP strategy called phase rotation, which can be considered in the future. On the other hand, not allowing left turns as permitted can likely increase left turn delays.

The basic BRT operations are defined within this scenario. The estimated BRT daily ridership for the year 2030 is 8,830 boardings per day on the line. It is estimated that 25% of the boardings will be realized during the analyzed PM peak period (4:00–6:00 PM), which makes a total of 2,200 boardings, or 1,100 boardings during every hour. Furthermore, an assumption is made regarding boarding distribution per direction as 80:20 for SB:NB direction (the majority of trips are made in the southbound direction), which makes 880 boardings per hour southbound and 220 boardings per hour northbound. These passenger volumes are distributed evenly among the BRT stations and occupancy of BRT vehicles when entering the study corridor. The alighting probability (important for defining passenger activity in VISSIM) is estimated as 40% at stations at 3500 S and 4100 S, and 30% at the other stations. Boarding and alighting times depend on many factors, such as bus stop design, the number of doors used for boarding or alighting and their width, bus floor height, payment process, etc. For this case, where the BRT vehicles will have three doors used for boarding and alighting and an off-vehicles payment process, the studies *(18)* show that the boarding time can be taken as 1.10 seconds per passenger; alighting time is 1.20 seconds per passenger, while the bus clearance time is set to 10 seconds. These settings are programmed into VISSIM.

As a result of the major design and volume changes made within this scenario, the corresponding VISSIM model needed recalibration. The calibration results are shown in Figure 4.4, where the estimated intersection movements are plotted against the movements obtained from the simulation. The R Square value of 0.81 shows a relatively good correlation between the data sets. As for the No Action scenario, the biggest problem in the simulation was high volumes and congestion at the 3500 S intersection. The same model is used with the TSP scenario described later, so it is assumed that the transit scenario is calibrated for the given traffic volumes.

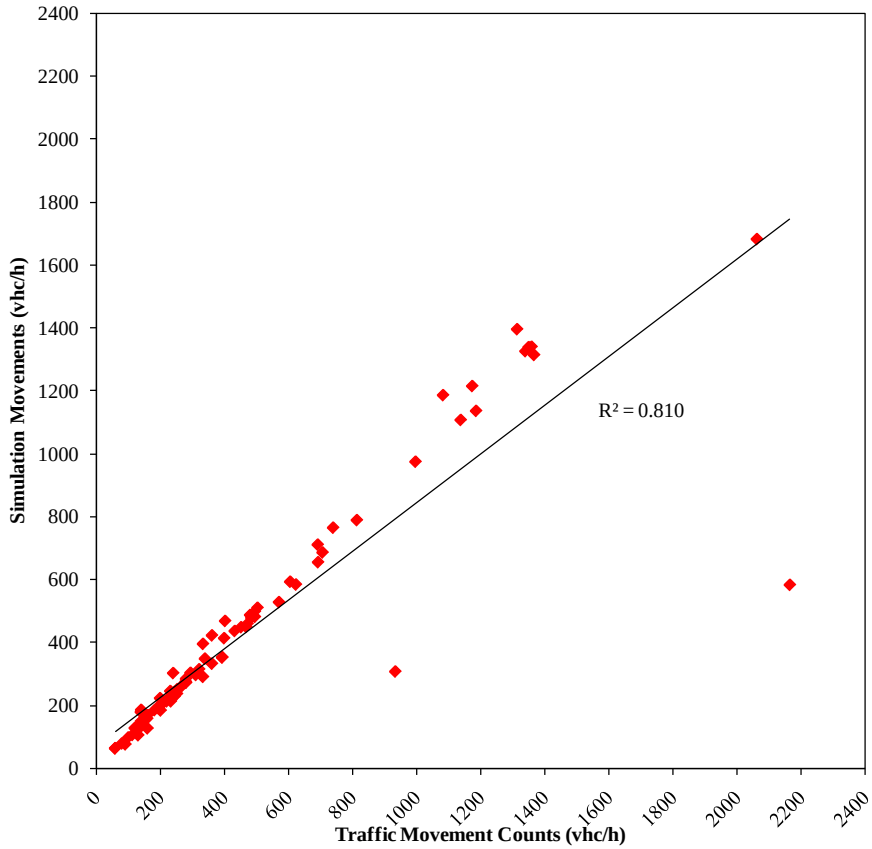


Figure 4.4 2030 Transit Scenario Model Calibration

The 2030 No TSP scenario is used to estimate the effects of the corridor design changes on traffic and introduce basic BRT operations, and it is the base scenario for estimating benefits and impacts of TSP strategies.

4.4 2030 TSP Transit Scenario

This transit scenario introduces the basic TSP strategy, Green Extension/Early Green. All analyzed BRT movements at intersections are through movements that time simultaneously with the coordinated through movements. If a BRT bus is detected within a range of approximately 400′ from the intersection, TSP is activated. If at that time the BRT phase is timing green, the green light will be extended until the bus passes the stop bar and activates the checkout detector, but this extension cannot be more than 10 seconds. If at the time the TSP is activated the BRT phase is timing red, the conflicting through movements on side streets will be truncated for 10 seconds, in order to allow 10 seconds earlier activation of the BRT phases.

These are the most common TSP strategies, and they are analyzed in this scenario to address their benefits and impacts on BRT and general purpose traffic. All other elements, such as intersection and corridor design, traffic volumes, BRT operations, speeds, and signal timings are the same as for the 2030 No TSP scenario.

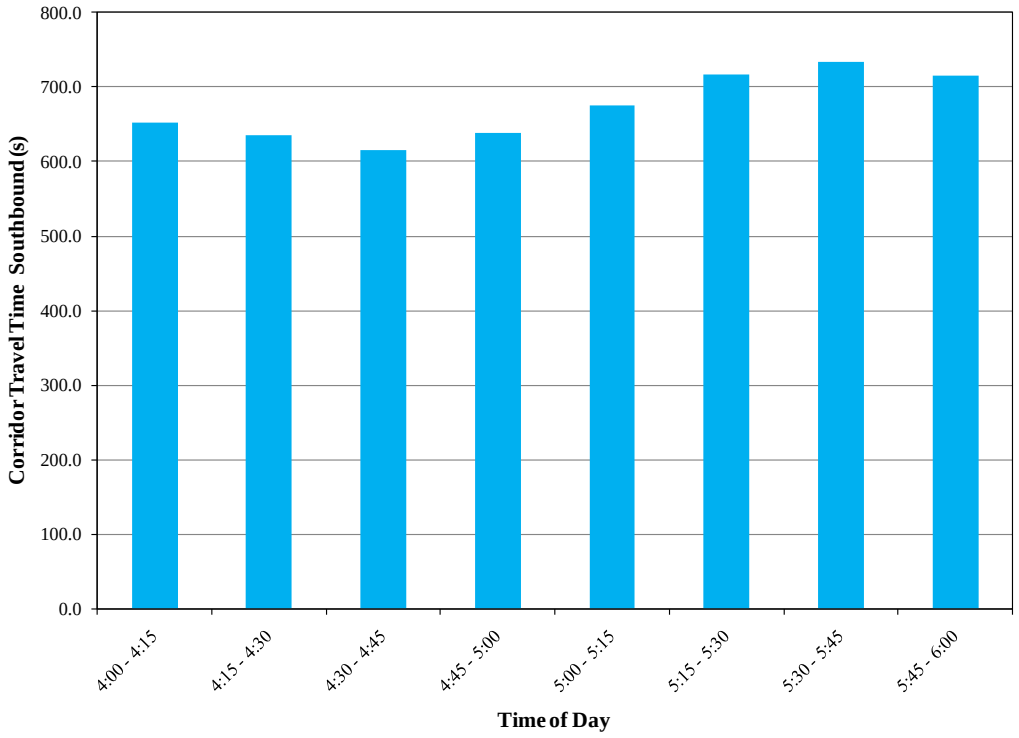
5. RESULTS

In order to assess all impacts and benefits of each scenario, they need to be compared in various ways. The 2009 scenario is the base case scenario. It is used to analyze changes in traffic conditions due to the increased traffic demand and design changes along the corridor. The 2030 No Action scenario shows what can be expected along the corridor if no action is taken (except signal timing optimization). The 2030 Minor Improvements scenario evaluates traffic operations with minor design and operational improvements for the corridor. The 2030 No TSP scenario is the basic transit scenario, which incorporates a BRT system and design changes along the corridor. It is used to analyze the implemented TSP strategy and its impacts. Also, it shows traffic conditions along the corridor if major design and signal timing changes are made. The analysis addresses travel times, speeds and LOS along the main corridor, intersection performance and LOS and the overall network performance. The given results can serve as guidelines for choosing optimal design and TSP strategies.

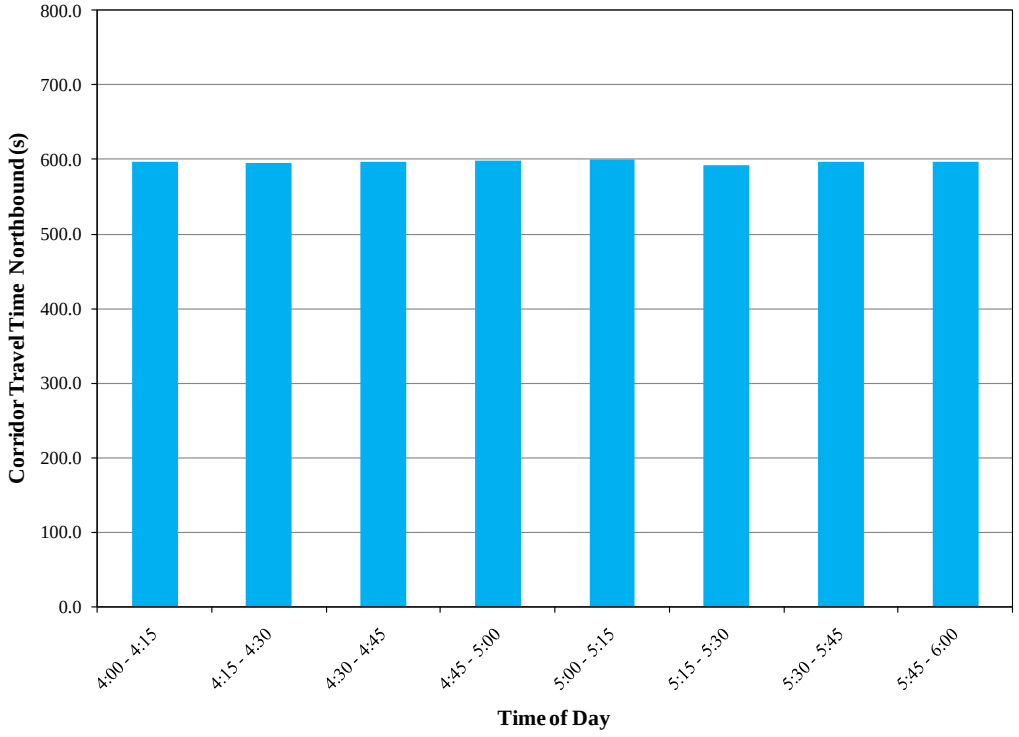
5.1 Vehicular Travel Times, Speeds and Level of Service

A major impact caused by the changes in design, volumes, and traffic operations is expected to be on vehicular travel times, speeds, and LOS along the main corridor. Figures 5.1 – 5.5 show 15-minute vehicular travel time distribution along the corridor for the 2009, 2030 No Action, 2030 Minor Improvements, 2030 No TSP, and 2030 TSP scenarios respectively. The increase in travel times in the southbound direction is obvious after 5:00 PM, while in the northbound direction the travel times are distributed evenly.

The averaged travel times for the 2-hour peak period and each described scenario are given in Table 5.1, and the comparison is also shown in Figure 5.6. The travel times for the 2030 No Action scenario are doubled when compared with the 2009 scenario, and they are impacted by the increase in traffic demand, without the necessary design strategies that would follow the demand. Travel times for the 2030 Minor Improvements scenario are impacted by the increased demand. The travel times for 2030 Transit scenarios are impacted by the increase in traffic demand and the reduced speed limits along the corridor.

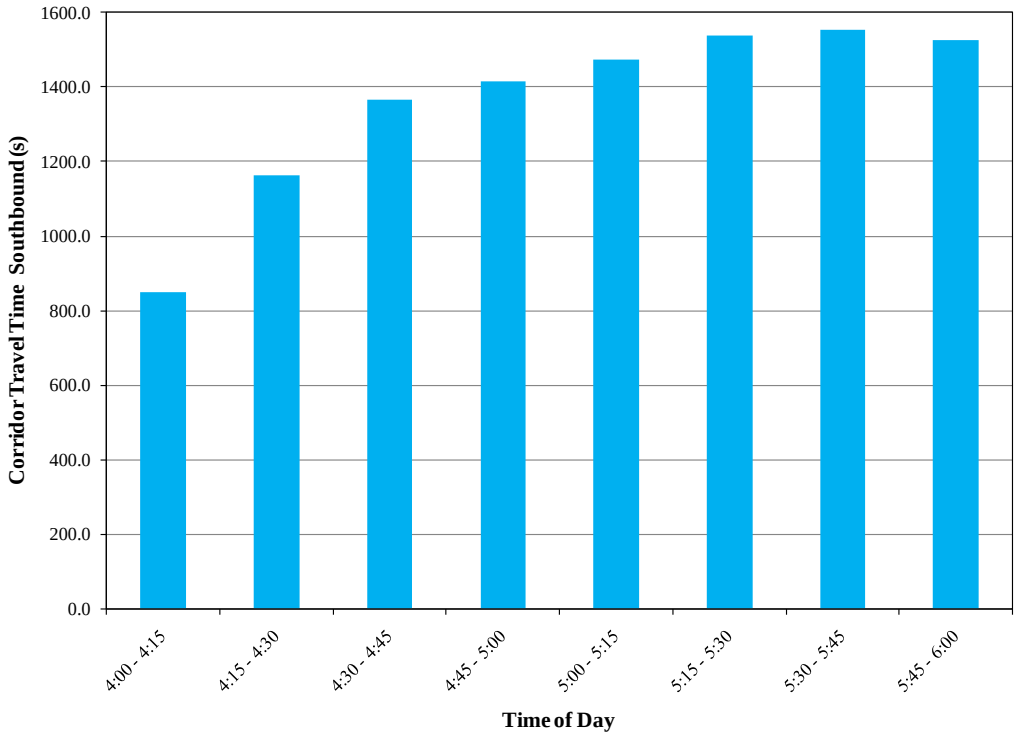


a)

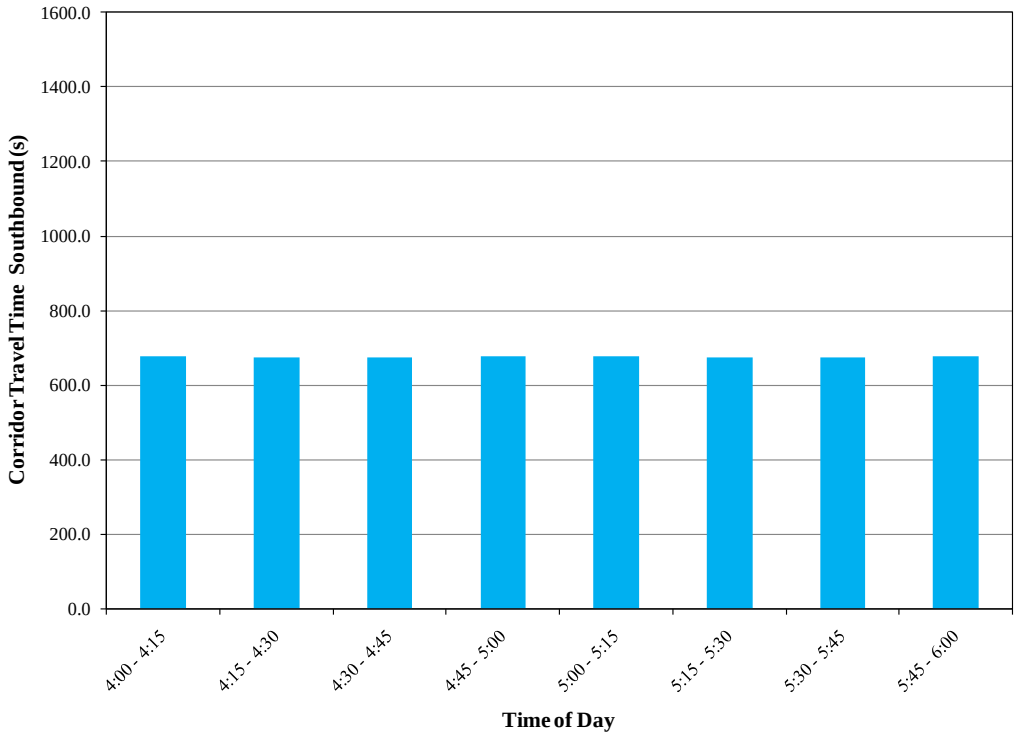


b)

Figure 5.1 15-min Vehicular Travel Times along the Corridor: 2009 Scenario
a) Southbound; b) Northbound

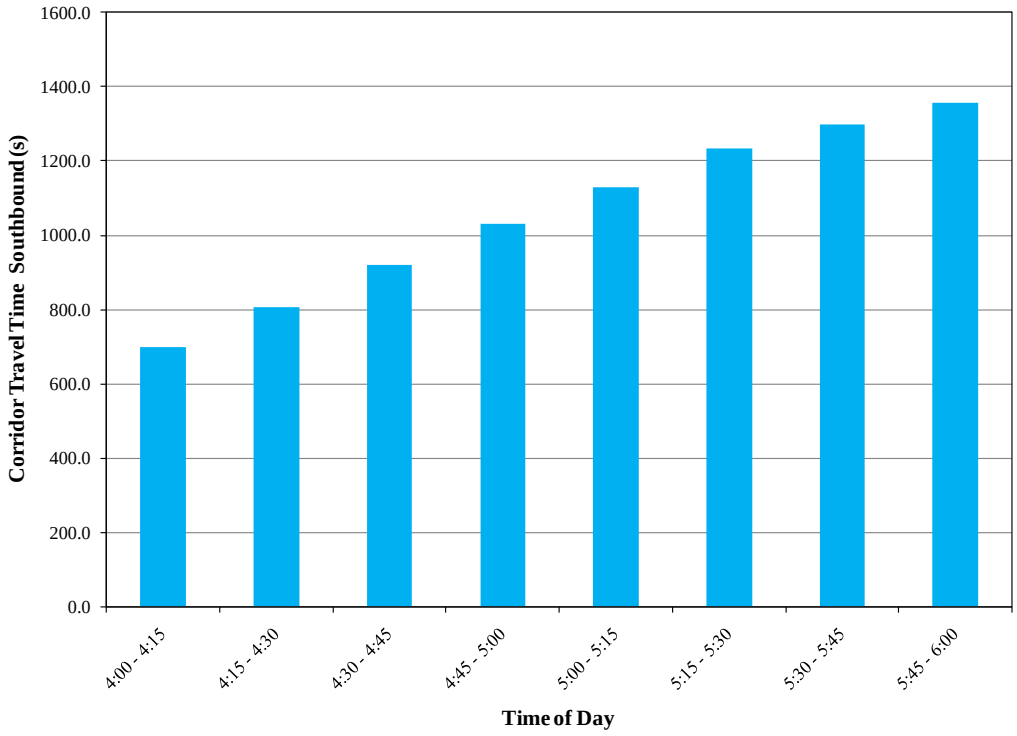


a)

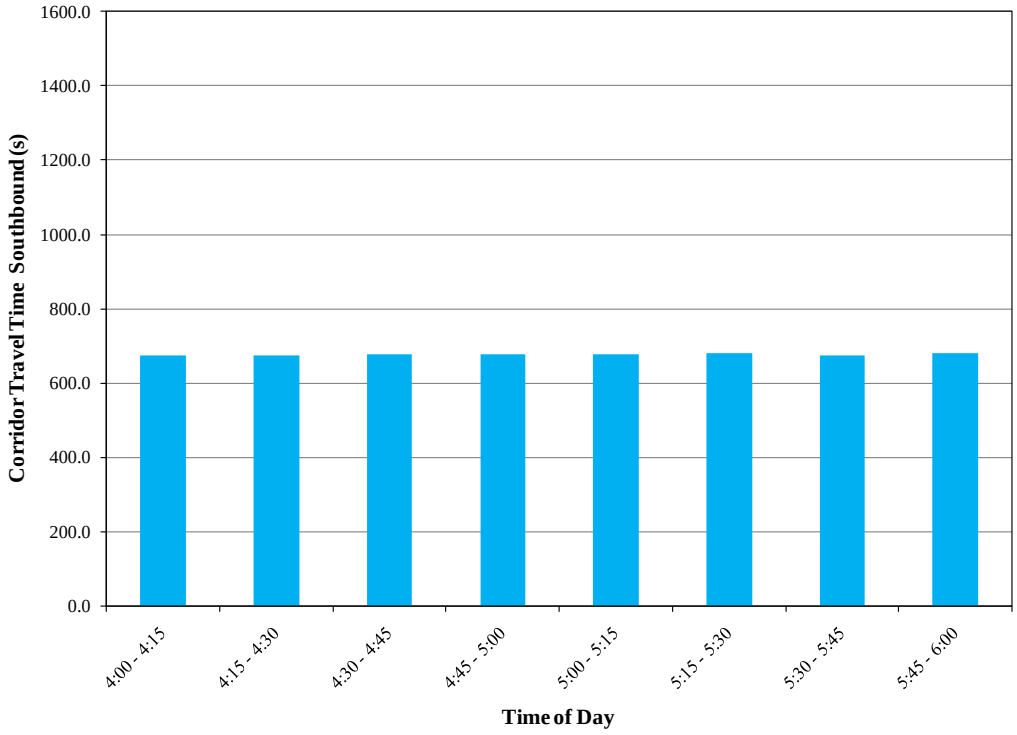


b)

Figure 5.2 15-min Vehicular Travel Times along the Corridor: 2030 No Action Scenario
a) Southbound; b) Northbound

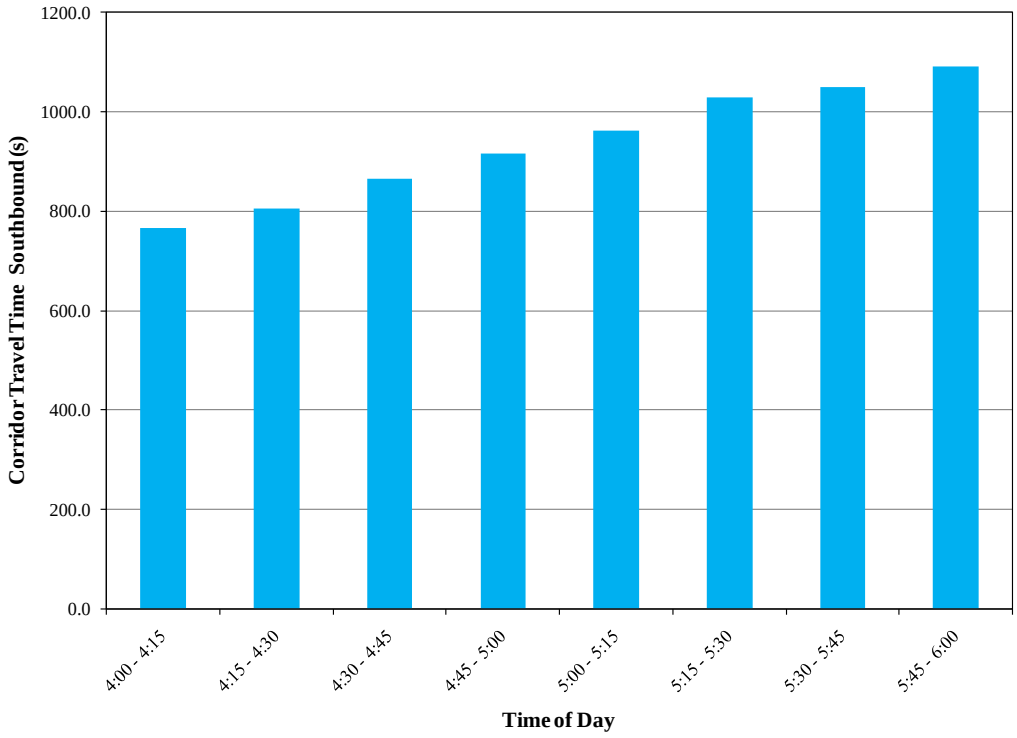


a)

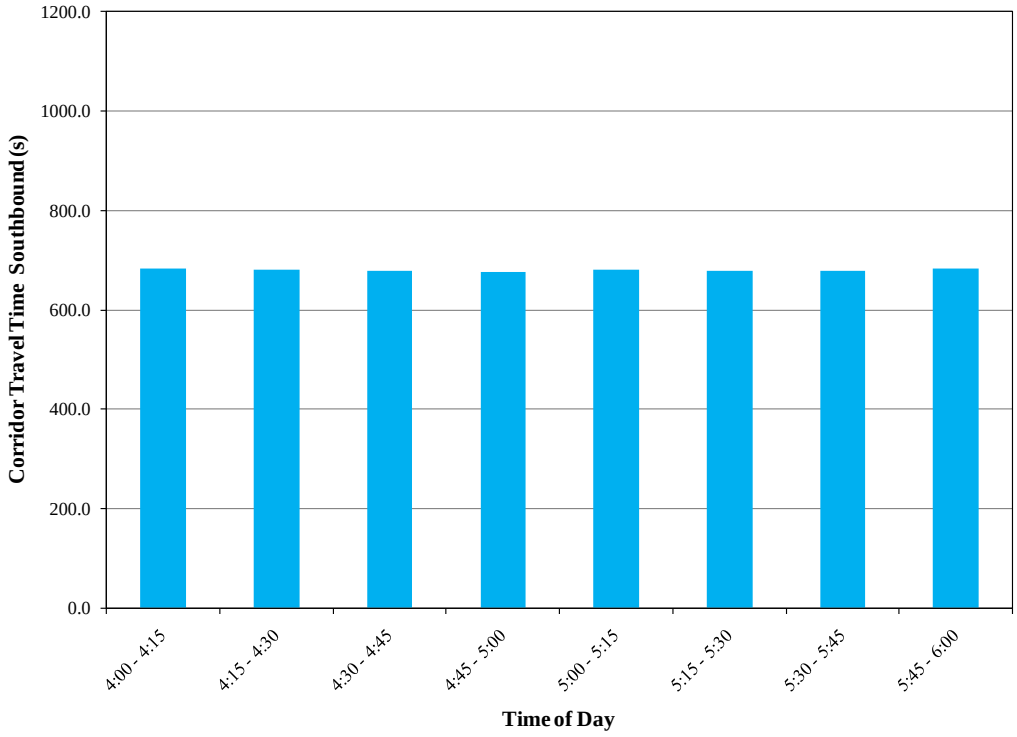


b)

Figure 5.3 15-min Vehicular Travel Times along the Corridor: 2030 Minor Improvements Scenario a) Southbound; b) Northbound

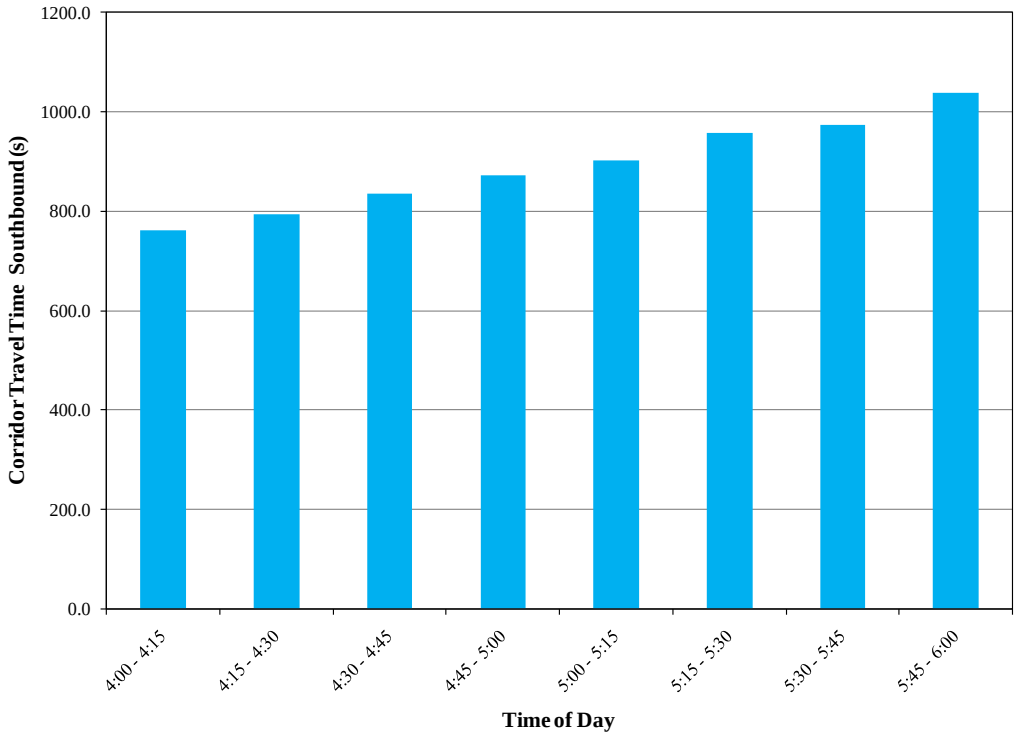


a)

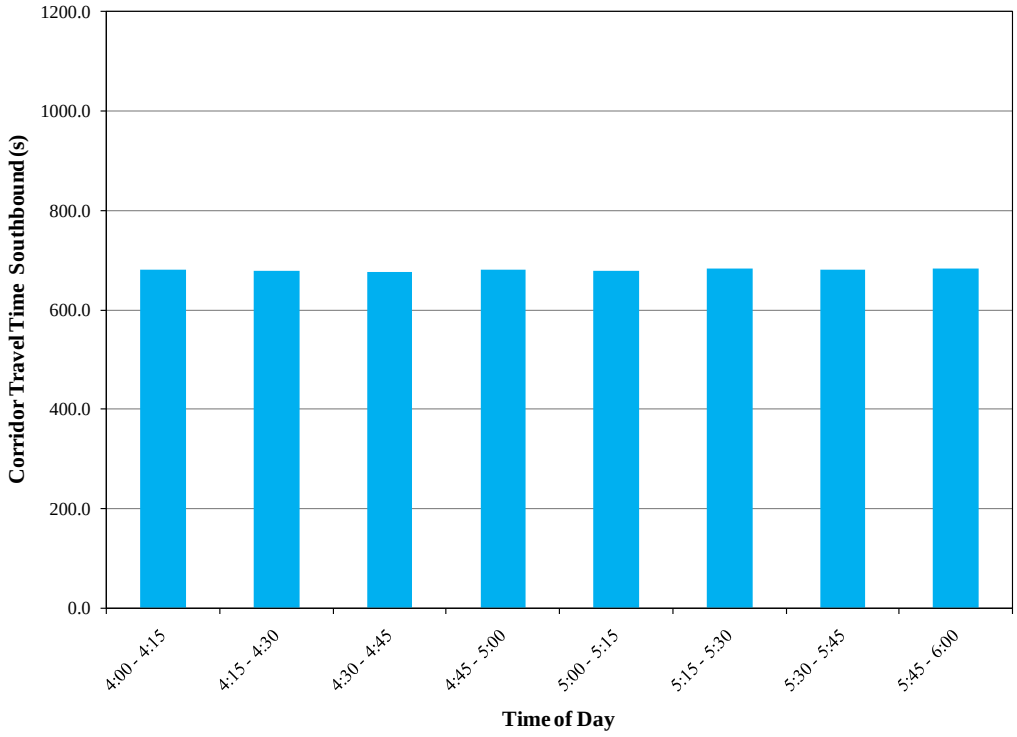


b)

Figure 5.4 15-min Vehicular Travel Times along the Corridor: 2030 No TSP Transit Scenario
a) Southbound; b) Northbound



a)



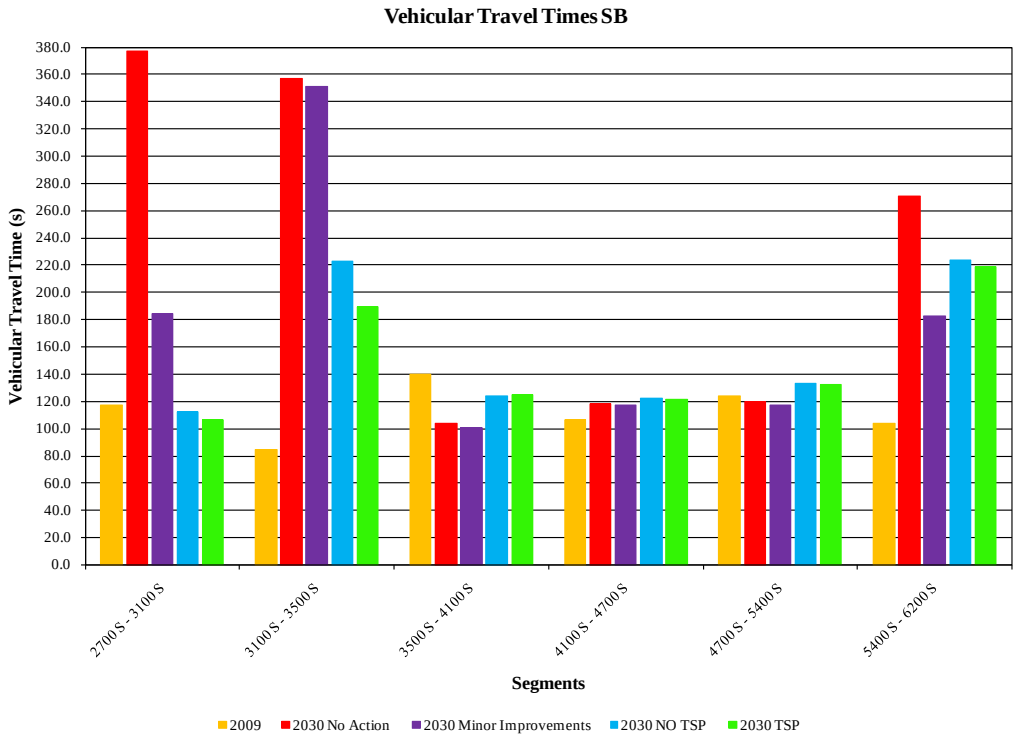
b)

Figure 5.5 15-min Vehicular Travel Times along the Corridor: 2030 TSP Transit Scenario
a) Southbound; b) Northbound

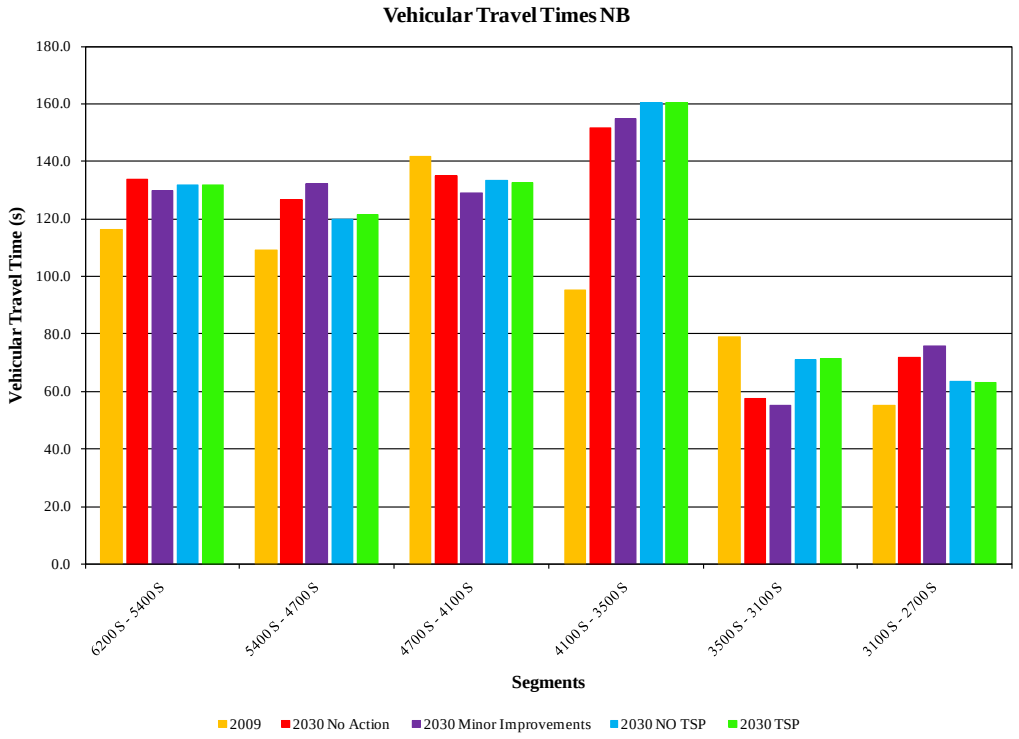
Table 5.1: Vehicular Travel Times Comparison

Segment/Scenario Southbound	2009 (s)	2030 No Action (s)	2030 Minor Improvements (s)	2030 NO TSP (s)	2030 TSP (s)
2700 S - 3100 S	117.6	376.9	184.1	112.1	106.7
3100 S - 3500 S	84.2	357.3	351.0	222.7	189.2
3500 S - 4100 S	140.0	104.1	100.4	124.4	125.0
4100 S - 4700 S	106.2	117.8	117.5	122.7	121.6
4700 S - 5400 S	124.3	120.1	117.6	133.1	132.7
5400 S - 6200 S	103.6	270.4	182.6	223.6	218.8
Total	**675.9**	**1346.6**	**1053.3**	**938.5**	**894.0**

Segment/Scenario Northbound	2009 (s)	2030 No Action (s)	2030 Minor Improvements (s)	2030 NO TSP (s)	2030 TSP (s)
6200 S - 5400 S	116.3	133.7	129.8	132.0	132.0
5400 S - 4700 S	109.3	126.5	132.1	119.8	121.4
4700 S - 4100 S	141.6	135.1	128.9	133.4	132.5
4100 S - 3500 S	95.2	151.8	154.9	160.6	160.3
3500 S - 3100 S	79.1	57.4	55.2	70.9	71.3
3100 S - 2700 S	55.2	71.7	76.0	63.6	63.0
Total	**596.7**	**676.2**	**676.8**	**680.3**	**680.4**



a)



b)

Figure 5.6 Vehicular Travel Times Comparison: a) Southbound; b) Northbound

Travel speed is used to determine the LOS for arterial segments along the main corridor using the HCM methodology. For the 2009 Base Case, 2030 No Action and 2030 Minor Improvements scenarios, based on free flow travel speed (or speed limits), 5600 W is assumed to be a Class II urban street. For the transit scenarios, a Class III urban street is assumed, according to the speed limit changes. The results are presented in Table 5.2. It should be noted that the results in this table for the 2009 Base Case scenario are obtained through VISSIM simulation, and are slightly different than those given in Table 2.2, which are obtained through field measurements.

Table 5.2 Arterial Speed and Level of Service

Segment/Scenario Southbound	2009		2030 No Action		2030 Minor Improvements		2030 NO TSP		2030 TSP	
	Speed (mph)	LOS	Speed (mph)	LOS	Speed (mph)	LOS	Speed (mph)	LOS	Speed (mph)	LOS
2700 S - 3100 S	15.3	E	4.8	F	9.8	F	16.1	D	16.9	D
3100 S - 3500 S	21.4	D	5.0	F	5.1	F	8.1	F	9.5	F
3500 S - 4100 S	25.7	C	34.6	B	35.8	A	28.9	B	28.8	B
4100 S - 4700 S	33.9	B	30.5	B	30.6	B	29.3	B	29.6	B
4700 S - 5400 S	29.1	B	30.1	B	30.7	B	27.1	B	27.2	B
5400 S - 6200 S	34.8	B	13.3	E	19.8	D	16.1	D	16.5	D
Total	**26.7**	**C**	**13.4**	**E**	**17.1**	**D**	**19.2**	**C**	**20.2**	**C**

Segment/Scenario Northbound	2009		2030 No Action		2030 Minor Improvements		2030 NO TSP		2030 TSP	
	Speed (mph)	LOS	Speed (mph)	LOS	Speed (mph)	LOS	Speed (mph)	LOS	Speed (mph)	LOS
6200 S - 5400 S	31.0	B	27.0	C	27.8	C	27.3	B	27.3	B
5400 S - 4700 S	33.1	B	28.6	B	27.4	C	30.2	A	29.8	B
4700 S - 4100 S	25.4	C	26.6	C	27.9	C	27.0	B	27.1	B
4100 S - 3500 S	37.8	A	23.7	C	23.2	C	22.4	C	22.5	C
3500 S - 3100 S	22.8	C	31.4	B	32.6	B	25.4	B	25.3	B
3100 S - 2700 S	32.6	B	25.1	C	23.7	C	28.3	B	28.6	B
Total	**30.2**	**B**	**26.6**	**C**	**26.6**	**C**	**26.5**	**B**	**26.5**	**B**

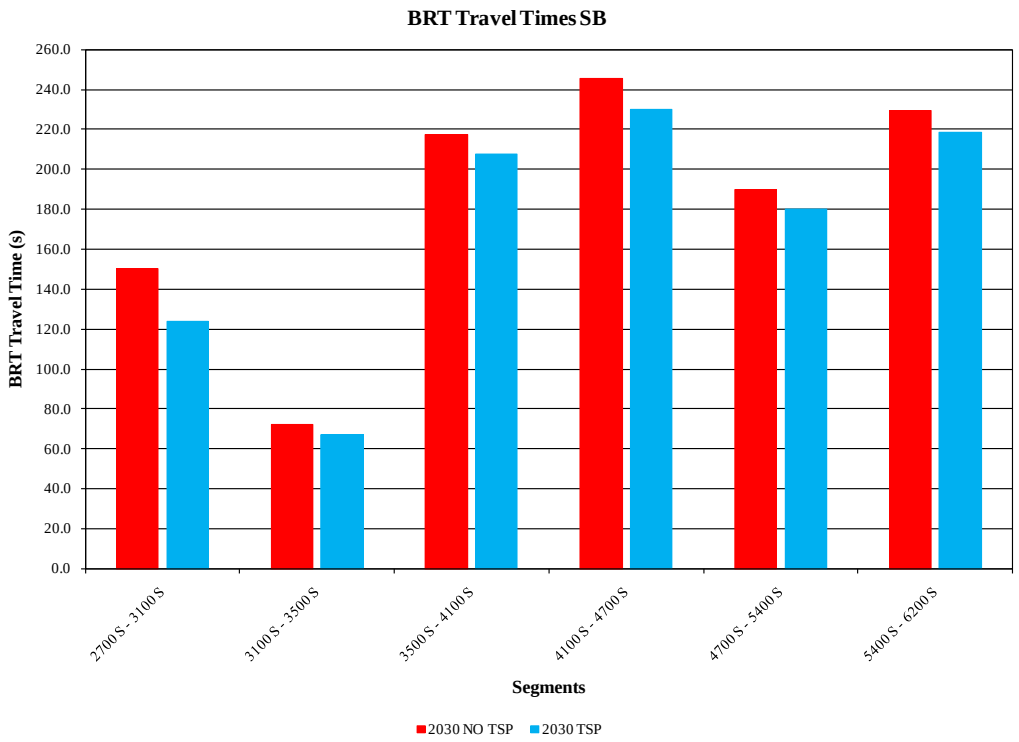
5.2 Transit Travel Times

Transit travel time can be considered the single attribute of a transit system that customers care the most about, but it is also important to transit agencies, especially from the operational standpoint. The four transit models are used to estimate BRT travel times along the 5600 W corridor, so they can serve as an indicator of what can be expected from the transit system, but also which TSP strategies should be considered in order to improve these travel times. A comparison of BRT travel times for the No TSP and TSP transit scenario is given in Table 5.3 and Figure 5.7. Figures 5.8 and 5.9 show distribution of BRT travel times for 15-minute periods during the PM peak period for the No TSP and TSP scenario, respectively.

