EVALUATION OF TRANSIT SIGNAL PRIORITY STRATEGIES FOR 400 SOUTH LIGHT RAIL LINE IN SALT LAKE COUNTY, UT

PART II

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Disclaimer

ABSTRACT

The goal of this study is to evaluate light rail priority strategies along the 400 S / 500 S corridor in Salt Lake County through analyzing benefits and impacts of the priority on transit and vehicular traffic through microsimulation. The field of study consists of a 2-mile corridor with 12 signalized intersections along 400 S / 500 S, where the university light rail line operates. The study uses VISSIM microsimulation models to estimate light rail operations, as well as impacts that light rail priority has on transit and general purpose traffic.

The results show that the existing priority strategies have no impacts on vehicular traffic along the corridor, while at the same time help reduce train travel times 20% to 30%. Left turns along the main corridor are more affected by the priority than the through movements. Depending on the side street, the priority strategies can cause minor to major impacts on vehicular traffic through increased delays, while they help reduce train delays by 140%. Enabling priority at the 700 E intersection, where the priority is currently not active, would help reduce delays for trains an additional 10%, while increasing delays for vehicles approximately 7%. However, the coordinated north-south through movements would experience minimum impacts.

Three recommendations have emerged from the study. The first is to enable priority at 700 E. This would help transit without major impacts on vehicular traffic. The second is to reset priority parameters at intersections adjacent to LRT stations so that the priority call encompasses station dwell times. The last recommendation is to consider removing the queue jump strategies to reduce delays for the corridor through movements and help preserve coordination patterns.

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AVI	Automatic Vehicle Identification
AVL	Automatic Vehicle Location
DSRC	Dedicated Short Range Communications
GPS	Global Positioning Systems
HCM	Highway Capacity Manual
ITS	Intelligent Transportation Systems
LOS	Level of Service
LRT	Light Rail Transit
LRV	Light Rail Vehicle
MOE	Measure of Effectiveness
NEMA	National Electrical Manufacturers Association
ROW	Right-of-Way
SIL	Software-In-The-Loop
TRAX	UTA's Light Rail System
TSP	Transit Signal Priority
UDOT	Utah Department of Transportation
UTA	Utah Transit Authority
UTL	Utah Traffic Laboratory
VISSIM	Traffic in Towns – Simulation (German Acronym)
VAP	Vehicle Actuation Program
VNP	Virtual NextPhase

INTRODUCTION

Light Rail Transit (LRT) was developed from other rail transit modes in the 1950s. It was introduced as a separate rail transit mode in North America in 1972. The Transportation Research Board (TRB) Committee on LRT defines LRT as a metropolitan electric railway system which can operate single cars or short trains along exclusive rights-of-way (ROW) at ground level, on aerial structures, in subways, or in streets, and it can board and discharge passengers at track or car-floor level (*1*). The major characteristics of LRT are that it uses electrically powered, high capacity, quiet vehicles with high riding quality, have good acceleration/deceleration performances, and is able to cruise at high speeds. LRT vehicles (LRV) usually operate in one-car to four-car trains on predominantly separated ROW (*2*). LRT can use many different types of alignment on the same line, such as tunnels, medians, parks, pedestrian zones etc. LRT usually operates in ROW category B, which is a semi-exclusive ROW that operates at street grade with different separations and protections of the LRT ROW, but can sometimes operate in ROW category A (exclusive, fully grade-separated), or category C (non-exclusive, mixed traffic operations) (*2, 3*). Operating LRT in semi-exclusive or non-exclusive ROW can cause some safety problems, mainly caused by turning vehicles, pedestrians at LRT/pedestrian malls, and/or complex intersection geometry. In order to overcome some of these problems, it is necessary to follow planning principles and guidelines for LRT, such as (*3*):

- Respect existing urban environment
- Comply with motorists, pedestrians, and LRV operator expectancy
- Simplify decisions and minimize road-user confusion
- Clearly transmit the level of risk associated with environment
- Provide recovery opportunities for errant pedestrians and motorists

Major characteristics of transportation technology, specifically designed for rapid transit modes (where LRT belongs), and which should be followed during design/implementation are as follows (*4*):

- Operates in a reserved guideway, at-grade crossings, sometimes shared with other vehicles
- Widely spread stations
- Vehicle floors level with station platforms
- Off-vehicle fare collection
- Multiple doors, combined entry/exit
- Transit Signal Priority (TSP)/Preemption
- Speeds competitive to cars
- Provides enough capacity

In order to make LRT faster, more reliable, and competitive, as well as to resolve some safety problems, it is necessary to provide certain priority or preemption to LRVs. Depending on the specific location, traffic operations and safety requirements, either preemption or TSP for LRT are implemented (off course, there are situations when none of these techniques is used). 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 (*5*). 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, and these delays have proven to be minimal.

A transit agency has two objectives for using TSP: improve service and decrease costs. Through customer service enhancements, the transit agency could ultimately attract more customers. Fewer stops also mean reductions in drivers' workload, travel time, fuel consumption, vehicle emissions, and maintenance costs. Greater 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 (*6*). 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, in forms of passive, active, and adaptive TSP (*5*). 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 as low a cycle length as 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; 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, or a combination of, active priority strategies can be used depending on the specific situation and traffic and transit operations. TSP strategies used with LRT usually belong to the active TSP strategies.

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 it is 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. (*7*). 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.

A TSP implementation is not a straightforward process. Each TSP deployment likely faces problems, which depend on the actual traffic and transit system. Factors which affect a TSP implementation can be categorized in two major categories: traffic related factors and transit related factors (*8, 9*).

Traffic related factors include the following:

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 include the following:

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
   - Farside bus stops are more compatible with priority systems

Another important part of a TSP system is the detection technology (*9*). It must detect a transit vehicle and transfer the information to the traffic controller in time to influence the priority settings. 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 (*5 – 9*).

Providing priority for LRVs is usually a more complex process than bus priority, especially considering safety at intersections. That is why a new approach, called predictive priority concept, is starting to emerge when priority for LRT is being provided. The predictive priority concept utilizes TSP strategies and communications among intersections (*10*). The major goals of this concept include the following:

- Provide additional service phase opportunities within the existing intersection signal phasing to serve LRVs, and communicate between intersections along the route to provide predictive information about approaching trains
- Make sure intersections can prepare for the train without causing additional delay to vehicle or pedestrian traffic and serve the train quickly, maintaining coordinated signal operation

Traffic simulation is a powerful tool to analyze different aspects of traffic operations. However, modeling LRT operations, especially when integrated with certain priority strategies, can be a challenging task. This is partially due to the software capabilities to simulate transit operations, and partially due to the simulation of complex signal operations. A successful integration of VISSIM simulation software and Siemens NextPhase virtual controller is used to simulate predictive priority for an LRT line in Houston, Texas (*10*). This study showed benefits of the