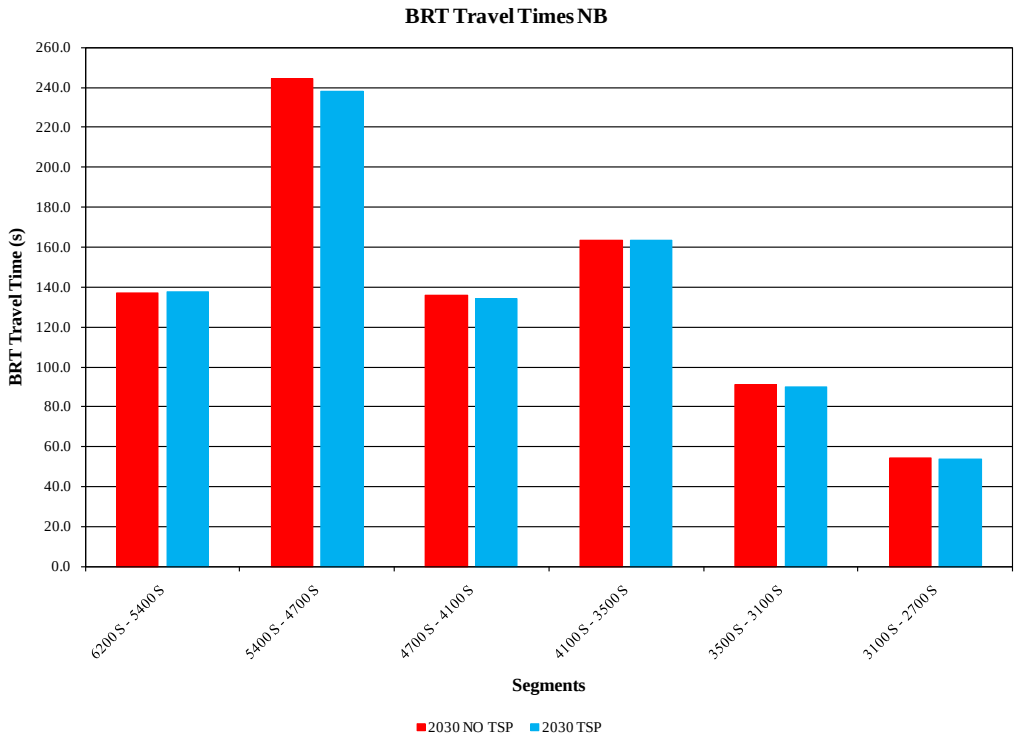
Table 5.3 Transit Travel Times Comparison

Segment/Scenario Southbound	2030 NO TSP (s)	2030 TSP (s)
2700 S - 3100 S	150.5	123.8
3100 S - 3500 S	72.4	67.2
3500 S - 4100 S	217.1	207.7
4100 S - 4700 S	245.5	229.8
4700 S - 5400 S	189.6	180.0
5400 S - 6200 S	229.5	218.8
Total	**1104.5**	**1027.2**

Segment/Scenario Northbound	2030 NO TSP (s)	2030 TSP (s)
6200 S - 5400 S	137.2	137.9
5400 S - 4700 S	244.1	238.0
4700 S - 4100 S	136.1	134.3
4100 S - 3500 S	163.5	163.3
3500 S - 3100 S	91.4	90.0
3100 S - 2700 S	54.3	54.1
Total	**826.6**	**817.6**

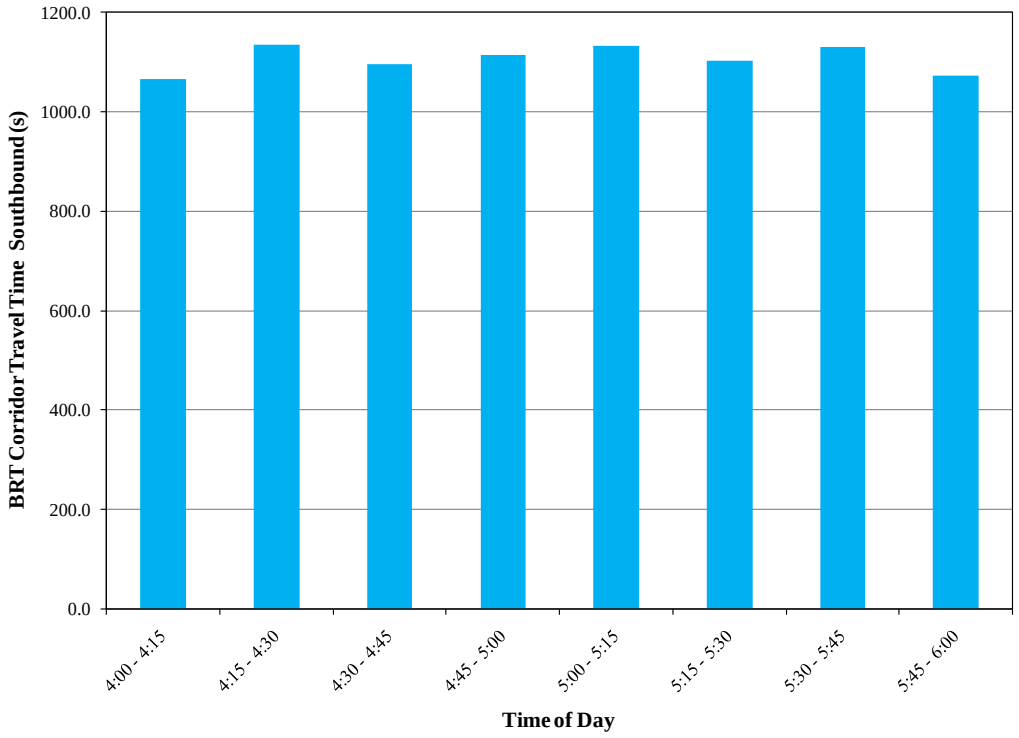


a)

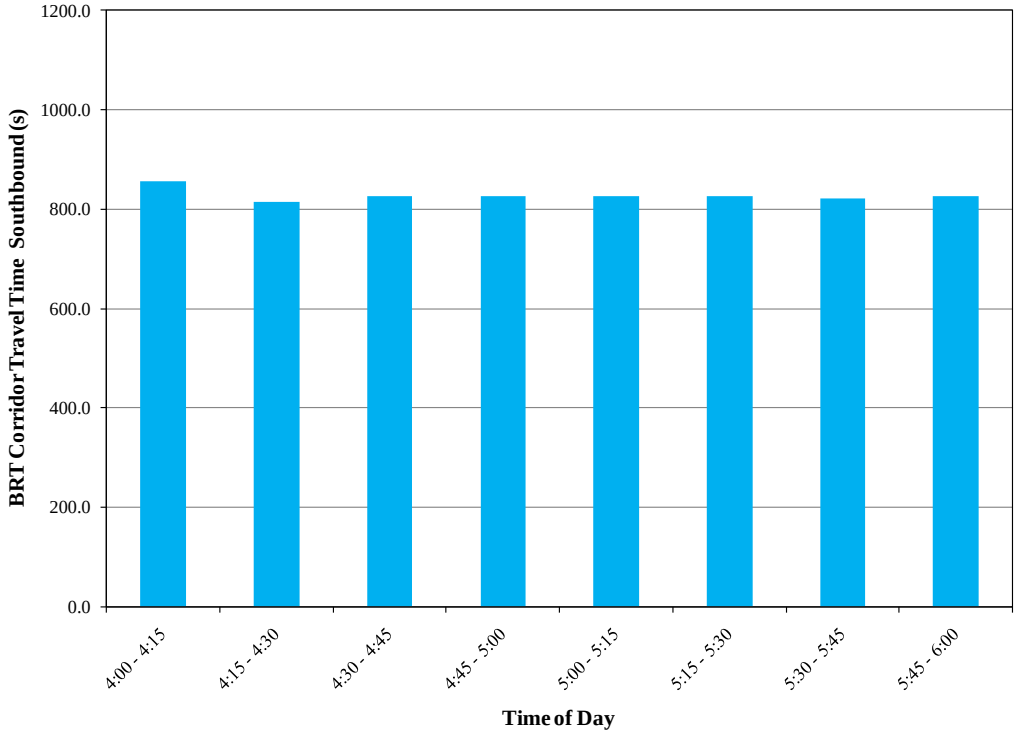


b)

Figure 5.7 Transit Travel Times Comparison: a) Southbound; b) Northbound

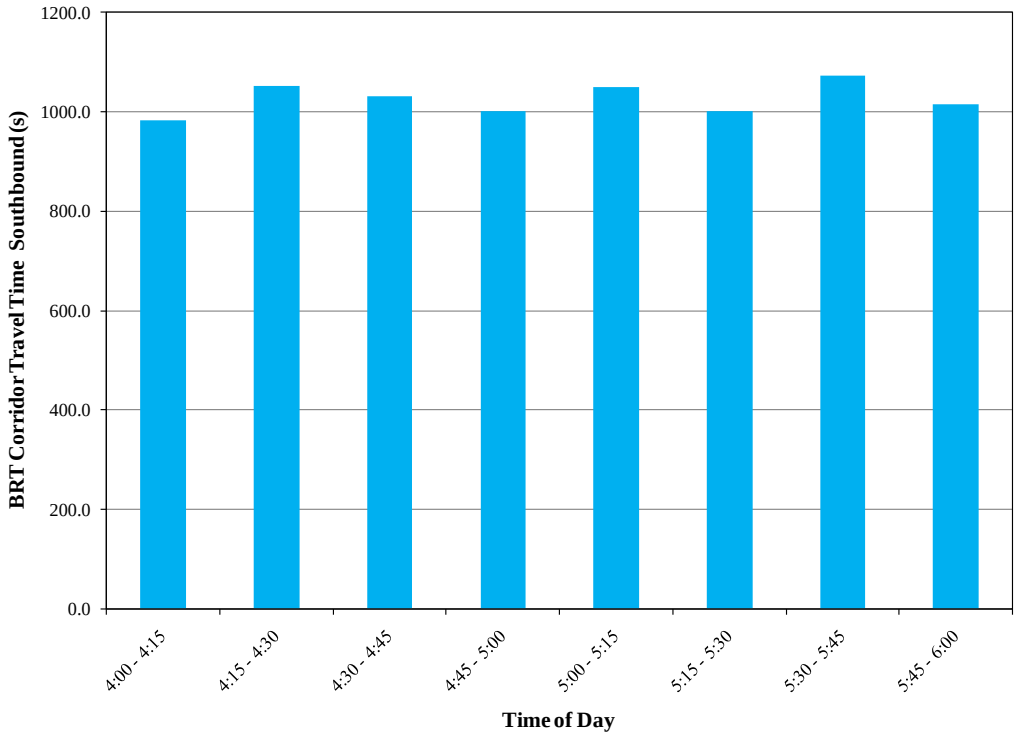


a)

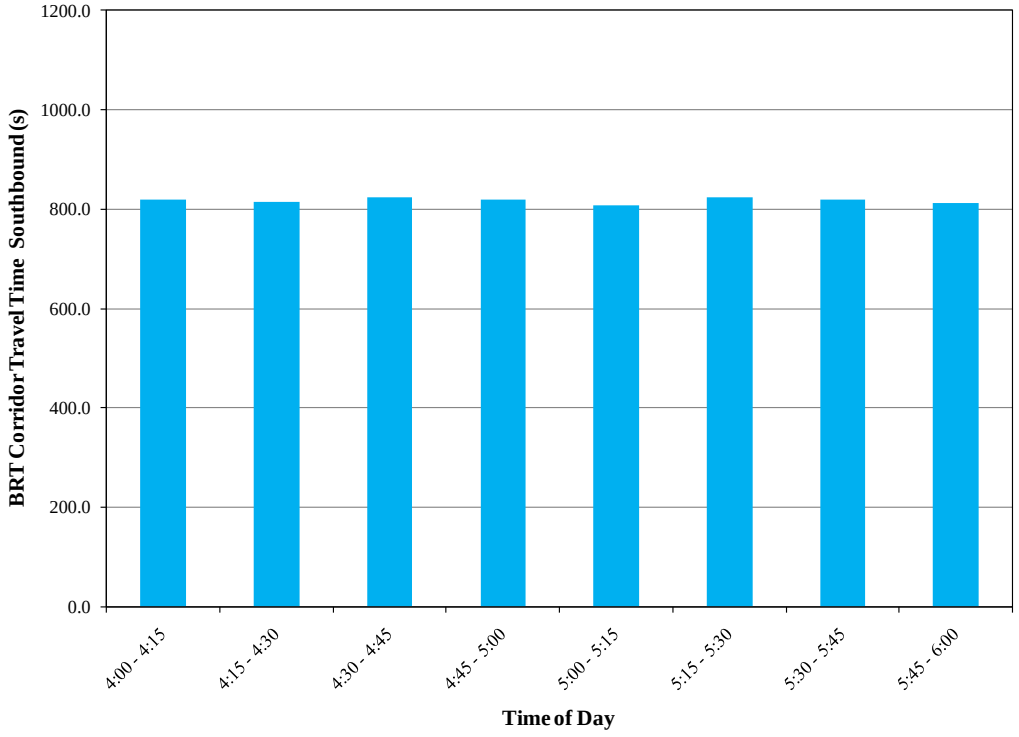


b)

Figure 5.8 15-min BRT Travel Times along the Corridor: 2030 No TSP Transit Scenario
a) Southbound; b) Northbound



a)



b)

Figure 5.9 15-min BRT Travel Times along the Corridor: 2030 TSP Transit Scenario
a) Southbound; b) Northbound

Another indicator that could influence passengers' choices between a private car and transit is a comparison of travel times for these two modes of travel. Table 5.4 gives a comparison of travel times for general purpose traffic and BRT vehicles along the corridor for each transit scenario.

Table 5.4: Travel Times Comparison: Vehicles vs. BRT

Segment/Scenario	2030 NO TSP		2030 TSP	
Southbound	Vehicles (s)	BRT (s)	Vehicles (s)	BRT (s)
2700 S - 3100 S	112.1	150.5	106.7	123.8
3100 S - 3500 S	222.7	72.4	189.2	67.2
3500 S - 4100 S	124.4	217.1	125.0	207.7
4100 S - 4700 S	122.7	245.5	121.6	229.8
4700 S - 5400 S	133.1	189.6	132.7	180.0
5400 S - 6200 S	223.6	229.5	218.8	218.8
Total	**938.5**	**1104.5**	**894.0**	**1027.2**

Segment/Scenario	2030 NO TSP		2030 TSP	
Northbound	Vehicles (s)	BRT (s)	Vehicles (s)	BRT (s)
6200 S - 5400 S	132.0	137.2	132.0	137.9
5400 S - 4700 S	119.8	244.1	121.4	238.0
4700 S - 4100 S	133.4	136.1	132.5	134.3
4100 S - 3500 S	160.6	163.5	160.3	163.3
3500 S - 3100 S	70.9	91.4	71.3	90.0
3100 S - 2700 S	63.6	54.3	63.0	54.1
Total	**680.3**	**826.6**	**680.4**	**817.6**

5.3 Intersection Performance

Vehicular and transit travel times and LOS along the main corridor can only show some of the benefits of the new corridor design and TSP strategies, but intersection performance can give a more detailed insight in traffic and transit operations, especially for side street movements and left turns. The major indicator used in the analysis is the intersection delay, used also for determining the LOS. Table 5.5 shows detailed information on average delays for each intersection for 15-minute time periods, and the corresponding LOS, calculated based on the HCM methodology.

Table 5.5 Intersection Movement Delays (s) and LOS

Intersection	Time period	2009		2030 No Action		2030 Minor Improvements		2030 NO TSP		2030 TSP	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
2700 S	4:00 - 4:15	17.7	B	26.2	C	21.7	C	31.5	C	30.9	C
	4:15 - 4:30	19.4	B	30.7	C	21.0	C	30.3	C	29.8	C
	4:30 - 4:45	18.8	B	77.5	E	20.3	C	30.2	C	30.3	C
	4:45 - 5:00	17.4	B	149.2	F	21.4	C	27.9	C	28.3	C
	5:00 - 5:15	18.9	B	187.1	F	22.6	C	29.5	C	29.8	C
	5:15 - 5:30	19.5	B	182.7	F	26.8	C	29.6	C	30.1	C
	5:30 - 5:45	20.6	C	190.2	F	41.4	D	30.6	C	29.2	C
	5:45 - 6:00	18.0	B	190.2	F	65.4	E	32.0	C	31.4	C

Intersection	Time period	2009		2030 No Action		2030 Minor Improvements		2030 NO TSP		2030 TSP	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
3100 S	4:00 - 4:15	43.7	D	42.7	D	30.3	C	58.8	E	56.4	E
	4:15 - 4:30	45.6	D	64.3	E	32.2	C	70.0	E	69.6	E
	4:30 - 4:45	44.0	D	69.6	E	43.1	D	78.6	E	75.9	E
	4:45 - 5:00	43.5	D	68.8	E	59.7	E	77.2	E	77.5	E
	5:00 - 5:15	44.2	D	70.2	E	78.0	E	74.8	E	74.8	E
	5:15 - 5:30	44.8	D	71.6	E	93.1	F	77.4	E	73.0	E
	5:30 - 5:45	50.3	D	70.7	E	106.5	F	83.1	F	83.7	F
	5:45 - 6:00	46.5	D	71.7	E	113.1	F	83.0	F	86.6	F

Intersection	Time period	2009		2030 No Action		2030 Minor Improvements		2030 NO TSP		2030 TSP	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
3500 S	4:00 - 4:15	21.4	C	109.2	F	102.3	F	88.5	F	90.0	F
	4:15 - 4:30	25.8	C	114.8	F	134.6	F	112.8	F	111.0	F
	4:30 - 4:45	23.3	C	114.2	F	143.6	F	125.2	F	124.0	F
	4:45 - 5:00	22.9	C	110.3	F	152.7	F	128.7	F	124.7	F
	5:00 - 5:15	24.9	C	110.7	F	153.0	F	133.7	F	133.0	F
	5:15 - 5:30	24.7	C	109.7	F	152.2	F	129.7	F	129.4	F
	5:30 - 5:45	26.8	C	111.5	F	152.4	F	137.0	F	130.0	F
	5:45 - 6:00	28.2	C	112.5	F	151.4	F	137.7	F	145.1	F

Table 5.5 Intersection Movement Delays (s) and LOS (continued)

Intersection	Time period	2009		2030 No Action		2030 Minor Improvements		2030 NO TSP		2030 TSP	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
4100 S	4:00 - 4:15	36.6	D	46.2	D	31.2	C	35.9	D	34.8	C
	4:15 - 4:30	40.7	D	44.8	D	31.5	C	37.4	D	35.9	D
	4:30 - 4:45	38.7	D	48.8	D	32.5	C	35.7	D	35.0	D
	4:45 - 5:00	41.5	D	45.1	D	30.8	C	37.8	D	37.0	D
	5:00 - 5:15	42.0	D	44.4	D	32.4	C	36.3	D	36.1	D
	5:15 - 5:30	46.7	D	43.5	D	32.3	C	36.4	D	35.6	D
	5:30 - 5:45	44.4	D	42.7	D	31.8	C	35.3	D	35.8	D
	5:45 - 6:00	46.3	D	44.1	D	32.6	C	37.3	D	36.0	D

Intersection	Time period	2009		2030 No Action		2030 Minor Improvements		2030 NO TSP		2030 TSP	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
4700 S	4:00 - 4:15	20.9	C	62.0	E	41.5	D	51.8	D	54.6	D
	4:15 - 4:30	21.0	C	57.1	E	40.4	D	53.2	D	57.3	E
	4:30 - 4:45	24.9	C	56.9	E	43.9	D	57.4	E	64.9	E
	4:45 - 5:00	22.1	C	54.0	D	39.5	D	55.0	E	62.8	E
	5:00 - 5:15	25.9	C	55.4	E	39.1	D	55.1	E	67.5	E
	5:15 - 5:30	30.8	C	57.4	E	38.5	D	52.8	D	60.7	E
	5:30 - 5:45	25.7	C	56.0	E	36.1	D	54.0	D	63.3	E
	5:45 - 6:00	24.0	C	55.8	E	37.7	D	56.5	E	62.5	E

Intersection	Time period	2009		2030 No Action		2030 Minor Improvements		2030 NO TSP		2030 TSP	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
5400 S	4:00 - 4:15	21.4	C	36.0	D	32.8	C	42.2	D	44.9	D
	4:15 - 4:30	21.5	C	36.2	D	32.1	C	45.0	D	43.9	D
	4:30 - 4:45	22.2	C	35.7	D	31.4	C	42.9	D	43.5	D
	4:45 - 5:00	21.8	C	34.6	C	31.3	C	41.8	D	40.7	D
	5:00 - 5:15	22.9	C	35.1	D	32.4	C	44.9	D	43.8	D
	5:15 - 5:30	23.8	C	36.6	D	32.6	C	45.4	D	48.8	D
	5:30 - 5:45	22.1	C	34.8	C	31.3	C	42.3	D	41.2	D
	5:45 - 6:00	23.8	C	36.4	D	31.9	C	43.6	D	44.5	D

Table 5.5 Intersection Movement Delays (s) and LOS (continued)

Intersection	Time period	2009		2030 No Action		2030 Minor Improvements		2030 NO TSP		2030 TSP	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
6200 S	4:00 - 4:15	21.2	C	74.7	E	42.4	D	59.3	E	58.1	E
	4:15 - 4:30	22.7	C	86.4	F	44.3	D	70.5	E	68.3	E
	4:30 - 4:45	24.0	C	96.6	F	53.4	D	90.8	F	84.6	F
	4:45 - 5:00	23.0	C	100.4	F	55.2	E	94.7	F	89.6	F
	5:00 - 5:15	24.0	C	108.3	F	52.5	D	99.3	F	91.0	F
	5:15 - 5:30	26.6	C	117.2	F	57.4	E	98.8	F	98.3	F
	5:30 - 5:45	26.6	C	125.3	F	56.7	E	101.4	F	97.7	F
	5:45 - 6:00	23.9	C	128.5	F	53.4	D	108.7	F	105.6	F

5.4 Percentage of Served Demand

Another indicator of the traffic condition at intersections is the percentage of the estimated demand that is served. This can provide guidelines on the intersection capacity. Some major design changes are planned for the analyzed corridor, and taking into account the predicted traffic, this measurement can be very useful to estimate the effects of the planned changes. The percentage of served demand is calculated for each intersection in each scenario. Traffic prediction is the demand, while the VISSIM model outputs present served demand. Due to the nature of the simulation models, the demand is estimated at 100% served if the calculation of this measure is greater than 97%. Table 5.6. shows the percentage of the served demand for each intersection in each 15-minute period.

Table 5.6 Percentage of Demand Served

Intersection	Time period	Percentage of Demand Served				
		2009	2030 No Action	2030 Minor Improvements	2030 NO TSP	2030 TSP
2700 S	4:00 - 4:15	100.0	100.0	100.0	100.0	100.0
	4:15 - 4:30	100.0	100.0	100.0	100.0	100.0
	4:30 - 4:45	100.0	88.1	100.0	100.0	100.0
	4:45 - 5:00	100.0	82.6	100.0	100.0	100.0
	5:00 - 5:15	100.0	81.6	100.0	100.0	100.0
	5:15 - 5:30	100.0	80.2	100.0	100.0	100.0
	5:30 - 5:45	100.0	81.6	100.0	100.0	100.0
	5:45 - 6:00	100.0	77.4	96.2	100.0	100.0

Table 5.6 Percentage of Demand Served (continued)

Intersection	Time period	Percentage of Demand Served				
		2009	2030 No Action	2030 Minor Improvements	2030 NO TSP	2030 TSP
3100 S	4:00 - 4:15	100.0	100.0	100.0	100.0	100.0
	4:15 - 4:30	100.0	94.6	100.0	100.0	100.0
	4:30 - 4:45	100.0	91.7	100.0	100.0	100.0
	4:45 - 5:00	100.0	87.6	100.0	100.0	100.0
	5:00 - 5:15	100.0	90.4	100.0	100.0	100.0
	5:15 - 5:30	100.0	89.5	100.0	100.0	100.0
	5:30 - 5:45	100.0	91.0	100.0	100.0	100.0
	5:45 - 6:00	100.0	89.2	100.0	100.0	100.0

Intersection	Time period	Percentage of Demand Served				
		2009	2030 No Action	2030 Minor Improvements	2030 NO TSP	2030 TSP
3500 S	4:00 - 4:15	100.0	83.0	91.3	91.4	90.4
	4:15 - 4:30	100.0	85.3	92.1	92.2	92.0
	4:30 - 4:45	100.0	83.8	91.3	92.0	92.1
	4:45 - 5:00	100.0	84.2	90.6	92.6	92.3
	5:00 - 5:15	100.0	83.2	91.3	92.3	91.9
	5:15 - 5:30	100.0	84.5	91.4	93.7	94.2
	5:30 - 5:45	100.0	84.3	92.3	93.2	92.5
	5:45 - 6:00	100.0	84.4	92.1	90.8	90.7

Intersection	Time period	Percentage of Demand Served				
		2009	2030 No Action	2030 Minor Improvements	2030 NO TSP	2030 TSP
4100 S	4:00 - 4:15	100.0	100.0	100.0	100.0	100.0
	4:15 - 4:30	100.0	96.0	100.0	100.0	100.0
	4:30 - 4:45	100.0	96.5	100.0	100.0	100.0
	4:45 - 5:00	100.0	95.0	100.0	100.0	100.0
	5:00 - 5:15	100.0	95.5	100.0	95.8	95.8
	5:15 - 5:30	100.0	93.8	100.0	100.0	100.0
	5:30 - 5:45	100.0	92.6	100.0	100.0	96.8
	5:45 - 6:00	100.0	93.8	100.0	100.0	100.0

Table 5.6 Percentage of Demand Served (continued)

Intersection	Time period	Percentage of Demand Served				
		2009	2030 No Action	2030 Minor Improvements	2030 NO TSP	2030 TSP
4700 S	4:00 - 4:15	100.0	93.6	100.0	100.0	96.4
	4:15 - 4:30	100.0	92.1	100.0	100.0	100.0
	4:30 - 4:45	100.0	92.3	100.0	100.0	100.0
	4:45 - 5:00	100.0	91.2	100.0	100.0	100.0
	5:00 - 5:15	100.0	85.8	96.3	94.1	93.8
	5:15 - 5:30	100.0	89.9	100.0	100.0	100.0
	5:30 - 5:45	100.0	89.8	100.0	100.0	100.0
	5:45 - 6:00	100.0	88.1	100.0	100.0	100.0

Intersection	Time period	Percentage of Demand Served				
		2009	2030 No Action	2030 Minor Improvements	2030 NO TSP	2030 TSP
5400 S	4:00 - 4:15	100.0	100.0	100.0	100.0	100.0
	4:15 - 4:30	100.0	100.0	100.0	100.0	100.0
	4:30 - 4:45	100.0	100.0	100.0	100.0	100.0
	4:45 - 5:00	100.0	100.0	100.0	100.0	100.0
	5:00 - 5:15	100.0	94.5	100.0	100.0	100.0
	5:15 - 5:30	100.0	100.0	100.0	100.0	100.0
	5:30 - 5:45	100.0	96.2	100.0	100.0	100.0
	5:45 - 6:00	100.0	100.0	100.0	100.0	100.0

Intersection	Time period	Percentage of Demand Served				
		2009	2030 No Action	2030 Minor Improvements	2030 NO TSP	2030 TSP
6200 S	4:00 - 4:15	100.0	72.9	80.2	78.0	78.0
	4:15 - 4:30	100.0	74.7	79.9	79.7	79.5
	4:30 - 4:45	100.0	74.0	79.9	79.3	79.5
	4:45 - 5:00	100.0	73.9	81.4	79.6	79.9
	5:00 - 5:15	100.0	74.2	80.9	79.1	79.8
	5:15 - 5:30	100.0	74.5	81.7	79.3	79.3
	5:30 - 5:45	100.0	73.4	80.2	78.0	77.5
	5:45 - 6:00	100.0	74.1	80.5	80.5	80.5

5.5 Network Performance

The analysis so far regarded only the main corridor and intersections. However, an overall assessment in network performance, that includes all intersections (signalized and non-signalized) and all streets within the field of study, can provide important information on traffic conditions on a network wide level. The network performance, obtained through microsimulation models for each scenario, is presented in Table 5.7. The results are given for the 2-hour simulation period (4:00–6:00 PM).

Table 5.7 Network Performance

Parameter	2009	2030 No Action	2030 Minor Improvements	2030 NO TSP	2030 TSP
# of vehicles left the network (vhc)	25372	40939	43104	43700	43636
# of vehicles in the network (vhc)	768	1924	1666	1598	1559
Total Vehicles (vhc)	26141	42863	44771	45297	45195
Average delay time per vehicle (s)	75.20	184.30	124.70	119.80	118.50
Total delay time (h)	546.24	2194.13	1550.35	1507.37	1488.10
Average stopped delay per vehicle (s)	44.60	117.60	83.30	83.10	82.70
Total stopped delay (h)	324.21	1400.75	1036.05	1046.24	1038.10
Average number of stops per vehicles	1.87	4.20	2.95	2.73	2.69
Total Number of Stops	48968	179847	131957	123556	121366
Average speed (mph)	24.60	14.40	18.65	17.13	17.24
Total travel time (h)	1456.68	3409.53	2848.19	2939.14	2919.39
Total Distance Traveled (mi)	35824.31	49024.00	53049.88	50300.66	50280.45

6. DISCUSSION

This section provides major findings and some recommendations for operational strategies along the corridor that could improve transit, without impacting the overall traffic. The findings and recommendations are based on the results presented in the previous section. The results are discussed in the same order as they are presented.

6.1 Vehicular Travel Times, Speeds, and Level of Service

The majority of traffic along the corridor during the PM peak period is directed southbound, creating traffic congestion and reducing travel times. Depending on the scenario, the northbound travel times are 10% to 50% lower than the southbound travel times. Considering the PM peak direction of travel, the southbound travel times are more important for the analysis (Table 5.1 and Figure 5.6). Compared with the 2009 Base scenario, vehicular travel times are increased in all other scenarios. The most significant increase is for the 2030 No Action scenario, where the expected travel time increase would be almost 100% in the peak direction. The major deterioration of traffic conditions is expected on segments 2700 S to 3100 S, 3100 S to 3500 S, and 5400 S to 6200 S. This is a good indicator that the No Action alternative is not recommended for this corridor. Minor design and operational improvements would decrease travel times approximately 20%, compared with the No Action alternative. Lower travel times in this case are a result of the absence of mid-block left turns and signal optimization. If the proposed design changes were made, the peak direction travel times would be approximately 30% lower than if no action is taken. This can be attributed to the absence of mid-block left turns (which will not be allowed once the center-running BRT guideway is built), and slightly modified driving behavior for the new lower speed limit. Due to the higher traffic volumes and lower speed limits, the vehicular travel times for the basic transit alternative would be approximately 40% higher than in the existing conditions. The major deterioration of traffic conditions, even after the design changes, can be expected at segments from 3100 S to 3500 S, and 5400 S to 6200 S. The vehicular travel times along the corridor mostly benefit from the proposed TSP strategies. The results show that, on average, these travel times are approximately 5% lower when the TSP scenario is compared with the No TSP scenario.

The 15-minute travel times along the corridor suggest the peak hour of travel, which is 5:00–6:00 PM in all scenarios (Figures 5.1–5.5). Also, in the northbound direction, which is not the PM direction, the travel times are evenly distributed for all 15-minute periods.

As expected, the results for travel speed and LOS, presented in Table 5.2, correspond to the vehicular travel time results. If no action is taken, a major deterioration in arterial LOS can be expected for the year 2030 in the peak direction.

6.2 Transit Travel Times

The results for the transit travel times, given in Table 5.3 and Figure 5.7 show the southbound peak hour direction of travel is noticeable for BRT vehicles, too. The strategies should be selected in order to improve southbound transit travel times, so the analysis will focus on this direction. As expected, the BRT travel times are higher if no priority is given to the BRT vehicles. The implemented TSP strategy brings certain improvement for transit by lowering the BRT travel times by approximately 7%. The biggest transit travel time savings are achieved along the most congested segments of 5600 W.

6.3 Intersection Performance

According to Table 5.5, the majority of the intersections experience an increase in delays for any 2030 scenario, when compared with the existing conditions. The intersection delays also show a deterioration of traffic conditions if no action is taken, especially for some of the busiest intersections, such as 3100 S and 3500 S. Even minor design and operational improvements can significantly improve intersection performance at the busiest intersections. This can be seen when the 2030 Minor Improvements and the basic transit scenarios are compared with the 2030 No Action scenario.

The impacts of the TSP strategy can be determined when the delays from the TSP transit scenario are compared with the No TSP scenario. An implementation of the Green Extension/Early Green strategy is usually expected to cause minor negative impacts on side street movement, especially the through movements, which are in this case directly affected. However, the results presented in the table show that this strategy has neutral traffic impacts on side street movements. When vehicular travel times are compared, the implementation of these TSP strategies can cause a minor improvement for the peak period southbound traffic. As for the BRT performance, these strategies cause minor to major improvements (depending on the intersection) to the BRT operations. The results justify an implementation of this strategy in the field.

6.4 Percentage of Served Demand

The analysis of the served demand for each intersection can provide some guidelines about the intersection capacity. This analysis can also pinpoint the most problematic intersections. First, if no action is taken, almost all intersections, during all 15-minute time periods, are unable to serve the total demand. This is another indicator that No Action scenario is the worst option. Minor improvements can lead to an increase in intersection capacity, so if minor improvements were implemented, the percentage of the served demand would increase. The two transit scenarios perform almost the same when this measurement is analyzed. The analysis shows that the 3500 S and 6200 S intersections do not have enough capacity, even after minor or major design changes. The 3500 S intersection doesn't have enough capacity to accommodate the new traffic volumes at all approaches, while the 6200 S intersection has the biggest problems with the westbound through and left movements. This should be taken into consideration when the design changes are being made, assuming that the given traffic predictions are accurate.

6.5 Network Performance

The first thing that can be seen from the network performance indicators given in Table 5.7 is that the number of vehicles in the network is almost doubled in the year 2030 compared with 2009. If no action is taken, the traffic conditions will worsen significantly (the delays and number of stops are increased almost three-fold, with a 40% drop in the average speed, although the speed limit remained the same). After the implementation of minor improvements, or the full reconstruction and design changes, a major improvement in traffic conditions over the No Action alternative could be expected. The network throughput would increase, while at the same time the negative impacts would decrease. Although minor improvements in design and operations significantly improve traffic conditions, these improvements on the network level are more noticeable with the full build alternative. An implementation of the proposed TSP strategy would cause minor improvements in traffic conditions on a network level. As explained earlier, this strategy would improve the peak direction traffic along the main corridor without negative impacts on other traffic, so these improvements can be expected. This is one more indicator that the implementation of the TSP strategy is justified.

6.6 Summary of the Results

For a detailed insight and traffic analysis of the proposed changes along the 5600 W corridor, five scenarios are designed and analyzed:

- 2009 Base Case scenario, which represents current traffic conditions along the corridor
- 2030 No Action scenario, which estimates traffic conditions for the year 2030 taking into consideration changes in the traffic demand, but if no major design or operational changes are made (except an optimization of signal timings for the new volumes)
- 2030 Minor Improvements scenario, which introduces minor design and operational improvements, such as a prohibition of mid-block left turns, longer left and right turn lanes at intersections and signal optimization
- 2030 Transit No TSP scenario, which is the basic Transit Build scenario that introduces design and operational changes along the corridor and the new 5600 W BRT line running on a separate centrally located guideway, but without any special operational treatment at intersections
- 2030 Transit TSP Scenario, which is an extension of the basic transit scenario, where the BRT vehicles are getting certain priority at intersections given as an extra 10 seconds for the BRT phases when the BRT vehicles are present at intersections

The scenarios are compared in various ways in order to determine the benefits and impacts of each design or operational strategy on general purpose traffic, as well as on the new BRT line. These effects are summarized and presented in Table 6.1. The effects of the 2030 No Action scenario are compared with the existing conditions. The 2030 Minor Improvements scenario is compared with the No Action scenario, while the 2030 TSP transit scenario is compared with the 2030 basic No TSP transit scenario.

Table 6.1 Effects on Traffic

Scenario	2009	2030 No Action	2030 Minor Improvements	2030 NO TSP	2030 TSP
Traffic / Transit Component			Traffic Impacts		
Through Traffic Along the Main Corridor	N/A	N/A	N/A	N/A	N/A
	Major Improvement	Major Improvement	Major Improvement	Major Improvement	Major Improvement
	Minor Improvement	Minor Improvement	Minor Improvement	Minor Improvement	Minor Improvement
	Neutral	Neutral	Neutral	Neutral	Neutral
	Minor Impact	Minor Impact	Minor Impact	Minor Impact	Minor Impact
	Major Impact	Major Impact	Major Impact	Major Impact	Major Impact

Scenario	2009	2030 No Action	2030 Minor Improvements	2030 NO TSP	2030 TSP
Traffic / Transit Component			Traffic Impacts		
Left Turns Along the Main Corridor	N/A	N/A	N/A	N/A	N/A
	Major Improvement	Major Improvement	Major Improvement	Major Improvement	Major Improvement
	Minor Improvement	Minor Improvement	Minor Improvement	Minor Improvement	Minor Improvement
	Neutral	Neutral	Neutral	Neutral	Neutral
	Minor Impact	Minor Impact	Minor Impact	Minor Impact	Minor Impact
	Major Impact	Major Impact	Major Impact	Major Impact	Major Impact

Table 6.1 Effects on Traffic (continued)

Scenario	2009	2030 No Action	2030 Minor Improvements	2030 NO TSP	2030 TSP
Traffic / Transit Component			Traffic Impacts		
Side Street Traffic	N/A	N/A	N/A	N/A	N/A
	Major Improvement	Major Improvement	Major Improvement	Major Improvement	Major Improvement
	Minor Improvement	Minor Improvement	Minor Improvement	Minor Improvement	Minor Improvement
	Neutral	Neutral	Neutral	Neutral	Neutral
	Minor Impact	Minor Impact	Minor Impact	Minor Impact	Minor Impact
	Major Impact	Major Impact	Major Impact	Major Impact	Major Impact

Scenario	2009	2030 No Action	2030 Minor Improvements	2030 NO TSP	2030 TSP
Traffic / Transit Component			Traffic Impacts		
BRT Operations	N/A	N/A	N/A	N/A	N/A
	Major Improvement	Major Improvement	Major Improvement	Major Improvement	Major Improvement
	Minor Improvement	Minor Improvement	Minor Improvement	Minor Improvement	Minor Improvement
	Neutral	Neutral	Neutral	Neutral	Neutral
	Minor Impact	Minor Impact	Minor Impact	Minor Impact	Minor Impact
	Major Impact	Major Impact	Major Impact	Major Impact	Major Impact

Scenario	2009	2030 No Action	2030 Minor Improvements	2030 NO TSP	2030 TSP
Traffic / Transit Component			Traffic Impacts		
Network Performance	N/A	N/A	N/A	N/A	N/A
	Major Improvement	Major Improvement	Major Improvement	Major Improvement	Major Improvement
	Minor Improvement	Minor Improvement	Minor Improvement	Minor Improvement	Minor Improvement
	Neutral	Neutral	Neutral	Neutral	Neutral
	Minor Impact	Minor Impact	Minor Impact	Minor Impact	Minor Impact
	Major Impact	Major Impact	Major Impact	Major Impact	Major Impact

The No Action alternative is the worst scenario for the given corridor. Minor improvements in design and operations could bring certain improvements to traffic. Once the planned design changes are implemented, the major improvement in traffic conditions can be seen over the No Action alternative. The implemented TSP strategy brings minor to major improvements to BRT operations, with no impacts on the overall traffic.

7. CONCLUSIONS

The goal of this study is to evaluate 5600 W BRT operations and impacts of BRT and TSP implementations on transit and vehicular traffic through microsimulation, as well as to explore whether the planned design changes along the corridor are justified. The goal is achieved through the study objectives, which are traffic analysis of the vehicular travel times along the corridor, transit travel times, intersection performance, and network performance. The test bed for the research is a 5-mile long BRT line planned for implementation along the 5600 W corridor from 2700 S to 6200 S Street for the target year 2030. This study uses VISSIM simulation models to estimate BRT operations, as well as impacts that BRT and TSP implementations will have on transit and general purpose traffic.

The scenario with the most negative impacts for the corridor is if no action is taken, which would bring major deteriorations of traffic conditions. Minor improvements, such as prohibited mid-block left turns, longer left and right turn lanes at intersections, and signal optimization would improve traffic conditions. Once the planned design changes are implemented, the major improvement in traffic conditions can be seen over the No Action alternative. The implemented TSP strategy, which allows 10 seconds of extra time for the BRT vehicles, brings certain improvements to BRT operations, with no impacts on the overall traffic. The different analyses, which were performed in this study, justify the implementation of the TSP strategy, and the design changes that should be performed along the corridor.

Future work on this project should follow any new design or operational changes, as well as to be reanalyzed with any new data that will emerge during the process. The results from this research should serve as a starting point in the transit planning decision-making process.

8. REFERENCES

1. Center for Urban Transportation Research, National BRT Institute, *What is Bus Rapid Transit?* University of South Florida, Tampa, Florida. www.nbrti.org/. Accessed October 01, 2009.
2. Levinson, H. et al. *Case Studies in Bus Rapid Transit*. TCRP Report. 2003.
3. Menckhoff, G. *BRT: Latin American Experience Using Lessons Learned*. TRB/APTA Bus Rapid Transit Conference. 2004.
4. Cain, A. et al. *Applicability of Bogotá's TransMilenio BRT System to the United States – Final Report*. 2006.
5. Callaghan, L. and W. Vincent. *Preliminary Evaluation of Metro Orange Line Bus Rapid Transit Project*. Transportation Research Record 2034. Washington, D.C. 2007.
6. Transport Canada, IBI Group and Trans Link. *98 B-Line Bus Rapid Transit Evaluation Study*. 2003.
7. Levinson, H. et al. "Bus Rapid Transit, Vol. 1: Case Studies in Bus Rapid Transit." *Transit Cooperative Research Program Report, No. 90*, Transportation Research Board of the National Academies, Washington, D.C. 2003
8. Smith, H. R., B. Hemily, and M. Ivanovic. *Transit Signal Priority (TSP): A Planning and Implementation Handbook*. Intelligent Transportation Society of America. 2005.
9. Garrow, M. and R. Machemehl, *Development and evaluation of transit signal priority strategies.* Research Report SWUTC/97/472840-00068-1. Center for Transportation Research, University of Texas, Austin, Tex. 1997.
10. Ludwick, J. S. "Simulation of an Unconditional Preemption Bus Priority System." *Transportation Research Record: Journal of the Transportation Research Board*, No. 536. Transportation Research Board of the National Academies, Washington, D.C. 1975. pp. 1–10.
11. U.S. Department of Transportation. *Intelligent Transportation Systems. 2006 National Summary*. http://www.its.dot.gov/. 2006.
12. Gifford, J., D. Pelletiere, and J. Collura. "An Analysis of the Issues, Concerns, Needs and Requirements Associated with Traffic Signal Preemption and Priority in the Washington D.C. Region." *Proceedings of the 11th ITS America Meeting: ITS connecting the Americas*. Miami Beach, Florida. 2001. pp. 19.
13. Kamdar, V. "Evaluating the Transit Signal Priority Impacts along the U.S. 1 Corridor in Northern Virginia." Master's Thesis, Virginia Polytechnic Institute and State University, Falls Church, Virginia. 2004.
14. Wasatch Front Regional Council. Regional Transportation Plan: 2007 – 2030 (2030 RTP). 2007. http:\\www.wfrc.org
15. Utah Department of Transportation. *Projects and Studies*. www.udot.utah.gov
16. Utah Transit Authority. *Projects/Programs – 5600 West BRT Project*. www.rideuta.com
17. Transportation Research Board of the National Academies. *Highway Capacity Manual*, Washington, D.C. 2000
18. Federal Transit Administration, and U.S. Department of Transportation. *Characteristics of Bus Rapid Transit for Decision Making*. 2004.

ANNEX A

Vehicular Travel Times, Speed, and Level of Service along the Main Arterial

Table 9.1 Vehicular Travel Times, Speed, and Level of Service along the Main Arterial

Segment/Scenario Southbound	Length (miles)	2009			2030 NO ACTION			2030 MINOR IMPROVEMENTS		
		TT (s)	V (mph)	LOS	TT (s)	V (mph)	LOS	TT (s)	V (mph)	LOS
2700 S - 3100 S	0.50	117.6	15.3	E	376.9	4.8	F	184.1	9.8	F
3100 S - 3500 S	0.50	84.2	21.4	D	357.3	5.0	F	351.0	5.1	F
3500 S - 4100 S	1.00	140.0	25.7	C	104.1	34.6	B	100.4	35.8	A
4100 S - 4700 S	1.00	106.2	33.9	B	117.8	30.5	B	117.5	30.6	B
4700 S - 5400 S	1.00	124.3	29.1	B	120.1	30.1	B	117.6	30.7	B
5400 S - 6200 S	1.00	103.6	34.8	B	270.4	13.3	E	182.6	19.8	D
Total	**5.00**	**675.9**	**26.7**	**C**	**1346.6**	**13.4**	**E**	**1053.3**	**17.1**	**D**

Segment/Scenario Southbound	Length (miles)	2030 NO TSP			2030 TSP		
		TT (s)	V (mph)	LOS	TT (s)	V (mph)	LOS
2700 S - 3100 S	0.50	112.1	16.1	D	106.7	16.9	D
3100 S - 3500 S	0.50	222.7	8.1	F	189.2	9.5	F
3500 S - 4100 S	1.00	124.4	28.9	B	125.0	28.8	B
4100 S - 4700 S	1.00	122.7	29.3	B	121.6	29.6	B
4700 S - 5400 S	1.00	133.1	27.1	B	132.7	27.2	B
5400 S - 6200 S	1.00	223.6	16.1	D	218.8	16.5	D
Total	**5.00**	**938.5**	**19.2**	**C**	**894.0**	**20.2**	**C**

Table 9.1 Vehicular Travel Times, Speed, and Level of Service along the Main Arterial (continued)

Segment/Scenario Northbound	Length (miles)	2009			2030 NO ACTION			2030 MINOR IMPROVEMENTS		
		TT (s)	V (mph)	LOS	TT (s)	V (mph)	LOS	TT (s)	V (mph)	LOS
6200 S - 5400 S	1.00	116.3	31.0	B	133.7	27.0	C	129.8	27.8	C
5400 S - 4700 S	1.00	109.3	33.1	B	126.5	28.6	B	132.1	27.4	C
4700 S - 4100 S	1.00	141.6	25.4	C	135.1	26.6	C	128.9	27.9	C
4100 S - 3500 S	1.00	95.2	37.8	A	151.8	23.7	C	154.9	23.2	C
3500 S - 3100 S	0.50	79.1	22.8	C	57.4	31.4	B	55.2	32.6	B
3100 S - 2700 S	0.50	55.2	32.6	B	71.7	25.1	C	76.0	23.7	C
Total	**5.00**	**596.7**	**30.2**	**B**	**676.2**	**26.6**	**C**	**676.8**	**26.6**	**C**

Segment/Scenario Northbound	Length (miles)	2030 NO TSP			2030 TSP		
		TT (s)	V (mph)	LOS	TT (s)	V (mph)	LOS
6200 S - 5400 S	1.00	132.0	27.3	B	132.0	27.3	B
5400 S - 4700 S	1.00	119.8	30.2	A	121.4	29.8	B
4700 S - 4100 S	1.00	133.4	27.0	B	132.5	27.1	B
4100 S - 3500 S	1.00	160.6	22.4	C	160.3	22.5	C
3500 S - 3100 S	0.50	70.9	25.4	B	71.3	25.3	B
3100 S - 2700 S	0.50	63.6	28.3	B	63.0	28.6	B
Total	**5.00**	**680.3**	**26.5**	**B**	**680.4**	**26.5**	**B**

ANNEX B
Intersection Measures of Effectiveness

Table 9.2 Intersection Measures of Effectiveness: 2009

Node	Time period	Number of vehicles	Number of persons	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
2700 S	4:00 - 4:15	860	1031	17.7	12.5	17.8	0.81	13.8	326.5
	4:15 - 4:30	917	1099	19.4	13.7	19.2	0.90	16.7	385.4
	4:30 - 4:45	952	1136	18.8	13.0	18.8	0.86	15.5	371.8
	4:45 - 5:00	868	1047	17.4	11.9	17.3	0.82	18.3	402.3
	5:00 - 5:15	904	1090	18.9	12.9	18.8	0.86	20.3	504.9
	5:15 - 5:30	972	1165	19.5	13.1	19.2	0.84	20.4	506.0
	5:30 - 5:45	936	1121	20.6	13.6	20.8	0.92	22.7	500.6
	5:45 - 6:00	820	980	18.0	12.2	18.1	0.86	16.6	395.3
3100 S	4:00 - 4:15	1065	1267	43.7	31.8	43.6	1.11	121.4	768.9
	4:15 - 4:30	1032	1241	45.6	33.6	45.5	1.19	121.4	749.1
	4:30 - 4:45	1050	1254	44.0	32.5	43.9	1.17	107.4	766.3
	4:45 - 5:00	1037	1243	43.5	32.0	43.7	1.12	128.8	773.1
	5:00 - 5:15	1016	1221	44.2	33.2	44.1	1.06	123.9	761.4
	5:15 - 5:30	1055	1264	44.8	33.5	44.4	1.09	150.8	775.9
	5:30 - 5:45	1071	1280	50.3	37.5	50.1	1.19	160.6	777.4
	5:45 - 6:00	1065	1275	46.5	34.7	46.6	1.11	139.6	772.6
3500 S	4:00 - 4:15	910	1093	21.4	15.7	21.3	0.69	61.2	369.8
	4:15 - 4:30	929	1120	25.8	19.2	25.8	0.79	66.0	377.1
	4:30 - 4:45	940	1120	23.3	17.3	23.5	0.71	60.1	342.4
	4:45 - 5:00	908	1090	22.9	17.1	22.9	0.73	64.9	394.5
	5:00 - 5:15	929	1116	24.9	19.0	24.9	0.74	70.0	394.7
	5:15 - 5:30	949	1136	24.7	18.9	24.8	0.69	76.6	398.8
	5:30 - 5:45	952	1138	26.8	20.8	26.8	0.77	72.9	395.6
	5:45 - 6:00	981	1168	28.2	21.4	28.3	0.78	89.8	399.6
4100 S	4:00 - 4:15	1108	1324	36.6	25.5	36.4	0.99	72.5	612.0
	4:15 - 4:30	1107	1333	40.7	28.7	40.5	1.05	86.7	603.6
	4:30 - 4:45	1102	1314	38.7	26.9	38.5	1.05	76.6	566.9
	4:45 - 5:00	1036	1240	41.5	29.2	41.3	1.07	84.2	529.1
	5:00 - 5:15	1122	1348	42.0	28.8	41.9	1.11	85.6	686.1
	5:15 - 5:30	1178	1409	46.7	32.2	46.4	1.14	107.0	691.5
	5:30 - 5:45	1111	1328	44.4	30.7	44.2	1.13	92.0	685.6
	5:45 - 6:00	1131	1352	46.3	32.1	46.2	1.16	106.8	680.1

Table 9.2 Intersection Measures of Effectiveness: 2009 (continued)

Node	Time period	Number of vehicles	Number of persons	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4700 S	4:00 - 4:15	734	878	20.9	14.8	20.9	0.78	17.7	332.1
	4:15 - 4:30	707	846	21.0	14.7	20.9	0.76	20.4	287.0
	4:30 - 4:45	832	995	24.9	17.3	24.8	0.86	29.3	328.8
	4:45 - 5:00	680	815	22.1	15.3	21.8	0.80	21.0	364.3
	5:00 - 5:15	864	1036	25.9	17.4	25.8	0.87	33.7	718.1
	5:15 - 5:30	831	988	30.8	20.5	30.8	0.96	39.1	820.5
	5:30 - 5:45	797	953	25.7	17.7	25.6	0.84	26.2	455.0
	5:45 - 6:00	739	883	24.0	16.6	23.7	0.86	23.2	372.4
5400 S	4:00 - 4:15	773	931	21.4	14.4	21.3	0.78	25.1	262.8
	4:15 - 4:30	757	911	21.5	14.7	21.4	0.78	25.8	291.8
	4:30 - 4:45	815	974	22.2	15.1	21.9	0.80	29.3	310.4
	4:45 - 5:00	762	914	21.8	14.8	21.7	0.77	25.9	276.1
	5:00 - 5:15	865	1039	22.9	15.3	22.9	0.82	30.8	365.6
	5:15 - 5:30	876	1044	23.8	16.0	23.7	0.87	31.4	392.7
	5:30 - 5:45	828	989	22.1	15.0	22.0	0.79	27.8	332.1
	5:45 - 6:00	877	1048	23.8	16.1	23.7	0.86	31.7	394.3
6200 S	4:00 - 4:15	622	745	21.2	15.1	21.0	0.72	22.9	392.9
	4:15 - 4:30	684	825	22.7	16.3	22.7	0.75	27.4	418.5
	4:30 - 4:45	706	848	24.0	17.1	24.0	0.79	27.3	404.8
	4:45 - 5:00	711	855	23.0	16.2	22.7	0.75	25.9	369.7
	5:00 - 5:15	776	931	24.0	16.9	24.1	0.80	30.5	496.1
	5:15 - 5:30	809	969	26.6	18.9	26.5	0.83	35.4	491.9
	5:30 - 5:45	796	950	26.6	18.6	26.5	0.86	33.5	477.7
	5:45 - 6:00	811	971	23.9	16.8	23.7	0.73	31.0	521.0

Table 9.3 Intersection Measures of Effectiveness: 2030 No Action

Node	Time period	Number of vehicles	Number of persons	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
2700 S	4:00 - 4:15	1136	1364	26.2	17.8	26.1	1.01	60.3	417.1
	4:15 - 4:30	1102	1318	30.7	20.6	30.6	1.15	67.3	638.4
	4:30 - 4:45	980	1173	77.5	51.2	77.4	2.39	174.8	1661.7
	4:45 - 5:00	919	1105	149.2	96.0	149.0	4.14	313.6	1995.5
	5:00 - 5:15	908	1081	187.1	121.8	186.5	5.04	391.2	1994.1
	5:15 - 5:30	920	1105	182.7	117.1	181.8	4.96	395.0	1995.9
	5:30 - 5:45	908	1086	190.2	123.1	189.6	5.11	402.2	1994.9
	5:45 - 6:00	862	1033	190.2	125.3	189.8	4.95	426.0	1996.0
3100 S	4:00 - 4:15	1079	1290	42.7	32.2	42.5	1.01	108.3	740.2
	4:15 - 4:30	1033	1238	64.3	49.6	64.2	1.33	178.5	769.1
	4:30 - 4:45	1001	1203	69.6	54.6	69.5	1.35	197.7	768.1
	4:45 - 5:00	986	1176	68.8	53.6	68.7	1.36	193.3	767.8
	5:00 - 5:15	987	1181	70.2	54.7	70.1	1.38	193.2	767.7
	5:15 - 5:30	977	1169	71.6	56.3	71.5	1.37	196.8	770.3
	5:30 - 5:45	994	1190	70.7	55.4	70.6	1.35	197.2	771.1
	5:45 - 6:00	974	1172	71.7	56.2	71.7	1.36	199.2	768.8
3500 S	4:00 - 4:15	1446	1728	109.2	72.9	108.9	2.69	667.3	2037.7
	4:15 - 4:30	1487	1777	114.8	76.6	114.5	2.84	699.7	2042.8
	4:30 - 4:45	1460	1746	114.2	76.7	114.1	2.84	683.9	2039.0
	4:45 - 5:00	1468	1754	110.3	74.0	110.1	2.76	674.5	2041.9
	5:00 - 5:15	1451	1736	110.7	73.5	110.6	2.76	678.2	2039.6
	5:15 - 5:30	1472	1760	109.7	73.5	109.8	2.74	665.8	2039.3
	5:30 - 5:45	1469	1761	111.5	74.7	111.4	2.80	679.7	2042.0
	5:45 - 6:00	1500	1787	112.5	74.1	112.3	2.86	702.6	2039.2
4100 S	4:00 - 4:15	1346	1611	46.2	32.4	46.0	1.23	123.5	726.6
	4:15 - 4:30	1305	1559	44.8	31.4	44.7	1.20	116.6	705.1
	4:30 - 4:45	1312	1571	48.8	34.0	48.6	1.30	133.5	746.2
	4:45 - 5:00	1292	1546	45.1	31.7	44.9	1.18	111.9	723.9
	5:00 - 5:15	1326	1582	44.4	30.9	44.2	1.20	112.3	686.3
	5:15 - 5:30	1276	1528	43.5	30.3	43.2	1.19	103.8	649.7
	5:30 - 5:45	1259	1504	42.7	29.8	42.7	1.14	106.0	653.2
	5:45 - 6:00	1276	1525	44.1	30.9	44.1	1.18	110.0	719.5

Table 9.3 Intersection Measures of Effectiveness: 2030 No Action (continued)

Node	Time period	Number of vehicles	Number of persons	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4700 S	4:00 - 4:15	1167	1395	62.0	40.5	61.8	1.67	157.9	1221.0
	4:15 - 4:30	1149	1375	57.1	37.0	56.6	1.59	144.6	1219.4
	4:30 - 4:45	1151	1383	56.9	36.6	56.7	1.59	145.1	1220.5
	4:45 - 5:00	1137	1362	54.0	34.9	53.7	1.54	134.4	1220.7
	5:00 - 5:15	1153	1385	55.4	35.8	55.2	1.56	139.4	1220.8
	5:15 - 5:30	1121	1342	57.4	37.5	57.3	1.58	143.5	1219.9
	5:30 - 5:45	1120	1343	56.0	36.6	55.6	1.54	138.5	1221.3
	5:45 - 6:00	1098	1319	55.8	36.0	55.5	1.58	142.5	1223.1
5400 S	4:00 - 4:15	1364	1638	36.0	25.6	35.9	1.01	88.2	634.1
	4:15 - 4:30	1342	1611	36.2	25.7	36.0	1.03	88.5	617.5
	4:30 - 4:45	1336	1602	35.7	25.3	35.7	1.01	87.9	597.2
	4:45 - 5:00	1349	1619	34.6	24.6	34.5	1.00	82.8	612.7
	5:00 - 5:15	1334	1601	35.1	25.0	34.9	1.02	82.1	589.3
	5:15 - 5:30	1341	1607	36.6	26.3	36.3	1.02	87.9	629.2
	5:30 - 5:45	1302	1561	34.8	24.7	34.6	0.99	85.1	582.9
	5:45 - 6:00	1330	1594	36.4	25.9	36.1	1.03	88.3	605.8
6200 S	4:00 - 4:15	1324	1590	74.7	42.3	74.5	2.04	287.6	2103.1
	4:15 - 4:30	1357	1632	86.4	49.0	86.1	2.30	426.6	2161.5
	4:30 - 4:45	1344	1615	96.6	50.6	96.3	2.63	500.2	2243.2
	4:45 - 5:00	1342	1616	100.4	52.4	100.1	2.76	578.9	2344.6
	5:00 - 5:15	1348	1622	108.3	55.1	108.0	2.99	658.2	2390.5
	5:15 - 5:30	1353	1629	117.2	56.3	117.0	3.22	742.7	2532.6
	5:30 - 5:45	1346	1604	125.3	60.8	124.9	3.49	798.7	2547.5
	5:45 - 6:00	1345	1617	128.5	60.6	128.1	3.64	820.5	2584.1

Table 9.4 Intersection Measures of Effectiveness: 2030 Minor Improvements

Node	Time period	Number of vehicles	Number of persons	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
2700 S	4:00 - 4:15	1168	1400	21.7	15.1	21.6	0.80	56.3	431.3
	4:15 - 4:30	1163	1394	21.0	14.4	20.8	0.79	55.4	462.3
	4:30 - 4:45	1155	1383	20.3	14.0	20.1	0.77	53.5	429.0
	4:45 - 5:00	1155	1388	21.4	14.8	21.2	0.81	56.8	448.7
	5:00 - 5:15	1154	1382	22.6	15.5	22.5	0.83	54.9	401.9
	5:15 - 5:30	1151	1382	26.8	17.9	26.6	0.99	60.8	535.6
	5:30 - 5:45	1117	1337	41.4	27.2	41.1	1.43	87.5	890.2
	5:45 - 6:00	1070	1281	65.4	42.2	65.3	2.17	138.0	1291.9
3100 S	4:00 - 4:15	1278	1528	30.3	24.0	30.0	0.79	56.8	355.1
	4:15 - 4:30	1255	1501	32.2	24.8	32.2	0.84	54.2	350.3
	4:30 - 4:45	1228	1474	43.1	31.9	42.8	1.14	88.0	470.2
	4:45 - 5:00	1190	1427	59.7	43.0	59.9	1.55	191.5	1033.6
	5:00 - 5:15	1202	1437	78.0	56.2	77.7	1.91	349.1	1600.0
	5:15 - 5:30	1175	1410	93.1	66.4	93.0	2.31	506.5	2109.2
	5:30 - 5:45	1197	1434	106.5	76.9	106.3	2.57	651.9	2459.7
	5:45 - 6:00	1214	1456	113.1	81.6	113.1	2.72	774.1	2626.3
3500 S	4:00 - 4:15	1592	1906	102.3	73.1	102.2	2.40	611.8	2037.0
	4:15 - 4:30	1605	1922	134.6	95.3	134.2	3.12	676.8	2036.2
	4:30 - 4:45	1592	1905	143.6	100.2	143.4	3.42	664.1	2035.5
	4:45 - 5:00	1578	1892	152.7	105.7	152.2	3.60	683.3	2039.4
	5:00 - 5:15	1591	1903	153.0	105.8	152.8	3.66	674.5	2038.0
	5:15 - 5:30	1592	1910	152.2	106.1	152.2	3.54	670.3	2037.8
	5:30 - 5:45	1609	1927	152.4	105.5	152.1	3.65	674.9	2036.1
	5:45 - 6:00	1638	1958	151.4	105.4	151.2	3.58	679.7	2037.7
4100 S	4:00 - 4:15	1416	1692	31.2	21.3	31.0	0.88	69.2	491.6
	4:15 - 4:30	1403	1679	31.5	21.4	31.1	0.90	67.7	490.4
	4:30 - 4:45	1405	1682	32.5	22.4	32.2	0.93	69.2	460.0
	4:45 - 5:00	1388	1664	30.8	20.9	30.7	0.86	66.1	472.9
	5:00 - 5:15	1425	1702	32.4	22.0	32.1	0.94	69.7	502.8
	5:15 - 5:30	1385	1662	32.3	22.0	31.9	0.94	70.2	476.0
	5:30 - 5:45	1370	1638	31.8	21.7	31.7	0.91	68.6	483.0
	5:45 - 6:00	1397	1671	32.6	22.1	32.4	0.91	70.7	488.1

Table 9.4 Intersection Measures of Effectiveness: 2030 Minor Improvements (continued)

Node	Time period	Number of vehicles	Number of persons	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4700 S	4:00 - 4:15	1274	1527	41.5	27.4	41.3	1.26	104.7	1123.9
	4:15 - 4:30	1262	1512	40.4	26.5	40.1	1.26	97.9	1125.2
	4:30 - 4:45	1262	1513	43.9	29.0	43.7	1.34	111.2	1213.5
	4:45 - 5:00	1243	1490	39.5	26.1	39.3	1.24	90.6	1049.9
	5:00 - 5:15	1295	1554	39.1	25.5	38.8	1.23	92.3	1046.4
	5:15 - 5:30	1262	1511	38.5	25.0	38.2	1.21	88.8	1099.7
	5:30 - 5:45	1253	1500	36.1	23.6	35.9	1.17	77.2	1033.2
	5:45 - 6:00	1244	1488	37.7	24.6	37.3	1.20	87.7	1043.3
5400 S	4:00 - 4:15	1417	1707	32.8	22.6	32.6	0.98	68.0	619.2
	4:15 - 4:30	1398	1678	32.1	21.9	31.9	0.97	66.4	574.8
	4:30 - 4:45	1400	1674	31.4	21.3	31.4	0.94	63.9	601.8
	4:45 - 5:00	1403	1680	31.3	21.4	31.2	0.93	64.2	579.0
	5:00 - 5:15	1420	1703	32.4	22.2	32.1	0.96	66.6	597.9
	5:15 - 5:30	1416	1694	32.6	22.4	32.3	0.97	66.8	572.6
	5:30 - 5:45	1384	1657	31.3	21.4	31.1	0.94	64.2	525.2
	5:45 - 6:00	1411	1690	31.9	21.9	31.6	0.96	67.0	623.0
6200 S	4:00 - 4:15	1456	1751	42.4	28.5	42.4	1.27	112.8	1214.5
	4:15 - 4:30	1451	1742	44.3	29.8	43.9	1.31	119.3	1220.9
	4:30 - 4:45	1452	1742	53.4	36.3	53.1	1.49	168.6	1384.6
	4:45 - 5:00	1479	1771	55.2	35.5	54.9	1.58	190.2	1378.5
	5:00 - 5:15	1470	1769	52.5	35.0	52.3	1.49	177.8	1357.9
	5:15 - 5:30	1484	1780	57.4	36.9	57.1	1.61	215.8	1431.6
	5:30 - 5:45	1470	1755	56.7	37.4	56.3	1.62	200.3	1316.9
	5:45 - 6:00	1462	1754	53.4	35.7	53.2	1.52	179.7	1431.6

Table 9.5 Intersection Measures of Effectiveness: 2030 No TSP

Node	Time period	Number of vehicles	Number of persons	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
2700 S	4:00 - 4:15	1133	1459	31.5	22.6	31.6	0.77	50.8	553.0
	4:15 - 4:30	1127	1413	30.3	22.1	30.3	0.73	52.4	606.1
	4:30 - 4:45	1128	1432	30.2	21.6	30.1	0.73	48.4	568.2
	4:45 - 5:00	1129	1416	27.9	20.0	27.7	0.69	44.9	543.2
	5:00 - 5:15	1126	1439	29.5	21.2	29.6	0.71	44.8	528.8
	5:15 - 5:30	1144	1423	29.6	20.9	29.6	0.75	45.9	501.1
	5:30 - 5:45	1122	1443	30.6	22.2	30.7	0.73	46.0	569.3
	5:45 - 6:00	1095	1355	32.0	22.8	31.9	0.76	48.7	638.2
3100 S	4:00 - 4:15	1122	1436	58.8	48.6	59.0	1.06	148.1	728.5
	4:15 - 4:30	1137	1418	70.0	57.9	69.7	1.29	155.3	744.0
	4:30 - 4:45	1110	1411	78.6	65.2	78.6	1.51	154.9	737.8
	4:45 - 5:00	1120	1398	77.2	64.2	77.1	1.46	155.6	743.8
	5:00 - 5:15	1113	1418	74.8	61.2	74.4	1.45	154.2	721.8
	5:15 - 5:30	1119	1395	77.4	63.7	77.6	1.43	158.9	737.0
	5:30 - 5:45	1118	1422	83.1	68.6	83.2	1.58	164.2	745.7
	5:45 - 6:00	1098	1373	83.0	68.1	82.6	1.61	166.4	720.6
3500 S	4:00 - 4:15	1594	1986	88.5	61.9	88.5	2.14	500.3	2000.6
	4:15 - 4:30	1608	2052	112.8	80.4	112.8	2.76	601.7	1999.7
	4:30 - 4:45	1603	2007	125.2	91.5	125.3	2.88	644.0	1997.5
	4:45 - 5:00	1614	2044	128.7	93.3	128.3	2.99	678.0	2002.7
	5:00 - 5:15	1608	2011	133.7	96.5	133.2	3.13	656.6	2000.7
	5:15 - 5:30	1633	2080	129.7	93.4	129.4	3.10	672.1	1998.8
	5:30 - 5:45	1625	2037	137.0	99.6	137.1	3.22	701.0	2011.1
	5:45 - 6:00	1615	2045	137.7	100.5	137.4	3.14	691.7	2005.2
4100 S	4:00 - 4:15	1345	1670	35.9	25.5	35.9	0.87	78.5	585.4
	4:15 - 4:30	1357	1738	37.4	26.9	37.1	0.90	80.2	540.9
	4:30 - 4:45	1356	1680	35.7	25.3	35.6	0.87	74.0	537.0
	4:45 - 5:00	1334	1716	37.8	27.3	37.7	0.89	84.7	529.5
	5:00 - 5:15	1330	1653	36.3	25.9	36.2	0.87	76.8	537.2
	5:15 - 5:30	1352	1727	36.4	26.0	36.3	0.87	76.6	517.6
	5:30 - 5:45	1325	1671	35.3	24.9	35.2	0.87	75.9	578.9
	5:45 - 6:00	1365	1706	37.3	26.7	37.1	0.88	80.5	568.3

Table 9.5 Intersection Measures of Effectiveness: 2030 No TSP (continued)

Node	Time period	Number of vehicles	Number of persons	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4700 S	4:00 - 4:15	1221	1601	51.8	38.3	51.6	1.10	117.6	1142.1
	4:15 - 4:30	1213	1525	53.2	39.2	53.3	1.13	126.7	1209.8
	4:30 - 4:45	1232	1614	57.4	42.7	57.2	1.18	136.0	1212.0
	4:45 - 5:00	1219	1529	55.0	41.2	54.9	1.12	122.9	1209.5
	5:00 - 5:15	1264	1655	55.1	41.0	55.0	1.17	119.6	1039.3
	5:15 - 5:30	1219	1526	52.8	39.3	52.7	1.11	112.3	1160.5
	5:30 - 5:45	1237	1589	54.0	40.0	53.8	1.13	122.0	1191.5
	5:45 - 6:00	1217	1560	56.5	42.1	56.5	1.16	131.6	1188.6
5400 S	4:00 - 4:15	1352	1723	42.2	32.1	42.1	0.89	76.0	536.7
	4:15 - 4:30	1375	1756	45.0	34.6	45.1	0.93	78.0	576.0
	4:30 - 4:45	1368	1731	42.9	32.9	43.0	0.91	74.8	613.8
	4:45 - 5:00	1357	1744	41.8	32.0	41.9	0.86	74.7	577.3
	5:00 - 5:15	1371	1715	44.9	34.5	45.1	0.92	81.3	631.3
	5:15 - 5:30	1387	1813	45.4	35.0	45.2	0.91	82.6	632.7
	5:30 - 5:45	1361	1698	42.3	32.2	41.9	0.89	77.8	585.1
	5:45 - 6:00	1383	1804	43.6	33.3	43.5	0.90	76.1	605.1
6200 S	4:00 - 4:15	1417	1766	59.3	45.2	59.1	1.18	101.5	902.3
	4:15 - 4:30	1447	1816	70.5	55.2	70.3	1.33	128.2	954.8
	4:30 - 4:45	1440	1848	90.8	72.5	90.6	1.61	169.8	1249.4
	4:45 - 5:00	1446	1862	94.7	75.3	94.8	1.70	179.2	1272.2
	5:00 - 5:15	1437	1803	99.3	80.2	98.9	1.70	174.9	1220.3
	5:15 - 5:30	1441	1866	98.8	78.0	99.1	1.78	227.9	1491.0
	5:30 - 5:45	1431	1783	101.4	81.2	101.4	1.78	258.4	1590.0
	5:45 - 6:00	1462	1848	108.7	86.8	108.8	1.91	251.9	1557.0

Table 9.6 Intersection Measures of Effectiveness: 2030 TSP

Node	Time period	Number of vehicles	Number of persons	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
2700 S	4:00 - 4:15	1131	1454	30.9	22.2	30.9	0.76	50.6	545.4
	4:15 - 4:30	1126	1411	29.8	21.6	29.7	0.72	51.1	604.5
	4:30 - 4:45	1129	1435	30.3	21.7	30.2	0.73	48.7	531.1
	4:45 - 5:00	1130	1418	28.3	20.4	28.2	0.68	45.8	532.5
	5:00 - 5:15	1123	1432	29.8	21.4	29.8	0.73	45.5	498.4
	5:15 - 5:30	1145	1423	30.1	21.3	30.1	0.76	46.4	529.8
	5:30 - 5:45	1124	1451	29.2	21.3	29.2	0.70	47.2	571.1
	5:45 - 6:00	1099	1362	31.4	22.5	31.4	0.76	47.7	611.8
3100 S	4:00 - 4:15	1126	1439	56.4	46.8	56.5	1.01	148.2	722.8
	4:15 - 4:30	1134	1419	69.6	57.3	69.5	1.36	154.8	737.8
	4:30 - 4:45	1110	1407	75.9	62.9	76.1	1.49	146.3	728.9
	4:45 - 5:00	1117	1396	77.5	64.7	77.6	1.43	156.0	745.1
	5:00 - 5:15	1116	1421	74.8	62.0	74.7	1.38	152.4	723.8
	5:15 - 5:30	1118	1398	73.0	60.6	72.8	1.36	153.8	695.1
	5:30 - 5:45	1116	1419	83.7	69.6	83.8	1.55	167.8	743.8
	5:45 - 6:00	1107	1384	86.6	72.4	86.4	1.60	170.4	728.7
3500 S	4:00 - 4:15	1576	1954	90.0	63.2	90.0	2.18	499.4	1998.0
	4:15 - 4:30	1604	2053	111.0	78.7	110.9	2.68	601.3	1999.1
	4:30 - 4:45	1606	2008	124.0	90.2	123.8	2.86	645.6	1997.2
	4:45 - 5:00	1609	2033	124.7	89.8	124.3	2.92	677.7	2000.2
	5:00 - 5:15	1601	2000	133.0	96.3	133.0	3.08	665.0	2002.5
	5:15 - 5:30	1641	2085	129.4	93.8	129.2	3.06	680.8	1999.8
	5:30 - 5:45	1613	2026	130.0	94.6	129.8	2.98	704.8	2002.9
	5:45 - 6:00	1613	2036	145.1	106.6	145.0	3.30	697.1	2003.6
4100 S	4:00 - 4:15	1346	1667	34.8	24.6	34.8	0.84	78.0	592.1
	4:15 - 4:30	1358	1746	35.9	25.4	35.8	0.87	78.4	539.0
	4:30 - 4:45	1365	1690	35.0	24.6	34.9	0.87	74.5	547.7
	4:45 - 5:00	1336	1711	37.0	26.5	37.0	0.90	82.6	508.9
	5:00 - 5:15	1329	1661	36.1	25.5	36.0	0.90	77.6	543.6
	5:15 - 5:30	1357	1729	35.6	25.3	35.4	0.85	76.2	514.3
	5:30 - 5:45	1317	1645	35.8	25.4	35.8	0.88	76.4	576.9
	5:45 - 6:00	1368	1727	36.0	25.5	35.7	0.87	81.0	580.1

Table 9.6 Intersection Measures of Effectiveness: 2030 TSP (continued)

Node	Time period	Number of vehicles	Number of persons	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4700 S	4:00 - 4:15	1202	1577	54.6	40.6	54.4	1.14	125.8	1138.9
	4:15 - 4:30	1219	1547	57.3	42.5	57.3	1.21	139.6	1142.3
	4:30 - 4:45	1218	1587	64.9	49.3	64.7	1.29	157.9	1214.4
	4:45 - 5:00	1230	1546	62.8	48.0	62.7	1.23	143.3	1196.3
	5:00 - 5:15	1261	1637	67.5	51.5	67.3	1.34	155.7	1118.2
	5:15 - 5:30	1213	1519	60.7	45.9	60.6	1.22	138.0	1170.5
	5:30 - 5:45	1232	1613	63.3	48.0	63.2	1.25	148.9	1199.1
	5:45 - 6:00	1218	1526	62.5	47.1	62.5	1.25	151.6	1200.3
5400 S	4:00 - 4:15	1349	1743	44.9	34.3	44.8	0.95	78.6	523.4
	4:15 - 4:30	1371	1735	43.9	33.6	44.0	0.92	79.5	548.7
	4:30 - 4:45	1367	1747	43.5	33.3	43.6	0.92	79.3	586.9
	4:45 - 5:00	1366	1740	40.7	30.9	40.6	0.87	74.5	610.0
	5:00 - 5:15	1368	1712	43.8	33.5	43.6	0.91	82.1	626.4
	5:15 - 5:30	1381	1792	48.8	37.9	48.5	0.97	83.7	620.2
	5:30 - 5:45	1366	1705	41.2	31.2	41.2	0.90	78.8	588.3
	5:45 - 6:00	1375	1798	44.5	34.2	44.3	0.93	76.1	608.5
6200 S	4:00 - 4:15	1416	1764	58.1	44.2	58.0	1.16	99.2	895.8
	4:15 - 4:30	1444	1866	68.3	52.9	68.1	1.28	132.1	997.1
	4:30 - 4:45	1444	1805	84.6	67.0	84.4	1.52	159.0	1230.0
	4:45 - 5:00	1451	1880	89.6	70.8	89.6	1.70	172.9	1253.7
	5:00 - 5:15	1449	1810	91.0	72.5	91.0	1.65	180.4	1283.3
	5:15 - 5:30	1440	1866	98.3	77.6	98.5	1.80	237.6	1544.5
	5:30 - 5:45	1421	1769	97.7	77.6	97.6	1.77	243.4	1516.3
	5:45 - 6:00	1462	1859	105.6	84.1	105.7	1.87	248.4	1501.5

ANNEX C
Intersection Movement Measures of Effectiveness

Table 9.7a Intersection 2700S: 2009

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	2.1	0.3	2.1	0.28	0.1	14.7
		NBT	10.5	4.3	10.5	0.46	16.3	146.7
		NBL	22.5	14.6	23.0	1.77	8.0	74.6
		SBR	6.5	0.2	6.4	0.40	2.9	67.5
		SBT	14.1	5.5	13.9	0.40	46.5	326.5
		SBL	11.9	6.6	11.9	0.86	0.8	23.5
		EBR	12.6	5.6	12.7	1.19	2.6	66.0
		EBT	22.8	20.4	23.5	0.66	4.5	69.9
		EBL	27.2	21.5	27.5	0.77	25.0	157.1
		WBR	7.5	2.0	7.6	1.21	10.0	109.4
		WBT	38.1	35.4	38.2	0.88	25.3	125.1
		WBL	36.0	33.2	36.6	0.86	23.5	123.7
4:15	4:30	NBR	3.1	0.1	3.0	0.51	0.2	26.6
		NBT	10.8	4.6	11.0	0.48	18.3	174.5
		NBL	27.2	19.7	26.0	1.84	6.0	59.3
		SBR	7.6	0.4	7.3	0.41	3.6	88.9
		SBT	16.2	5.9	16.0	0.43	59.2	385.4
		SBL	18.3	10.7	18.0	1.48	1.2	31.8
		EBR	15.6	8.0	15.5	1.12	4.3	73.7
		EBT	25.8	23.0	25.5	0.73	6.5	77.5
		EBL	30.0	24.1	30.5	0.79	28.6	171.5
		WBR	9.1	3.3	9.3	1.32	16.3	120.7
		WBT	36.0	33.4	35.4	0.87	29.9	127.1
		WBL	33.2	31.0	33.1	0.82	26.5	125.7
4:30	4:45	NBR	3.0	0.4	2.9	0.39	0.0	12.3
		NBT	10.7	4.2	10.6	0.47	18.5	177.0
		NBL	31.9	23.4	32.9	2.11	7.9	71.4
		SBR	8.5	0.5	8.3	0.41	5.9	130.7
		SBT	15.6	5.8	15.5	0.41	55.3	371.8
		SBL	13.8	7.3	14.1	0.99	1.0	26.2
		EBR	13.9	6.9	13.5	1.18	3.9	64.0
		EBT	22.1	19.2	22.7	0.68	6.0	68.2
		EBL	28.8	23.1	29.0	0.77	28.8	153.9
		WBR	9.2	3.3	9.0	1.22	11.6	122.5
		WBT	34.1	30.8	34.4	0.86	24.0	125.5
		WBL	33.6	31.1	32.9	0.88	22.6	124.1

Table 9.7a Intersection 2700S: 2009 (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	2.4	0.1	2.4	0.45	0.0	10.1
		NBT	11.1	5.3	11.1	0.47	15.0	121.0
		NBL	22.4	15.9	20.9	1.57	4.1	49.5
		SBR	9.8	1.1	9.8	0.49	6.6	117.3
		SBT	17.7	7.2	17.5	0.46	66.2	402.3
		SBL	15.2	7.7	15.2	1.01	3.0	45.0
		EBR	14.7	7.8	14.9	1.20	1.8	52.1
		EBT	18.3	16.2	18.1	0.61	3.6	55.8
		EBL	24.8	19.5	25.2	0.74	16.9	135.1
		WBR	7.9	2.3	7.8	1.23	26.2	166.3
		WBT	31.5	28.5	31.6	0.80	39.8	168.9
		WBL	32.9	30.6	33.6	0.82	36.0	167.5
5:00	5:15	NBR	3.2	0.1	3.1	0.52	0.1	15.6
		NBT	10.7	5.3	10.8	0.43	14.0	123.8
		NBL	29.4	22.2	29.1	2.05	8.0	59.6
		SBR	12.0	1.3	11.9	0.52	9.3	163.6
		SBT	19.3	6.8	19.0	0.47	74.1	504.9
		SBL	14.7	7.9	14.3	0.91	1.8	30.3
		EBR	16.4	8.6	16.2	1.23	3.0	57.3
		EBT	21.9	19.4	21.8	0.65	5.2	61.2
		EBL	27.0	21.9	26.9	0.77	17.2	117.6
		WBR	6.6	1.1	6.6	1.10	31.1	177.9
		WBT	33.9	30.4	34.0	0.84	41.8	180.2
		WBL	31.9	29.4	32.3	0.82	37.9	178.8
5:15	5:30	NBR	2.7	0.1	2.5	0.45	0.1	17.2
		NBT	12.0	5.5	11.9	0.49	19.2	152.2
		NBL	50.7	42.3	49.0	2.14	7.3	64.8
		SBR	11.1	1.0	11.0	0.50	8.5	126.8
		SBT	20.3	7.2	20.0	0.49	76.3	506.0
		SBL	15.5	7.6	15.9	1.08	1.8	39.5
		EBR	14.4	6.3	14.8	0.98	2.5	66.0
		EBT	15.5	14.1	14.9	0.55	4.3	69.9
		EBL	21.3	16.3	21.0	0.69	16.2	113.7
		WBR	7.7	1.8	7.5	1.13	28.3	172.0
		WBT	29.9	26.3	29.1	0.80	40.5	174.3
		WBL	32.8	29.1	32.7	0.83	39.2	172.9

Table 9.7a Intersection 2700S: 2009 (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	3.1	0.1	3.1	0.42	0.1	14.7
		NBT	11.6	5.4	11.4	0.46	17.9	149.4
		NBL	31.5	23.6	30.9	2.15	5.7	54.2
		SBR	12.4	1.2	12.3	0.54	9.5	136.3
		SBT	25.3	9.6	24.9	0.60	97.7	500.6
		SBL	20.6	11.3	20.9	1.30	3.7	42.7
		EBR	17.0	7.5	17.3	1.17	1.9	54.4
		EBT	19.0	17.5	20.2	0.61	4.8	58.3
		EBL	29.0	23.0	29.0	0.86	24.4	143.9
		WBR	8.6	2.6	9.0	1.23	28.2	174.1
		WBT	34.3	30.6	35.2	0.83	40.6	176.5
		WBL	35.1	30.2	35.8	0.88	37.4	175.1
5:45	6:00	NBR	3.0	0.1	2.9	0.51	0.1	14.6
		NBT	9.2	4.3	9.3	0.37	11.3	122.6
		NBL	25.2	17.7	24.7	1.96	4.6	53.1
		SBR	9.1	1.2	9.2	0.47	5.4	94.7
		SBT	19.2	6.9	19.0	0.50	60.4	395.3
		SBL	16.1	9.2	15.7	1.13	2.0	31.1
		EBR	15.7	7.5	15.9	1.14	2.9	60.2
		EBT	21.0	19.1	21.9	0.67	5.3	64.1
		EBL	26.3	21.7	27.0	0.76	12.1	88.2
		WBR	6.7	1.5	6.7	1.10	26.0	165.6
		WBT	30.4	27.0	30.2	0.82	35.3	168.0
		WBL	34.2	30.2	34.6	0.83	33.5	166.5

Table 9.7b Intersection 2700S: 2030 No Action

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	5.3	0.4	5.2	0.73	1.0	47.3
		NBT	18.5	11.5	18.6	0.64	20.2	133.9
		NBL	39.9	27.4	39.7	2.22	29.8	154.1
		SBR	14.8	5.7	14.7	0.81	16.5	174.0
		SBT	22.4	13.8	22.0	0.55	79.3	417.1
		SBL	23.0	15.0	22.7	1.20	14.7	109.4
		EBR	29.7	18.4	29.9	1.05	72.7	309.9
		EBT	31.0	23.2	30.4	0.70	76.1	313.8
		EBL	34.3	27.0	34.6	0.97	32.0	155.7
		WBR	6.3	0.8	6.1	0.93	122.2	399.3
		WBT	40.8	33.6	40.7	0.82	130.4	401.6
		WBL	48.3	36.3	48.3	1.54	129.1	400.2
4:15	4:30	NBR	5.3	0.5	5.3	0.70	1.2	53.3
		NBT	20.1	12.7	19.9	0.63	24.1	152.9
		NBL	45.3	31.7	45.3	2.37	33.6	172.0
		SBR	16.8	6.9	16.5	0.83	14.5	168.6
		SBT	40.3	24.1	39.9	1.02	134.1	638.4
		SBL	25.1	16.4	25.5	1.26	13.8	93.3
		EBR	39.7	23.6	40.5	1.48	73.1	308.2
		EBT	28.3	20.6	28.3	0.68	76.6	312.1
		EBL	31.9	24.8	31.4	0.97	31.0	168.6
		WBR	8.6	2.9	8.4	1.01	128.6	442.2
		WBT	40.9	33.9	40.6	0.83	139.7	444.5
		WBL	65.8	49.5	65.9	1.99	137.8	443.1
4:30	4:45	NBR	4.9	0.5	4.7	0.61	1.2	51.3
		NBT	21.6	13.8	21.9	0.73	23.7	139.9
		NBL	31.8	23.4	31.7	1.23	19.0	135.9
		SBR	102.5	55.2	101.9	3.26	31.0	243.4
		SBT	199.2	131.3	199.3	4.52	925.5	1661.7
		SBL	110.5	68.3	110.7	3.63	24.3	139.2
		EBR	184.8	126.8	184.3	5.78	244.5	522.4
		EBT	42.5	27.8	42.0	1.21	248.2	526.3
		EBL	33.8	24.4	33.6	1.07	25.8	143.7
		WBR	6.1	0.7	6.1	0.88	176.2	480.0
		WBT	40.3	33.4	40.2	0.83	189.9	482.4
		WBL	152.1	108.2	152.0	4.87	188.8	481.0

Table 9.7b Intersection 2700S: 2030 No Action (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	4.9	0.2	4.9	0.62	1.0	56.4
		NBT	20.5	13.6	20.5	0.58	22.3	126.5
		NBL	32.6	24.7	32.3	1.14	21.2	142.7
		SBR	244.8	129.5	243.9	6.99	249.4	776.9
		SBT	373.1	230.9	372.3	8.55	1756.8	1995.5
		SBL	260.2	149.4	261.5	7.45	24.6	132.3
		EBR	387.3	282.7	390.4	10.62	484.4	645.5
		EBT	123.3	76.4	122.0	3.75	488.3	649.4
		EBL	85.3	57.2	84.4	1.98	28.8	140.3
		WBR	6.8	1.4	6.8	0.87	218.5	472.9
		WBT	43.4	35.9	43.2	0.86	234.5	475.3
		WBL	207.8	150.6	206.3	6.21	233.1	474.0
5:00	5:15	NBR	4.4	0.2	4.3	0.63	1.0	49.8
		NBT	20.6	13.6	20.6	0.61	23.6	131.1
		NBL	34.9	26.5	35.1	1.15	20.6	141.1
		SBR	269.8	138.2	270.1	8.18	750.8	945.9
		SBT	417.2	249.7	416.3	10.14	1858.2	1994.1
		SBL	290.4	160.3	287.7	8.64	27.3	124.9
		EBR	568.3	435.9	566.4	13.42	598.4	666.2
		EBT	221.5	145.5	220.6	6.18	602.3	670.1
		EBL	116.6	73.8	117.1	2.55	29.3	137.6
		WBR	8.2	1.1	8.3	0.94	253.8	528.0
		WBT	47.6	37.9	47.1	0.93	264.9	530.3
		WBL	245.1	179.0	244.6	7.06	264.0	528.9
5:15	5:30	NBR	4.3	0.2	4.3	0.61	0.9	41.9
		NBT	22.2	14.8	22.0	0.61	28.2	145.6
		NBL	31.2	24.2	31.3	1.05	22.3	131.2
		SBR	274.8	138.1	274.3	8.35	766.9	968.1
		SBT	429.8	256.1	428.7	10.68	1871.6	1995.9
		SBL	300.7	164.9	297.4	9.09	23.8	133.6
		EBR	481.5	359.3	476.2	11.43	599.8	668.8
		EBT	231.4	152.6	229.5	6.41	603.7	672.7
		EBL	123.1	79.6	125.7	2.55	31.4	151.3
		WBR	8.0	1.4	7.9	1.01	254.8	535.9
		WBT	48.5	39.2	48.8	0.94	269.0	538.3
		WBL	237.4	175.2	235.9	6.78	267.8	536.9

Table 9.7b Intersection 2700S: 2030 No Action (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	5.3	0.2	5.4	0.68	1.4	61.0
		NBT	22.5	14.7	22.3	0.71	25.5	136.4
		NBL	41.8	34.0	40.9	1.10	22.8	145.7
		SBR	274.3	137.6	274.3	8.24	856.4	1119.9
		SBT	433.0	259.7	432.0	10.35	1872.1	1994.9
		SBL	291.0	157.1	290.9	8.62	23.3	127.2
		EBR	518.9	387.3	515.3	12.54	599.2	666.2
		EBT	235.7	157.6	235.3	6.38	603.0	670.1
		EBL	140.8	93.0	140.9	3.27	32.4	144.6
		WBR	6.3	0.8	6.5	0.86	254.8	512.7
		WBT	42.6	35.1	42.3	0.86	268.2	515.0
		WBL	270.1	200.6	268.9	7.68	267.1	513.6
5:45	6:00	NBR	4.3	0.2	4.4	0.60	0.8	41.7
		NBT	19.7	13.3	19.8	0.56	20.4	111.7
		NBL	29.9	22.6	29.7	1.06	17.1	118.7
		SBR	276.7	142.4	276.7	8.29	983.7	1291.6
		SBT	427.9	258.9	426.7	10.39	1872.0	1996.0
		SBL	292.7	162.1	292.9	8.65	20.6	116.7
		EBR	548.2	428.9	547.7	11.63	596.1	665.5
		EBT	223.2	149.2	220.1	5.80	599.9	669.4
		EBL	124.2	81.4	124.3	2.62	89.4	239.6
		WBR	6.8	0.7	6.9	0.89	294.9	526.5
		WBT	46.4	37.5	45.9	0.92	309.1	528.8
		WBL	281.8	205.8	281.9	8.02	307.9	527.4

Table 9.7c Intersection 2700S: 2030 Minor Improvement

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	3.4	0.4	3.3	0.70	1.1	45.4
		NBT	23.9	17.0	23.6	0.82	32.0	173.7
		NBL	20.6	14.7	20.5	1.11	13.8	105.4
		SBR	14.7	4.7	14.7	0.95	14.8	156.8
		SBT	29.2	19.5	28.9	0.66	97.0	431.3
		SBL	17.2	12.1	16.7	0.51	10.2	95.3
		EBR	29.7	19.9	29.6	0.96	69.5	276.9
		EBT	33.9	25.9	33.5	0.74	72.9	280.8
		EBL	33.0	26.5	33.2	0.91	29.3	147.9
		WBR	6.3	0.9	6.3	0.98	110.0	396.0
		WBT	42.9	36.1	43.3	0.86	114.3	398.3
		WBL	6.0	3.9	5.6	0.37	110.3	396.9
4:15	4:30	NBR	3.4	0.5	3.5	0.67	1.3	49.4
		NBT	24.3	16.2	24.0	0.89	34.0	187.2
		NBL	19.6	14.4	19.4	1.06	14.7	116.0
		SBR	14.4	4.9	14.4	0.91	12.8	138.3
		SBT	29.2	19.2	28.9	0.67	99.7	462.3
		SBL	16.8	11.3	16.7	0.60	9.2	73.0
		EBR	27.4	17.6	27.5	0.97	63.5	275.7
		EBT	28.5	21.1	28.3	0.67	67.1	279.6
		EBL	32.6	26.0	32.9	0.96	29.4	153.8
		WBR	9.8	4.2	9.3	1.04	109.6	375.6
		WBT	42.7	36.0	42.4	0.86	113.9	377.9
		WBL	2.8	1.8	2.6	0.22	109.2	376.5
4:30	4:45	NBR	3.3	0.8	3.2	0.67	1.2	47.3
		NBT	23.6	17.3	23.2	0.76	30.5	172.1
		NBL	18.5	13.6	18.6	1.07	12.4	107.1
		SBR	13.1	4.3	12.9	0.84	11.7	142.0
		SBT	28.2	18.5	28.2	0.64	91.3	393.8
		SBL	17.6	12.3	17.7	0.57	11.3	96.6
		EBR	25.8	16.0	25.5	1.01	60.9	270.2
		EBT	29.6	22.0	29.7	0.69	64.4	274.1
		EBL	30.8	24.7	30.1	0.90	25.1	125.2
		WBR	5.9	1.0	5.7	0.91	109.2	426.7
		WBT	42.7	35.8	42.3	0.87	114.0	429.0
		WBL	4.1	2.3	3.7	0.31	109.7	427.6

Table 9.7c Intersection 2700S: 2030 Minor Improvement (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	3.2	0.3	3.2	0.66	1.0	40.7
		NBT	24.8	17.1	24.6	0.86	32.8	167.8
		NBL	20.0	15.0	19.3	1.10	13.2	112.0
		SBR	15.1	5.3	14.9	0.95	16.2	172.9
		SBT	29.0	19.1	28.9	0.66	95.9	448.7
		SBL	17.9	12.9	17.7	0.57	12.0	99.3
		EBR	28.5	17.9	28.3	1.04	64.6	285.5
		EBT	31.4	23.2	31.6	0.74	67.8	289.4
		EBL	32.5	26.2	32.0	0.93	28.3	149.1
		WBR	7.6	2.6	7.4	1.01	115.6	399.1
		WBT	43.9	37.1	44.2	0.87	119.2	401.4
		WBL	2.3	1.3	2.2	0.27	115.0	400.0
5:00	5:15	NBR	3.3	0.4	3.2	0.68	1.0	44.1
		NBT	23.7	16.6	23.6	0.78	32.6	165.1
		NBL	24.4	18.3	24.5	1.23	14.5	109.6
		SBR	14.5	4.8	14.1	0.92	14.9	145.3
		SBT	31.4	19.6	31.2	0.77	92.3	401.9
		SBL	17.7	12.0	17.8	0.60	10.4	90.0
		EBR	31.8	19.9	31.8	1.09	63.9	290.5
		EBT	32.8	24.8	32.8	0.71	67.3	294.4
		EBL	35.1	28.3	35.1	0.97	32.1	155.6
		WBR	6.6	1.4	6.5	0.94	108.5	398.2
		WBT	43.2	36.6	43.1	0.87	113.0	400.5
		WBL	6.6	3.4	6.7	0.35	108.2	399.1
5:15	5:30	NBR	3.3	0.4	3.1	0.77	1.0	47.6
		NBT	25.7	17.6	25.6	0.86	37.4	179.8
		NBL	25.8	19.8	25.7	1.17	28.3	145.5
		SBR	14.5	4.9	14.4	0.92	13.6	131.9
		SBT	48.1	29.1	47.7	1.30	122.5	535.6
		SBL	17.3	11.8	16.8	0.60	10.1	103.3
		EBR	51.0	31.2	50.5	1.86	75.0	284.4
		EBT	32.7	24.5	33.0	0.74	78.3	288.3
		EBL	33.1	26.6	32.5	0.90	30.1	153.1
		WBR	6.3	1.0	6.3	0.96	108.7	403.3
		WBT	42.8	36.0	42.5	0.85	114.8	405.6
		WBL	21.3	12.0	20.9	0.92	110.0	404.2

Table 9.7c Intersection 2700S: 2030 Minor Improvement (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	3.3	0.3	3.1	0.68	1.2	48.4
		NBT	23.1	16.6	23.0	0.73	31.2	169.5
		NBL	47.5	39.6	46.6	1.41	31.7	163.8
		SBR	37.2	16.9	36.9	1.55	31.3	278.7
		SBT	91.7	56.5	91.4	2.34	322.8	890.2
		SBL	41.2	27.2	40.0	1.06	11.5	93.7
		EBR	92.8	55.6	93.1	3.86	113.0	322.4
		EBT	35.0	25.3	34.9	0.86	116.5	326.3
		EBL	40.8	32.4	40.6	1.38	36.0	167.4
		WBR	6.0	0.9	5.9	0.96	116.8	409.5
		WBT	45.7	38.7	46.0	0.90	121.2	411.9
		WBL	32.4	16.5	32.2	1.42	116.9	410.4
5:45	6:00	NBR	4.0	0.3	4.1	0.77	1.2	50.1
		NBT	25.4	18.0	25.3	0.93	37.2	182.3
		NBL	23.1	18.2	22.8	0.97	17.2	120.9
		SBR	80.5	40.4	80.1	2.85	27.7	210.0
		SBT	167.5	103.7	166.9	4.25	711.9	1291.9
		SBL	87.7	54.7	88.4	2.30	16.9	110.6
		EBR	202.4	139.6	202.7	7.38	247.7	473.6
		EBT	54.4	35.9	53.5	1.67	251.2	477.5
		EBL	40.8	29.6	40.1	1.11	24.8	140.0
		WBR	5.7	0.7	5.6	0.90	104.6	382.6
		WBT	40.3	33.9	40.2	0.82	109.9	384.9
		WBL	53.6	31.1	53.3	2.04	106.4	383.5

Table 9.7d Intersection 2700S: 2030 No TSP

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	0.0	0.0	0.0	0.00	0.0	5.3
		NBT	20.4	15.0	20.7	0.58	28.5	168.4
		NBL	99.5	89.4	99.4	1.27	90.0	213.6
		NBL UT	0.0	0.0	0.0	0.00	90.0	213.6
		SBR	10.5	1.4	10.4	1.03	6.4	115.5
		SBT	30.8	21.3	30.7	0.69	129.1	553.0
		SBL	59.6	51.9	59.4	0.97	46.7	179.0
		SBL UT	0.0	0.0	0.0	0.00	46.7	179.0
		EBR	17.7	8.3	17.8	1.75	12.1	133.7
		EBT	30.9	24.3	31.2	0.67	44.1	188.2
		EBL	36.1	29.2	35.9	1.04	32.7	168.5
		WBR	25.9	18.6	25.6	0.88	90.9	314.7
		WBT	40.6	32.7	40.6	0.76	96.5	314.6
		WBL	55.5	41.2	55.3	1.74	95.6	314.0
		BRT NBT	21.6	1.8	21.6	0.20	0.1	9.3
		BRT SBT	54.7	27.0	57.4	0.80	2.8	46.4
4:15	4:30	NBR	0.0	0.0	0.0	0.00	0.1	20.6
		NBT	18.3	13.4	18.4	0.49	26.5	172.7
		NBL	114.1	103.8	114.2	1.31	97.8	213.5
		NBL UT	0.0	0.0	0.0	0.00	97.8	213.5
		SBR	11.1	1.8	10.9	1.04	6.1	124.9
		SBT	29.9	20.4	29.7	0.68	132.0	606.1
		SBL	61.0	53.6	60.9	0.97	46.8	172.7
		SBL UT	0.0	0.0	0.0	0.00	46.8	172.7
		EBR	17.9	8.9	17.9	1.72	10.2	119.5
		EBT	30.1	24.1	30.2	0.64	46.7	186.9
		EBL	37.5	29.7	38.2	1.16	36.4	177.5
		WBR	26.7	20.1	25.9	0.83	91.2	277.5
		WBT	40.0	32.1	39.7	0.75	100.1	277.3
		WBL	61.8	46.0	61.7	1.96	99.3	276.7
		BRT NBT	20.0	0.5	20.0	0.15	0.1	13.7
		BRT SBT	16.6	0.0	16.6	0.00	0.0	0.0

Table 9.7d Intersection 2700S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:30	4:45	NBR	0.1	0.0	0.0	0.01	0.0	16.9
		NBT	18.8	14.1	18.8	0.51	24.9	155.4
		NBL	112.1	101.5	112.7	1.31	85.8	206.5
		NBL UT	0.0	0.0	0.0	0.00	85.8	206.5
		SBR	10.1	1.3	9.8	0.96	6.5	114.2
		SBT	28.8	19.7	28.5	0.66	117.7	568.2
		SBL	56.9	49.4	56.9	0.93	46.7	194.6
		SBL UT	0.0	0.0	0.0	0.00	46.7	194.6
		EBR	15.5	7.3	15.3	1.52	9.8	134.2
		EBT	30.5	24.0	30.4	0.65	45.1	185.9
		EBL	34.3	27.3	33.8	1.04	28.3	157.5
		WBR	26.8	19.8	26.2	0.88	87.7	295.9
		WBT	40.4	32.6	40.2	0.77	94.3	295.7
		WBL	56.9	42.0	56.3	1.80	93.6	295.2
		BRT NBT	22.0	0.2	22.0	0.10	0.0	9.0
		BRT SBT	29.9	6.9	30.0	0.50	0.8	46.1
4:45	5:00	NBR	0.0	0.0	0.0	0.00	0.0	5.4
		NBT	19.2	14.3	19.2	0.52	26.4	162.4
		NBL	84.1	75.5	84.3	1.08	58.7	173.2
		NBL UT	0.0	0.0	0.0	0.00	58.7	173.2
		SBR	10.3	1.4	10.1	1.01	6.8	123.4
		SBT	28.2	19.2	28.0	0.65	114.6	543.2
		SBL	59.7	52.2	58.9	0.96	50.3	196.9
		SBL UT	0.0	0.0	0.0	0.00	50.3	196.9
		EBR	17.5	8.3	17.7	1.73	11.4	128.9
		EBT	30.6	24.2	30.2	0.65	44.8	181.3
		EBL	36.1	29.5	36.4	1.00	32.3	166.8
		WBR	27.2	20.2	26.1	0.87	82.6	276.0
		WBT	41.4	33.4	41.1	0.79	91.4	275.8
		WBL	55.2	41.2	54.9	1.75	90.9	275.3
		BRT NBT	18.4	0.0	18.4	0.00	0.0	4.5
		BRT SBT	18.0	0.0	18.0	0.00	0.0	0.0

Table 9.7d Intersection 2700S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:00	5:15	NBR	0.0	0.0	0.0	0.00	0.0	5.3
		NBT	19.3	14.5	18.9	0.53	26.8	158.6
		NBL	84.2	76.1	85.3	1.01	56.4	172.4
		NBL UT	0.0	0.0	0.0	0.00	56.4	172.4
		SBR	10.5	1.4	10.2	1.04	7.1	117.8
		SBT	29.2	19.8	29.1	0.68	118.9	528.8
		SBL	59.5	52.2	59.8	0.97	49.1	168.7
		SBL UT	0.0	0.0	0.0	0.00	49.1	168.7
		EBR	16.0	7.7	15.8	1.54	8.5	108.7
		EBT	31.0	24.7	30.8	0.67	43.3	183.5
		EBL	40.0	31.7	39.9	1.14	41.2	197.4
		WBR	27.0	20.1	26.7	0.85	82.2	270.4
		WBT	41.5	33.4	41.3	0.79	88.9	270.2
		WBL	53.9	39.7	53.7	1.70	87.4	269.6
		BRT NBT	19.1	0.0	19.1	0.00	0.0	0.0
		BRT SBT	40.8	17.8	42.7	0.50	1.8	45.6
5:15	5:30	NBR	0.0	0.0	0.0	0.00	0.1	27.1
		NBT	20.1	15.1	20.0	0.53	30.9	179.1
		NBL	84.1	75.9	84.3	1.04	54.1	154.4
		NBL UT	0.0	0.0	0.0	0.00	54.1	154.4
		SBR	9.7	1.3	9.6	0.97	6.4	112.6
		SBT	28.2	19.2	27.8	0.65	115.2	501.1
		SBL	60.8	53.3	61.6	0.94	49.5	187.5
		SBL UT	0.0	0.0	0.0	0.00	49.5	187.5
		EBR	16.7	7.7	16.7	1.63	9.9	138.8
		EBT	30.7	24.4	30.7	0.66	44.8	188.3
		EBL	43.4	35.2	43.5	1.18	41.4	191.0
		WBR	28.1	20.8	28.7	0.93	88.7	285.2
		WBT	43.3	34.8	43.4	0.80	95.5	285.0
		WBL	55.6	41.2	54.8	1.81	94.2	284.4
		BRT NBT	17.7	0.0	17.7	0.00	0.0	4.6
		BRT SBT	35.0	6.2	35.0	0.80	0.4	41.4

Table 9.7d Intersection 2700S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	0.0	0.0	0.0	0.00	0.1	21.0
		NBT	18.5	13.4	18.8	0.52	24.9	168.4
		NBL	82.6	74.4	82.4	1.08	59.5	174.7
		NBL UT	0.0	0.0	0.0	0.00	59.5	174.7
		SBR	10.7	1.7	10.6	1.00	8.0	138.9
		SBT	30.4	20.3	30.2	0.68	126.3	569.3
		SBL	59.8	52.0	59.5	0.99	44.8	176.5
		SBL UT	0.0	0.0	0.0	0.00	44.8	176.5
		EBR	18.5	9.4	18.3	1.64	11.5	144.2
		EBT	31.7	25.5	31.6	0.67	45.6	188.9
		EBL	39.9	32.2	39.8	1.10	35.7	164.4
		WBR	28.8	21.5	27.9	0.93	87.2	279.1
		WBT	44.2	35.6	44.7	0.82	93.0	279.0
		WBL	54.3	40.2	54.2	1.79	92.5	278.4
		BRT NBT	18.6	0.0	18.6	0.00	0.0	0.0
		BRT SBT	51.7	28.9	54.5	0.50	2.8	45.6
5:45	6:00	NBR	0.1	0.0	0.0	0.00	0.1	13.4
		NBT	18.0	13.5	18.1	0.50	23.9	147.9
		NBL	86.1	77.8	85.1	1.09	58.7	168.9
		NBL UT	0.0	0.0	0.0	0.00	58.7	168.9
		SBR	11.2	1.8	10.9	1.02	6.7	111.7
		SBT	36.0	22.7	35.8	0.81	145.3	638.2
		SBL	62.8	55.2	63.3	1.01	50.3	174.2
		SBL UT	0.0	0.0	0.0	0.00	50.3	174.2
		EBR	18.1	9.1	17.9	1.47	9.0	118.0
		EBT	35.2	27.9	35.2	0.71	52.5	214.8
		EBL	35.8	29.2	35.2	1.04	32.7	157.2
		WBR	29.7	22.4	29.6	0.91	92.7	295.1
		WBT	42.7	34.5	42.1	0.78	98.9	295.0
		WBL	61.0	43.7	61.3	1.88	98.1	294.4
		BRT NBT	17.9	0.0	17.9	0.00	0.0	0.0
		BRT SBT	57.1	26.6	57.1	1.00	1.4	46.3

Table 9.7e Intersection 2700S: 2030 TSP

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	0.0	0.0	0.0	0.00	0.1	30.1
		NBT	18.9	13.7	19.1	0.55	26.5	168.2
		NBL	94.2	84.7	94.5	1.17	84.5	200.2
		NBL UT	0.0	0.0	0.0	0.00	84.5	200.2
		SBR	10.3	1.3	10.1	1.01	6.4	106.9
		SBT	29.5	20.3	29.5	0.67	123.1	545.4
		SBL	60.2	52.6	59.8	0.96	47.2	180.6
		SBL UT	0.0	0.0	0.0	0.00	47.2	180.6
		EBR	18.0	8.3	18.0	1.81	12.2	131.8
		EBT	32.4	25.5	32.7	0.68	46.1	192.7
		EBL	37.7	30.7	37.5	1.07	34.3	163.5
		WBR	25.2	17.8	25.1	0.88	94.3	314.8
		WBT	42.0	33.9	42.0	0.77	100.6	314.6
		WBL	58.0	43.3	57.5	1.73	99.7	314.0
		BRT NBT	16.6	0.0	16.6	0.00	0.0	0.0
		BRT SBT	50.6	22.8	52.8	0.80	2.4	46.3
4:15	4:30	NBR	0.1	0.0	0.0	0.01	0.1	29.6
		NBT	18.4	13.7	18.4	0.49	26.6	161.3
		NBL	102.8	92.9	103.1	1.20	86.6	202.0
		NBL UT	0.0	0.0	0.0	0.00	86.6	202.0
		SBR	11.1	1.6	10.8	1.08	6.4	120.9
		SBT	30.2	20.4	30.0	0.68	131.2	604.5
		SBL	61.4	53.7	61.2	0.97	46.6	177.5
		SBL UT	0.0	0.0	0.0	0.00	46.6	177.5
		EBR	17.4	8.9	17.2	1.60	10.1	126.3
		EBT	30.9	24.7	31.0	0.64	47.5	188.1
		EBL	38.5	30.7	38.3	1.15	37.0	175.4
		WBR	28.6	21.7	27.9	0.82	93.9	276.9
		WBT	40.0	32.2	39.8	0.75	99.8	276.8
		WBL	60.7	44.2	60.8	2.08	99.2	276.2
		BRT NBT	19.8	0.6	20.1	0.05	0.1	13.8
		BRT SBT	16.6	0.0	16.6	0.00	0.0	0.0

Table 9.7e Intersection 2700S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:30	4:45	NBR	0.0	0.0	0.0	0.00	0.0	12.3
		NBT	18.6	14.0	18.6	0.47	24.7	149.9
		NBL	114.7	103.8	114.6	1.32	88.5	218.9
		NBL UT	0.0	0.0	0.0	0.00	88.5	218.9
		SBR	10.1	1.3	9.9	0.96	6.9	116.6
		SBT	28.9	19.3	28.7	0.66	115.2	531.1
		SBL	58.0	50.5	58.1	0.95	47.5	191.5
		SBL UT	0.0	0.0	0.0	0.00	47.5	191.5
		EBR	17.2	8.4	17.3	1.61	11.8	155.4
		EBT	28.5	22.3	28.1	0.64	42.8	188.9
		EBL	35.6	28.1	35.2	1.08	31.6	164.8
		WBR	23.7	16.8	22.9	0.83	87.1	296.3
		WBT	40.7	32.6	40.3	0.78	93.8	296.1
		WBL	56.4	41.8	56.6	1.85	93.2	295.6
		BRT NBT	20.5	0.0	20.5	0.00	0.0	4.6
		BRT SBT	32.0	9.0	32.2	0.50	1.0	46.1
4:45	5:00	NBR	0.0	0.0	0.0	0.00	0.1	15.8
		NBT	19.8	15.0	19.8	0.52	27.4	165.7
		NBL	85.6	76.9	86.1	1.07	60.2	168.0
		NBL UT	0.0	0.0	0.0	0.00	60.2	168.0
		SBR	10.3	1.4	10.0	0.97	6.8	128.9
		SBT	28.1	19.1	27.8	0.65	113.0	532.5
		SBL	60.1	52.7	59.7	0.97	51.1	195.3
		SBL UT	0.0	0.0	0.0	0.00	51.1	195.3
		EBR	17.2	8.5	17.0	1.56	11.9	132.4
		EBT	31.4	24.9	31.4	0.66	44.7	185.9
		EBL	38.9	31.8	38.7	1.06	33.6	152.9
		WBR	27.4	20.2	27.2	0.90	86.2	290.9
		WBT	41.8	33.7	41.6	0.79	93.7	290.8
		WBL	56.6	41.9	55.8	1.80	93.2	290.2
		BRT NBT	17.7	0.0	17.8	0.00	0.0	4.5
		BRT SBT	18.3	0.0	18.3	0.00	0.0	0.0

Table 9.7e Intersection 2700S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:00	5:15	NBR	0.0	0.0	0.0	0.00	0.1	21.9
		NBT	19.4	14.6	19.5	0.52	25.6	142.2
		NBL	78.1	70.5	77.0	0.99	49.9	140.7
		NBL UT	0.0	0.0	0.0	0.00	49.9	140.7
		SBR	9.9	1.2	9.6	0.99	6.4	108.9
		SBT	27.6	18.6	27.6	0.66	111.6	498.4
		SBL	60.3	52.7	60.3	0.97	49.9	177.8
		SBL UT	0.0	0.0	0.0	0.00	49.9	177.8
		EBR	16.3	7.6	16.0	1.66	9.2	114.3
		EBT	31.9	25.3	31.8	0.68	45.2	193.6
		EBL	43.5	35.0	44.0	1.20	46.0	198.2
		WBR	29.3	22.0	28.7	0.85	89.5	275.4
		WBT	43.0	34.4	42.8	0.80	96.9	275.2
		WBL	60.3	45.1	60.1	1.84	96.0	274.7
		BRT NBT	18.7	0.1	18.8	0.05	0.0	4.6
		BRT SBT	39.2	16.1	40.5	0.50	1.6	45.6
5:15	5:30	NBR	0.0	0.0	0.0	0.00	0.1	23.0
		NBT	20.4	15.4	20.4	0.51	32.1	186.5
		NBL	83.1	75.2	83.5	1.02	51.9	152.5
		NBL UT	0.0	0.0	0.0	0.00	51.9	152.5
		SBR	10.5	1.5	10.4	1.03	6.9	112.9
		SBT	29.2	20.1	28.8	0.66	121.3	529.8
		SBL	60.1	52.5	60.7	0.94	49.0	182.1
		SBL UT	0.0	0.0	0.0	0.00	49.0	182.1
		EBR	17.4	8.0	17.2	1.83	10.4	134.8
		EBT	31.1	24.7	31.1	0.67	45.9	191.2
		EBL	40.9	33.6	41.1	1.10	37.0	164.7
		WBR	30.4	23.4	30.2	0.84	91.6	283.4
		WBT	42.8	34.6	43.0	0.79	97.7	283.2
		WBL	58.3	43.2	57.8	1.80	96.8	282.6
		BRT NBT	21.0	0.6	21.0	0.20	0.1	9.2
		BRT SBT	36.1	7.8	36.1	0.80	0.5	36.6

Table 9.7e Intersection 2700S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	0.0	0.0	0.0	0.00	0.0	5.3
		NBT	18.2	13.5	18.2	0.51	24.1	156.8
		NBL	93.9	84.5	92.1	1.17	68.8	187.4
		NBL UT	0.0	0.0	0.0	0.00	68.8	187.4
		SBR	10.5	1.6	10.5	0.97	7.3	128.1
		SBT	29.3	19.7	29.1	0.66	122.9	571.1
		SBL	56.8	49.3	56.8	0.93	42.1	172.6
		SBL UT	0.0	0.0	0.0	0.00	42.1	172.6
		EBR	17.0	8.5	16.9	1.55	9.9	137.8
		EBT	32.1	25.6	32.0	0.67	46.6	208.6
		EBL	43.1	35.1	43.1	1.15	40.3	175.0
		WBR	32.4	25.0	32.8	0.92	90.2	282.8
		WBT	43.2	34.8	43.3	0.82	96.4	282.6
		WBL	56.3	42.6	57.3	1.84	95.4	282.0
		BRT NBT	18.4	0.0	18.4	0.00	0.0	0.0
		BRT SBT	16.5	0.0	16.5	0.00	0.0	0.0
5:45	6:00	NBR	0.0	0.0	0.0	0.00	0.0	5.1
		NBT	17.1	12.9	17.3	0.47	24.0	135.9
		NBL	84.8	76.7	83.9	1.08	59.5	158.8
		NBL UT	0.0	0.0	0.0	0.00	59.5	158.8
		SBR	11.2	2.2	11.0	1.01	6.5	120.6
		SBT	33.1	21.9	32.7	0.74	141.1	611.8
		SBL	61.9	54.5	62.3	1.00	49.3	173.1
		SBL UT	0.0	0.0	0.0	0.00	49.3	173.1
		EBR	17.2	8.5	17.3	1.58	8.7	108.3
		EBT	33.2	26.5	33.0	0.70	50.2	202.4
		EBL	39.2	32.1	39.6	1.09	34.7	173.9
		WBR	28.7	21.7	28.7	0.86	89.0	308.9
		WBT	42.4	34.1	42.7	0.78	95.8	308.7
		WBL	57.3	41.6	57.2	1.85	94.8	308.2
		BRT NBT	19.1	0.1	19.0	0.05	0.0	9.0
		BRT SBT	57.9	27.3	57.9	1.00	1.5	46.3

Table 9.8a Intersection 3100S: 2009

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	4.2	0.1	4.1	0.50	1.1	50.0
		NBT	20.3	11.0	20.2	0.62	31.0	174.7
		NBL	92.5	71.6	92.1	2.89	118.9	313.0
		SBR	28.4	8.9	28.5	1.12	294.6	768.9
		SBT	47.1	25.7	46.9	0.86	294.0	767.1
		SBL	42.4	23.8	42.0	1.13	294.2	768.2
		EBR	34.7	21.2	34.9	1.33	73.2	251.3
		EBT	44.6	36.9	44.7	0.86	74.1	252.2
		EBL	61.2	53.6	61.1	0.99	66.5	232.9
		WBR	35.9	29.4	35.8	1.05	66.8	229.1
		WBT	41.9	36.9	41.8	0.85	67.7	230.5
		WBL	71.4	62.1	71.5	1.06	74.7	225.5
4:15	4:30	NBR	4.7	0.1	4.6	0.54	1.4	51.5
		NBT	22.2	12.2	22.1	0.66	31.5	178.6
		NBL	122.6	91.9	122.4	3.87	193.4	395.5
		SBR	23.6	7.0	23.7	1.03	281.3	749.1
		SBT	44.6	25.6	44.2	0.85	280.9	747.3
		SBL	38.8	22.5	39.0	1.11	281.3	748.4
		EBR	31.6	20.8	31.5	1.23	50.6	210.9
		EBT	46.0	38.6	45.4	0.84	51.9	211.9
		EBL	66.7	58.2	66.5	1.04	83.6	258.3
		WBR	33.6	27.2	33.6	1.13	53.1	210.0
		WBT	40.7	36.2	41.6	0.83	54.0	211.3
		WBL	71.8	62.5	71.8	1.09	93.3	257.3
4:30	4:45	NBR	4.5	0.2	4.7	0.52	1.2	47.9
		NBT	20.7	11.0	20.2	0.62	30.9	179.1
		NBL	113.6	85.5	114.7	3.97	135.0	292.3
		SBR	24.0	7.1	24.0	1.01	225.8	766.3
		SBT	38.4	20.9	38.0	0.77	225.6	764.4
		SBL	31.7	16.7	31.1	0.96	225.5	765.6
		EBR	28.5	19.4	27.7	1.25	59.1	212.2
		EBT	44.0	36.4	43.8	0.84	60.4	213.1
		EBL	60.3	52.6	60.4	0.98	67.6	221.0
		WBR	43.3	36.2	43.4	1.16	87.3	273.4
		WBT	47.4	41.6	47.5	0.90	88.4	274.7
		WBL	71.4	62.3	71.7	1.09	82.0	241.0

Table 9.8a Intersection 3100S: 2009 (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	4.8	0.2	4.7	0.61	1.3	48.8
		NBT	22.3	13.1	22.2	0.63	30.1	157.0
		NBL	90.7	70.0	90.9	2.92	98.0	254.5
		SBR	29.7	10.3	29.3	1.19	329.9	773.1
		SBT	47.9	27.6	47.8	0.87	329.0	771.3
		SBL	38.1	21.5	38.1	1.03	329.5	772.4
		EBR	29.5	19.7	29.6	1.28	48.4	198.2
		EBT	44.9	37.5	45.4	0.84	49.7	199.2
		EBL	57.8	51.0	59.3	0.96	50.7	181.2
		WBR	38.6	31.3	39.0	1.11	91.9	312.9
		WBT	45.6	39.2	45.9	0.89	93.0	314.2
		WBL	72.4	62.8	72.6	1.12	93.9	282.0
5:00	5:15	NBR	4.8	0.2	4.8	0.59	1.6	55.6
		NBT	19.9	11.8	19.8	0.56	25.1	149.1
		NBL	66.1	51.0	66.0	2.20	77.2	240.3
		SBR	28.4	9.7	28.5	1.13	295.8	761.4
		SBT	46.3	26.3	46.3	0.86	295.2	759.6
		SBL	39.8	22.4	39.6	1.08	295.5	760.7
		EBR	33.0	22.6	33.4	1.33	60.2	205.1
		EBT	43.2	35.8	43.6	0.82	61.6	206.1
		EBL	57.5	50.9	57.5	0.96	45.8	181.2
		WBR	41.2	35.0	40.7	1.01	77.8	352.2
		WBT	43.5	38.1	43.4	0.86	78.8	353.5
		WBL	106.6	94.7	105.5	1.34	172.1	394.3
5:15	5:30	NBR	5.2	0.2	5.2	0.65	1.4	53.0
		NBT	22.3	12.8	22.0	0.67	32.5	167.2
		NBL	65.9	51.9	65.1	2.08	72.8	236.0
		SBR	32.6	12.7	31.9	1.23	391.2	775.9
		SBT	51.0	30.1	50.7	0.94	390.2	774.0
		SBL	43.3	26.9	42.7	1.10	390.7	775.2
		EBR	33.1	22.6	32.3	1.30	53.0	204.4
		EBT	44.5	36.6	44.5	0.87	54.1	205.3
		EBL	57.0	50.7	57.2	0.96	39.3	165.6
		WBR	38.2	31.1	38.1	1.16	109.2	338.6
		WBT	43.5	37.4	43.1	0.87	110.2	339.9
		WBL	100.5	89.1	100.1	1.28	165.5	345.4

Table 9.8a Intersection 3100S: 2009 (Continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	5.4	0.2	5.4	0.64	2.1	67.3
		NBT	23.3	13.4	23.3	0.67	34.8	184.1
		NBL	95.7	74.3	94.5	2.92	126.4	309.6
		SBR	36.0	14.0	36.2	1.32	392.3	777.4
		SBT	54.7	31.0	54.4	0.99	391.5	775.6
		SBL	51.3	29.7	51.4	1.30	392.1	776.7
		EBR	30.4	21.4	30.0	1.29	52.1	198.6
		EBT	43.6	36.1	44.1	0.83	53.5	199.5
		EBL	56.1	49.4	55.8	0.94	51.9	179.8
		WBR	44.3	37.1	44.7	1.08	123.3	395.1
		WBT	50.1	43.4	49.8	0.91	124.4	396.4
		WBL	112.7	100.4	112.0	1.38	182.4	393.8
5:45	6:00	NBR	5.4	0.2	5.4	0.64	1.9	56.3
		NBT	23.6	13.7	23.4	0.75	29.8	166.3
		NBL	68.0	52.3	68.0	2.20	60.7	228.4
		SBR	32.4	12.7	32.2	1.19	348.9	772.6
		SBT	50.1	28.8	49.9	0.92	348.2	770.8
		SBL	43.4	24.6	43.8	1.10	348.5	771.9
		EBR	34.6	24.2	34.9	1.29	59.8	232.7
		EBT	44.9	37.3	45.1	0.85	60.9	233.7
		EBL	57.1	50.3	57.1	0.96	51.3	194.7
		WBR	48.1	40.2	47.8	1.16	114.4	370.7
		WBT	49.5	42.6	49.6	0.92	115.5	372.0
		WBL	100.4	88.9	101.4	1.30	135.2	336.7

Table 9.8b Intersection 3100S: 2030 No Action

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	4.2	0.2	4.2	0.56	1.3	51.6
		NBT	21.9	15.2	22.0	0.50	24.4	129.2
		NBL	27.6	22.5	27.3	1.03	13.3	93.5
		SBR	20.1	8.6	20.0	0.95	219.0	740.2
		SBT	57.5	33.8	57.8	1.36	219.5	738.4
		SBL	25.2	14.4	25.2	0.78	219.1	739.6
		EBR	67.5	50.2	67.0	1.74	87.7	269.1
		EBT	47.7	38.9	47.9	0.84	88.8	270.0
		EBL	63.1	56.0	62.7	1.02	48.4	189.3
		WBR	34.7	27.9	34.0	0.95	121.0	423.5
		WBT	41.2	35.3	41.2	0.81	122.0	424.8
		WBL	101.5	83.8	101.2	1.61	134.7	409.1
4:15	4:30	NBR	4.0	0.2	4.0	0.52	1.4	52.4
		NBT	18.7	12.6	18.8	0.44	21.3	120.5
		NBL	25.0	19.8	25.6	0.95	14.1	105.2
		SBR	57.3	40.6	56.7	1.22	510.0	769.1
		SBT	163.0	119.0	162.6	3.06	509.1	767.3
		SBL	68.1	51.8	67.9	1.19	509.5	768.4
		EBR	101.9	77.3	101.6	2.37	86.7	266.9
		EBT	48.9	39.9	48.9	0.88	87.7	267.8
		EBL	61.1	54.1	60.8	0.96	46.3	171.6
		WBR	35.3	29.0	35.3	0.90	115.3	401.7
		WBT	39.9	34.0	39.9	0.81	116.3	403.0
		WBL	147.9	116.8	148.0	2.70	124.7	386.7
4:30	4:45	NBR	3.6	0.2	3.6	0.48	1.0	37.5
		NBT	20.0	13.9	20.0	0.46	20.8	119.4
		NBL	19.8	15.9	20.1	0.73	9.1	78.8
		SBR	70.0	51.4	69.8	1.29	568.4	768.1
		SBT	185.8	139.1	185.1	3.26	567.4	766.2
		SBL	78.9	60.7	78.5	1.28	568.0	767.4
		EBR	106.4	82.0	107.1	2.40	91.0	263.6
		EBT	52.2	43.3	51.9	0.89	92.1	264.5
		EBL	61.1	54.3	60.7	0.99	48.0	175.1
		WBR	41.0	34.0	40.1	1.02	131.4	460.8
		WBT	42.0	35.9	41.9	0.80	132.5	462.1
		WBL	154.9	124.2	154.9	2.65	143.1	415.7

Table 9.8b Intersection 3100S: 2030 No Action (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	4.1	0.3	4.2	0.60	1.0	44.6
		NBT	19.1	13.3	19.0	0.44	19.9	112.6
		NBL	18.4	14.2	18.1	0.81	6.5	66.5
		SBR	73.4	54.6	73.2	1.24	569.4	767.8
		SBT	188.3	141.3	187.8	3.32	568.2	765.9
		SBL	78.1	59.0	78.4	1.33	568.9	767.1
		EBR	108.5	83.8	108.4	2.42	89.0	268.1
		EBT	49.5	40.7	49.6	0.88	90.0	269.0
		EBL	56.1	49.7	56.2	0.97	41.7	157.5
		WBR	34.3	27.9	34.8	0.90	116.4	387.2
		WBT	40.6	34.6	40.3	0.82	117.5	388.5
		WBL	154.6	123.9	153.9	2.64	130.5	382.2
5:00	5:15	NBR	3.6	0.2	3.6	0.50	0.9	41.3
		NBT	18.1	12.7	18.0	0.42	18.4	118.2
		NBL	22.4	18.1	23.0	0.84	9.4	73.5
		SBR	72.1	53.1	72.6	1.27	567.3	767.7
		SBT	201.1	151.5	200.3	3.45	566.1	765.8
		SBL	82.0	63.1	81.7	1.37	567.0	767.0
		EBR	109.4	84.0	109.5	2.39	86.5	260.2
		EBT	48.3	39.3	47.6	0.88	87.7	261.1
		EBL	59.0	52.3	58.8	0.97	46.3	170.5
		WBR	36.4	29.9	36.5	0.92	120.8	419.7
		WBT	40.7	34.7	40.7	0.81	121.8	421.1
		WBL	149.2	117.1	148.4	2.68	126.5	396.1
5:15	5:30	NBR	3.8	0.3	3.8	0.53	0.9	39.8
		NBT	16.4	11.1	16.1	0.40	16.9	99.0
		NBL	19.9	15.6	20.6	0.77	8.5	72.8
		SBR	75.8	57.4	75.2	1.23	575.7	770.3
		SBT	207.9	158.9	207.7	3.49	574.4	768.4
		SBL	80.1	62.7	80.4	1.19	575.3	769.6
		EBR	109.7	84.4	110.1	2.42	91.2	263.2
		EBT	50.5	41.2	50.2	0.89	92.2	264.1
		EBL	61.0	54.8	60.8	0.97	37.4	140.0
		WBR	37.2	30.5	37.2	0.89	120.9	413.4
		WBT	40.9	34.8	40.7	0.83	122.0	414.7
		WBL	156.3	123.6	155.5	2.77	145.6	412.0

Table 9.8b Intersection 3100S: 2030 No Action (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	3.7	0.2	3.6	0.47	1.0	41.5
		NBT	16.5	10.9	16.1	0.41	17.7	106.3
		NBL	17.9	14.0	18.4	0.80	7.2	67.4
		SBR	74.2	55.5	74.6	1.21	572.8	771.1
		SBT	200.6	152.1	200.2	3.39	571.5	769.3
		SBL	80.9	62.9	80.3	1.27	572.1	770.4
		EBR	109.9	84.4	109.1	2.44	92.1	269.1
		EBT	50.8	41.8	50.7	0.87	93.2	270.0
		EBL	61.3	54.1	61.4	1.04	49.5	185.2
		WBR	39.5	32.9	40.1	0.91	124.6	413.5
		WBT	41.6	35.6	42.0	0.83	125.6	414.9
		WBL	151.7	120.7	151.1	2.59	138.6	405.5
5:45	6:00	NBR	3.1	0.1	3.2	0.40	0.8	38.7
		NBT	17.0	11.7	17.0	0.40	16.5	99.8
		NBL	20.2	16.0	20.1	0.79	7.7	75.7
		SBR	77.4	58.2	77.4	1.26	579.6	768.8
		SBT	202.7	153.9	202.7	3.46	578.2	767.0
		SBL	80.0	61.4	79.9	1.29	578.8	768.1
		EBR	110.2	84.5	110.3	2.39	86.2	258.6
		EBT	50.5	41.7	51.0	0.86	87.3	259.5
		EBL	62.7	56.0	63.8	1.00	51.1	181.5
		WBR	40.9	34.1	39.8	0.98	129.6	434.1
		WBT	42.1	35.7	42.1	0.85	130.6	435.5
		WBL	153.3	121.6	152.8	2.67	143.4	424.2

Table 9.8c Intersection 3100S: 2030 Minor Improvements

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	3.7	0.4	3.6	0.46	1.6	67.7
		NBT	15.2	9.9	15.2	0.45	19.8	133.7
		NBL	21.1	16.0	20.6	1.17	10.4	84.4
		SBR	3.5	0.8	3.4	0.25	47.9	291.5
		SBT	18.0	9.8	17.8	0.37	50.2	289.7
		SBL	18.6	11.1	18.1	0.66	49.9	290.9
		EBR	39.6	29.2	39.5	1.45	77.8	244.1
		EBT	46.8	38.3	46.5	0.85	79.1	245.1
		EBL	55.8	51.8	54.9	1.00	41.2	166.4
		WBR	35.7	29.2	34.8	0.93	101.3	353.8
		WBT	41.4	35.6	41.4	0.83	102.3	355.1
		WBL	64.1	56.0	64.1	1.06	100.5	330.4
4:15	4:30	NBR	3.1	0.3	3.1	0.39	1.6	73.1
		NBT	14.1	8.7	14.1	0.46	18.7	138.2
		NBL	22.4	17.5	21.9	1.12	12.7	83.8
		SBR	3.3	0.7	3.2	0.22	42.7	258.5
		SBT	28.6	14.1	28.6	0.73	45.3	256.7
		SBL	16.9	10.5	16.7	0.63	44.6	257.9
		EBR	49.6	35.3	49.7	1.59	77.3	253.6
		EBT	48.2	39.5	48.4	0.87	78.3	254.6
		EBL	54.2	50.5	54.2	0.92	40.0	152.9
		WBR	34.9	28.6	35.0	0.90	97.5	348.9
		WBT	39.9	34.2	39.9	0.82	98.4	350.3
		WBL	71.6	57.8	71.7	1.40	93.4	323.8
4:30	4:45	NBR	3.1	0.2	3.0	0.42	1.4	58.5
		NBT	14.7	9.2	14.5	0.47	17.3	121.2
		NBL	18.8	13.9	18.4	1.04	9.2	80.2
		SBR	4.5	1.5	4.2	0.26	116.2	470.2
		SBT	65.6	36.8	65.3	1.87	118.4	468.4
		SBL	17.7	9.8	17.2	0.63	117.9	469.5
		EBR	80.3	53.9	80.0	2.59	81.6	240.9
		EBT	50.6	41.8	50.4	0.90	82.9	241.8
		EBL	58.7	54.6	58.3	0.96	45.1	160.7
		WBR	38.7	32.7	38.5	0.91	150.4	428.7
		WBT	41.2	35.6	41.2	0.81	151.4	430.0
		WBL	123.0	93.1	122.5	2.81	164.7	393.9

Table 9.8c Intersection 3100S: 2030 Minor Improvements (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	3.2	0.3	3.0	0.42	1.2	61.1
		NBT	14.8	9.5	14.7	0.46	17.9	127.5
		NBL	18.2	14.2	19.0	0.94	9.0	86.8
		SBR	14.2	7.7	14.0	0.51	420.5	1033.6
		SBT	133.5	83.1	133.0	3.41	421.2	1032.5
		SBL	45.2	29.7	45.7	1.17	421.1	1033.5
		EBR	106.6	67.5	106.9	3.37	85.0	257.4
		EBT	49.3	40.5	50.0	0.92	85.9	258.3
		EBL	57.4	53.5	57.3	0.98	40.9	144.8
		WBR	36.7	30.4	37.0	0.90	258.0	491.0
		WBT	42.2	36.4	42.4	0.85	259.2	492.3
		WBL	195.2	143.1	195.5	4.64	277.7	485.5
5:00	5:15	NBR	2.9	0.3	3.0	0.42	1.2	57.3
		NBT	15.6	10.1	15.4	0.46	19.5	131.7
		NBL	14.9	11.4	15.0	0.81	6.5	65.1
		SBR	39.6	25.5	39.7	1.02	999.5	1600.0
		SBT	220.5	146.9	220.3	5.03	999.1	1598.6
		SBL	101.3	68.4	100.4	2.34	999.4	1599.5
		EBR	118.9	76.7	118.0	3.67	82.9	241.3
		EBT	49.9	40.9	49.8	0.91	84.0	242.2
		EBL	57.8	53.7	57.2	0.97	42.9	178.7
		WBR	40.6	34.2	40.8	0.95	306.5	548.7
		WBT	43.2	37.0	43.1	0.85	307.7	550.0
		WBL	231.4	169.5	229.6	5.54	340.3	532.1
5:15	5:30	NBR	3.0	0.2	2.9	0.43	1.2	49.1
		NBT	15.0	9.5	14.9	0.46	18.9	134.0
		NBL	14.4	11.1	14.3	0.76	6.4	61.2
		SBR	56.0	36.6	56.0	1.44	1525.7	2109.2
		SBT	293.8	196.9	293.3	6.95	1524.9	2108.3
		SBL	148.6	100.2	148.4	3.51	1525.5	2108.9
		EBR	136.0	88.6	135.8	4.08	95.5	263.8
		EBT	53.0	43.9	52.4	0.91	96.5	264.8
		EBL	57.2	53.4	56.7	0.95	34.5	133.5
		WBR	39.7	32.4	40.0	0.99	402.4	625.1
		WBT	43.4	37.1	43.4	0.90	403.7	626.5
		WBL	257.5	186.8	257.6	6.31	443.1	624.1

Table 9.8c Intersection 3100S: 2030 Minor Improvements (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	3.5	0.4	3.4	0.48	1.5	59.8
		NBT	14.5	9.5	14.5	0.44	18.0	130.8
		NBL	14.6	11.3	14.7	0.82	6.2	67.6
		SBR	79.0	52.4	77.9	1.98	2075.2	2459.7
		SBT	355.0	244.3	354.0	8.08	2072.7	2459.0
		SBL	196.3	134.0	197.1	4.64	2073.2	2459.4
		EBR	132.3	85.5	132.5	4.03	92.9	255.2
		EBT	53.6	44.4	53.4	0.93	93.9	256.1
		EBL	58.8	54.4	57.6	0.98	45.7	165.3
		WBR	43.5	36.4	43.7	0.98	420.7	667.4
		WBT	45.5	39.3	46.0	0.89	421.9	668.7
		WBL	282.1	210.5	280.8	6.53	500.4	674.2
5:45	6:00	NBR	3.7	0.2	3.7	0.41	1.5	65.3
		NBT	15.3	9.6	14.9	0.45	19.2	129.0
		NBL	16.3	12.4	16.4	0.80	8.4	76.0
		SBR	90.4	60.5	90.8	2.29	2487.5	2626.3
		SBT	393.6	273.0	392.5	8.97	2487.0	2626.0
		SBL	236.5	163.8	235.9	5.67	2487.1	2626.1
		EBR	123.2	78.8	124.0	3.87	81.5	242.5
		EBT	51.2	42.3	51.0	0.92	82.5	243.4
		EBL	58.7	54.7	59.3	0.99	46.0	153.7
		WBR	42.0	34.9	40.9	1.09	519.4	720.2
		WBT	46.0	39.4	46.2	0.95	520.6	721.5
		WBL	280.2	210.2	281.5	6.26	549.0	718.8

Table 9.8d Intersection 3100S: 2030 No TSP

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	4.6	0.4	4.5	0.78	1.2	40.5
		NBT	23.3	17.4	23.9	0.68	27.1	152.3
		NBL	155.7	141.5	157.0	1.95	172.4	333.4
		NBL UT	163.3	148.1	164.3	1.92	172.4	333.4
		SBR	28.2	12.9	28.2	1.43	326.8	722.7
		SBT	49.2	34.6	49.1	0.87	342.0	725.3
		SBL	70.8	55.7	70.4	1.20	346.6	728.5
		SBL UT	83.0	66.2	82.6	1.43	346.6	728.5
		EBR	42.0	31.6	42.3	1.22	92.9	251.6
		EBT	47.5	39.8	47.2	0.83	94.1	251.9
		EBL	73.1	64.7	72.5	1.12	61.7	206.0
		WBR	25.2	19.7	25.5	0.82	110.8	421.0
		WBT	39.2	31.2	39.1	0.76	116.4	423.8
		WBL	69.7	60.7	69.1	1.03	153.8	421.7
		BRT NBT	17.6	14.6	17.6	0.20	0.7	9.4
		BRT SBT	48.0	37.9	50.9	0.65	3.7	46.2
4:15	4:30	NBR	4.7	0.3	4.6	0.72	1.6	59.5
		NBT	24.0	17.8	24.0	0.66	28.8	167.1
		NBL	239.7	214.0	238.7	3.65	297.6	460.0
		NBL UT	258.8	229.6	257.8	3.93	297.6	460.0
		SBR	26.0	10.7	25.9	1.40	295.0	738.2
		SBT	45.6	31.5	45.3	0.84	310.6	740.7
		SBL	75.3	59.5	75.0	1.23	315.4	744.0
		SBL UT	81.7	65.0	81.0	1.34	315.4	744.0
		EBR	41.6	30.4	41.8	1.33	94.5	252.3
		EBT	48.0	40.3	48.6	0.84	95.9	252.5
		EBL	75.1	66.5	74.3	1.13	61.6	200.6
		WBR	26.0	20.4	26.3	0.79	110.5	393.0
		WBT	38.6	30.8	38.4	0.76	116.8	395.8
		WBL	69.5	60.6	68.6	1.04	141.6	396.1
		BRT NBT	0.1	0.0	0.1	0.00	0.0	0.0
		BRT SBT	65.0	48.4	65.0	1.00	2.4	45.6

Table 9.8d Intersection 3100S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:30	4:45	NBR	4.9	0.4	4.9	0.77	1.3	57.8
		NBT	24.2	18.3	24.9	0.67	26.9	141.9
		NBL	323.6	285.0	321.4	5.73	367.8	537.7
		NBL UT	321.5	280.9	323.1	5.71	367.8	537.7
		SBR	21.5	8.1	21.5	1.10	248.3	731.9
		SBT	41.5	26.4	41.3	0.85	266.8	734.5
		SBL	81.4	65.6	81.1	1.23	271.6	737.8
		SBL UT	84.4	68.8	84.0	1.26	271.6	737.8
		EBR	45.9	34.1	46.1	1.31	92.0	244.4
		EBT	49.7	42.3	49.4	0.86	93.1	244.7
		EBL	78.6	69.5	78.7	1.17	69.4	226.1
		WBR	29.8	24.4	29.8	0.77	121.6	460.5
		WBT	40.2	32.3	40.0	0.73	127.0	463.3
		WBL	74.7	63.8	74.7	1.19	150.4	463.6
		BRT NBT	0.0	0.0	0.0	0.00	0.0	0.0
		BRT SBT	35.7	23.8	36.4	0.75	2.4	46.2
4:45	5:00	NBR	4.5	0.3	4.6	0.75	1.3	56.2
		NBT	21.9	16.4	22.1	0.62	23.5	136.3
		NBL	322.7	282.9	323.0	5.54	322.4	490.9
		NBL UT	340.6	301.0	338.0	5.40	322.4	490.9
		SBR	26.4	10.8	26.4	1.33	292.5	738.0
		SBT	48.3	31.4	48.3	0.94	304.2	740.6
		SBL	66.7	52.6	66.1	1.10	308.4	743.8
		SBL UT	66.7	52.6	66.8	1.07	308.4	743.8
		EBR	43.9	31.4	43.5	1.39	87.5	251.6
		EBT	46.6	39.0	46.9	0.88	88.8	251.8
		EBL	73.6	65.4	74.4	1.12	59.0	175.7
		WBR	29.8	24.0	30.2	0.87	111.8	396.1
		WBT	40.2	32.2	40.6	0.76	117.3	398.9
		WBL	73.1	62.8	72.0	1.14	141.5	399.2
		BRT NBT	0.0	0.0	0.0	0.00	0.0	0.0
		BRT SBT	30.3	23.6	30.3	0.40	1.2	18.5

Table 9.8d Intersection 3100S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:00	5:15	NBR	4.8	0.4	4.8	0.83	1.3	48.4
		NBT	22.3	16.6	22.7	0.65	21.8	138.0
		NBL	275.8	243.8	274.7	4.78	294.7	440.0
		NBL UT	291.5	253.7	287.4	5.04	294.7	440.0
		SBR	25.4	10.7	24.9	1.27	288.4	716.0
		SBT	54.0	32.9	53.6	1.17	301.0	718.6
		SBL	72.5	57.2	72.5	1.17	305.9	721.8
		SBL UT	74.8	59.8	72.9	1.19	305.9	721.8
		EBR	55.0	39.5	54.3	1.54	93.6	249.6
		EBT	48.3	40.5	48.2	0.84	94.8	249.9
		EBL	74.1	65.7	74.3	1.11	63.3	192.8
		WBR	29.4	23.6	29.8	0.80	119.5	414.0
		WBT	40.4	32.4	40.6	0.76	125.0	416.8
		WBL	79.5	66.8	79.8	1.24	153.5	417.1
		BRT NBT	0.2	0.0	0.2	0.00	0.0	0.0
		BRT SBT	49.0	36.0	49.2	0.80	3.6	46.1
5:15	5:30	NBR	4.9	0.4	4.8	0.75	1.3	50.4
		NBT	23.0	16.9	23.5	0.67	25.2	138.8
		NBL	288.3	256.3	288.8	4.24	322.3	494.0
		NBL UT	314.3	274.5	316.5	5.07	322.3	494.0
		SBR	24.4	10.2	24.3	1.30	304.2	731.2
		SBT	56.8	34.9	56.7	1.32	315.1	733.8
		SBL	78.4	61.7	78.5	1.35	319.3	737.0
		SBL UT	77.1	61.9	77.1	1.15	319.3	737.0
		EBR	56.3	40.0	55.7	1.61	93.2	251.4
		EBT	48.6	41.1	48.5	0.83	94.3	251.7
		EBL	66.2	58.4	66.7	1.07	43.0	162.3
		WBR	29.8	24.4	29.7	0.80	115.1	422.8
		WBT	40.0	32.1	39.9	0.76	120.3	425.7
		WBL	83.1	68.7	83.3	1.36	145.8	425.9
		BRT NBT	0.2	0.0	0.1	0.00	0.0	0.0
		BRT SBT	46.9	37.5	46.9	0.60	1.8	27.5

Table 9.8d Intersection 3100S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	4.5	0.3	4.6	0.71	1.2	50.0
		NBT	21.0	15.5	21.2	0.60	22.9	150.2
		NBL	336.6	296.2	337.3	6.21	365.5	551.9
		NBL UT	351.6	307.0	349.0	5.66	365.5	551.9
		SBR	25.9	10.6	25.8	1.23	294.5	739.9
		SBT	56.6	35.3	56.5	1.23	308.6	742.4
		SBL	71.7	56.9	72.0	1.14	313.1	745.7
		SBL UT	76.1	61.3	76.9	1.28	313.1	745.7
		EBR	55.8	39.4	54.7	1.64	97.3	253.8
		EBT	50.2	42.7	50.8	0.84	98.5	254.1
		EBL	74.5	66.2	74.4	1.12	65.0	191.5
		WBR	32.4	26.9	33.3	0.84	117.2	417.1
		WBT	41.3	33.4	41.5	0.75	122.1	419.9
		WBL	80.4	66.3	80.3	1.38	138.3	417.1
		BRT NBT	0.0	0.0	0.0	0.00	0.0	0.0
		BRT SBT	51.8	40.4	53.5	0.70	4.0	46.2
5:45	6:00	NBR	4.7	0.3	4.6	0.78	1.4	56.4
		NBT	21.9	16.1	22.1	0.66	22.1	134.3
		NBL	340.4	302.3	339.4	5.24	371.3	541.8
		NBL UT	354.9	307.3	352.7	6.79	371.3	541.8
		SBR	27.4	12.5	27.1	1.22	301.4	714.8
		SBT	61.5	36.9	61.3	1.33	322.1	717.4
		SBL	77.1	60.6	77.7	1.28	326.8	720.6
		SBL UT	66.0	51.3	63.9	1.14	326.8	720.6
		EBR	55.7	37.8	55.5	1.71	84.0	249.3
		EBT	44.0	36.5	44.0	0.83	85.3	249.6
		EBL	73.9	65.9	73.4	1.06	65.0	197.3
		WBR	26.4	21.1	26.0	0.80	120.4	425.0
		WBT	41.1	33.2	41.2	0.75	126.0	427.8
		WBL	88.1	72.1	88.0	1.52	137.2	411.4
		BRT NBT	0.0	0.0	0.0	0.00	0.0	0.0
		BRT SBT	44.9	35.2	44.9	0.60	1.7	27.8

Table 9.8e Intersection 3100S: 2030 TSP

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	4.6	0.3	4.6	0.76	1.3	52.8
		NBT	23.0	17.1	22.9	0.67	26.1	145.3
		NBL	161.8	146.7	163.4	2.07	181.1	350.8
		NBL UT	169.6	153.8	171.4	2.04	181.1	350.8
		SBR	27.6	12.5	27.7	1.37	320.8	717.0
		SBT	47.2	32.9	47.1	0.84	336.2	719.6
		SBL	75.1	60.2	74.9	1.21	340.8	722.8
		SBL UT	89.5	72.3	89.5	1.27	340.8	722.8
		EBR	43.2	32.7	43.5	1.28	95.4	250.8
		EBT	48.5	40.8	48.2	0.84	96.7	251.1
		EBL	73.2	64.8	72.7	1.13	61.0	201.1
		WBR	25.1	19.5	25.4	0.83	113.8	423.7
		WBT	40.0	32.1	39.9	0.77	119.4	426.5
		WBL	69.9	60.7	69.3	1.02	156.8	426.8
		BRT NBT	0.0	0.0	0.0	0.00	0.0	0.0
		BRT SBT	3.5	2.7	4.4	0.05	0.3	4.7
4:15	4:30	NBR	4.7	0.4	4.7	0.76	1.6	65.8
		NBT	25.0	18.9	24.6	0.67	29.8	158.6
		NBL	237.5	211.4	236.9	3.98	294.2	465.6
		NBL UT	259.8	226.5	261.6	4.69	294.2	465.6
		SBR	26.1	10.8	26.4	1.32	295.1	731.9
		SBT	45.0	30.9	44.8	0.84	309.3	734.5
		SBL	77.9	61.4	77.9	1.31	313.8	737.8
		SBL UT	84.6	67.8	83.2	1.41	313.8	737.8
		EBR	43.2	32.2	43.1	1.30	94.1	250.1
		EBT	47.7	39.9	47.9	0.86	95.3	250.4
		EBL	77.8	69.0	77.6	1.16	64.6	201.3
		WBR	26.6	21.0	26.8	0.78	110.2	392.6
		WBT	38.5	30.7	38.2	0.76	116.4	395.4
		WBL	70.3	61.3	69.4	1.06	142.6	395.7
		BRT NBT	0.2	0.0	0.2	0.00	0.0	0.0
		BRT SBT	48.9	35.6	48.9	0.80	1.8	36.4

Table 9.8e Intersection 3100S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:30	4:45	NBR	4.9	0.3	4.9	0.73	1.3	50.4
		NBT	22.4	16.4	23.0	0.67	25.1	156.9
		NBL	309.1	270.0	309.3	5.91	352.8	518.9
		NBL UT	314.5	275.9	315.4	5.83	352.8	518.9
		SBR	18.1	5.9	18.0	1.00	214.6	723.1
		SBT	35.2	22.0	34.9	0.73	242.0	725.7
		SBL	80.3	64.8	81.4	1.21	246.8	728.9
		SBL UT	94.8	74.5	94.7	1.44	246.8	728.9
		EBR	46.3	35.4	46.2	1.23	95.3	251.4
		EBT	49.3	41.6	49.4	0.87	96.5	251.7
		EBL	78.8	70.1	78.8	1.16	67.8	195.0
		WBR	29.9	24.4	29.9	0.78	120.4	448.8
		WBT	39.7	31.9	39.7	0.74	125.7	451.6
		WBL	71.5	62.1	71.6	1.03	151.2	444.7
		BRT NBT	0.0	0.0	0.0	0.00	0.0	0.0
		BRT SBT	20.1	11.2	20.0	0.55	1.2	46.1
4:45	5:00	NBR	4.6	0.2	4.6	0.69	1.1	46.1
		NBT	22.9	17.1	23.1	0.65	23.9	133.3
		NBL	332.9	294.9	332.0	5.35	323.8	477.9
		NBL UT	344.7	301.9	345.6	5.35	323.8	477.9
		SBR	24.7	10.0	24.5	1.29	289.1	739.3
		SBT	46.3	30.5	46.3	0.92	303.6	741.9
		SBL	70.2	55.1	70.3	1.17	307.9	745.1
		SBL UT	72.8	59.5	72.8	1.11	307.9	745.1
		EBR	47.1	34.2	47.1	1.46	92.0	251.2
		EBT	47.7	40.0	48.3	0.85	93.1	251.5
		EBL	77.2	68.7	77.3	1.13	61.2	187.2
		WBR	29.8	24.1	30.2	0.87	112.2	412.1
		WBT	40.4	32.4	40.7	0.79	117.8	415.0
		WBL	71.8	61.8	71.0	1.15	138.7	414.0
		BRT NBT	0.1	0.0	0.1	0.00	0.0	0.0
		BRT SBT	7.2	5.6	7.2	0.10	0.3	4.5

Table 9.8e Intersection 3100S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:00	5:15	NBR	4.5	0.2	4.4	0.70	1.1	40.3
		NBT	22.2	16.7	22.4	0.62	22.0	129.9
		NBL	302.6	268.7	303.3	5.05	317.2	461.5
		NBL UT	302.7	266.2	299.6	4.66	317.2	461.5
		SBR	25.5	11.2	25.5	1.20	263.8	718.0
		SBT	46.5	30.0	46.1	0.94	283.8	720.6
		SBL	71.0	56.0	71.0	1.19	288.3	723.8
		SBL UT	74.8	60.3	75.1	1.18	288.3	723.8
		EBR	45.5	33.5	44.9	1.33	89.6	252.4
		EBT	46.4	38.9	46.5	0.80	91.0	252.7
		EBL	72.8	64.2	72.8	1.14	58.5	187.5
		WBR	29.6	23.9	30.4	0.79	124.9	428.7
		WBT	41.3	33.2	41.6	0.76	130.3	431.5
		WBL	75.8	64.7	76.2	1.16	159.6	431.7
		BRT NBT	0.5	0.0	0.5	0.00	0.0	0.0
		BRT SBT	34.6	25.0	34.5	0.60	2.5	46.0
5:15	5:30	NBR	4.7	0.3	4.7	0.74	1.3	54.2
		NBT	23.8	17.6	23.7	0.67	26.9	170.6
		NBL	285.8	252.6	286.4	4.46	334.2	529.2
		NBL UT	293.9	258.3	293.7	4.70	334.2	529.2
		SBR	21.5	8.4	21.1	1.14	257.8	689.3
		SBT	44.9	28.4	44.7	0.95	283.8	691.9
		SBL	85.8	68.7	84.7	1.39	288.1	695.1
		SBL UT	79.7	63.7	79.4	1.38	288.1	695.1
		EBR	48.3	34.6	48.3	1.45	94.0	251.5
		EBT	49.2	41.5	49.4	0.86	95.2	251.8
		EBL	71.5	63.7	70.9	1.09	49.3	174.5
		WBR	29.8	24.5	29.1	0.82	123.0	432.4
		WBT	41.3	33.1	41.1	0.77	128.1	435.2
		WBL	80.9	68.9	80.7	1.26	156.6	435.9
		BRT NBT	0.2	0.0	0.2	0.00	0.0	0.0
		BRT SBT	6.4	4.9	6.4	0.10	0.2	4.7

Table 9.8e Intersection 3100S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	4.5	0.3	4.6	0.71	1.2	52.5
		NBT	20.8	15.3	21.0	0.58	22.5	135.0
		NBL	365.0	321.8	365.8	5.89	413.9	603.5
		NBL UT	365.9	321.1	367.9	5.96	413.9	603.5
		SBR	23.6	9.2	23.4	1.17	283.1	737.9
		SBT	47.7	30.6	47.5	1.00	296.8	740.5
		SBL	75.6	60.5	75.5	1.20	301.2	743.8
		SBL UT	84.7	68.8	85.0	1.38	301.2	743.8
		EBR	49.8	36.4	49.3	1.47	97.4	253.2
		EBT	50.2	42.7	49.9	0.84	98.7	253.5
		EBL	77.4	69.0	77.3	1.13	67.0	197.7
		WBR	33.6	27.9	33.7	0.86	120.7	420.2
		WBT	41.6	33.7	41.6	0.75	125.4	423.0
		WBL	77.0	65.3	76.5	1.21	140.2	420.2
		BRT NBT	0.1	0.0	0.1	0.00	0.0	0.0
		BRT SBT	21.2	10.5	21.9	0.65	1.2	45.9
5:45	6:00	NBR	4.5	0.3	4.4	0.76	1.4	53.8
		NBT	23.6	17.8	24.0	0.65	23.2	132.0
		NBL	396.4	351.9	397.0	6.32	428.0	574.3
		NBL UT	411.0	359.5	409.6	6.92	428.0	574.3
		SBR	26.2	11.4	26.3	1.19	287.8	722.9
		SBT	52.0	32.6	52.2	1.08	306.5	725.5
		SBL	75.6	59.8	74.1	1.18	310.8	728.7
		SBL UT	74.2	58.9	75.8	1.26	310.8	728.7
		EBR	48.1	34.5	47.4	1.41	85.2	249.3
		EBT	43.6	36.4	43.5	0.79	86.5	249.6
		EBL	74.4	66.3	72.7	1.08	63.5	210.0
		WBR	27.9	22.6	28.0	0.81	124.1	429.9
		WBT	41.9	34.0	41.8	0.75	129.7	432.7
		WBL	79.2	66.8	78.9	1.27	140.0	427.3
		BRT NBT	0.1	0.0	0.1	0.00	0.0	0.0
		BRT SBT	7.1	5.3	7.1	0.10	0.3	4.7

Table 9.9a Intersection 3500S: 2009

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	6.0	0.8	6.1	0.48	37.8	303.9
		NBT	20.0	11.2	19.8	0.50	42.4	304.3
		NBL	24.1	17.0	23.9	1.16	38.8	304.5
		SBR	4.7	0.7	4.6	0.60	79.7	368.7
		SBT	19.2	13.5	19.2	0.48	84.0	369.7
		SBL	22.8	15.8	22.3	0.75	83.7	369.8
		EBR	32.0	23.7	32.9	1.07	75.0	253.9
		EBT	44.2	33.5	44.0	0.80	76.7	254.6
		EBL	0.0	0.0	0.0	0.00	75.6	255.0
		WBR	21.9	18.4	21.6	0.85	45.2	197.1
		WBT	32.0	27.4	32.2	0.73	48.9	197.5
		WBL	29.6	26.6	29.4	0.80	46.0	197.2
4:15	4:30	NBR	6.5	0.7	6.4	0.50	42.5	325.8
		NBT	19.3	10.6	19.0	0.47	51.1	326.1
		NBL	35.1	25.7	35.5	1.24	49.7	326.4
		SBR	7.2	1.4	7.0	0.79	93.8	376.2
		SBT	19.5	13.9	19.4	0.47	97.0	377.0
		SBL	20.3	14.2	19.9	0.68	96.4	377.1
		EBR	33.2	25.3	33.6	1.11	66.9	241.3
		EBT	47.3	36.6	47.6	0.84	68.9	242.0
		EBL	23.5	19.3	23.6	0.86	67.0	242.4
		WBR	28.3	23.7	28.0	0.94	50.8	204.4
		WBT	34.9	29.4	35.2	0.75	55.5	204.8
		WBL	33.9	29.9	34.7	0.85	52.5	204.5
4:30	4:45	NBR	6.3	0.7	6.4	0.44	34.8	297.3
		NBT	18.1	9.6	17.9	0.44	43.6	297.7
		NBL	35.0	26.0	34.6	1.25	43.5	297.9
		SBR	7.5	1.1	7.7	0.70	86.0	341.5
		SBT	20.6	15.1	20.7	0.47	88.1	342.4
		SBL	19.0	13.5	19.5	0.62	87.4	342.3
		EBR	30.4	22.7	30.9	1.10	64.0	216.5
		EBT	44.8	34.9	44.9	0.79	65.9	217.2
		EBL	13.4	12.6	13.4	0.20	64.1	217.6
		WBR	22.7	18.1	22.6	0.98	46.8	203.5
		WBT	30.5	25.3	31.1	0.71	49.7	203.9
		WBL	31.7	28.3	32.0	0.82	46.7	203.6

Table 9.9a Intersection 3500S: 2009 (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	6.5	1.0	6.6	0.59	29.4	250.5
		NBT	18.0	10.3	18.2	0.45	37.3	250.9
		NBL	36.5	27.8	37.2	1.42	36.3	251.1
		SBR	7.4	1.7	7.3	0.83	116.5	393.6
		SBT	19.7	13.9	19.6	0.48	118.6	394.5
		SBL	16.4	11.3	15.9	0.57	118.1	394.5
		EBR	35.6	27.8	35.5	1.07	60.7	225.0
		EBT	45.5	35.4	44.9	0.79	62.7	225.7
		EBL	0.0	0.0	0.0	0.00	60.8	226.1
		WBR	25.1	21.1	25.3	0.90	45.5	196.9
		WBT	33.2	28.0	33.4	0.74	48.4	197.5
		WBL	30.6	27.3	30.8	0.88	43.9	197.2
5:00	5:15	NBR	6.3	0.7	6.2	0.56	42.3	297.0
		NBT	22.4	13.3	22.0	0.52	48.7	297.4
		NBL	37.1	28.9	38.1	1.28	48.8	297.6
		SBR	6.6	1.1	6.4	0.77	121.6	393.7
		SBT	21.9	15.8	21.8	0.50	123.8	394.6
		SBL	20.5	14.7	20.7	0.62	123.3	394.7
		EBR	31.9	24.6	31.8	1.10	63.8	215.1
		EBT	46.7	36.5	46.7	0.82	65.6	215.8
		EBL	18.9	16.9	18.9	0.40	63.5	216.3
		WBR	24.3	21.0	23.9	0.81	45.0	178.9
		WBT	31.1	26.8	30.6	0.70	48.3	179.3
		WBL	30.6	27.2	31.3	0.85	45.2	178.9
5:15	5:30	NBR	6.2	1.0	6.1	0.53	29.6	252.8
		NBT	15.8	8.1	15.7	0.37	45.5	253.2
		NBL	53.9	45.2	54.8	1.22	46.5	253.5
		SBR	8.9	1.3	9.0	0.85	165.4	397.9
		SBT	23.0	16.9	23.0	0.47	167.2	398.8
		SBL	17.7	12.6	17.2	0.59	166.6	398.8
		EBR	35.2	27.8	35.2	1.07	59.4	193.8
		EBT	46.8	36.4	46.3	0.82	61.6	194.5
		EBL	0.0	0.0	0.0	0.00	59.6	194.9
		WBR	25.0	21.9	25.5	0.78	36.7	178.0
		WBT	31.3	27.2	31.8	0.68	41.4	178.4
		WBL	32.6	28.7	32.7	0.88	39.4	178.1

Table 9.9a Intersection 3500S: 2009 (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	5.3	0.3	5.2	0.47	34.0	263.7
		NBT	18.8	10.2	18.6	0.47	48.2	264.1
		NBL	49.0	40.3	49.2	1.29	48.5	264.9
		SBR	7.6	1.4	7.5	0.74	147.9	394.6
		SBT	23.3	17.0	23.4	0.48	149.6	395.5
		SBL	19.1	13.5	19.6	0.60	149.1	395.6
		EBR	30.8	24.6	30.8	1.02	49.1	164.8
		EBT	47.1	37.3	46.7	0.81	51.3	165.5
		EBL	27.3	23.4	27.1	0.87	49.3	165.9
		WBR	25.3	22.0	25.2	0.89	46.5	199.2
		WBT	34.6	29.5	34.9	0.75	51.8	199.6
		WBL	33.5	29.5	33.6	0.84	49.3	199.2
5:45	6:00	NBR	5.8	0.4	5.7	0.44	60.2	315.0
		NBT	23.7	14.1	23.4	0.60	73.0	315.4
		NBL	51.3	41.2	51.2	1.25	73.5	315.7
		SBR	11.2	2.8	11.4	0.97	179.8	398.6
		SBT	26.4	19.6	26.2	0.50	182.3	399.5
		SBL	25.0	16.5	24.7	0.72	182.1	399.6
		EBR	36.7	29.2	37.0	1.07	61.2	224.5
		EBT	45.2	35.0	45.2	0.79	63.3	225.2
		EBL	23.4	20.2	23.9	0.65	61.8	225.6
		WBR	25.3	21.6	25.6	0.81	45.7	190.3
		WBT	33.3	28.1	33.1	0.72	49.5	191.1
		WBL	31.4	28.2	31.9	0.82	45.5	190.7

Table 9.9b Intersection 3500S: 2030 No Action

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	19.8	12.1	19.8	1.32	106.9	334.2
		NBT	43.7	33.4	43.4	0.76	138.0	334.5
		NBL	82.9	65.1	82.9	1.44	138.6	334.8
		SBR	38.6	23.1	38.1	1.44	267.1	402.1
		SBT	65.0	57.1	64.9	0.78	268.1	403.0
		SBL	45.2	39.9	45.2	0.77	267.4	403.1
		EBR	50.6	25.2	50.6	1.17	485.6	913.5
		EBT	55.9	29.4	56.0	1.16	492.0	914.2
		EBL	141.7	106.2	141.1	3.27	492.4	914.7
		WBR	258.1	163.5	256.7	6.67	1783.7	2037.3
		WBT	260.5	162.7	260.1	6.48	1784.1	2037.7
		WBL	247.8	156.5	247.8	7.05	1783.7	2037.4
4:15	4:30	NBR	24.9	16.4	24.9	1.40	154.8	388.4
		NBT	43.3	32.5	43.7	0.76	183.4	388.7
		NBL	104.1	82.9	104.1	1.73	183.9	389.0
		SBR	38.5	22.7	39.1	1.50	265.1	396.7
		SBT	64.6	56.8	64.5	0.77	266.2	397.6
		SBL	45.9	40.4	45.9	0.81	265.4	397.7
		EBR	56.2	31.3	55.4	1.30	504.3	901.2
		EBT	61.1	33.8	60.8	1.25	507.6	901.9
		EBL	147.4	109.9	146.8	3.49	508.0	902.4
		WBR	266.1	167.2	265.9	6.77	1852.5	2042.4
		WBT	263.8	162.0	262.7	6.66	1852.8	2042.8
		WBL	261.2	162.7	259.7	7.62	1852.5	2042.4
4:30	4:45	NBR	19.9	12.5	20.7	1.26	105.8	328.4
		NBT	46.6	35.4	46.8	0.81	137.0	328.8
		NBL	90.1	70.7	90.2	1.66	137.7	329.0
		SBR	41.9	24.7	41.6	1.49	266.8	399.5
		SBT	65.3	57.4	65.1	0.77	268.0	400.4
		SBL	46.6	41.2	46.7	0.82	267.0	400.5
		EBR	53.2	29.8	53.1	1.26	491.2	930.5
		EBT	58.2	32.9	57.7	1.19	492.5	931.2
		EBL	155.1	116.5	155.1	3.67	493.0	931.6
		WBR	263.9	166.0	263.0	6.88	1849.0	2038.6
		WBT	266.1	165.7	265.6	6.61	1849.4	2039.0
		WBL	263.8	167.0	263.3	7.61	1849.1	2038.6

Table 9.9b Intersection 3500S: 2030 No Action (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	24.6	15.8	24.4	1.45	141.6	375.6
		NBT	43.5	32.9	43.0	0.76	169.7	376.0
		NBL	95.5	74.4	95.9	1.73	170.4	376.2
		SBR	39.0	23.4	39.5	1.46	266.3	397.5
		SBT	64.6	56.9	64.4	0.77	267.3	398.4
		SBL	48.7	43.3	48.7	0.80	266.8	398.5
		EBR	49.0	27.6	48.7	1.20	417.9	869.2
		EBT	52.6	29.9	52.3	1.07	422.6	869.9
		EBL	122.8	91.9	122.3	2.96	423.0	870.4
		WBR	260.0	164.1	259.8	6.81	1849.3	2041.5
		WBT	262.4	163.1	262.2	6.58	1849.7	2041.9
		WBL	260.3	164.9	260.2	7.53	1849.4	2041.6
5:00	5:15	NBR	21.3	13.0	21.2	1.37	105.7	340.5
		NBT	46.3	35.4	46.0	0.79	127.6	343.3
		NBL	81.5	64.1	81.7	1.46	128.7	343.2
		SBR	36.9	22.3	38.0	1.37	266.8	399.3
		SBT	64.7	56.9	64.7	0.78	268.1	400.2
		SBL	45.1	39.9	45.3	0.79	267.4	400.3
		EBR	51.6	27.5	51.3	1.23	471.3	862.9
		EBT	56.0	30.5	55.5	1.14	475.0	863.6
		EBL	142.3	106.4	141.4	3.33	475.4	864.0
		WBR	259.9	162.8	260.1	6.66	1850.5	2039.2
		WBT	262.3	160.5	261.8	6.69	1850.9	2039.6
		WBL	260.8	163.0	260.1	7.55	1850.5	2039.2
5:15	5:30	NBR	21.2	13.1	22.0	1.35	120.1	313.9
		NBT	42.3	32.2	42.4	0.73	139.5	314.2
		NBL	84.9	66.9	84.9	1.42	140.5	314.5
		SBR	39.9	23.9	40.0	1.44	267.5	398.2
		SBT	64.9	57.1	65.4	0.78	268.8	399.0
		SBL	44.0	39.2	43.4	0.80	268.0	399.1
		EBR	47.6	26.1	47.3	1.16	408.0	913.4
		EBT	51.3	29.1	50.9	1.03	412.2	914.1
		EBL	131.3	99.5	131.7	3.08	412.6	914.6
		WBR	262.6	167.4	262.9	6.74	1850.6	2038.9
		WBT	265.2	163.3	264.7	6.79	1851.0	2039.3
		WBL	260.9	164.1	261.4	7.50	1850.7	2038.9

Table 9.9b Intersection 3500S: 2030 No Action (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	24.9	15.8	24.6	1.43	103.4	314.6
		NBT	44.4	33.8	43.5	0.77	123.3	315.0
		NBL	79.9	63.1	80.5	1.43	124.0	315.2
		SBR	39.3	23.6	39.4	1.41	265.8	397.5
		SBT	63.7	56.0	63.4	0.77	266.9	398.4
		SBL	44.0	38.7	44.3	0.76	266.3	398.5
		EBR	49.5	26.5	49.7	1.22	482.1	858.1
		EBT	54.4	29.6	54.2	1.14	489.6	858.8
		EBL	147.6	111.4	147.7	3.48	490.1	859.3
		WBR	258.8	164.2	259.1	6.69	1848.3	2041.6
		WBT	265.1	164.4	264.9	6.75	1848.6	2042.0
		WBL	266.1	169.4	265.7	7.72	1848.3	2041.7
5:45	6:00	NBR	21.8	13.3	21.9	1.48	122.8	308.7
		NBT	46.7	35.2	46.5	0.82	135.8	309.0
		NBL	76.5	60.0	75.8	1.40	136.5	309.3
		SBR	39.1	22.9	39.9	1.44	268.8	399.3
		SBT	66.0	57.9	66.1	0.79	269.8	400.2
		SBL	49.0	42.6	48.8	0.85	269.1	400.3
		EBR	56.0	27.1	55.8	1.27	559.1	919.0
		EBT	64.1	33.6	63.8	1.36	561.5	919.7
		EBL	164.1	120.3	163.6	3.94	561.9	920.2
		WBR	255.9	160.4	255.2	6.70	1848.5	2038.8
		WBT	258.6	159.2	258.1	6.72	1848.9	2039.2
		WBL	251.9	157.0	252.0	7.50	1848.6	2038.8

Table 9.9c Intersection 3500S: 2030 Minor Improvements

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	21.6	13.3	21.7	1.52	117.9	309.1
		NBT	44.6	34.9	44.5	0.76	141.5	309.4
		NBL	83.1	63.0	83.2	1.80	142.0	309.7
		SBR	99.0	63.7	98.8	2.93	423.2	641.5
		SBT	125.3	97.9	124.5	2.20	424.6	642.3
		SBL	73.9	55.0	73.3	1.76	423.7	642.4
		EBR	33.2	20.8	33.5	0.94	228.9	545.2
		EBT	36.5	23.2	36.3	0.75	238.9	545.9
		EBL	87.6	70.1	87.2	2.19	239.3	546.4
		WBR	218.4	157.1	218.7	4.63	1653.9	2036.6
		WBT	219.8	152.3	219.5	4.60	1654.3	2037.0
		WBL	184.4	126.3	185.5	4.66	1654.0	2036.7
4:15	4:30	NBR	17.7	10.7	17.7	1.18	147.7	360.6
		NBT	44.9	34.6	45.0	0.82	171.8	360.9
		NBL	97.9	74.7	97.1	2.11	172.2	361.2
		SBR	196.6	134.6	196.4	4.80	482.7	645.2
		SBT	214.5	164.0	214.0	3.85	483.8	646.1
		SBL	153.3	110.8	152.7	3.39	483.1	646.2
		EBR	31.6	19.9	31.4	0.88	224.5	532.5
		EBT	37.3	24.2	37.0	0.78	234.5	533.2
		EBL	84.5	68.1	83.3	2.08	235.0	533.6
		WBR	257.3	178.0	256.7	5.95	1828.8	2035.8
		WBT	258.8	174.9	258.1	5.82	1829.2	2036.2
		WBL	221.0	148.6	220.5	5.79	1828.9	2035.8
4:30	4:45	NBR	20.1	12.6	20.0	1.35	127.7	327.9
		NBT	47.5	37.5	47.4	0.80	153.5	328.3
		NBL	95.0	72.1	95.3	2.12	154.0	328.6
		SBR	241.3	161.3	240.9	6.02	478.3	644.1
		SBT	255.8	187.4	254.9	5.15	479.5	645.0
		SBL	190.2	127.8	189.2	4.78	478.7	645.1
		EBR	32.3	20.2	32.2	0.97	205.4	534.2
		EBT	36.7	23.7	36.6	0.76	212.7	534.9
		EBL	71.7	57.3	71.8	1.83	213.2	535.4
		WBR	253.8	177.0	253.9	5.74	1821.8	2035.1
		WBT	257.6	174.9	257.0	5.82	1822.2	2035.5
		WBL	221.5	150.1	221.4	5.75	1821.9	2035.1

Table 9.9c Intersection 3500S: 2030 Minor Improvements (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	18.3	11.1	18.3	1.27	169.6	375.6
		NBT	44.3	34.8	44.4	0.75	201.8	378.9
		NBL	117.4	88.7	117.0	2.59	202.3	379.1
		SBR	262.4	172.4	261.9	6.48	482.3	646.6
		SBT	280.3	201.3	279.7	5.70	483.5	647.4
		SBL	216.8	143.1	215.7	5.31	482.9	647.5
		EBR	32.7	20.8	32.6	0.90	227.7	537.0
		EBT	35.9	22.8	35.7	0.75	236.6	537.7
		EBL	82.7	66.4	82.8	2.03	237.0	538.1
		WBR	257.7	179.1	256.5	5.82	1825.1	2039.0
		WBT	257.6	174.7	257.1	5.82	1825.5	2039.4
		WBL	225.8	153.2	225.2	5.83	1825.1	2039.1
5:00	5:15	NBR	21.3	13.3	20.7	1.40	138.6	355.5
		NBT	45.6	36.1	45.8	0.75	160.3	355.8
		NBL	103.3	77.8	103.9	2.26	160.7	356.1
		SBR	271.7	179.6	271.5	6.77	482.8	646.5
		SBT	286.6	205.3	285.8	5.92	484.0	647.4
		SBL	220.9	146.3	220.5	5.42	483.3	647.5
		EBR	35.9	23.2	35.7	1.00	236.1	548.3
		EBT	37.3	23.5	37.1	0.79	246.5	549.0
		EBL	89.6	72.2	89.9	2.23	247.0	549.5
		WBR	249.9	173.4	249.2	5.76	1818.0	2037.7
		WBT	253.6	171.8	253.1	5.70	1818.4	2038.0
		WBL	220.3	147.1	220.7	5.88	1818.1	2037.7
5:15	5:30	NBR	20.2	13.0	21.0	1.36	139.1	328.3
		NBT	46.3	36.4	46.1	0.77	164.3	328.6
		NBL	97.3	74.2	97.4	2.04	164.7	328.9
		SBR	273.0	180.5	273.0	6.75	485.7	645.1
		SBT	293.5	211.5	293.3	5.89	486.8	646.0
		SBL	224.2	148.9	223.8	5.31	486.1	646.1
		EBR	32.5	20.5	32.3	0.91	211.3	537.4
		EBT	36.5	23.0	36.2	0.75	218.4	538.1
		EBL	77.8	62.6	77.9	1.88	218.8	538.5
		WBR	253.3	180.0	254.0	5.68	1822.9	2037.4
		WBT	254.8	175.8	254.4	5.64	1823.2	2037.8
		WBL	216.9	146.6	216.7	5.56	1822.9	2037.5

Table 9.9c Intersection 3500S: 2030 Minor Improvements (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	22.8	14.9	23.5	1.51	122.1	327.0
		NBT	45.1	35.7	44.6	0.75	145.2	327.4
		NBL	90.4	68.3	89.9	1.95	145.5	327.7
		SBR	270.8	176.1	270.0	6.81	482.2	646.6
		SBT	287.8	204.6	287.5	6.05	483.4	647.5
		SBL	219.5	143.4	217.9	5.60	482.6	647.6
		EBR	33.3	21.4	33.0	0.91	250.8	564.6
		EBT	36.9	23.5	36.9	0.76	264.0	565.3
		EBL	97.1	78.5	97.4	2.30	264.4	565.8
		WBR	253.7	178.5	253.9	5.78	1819.2	2035.7
		WBT	255.0	173.9	254.7	5.71	1819.6	2036.1
		WBL	216.5	147.4	215.9	5.67	1819.3	2035.7
5:45	6:00	NBR	22.9	14.1	22.7	1.57	160.3	336.2
		NBT	48.9	37.9	48.8	0.87	174.6	336.5
		NBL	101.0	76.8	100.7	2.09	175.0	336.8
		SBR	265.1	173.7	265.5	6.68	486.7	642.4
		SBT	283.5	203.1	283.5	5.80	487.7	643.3
		SBL	217.9	145.2	217.6	5.47	487.0	643.4
		EBR	32.1	19.9	32.2	0.87	239.5	562.1
		EBT	37.1	23.7	36.9	0.77	249.0	562.8
		EBL	92.3	74.4	91.3	2.23	249.4	563.2
		WBR	246.3	174.0	246.7	5.48	1815.5	2037.3
		WBT	252.3	174.0	251.8	5.56	1815.9	2037.7
		WBL	217.0	148.1	216.7	5.53	1815.5	2037.4

Table 9.9d Intersection 3500S: 2030 No TSP

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	13.9	8.5	13.3	1.28	308.3	609.1
		NBT	44.2	35.5	43.6	0.89	356.2	612.3
		NBL	160.9	135.5	160.9	2.23	360.6	612.7
		NBL UT	93.8	79.2	94.3	1.25	360.6	612.7
		SBR	28.6	16.2	28.9	2.01	198.1	369.9
		SBT	47.1	38.3	47.2	1.11	206.3	370.8
		SBL	64.1	56.7	65.1	0.96	208.3	370.8
		SBL UT	67.1	60.7	66.1	1.06	208.3	370.8
		EBR	62.1	46.1	62.3	1.79	190.8	283.2
		EBT	49.1	29.1	49.1	0.96	388.5	566.6
		EBL	140.4	118.7	139.8	2.86	193.2	282.6
		WBR	206.9	125.0	207.6	5.86	1666.5	2000.0
		WBT	213.2	132.0	213.8	5.60	1679.9	2000.6
		WBL	169.1	99.5	168.3	5.48	1679.6	2000.4
		BRT NBT	31.1	6.2	31.1	0.50	0.4	32.8
		BRT SBT	24.1	2.6	24.1	0.40	0.2	18.4
4:15	4:30	NBR	16.8	9.8	16.7	1.51	619.2	861.7
		NBT	42.9	33.3	42.4	0.85	627.3	864.9
		NBL	279.1	232.6	278.3	4.08	627.9	865.3
		NBL UT	224.3	189.2	225.7	3.52	627.9	865.3
		SBR	36.2	20.2	36.2	2.62	239.9	369.5
		SBT	57.0	46.6	57.3	1.32	244.5	370.4
		SBL	61.0	52.8	60.8	1.03	245.3	370.5
		SBL UT	70.4	63.6	70.2	1.12	245.3	370.5
		EBR	81.3	63.8	82.0	2.46	207.2	287.6
		EBT	55.0	32.6	54.7	1.04	416.7	575.3
		EBL	183.9	155.4	184.9	4.46	207.5	287.0
		WBR	215.9	129.2	214.9	6.25	1771.8	1999.0
		WBT	223.3	135.3	223.8	5.98	1772.4	1999.7
		WBL	182.6	103.8	182.1	5.99	1772.1	1999.4
		BRT NBT	41.1	13.6	40.6	0.90	1.6	46.3
		BRT SBT	34.0	5.3	34.0	0.95	0.8	46.2

Table 9.9d Intersection 3500S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:30	4:45	NBR	19.5	11.3	19.6	1.51	802.6	1073.6
		NBT	42.2	31.1	42.5	0.86	807.5	1076.8
		NBL	387.8	321.7	387.3	5.96	808.0	1077.2
		NBL UT	333.6	277.7	336.6	5.08	808.0	1077.2
		SBR	36.8	20.8	36.5	2.66	243.9	373.7
		SBT	57.5	47.1	57.2	1.35	247.4	374.6
		SBL	58.6	49.6	58.5	1.11	247.9	374.7
		SBL UT	76.5	70.1	74.9	1.13	247.9	374.7
		EBR	88.7	71.5	88.4	2.82	196.5	284.1
		EBT	51.4	30.6	51.3	0.99	394.6	568.3
		EBL	181.9	156.8	182.0	3.71	196.4	283.5
		WBR	208.1	126.3	206.5	5.88	1766.8	1996.8
		WBT	217.4	132.7	218.9	5.78	1767.4	1997.5
		WBL	177.5	102.6	178.4	5.73	1767.1	1997.2
		BRT NBT	38.1	10.0	38.1	1.00	0.6	45.6
		BRT SBT	27.5	4.1	27.7	0.55	0.7	46.1
4:45	5:00	NBR	19.8	10.4	19.5	1.32	934.5	1179.1
		NBT	44.5	31.3	45.0	0.83	937.7	1182.3
		NBL	468.0	382.7	468.3	7.67	938.1	1182.7
		NBL UT	280.9	229.6	281.2	4.74	938.1	1182.7
		SBR	39.8	23.8	40.2	2.75	252.4	366.8
		SBT	58.1	47.0	57.7	1.47	255.2	367.7
		SBL	54.7	46.0	54.4	1.06	255.2	367.7
		SBL UT	73.5	66.9	72.8	1.12	255.2	367.7
		EBR	82.8	65.5	83.7	2.64	191.4	284.6
		EBT	54.7	33.6	54.6	1.07	386.5	569.1
		EBL	170.8	146.0	166.9	3.76	192.2	283.9
		WBR	216.3	131.2	214.8	6.06	1769.4	2002.0
		WBT	221.1	134.1	220.0	5.93	1770.0	2002.7
		WBL	179.6	103.0	179.0	5.78	1769.7	2002.4
		BRT NBT	37.5	10.7	37.4	0.85	1.3	46.4
		BRT SBT	57.4	30.9	57.9	0.85	2.0	36.9

Table 9.9d Intersection 3500S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:00	5:15	NBR	20.7	10.7	20.2	1.59	827.4	1048.3
		NBT	42.8	32.6	42.9	0.83	830.6	1051.5
		NBL	453.9	364.7	453.5	8.00	831.0	1051.9
		NBL UT	373.7	302.1	371.4	6.17	831.0	1051.9
		SBR	36.7	21.3	37.0	2.58	253.9	373.3
		SBT	58.2	47.0	58.1	1.44	256.6	374.2
		SBL	52.5	42.2	52.2	1.26	256.8	374.2
		SBL UT	70.3	63.1	70.0	1.16	256.8	374.2
		EBR	80.5	64.1	80.5	2.09	211.1	283.6
		EBT	56.5	33.7	56.6	1.08	424.1	567.4
		EBL	199.7	171.2	198.0	4.17	211.4	283.0
		WBR	217.5	130.4	215.8	6.19	1771.1	2000.1
		WBT	220.8	133.4	219.7	6.16	1771.4	2000.7
		WBL	183.2	107.4	183.8	6.10	1771.1	2000.5
		BRT NBT	32.7	6.9	32.7	0.60	0.5	41.9
		BRT SBT	39.2	13.6	39.2	0.70	1.2	46.1
5:15	5:30	NBR	20.7	12.5	20.4	1.77	897.1	1144.4
		NBT	42.7	31.1	42.1	0.86	900.3	1147.6
		NBL	413.7	336.3	414.2	6.93	900.7	1148.0
		NBL UT	364.2	295.8	364.2	6.22	900.7	1148.0
		SBR	40.2	23.3	39.6	2.89	255.7	370.1
		SBT	59.0	47.7	59.5	1.50	258.2	371.0
		SBL	52.6	43.2	52.0	1.15	257.8	371.0
		SBL UT	74.0	67.6	74.1	1.18	257.8	371.0
		EBR	69.5	53.5	68.2	1.95	199.2	284.2
		EBT	54.8	32.8	54.5	1.06	400.3	568.6
		EBL	194.6	167.0	193.9	4.11	199.6	283.6
		WBR	213.4	126.8	213.2	6.31	1774.7	1998.1
		WBT	222.8	135.4	221.7	6.03	1775.3	1998.8
		WBL	178.0	101.2	176.8	5.93	1775.0	1998.5
		BRT NBT	38.9	11.4	38.6	0.85	1.4	46.3
		BRT SBT	36.2	9.0	37.2	0.85	0.7	32.2

Table 9.9d Intersection 3500S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	22.9	13.9	23.5	1.55	1005.7	1227.0
		NBT	46.3	31.5	45.9	0.86	1016.2	1230.2
		NBL	488.0	394.5	488.7	8.40	1017.3	1230.6
		NBL UT	378.7	303.5	379.1	6.67	1017.3	1230.6
		SBR	39.5	23.3	39.3	2.74	256.6	373.3
		SBT	59.8	48.8	59.4	1.42	259.2	374.2
		SBL	52.6	43.0	52.2	1.10	259.0	374.2
		SBL UT	71.3	64.8	72.2	1.15	259.0	374.2
		EBR	87.1	68.1	86.8	2.53	204.1	284.5
		EBT	58.3	34.6	58.2	1.11	416.1	569.1
		EBL	207.5	179.0	208.3	5.00	207.1	283.9
		WBR	215.9	133.3	216.3	5.93	1765.4	2010.4
		WBT	220.4	136.8	219.6	5.83	1766.0	2011.1
		WBL	182.0	107.9	180.6	5.70	1765.7	2010.8
		BRT NBT	34.9	7.3	34.9	0.90	0.5	45.9
		BRT SBT	27.2	3.7	28.0	0.55	0.6	46.3
5:45	6:00	NBR	18.5	7.7	18.4	1.31	970.5	1195.7
		NBT	44.7	32.3	44.8	0.84	983.4	1198.9
		NBL	496.4	400.7	495.3	8.66	984.4	1199.3
		NBL UT	402.6	323.6	402.9	6.96	984.4	1199.3
		SBR	37.7	22.7	37.4	2.54	257.6	370.7
		SBT	58.8	48.3	58.5	1.34	259.8	371.5
		SBL	53.6	43.5	53.5	1.26	259.6	371.6
		SBL UT	79.3	71.4	78.7	1.19	259.6	371.6
		EBR	86.1	67.0	85.5	2.36	215.9	286.2
		EBT	60.4	35.3	60.6	1.18	433.7	568.4
		EBL	216.0	186.6	215.2	4.50	216.2	285.6
		WBR	203.1	123.0	203.1	5.68	1746.5	2004.5
		WBT	213.5	133.0	212.3	5.54	1747.1	2005.2
		WBL	166.7	98.2	166.1	5.32	1746.8	2004.9
		BRT NBT	37.9	10.6	37.6	0.90	1.3	46.4
		BRT SBT	28.8	3.6	28.7	0.65	0.3	27.8

Table 9.9e Intersection 3500S: 2030 TSP

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	20.0	13.3	19.9	1.80	292.1	624.3
		NBT	42.7	34.0	42.1	0.87	358.0	627.5
		NBL	163.4	137.6	164.0	2.26	362.1	627.9
		NBL UT	86.5	71.4	86.5	1.21	362.1	627.9
		SBR	27.0	15.4	26.9	1.85	193.7	372.7
		SBT	46.0	37.8	46.0	0.98	203.5	373.6
		SBL	65.7	58.2	66.3	1.00	205.3	373.6
		SBL UT	65.1	58.6	66.0	1.07	205.3	373.6
		EBR	60.4	44.5	60.6	1.75	186.1	284.4
		EBT	50.2	30.6	50.4	0.97	382.4	568.9
		EBL	138.1	116.5	137.6	2.94	190.6	283.8
		WBR	214.5	131.1	215.2	6.03	1673.8	1997.4
		WBT	222.6	139.8	222.7	5.76	1687.2	1998.0
		WBL	179.3	108.1	178.1	5.69	1686.8	1997.8
		BRT NBT	32.4	5.8	32.4	0.60	0.4	41.9
		BRT SBT	25.7	8.0	25.7	0.10	0.4	4.6
4:15	4:30	NBR	18.4	12.5	17.5	1.41	613.0	849.1
		NBT	42.4	32.4	42.1	0.88	624.7	852.2
		NBL	253.7	211.9	255.2	3.74	628.5	852.7
		NBL UT	239.1	200.8	238.0	3.39	628.5	852.7
		SBR	33.1	18.8	33.6	2.41	224.8	370.8
		SBT	52.9	42.1	52.4	1.42	229.9	371.7
		SBL	63.5	54.3	64.0	1.17	230.3	371.7
		SBL UT	68.5	60.9	69.2	1.23	230.3	371.7
		EBR	82.3	62.7	82.0	2.50	217.3	284.7
		EBT	57.8	34.1	57.7	1.10	434.4	569.6
		EBL	164.4	136.9	164.2	3.68	216.2	284.1
		WBR	222.5	133.0	222.0	6.42	1780.2	1998.4
		WBT	234.0	142.9	234.5	6.24	1780.5	1999.1
		WBL	179.2	101.6	179.0	5.93	1780.3	1998.8
		BRT NBT	39.3	11.7	38.5	0.95	1.4	46.3
		BRT SBT	25.4	3.2	25.0	0.45	0.5	36.4

Table 9.9e Intersection 3500S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:30	4:45	NBR	19.5	10.6	19.1	1.62	809.5	1054.9
		NBT	42.3	32.0	42.3	0.82	814.3	1058.1
		NBL	388.9	321.8	388.8	6.05	815.8	1058.5
		NBL UT	304.3	252.0	302.1	4.84	815.8	1058.5
		SBR	35.5	19.9	35.4	2.64	234.2	368.3
		SBT	54.0	43.9	54.1	1.35	238.1	369.1
		SBL	59.0	49.8	58.8	1.21	238.6	369.2
		SBL UT	74.6	68.1	74.0	1.15	238.6	369.2
		EBR	76.9	60.5	76.6	2.27	201.3	284.1
		EBT	55.0	33.2	55.0	1.07	404.2	568.3
		EBL	178.2	150.8	177.3	3.70	201.5	283.5
		WBR	214.7	131.4	215.4	6.05	1771.6	1996.5
		WBT	224.2	138.7	225.5	5.89	1772.1	1997.2
		WBL	182.1	106.1	180.7	5.84	1771.9	1997.0
		BRT NBT	39.3	11.3	39.3	0.90	0.7	45.6
		BRT SBT	35.6	14.1	35.9	0.40	1.3	46.1
4:45	5:00	NBR	19.6	11.1	19.7	1.33	937.8	1199.0
		NBT	44.7	32.5	45.6	0.81	941.0	1202.2
		NBL	448.9	366.5	449.0	7.39	941.4	1202.6
		NBL UT	276.5	226.2	275.5	4.51	941.4	1202.6
		SBR	36.0	20.0	35.8	2.67	236.0	371.3
		SBT	53.5	43.0	53.8	1.38	239.8	372.1
		SBL	57.9	49.7	57.9	1.01	240.4	372.2
		SBL UT	66.4	60.0	67.0	1.03	240.4	372.2
		EBR	76.4	58.1	75.2	2.55	196.4	284.8
		EBT	56.9	35.8	56.8	1.07	396.2	569.7
		EBL	168.2	143.4	165.0	3.77	197.5	284.2
		WBR	221.0	133.3	219.6	6.18	1777.6	1999.5
		WBT	227.1	138.9	226.6	6.06	1778.2	2000.2
		WBL	182.8	105.9	181.1	5.80	1777.9	1999.9
		BRT NBT	37.4	10.5	37.3	0.85	1.3	46.4
		BRT SBT	22.7	2.0	23.1	0.35	0.0	4.5

Table 9.9e Intersection 3500S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:00	5:15	NBR	20.4	13.0	19.9	1.58	856.2	1117.1
		NBT	43.6	32.7	43.6	0.83	859.4	1120.3
		NBL	501.2	405.6	500.5	8.47	859.8	1120.7
		NBL UT	351.0	283.6	352.1	5.88	859.8	1120.7
		SBR	37.3	21.6	37.2	2.76	248.0	372.3
		SBT	57.9	47.3	58.2	1.38	251.1	373.1
		SBL	55.2	46.6	55.8	1.15	251.6	373.2
		SBL UT	72.4	65.4	73.0	1.14	251.6	373.2
		EBR	65.2	48.8	65.0	1.84	219.3	283.9
		EBT	57.5	33.1	57.3	1.10	438.6	567.9
		EBL	199.3	169.4	200.8	4.47	218.3	283.3
		WBR	211.6	126.5	211.3	5.99	1774.8	2001.8
		WBT	222.8	134.2	221.8	6.03	1775.4	2002.5
		WBL	179.3	103.4	179.0	5.87	1775.1	2002.2
		BRT NBT	32.8	7.3	32.8	0.60	0.5	32.7
		BRT SBT	20.4	1.5	20.4	0.20	0.6	46.1
5:15	5:30	NBR	20.7	10.4	20.2	1.74	936.9	1175.8
		NBT	44.4	33.3	44.3	0.88	940.1	1179.0
		NBL	469.9	387.0	469.2	7.77	940.5	1179.4
		NBL UT	281.0	230.2	281.1	4.82	940.5	1179.4
		SBR	38.8	22.4	39.1	2.74	250.9	373.3
		SBT	57.1	46.4	57.1	1.34	253.3	374.2
		SBL	55.2	46.4	54.7	1.10	253.4	374.2
		SBL UT	71.6	64.6	69.7	1.15	253.4	374.2
		EBR	84.0	66.8	84.5	2.45	193.9	285.5
		EBT	58.1	35.7	57.9	1.13	391.5	571.2
		EBL	182.1	155.9	182.9	3.74	195.0	284.9
		WBR	221.7	134.4	220.4	6.34	1780.5	1999.2
		WBT	227.7	139.1	227.1	6.13	1781.0	1999.8
		WBL	187.7	108.5	188.5	6.07	1780.8	1999.6
		BRT NBT	39.4	11.6	39.9	1.00	1.4	46.3
		BRT SBT	31.6	7.4	31.4	0.60	0.4	9.3

Table 9.9e Intersection 3500S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	19.1	11.4	18.7	1.50	1025.8	1246.0
		NBT	45.3	31.8	45.1	0.81	1030.0	1249.2
		NBL	489.1	397.7	489.1	8.30	1030.5	1249.6
		NBL UT	296.8	244.5	296.1	4.56	1030.5	1249.6
		SBR	35.9	21.1	35.7	2.46	248.0	371.4
		SBT	57.7	47.2	57.6	1.34	250.8	372.3
		SBL	56.0	46.9	55.6	1.12	251.1	372.4
		SBL UT	68.5	62.2	68.1	1.07	251.1	372.4
		EBR	72.7	57.0	72.0	2.01	206.9	284.9
		EBT	57.5	35.0	57.6	1.09	417.3	570.0
		EBL	199.9	174.8	200.1	4.06	207.8	284.3
		WBR	212.9	129.0	212.6	6.04	1774.8	2002.3
		WBT	221.3	136.0	221.2	5.97	1775.4	2002.9
		WBL	181.6	107.0	182.1	5.77	1775.1	2002.7
		BRT NBT	35.0	7.6	35.0	0.80	0.5	45.9
		BRT SBT	30.8	4.7	31.1	0.75	1.4	45.9
5:45	6:00	NBR	19.8	11.7	19.6	1.30	994.5	1238.2
		NBT	45.3	32.5	44.8	0.84	1002.3	1241.4
		NBL	506.3	409.8	504.8	8.86	1002.7	1241.8
		NBL UT	437.7	352.8	438.9	7.61	1002.7	1241.8
		SBR	36.7	20.7	36.4	2.73	256.9	369.9
		SBT	57.6	46.6	57.8	1.46	259.2	370.7
		SBL	53.1	44.4	52.4	1.10	259.2	370.8
		SBL UT	72.7	66.1	73.5	1.16	259.2	370.8
		EBR	93.8	74.5	93.7	2.67	207.2	287.3
		EBT	59.9	35.5	60.0	1.15	421.0	570.6
		EBL	230.4	199.7	229.5	4.50	209.3	286.7
		WBR	221.4	136.9	221.6	6.12	1759.0	2002.9
		WBT	227.5	141.4	227.7	6.04	1759.6	2003.6
		WBL	182.0	106.8	182.3	5.85	1759.3	2003.3
		BRT NBT	37.1	9.4	36.7	0.95	1.2	46.4
		BRT SBT	40.0	17.3	40.2	0.45	0.8	13.9

Table 9.10a Intersection 4100S: 2009

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	16.1	5.8	16.0	1.33	3.5	68.3
		NBT	47.2	34.1	46.8	0.93	131.8	432.1
		NBL	32.2	22.3	32.0	1.05	29.8	233.3
		SBR	20.1	7.9	19.6	1.17	7.2	93.4
		SBT	52.9	34.2	52.5	0.94	202.6	612.0
		SBL	33.2	22.3	33.4	0.97	38.2	249.5
		EBR	32.4	23.5	32.7	0.92	80.8	279.4
		EBT	39.9	30.0	39.8	0.75	82.0	279.4
		EBL	40.2	32.7	40.0	1.00	46.8	196.8
		WBR	35.6	26.6	35.0	0.93	106.9	367.0
		WBT	47.3	34.7	47.4	0.83	108.0	367.1
		WBL	41.5	31.4	41.7	1.09	31.9	191.0
4:15	4:30	NBR	14.5	5.4	14.2	1.29	3.8	76.4
		NBT	43.7	31.3	43.1	0.88	109.6	353.8
		NBL	31.7	22.3	31.5	1.04	26.7	184.3
		SBR	22.0	8.8	21.7	1.20	9.5	119.1
		SBT	50.6	31.9	50.0	0.93	177.7	603.6
		SBL	31.7	21.1	31.6	0.96	32.1	205.0
		EBR	37.7	28.3	37.7	0.95	90.1	292.8
		EBT	42.3	32.0	42.2	0.80	91.2	292.8
		EBL	40.1	33.4	39.1	1.04	21.9	142.0
		WBR	49.9	36.9	49.9	1.09	198.4	587.3
		WBT	57.8	41.2	57.4	0.97	199.1	587.4
		WBL	66.9	51.3	67.0	1.50	79.7	435.3
4:30	4:45	NBR	14.4	4.9	14.4	1.18	3.6	64.9
		NBT	43.8	31.0	43.3	0.88	147.1	466.2
		NBL	29.7	20.5	29.4	1.01	23.9	176.3
		SBR	21.4	8.7	21.2	1.17	14.1	168.6
		SBT	47.1	29.6	46.7	0.93	159.8	566.9
		SBL	28.3	18.1	28.2	0.97	28.2	199.0
		EBR	39.3	28.6	40.2	1.14	78.1	289.7
		EBT	41.6	31.6	41.7	0.81	79.5	289.7
		EBL	37.9	32.0	37.9	1.09	20.1	106.2
		WBR	49.1	35.3	48.6	1.13	155.9	528.6
		WBT	54.1	38.9	53.8	0.93	156.7	528.7
		WBL	57.1	43.4	56.7	1.33	52.2	311.7

Table 9.10a Intersection 4100S: 2009 (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	14.0	4.8	13.8	1.27	4.9	82.6
		NBT	46.4	33.7	45.7	0.91	84.8	363.9
		NBL	31.6	21.5	31.4	1.06	38.9	222.6
		SBR	20.6	7.6	20.5	1.13	9.2	111.3
		SBT	50.1	32.3	49.9	0.92	147.4	501.3
		SBL	29.5	18.8	29.2	0.88	33.7	213.9
		EBR	36.6	27.3	36.6	0.96	75.3	263.8
		EBT	39.9	30.2	39.6	0.77	76.9	263.8
		EBL	39.8	32.7	39.5	1.07	36.7	185.8
		WBR	55.7	42.0	56.1	1.17	196.2	529.1
		WBT	61.6	45.2	61.6	1.02	196.7	529.1
		WBL	71.8	54.3	71.3	1.72	109.8	477.1
5:00	5:15	NBR	13.4	3.7	13.1	1.27	4.0	79.8
		NBT	49.4	36.3	49.1	0.93	100.5	339.5
		NBL	36.3	26.4	36.3	1.08	33.1	208.7
		SBR	30.9	14.0	30.9	1.44	12.0	137.8
		SBT	63.4	40.2	62.8	1.07	311.5	686.1
		SBL	41.7	26.7	41.3	1.09	38.3	231.9
		EBR	39.0	29.4	38.5	1.06	78.0	271.0
		EBT	38.6	28.8	38.1	0.74	79.1	271.0
		EBL	40.5	32.9	40.3	1.09	38.9	184.8
		WBR	41.5	29.0	41.7	1.11	130.0	453.3
		WBT	50.2	35.6	50.8	0.89	130.7	453.4
		WBL	59.4	43.0	59.5	1.58	71.4	343.2
5:15	5:30	NBR	13.8	4.6	13.8	1.25	4.2	65.0
		NBT	41.4	29.2	41.0	0.86	106.0	401.8
		NBL	41.9	30.5	41.3	1.19	52.3	268.6
		SBR	38.6	17.8	38.5	1.44	28.3	247.8
		SBT	64.2	39.1	63.8	1.07	290.2	691.5
		SBL	42.9	26.8	43.0	1.12	31.5	216.9
		EBR	41.5	31.8	41.1	1.09	79.5	248.2
		EBT	41.5	31.6	41.9	0.80	80.5	248.2
		EBL	39.0	32.2	38.0	1.05	26.0	156.8
		WBR	57.2	43.0	56.9	1.18	237.1	647.5
		WBT	66.9	47.7	66.7	1.08	237.7	647.6
		WBL	71.5	52.5	70.3	1.59	110.1	524.3

Table 9.10a Intersection 4100S: 2009 (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	13.2	4.3	13.2	1.24	2.0	50.4
		NBT	48.2	35.2	47.5	0.93	98.2	350.9
		NBL	37.6	27.3	37.3	1.11	40.2	228.2
		SBR	34.2	15.8	34.1	1.44	9.9	124.3
		SBT	65.4	41.7	65.1	1.10	313.1	685.6
		SBL	43.0	26.9	42.7	1.14	42.6	287.4
		EBR	41.7	31.7	41.2	1.07	72.7	252.0
		EBT	38.5	29.0	38.4	0.77	74.2	252.0
		EBL	36.7	29.8	36.5	1.08	29.5	146.9
		WBR	52.2	38.1	53.0	1.21	176.5	579.5
		WBT	60.6	43.6	60.3	1.00	177.1	579.6
		WBL	60.9	44.6	60.9	1.45	67.4	403.6
5:45	6:00	NBR	14.6	4.6	14.4	1.21	5.9	98.5
		NBT	44.3	31.5	44.2	0.91	96.6	379.9
		NBL	35.2	25.0	34.6	1.06	35.7	226.0
		SBR	32.2	14.7	32.2	1.37	17.7	178.9
		SBT	58.0	35.1	57.6	1.03	238.6	674.5
		SBL	36.8	22.5	36.4	1.04	27.0	215.3
		EBR	41.1	30.2	41.5	1.16	81.2	258.6
		EBT	41.9	31.7	41.5	0.82	82.6	258.6
		EBL	44.9	38.0	44.7	1.17	29.3	148.1
		WBR	59.5	44.0	59.4	1.28	255.1	680.0
		WBT	67.3	48.0	67.3	1.10	255.4	680.1
		WBL	80.0	59.9	80.5	1.74	156.6	631.4

Table 9.10b Intersection 4100S: 2030 No Action

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	16.3	8.4	16.2	1.40	5.2	80.5
		NBT	37.8	26.6	37.4	0.82	49.1	229.0
		NBL	37.5	27.1	37.2	1.07	48.6	252.2
		SBR	17.5	5.3	17.3	0.83	10.0	116.6
		SBT	30.9	17.1	30.3	0.74	115.2	609.1
		SBL	24.3	13.5	24.0	0.77	20.4	118.6
		EBR	35.5	25.0	35.5	0.92	146.3	475.6
		EBT	41.5	29.9	41.4	0.81	146.9	475.6
		EBL	65.5	52.9	65.7	1.68	71.5	232.6
		WBR	51.0	37.1	50.6	1.18	299.3	726.5
		WBT	61.5	40.7	61.3	1.15	299.7	726.6
		WBL	135.5	104.7	135.2	3.43	269.4	648.8
4:15	4:30	NBR	17.3	9.4	17.0	1.41	5.5	85.7
		NBT	37.7	26.6	37.3	0.80	45.2	193.5
		NBL	31.9	22.4	31.9	0.96	43.2	222.5
		SBR	13.5	3.2	13.5	0.62	4.9	85.0
		SBT	28.3	15.2	27.9	0.72	84.2	552.1
		SBL	18.9	9.4	18.7	0.60	13.1	97.9
		EBR	38.7	27.4	38.4	0.97	153.7	542.0
		EBT	41.9	30.3	41.9	0.82	154.2	542.0
		EBL	67.6	54.6	68.0	1.75	75.6	238.7
		WBR	50.7	36.5	50.7	1.20	284.8	705.0
		WBT	60.6	40.7	60.5	1.16	285.3	705.1
		WBL	129.9	100.6	130.6	3.39	249.6	683.9
4:30	4:45	NBR	17.7	9.3	17.2	1.42	6.2	80.8
		NBT	38.5	27.2	38.1	0.81	45.3	205.7
		NBL	35.2	25.3	34.7	1.05	47.6	287.0
		SBR	14.1	3.6	13.7	0.66	6.6	92.3
		SBT	27.3	14.5	27.0	0.70	89.2	568.1
		SBL	19.2	9.9	18.8	0.62	14.0	105.6
		EBR	42.5	29.2	43.0	1.18	172.6	590.6
		EBT	45.7	33.0	45.6	0.92	172.9	590.6
		EBL	66.2	53.6	66.2	1.64	73.1	247.2
		WBR	54.1	38.0	54.2	1.24	326.2	746.2
		WBT	67.7	43.6	67.5	1.32	326.6	746.2
		WBL	157.1	120.6	156.6	4.00	321.8	728.5

Table 9.10b Intersection 4100S: 2030 No Action (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	14.9	7.1	14.4	1.21	5.0	71.2
		NBT	37.8	26.5	37.6	0.81	43.8	212.2
		NBL	34.7	24.5	34.6	1.01	46.5	269.2
		SBR	13.5	3.5	13.3	0.62	4.1	70.7
		SBT	26.7	14.2	26.5	0.68	75.7	520.6
		SBL	18.4	9.1	18.2	0.64	12.6	116.3
		EBR	37.9	26.9	37.6	0.95	153.4	550.1
		EBT	41.8	29.8	41.7	0.83	154.1	550.1
		EBL	77.9	63.7	77.7	1.85	91.9	303.3
		WBR	52.0	37.7	51.9	1.19	261.9	723.9
		WBT	59.4	40.2	59.2	1.10	262.4	723.9
		WBL	125.7	97.0	125.9	3.30	231.0	701.3
5:00	5:15	NBR	16.8	8.2	16.4	1.26	6.2	91.5
		NBT	39.1	27.6	38.4	0.83	47.0	225.3
		NBL	33.9	24.1	34.0	1.01	45.8	249.8
		SBR	14.6	3.7	14.5	0.70	6.0	85.3
		SBT	29.4	15.8	29.0	0.73	102.7	585.4
		SBL	19.6	9.6	19.2	0.63	14.2	99.9
		EBR	40.4	28.2	40.1	1.16	157.4	543.0
		EBT	42.9	31.0	42.5	0.86	158.0	543.0
		EBL	70.2	56.9	70.1	1.79	77.5	252.2
		WBR	46.8	33.2	46.6	1.21	254.7	686.3
		WBT	58.0	38.3	58.0	1.09	255.1	686.3
		WBL	120.8	93.7	121.4	3.14	223.2	627.1
5:15	5:30	NBR	16.5	8.7	16.3	1.39	5.0	91.1
		NBT	38.1	26.8	37.6	0.81	43.8	218.8
		NBL	35.6	25.4	35.0	1.04	43.6	279.4
		SBR	13.4	3.6	13.0	0.60	4.8	84.6
		SBT	26.5	13.9	26.3	0.66	73.4	500.0
		SBL	18.6	9.4	18.2	0.62	11.4	94.2
		EBR	45.8	30.9	46.0	1.40	174.6	561.8
		EBT	45.5	32.7	45.2	0.90	175.0	561.8
		EBL	75.2	61.3	75.5	1.88	85.5	314.3
		WBR	43.5	30.9	44.1	1.07	219.3	649.6
		WBT	53.7	35.6	53.4	0.98	220.0	649.7
		WBL	109.1	84.3	108.1	2.96	188.6	616.5

Table 9.10b Intersection 4100S: 2030 No Action (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	17.8	9.3	17.8	1.39	5.3	80.8
		NBT	37.8	27.2	37.0	0.76	43.9	226.0
		NBL	33.5	23.7	33.2	0.98	41.3	239.1
		SBR	13.7	3.5	13.7	0.60	4.7	78.3
		SBT	25.9	13.5	25.5	0.64	72.3	479.4
		SBL	18.1	9.2	17.8	0.67	13.0	121.8
		EBR	45.8	32.6	46.8	1.19	170.5	538.5
		EBT	43.6	31.0	43.7	0.87	171.1	538.5
		EBL	63.0	50.1	63.7	1.61	65.4	259.8
		WBR	43.8	32.1	43.6	1.02	238.2	653.2
		WBT	53.4	35.2	53.0	1.02	238.7	653.2
		WBL	115.7	90.7	116.5	2.92	207.9	607.0
5:45	6:00	NBR	16.7	9.1	16.9	1.26	4.6	74.7
		NBT	38.6	27.1	38.0	0.84	45.2	202.4
		NBL	33.1	23.6	33.4	0.97	44.0	228.7
		SBR	12.8	2.8	12.4	0.56	3.7	66.1
		SBT	26.1	13.2	25.7	0.67	72.5	501.2
		SBL	17.4	7.8	17.0	0.61	11.6	112.8
		EBR	49.9	35.8	50.2	1.29	185.7	603.7
		EBT	47.6	34.3	47.3	0.94	186.2	603.7
		EBL	62.1	49.4	62.7	1.61	61.1	260.8
		WBR	49.0	36.1	48.9	1.15	248.0	719.5
		WBT	55.8	36.9	55.1	1.07	248.5	719.5
		WBL	120.0	94.4	121.1	3.15	208.7	621.9

Table 9.10c Intersection 4100S: 2030 Minor Improvements

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	15.1	6.2	14.5	1.28	3.3	66.4
		NBT	35.9	23.2	35.5	0.77	45.6	225.1
		NBL	30.1	19.7	30.0	0.95	34.7	227.1
		SBR	12.3	2.7	11.8	0.55	3.3	62.3
		SBT	23.8	12.2	23.2	0.62	67.3	449.3
		SBL	16.0	8.8	15.8	0.66	13.4	116.9
		EBR	35.2	25.9	34.9	0.88	129.0	423.8
		EBT	41.6	30.4	41.7	0.81	129.7	423.8
		EBL	46.6	38.6	46.8	1.21	46.1	190.4
		WBR	14.1	10.5	14.4	0.37	148.0	491.5
		WBT	46.7	31.5	46.5	0.87	148.7	491.6
		WBL	57.0	46.1	56.7	1.55	61.5	206.6
4:15	4:30	NBR	17.4	7.4	17.1	1.38	4.3	82.7
		NBT	35.5	23.2	35.0	0.79	41.6	202.5
		NBL	28.8	18.9	28.5	0.96	32.2	206.2
		SBR	12.1	2.6	11.8	0.55	3.6	72.8
		SBT	22.8	11.3	22.2	0.59	60.8	452.9
		SBL	14.9	8.1	14.4	0.64	11.7	108.2
		EBR	37.4	27.1	36.8	0.93	130.6	447.8
		EBT	40.9	29.9	40.7	0.81	131.1	447.8
		EBL	41.7	33.7	41.8	1.13	39.3	180.0
		WBR	14.2	10.5	14.3	0.36	141.5	490.3
		WBT	45.7	30.8	45.3	0.86	142.3	490.4
		WBL	66.1	53.9	66.0	1.81	73.2	231.1
4:30	4:45	NBR	15.9	6.7	15.2	1.32	4.3	79.4
		NBT	36.8	24.2	36.5	0.81	42.9	219.6
		NBL	29.9	19.7	29.5	0.98	34.2	216.4
		SBR	12.2	2.5	11.8	0.54	3.5	70.7
		SBT	22.4	11.5	21.8	0.58	60.5	448.1
		SBL	14.5	7.3	14.1	0.61	11.3	104.7
		EBR	40.0	28.3	40.2	1.20	139.1	438.7
		EBT	43.0	31.4	42.9	0.89	139.8	438.7
		EBL	50.5	41.9	50.4	1.29	50.2	185.9
		WBR	14.2	10.6	14.6	0.35	137.5	460.0
		WBT	45.2	30.3	45.2	0.85	138.2	460.0
		WBL	65.9	54.0	64.9	1.79	68.6	227.1

Table 9.10c Intersection 4100S: 2030 Minor Improvements (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	16.8	6.8	16.8	1.29	3.8	68.8
		NBT	35.2	22.7	34.7	0.78	39.2	204.4
		NBL	31.6	20.5	31.4	0.98	38.0	243.4
		SBR	12.0	2.2	11.5	0.51	3.0	69.8
		SBT	21.9	10.8	21.4	0.55	55.5	415.1
		SBL	14.0	7.3	13.4	0.55	10.3	99.2
		EBR	34.1	24.5	33.8	0.94	127.2	464.8
		EBT	40.5	29.3	40.5	0.82	128.0	464.7
		EBL	46.1	37.8	46.4	1.17	44.2	183.2
		WBR	14.1	10.5	14.4	0.37	143.4	472.9
		WBT	46.4	31.6	45.8	0.88	144.1	472.9
		WBL	57.3	47.3	58.0	1.51	56.0	176.6
5:00	5:15	NBR	16.1	6.1	16.1	1.28	3.9	70.9
		NBT	35.2	22.4	34.9	0.80	41.3	213.6
		NBL	30.4	18.9	29.8	0.98	34.7	249.5
		SBR	13.1	3.0	12.6	0.58	4.6	71.9
		SBT	23.7	12.0	23.1	0.62	70.0	502.8
		SBL	15.6	8.5	15.2	0.65	12.1	121.2
		EBR	40.4	29.1	40.0	1.22	133.9	441.1
		EBT	41.6	30.4	41.4	0.86	134.5	441.1
		EBL	47.1	38.7	46.6	1.26	46.8	187.3
		WBR	15.3	11.4	15.1	0.43	141.7	454.3
		WBT	45.7	30.8	45.7	0.86	142.4	454.3
		WBL	64.7	52.9	64.7	1.71	70.5	225.2
5:15	5:30	NBR	15.2	5.6	14.6	1.30	3.5	67.3
		NBT	35.4	22.6	35.0	0.81	42.0	213.3
		NBL	29.4	19.1	29.0	0.92	33.4	209.4
		SBR	12.7	3.1	12.3	0.57	3.9	65.9
		SBT	21.5	10.5	20.9	0.59	59.2	467.5
		SBL	14.0	7.2	13.4	0.55	10.4	103.4
		EBR	48.5	34.9	48.4	1.55	151.3	476.0
		EBT	44.9	32.8	44.6	0.90	151.8	476.0
		EBL	47.3	38.7	47.3	1.27	45.5	192.2
		WBR	14.1	10.5	13.8	0.36	138.4	459.7
		WBT	44.2	29.9	44.0	0.85	139.0	459.7
		WBL	60.2	48.9	59.6	1.65	63.9	213.3

Table 9.10c Intersection 4100S: 2030 Minor Improvements (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	15.3	6.2	14.9	1.25	4.0	74.9
		NBT	36.3	23.7	35.7	0.80	42.1	198.5
		NBL	30.0	19.7	29.6	0.98	34.4	222.4
		SBR	11.3	1.6	10.9	0.45	2.6	69.5
		SBT	22.2	11.0	21.5	0.57	57.5	410.8
		SBL	14.5	7.6	14.1	0.58	11.4	93.1
		EBR	38.9	27.6	38.5	1.13	135.5	445.9
		EBT	40.3	29.0	40.5	0.84	136.1	445.9
		EBL	48.6	40.1	49.6	1.29	45.8	185.0
		WBR	15.4	11.7	15.3	0.38	143.3	482.9
		WBT	44.6	29.7	44.4	0.89	144.0	483.0
		WBL	64.7	52.9	65.2	1.75	67.0	223.6
5:45	6:00	NBR	16.2	6.8	15.9	1.17	4.1	70.7
		NBT	36.5	23.5	36.1	0.81	42.7	210.8
		NBL	32.8	21.2	32.6	0.99	40.4	245.8
		SBR	12.1	1.8	11.7	0.51	2.4	61.4
		SBT	23.4	11.4	22.7	0.58	62.3	476.4
		SBL	14.9	7.2	14.4	0.56	10.6	96.4
		EBR	45.4	33.0	45.6	1.32	147.3	465.1
		EBT	44.6	32.5	44.5	0.90	147.8	465.1
		EBL	45.0	36.6	44.7	1.19	43.1	184.8
		WBR	16.2	12.3	16.3	0.40	141.7	488.1
		WBT	45.6	30.8	45.4	0.88	142.2	488.1
		WBL	59.2	47.9	58.8	1.64	63.8	206.4

Table 9.10d Intersection 4100S: 2030 No TSP

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	7.8	2.9	7.5	1.09	0.8	49.4
		NBT	31.7	24.0	31.1	0.85	41.5	216.9
		NBL	66.0	55.0	65.8	1.13	109.7	384.8
		NBL UT	0.0	0.0	0.0	0.00	109.7	384.8
		SBR	11.9	5.3	12.1	1.06	6.4	94.8
		SBT	24.4	19.8	24.3	0.37	82.4	238.3
		SBL	74.4	64.7	74.3	1.06	93.8	251.6
		SBL UT	0.0	0.0	0.0	0.00	93.8	251.6
		EBR	30.8	20.3	30.4	0.99	128.1	468.4
		EBT	40.8	30.3	41.1	0.81	142.2	467.9
		EBL	49.1	38.9	49.7	1.39	47.0	195.4
		WBR	38.6	28.0	38.7	0.96	173.3	584.8
		WBT	43.1	32.0	42.8	0.85	175.5	585.4
		WBL	48.3	38.2	48.3	1.33	48.8	198.1
		BRT NBT	48.7	19.1	48.7	1.00	2.0	46.6
		BRT SBT	59.2	30.2	59.2	1.00	1.6	45.9
4:15	4:30	NBR	9.2	3.9	9.1	1.16	1.0	51.5
		NBT	32.7	24.9	32.7	0.87	43.0	218.4
		NBL	73.3	61.8	73.6	1.20	125.5	370.1
		NBL UT	0.0	0.0	0.0	0.00	125.5	370.1
		SBR	12.7	6.1	12.6	1.09	7.1	91.5
		SBT	23.6	19.4	23.4	0.37	74.7	232.3
		SBL	73.3	64.3	72.1	1.07	94.1	243.4
		SBL UT	0.0	0.0	0.0	0.00	94.1	243.4
		EBR	32.2	21.3	32.0	1.06	124.5	495.4
		EBT	40.4	29.8	40.2	0.81	140.6	494.9
		EBL	58.2	46.3	57.4	1.53	63.1	231.0
		WBR	36.7	25.8	36.5	0.99	164.2	540.3
		WBT	42.1	31.2	42.0	0.83	166.3	540.9
		WBL	51.5	40.4	50.7	1.43	55.0	232.5
		BRT NBT	46.0	16.5	45.8	1.00	0.9	46.1
		BRT SBT	67.1	38.0	65.9	1.00	3.8	46.3

Table 9.10d Intersection 4100S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:30	4:45	NBR	8.9	3.3	8.8	1.10	1.2	59.0
		NBT	30.8	23.1	30.3	0.84	37.9	202.3
		NBL	54.5	44.5	54.3	1.02	83.2	328.5
		NBL UT	0.0	0.0	0.0	0.00	83.2	328.5
		SBR	12.5	5.9	12.3	1.09	7.4	106.5
		SBT	24.1	19.6	24.4	0.38	77.4	230.4
		SBL	75.3	66.1	75.0	1.05	96.1	245.4
		SBL UT	0.0	0.0	0.0	0.00	96.1	245.4
		EBR	30.7	20.4	30.4	1.02	117.7	470.2
		EBT	39.3	28.9	39.4	0.78	136.4	469.7
		EBL	54.2	43.4	54.1	1.46	57.0	220.5
		WBR	37.8	27.5	38.4	0.96	165.9	536.4
		WBT	42.5	31.6	42.6	0.84	168.0	537.0
		WBL	54.0	43.1	53.7	1.41	53.3	219.6
		BRT NBT	46.6	16.5	46.6	1.00	1.1	46.1
		BRT SBT	59.9	31.0	59.9	1.00	1.6	46.0
4:45	5:00	NBR	10.1	4.5	10.5	1.17	1.1	51.7
		NBT	32.5	24.8	32.0	0.89	32.9	167.4
		NBL	81.8	70.3	81.1	1.19	164.9	390.0
		NBL UT	0.0	0.0	0.0	0.00	164.9	390.0
		SBR	13.8	6.5	14.0	1.20	7.0	103.1
		SBT	25.5	20.9	25.5	0.39	81.5	246.5
		SBL	74.3	64.6	74.1	1.06	100.2	275.5
		SBL UT	0.0	0.0	0.0	0.00	100.2	275.5
		EBR	31.9	21.3	32.3	1.04	125.0	506.0
		EBT	40.0	29.3	39.7	0.80	142.9	505.5
		EBL	57.4	45.9	57.1	1.49	55.8	222.0
		WBR	36.1	26.1	36.1	0.94	165.5	529.0
		WBT	42.3	31.4	42.1	0.84	167.6	529.5
		WBL	44.0	34.7	44.2	1.27	40.1	179.2
		BRT NBT	47.2	17.6	47.0	1.00	1.8	46.2
		BRT SBT	67.7	38.8	67.7	1.00	4.0	46.6

Table 9.10d Intersection 4100S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:00	5:15	NBR	8.1	2.7	8.0	1.05	1.1	54.8
		NBT	30.5	22.7	30.2	0.89	30.6	170.0
		NBL	71.6	60.8	71.5	1.10	110.3	399.1
		NBL UT	0.0	0.0	0.0	0.00	110.3	399.1
		SBR	11.9	5.1	11.8	1.09	5.6	90.5
		SBT	25.7	21.0	25.3	0.38	81.9	246.1
		SBL	74.2	65.0	73.8	1.07	89.7	243.2
		SBL UT	0.0	0.0	0.0	0.00	89.7	243.2
		EBR	30.9	20.8	30.9	0.99	127.4	470.0
		EBT	40.5	30.0	40.3	0.81	139.5	469.5
		EBL	55.1	43.9	54.9	1.42	59.3	222.9
		WBR	36.4	25.7	36.2	0.98	167.2	536.7
		WBT	43.2	32.3	43.2	0.84	169.2	537.2
		WBL	44.8	35.2	45.1	1.26	44.2	211.0
		BRT NBT	47.7	18.2	47.7	1.00	1.0	46.4
		BRT SBT	59.9	31.0	59.9	1.00	1.6	45.6
5:15	5:30	NBR	7.9	2.7	8.0	1.08	1.2	54.4
		NBT	32.4	24.7	32.0	0.85	44.2	205.8
		NBL	63.2	52.9	62.8	1.12	100.3	361.5
		NBL UT	0.0	0.0	0.0	0.00	100.3	361.5
		SBR	14.0	6.5	14.0	1.19	7.6	103.3
		SBT	27.4	22.1	27.3	0.41	88.5	276.4
		SBL	73.9	64.5	73.4	1.06	90.4	255.9
		SBL UT	0.0	0.0	0.0	0.00	90.4	255.9
		EBR	28.8	18.6	28.9	0.96	124.8	466.8
		EBT	41.9	31.2	41.7	0.81	141.9	466.3
		EBL	56.5	45.6	56.1	1.45	61.4	221.2
		WBR	33.6	23.3	33.9	0.93	161.6	517.1
		WBT	41.8	31.1	41.7	0.82	163.9	517.6
		WBL	45.6	35.8	45.6	1.28	43.0	192.1
		BRT NBT	45.8	16.0	45.6	1.00	1.8	46.3
		BRT SBT	70.4	41.3	69.7	1.00	4.0	46.2

Table 9.10d Intersection 4100S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	8.6	3.3	8.7	1.10	1.2	54.4
		NBT	33.0	25.1	32.5	0.91	35.8	200.7
		NBL	55.8	45.7	55.9	1.01	89.7	328.9
		NBL UT	0.0	0.0	0.0	0.00	89.7	328.9
		SBR	12.1	5.4	12.4	1.12	6.6	94.5
		SBT	26.5	21.5	26.8	0.40	83.8	255.2
		SBL	73.9	63.7	73.4	1.10	97.9	263.5
		SBL UT	0.0	0.0	0.0	0.00	97.9	263.5
		EBR	29.3	19.0	29.4	1.03	125.6	493.8
		EBT	38.5	28.2	38.6	0.79	143.0	493.3
		EBL	54.3	43.3	54.9	1.49	54.4	198.9
		WBR	36.6	26.2	36.8	0.93	170.4	578.4
		WBT	42.5	31.5	42.2	0.84	172.9	578.9
		WBL	44.1	34.6	43.5	1.22	42.4	190.4
		BRT NBT	47.6	18.0	47.3	1.00	2.0	46.4
		BRT SBT	61.6	32.7	61.6	1.00	1.7	45.7
5:45	6:00	NBR	8.4	3.1	8.3	1.03	0.9	55.7
		NBT	34.0	26.1	33.7	0.90	42.4	196.0
		NBL	64.2	53.5	64.1	1.10	114.9	394.5
		NBL UT	0.0	0.0	0.0	0.00	114.9	394.5
		SBR	13.2	6.2	13.2	1.21	7.4	110.7
		SBT	24.7	20.3	24.9	0.38	80.5	230.0
		SBL	73.5	63.9	73.4	1.05	96.8	267.1
		SBL UT	0.0	0.0	0.0	0.00	96.8	267.1
		EBR	32.6	21.9	32.5	1.04	129.1	536.8
		EBT	41.9	31.1	41.7	0.82	144.6	536.3
		EBL	53.0	41.9	52.3	1.42	54.9	213.4
		WBR	37.4	27.3	37.4	0.99	173.4	567.8
		WBT	44.0	32.6	43.7	0.87	175.3	568.3
		WBL	52.3	41.7	52.3	1.33	51.4	212.5
		BRT NBT	49.2	19.2	49.2	1.00	1.1	46.1
		BRT SBT	68.0	38.6	67.8	1.00	3.7	46.7

Table 9.10e Intersection 4100S: 2030 TSP

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	7.6	2.4	7.4	1.04	0.9	50.8
		NBT	30.9	23.2	30.6	0.86	40.4	212.0
		NBL	65.2	54.6	64.7	1.10	107.0	390.2
		NBL UT	0.0	0.0	0.0	0.00	107.0	390.2
		SBR	11.8	5.3	11.9	1.02	5.7	98.5
		SBT	23.5	19.0	23.7	0.37	79.6	246.4
		SBL	74.8	65.3	74.9	1.04	95.0	251.7
		SBL UT	0.0	0.0	0.0	0.00	95.0	251.7
		EBR	30.8	20.3	30.4	0.98	126.1	468.2
		EBT	40.7	30.2	41.0	0.81	141.9	467.7
		EBL	48.6	38.5	49.2	1.38	46.5	195.4
		WBR	38.9	28.3	38.8	0.96	174.1	591.5
		WBT	43.0	32.0	42.7	0.84	176.3	592.1
		WBL	48.7	38.4	48.6	1.34	49.5	197.5
		BRT NBT	41.5	14.6	41.5	0.80	1.8	46.6
		BRT SBT	50.9	22.0	50.9	0.90	1.2	45.9
4:15	4:30	NBR	8.0	2.8	7.9	1.11	1.0	59.1
		NBT	31.5	23.7	30.8	0.85	41.8	217.3
		NBL	67.7	57.0	68.3	1.14	110.3	331.2
		NBL UT	0.0	0.0	0.0	0.00	110.3	331.2
		SBR	12.5	5.8	12.7	1.08	6.7	91.2
		SBT	25.0	20.3	25.2	0.39	81.6	258.1
		SBL	74.7	65.2	74.7	1.06	96.9	247.5
		SBL UT	0.0	0.0	0.0	0.00	96.9	247.5
		EBR	31.9	21.2	31.8	1.04	125.1	499.8
		EBT	40.3	29.8	40.1	0.80	140.1	499.3
		EBL	55.1	43.7	54.1	1.49	58.7	219.9
		WBR	36.1	25.5	36.1	0.95	161.6	538.4
		WBT	41.5	30.7	41.4	0.82	163.8	539.0
		WBL	53.2	42.1	53.2	1.41	57.1	236.7
		BRT NBT	45.5	16.0	45.7	1.00	0.9	46.1
		BRT SBT	52.0	23.4	50.9	0.85	2.4	46.1

Table 9.10e Intersection 4100S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:30	4:45	NBR	7.8	2.4	7.8	1.07	1.1	65.3
		NBT	30.9	23.4	30.4	0.83	37.1	203.9
		NBL	55.6	45.4	56.5	1.04	86.7	324.8
		NBL UT	0.0	0.0	0.0	0.00	86.7	324.8
		SBR	14.3	6.8	13.8	1.23	8.8	106.5
		SBT	24.5	20.0	24.6	0.39	80.7	270.4
		SBL	73.6	64.2	72.9	1.04	96.7	276.2
		SBL UT	0.0	0.0	0.0	0.00	96.7	276.2
		EBR	31.0	20.8	31.0	0.99	120.3	464.5
		EBT	39.4	29.0	39.5	0.79	137.0	464.0
		EBL	55.0	44.3	55.1	1.45	57.9	220.6
		WBR	36.6	26.4	36.7	0.98	163.7	547.1
		WBT	41.8	31.1	42.0	0.83	165.8	547.7
		WBL	51.8	41.7	51.4	1.32	50.4	218.0
		BRT NBT	46.5	16.4	46.5	1.00	1.0	46.0
		BRT SBT	50.6	21.8	50.6	1.00	1.2	46.0
4:45	5:00	NBR	8.8	3.4	8.8	1.15	0.9	55.7
		NBT	30.9	23.1	30.5	0.90	31.7	180.6
		NBL	74.7	63.7	74.8	1.14	142.9	383.6
		NBL UT	0.0	0.0	0.0	0.00	142.9	383.6
		SBR	14.8	7.0	14.7	1.24	9.7	109.9
		SBT	29.0	23.7	29.4	0.44	95.8	315.3
		SBL	75.2	65.4	74.4	1.08	99.6	275.2
		SBL UT	0.0	0.0	0.0	0.00	99.6	275.2
		EBR	31.6	21.1	32.1	1.02	124.8	503.3
		EBT	40.0	29.3	39.7	0.81	142.9	502.8
		EBL	58.5	46.9	58.4	1.53	57.1	222.3
		WBR	39.1	29.3	39.1	0.96	164.2	508.4
		WBT	41.8	31.1	41.7	0.84	166.2	508.9
		WBL	43.2	34.3	43.3	1.24	38.1	167.4
		BRT NBT	45.5	15.9	45.4	1.00	1.8	46.3
		BRT SBT	58.6	29.8	59.3	1.00	3.1	46.6

Table 9.10e Intersection 4100S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:00	5:15	NBR	8.2	2.7	8.3	1.05	1.2	58.4
		NBT	29.2	21.5	28.9	0.87	29.6	160.6
		NBL	66.5	55.6	66.0	1.16	105.3	382.9
		NBL UT	0.0	0.0	0.0	0.00	105.3	382.9
		SBR	16.2	7.6	16.2	1.40	9.0	112.4
		SBT	27.8	22.4	28.0	0.41	88.3	298.2
		SBL	75.8	66.2	75.6	1.05	91.5	251.5
		SBL UT	0.0	0.0	0.0	0.00	91.5	251.5
		EBR	31.6	21.1	31.5	1.00	129.0	482.1
		EBT	40.6	30.1	40.4	0.81	141.1	481.6
		EBL	58.4	46.4	57.9	1.54	63.4	223.4
		WBR	37.2	27.2	36.6	0.91	166.1	543.1
		WBT	42.9	32.0	42.9	0.84	168.3	543.6
		WBL	48.9	39.1	49.6	1.30	50.0	222.5
		BRT NBT	46.7	17.1	46.7	1.00	1.9	46.6
		BRT SBT	47.2	18.3	47.2	1.00	1.0	45.5
5:15	5:30	NBR	8.4	3.1	8.4	1.10	1.0	56.6
		NBT	31.0	23.4	30.3	0.81	42.2	199.4
		NBL	66.2	55.7	66.3	1.09	104.7	350.0
		NBL UT	0.0	0.0	0.0	0.00	104.7	350.0
		SBR	12.1	5.6	12.3	1.01	5.6	85.3
		SBT	25.6	20.7	25.6	0.39	83.0	247.0
		SBL	73.8	64.3	73.2	1.05	91.5	251.4
		SBL UT	0.0	0.0	0.0	0.00	91.5	251.4
		EBR	29.4	19.4	29.4	0.93	121.2	468.7
		EBT	42.1	31.5	41.8	0.82	143.4	468.2
		EBL	52.3	41.9	52.3	1.37	54.9	217.1
		WBR	32.8	22.8	32.8	0.91	160.9	513.7
		WBT	41.6	31.0	41.4	0.82	163.2	514.3
		WBL	48.7	38.6	48.3	1.33	47.8	206.7
		BRT NBT	45.4	15.7	45.4	1.00	0.9	46.1
		BRT SBT	60.4	31.4	59.7	1.00	3.2	46.2

Table 9.10e Intersection 4100S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	9.0	3.4	9.1	1.22	1.4	66.5
		NBT	31.2	23.5	31.2	0.89	33.1	187.8
		NBL	56.2	46.3	55.9	1.00	91.1	329.8
		NBL UT	0.0	0.0	0.0	0.00	91.1	329.8
		SBR	12.9	5.8	12.6	1.10	7.3	102.1
		SBT	24.9	20.2	25.2	0.39	79.7	262.4
		SBL	76.0	66.4	75.8	1.05	101.7	273.7
		SBL UT	0.0	0.0	0.0	0.00	101.7	273.7
		EBR	29.3	19.1	29.4	1.02	124.1	487.7
		EBT	38.7	28.4	38.8	0.79	142.8	487.2
		EBL	54.7	43.6	55.0	1.51	54.6	206.2
		WBR	36.7	26.2	37.6	0.92	170.3	576.3
		WBT	42.4	31.3	42.3	0.84	172.7	576.9
		WBL	47.4	37.3	46.8	1.37	47.7	188.9
		BRT NBT	44.7	15.0	44.8	1.00	1.7	46.4
		BRT SBT	69.3	40.3	69.3	1.00	2.0	45.6
5:45	6:00	NBR	8.8	3.5	8.5	1.10	1.0	65.6
		NBT	32.9	25.1	32.7	0.87	41.7	206.0
		NBL	67.5	56.6	67.2	1.12	119.4	385.3
		NBL UT	0.0	0.0	0.0	0.00	119.4	385.3
		SBR	13.5	5.9	13.2	1.20	8.2	111.6
		SBT	26.8	21.9	26.6	0.41	87.1	251.8
		SBL	74.2	64.6	73.6	1.07	99.0	274.0
		SBL UT	0.0	0.0	0.0	0.00	99.0	274.0
		EBR	32.9	21.9	32.9	1.07	128.8	535.2
		EBT	42.1	31.2	41.9	0.82	146.0	534.7
		EBL	51.3	40.4	50.5	1.40	52.4	220.1
		WBR	37.6	27.8	37.1	0.96	172.0	579.6
		WBT	43.2	32.1	43.0	0.85	173.9	580.1
		WBL	46.0	36.2	45.5	1.26	45.1	203.5
		BRT NBT	45.3	16.6	45.3	0.90	0.9	41.6
		BRT SBT	53.5	24.6	53.6	0.90	2.7	46.5

Table 9.11a Intersection 4700S: 2009

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	2.6	0.3	2.5	0.57	0.4	38.2
		NBT	23.9	13.3	23.6	0.66	54.7	332.1
		NBL	24.7	18.6	25.6	1.33	2.9	40.3
		SBR	3.9	0.3	3.9	0.28	0.1	16.7
		SBT	12.1	6.2	12.1	0.23	35.9	286.2
		SBL	20.5	13.1	20.1	0.84	11.9	90.1
		EBR	11.9	5.4	12.1	1.35	0.7	30.4
		EBT	45.0	40.4	44.5	0.86	27.0	132.1
		EBL	28.2	25.9	27.9	0.69	3.0	35.7
		WBR	11.5	3.9	11.5	1.11	4.8	81.7
		WBT	34.5	26.1	35.0	0.68	26.6	144.6
		WBL	31.7	24.6	32.0	0.72	44.7	254.8
4:15	4:30	NBR	4.7	0.8	4.4	0.63	1.2	60.7
		NBT	23.7	12.3	23.3	0.67	47.9	287.0
		NBL	24.4	18.1	24.9	1.32	7.5	64.0
		SBR	3.3	0.2	3.2	0.30	0.1	15.7
		SBT	14.7	8.1	14.5	0.28	41.0	249.4
		SBL	18.7	11.4	19.0	0.78	9.1	94.1
		EBR	10.8	4.4	10.5	1.21	0.7	32.6
		EBT	46.1	40.6	46.1	0.84	37.8	152.8
		EBL	24.3	21.5	23.5	0.68	5.3	46.7
		WBR	8.6	2.2	8.3	0.86	2.5	63.5
		WBT	36.2	27.5	36.1	0.69	35.5	209.4
		WBL	36.8	28.7	36.9	0.80	56.2	232.5
4:30	4:45	NBR	4.0	0.9	3.7	0.56	0.4	45.2
		NBT	24.9	13.8	24.8	0.68	59.0	311.6
		NBL	26.4	19.3	27.1	1.38	6.7	62.8
		SBR	4.7	0.6	4.7	0.38	0.1	17.0
		SBT	14.1	6.9	13.8	0.26	42.5	294.2
		SBL	22.7	14.4	22.6	0.89	14.3	112.4
		EBR	15.0	7.2	14.7	1.55	1.1	39.8
		EBT	58.8	50.1	58.8	0.97	82.9	253.1
		EBL	30.7	25.2	30.8	0.85	22.3	135.4
		WBR	11.5	3.4	11.3	1.06	5.2	79.9
		WBT	41.0	31.4	40.8	0.76	35.8	184.9
		WBL	44.6	34.6	44.1	0.97	81.6	328.8

Table 9.11a Intersection 4700S: 2009 (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	4.0	0.9	3.9	0.61	0.7	49.8
		NBT	22.7	11.3	22.6	0.66	49.2	287.5
		NBL	24.2	17.0	23.8	1.36	4.3	55.2
		SBR	3.8	0.2	3.8	0.40	0.2	21.3
		SBT	13.0	6.9	12.7	0.26	33.1	198.1
		SBL	17.3	11.0	17.3	0.77	7.4	75.9
		EBR	10.3	3.4	10.0	1.23	0.5	26.7
		EBT	54.3	47.4	53.7	0.95	40.4	207.6
		EBL	27.3	23.7	26.1	0.77	4.5	39.7
		WBR	10.5	3.1	10.3	0.98	2.2	56.6
		WBT	37.4	28.2	36.9	0.71	31.0	151.6
		WBL	40.4	30.8	40.3	0.89	78.6	364.3
5:00	5:15	NBR	4.8	0.5	4.6	0.52	1.2	66.3
		NBT	24.8	13.6	24.7	0.68	57.2	319.9
		NBL	32.1	24.4	32.7	1.58	3.8	44.7
		SBR	10.3	1.5	9.8	0.50	0.2	21.9
		SBT	25.3	11.9	24.8	0.46	138.1	718.1
		SBL	32.8	17.9	32.1	1.03	40.3	324.6
		EBR	16.4	8.7	16.2	1.45	1.1	35.2
		EBT	50.6	44.5	50.6	0.89	40.3	175.7
		EBL	26.3	23.2	26.8	0.75	6.3	55.9
		WBR	10.6	3.4	10.6	1.05	3.2	59.7
		WBT	37.1	28.0	36.8	0.70	40.4	182.9
		WBL	40.2	30.8	40.3	0.85	72.0	350.3
5:15	5:30	NBR	3.6	0.6	3.4	0.57	0.6	48.2
		NBT	21.8	10.6	21.6	0.62	46.8	271.3
		NBL	49.4	38.8	50.9	1.84	16.4	103.5
		SBR	16.7	4.0	16.4	0.79	0.2	25.8
		SBT	31.4	14.8	31.4	0.55	164.1	820.5
		SBL	39.6	20.8	40.0	1.13	27.6	263.7
		EBR	18.4	10.5	18.3	1.47	1.4	46.3
		EBT	51.9	45.5	52.5	0.90	40.2	163.9
		EBL	28.9	25.1	27.9	0.74	12.6	89.2
		WBR	14.1	5.1	14.0	1.09	3.2	63.2
		WBT	46.7	35.5	46.3	0.80	44.8	233.4
		WBL	46.7	35.1	46.6	0.96	111.8	483.4

Table 9.11a Intersection 4700S: 2009 (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	4.4	0.5	4.2	0.59	1.0	55.9
		NBT	24.1	12.8	24.0	0.67	51.1	289.2
		NBL	40.1	30.9	38.7	1.61	12.0	84.3
		SBR	11.9	2.5	11.1	0.45	0.1	14.5
		SBT	23.9	12.0	23.9	0.41	103.0	455.0
		SBL	25.3	13.8	25.6	0.77	12.8	117.0
		EBR	17.8	10.7	17.9	1.41	0.7	35.5
		EBT	48.0	44.1	49.1	0.82	21.5	110.2
		EBL	27.1	24.3	27.7	0.76	7.0	60.5
		WBR	10.5	3.4	10.2	1.04	2.6	52.2
		WBT	38.0	28.8	37.8	0.71	38.9	162.3
		WBL	37.6	28.6	37.3	0.78	64.0	361.5
5:45	6:00	NBR	4.2	0.3	4.0	0.52	1.0	66.7
		NBT	23.6	11.1	23.2	0.64	54.7	319.7
		NBL	39.3	28.6	39.2	1.81	11.6	85.6
		SBR	5.5	1.1	5.4	0.55	0.2	25.0
		SBT	16.3	9.3	16.3	0.31	55.4	306.8
		SBL	20.4	12.8	19.9	0.80	7.5	80.7
		EBR	13.9	6.0	13.9	1.49	1.0	39.9
		EBT	46.9	42.4	46.0	0.84	28.7	123.2
		EBL	25.9	23.4	26.6	0.70	3.1	31.1
		WBR	12.1	4.5	11.9	1.04	3.3	67.5
		WBT	37.6	28.5	37.2	0.70	24.5	152.2
		WBL	41.7	31.3	41.2	0.90	87.2	372.4

Table 9.11b Intersection 4700S: 2030 No Action

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	23.5	8.2	23.2	1.14	63.3	330.1
		NBT	38.9	25.7	38.6	0.79	51.2	223.9
		NBL	39.3	29.3	38.8	1.24	48.6	228.8
		SBR	20.4	7.4	20.1	1.14	0.8	40.7
		SBT	39.7	23.3	39.5	0.99	175.8	665.2
		SBL	36.5	21.4	36.0	1.10	43.6	497.7
		EBR	37.2	22.1	36.8	1.85	5.3	76.1
		EBT	87.7	73.0	87.0	1.31	309.0	748.1
		EBL	66.4	53.1	67.2	1.57	34.7	205.0
		WBR	94.6	53.8	95.4	2.76	0.4	32.7
		WBT	109.3	67.6	109.3	2.55	241.0	1012.1
		WBL	150.2	101.5	150.1	3.55	921.3	1221.0
4:15	4:30	NBR	24.4	8.5	24.4	1.14	67.1	362.6
		NBT	38.9	26.3	38.2	0.81	48.5	196.6
		NBL	39.4	29.3	38.4	1.28	50.8	255.1
		SBR	15.2	4.6	15.1	1.02	0.7	45.8
		SBT	35.2	20.7	34.7	0.91	129.2	607.4
		SBL	27.6	15.2	27.0	1.00	22.4	320.8
		EBR	26.1	13.3	26.0	1.60	3.5	72.9
		EBT	76.5	62.9	76.1	1.21	252.2	638.7
		EBL	56.1	43.7	55.4	1.49	26.4	135.6
		WBR	88.0	49.2	87.2	2.63	0.6	38.3
		WBT	111.0	70.0	110.4	2.55	252.1	1215.1
		WBL	146.7	100.6	146.7	3.43	881.1	1219.4
4:30	4:45	NBR	22.3	8.7	22.1	1.07	57.1	352.4
		NBT	37.8	25.2	37.4	0.78	49.1	229.7
		NBL	36.2	26.5	35.9	1.14	44.4	223.1
		SBR	16.8	5.6	16.4	1.07	0.8	45.8
		SBT	35.8	21.0	35.3	0.95	138.0	581.7
		SBL	31.1	17.6	30.8	1.09	31.2	440.1
		EBR	23.7	11.6	23.5	1.57	2.9	62.8
		EBT	71.7	59.0	71.4	1.18	224.1	655.6
		EBL	55.0	42.9	55.3	1.53	31.5	149.4
		WBR	92.1	50.6	92.5	2.70	0.6	37.4
		WBT	109.9	68.9	109.6	2.51	301.5	1108.6
		WBL	150.3	102.0	149.9	3.51	860.0	1220.5

Table 9.11b Intersection 4700S: 2030 No Action (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	22.7	8.3	22.3	1.08	55.5	334.0
		NBT	38.1	25.5	37.8	0.82	46.3	219.1
		NBL	37.8	28.1	37.4	1.20	44.6	243.0
		SBR	14.8	4.6	14.5	0.98	0.6	35.2
		SBT	33.9	19.9	33.3	0.90	116.7	524.9
		SBL	28.6	16.4	28.6	0.99	21.6	226.3
		EBR	20.4	9.4	20.3	1.48	2.8	54.3
		EBT	69.6	57.5	69.4	1.11	207.9	604.7
		EBL	47.0	36.5	47.0	1.40	26.0	140.6
		WBR	87.4	48.6	87.3	2.75	0.7	43.8
		WBT	104.4	66.1	103.8	2.37	217.2	901.6
		WBL	142.8	98.1	142.7	3.36	873.2	1220.7
5:00	5:15	NBR	22.7	8.2	22.4	1.06	54.6	353.3
		NBT	38.1	25.7	37.7	0.79	50.2	217.9
		NBL	36.2	26.5	35.8	1.20	40.8	250.1
		SBR	16.0	5.7	16.0	1.02	0.6	39.7
		SBT	34.7	19.7	34.2	0.88	140.6	612.0
		SBL	31.6	17.5	31.3	1.09	30.5	289.7
		EBR	25.0	12.8	24.8	1.57	2.6	55.2
		EBT	74.1	61.0	74.2	1.17	236.3	635.9
		EBL	53.6	42.2	53.6	1.49	27.5	130.6
		WBR	84.4	46.0	84.4	2.62	0.8	44.6
		WBT	107.0	67.8	106.4	2.41	247.7	1002.6
		WBL	141.7	96.1	141.2	3.37	840.3	1220.8
5:15	5:30	NBR	21.8	8.2	21.5	1.06	53.0	312.8
		NBT	36.8	24.7	36.8	0.81	44.5	222.4
		NBL	35.1	26.1	35.1	1.17	39.1	213.1
		SBR	17.8	6.8	17.3	1.04	0.5	27.8
		SBT	36.4	21.6	36.2	0.92	139.9	603.2
		SBL	32.0	18.4	32.1	0.98	36.8	406.2
		EBR	26.4	13.1	26.1	1.67	3.3	63.8
		EBT	71.9	59.2	71.9	1.16	237.5	659.0
		EBL	50.9	39.7	51.7	1.43	24.8	126.4
		WBR	93.3	52.8	94.2	2.76	0.5	42.0
		WBT	113.9	73.7	113.8	2.53	281.7	1007.4
		WBL	151.9	105.5	151.4	3.48	860.2	1219.9

Table 9.11b Intersection 4700S: 2030 No Action (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	22.6	9.0	22.4	1.07	56.9	332.1
		NBT	38.1	26.0	37.4	0.82	45.2	194.0
		NBL	33.9	25.1	33.7	1.14	39.1	229.4
		SBR	15.8	5.3	15.6	0.98	0.5	32.9
		SBT	35.0	20.8	34.4	0.90	123.1	535.7
		SBL	28.3	16.0	28.2	1.02	28.1	279.9
		EBR	26.5	13.5	26.0	1.64	3.2	59.3
		EBT	72.6	59.6	72.3	1.17	238.7	679.7
		EBL	57.6	45.1	56.4	1.50	29.9	141.0
		WBR	87.4	49.4	87.2	2.51	0.6	36.0
		WBT	107.8	67.8	107.2	2.44	191.3	968.9
		WBL	146.9	101.3	146.8	3.33	904.8	1221.3
5:45	6:00	NBR	20.9	7.9	20.5	1.00	49.8	311.9
		NBT	38.5	25.8	38.2	0.81	48.2	220.3
		NBL	31.2	22.7	31.0	1.12	35.9	209.1
		SBR	14.2	4.2	14.0	1.04	0.6	38.1
		SBT	32.9	19.3	32.5	0.86	109.7	502.6
		SBL	25.2	13.8	25.1	0.86	17.2	229.6
		EBR	23.5	11.8	23.5	1.54	2.9	60.8
		EBT	72.3	59.9	72.0	1.16	233.0	625.9
		EBL	52.3	41.3	52.8	1.40	26.8	129.1
		WBR	93.6	52.6	92.5	2.76	0.5	34.2
		WBT	111.2	68.8	111.4	2.63	285.6	1215.5
		WBL	153.4	103.6	153.0	3.75	899.2	1223.1

Table 9.11c Intersection 4700S: 2030 Minor Improvements

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	23.9	8.5	23.7	1.44	55.7	293.6
		NBT	40.8	27.2	40.6	0.79	48.8	194.2
		NBL	35.0	24.8	34.8	1.16	36.9	195.1
		SBR	21.0	8.0	20.9	1.19	0.7	38.4
		SBT	38.0	22.8	37.5	1.02	135.4	543.4
		SBL	25.7	13.8	25.7	0.87	19.9	142.8
		EBR	14.5	6.4	14.8	1.32	2.0	53.9
		EBT	64.0	52.5	63.9	1.07	168.8	575.5
		EBL	37.0	29.3	36.5	1.18	18.7	108.9
		WBR	39.7	21.5	39.5	1.59	0.9	39.0
		WBT	65.4	45.9	65.2	1.36	250.1	1021.6
		WBL	92.6	67.9	92.2	2.17	518.1	1123.9
4:15	4:30	NBR	24.3	8.6	23.9	1.47	58.8	321.3
		NBT	40.1	27.7	39.5	0.78	45.3	177.5
		NBL	34.0	23.6	33.3	1.21	37.7	212.7
		SBR	19.6	7.2	19.2	1.21	0.9	40.8
		SBT	37.5	22.7	36.8	1.01	125.7	524.5
		SBL	23.8	12.3	23.3	0.81	20.1	173.1
		EBR	12.3	5.0	12.5	1.15	1.8	47.9
		EBT	60.2	48.9	60.3	1.04	149.8	500.7
		EBL	35.9	27.5	35.3	1.24	19.4	114.6
		WBR	38.3	20.2	38.1	1.55	0.9	35.4
		WBT	65.2	45.4	65.2	1.41	222.3	897.9
		WBL	94.2	68.3	93.7	2.28	492.3	1125.2
4:30	4:45	NBR	23.1	8.5	22.7	1.39	51.6	285.7
		NBT	42.8	29.3	42.2	0.82	50.8	209.2
		NBL	35.2	24.5	35.0	1.23	35.7	187.0
		SBR	18.7	6.4	18.3	1.09	0.7	34.1
		SBT	37.0	21.9	36.3	1.01	123.1	531.6
		SBL	22.9	10.9	22.8	0.82	16.4	141.2
		EBR	13.5	5.9	13.1	1.34	1.7	48.3
		EBT	59.9	48.6	59.9	1.02	148.4	512.4
		EBL	38.5	30.2	38.5	1.25	21.6	119.9
		WBR	50.8	28.7	51.4	1.92	0.8	38.5
		WBT	75.9	53.0	75.8	1.60	265.5	1024.6
		WBL	109.2	79.7	109.0	2.61	618.5	1213.5

Table 9.11c Intersection 4700S: 2030 Minor Improvements (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	21.3	7.4	21.0	1.28	46.5	279.8
		NBT	42.1	29.3	41.4	0.82	45.3	193.2
		NBL	31.8	23.0	31.2	1.12	33.3	193.3
		SBR	19.5	7.2	19.5	1.27	0.8	40.7
		SBT	36.3	21.9	35.9	0.99	118.2	504.6
		SBL	23.2	12.0	22.8	0.80	16.1	147.1
		EBR	12.9	5.3	13.0	1.23	1.9	46.0
		EBT	62.3	51.2	62.1	1.03	150.2	472.7
		EBL	35.6	27.8	36.3	1.26	20.0	115.7
		WBR	35.9	18.3	35.6	1.52	1.0	47.9
		WBT	63.5	44.7	63.4	1.32	211.0	964.5
		WBL	90.1	65.5	89.9	2.21	443.1	1049.9
5:00	5:15	NBR	25.0	8.8	24.8	1.52	56.8	312.2
		NBT	43.0	28.7	42.5	0.83	54.5	206.6
		NBL	34.2	24.4	34.0	1.15	37.6	225.5
		SBR	19.7	7.2	19.2	1.16	0.7	43.3
		SBT	36.1	21.1	35.6	0.99	121.9	522.8
		SBL	22.9	10.8	22.4	0.86	17.8	159.6
		EBR	13.0	5.3	12.7	1.24	1.9	48.3
		EBT	60.0	49.1	60.3	1.03	150.8	506.9
		EBL	39.8	31.7	39.4	1.25	21.5	117.1
		WBR	31.6	15.7	31.1	1.48	0.8	38.6
		WBT	57.8	40.2	58.0	1.24	222.3	1024.4
		WBL	86.0	62.8	85.3	2.07	421.4	1046.4
5:15	5:30	NBR	24.9	9.1	24.6	1.45	53.9	297.8
		NBT	44.3	30.5	43.9	0.85	49.7	201.0
		NBL	33.6	24.2	33.2	1.17	32.9	194.1
		SBR	20.1	6.8	19.4	1.12	0.6	31.9
		SBT	36.9	22.1	36.3	0.99	125.7	489.7
		SBL	23.4	11.7	22.6	0.82	18.6	160.8
		EBR	12.4	5.0	12.2	1.17	1.7	49.4
		EBT	59.5	48.4	59.4	1.01	158.5	510.2
		EBL	35.4	27.7	36.5	1.21	16.9	99.3
		WBR	31.5	14.8	31.4	1.43	1.1	46.3
		WBT	56.5	39.0	56.4	1.20	181.8	836.9
		WBL	83.9	61.2	83.2	2.10	424.2	1099.7

Table 9.11c Intersection 4700S: 2030 Minor Improvements (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	24.4	9.4	23.9	1.49	56.3	311.2
		NBT	42.1	29.1	42.0	0.83	45.5	178.4
		NBL	31.6	22.5	31.7	1.16	34.2	190.7
		SBR	20.7	8.2	20.4	1.19	0.8	42.6
		SBT	37.3	22.7	36.8	1.01	124.2	519.7
		SBL	22.3	11.6	22.2	0.81	14.9	146.2
		EBR	13.7	6.2	13.9	1.28	1.8	46.5
		EBT	59.5	48.2	59.2	1.05	153.7	513.2
		EBL	41.7	32.7	41.4	1.35	23.1	127.9
		WBR	22.0	9.4	21.7	1.14	1.0	41.3
		WBT	48.0	33.0	47.9	1.03	192.0	867.6
		WBL	69.3	50.4	69.4	1.74	279.1	1033.2
5:45	6:00	NBR	23.2	9.1	23.1	1.37	50.2	296.6
		NBT	41.1	27.6	40.9	0.80	48.5	198.1
		NBL	34.3	24.5	33.7	1.16	36.7	202.9
		SBR	21.2	7.7	21.0	1.18	0.6	40.6
		SBT	36.5	21.7	36.0	0.97	122.5	520.6
		SBL	22.5	11.2	22.0	0.81	15.4	119.2
		EBR	11.7	4.6	11.6	1.19	1.8	46.3
		EBT	54.3	44.0	54.3	0.97	128.4	451.9
		EBL	35.3	27.9	34.8	1.28	19.7	107.9
		WBR	31.4	15.9	30.8	1.44	0.9	38.3
		WBT	55.9	38.8	55.3	1.19	199.0	978.0
		WBL	85.0	62.3	84.3	2.09	428.7	1043.3

Table 9.11d Intersection 4700S: 2030 No TSP

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	11.7	2.2	11.4	0.92	8.5	176.5
		NBT	29.8	21.8	30.0	0.69	43.7	213.1
		NBL	139.8	125.1	137.8	1.56	198.0	367.7
		NBL UT	0.0	0.0	0.0	0.00	198.0	367.7
		SBR	8.8	2.1	8.8	0.68	0.8	38.7
		SBT	25.5	16.3	25.4	0.65	88.3	461.9
		SBL	83.7	71.8	83.6	1.00	99.2	255.3
		SBL UT	0.0	0.0	0.0	0.00	99.2	255.3
		EBR	27.8	15.5	27.7	2.01	4.5	71.1
		EBT	80.0	66.4	79.4	1.23	262.7	745.2
		EBL	35.8	26.2	35.6	1.48	18.5	110.7
		WBR	41.0	20.5	40.6	1.62	1.0	43.9
		WBT	64.8	44.5	64.6	1.33	277.0	1104.8
		WBL	105.4	74.6	105.4	2.52	566.4	1142.1
		BRT NBT	89.9	68.4	89.4	1.00	9.9	58.5
		BRT SBT	85.3	57.2	85.7	0.90	5.6	46.4
4:15	4:30	NBR	11.5	2.3	11.2	0.94	8.2	156.6
		NBT	27.6	19.5	27.4	0.66	35.0	189.7
		NBL	165.4	148.5	165.2	1.88	234.3	436.1
		NBL UT	0.0	0.0	0.0	0.00	234.3	436.1
		SBR	8.9	2.0	8.9	0.68	0.9	40.7
		SBT	27.3	18.0	26.9	0.64	89.6	466.7
		SBL	76.3	64.2	77.4	1.01	101.9	280.4
		SBL UT	0.0	0.0	0.0	0.00	101.9	280.4
		EBR	22.8	12.6	22.4	1.69	3.1	57.5
		EBT	74.6	61.6	74.4	1.16	231.0	619.4
		EBL	34.3	24.6	34.3	1.44	19.1	110.4
		WBR	46.8	25.2	46.9	1.64	0.8	39.2
		WBT	71.6	48.6	71.8	1.49	327.1	1115.1
		WBL	119.7	84.9	119.8	2.79	633.8	1209.8
		BRT NBT	76.9	55.6	76.9	1.00	4.2	58.1
		BRT SBT	88.5	59.2	88.5	1.00	2.9	46.2

Table 9.11d Intersection 4700S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:30	4:45	NBR	12.3	2.1	11.8	0.95	9.7	173.2
		NBT	30.5	22.1	30.4	0.71	42.4	216.2
		NBL	201.3	180.6	201.2	2.19	289.5	511.8
		NBL UT	0.0	0.0	0.0	0.00	289.5	511.8
		SBR	8.9	2.3	8.7	0.64	0.6	30.7
		SBT	27.2	17.3	26.8	0.66	99.0	487.1
		SBL	80.7	68.2	79.9	1.06	114.8	278.9
		SBL UT	0.0	0.0	0.0	0.00	114.8	278.9
		EBR	19.8	10.4	19.3	1.71	2.9	57.2
		EBT	67.5	55.7	67.7	1.11	200.2	578.6
		EBL	30.9	22.9	30.3	1.34	18.7	115.0
		WBR	52.5	28.1	52.2	1.86	0.7	37.1
		WBT	77.8	52.1	77.9	1.64	326.3	1130.4
		WBL	125.9	87.5	125.6	3.06	651.2	1212.0
		BRT NBT	89.8	68.2	89.3	1.00	9.7	58.2
		BRT SBT	93.9	65.1	94.7	0.95	6.3	46.3
4:45	5:00	NBR	11.3	2.0	10.9	0.90	8.6	177.1
		NBT	28.4	20.4	28.6	0.66	38.9	208.2
		NBL	184.2	165.3	183.9	2.05	252.1	467.0
		NBL UT	0.0	0.0	0.0	0.00	252.1	467.0
		SBR	8.6	2.4	9.0	0.67	0.8	41.5
		SBT	27.1	17.9	27.1	0.66	91.3	483.4
		SBL	84.8	72.3	84.4	1.00	107.0	283.7
		SBL UT	0.0	0.0	0.0	0.00	107.0	283.7
		EBR	18.1	9.3	18.3	1.60	3.3	62.4
		EBT	65.4	54.1	64.6	1.04	189.8	563.4
		EBL	28.8	20.9	28.9	1.30	17.2	106.1
		WBR	41.6	21.1	41.0	1.77	1.1	51.2
		WBT	70.7	48.2	70.8	1.48	265.9	1084.7
		WBL	120.0	85.1	119.7	2.86	622.1	1209.5
		BRT NBT	96.7	75.1	96.7	1.00	5.1	58.1
		BRT SBT	94.0	65.3	94.8	0.95	3.6	46.1

Table 9.11d Intersection 4700S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:00	5:15	NBR	11.8	2.2	11.4	1.00	8.8	176.1
		NBT	29.2	21.4	29.2	0.67	42.0	210.6
		NBL	177.1	158.9	177.4	1.97	239.4	457.6
		NBL UT	0.0	0.0	0.0	0.00	239.4	457.6
		SBR	15.5	5.3	15.3	0.99	1.3	47.8
		SBT	37.3	25.9	37.2	0.84	166.0	654.2
		SBL	79.2	66.3	78.7	1.06	109.9	286.6
		SBL UT	0.0	0.0	0.0	0.00	109.9	286.6
		EBR	32.4	19.7	32.3	2.09	5.1	73.6
		EBT	77.8	64.5	77.9	1.21	257.7	724.8
		EBL	39.5	29.2	39.8	1.57	21.7	127.9
		WBR	37.5	18.6	36.8	1.64	1.0	47.9
		WBT	59.5	40.3	59.6	1.26	231.8	1006.5
		WBL	102.3	72.0	101.5	2.42	463.7	1039.3
		BRT NBT	90.7	69.1	89.9	1.00	9.9	58.6
		BRT SBT	92.5	63.2	92.3	1.00	5.6	46.5
5:15	5:30	NBR	10.8	2.2	10.5	0.91	7.2	146.7
		NBT	26.9	19.2	26.5	0.65	34.8	177.7
		NBL	153.2	137.6	153.3	1.75	183.3	362.5
		NBL UT	0.0	0.0	0.0	0.00	183.3	362.5
		SBR	13.7	4.5	13.5	0.89	1.0	38.9
		SBT	34.8	23.8	34.4	0.80	136.6	591.1
		SBL	85.4	72.2	85.1	1.09	109.3	294.3
		SBL UT	0.0	0.0	0.0	0.00	109.3	294.3
		EBR	31.0	18.2	31.5	1.94	4.3	65.3
		EBT	76.7	63.1	76.2	1.22	265.1	701.5
		EBL	35.7	26.1	36.1	1.43	18.0	113.2
		WBR	32.4	15.2	32.1	1.48	1.1	43.3
		WBT	59.1	40.5	59.0	1.23	208.5	993.3
		WBL	106.4	75.9	106.3	2.51	527.1	1160.5
		BRT NBT	97.0	75.3	97.0	1.00	5.1	58.1
		BRT SBT	81.9	55.3	81.9	0.80	3.2	37.0

Table 9.11d Intersection 4700S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	11.0	2.0	10.7	0.85	7.6	170.2
		NBT	28.0	20.5	28.1	0.67	36.2	188.6
		NBL	162.5	145.5	162.9	1.86	239.0	441.9
		NBL UT	0.0	0.0	0.0	0.00	239.0	441.9
		SBR	9.5	1.8	9.4	0.68	0.8	34.5
		SBT	29.5	19.3	29.4	0.70	110.4	537.5
		SBL	83.6	71.2	83.6	1.05	106.0	264.8
		SBL UT	0.0	0.0	0.0	0.00	106.0	264.8
		EBR	35.0	21.8	35.0	2.02	4.2	70.6
		EBT	79.6	65.1	79.0	1.27	267.3	671.4
		EBL	41.7	30.6	41.4	1.65	22.9	126.9
		WBR	36.4	18.0	36.4	1.44	1.1	46.4
		WBT	61.6	41.5	61.6	1.30	279.3	1153.1
		WBL	106.2	75.2	105.9	2.58	516.5	1191.5
		BRT NBT	87.4	65.9	86.5	1.00	9.5	58.3
		BRT SBT	91.5	62.3	91.5	1.00	5.7	46.2
5:45	6:00	NBR	10.6	1.9	10.3	0.83	7.4	172.7
		NBT	29.3	21.4	28.7	0.65	42.0	194.0
		NBL	179.0	160.3	179.2	2.00	260.8	482.3
		NBL UT	0.0	0.0	0.0	0.00	260.8	482.3
		SBR	9.4	2.0	9.3	0.70	0.6	34.8
		SBT	28.1	18.1	28.1	0.70	104.4	502.8
		SBL	79.4	68.0	78.8	1.00	92.1	236.2
		SBL UT	0.0	0.0	0.0	0.00	92.1	236.2
		EBR	28.1	16.9	27.7	1.81	3.2	58.3
		EBT	77.6	64.1	77.8	1.20	251.3	651.1
		EBL	39.7	29.3	39.3	1.55	21.0	123.2
		WBR	48.7	26.2	48.7	1.84	1.0	41.6
		WBT	71.7	48.7	71.7	1.49	272.1	1113.0
		WBL	123.0	87.7	123.0	2.87	689.3	1188.6
		BRT NBT	90.9	69.0	90.9	1.00	4.9	58.1
		BRT SBT	88.8	60.8	90.4	0.90	3.0	46.4

Table 9.11e Intersection 4700S: 2030 TSP

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	11.1	2.0	10.9	0.88	8.0	174.9
		NBT	27.7	20.0	27.3	0.66	41.0	202.0
		NBL	148.7	133.3	148.0	1.65	210.8	398.8
		NBL UT	0.0	0.0	0.0	0.00	210.8	398.8
		SBR	8.2	1.9	7.9	0.64	0.8	38.9
		SBT	22.5	13.7	22.3	0.59	76.2	420.2
		SBL	85.6	73.7	85.6	1.04	103.3	261.1
		SBL UT	0.0	0.0	0.0	0.00	103.3	261.1
		EBR	45.3	28.6	44.8	2.53	5.6	71.7
		EBT	103.5	86.8	102.5	1.47	370.3	845.8
		EBL	44.7	33.3	44.5	1.50	20.6	125.6
		WBR	44.4	23.3	44.0	1.75	1.0	43.4
		WBT	71.0	49.7	70.5	1.37	268.8	1109.1
		WBL	115.0	82.7	115.1	2.62	579.6	1138.9
		BRT NBT	79.1	58.1	78.4	0.90	8.9	58.5
		BRT SBT	67.4	42.1	69.2	0.70	4.1	46.3
4:15	4:30	NBR	11.8	2.2	11.6	0.89	9.1	195.3
		NBT	27.8	19.7	27.2	0.68	33.8	177.8
		NBL	193.2	174.1	193.5	2.14	277.4	485.2
		NBL UT	0.0	0.0	0.0	0.00	277.4	485.2
		SBR	8.3	1.5	8.1	0.64	0.9	46.0
		SBT	26.8	17.4	26.8	0.65	89.5	489.1
		SBL	81.6	69.3	82.0	1.02	112.3	282.7
		SBL UT	0.0	0.0	0.0	0.00	112.3	282.7
		EBR	44.4	28.5	44.1	2.32	5.8	88.2
		EBT	96.5	79.6	96.2	1.44	334.0	755.6
		EBL	45.5	33.1	46.1	1.69	22.9	134.9
		WBR	45.8	24.2	46.3	1.82	0.9	44.2
		WBT	71.6	48.9	71.8	1.55	325.6	1048.4
		WBL	112.2	78.8	111.6	2.70	624.3	1142.3
		BRT NBT	78.2	56.9	78.2	1.00	4.3	58.0
		BRT SBT	72.4	45.6	73.5	0.80	2.6	41.4

Table 9.11e Intersection 4700S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:30	4:45	NBR	11.1	1.9	10.8	0.91	8.3	168.4
		NBT	29.1	20.5	28.5	0.69	39.8	209.1
		NBL	257.3	231.3	257.1	2.77	382.5	609.2
		NBL UT	0.0	0.0	0.0	0.00	382.5	609.2
		SBR	8.9	2.3	9.0	0.67	0.8	35.4
		SBT	25.4	15.6	24.9	0.63	92.9	509.9
		SBL	95.9	81.4	96.7	1.24	138.6	328.8
		SBL UT	0.0	0.0	0.0	0.00	138.6	328.8
		EBR	36.2	21.9	36.0	2.29	4.5	62.6
		EBT	91.5	76.7	91.0	1.35	300.9	778.9
		EBL	36.7	26.9	36.1	1.41	20.6	121.3
		WBR	57.3	33.0	56.7	2.02	1.0	45.1
		WBT	84.5	58.7	84.0	1.67	321.4	981.6
		WBL	131.5	93.7	131.0	3.03	679.9	1214.4
		BRT NBT	88.1	66.4	87.5	1.00	9.5	58.2
		BRT SBT	85.7	58.0	86.4	0.90	5.0	46.1
4:45	5:00	NBR	12.3	2.4	12.1	0.95	8.6	169.1
		NBT	30.8	21.8	30.5	0.72	39.1	200.7
		NBL	288.0	258.8	288.6	3.06	404.9	617.3
		NBL UT	0.0	0.0	0.0	0.00	404.9	617.3
		SBR	9.0	2.4	8.5	0.67	0.8	35.1
		SBT	26.8	17.0	26.5	0.69	91.1	476.6
		SBL	89.9	76.9	89.1	1.09	108.1	288.6
		SBL UT	0.0	0.0	0.0	0.00	108.1	288.6
		EBR	37.5	23.3	37.5	2.23	6.4	80.5
		EBT	84.6	70.4	84.1	1.26	277.8	721.8
		EBL	42.5	31.3	42.6	1.65	22.5	128.5
		WBR	39.9	20.3	39.5	1.64	1.0	39.2
		WBT	66.8	46.0	67.1	1.37	260.2	954.8
		WBL	110.7	77.7	110.6	2.62	549.7	1196.3
		BRT NBT	91.2	69.6	91.2	1.00	4.8	58.0
		BRT SBT	75.3	49.7	75.7	0.75	4.4	41.7

Table 9.11e Intersection 4700S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:00	5:15	NBR	12.3	2.2	11.9	0.93	8.2	192.7
		NBT	29.8	21.3	30.2	0.70	40.6	195.3
		NBL	301.6	270.1	302.2	3.31	404.9	664.3
		NBL UT	0.0	0.0	0.0	0.00	404.9	664.3
		SBR	14.9	5.1	14.5	0.98	1.1	39.2
		SBT	33.9	22.9	33.7	0.81	150.5	666.5
		SBL	88.2	74.5	87.4	1.14	121.8	284.8
		SBL UT	0.0	0.0	0.0	0.00	121.8	284.8
		EBR	58.4	39.4	57.3	2.68	6.5	83.5
		EBT	108.2	90.2	108.3	1.56	400.1	816.3
		EBL	54.8	40.7	53.9	1.88	25.4	138.0
		WBR	41.3	20.7	40.7	1.76	0.9	45.2
		WBT	66.7	46.0	67.0	1.34	299.9	1093.7
		WBL	105.9	74.9	105.4	2.47	492.8	1118.2
		BRT NBT	77.8	56.3	77.8	1.00	8.6	58.6
		BRT SBT	87.0	59.0	87.1	0.95	3.4	45.1
5:15	5:30	NBR	11.1	2.2	10.8	0.90	7.2	167.9
		NBT	30.0	21.6	29.5	0.69	38.3	188.0
		NBL	258.8	231.7	257.5	2.82	325.7	564.3
		NBL UT	0.0	0.0	0.0	0.00	325.7	564.3
		SBR	9.4	2.1	9.1	0.73	0.8	37.5
		SBT	29.8	19.6	29.6	0.72	112.5	579.7
		SBL	81.4	69.0	81.5	1.01	108.3	291.7
		SBL UT	0.0	0.0	0.0	0.00	108.3	291.7
		EBR	45.1	28.1	45.5	2.37	6.0	81.3
		EBT	95.8	78.5	95.1	1.46	342.9	772.8
		EBL	47.3	34.8	48.0	1.62	21.5	122.8
		WBR	39.5	21.0	39.5	1.64	0.9	47.7
		WBT	66.9	46.4	66.7	1.38	214.2	803.3
		WBL	113.6	80.9	113.4	2.74	588.2	1170.5
		BRT NBT	89.6	68.0	89.6	1.00	4.8	58.1
		BRT SBT	53.7	30.8	53.7	0.50	2.4	36.8

Table 9.11e Intersection 4700S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	11.3	2.0	11.0	0.86	7.9	163.8
		NBT	29.7	21.3	29.9	0.68	37.4	196.9
		NBL	244.7	220.0	244.7	2.59	357.1	559.8
		NBL UT	0.0	0.0	0.0	0.00	357.1	559.8
		SBR	10.0	2.5	9.7	0.69	0.8	36.2
		SBT	27.2	17.7	27.1	0.67	102.4	532.2
		SBL	88.1	75.6	87.5	1.10	114.0	298.5
		SBL UT	0.0	0.0	0.0	0.00	114.0	298.5
		EBR	52.9	34.5	52.8	2.58	6.2	80.7
		EBT	111.3	92.5	110.6	1.58	397.6	795.7
		EBL	54.1	39.6	54.7	1.77	25.3	155.2
		WBR	42.5	22.4	42.4	1.65	1.0	41.6
		WBT	70.4	48.5	70.4	1.46	359.3	1199.1
		WBL	103.5	73.1	102.9	2.47	488.3	1099.4
		BRT NBT	87.3	65.7	86.0	1.00	9.5	58.3
		BRT SBT	80.6	53.3	81.6	0.85	4.3	46.0
5:45	6:00	NBR	11.5	1.9	11.1	0.85	7.2	144.8
		NBT	30.9	22.1	31.1	0.70	41.8	202.2
		NBL	265.5	237.5	267.1	2.95	404.7	636.3
		NBL UT	0.0	0.0	0.0	0.00	404.7	636.3
		SBR	9.6	2.7	9.3	0.72	0.7	38.6
		SBT	27.1	17.1	27.2	0.70	101.2	577.5
		SBL	78.3	67.1	78.5	0.99	92.3	246.9
		SBL UT	0.0	0.0	0.0	0.00	92.3	246.9
		EBR	44.1	28.8	44.0	2.21	4.5	69.4
		EBT	96.5	79.6	96.9	1.43	339.1	692.4
		EBL	50.2	37.0	50.1	1.76	23.1	137.3
		WBR	47.6	25.6	47.7	1.81	1.0	42.6
		WBT	72.8	49.9	72.3	1.48	280.0	1014.0
		WBL	118.6	84.3	118.5	2.81	626.6	1200.3
		BRT NBT	79.9	58.6	79.9	0.90	4.4	58.0
		BRT SBT	67.1	41.2	67.1	0.70	2.4	46.5

Table 9.12a Intersection 5400S: 2009

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	5.0	0.5	5.1	0.95	1.1	53.3
		NBT	41.9	30.8	41.7	0.91	41.2	164.2
		NBL	28.1	22.9	28.0	0.96	9.0	78.5
		SBR	6.4	0.3	6.1	0.81	2.5	72.9
		SBT	35.4	21.1	35.0	1.09	56.6	262.8
		SBL	25.8	18.7	25.4	0.86	24.8	179.9
		EBR	19.2	13.1	19.1	0.75	31.3	168.4
		EBT	21.8	15.7	21.8	0.52	33.3	168.5
		EBL	17.5	13.0	17.6	0.62	12.7	117.2
		WBR	14.2	7.7	13.8	0.67	33.7	195.7
		WBT	23.6	16.8	23.7	0.57	33.9	196.2
		WBL	18.4	12.6	18.4	0.66	20.6	148.2
4:15	4:30	NBR	3.9	0.3	3.9	0.79	0.7	44.5
		NBT	39.6	28.1	39.7	0.97	50.7	182.1
		NBL	27.9	23.2	28.9	0.90	11.0	75.0
		SBR	5.4	0.5	5.4	0.78	1.2	50.0
		SBT	36.2	21.8	35.4	1.14	67.6	291.8
		SBL	23.9	17.0	23.6	0.84	23.7	180.6
		EBR	19.6	13.1	20.1	0.75	36.0	205.2
		EBT	26.1	19.1	26.1	0.59	37.7	205.3
		EBL	16.1	11.7	15.7	0.56	12.6	101.3
		WBR	15.8	10.2	15.7	0.72	25.4	160.7
		WBT	24.6	17.8	24.5	0.59	25.6	161.2
		WBL	18.9	13.3	18.3	0.70	17.0	147.3
4:30	4:45	NBR	5.4	1.2	5.5	1.01	0.9	43.1
		NBT	39.7	29.3	39.7	0.85	42.3	164.8
		NBL	26.8	22.1	25.8	0.88	7.7	66.3
		SBR	5.7	0.6	5.6	0.83	1.0	44.0
		SBT	36.6	21.6	36.1	1.15	68.4	310.4
		SBL	28.6	20.0	29.0	1.00	37.3	235.3
		EBR	19.5	13.0	18.5	0.77	39.4	195.5
		EBT	25.8	18.6	25.6	0.59	41.5	195.7
		EBL	17.2	12.4	16.9	0.58	16.7	132.3
		WBR	16.3	10.6	15.9	0.62	36.2	179.7
		WBT	24.0	17.2	23.8	0.56	36.5	180.2
		WBL	20.9	14.6	20.4	0.72	23.6	170.1

Table 9.12a Intersection 5400S: 2009 (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	5.0	1.0	5.1	0.93	1.0	42.3
		NBT	38.0	27.4	38.6	0.85	47.2	171.1
		NBL	25.6	20.4	25.2	0.79	13.9	99.8
		SBR	5.3	0.2	5.4	0.75	1.6	53.9
		SBT	36.7	22.4	36.1	1.19	71.1	276.1
		SBL	26.2	19.1	25.8	0.87	26.4	211.7
		EBR	21.2	14.0	20.9	0.84	34.4	183.0
		EBT	26.7	19.6	26.8	0.59	36.2	183.1
		EBL	18.2	13.5	18.0	0.59	10.5	104.5
		WBR	14.9	9.6	14.9	0.62	24.8	160.3
		WBT	24.4	17.5	24.4	0.56	25.0	160.8
		WBL	19.2	13.3	19.0	0.71	19.2	143.4
5:00	5:15	NBR	4.4	0.5	4.4	0.86	0.8	44.1
		NBT	38.0	27.0	38.0	0.86	41.5	163.9
		NBL	31.7	26.6	32.7	0.92	10.4	84.4
		SBR	5.6	0.4	5.7	0.75	1.0	47.8
		SBT	37.5	21.7	37.1	1.24	77.1	365.6
		SBL	27.0	18.9	27.1	0.96	31.4	223.9
		EBR	22.5	14.5	22.2	0.86	47.1	227.2
		EBT	27.0	19.2	26.8	0.61	48.6	227.4
		EBL	18.6	13.5	18.4	0.63	16.8	124.8
		WBR	14.3	8.4	14.6	0.73	31.2	176.1
		WBT	24.9	17.8	25.0	0.58	31.5	176.6
		WBL	22.7	15.6	22.5	0.80	31.7	190.8
5:15	5:30	NBR	4.6	0.6	4.7	0.79	1.4	59.4
		NBT	34.5	23.7	34.6	0.90	45.8	188.8
		NBL	28.4	23.1	28.6	1.00	11.2	98.1
		SBR	7.2	0.7	7.1	0.85	1.4	53.5
		SBT	36.4	19.2	36.2	1.43	97.8	392.7
		SBL	29.7	20.0	29.6	1.11	42.0	268.3
		EBR	23.1	16.4	22.9	0.81	37.2	220.5
		EBT	30.1	22.1	30.0	0.65	39.3	220.6
		EBL	22.2	17.2	22.4	0.71	14.1	111.7
		WBR	20.0	13.7	19.8	0.80	31.0	154.8
		WBT	26.4	19.1	25.7	0.59	31.2	155.3
		WBL	22.7	16.5	22.8	0.75	24.6	159.7

Table 9.12a Intersection 5400S: 2009 (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	4.0	0.4	3.9	0.73	0.6	37.6
		NBT	36.4	25.8	36.5	0.83	41.8	172.3
		NBL	28.2	23.6	28.9	0.88	10.1	69.4
		SBR	6.5	0.7	6.3	0.80	1.1	47.1
		SBT	35.3	19.8	35.0	1.22	68.8	332.1
		SBL	24.8	17.6	24.2	0.94	14.6	174.2
		EBR	21.0	14.4	21.3	0.76	37.2	193.8
		EBT	26.9	19.9	26.6	0.59	39.0	193.9
		EBL	19.3	14.5	18.7	0.74	12.0	95.3
		WBR	17.9	11.4	18.1	0.72	38.3	198.1
		WBT	22.6	15.8	22.3	0.52	38.5	198.6
		WBL	22.4	15.5	22.4	0.80	32.0	203.8
5:45	6:00	NBR	4.3	0.4	4.4	0.74	1.3	56.6
		NBT	33.2	21.9	33.5	0.89	50.6	188.9
		NBL	28.4	22.3	28.6	0.99	17.6	121.5
		SBR	8.6	1.5	8.4	0.90	2.2	66.0
		SBT	38.8	22.3	38.6	1.38	102.8	394.3
		SBL	29.2	20.0	29.1	1.16	31.9	237.6
		EBR	25.4	18.5	25.0	0.84	37.4	189.0
		EBT	30.5	23.0	29.6	0.64	39.3	189.1
		EBL	18.5	14.2	18.1	0.67	7.4	69.1
		WBR	16.5	10.7	16.1	0.69	30.2	173.5
		WBT	27.8	20.7	27.5	0.61	30.4	174.0
		WBL	24.8	18.1	24.9	0.78	28.8	196.2

Table 9.12b Intersection 5400S: 2030 No Action

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	12.9	5.6	12.6	1.10	8.8	107.9
		NBT	36.3	26.9	35.8	0.86	91.0	395.2
		NBL	40.0	31.7	40.1	1.32	35.6	174.3
		SBR	10.9	3.1	11.0	0.84	1.3	46.9
		SBT	27.6	17.0	27.4	0.78	149.6	634.1
		SBL	29.3	19.0	29.3	1.00	34.5	265.4
		EBR	45.4	33.3	45.5	1.14	148.1	452.1
		EBT	53.9	41.4	53.4	0.93	148.8	452.2
		EBL	33.5	25.2	33.5	1.06	31.1	157.0
		WBR	31.4	20.9	31.5	0.89	100.5	496.0
		WBT	38.4	26.8	38.0	0.74	100.8	496.5
		WBL	72.0	56.4	72.1	1.49	208.3	538.4
4:15	4:30	NBR	11.7	4.4	11.4	1.06	9.2	119.6
		NBT	35.0	25.8	34.6	0.84	88.0	399.4
		NBL	38.2	29.9	38.3	1.29	34.9	202.6
		SBR	11.2	3.4	11.1	0.87	1.0	48.4
		SBT	27.7	17.4	27.2	0.81	138.9	617.5
		SBL	27.1	17.0	27.7	1.00	27.8	276.8
		EBR	45.9	33.4	45.8	1.13	148.1	472.6
		EBT	52.8	40.5	52.7	0.93	148.7	472.7
		EBL	35.7	26.9	35.8	1.18	34.4	189.2
		WBR	31.4	21.0	31.1	0.85	95.9	441.4
		WBT	37.7	26.2	37.3	0.74	96.2	441.9
		WBL	79.8	62.8	79.4	1.65	239.3	553.7
4:30	4:45	NBR	10.7	4.1	10.5	0.97	7.7	115.2
		NBT	32.6	23.6	32.4	0.83	81.3	379.6
		NBL	36.9	28.9	36.4	1.29	32.1	155.4
		SBR	10.8	3.0	10.6	0.77	1.0	46.6
		SBT	26.9	16.2	26.7	0.80	130.5	597.2
		SBL	25.8	14.6	25.8	1.01	28.3	253.9
		EBR	44.8	33.5	45.1	1.09	136.6	436.4
		EBT	49.1	37.2	48.9	0.89	137.3	436.5
		EBL	32.2	24.4	32.5	1.02	31.8	180.4
		WBR	33.9	22.8	34.0	0.92	110.0	537.8
		WBT	39.8	28.1	39.8	0.76	110.3	538.4
		WBL	85.3	67.0	85.6	1.76	247.8	577.6

Table 9.12b Intersection 5400S: 2030 No Action (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	10.8	4.1	10.4	1.00	7.6	101.2
		NBT	34.1	25.0	33.8	0.84	78.0	372.1
		NBL	33.4	25.9	33.6	1.20	28.5	173.2
		SBR	11.0	3.3	10.9	0.88	1.5	54.5
		SBT	28.1	17.5	27.9	0.81	138.0	612.7
		SBL	24.9	15.5	25.1	0.90	29.9	288.2
		EBR	45.5	33.4	45.9	1.19	139.8	428.2
		EBT	51.3	39.3	50.8	0.92	140.5	428.4
		EBL	33.2	25.2	33.4	1.10	31.8	171.2
		WBR	34.9	23.6	35.0	0.95	102.3	461.9
		WBT	38.1	26.9	38.2	0.73	102.7	462.5
		WBL	70.2	55.2	69.5	1.44	192.5	524.3
5:00	5:15	NBR	11.1	4.7	10.7	1.00	7.3	104.4
		NBT	33.8	24.8	33.2	0.81	84.2	427.2
		NBL	42.2	33.8	42.4	1.42	36.2	181.3
		SBR	10.1	2.5	10.0	0.84	1.1	46.6
		SBT	26.7	16.3	26.5	0.80	124.2	589.3
		SBL	25.3	15.3	25.4	1.00	28.7	290.5
		EBR	47.2	35.5	46.9	1.15	146.2	451.4
		EBT	53.0	41.0	52.6	0.92	147.0	451.5
		EBL	33.9	25.2	33.8	1.16	31.0	165.9
		WBR	31.3	21.3	31.3	0.90	90.7	458.8
		WBT	36.4	25.3	36.1	0.74	91.0	459.4
		WBL	70.2	54.7	69.5	1.50	197.8	554.3
5:15	5:30	NBR	11.1	4.4	10.8	0.98	7.9	129.0
		NBT	32.4	23.7	32.1	0.81	72.5	346.5
		NBL	39.4	31.5	39.2	1.33	34.4	173.0
		SBR	12.9	4.3	12.3	0.95	1.4	59.4
		SBT	29.1	18.6	29.1	0.80	150.3	629.2
		SBL	25.9	16.2	25.9	0.96	30.5	298.3
		EBR	55.6	42.8	56.1	1.19	167.3	503.1
		EBT	55.7	42.7	55.5	0.96	167.9	503.2
		EBL	37.0	28.0	36.9	1.13	33.0	165.2
		WBR	31.3	21.0	30.7	0.88	93.9	474.1
		WBT	37.5	26.5	37.1	0.74	94.3	474.6
		WBL	70.9	55.7	70.1	1.47	201.6	536.9

Table 9.12b Intersection 5400S: 2030 No Action (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	10.1	4.0	10.1	0.95	6.8	106.7
		NBT	30.7	22.1	30.3	0.77	68.6	336.9
		NBL	32.7	25.4	32.9	1.22	25.6	159.2
		SBR	9.4	2.1	9.2	0.76	1.2	45.0
		SBT	24.5	14.3	24.2	0.76	100.2	538.1
		SBL	20.5	11.6	20.3	0.86	18.2	212.0
		EBR	44.4	33.0	44.6	1.08	141.9	441.3
		EBT	49.3	37.6	49.0	0.90	142.7	441.4
		EBL	33.0	25.1	33.2	1.04	31.8	162.6
		WBR	36.5	25.0	36.6	1.00	115.4	513.5
		WBT	40.1	28.4	39.5	0.77	115.7	514.0
		WBL	86.2	67.7	85.7	1.77	252.5	582.9
5:45	6:00	NBR	10.9	4.0	10.5	1.00	8.0	127.5
		NBT	32.3	23.7	32.0	0.80	77.9	364.5
		NBL	37.0	29.3	36.2	1.29	32.9	166.1
		SBR	11.1	3.2	11.0	0.86	1.2	49.9
		SBT	27.9	17.0	27.5	0.82	122.7	534.4
		SBL	23.2	13.3	23.0	0.98	21.6	208.5
		EBR	46.0	34.3	45.9	1.06	139.2	424.5
		EBT	50.6	38.5	50.2	0.91	140.0	424.7
		EBL	31.1	22.8	31.1	1.07	30.9	175.8
		WBR	33.1	22.9	33.3	0.89	105.3	515.6
		WBT	38.6	27.2	38.3	0.74	105.7	516.2
		WBL	94.9	74.2	94.6	1.90	274.6	605.8

Table 9.12c Intersection 5400S: 2030 Minor Improvements

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	12.1	4.5	12.0	1.08	7.4	104.9
		NBT	35.4	24.8	34.9	0.85	71.8	306.6
		NBL	38.3	29.1	38.0	1.40	31.0	161.2
		SBR	16.3	4.1	15.9	0.95	1.1	47.6
		SBT	30.4	16.7	30.2	0.86	132.5	619.2
		SBL	23.3	11.2	23.1	0.78	19.7	159.0
		EBR	41.0	31.3	41.2	1.06	121.9	376.6
		EBT	50.9	39.4	50.4	0.88	122.9	376.8
		EBL	30.2	23.5	30.5	1.02	27.0	141.4
		WBR	31.8	22.9	31.6	0.87	85.6	302.5
		WBT	38.1	27.9	37.6	0.74	85.9	303.0
		WBL	46.2	35.3	46.1	1.23	109.4	409.1
4:15	4:30	NBR	12.4	3.7	11.9	1.12	8.5	117.6
		NBT	34.3	23.8	33.4	0.83	72.9	327.0
		NBL	36.9	27.8	36.8	1.28	30.4	160.1
		SBR	14.7	3.5	14.3	0.91	1.3	51.4
		SBT	29.7	16.6	29.5	0.84	127.0	574.8
		SBL	22.7	11.2	22.6	0.82	17.5	156.7
		EBR	41.4	31.1	41.4	1.06	121.8	394.4
		EBT	49.7	38.2	49.1	0.89	122.5	394.5
		EBL	30.5	23.5	30.4	1.04	28.2	149.3
		WBR	30.0	20.9	29.9	0.89	78.1	284.0
		WBT	37.1	27.0	36.7	0.75	78.4	284.5
		WBL	46.3	35.6	46.4	1.17	110.2	374.4
4:30	4:45	NBR	9.7	2.4	9.5	0.92	5.1	91.6
		NBT	33.6	22.8	33.2	0.84	66.2	295.5
		NBL	33.8	25.2	34.0	1.30	25.5	156.1
		SBR	16.1	4.3	15.8	0.93	1.0	44.0
		SBT	29.3	16.0	29.0	0.83	124.5	601.8
		SBL	21.4	10.2	21.7	0.76	16.9	185.3
		EBR	41.4	31.9	41.8	1.02	116.2	370.9
		EBT	47.3	36.1	47.1	0.87	117.1	371.1
		EBL	29.6	23.0	29.7	0.96	27.6	137.0
		WBR	31.6	22.2	32.0	0.94	84.7	310.6
		WBT	39.6	29.4	39.6	0.77	85.0	311.1
		WBL	42.9	32.9	42.9	1.10	97.2	355.2

Table 9.12c Intersection 5400S: 2030 Minor Improvements (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	9.9	2.7	9.6	0.96	5.8	91.7
		NBT	33.6	23.1	32.9	0.83	64.3	319.2
		NBL	30.0	22.2	30.2	1.21	21.3	128.8
		SBR	14.6	3.3	14.1	0.85	1.1	57.4
		SBT	28.4	15.2	28.2	0.82	117.3	579.0
		SBL	21.0	9.9	20.6	0.76	18.2	166.2
		EBR	44.6	34.2	45.3	1.12	124.1	384.1
		EBT	50.7	39.1	50.2	0.90	124.9	384.2
		EBL	28.6	22.0	29.0	0.97	25.9	143.9
		WBR	31.6	22.3	31.8	0.92	81.6	292.3
		WBT	37.1	27.1	37.3	0.73	81.9	292.9
		WBL	45.8	35.3	45.4	1.14	103.5	367.1
5:00	5:15	NBR	11.2	3.0	10.8	1.02	6.2	92.9
		NBT	33.7	23.0	32.8	0.82	75.4	321.4
		NBL	36.8	27.5	37.4	1.36	32.2	160.7
		SBR	14.7	3.7	14.4	0.83	0.8	37.0
		SBT	30.1	16.7	29.7	0.85	125.8	597.9
		SBL	23.4	11.5	23.3	0.81	16.7	147.0
		EBR	44.3	34.4	43.6	1.08	122.1	372.2
		EBT	50.5	39.1	50.2	0.89	123.1	372.3
		EBL	30.0	23.0	29.7	1.06	26.7	139.5
		WBR	29.8	21.3	29.8	0.87	77.4	295.5
		WBT	36.2	26.3	36.1	0.73	77.7	296.0
		WBL	48.1	37.0	47.7	1.25	115.3	437.5
5:15	5:30	NBR	12.5	4.1	12.0	1.08	7.6	106.5
		NBT	34.4	23.6	33.8	0.85	68.8	308.0
		NBL	36.9	28.5	36.9	1.23	26.7	135.5
		SBR	14.7	3.5	14.4	0.92	1.1	47.1
		SBT	29.9	16.6	29.5	0.85	127.6	572.6
		SBL	23.3	11.7	23.2	0.77	20.2	167.0
		EBR	45.6	35.1	45.6	1.10	126.9	404.4
		EBT	49.8	38.1	49.7	0.90	127.7	404.6
		EBL	29.8	23.2	29.7	1.05	25.3	125.2
		WBR	30.3	21.5	29.8	0.85	78.0	296.5
		WBT	36.5	26.6	36.4	0.74	78.3	297.0
		WBL	47.4	36.3	47.2	1.26	113.4	405.1

Table 9.12c Intersection 5400S: 2030 Minor Improvements (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Avg Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	10.7	3.1	10.3	0.98	5.3	97.3
		NBT	34.9	24.1	34.5	0.84	67.6	313.8
		NBL	32.9	24.6	33.4	1.30	24.2	123.4
		SBR	12.7	2.0	12.5	0.78	1.1	43.7
		SBT	28.1	15.1	27.9	0.81	105.7	525.2
		SBL	19.9	9.3	19.7	0.71	13.6	138.2
		EBR	41.7	32.3	41.7	1.04	121.2	376.6
		EBT	47.8	36.5	47.4	0.88	122.1	376.7
		EBL	28.5	22.0	28.4	0.96	26.8	137.8
		WBR	31.5	22.0	31.6	0.95	84.7	298.4
		WBT	39.0	29.1	38.2	0.76	85.0	298.9
		WBL	48.0	36.4	47.8	1.28	112.8	395.3
5:45	6:00	NBR	10.2	2.8	10.0	1.00	5.9	98.0
		NBT	33.3	22.6	32.5	0.83	68.0	316.4
		NBL	34.1	25.9	33.4	1.22	27.7	139.1
		SBR	15.3	3.8	15.3	0.95	1.1	44.0
		SBT	29.4	16.1	29.2	0.83	130.3	623.0
		SBL	21.3	9.9	21.2	0.82	18.2	154.4
		EBR	41.1	31.1	40.5	1.06	119.0	371.3
		EBT	49.5	37.9	49.2	0.88	120.1	371.5
		EBL	28.9	22.3	28.5	0.98	27.8	154.2
		WBR	32.8	23.8	32.8	0.90	87.1	317.6
		WBT	40.5	30.3	40.3	0.77	87.4	318.2
		WBL	46.9	36.0	46.6	1.20	111.6	406.0

Table 9.12d Intersection 5400S: 2030 No TSP

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	8.6	3.2	8.7	0.97	1.8	57.8
		NBT	34.8	27.7	34.6	0.77	77.8	313.1
		NBL	119.8	108.1	120.0	1.49	125.1	274.7
		NBL UT	98.2	88.5	99.0	1.28	125.1	274.7
		SBR	7.4	1.9	7.5	0.76	1.3	50.0
		SBT	25.4	16.6	25.2	0.77	123.5	536.7
		SBL	56.8	47.5	56.5	0.90	92.4	294.7
		SBL UT	52.7	44.2	51.5	0.90	92.4	294.7
		EBR	36.2	24.9	36.5	1.34	122.4	418.3
		EBT	51.4	40.0	51.4	0.91	129.5	419.7
		EBL	29.9	23.0	29.2	1.01	29.3	157.9
		WBR	22.6	14.4	22.7	0.96	79.6	324.8
		WBT	37.3	27.7	36.9	0.74	84.3	324.6
		WBL	49.7	37.4	49.5	1.29	130.4	432.7
		BRT NBT	17.9	0.0	17.9	0.00	0.0	4.5
		BRT SBT	27.1	8.9	27.1	0.15	0.9	9.3
4:15	4:30	NBR	7.5	2.5	7.6	0.92	2.3	59.3
		NBT	35.1	28.1	34.9	0.77	82.1	335.0
		NBL	111.2	100.2	111.6	1.37	125.9	271.8
		NBL UT	123.5	111.3	125.2	1.56	125.9	271.8
		SBR	8.0	1.9	8.0	0.75	1.4	51.7
		SBT	25.9	17.1	26.0	0.78	126.4	576.0
		SBL	62.6	52.9	62.6	0.93	103.5	313.4
		SBL UT	63.8	54.5	64.7	1.13	103.5	313.4
		EBR	39.0	26.6	39.2	1.36	126.5	430.6
		EBT	51.3	39.9	51.4	0.91	133.3	431.9
		EBL	28.8	21.8	28.9	0.99	27.1	161.9
		WBR	20.7	12.7	20.3	1.02	71.6	304.7
		WBT	36.2	26.9	35.7	0.75	77.0	304.5
		WBL	51.5	38.6	51.5	1.33	141.0	442.8
		BRT NBT	17.1	0.0	17.1	0.00	0.0	4.6
		BRT SBT	37.1	18.2	37.1	0.25	1.4	18.4

Table 9.12d Intersection 5400S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:30	4:45	NBR	7.5	2.6	7.5	0.89	1.8	56.9
		NBT	32.2	25.6	32.2	0.73	73.9	313.1
		NBL	112.1	101.1	111.3	1.41	109.7	269.2
		NBL UT	87.1	78.8	87.1	1.27	109.7	269.2
		SBR	7.5	1.6	7.4	0.78	1.4	54.2
		SBT	26.6	17.8	26.8	0.77	141.7	613.8
		SBL	62.1	52.9	61.9	0.94	95.0	284.5
		SBL UT	65.3	56.7	67.4	1.00	95.0	284.5
		EBR	35.9	24.4	35.8	1.30	114.6	413.2
		EBT	49.8	38.6	50.0	0.90	122.9	414.5
		EBL	30.9	23.8	31.7	1.04	30.9	173.3
		WBR	23.3	14.9	23.1	1.08	76.3	317.5
		WBT	37.6	28.1	37.6	0.74	81.8	317.3
		WBL	52.1	38.9	52.1	1.37	140.0	461.1
		BRT NBT	16.3	0.0	16.3	0.00	0.0	0.0
		BRT SBT	40.0	19.8	40.0	0.30	1.7	18.4
4:45	5:00	NBR	7.3	2.5	7.3	0.88	1.7	54.5
		NBT	33.2	26.4	33.0	0.75	77.3	338.5
		NBL	96.7	87.0	96.3	1.21	106.6	247.6
		NBL UT	79.6	72.2	80.9	0.93	106.6	247.6
		SBR	7.0	1.3	6.9	0.72	1.1	47.3
		SBT	26.1	17.5	26.2	0.77	128.2	577.3
		SBL	65.3	55.7	65.2	0.99	107.3	331.2
		SBL UT	76.0	66.6	76.6	1.07	107.3	331.2
		EBR	36.5	25.7	36.4	1.30	117.0	393.5
		EBT	50.4	39.5	50.2	0.88	124.6	394.9
		EBL	31.2	24.0	31.8	1.04	29.5	161.7
		WBR	22.4	14.2	21.9	1.05	78.6	336.3
		WBT	37.2	27.7	37.8	0.73	83.3	336.0
		WBL	49.5	37.2	49.5	1.28	124.6	446.2
		BRT NBT	17.9	0.3	17.7	0.05	0.1	4.7
		BRT SBT	32.3	14.2	32.3	0.20	0.7	13.4

Table 9.12d Intersection 5400S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:00	5:15	NBR	7.9	2.6	7.7	0.96	2.0	52.7
		NBT	32.6	25.7	32.6	0.75	76.5	328.8
		NBL	114.1	102.7	113.9	1.43	123.5	281.9
		NBL UT	93.6	84.1	93.6	1.13	123.5	281.9
		SBR	7.6	1.6	7.7	0.73	1.1	48.3
		SBT	26.4	17.5	26.6	0.78	151.9	631.3
		SBL	67.3	57.7	67.8	0.98	108.4	325.3
		SBL UT	68.8	59.6	71.6	1.08	108.4	325.3
		EBR	38.5	26.9	38.2	1.38	124.0	424.9
		EBT	49.4	38.2	49.4	0.88	131.1	426.2
		EBL	29.3	22.6	29.8	0.95	27.7	153.8
		WBR	22.8	14.5	23.0	1.00	80.7	325.5
		WBT	38.7	28.8	38.3	0.76	85.5	325.2
		WBL	55.9	41.6	55.8	1.44	155.2	480.5
		BRT NBT	16.8	0.0	16.8	0.00	0.0	0.0
		BRT SBT	48.5	27.6	48.5	0.40	1.3	18.4
5:15	5:30	NBR	7.2	2.5	6.9	0.82	1.8	63.4
		NBT	32.8	25.9	32.7	0.75	74.0	296.9
		NBL	129.9	116.9	128.7	1.63	143.7	285.1
		NBL UT	113.7	102.4	114.0	1.40	143.7	285.1
		SBR	9.2	2.9	9.3	0.90	1.6	63.2
		SBT	32.1	23.6	31.9	0.78	190.8	632.7
		SBL	60.1	50.5	60.2	0.95	98.3	302.6
		SBL UT	63.1	53.6	61.8	0.98	98.3	302.6
		EBR	39.3	27.5	38.6	1.29	124.5	464.9
		EBT	50.2	38.5	50.2	0.91	133.5	466.2
		EBL	29.4	22.9	30.3	0.92	26.8	143.4
		WBR	20.7	12.9	20.7	0.96	71.4	292.0
		WBT	35.7	26.4	35.4	0.71	77.2	291.8
		WBL	50.3	37.7	49.7	1.29	134.0	424.5
		BRT NBT	17.8	0.1	17.6	0.05	0.0	4.6
		BRT SBT	35.3	16.2	35.3	0.25	1.6	18.4

Table 9.12d Intersection 5400S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	8.5	3.1	8.3	0.95	1.8	60.1
		NBT	33.8	26.8	33.6	0.77	79.6	327.7
		NBL	109.0	97.5	109.3	1.44	119.4	256.5
		NBL UT	78.5	70.3	75.0	1.04	119.4	256.5
		SBR	7.5	1.5	7.7	0.73	1.2	43.6
		SBT	25.7	16.8	25.7	0.77	135.8	585.1
		SBL	60.3	51.0	59.5	0.93	98.9	308.0
		SBL UT	57.0	47.5	56.0	0.92	98.9	308.0
		EBR	35.9	25.2	35.6	1.22	118.2	411.6
		EBT	50.0	39.1	50.0	0.87	126.1	412.9
		EBL	30.2	23.4	30.3	0.98	30.6	170.4
		WBR	21.4	13.4	21.2	1.03	78.7	321.2
		WBT	35.9	26.7	35.9	0.71	83.6	321.0
		WBL	56.9	43.1	56.3	1.46	151.2	460.3
		BRT NBT	16.4	0.0	16.4	0.00	0.0	0.0
		BRT SBT	49.7	29.1	49.7	0.40	1.4	18.3
5:45	6:00	NBR	7.3	2.2	7.2	0.90	2.1	54.7
		NBT	34.5	27.6	34.2	0.76	84.6	340.1
		NBL	108.0	96.6	108.0	1.49	113.9	273.6
		NBL UT	116.9	106.5	117.3	1.40	113.9	273.6
		SBR	7.7	1.7	7.6	0.73	1.2	49.9
		SBT	27.1	18.4	27.2	0.78	143.3	605.1
		SBL	58.0	48.6	57.9	0.91	92.2	281.9
		SBL UT	54.5	46.7	54.2	0.88	92.2	281.9
		EBR	39.9	28.3	39.9	1.30	119.3	392.1
		EBT	49.7	38.4	49.7	0.89	127.6	393.4
		EBL	31.7	24.4	31.0	1.04	32.7	172.9
		WBR	23.9	15.4	23.8	1.10	76.0	320.8
		WBT	38.1	28.7	38.2	0.73	81.2	320.5
		WBL	49.3	37.1	49.3	1.29	135.7	448.0
		BRT NBT	19.0	0.2	18.9	0.05	0.0	9.2
		BRT SBT	31.4	12.8	31.4	0.20	1.3	13.7

Table 9.12e Intersection 5400S: 2030 TSP

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	9.1	3.7	9.0	1.01	2.0	69.8
		NBT	34.3	27.4	34.0	0.76	76.7	303.3
		NBL	128.0	115.1	128.1	1.73	133.2	297.0
		NBL UT	116.8	104.4	114.6	1.59	133.2	297.0
		SBR	7.1	1.4	7.1	0.80	1.5	57.8
		SBT	25.4	16.6	25.4	0.77	121.5	523.4
		SBL	57.5	48.3	58.0	0.92	94.0	293.7
		SBL UT	56.6	48.2	56.8	0.89	94.0	293.7
		EBR	37.8	26.1	38.1	1.35	128.6	429.5
		EBT	53.1	41.5	53.3	0.92	135.5	430.8
		EBL	30.2	23.3	29.4	1.00	29.7	156.7
		WBR	23.0	14.6	23.1	0.98	81.3	336.2
		WBT	37.8	28.1	37.4	0.74	85.9	335.9
		WBL	52.3	39.5	51.9	1.33	139.0	460.2
		BRT NBT	19.8	0.3	19.8	0.10	0.0	9.2
		BRT SBT	30.1	10.7	30.1	0.25	1.1	23.1
4:15	4:30	NBR	7.7	2.7	7.7	0.92	2.0	53.8
		NBT	33.8	26.7	33.5	0.77	79.6	322.6
		NBL	118.6	107.0	118.6	1.45	135.7	274.4
		NBL UT	111.0	100.0	115.2	1.52	135.7	274.4
		SBR	7.0	1.3	6.9	0.74	1.5	54.2
		SBT	26.0	17.1	26.2	0.78	122.4	548.7
		SBL	63.3	53.7	63.1	0.96	105.3	321.6
		SBL UT	65.1	56.0	64.5	1.00	105.3	321.6
		EBR	39.0	26.8	39.2	1.35	126.3	423.4
		EBT	51.3	40.0	51.4	0.89	133.4	424.7
		EBL	29.0	22.0	29.0	0.99	27.5	163.6
		WBR	21.1	13.0	20.7	1.03	72.8	308.1
		WBT	36.6	27.3	36.2	0.75	78.2	307.8
		WBL	53.2	39.9	53.3	1.35	146.6	470.7
		BRT NBT	17.9	0.6	17.9	0.05	0.1	4.5
		BRT SBT	21.1	3.9	21.1	0.10	0.2	4.6

Table 9.12e Intersection 5400S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:30	4:45	NBR	7.4	2.5	7.5	0.89	1.9	55.1
		NBT	32.6	25.9	32.2	0.73	74.4	310.6
		NBL	125.3	112.4	124.4	1.60	130.1	303.7
		NBL UT	94.5	85.1	93.5	1.30	130.1	303.7
		SBR	8.5	2.3	8.8	0.80	1.4	56.4
		SBT	26.6	17.8	26.8	0.78	144.4	586.9
		SBL	63.6	54.5	64.1	0.94	95.4	299.2
		SBL UT	56.6	49.0	59.3	0.88	95.4	299.2
		EBR	38.1	26.5	37.9	1.32	123.4	414.8
		EBT	52.0	40.6	52.0	0.91	130.8	416.1
		EBL	31.5	24.1	32.1	1.03	32.0	182.3
		WBR	23.5	15.1	23.6	1.11	76.8	309.5
		WBT	37.9	28.4	37.9	0.73	82.3	309.2
		WBL	55.4	41.5	55.6	1.44	150.5	474.8
		BRT NBT	16.0	0.0	16.0	0.00	0.0	0.0
		BRT SBT	26.2	7.2	26.2	0.20	0.6	13.8
4:45	5:00	NBR	7.2	2.3	7.3	0.84	1.5	56.0
		NBT	33.9	26.9	33.4	0.75	78.3	311.2
		NBL	104.7	94.1	104.4	1.30	111.5	253.5
		NBL UT	81.6	73.4	81.0	1.08	111.5	253.5
		SBR	7.5	1.8	7.4	0.77	1.1	44.2
		SBT	26.6	17.7	26.7	0.78	136.0	610.0
		SBL	62.0	52.9	61.3	0.94	96.3	321.8
		SBL UT	57.3	49.0	57.8	0.95	96.3	321.8
		EBR	37.1	26.3	37.3	1.31	117.3	389.9
		EBT	51.0	39.8	50.9	0.88	125.9	391.3
		EBL	32.5	25.2	32.4	1.04	31.0	166.4
		WBR	22.0	13.8	21.4	1.04	77.5	332.9
		WBT	37.1	27.7	37.8	0.73	82.4	332.6
		WBL	49.9	37.4	49.9	1.31	125.3	449.8
		BRT NBT	18.9	0.7	18.7	0.05	0.1	9.2
		BRT SBT	21.8	4.6	21.8	0.10	0.5	9.2

Table 9.12e Intersection 5400S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:00	5:15	NBR	7.6	2.6	7.4	0.95	1.9	62.2
		NBT	32.7	25.9	32.5	0.74	77.1	324.1
		NBL	117.6	105.8	116.1	1.47	130.8	276.7
		NBL UT	106.5	94.7	106.5	1.43	130.8	276.7
		SBR	6.9	1.1	6.9	0.70	1.3	56.1
		SBT	25.8	17.3	25.9	0.74	145.3	626.4
		SBL	63.2	53.8	63.2	0.95	100.9	330.3
		SBL UT	57.5	49.3	56.5	0.91	100.9	330.3
		EBR	39.1	27.3	39.4	1.37	127.3	428.4
		EBT	50.0	38.7	49.8	0.89	134.0	429.8
		EBL	29.2	22.2	29.7	0.99	27.5	154.4
		WBR	23.3	15.1	23.4	0.98	81.6	326.0
		WBT	39.1	29.2	38.8	0.76	86.5	325.7
		WBL	59.4	44.7	59.4	1.50	166.9	507.6
		BRT NBT	16.1	0.0	16.1	0.00	0.0	0.0
		BRT SBT	26.8	8.7	26.8	0.15	0.6	9.3
5:15	5:30	NBR	7.9	2.7	7.6	0.89	1.8	60.7
		NBT	34.2	27.3	34.0	0.76	77.2	320.0
		NBL	140.5	126.8	140.1	1.73	150.7	296.1
		NBL UT	137.2	124.8	138.0	1.74	150.7	296.1
		SBR	8.7	2.5	8.6	0.88	1.5	49.6
		SBT	29.2	20.4	29.3	0.78	163.2	620.2
		SBL	64.4	54.5	63.7	0.99	107.1	323.5
		SBL UT	81.2	69.4	78.7	1.18	107.1	323.5
		EBR	39.7	27.6	39.3	1.32	127.9	477.3
		EBT	51.4	39.5	51.3	0.92	136.4	478.7
		EBL	29.9	23.3	30.7	0.95	27.3	144.6
		WBR	20.5	12.7	20.4	0.97	71.6	296.4
		WBT	35.9	26.6	35.7	0.72	77.2	296.1
		WBL	51.3	38.5	50.7	1.32	137.7	433.4
		BRT NBT	18.5	0.1	18.4	0.05	0.0	4.6
		BRT SBT	29.5	10.3	29.5	0.25	1.0	23.1

Table 9.12e Intersection 5400S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	8.2	3.1	8.1	0.90	1.7	59.5
		NBT	32.5	25.6	32.7	0.75	76.5	333.4
		NBL	111.6	99.4	112.8	1.60	127.7	255.7
		NBL UT	94.9	85.8	93.5	1.31	127.7	255.7
		SBR	8.0	1.8	7.7	0.71	1.1	44.1
		SBT	27.4	18.5	27.4	0.77	147.1	588.3
		SBL	55.8	47.0	55.7	0.90	88.3	282.9
		SBL UT	42.8	35.8	44.5	0.82	88.3	282.9
		EBR	37.0	25.8	36.7	1.27	118.4	426.7
		EBT	50.7	39.6	50.6	0.88	128.5	428.0
		EBL	30.7	23.7	30.6	1.02	31.2	166.6
		WBR	21.1	13.1	21.0	1.03	78.2	311.0
		WBT	35.4	26.2	35.4	0.70	83.1	310.8
		WBL	60.3	45.7	59.6	1.57	162.7	474.5
		BRT NBT	16.7	0.0	16.7	0.00	0.0	0.0
		BRT SBT	26.2	7.5	26.2	0.20	0.6	13.7
5:45	6:00	NBR	8.5	3.3	8.5	1.00	2.2	57.2
		NBT	35.4	28.3	34.9	0.78	84.4	332.3
		NBL	115.1	103.8	115.1	1.43	119.8	264.0
		NBL UT	126.5	115.6	125.9	1.67	119.8	264.0
		SBR	8.0	1.8	7.8	0.78	1.5	49.8
		SBT	26.7	17.8	26.7	0.79	142.2	608.5
		SBL	55.1	46.1	54.7	0.90	89.2	272.7
		SBL UT	58.1	50.3	56.7	0.87	89.2	272.7
		EBR	38.8	27.2	38.6	1.32	118.9	377.0
		EBT	50.6	39.2	50.6	0.89	127.1	378.4
		EBL	31.4	23.9	30.9	1.03	32.4	169.4
		WBR	22.7	14.2	22.7	1.10	75.5	326.9
		WBT	38.3	28.9	38.4	0.74	80.7	326.6
		WBL	48.8	36.8	48.8	1.26	133.7	457.3
		BRT NBT	20.4	0.5	20.3	0.05	0.1	9.3
		BRT SBT	28.3	9.5	28.3	0.20	0.7	13.7

Table 9.13a Intersection 6200S: 2009

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	5.1	1.4	4.9	0.59	1.1	41.2
		NBT	14.2	13.4	14.1	0.49	12.4	94.5
		NBL	14.5	10.2	15.1	0.65	1.1	29.6
		SBR	9.4	2.0	9.2	0.51	7.2	142.9
		SBT	15.9	7.5	15.2	0.60	10.1	110.8
		SBL	16.1	7.7	15.8	0.71	25.0	268.2
		EBR	3.3	0.1	3.4	0.61	0.1	15.9
		EBT	39.6	34.8	38.7	0.76	32.9	121.2
		EBL	43.4	36.4	42.9	1.06	32.4	146.3
		WBR	6.4	0.6	6.3	0.94	1.8	56.2
		WBT	49.0	37.4	48.5	0.87	113.9	392.9
		WBL	37.6	29.9	37.5	0.90	36.5	179.5
4:15	4:30	NBR	4.8	0.9	4.7	0.64	1.1	41.5
		NBT	13.4	12.9	13.7	0.48	13.4	84.9
		NBL	14.5	10.6	15.2	0.59	1.3	24.4
		SBR	9.1	2.7	9.0	0.55	6.8	163.5
		SBT	14.8	6.1	14.1	0.59	13.5	140.7
		SBL	16.1	7.1	15.9	0.72	30.4	290.5
		EBR	4.4	0.4	4.5	0.63	0.1	20.1
		EBT	41.0	35.1	40.5	0.81	44.9	171.1
		EBL	57.9	48.1	57.3	1.29	61.0	226.3
		WBR	7.2	0.7	7.1	0.87	2.5	61.1
		WBT	50.7	39.2	50.6	0.89	119.8	418.5
		WBL	38.8	31.3	39.3	0.88	33.4	152.3
4:30	4:45	NBR	7.6	3.4	7.8	0.68	2.8	49.5
		NBT	14.3	13.9	14.1	0.47	11.9	77.5
		NBL	16.6	12.2	17.2	0.69	0.9	23.7
		SBR	9.7	2.3	9.4	0.50	7.5	161.0
		SBT	15.6	6.1	15.3	0.64	13.7	146.3
		SBL	15.5	6.9	15.2	0.68	24.5	265.6
		EBR	6.2	1.2	5.8	0.91	0.2	24.6
		EBT	40.9	35.6	41.4	0.79	40.9	153.9
		EBL	59.7	49.6	60.4	1.33	54.2	208.8
		WBR	6.9	0.4	6.9	0.88	2.5	61.6
		WBT	51.6	39.5	51.3	0.91	117.2	404.8
		WBL	43.5	33.7	43.2	1.04	51.0	205.7

Table 9.13a Intersection 6200S: 2009 (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	4.3	0.5	4.4	0.58	1.1	46.7
		NBT	12.2	11.8	11.8	0.46	11.5	82.4
		NBL	13.3	9.2	12.2	0.59	2.3	35.4
		SBR	8.6	1.4	8.4	0.49	7.1	144.8
		SBT	13.7	6.1	13.5	0.50	11.2	120.7
		SBL	12.8	5.5	12.8	0.56	19.7	238.6
		EBR	5.5	0.6	5.4	0.93	0.1	23.9
		EBT	41.6	36.0	41.3	0.79	41.4	154.3
		EBL	51.7	43.3	51.4	1.18	49.1	192.1
		WBR	9.7	0.4	9.6	0.87	5.3	89.9
		WBT	51.6	39.9	50.7	0.90	93.9	369.7
		WBL	51.1	39.8	50.8	1.19	68.2	265.8
5:00	5:15	NBR	3.8	0.4	4.0	0.59	0.5	32.4
		NBT	14.4	13.5	14.3	0.49	14.8	106.0
		NBL	14.6	10.0	15.2	0.77	1.9	30.6
		SBR	11.7	2.8	11.5	0.51	14.1	256.2
		SBT	16.9	7.0	16.6	0.64	20.1	189.2
		SBL	17.7	8.1	17.5	0.76	33.9	303.9
		EBR	4.3	0.6	4.1	0.80	0.1	15.6
		EBT	39.2	34.0	39.5	0.78	36.0	128.5
		EBL	58.0	48.1	58.3	1.33	53.5	186.8
		WBR	7.6	0.6	7.5	0.93	2.5	54.5
		WBT	54.2	41.5	54.6	0.94	137.9	496.1
		WBL	46.0	35.6	46.3	1.09	51.2	212.7
5:15	5:30	NBR	5.4	0.8	5.5	0.69	1.7	48.0
		NBT	16.1	14.9	16.1	0.52	16.2	95.5
		NBL	19.3	14.4	19.4	0.77	2.1	42.0
		SBR	10.6	2.3	10.4	0.53	10.9	208.1
		SBT	16.5	6.5	16.3	0.65	18.6	169.6
		SBL	16.1	6.7	15.8	0.70	29.5	279.7
		EBR	6.0	1.1	6.0	0.92	0.1	19.9
		EBT	39.2	33.6	39.3	0.76	43.0	163.4
		EBL	81.7	68.3	81.3	1.56	104.4	274.0
		WBR	7.9	0.6	7.8	0.88	3.3	66.7
		WBT	54.2	41.6	54.5	0.93	148.9	491.9
		WBL	46.3	36.1	46.1	1.06	45.6	202.6

Table 9.13a Intersection 6200S: 2009 (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	7.6	2.9	7.3	0.72	3.1	52.4
		NBT	15.2	14.5	15.6	0.49	12.5	79.5
		NBL	14.1	9.4	13.5	0.63	1.1	23.6
		SBR	10.0	2.2	9.8	0.46	8.2	185.4
		SBT	15.3	6.2	14.9	0.58	14.9	159.9
		SBL	15.5	6.7	15.2	0.68	22.2	255.5
		EBR	7.4	2.4	7.3	1.16	0.1	22.0
		EBT	38.3	32.8	38.5	0.76	41.6	148.3
		EBL	83.4	68.6	83.6	1.75	91.7	266.7
		WBR	9.7	0.5	9.6	0.88	4.9	78.9
		WBT	53.8	41.1	53.6	0.93	132.2	477.7
		WBL	48.4	35.7	48.5	1.24	69.1	310.9
5:45	6:00	NBR	5.8	1.5	5.6	0.68	1.5	43.1
		NBT	15.5	14.1	15.6	0.50	20.0	113.0
		NBL	17.2	13.2	16.9	0.75	2.1	31.4
		SBR	9.2	1.6	8.9	0.44	7.1	169.6
		SBT	15.2	6.1	14.8	0.57	15.4	150.4
		SBL	15.0	5.9	14.7	0.70	22.0	245.3
		EBR	0.5	0.0	0.5	0.10	0.0	1.9
		EBT	39.0	32.9	38.4	0.77	50.4	191.3
		EBL	50.5	41.8	50.2	1.14	46.5	176.1
		WBR	9.5	0.7	9.3	0.87	4.9	98.3
		WBT	56.6	43.4	56.8	0.98	158.7	521.0
		WBL	52.3	40.7	52.5	1.23	43.7	216.1

Table 9.13b Intersection 6200S: 2030 No Action

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	16.5	8.4	16.7	1.22	14.8	131.8
		NBT	43.3	36.2	42.9	0.80	57.5	198.0
		NBL	62.9	52.1	62.9	1.82	42.3	159.8
		SBR	69.4	32.1	69.0	2.30	280.3	1028.1
		SBT	86.3	62.6	85.5	1.56	534.3	1188.1
		SBL	77.8	55.7	77.3	1.62	121.0	772.7
		EBR	11.7	4.5	11.9	1.02	0.3	30.7
		EBT	33.2	24.7	32.8	0.72	77.6	368.0
		EBL	60.9	44.7	60.7	1.88	139.2	425.0
		WBR	80.4	8.8	79.5	2.31	5.2	120.5
		WBT	179.5	92.7	179.7	4.43	1608.7	2103.1
		WBL	174.5	85.5	175.1	4.85	569.6	1658.9
4:15	4:30	NBR	13.4	5.6	13.1	1.19	7.9	93.8
		NBT	43.4	36.4	42.7	0.79	58.5	194.8
		NBL	73.6	60.0	73.2	2.14	56.0	162.8
		SBR	97.9	47.4	97.2	2.89	616.9	1300.4
		SBT	108.0	76.5	108.1	1.92	833.4	1357.6
		SBL	105.9	76.5	105.6	2.12	263.4	1029.9
		EBR	13.1	5.6	13.0	1.06	0.4	30.6
		EBT	35.3	26.8	35.2	0.72	84.3	396.8
		EBL	61.2	45.4	61.1	1.84	149.5	444.4
		WBR	106.5	20.0	106.2	2.98	242.1	519.4
		WBT	191.4	97.0	191.1	4.62	1681.8	2161.5
		WBL	187.4	90.8	186.8	5.31	1125.5	1583.9
4:30	4:45	NBR	15.0	6.9	15.1	1.25	11.0	106.6
		NBT	44.1	36.7	44.4	0.81	58.5	186.5
		NBL	63.8	52.4	64.2	1.93	42.5	155.8
		SBR	104.4	49.6	103.8	3.11	813.8	1420.3
		SBT	117.3	80.7	117.2	2.09	968.9	1433.9
		SBL	118.8	83.5	118.3	2.36	287.7	894.4
		EBR	13.6	6.1	13.5	1.21	0.2	23.3
		EBT	32.0	23.9	31.4	0.68	73.1	337.2
		EBL	70.0	52.1	69.6	2.09	173.3	462.9
		WBR	149.5	22.5	148.6	4.63	422.9	590.7
		WBT	219.8	101.4	219.3	5.57	1841.5	2243.2
		WBL	210.7	91.7	209.8	5.86	1309.3	2190.4

Table 9.13b Intersection 6200S: 2030 No Action (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	10.8	3.5	10.9	1.04	6.0	83.0
		NBT	44.0	36.8	43.6	0.80	57.2	183.2
		NBL	64.1	52.5	64.5	1.96	45.8	162.9
		SBR	102.1	51.5	102.0	3.05	795.9	1457.8
		SBT	119.0	85.5	118.8	2.09	1007.3	1466.4
		SBL	118.6	87.3	118.4	2.28	426.9	1060.1
		EBR	12.9	5.5	12.8	1.05	0.2	26.0
		EBT	34.1	25.7	33.8	0.71	81.9	333.2
		EBL	60.0	43.8	59.9	1.88	145.0	441.5
		WBR	164.2	29.4	163.7	5.19	531.8	823.8
		WBT	241.0	108.8	240.8	6.29	1930.3	2342.4
		WBL	233.7	98.3	232.4	6.76	1918.6	2344.6
5:00	5:15	NBR	9.7	2.9	9.7	1.04	4.3	61.6
		NBT	43.5	36.8	42.8	0.80	56.2	195.1
		NBL	63.5	52.0	64.3	1.90	40.6	143.3
		SBR	99.1	49.2	99.0	2.88	902.6	1431.2
		SBT	115.2	81.5	115.1	1.99	1053.5	1439.2
		SBL	111.1	80.3	110.6	2.10	711.3	1215.4
		EBR	13.4	5.6	13.4	1.16	0.4	28.0
		EBT	33.1	24.7	33.0	0.71	77.6	327.4
		EBL	61.0	44.8	61.0	1.81	148.0	453.0
		WBR	211.3	44.6	209.3	6.66	811.5	1053.7
		WBT	273.6	124.4	273.5	7.39	2047.4	2388.8
		WBL	264.7	114.3	263.7	7.38	2045.3	2390.5
5:15	5:30	NBR	8.8	2.1	8.7	0.95	4.0	66.4
		NBT	42.5	36.0	42.6	0.77	54.9	197.0
		NBL	53.2	43.6	53.5	1.64	31.5	139.6
		SBR	104.8	54.9	104.8	2.92	908.5	1538.6
		SBT	120.8	86.6	120.3	2.04	1171.1	1556.0
		SBL	122.3	88.7	122.7	2.29	744.9	1392.2
		EBR	13.1	5.8	13.7	1.00	0.5	28.2
		EBT	33.2	24.9	33.4	0.72	78.3	351.0
		EBL	62.0	46.1	62.1	1.83	153.8	461.3
		WBR	259.6	49.6	259.2	7.98	1295.8	1557.0
		WBT	298.7	124.5	298.0	8.18	2233.9	2531.1
		WBL	286.8	112.9	285.2	8.30	2235.6	2532.6

Table 9.13b Intersection 6200S: 2030 No Action (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	13.3	5.6	13.6	1.17	9.3	100.0
		NBT	42.9	36.1	42.7	0.79	55.7	191.1
		NBL	70.2	57.2	69.2	2.05	54.7	169.8
		SBR	109.6	56.5	109.6	3.11	1106.1	1555.9
		SBT	129.3	92.3	129.2	2.20	1237.8	1561.2
		SBL	125.9	90.2	125.5	2.39	787.8	1400.2
		EBR	12.4	5.2	12.6	1.06	0.3	31.6
		EBT	33.0	24.3	32.9	0.72	78.2	336.3
		EBL	66.2	48.9	65.6	1.95	166.6	497.3
		WBR	277.1	61.1	276.8	9.08	1547.4	1871.7
		WBT	314.7	131.5	314.1	8.50	2269.7	2546.2
		WBL	308.4	120.2	307.0	8.80	2271.2	2547.5
5:45	6:00	NBR	10.5	3.4	10.1	1.05	5.6	88.2
		NBT	44.8	37.7	44.6	0.83	59.2	206.6
		NBL	68.7	56.8	68.5	1.94	43.1	148.2
		SBR	104.7	55.3	104.7	2.90	867.8	1506.2
		SBT	122.5	88.1	122.3	2.12	1144.5	1559.8
		SBL	124.1	90.6	124.3	2.35	867.3	1356.0
		EBR	12.2	5.0	12.1	0.97	0.4	31.2
		EBT	32.7	24.5	32.5	0.69	73.2	295.8
		EBL	65.8	48.9	65.6	1.93	167.5	486.4
		WBR	299.5	61.1	298.1	9.72	1882.0	2128.6
		WBT	332.2	132.4	331.1	9.40	2367.1	2583.0
		WBL	324.1	123.6	323.3	9.82	2368.3	2584.1

Table 9.13c Intersection 6200S: 2030 Minor Improvements

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	15.5	8.1	16.1	1.31	11.9	115.4
		NBT	44.1	37.4	44.0	0.78	54.3	183.5
		NBL	52.1	42.5	52.6	1.60	30.6	140.9
		SBR	55.4	23.9	54.9	2.10	174.3	771.0
		SBT	66.7	44.4	66.1	1.35	335.1	856.1
		SBL	57.1	37.2	57.6	1.30	44.2	202.4
		EBR	12.8	6.2	12.9	1.06	0.2	25.2
		EBT	34.7	26.6	34.4	0.73	74.8	289.6
		EBL	49.8	37.4	49.7	1.57	98.7	341.1
		WBR	6.8	1.1	6.7	0.79	1.9	52.4
		WBT	66.7	47.4	66.4	1.32	459.6	1214.5
		WBL	47.5	29.8	46.9	1.35	68.4	338.9
4:15	4:30	NBR	11.8	4.7	11.6	1.21	5.8	78.1
		NBT	44.1	37.3	43.6	0.81	55.7	179.2
		NBL	59.9	48.6	60.3	1.80	40.1	145.8
		SBR	67.1	29.5	66.9	2.52	239.7	824.2
		SBT	77.3	52.9	76.8	1.47	396.9	945.7
		SBL	70.8	49.1	69.1	1.49	68.5	302.4
		EBR	11.9	5.6	12.3	1.01	0.4	31.8
		EBT	31.9	24.6	31.6	0.68	68.4	297.7
		EBL	50.5	37.5	50.5	1.63	107.7	367.9
		WBR	7.0	1.1	6.8	0.77	2.4	81.1
		WBT	57.0	40.4	56.4	1.13	384.5	1220.9
		WBL	42.0	26.9	41.4	1.24	62.2	332.2
4:30	4:45	NBR	14.9	7.1	14.3	1.29	10.1	107.3
		NBT	45.6	38.6	45.7	0.82	55.5	173.4
		NBL	53.9	44.3	53.9	1.65	32.1	123.2
		SBR	91.0	47.5	90.5	2.89	372.7	1153.0
		SBT	100.5	69.4	100.4	1.92	632.5	1248.9
		SBL	94.2	64.9	93.6	1.97	71.5	236.7
		EBR	11.5	5.1	11.7	1.01	0.4	31.3
		EBT	33.4	25.9	33.0	0.70	71.0	269.1
		EBL	59.3	45.0	59.1	1.85	129.1	401.8
		WBR	7.7	1.0	7.6	0.80	2.1	69.3
		WBT	74.2	52.4	73.7	1.48	575.1	1384.6
		WBL	54.8	33.9	54.3	1.52	71.1	382.2

Table 9.13c Intersection 6200S: 2030 Minor Improvements (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:45	5:00	NBR	10.2	3.4	10.3	1.11	4.8	74.5
		NBT	45.2	38.5	44.9	0.80	54.7	175.1
		NBL	54.9	44.5	55.5	1.70	36.5	131.1
		SBR	109.0	51.4	108.7	3.58	633.6	1340.6
		SBT	114.1	72.2	113.5	2.36	733.7	1378.5
		SBL	104.4	64.1	103.6	2.44	80.3	379.0
		EBR	11.3	4.6	10.9	0.89	0.3	28.9
		EBT	34.7	26.8	34.4	0.72	76.6	283.6
		EBL	56.9	42.6	56.6	1.82	121.8	390.8
		WBR	7.2	1.1	7.1	0.82	2.5	64.8
		WBT	65.2	46.6	65.0	1.28	455.6	1257.9
		WBL	49.0	30.6	48.8	1.40	82.4	438.3
5:00	5:15	NBR	8.9	2.6	8.7	1.05	3.9	63.9
		NBT	46.8	40.0	46.9	0.83	54.7	188.0
		NBL	55.8	46.0	55.8	1.62	32.4	126.0
		SBR	98.7	49.6	98.7	3.24	532.2	1231.5
		SBT	109.2	73.0	108.6	2.19	709.1	1357.9
		SBL	99.7	66.1	99.3	2.19	116.1	457.4
		EBR	12.1	6.0	12.2	1.08	0.4	23.9
		EBT	33.5	26.0	33.2	0.71	73.0	270.5
		EBL	51.3	38.4	51.2	1.63	105.9	361.9
		WBR	7.1	1.1	7.0	0.84	2.0	61.7
		WBT	63.0	44.7	62.6	1.22	432.9	1255.1
		WBL	44.3	27.0	44.0	1.28	71.1	397.5
5:15	5:30	NBR	8.6	2.3	8.4	1.04	3.9	64.0
		NBT	45.1	38.5	44.7	0.79	54.2	192.2
		NBL	55.2	45.3	54.9	1.62	29.3	131.7
		SBR	115.8	55.5	115.6	3.69	582.8	1319.6
		SBT	123.0	77.6	122.8	2.49	829.9	1431.6
		SBL	111.5	68.7	110.5	2.52	302.0	676.5
		EBR	12.5	6.4	12.6	1.03	0.3	24.9
		EBT	33.1	25.3	33.2	0.70	71.9	301.2
		EBL	54.8	40.8	54.4	1.78	119.8	373.1
		WBR	7.7	1.2	7.4	0.81	2.1	64.1
		WBT	70.8	50.0	70.4	1.35	526.6	1323.3
		WBL	51.1	31.5	50.9	1.46	67.4	350.4

Table 9.13c Intersection 6200S: 2030 Minor Improvements (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	12.2	5.0	11.9	1.24	9.6	103.3
		NBT	44.6	37.7	44.4	0.81	54.0	178.7
		NBL	66.8	54.8	66.7	1.94	45.3	163.6
		SBR	105.7	52.9	105.2	3.48	485.6	1220.3
		SBT	116.4	76.3	115.8	2.36	723.5	1316.9
		SBL	106.5	67.6	105.9	2.45	327.1	728.4
		EBR	11.7	5.6	11.3	0.99	0.4	31.7
		EBT	34.5	26.8	34.4	0.72	74.9	269.5
		EBL	56.8	42.7	56.5	1.82	126.4	418.6
		WBR	7.7	1.1	7.5	0.82	2.0	64.4
		WBT	66.9	47.1	66.8	1.35	483.7	1315.0
		WBL	50.0	31.2	49.7	1.44	71.4	351.5
5:45	6:00	NBR	12.0	4.8	11.8	1.23	5.4	92.8
		NBT	45.9	39.0	45.5	0.83	56.1	179.2
		NBL	56.1	46.3	56.3	1.58	32.6	132.2
		SBR	92.2	44.7	91.5	3.18	367.8	1060.9
		SBT	105.7	71.8	105.2	2.07	618.5	1187.2
		SBL	95.8	63.9	95.2	2.12	252.8	626.9
		EBR	10.4	4.4	10.6	1.02	0.3	21.8
		EBT	31.5	24.1	31.2	0.68	66.9	270.4
		EBL	56.2	42.4	56.0	1.76	126.8	410.3
		WBR	8.7	1.1	8.4	0.85	2.9	74.4
		WBT	73.0	52.0	72.7	1.45	556.7	1431.6
		WBL	53.6	33.6	53.4	1.50	69.1	354.7

Table 9.13d Intersection 6200S: 2030 No TSP

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	9.3	2.8	9.2	1.13	2.6	55.6
		NBT	44.5	37.6	44.8	0.81	61.4	220.6
		NBL	288.8	269.3	288.9	3.04	208.7	352.6
		NBL UT	0.0	0.0	0.0	0.00	208.7	352.6
		SBR	33.7	9.2	33.3	1.80	52.6	472.1
		SBT	54.3	38.8	54.2	1.12	290.6	902.3
		SBL	77.8	63.1	77.9	1.33	128.6	395.1
		SBL UT	83.5	67.6	81.8	1.65	128.6	395.1
		EBR	15.8	8.4	15.6	1.10	0.3	28.1
		EBT	38.5	29.3	38.2	0.76	99.1	406.6
		EBL	38.8	26.4	38.6	1.25	73.6	333.4
		WBR	36.0	25.3	35.5	0.88	139.0	476.8
		WBT	39.4	28.6	39.1	0.80	141.7	479.3
		WBL	37.8	25.2	37.7	1.17	83.7	396.6
		BRT NBT	81.1	50.9	81.1	1.00	2.5	45.9
		BRT SBT	70.3	40.4	70.3	1.00	2.3	46.5
4:15	4:30	NBR	10.5	3.3	10.3	1.29	3.0	54.8
		NBT	46.3	38.8	46.3	0.82	60.2	198.7
		NBL	470.7	435.1	471.1	5.54	357.3	474.9
		NBL UT	0.0	0.0	0.0	0.00	357.3	474.9
		SBR	39.3	11.9	38.9	1.97	79.4	678.3
		SBT	62.0	44.4	61.7	1.22	347.3	954.8
		SBL	95.4	77.5	94.2	1.53	158.9	411.1
		SBL UT	96.7	79.6	95.1	1.41	158.9	411.1
		EBR	14.9	7.4	14.8	1.14	0.4	22.8
		EBT	36.3	27.9	36.5	0.71	88.9	356.0
		EBL	40.7	28.2	41.0	1.36	84.5	368.7
		WBR	35.0	24.0	34.8	0.84	137.0	464.3
		WBT	37.8	27.1	37.9	0.76	139.6	466.8
		WBL	35.3	23.1	35.4	1.13	74.1	352.4
		BRT NBT	34.3	10.9	34.1	0.50	1.2	45.7
		BRT SBT	73.3	43.4	73.3	1.00	3.5	46.1

Table 9.13d Intersection 6200S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:30	4:45	NBR	10.7	2.9	10.8	1.22	3.0	55.4
		NBT	48.3	39.7	48.7	0.87	59.5	193.1
		NBL	651.9	596.7	651.4	8.18	446.3	558.6
		NBL UT	0.0	0.0	0.0	0.00	446.3	558.6
		SBR	57.6	23.1	57.5	2.48	229.1	905.6
		SBT	83.2	61.6	83.0	1.50	615.8	1249.4
		SBL	112.6	91.0	112.0	1.82	200.4	626.6
		SBL UT	109.4	87.8	107.9	1.75	200.4	626.6
		EBR	13.3	6.0	12.6	1.06	0.4	29.0
		EBT	34.6	26.2	34.4	0.71	83.0	354.2
		EBL	43.5	29.7	43.2	1.54	90.1	395.4
		WBR	34.0	23.2	33.8	0.85	135.0	490.1
		WBT	37.5	26.9	37.4	0.75	137.6	492.7
		WBL	31.3	19.7	31.4	1.05	63.0	303.4
		BRT NBT	103.1	73.1	103.1	1.00	3.5	46.0
		BRT SBT	82.2	52.3	82.2	1.00	3.6	45.9
4:45	5:00	NBR	10.3	2.7	10.3	1.20	2.5	59.8
		NBT	48.1	39.4	47.9	0.84	63.3	202.9
		NBL	765.6	698.5	767.1	9.92	470.0	572.8
		NBL UT	0.0	0.0	0.0	0.00	470.0	572.8
		SBR	61.0	22.0	60.7	2.53	339.7	1024.9
		SBT	86.1	62.2	85.7	1.55	686.0	1272.2
		SBL	105.5	82.7	104.9	1.77	146.5	408.0
		SBL UT	116.2	94.3	117.1	1.85	146.5	408.0
		EBR	16.7	9.0	16.6	1.13	0.3	29.3
		EBT	39.2	30.0	39.3	0.78	99.6	416.3
		EBL	39.9	27.2	39.7	1.37	83.0	353.6
		WBR	35.7	25.0	35.4	0.86	134.6	505.2
		WBT	37.8	27.2	37.6	0.76	137.2	507.7
		WBL	36.5	24.1	36.7	1.11	81.6	374.6
		BRT NBT	46.3	20.2	47.3	0.50	2.1	46.4
		BRT SBT	70.5	40.6	70.5	1.00	4.2	46.5

Table 9.13d Intersection 6200S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:00	5:15	NBR	9.3	2.3	9.1	1.11	2.7	54.6
		NBT	49.1	40.9	49.0	0.84	62.1	206.0
		NBL	771.1	700.7	769.2	9.78	449.4	543.6
		NBL UT	0.0	0.0	0.0	0.00	449.4	543.6
		SBR	58.4	23.3	58.0	2.37	307.6	967.2
		SBT	82.6	60.5	82.2	1.50	690.1	1220.3
		SBL	100.2	79.7	100.0	1.73	153.4	464.3
		SBL UT	111.5	90.4	110.1	1.85	153.4	464.3
		EBR	14.8	7.0	15.0	1.08	0.4	28.1
		EBT	36.5	27.7	36.5	0.74	91.2	359.2
		EBL	43.8	30.0	43.5	1.47	90.0	352.1
		WBR	32.3	22.2	32.6	0.82	132.7	449.4
		WBT	38.1	27.5	38.0	0.77	135.4	452.0
		WBL	34.4	22.4	34.1	1.10	74.0	342.9
		BRT NBT	120.9	93.1	120.9	1.00	4.4	45.6
		BRT SBT	85.1	55.5	85.1	1.00	2.7	46.4
5:15	5:30	NBR	10.2	2.3	10.3	1.22	2.5	59.7
		NBT	47.5	39.0	47.7	0.85	62.4	203.6
		NBL	776.4	706.7	777.8	9.86	466.6	563.1
		NBL UT	0.0	0.0	0.0	0.00	466.6	563.1
		SBR	78.9	32.9	78.8	3.05	659.3	1442.6
		SBT	107.2	79.0	107.3	1.82	1026.0	1491.0
		SBL	111.8	86.9	111.5	1.93	218.1	690.4
		SBL UT	109.8	83.5	109.8	1.91	218.1	690.4
		EBR	13.3	5.9	13.9	1.03	0.3	27.0
		EBT	34.1	25.6	34.0	0.70	82.7	358.9
		EBL	42.5	29.7	42.6	1.41	90.4	379.1
		WBR	33.2	22.8	32.9	0.83	136.1	480.7
		WBT	38.3	27.6	38.4	0.77	138.9	483.3
		WBL	33.6	21.8	34.0	1.10	69.3	338.4
		BRT NBT	66.6	36.5	69.5	0.95	3.7	46.3
		BRT SBT	77.6	47.5	77.6	1.00	4.6	46.3

Table 9.13d Intersection 6200S: 2030 No TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	9.7	2.3	9.6	1.12	2.4	51.8
		NBT	45.7	37.4	45.6	0.82	58.4	197.5
		NBL	799.4	728.4	798.7	10.54	469.2	553.6
		NBL UT	0.0	0.0	0.0	0.00	469.2	553.6
		SBR	77.8	34.0	77.6	2.89	643.0	1398.2
		SBT	109.8	80.4	109.7	1.88	1117.9	1590.0
		SBL	135.1	107.2	134.4	2.19	403.6	847.6
		SBL UT	142.9	117.4	143.6	2.11	403.6	847.6
		EBR	15.1	7.1	15.2	1.00	0.3	26.5
		EBT	35.9	26.8	36.2	0.73	93.4	392.7
		EBL	48.6	34.2	48.6	1.55	108.6	410.8
		WBR	32.9	22.5	32.8	0.85	140.8	522.3
		WBT	37.7	27.0	37.4	0.77	143.3	524.8
		WBL	36.3	24.2	36.3	1.10	78.3	347.3
		BRT NBT	16.8	0.0	16.8	0.00	0.0	0.0
		BRT SBT	79.4	50.0	79.4	1.00	2.6	45.9
5:45	6:00	NBR	10.0	2.3	9.8	1.19	2.8	60.0
		NBT	47.9	39.4	48.1	0.83	62.5	213.8
		NBL	802.6	727.1	801.5	10.77	469.2	572.6
		NBL UT	0.0	0.0	0.0	0.00	469.2	572.6
		SBR	80.9	34.9	80.6	2.94	387.8	1405.8
		SBT	109.1	80.2	108.7	1.85	1086.3	1557.0
		SBL	155.4	124.7	155.7	2.42	489.5	1047.4
		SBL UT	168.3	139.3	170.6	2.51	489.5	1047.4
		EBR	13.6	6.0	13.5	1.03	0.4	28.0
		EBT	36.7	27.8	36.6	0.73	84.6	363.3
		EBL	45.6	31.8	46.0	1.51	100.5	398.5
		WBR	38.0	26.8	37.7	0.89	152.1	570.2
		WBT	41.4	29.9	41.2	0.82	154.6	572.7
		WBL	34.1	22.0	33.8	1.08	71.4	364.2
		BRT NBT	87.7	57.0	87.6	1.00	5.6	46.7
		BRT SBT	68.7	39.3	68.7	0.95	3.8	46.5

Table 9.13e Intersection 6200S: 2030 TSP

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:00	4:15	NBR	9.3	2.9	9.2	1.13	2.7	53.7
		NBT	44.8	37.9	44.7	0.81	61.6	219.3
		NBL	278.0	259.2	279.7	2.96	202.3	330.6
		NBL UT	0.0	0.0	0.0	0.00	202.3	330.6
		SBR	32.5	8.9	32.2	1.80	46.2	474.4
		SBT	54.8	39.3	54.7	1.14	293.0	895.8
		SBL	74.3	60.0	73.7	1.27	119.5	356.8
		SBL UT	86.4	69.4	85.1	1.61	119.5	356.8
		EBR	17.1	9.3	16.9	1.13	0.3	28.1
		EBT	38.4	29.4	37.9	0.76	98.9	393.6
		EBL	39.6	27.4	39.5	1.33	78.7	333.6
		WBR	35.5	25.1	35.4	0.85	137.8	467.7
		WBT	39.4	28.6	39.0	0.79	140.4	470.3
		WBL	36.8	24.7	36.7	1.11	79.8	374.7
		BRT NBT	83.1	52.9	83.1	1.00	2.6	45.9
		BRT SBT	60.5	32.0	60.5	0.90	1.8	41.8
4:15	4:30	NBR	10.6	3.1	10.4	1.32	3.2	68.5
		NBT	45.2	37.8	45.3	0.83	59.0	190.2
		NBL	438.7	406.7	438.2	4.70	335.2	459.9
		NBL UT	0.0	0.0	0.0	0.00	335.2	459.9
		SBR	45.2	14.1	45.1	2.14	123.6	786.2
		SBT	65.2	46.8	64.8	1.25	384.3	997.1
		SBL	94.3	76.5	94.5	1.54	167.6	476.1
		SBL UT	94.8	77.7	94.2	1.53	167.6	476.1
		EBR	16.6	8.5	16.2	1.08	0.4	29.6
		EBT	37.1	28.3	37.1	0.72	93.7	403.9
		EBL	45.4	31.3	45.5	1.48	95.8	405.0
		WBR	34.4	23.4	33.8	0.86	137.3	492.2
		WBT	38.0	27.3	38.1	0.76	139.9	494.7
		WBL	32.3	21.1	32.3	1.02	66.2	332.8
		BRT NBT	35.3	11.9	35.1	0.50	1.3	45.7
		BRT SBT	59.2	32.2	59.2	0.80	3.2	46.3

Table 9.13e Intersection 6200S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
4:30	4:45	NBR	10.3	2.7	10.5	1.23	3.4	71.2
		NBT	48.2	40.2	48.5	0.84	59.7	192.3
		NBL	599.7	549.2	600.0	7.26	412.6	526.7
		NBL UT	0.0	0.0	0.0	0.00	412.6	526.7
		SBR	56.8	23.2	56.7	2.39	200.6	914.5
		SBT	81.4	60.8	81.4	1.44	602.0	1230.0
		SBL	97.0	77.5	96.8	1.59	155.6	537.6
		SBL UT	94.6	75.7	91.9	1.63	155.6	537.6
		EBR	14.4	7.0	14.4	1.10	0.3	29.8
		EBT	34.7	26.2	34.5	0.72	82.2	331.2
		EBL	43.8	30.1	43.6	1.48	92.9	395.5
		WBR	33.5	22.4	33.0	0.87	140.7	507.9
		WBT	39.0	28.1	39.2	0.78	143.1	510.5
		WBL	36.0	23.8	36.0	1.13	77.8	367.9
		BRT NBT	106.5	76.5	106.5	1.00	3.7	46.0
		BRT SBT	57.5	28.4	57.5	0.90	1.4	41.0
4:45	5:00	NBR	10.3	2.7	10.3	1.21	2.5	64.7
		NBT	46.5	38.2	46.1	0.84	61.8	207.0
		NBL	724.4	661.1	725.6	9.93	458.2	572.6
		NBL UT	0.0	0.0	0.0	0.00	458.2	572.6
		SBR	57.0	21.1	56.5	2.37	248.8	988.0
		SBT	83.3	60.5	83.5	1.54	650.3	1253.7
		SBL	94.2	72.8	94.2	1.71	157.5	533.5
		SBL UT	90.3	72.2	90.5	1.73	157.5	533.5
		EBR	13.3	5.7	13.4	1.04	0.3	24.5
		EBT	40.6	31.1	40.8	0.78	104.3	435.9
		EBL	43.6	29.7	43.5	1.50	93.8	401.7
		WBR	34.7	24.6	34.6	0.85	141.7	543.7
		WBT	40.4	29.5	40.3	0.79	144.3	546.3
		WBL	36.3	23.8	36.2	1.12	81.2	345.7
		BRT NBT	51.2	22.3	52.2	0.90	2.4	46.5
		BRT SBT	66.9	37.8	66.9	0.95	3.8	46.5

Table 9.13e Intersection 6200S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:00	5:15	NBR	10.2	2.8	10.1	1.20	2.4	51.7
		NBT	46.1	38.2	46.0	0.80	57.9	193.3
		NBL	773.2	704.0	774.1	9.64	454.3	539.5
		NBL UT	0.0	0.0	0.0	0.00	454.3	539.5
		SBR	60.0	22.7	60.0	2.57	400.1	1160.4
		SBT	83.1	60.2	82.6	1.55	713.4	1283.3
		SBL	91.7	71.3	91.5	1.67	121.8	340.1
		SBL UT	96.5	78.1	96.7	1.69	121.8	340.1
		EBR	16.3	7.9	15.8	1.14	0.3	24.3
		EBT	38.4	28.4	38.2	0.79	100.2	379.9
		EBL	48.8	33.8	49.3	1.63	109.7	391.7
		WBR	34.9	24.4	34.8	0.85	135.8	470.0
		WBT	38.3	27.5	38.3	0.77	138.4	472.6
		WBL	34.3	22.6	33.8	1.08	74.0	342.9
		BRT NBT	16.3	0.0	16.3	0.00	0.0	0.0
		BRT SBT	67.9	38.2	67.9	1.00	2.0	46.3
5:15	5:30	NBR	10.0	2.3	9.9	1.19	2.5	50.9
		NBT	48.3	39.4	48.0	0.86	62.8	201.3
		NBL	758.8	690.6	758.3	9.86	466.3	567.0
		NBL UT	0.0	0.0	0.0	0.00	466.3	567.0
		SBR	81.0	35.6	81.1	3.05	736.5	1457.4
		SBT	108.9	80.0	108.5	1.89	1079.3	1544.5
		SBL	115.5	88.6	115.0	2.09	218.7	597.1
		SBL UT	115.2	89.9	119.0	2.07	218.7	597.1
		EBR	14.4	6.9	14.6	1.02	0.4	31.3
		EBT	35.1	26.7	35.2	0.69	88.1	390.9
		EBL	46.3	32.4	46.1	1.52	100.6	398.3
		WBR	34.0	23.5	34.1	0.84	139.7	474.5
		WBT	39.1	28.2	39.3	0.78	142.4	477.1
		WBL	33.8	22.2	33.1	1.10	72.3	323.9
		BRT NBT	69.2	39.0	70.6	1.00	3.9	46.3
		BRT SBT	63.8	36.0	63.8	0.85	3.6	45.9

Table 9.13e Intersection 6200S: 2030 TSP (continued)

From	To	Movement	Delay (s)	Stop delay (s)	Person delay (s)	Stops per vehicle	Average Queue (ft)	Max Queue (ft)
5:30	5:45	NBR	9.8	2.3	9.8	1.13	2.5	55.9
		NBT	47.0	38.7	46.4	0.84	59.6	198.5
		NBL	793.3	718.9	792.8	10.75	468.2	558.3
		NBL UT	0.0	0.0	0.0	0.00	468.2	558.3
		SBR	78.0	34.0	77.9	2.91	708.2	1241.2
		SBT	108.9	80.7	108.5	1.85	1039.5	1516.3
		SBL	121.8	95.2	122.8	2.07	297.8	788.3
		SBL UT	110.4	90.6	110.4	1.74	297.8	788.3
		EBR	15.5	7.5	15.3	1.00	0.3	28.2
		EBT	36.0	26.9	36.0	0.73	90.5	388.9
		EBL	47.9	33.2	47.7	1.61	105.1	395.3
		WBR	32.2	21.7	32.4	0.87	136.5	516.7
		WBT	36.8	26.3	36.5	0.74	139.1	519.2
		WBL	36.2	24.1	35.8	1.15	79.5	347.6
		BRT NBT	17.4	0.0	17.4	0.00	0.0	0.0
		BRT SBT	71.8	41.9	71.8	1.00	2.1	45.9
5:45	6:00	NBR	9.6	2.4	9.6	1.10	2.3	50.5
		NBT	48.8	40.2	48.4	0.85	64.1	202.4
		NBL	812.7	740.7	812.5	9.82	464.3	563.7
		NBL UT	0.0	0.0	0.0	0.00	464.3	563.7
		SBR	79.5	33.4	79.7	3.10	517.0	1366.3
		SBT	106.7	77.6	106.7	1.86	1089.0	1501.5
		SBL	135.2	106.9	134.4	2.22	405.1	1151.0
		SBL UT	137.6	109.3	140.0	2.92	405.1	1151.0
		EBR	15.2	7.2	15.2	1.17	0.4	32.8
		EBT	36.7	27.8	36.6	0.73	87.3	380.6
		EBL	42.3	29.0	42.3	1.45	91.3	397.1
		WBR	37.6	26.4	37.5	0.86	146.7	534.7
		WBT	40.7	29.5	40.6	0.80	149.2	537.2
		WBL	35.5	23.3	35.5	1.10	78.7	363.2
		BRT NBT	86.0	55.3	86.0	1.00	5.5	46.7
		BRT SBT	66.0	36.6	66.0	0.95	3.9	46.5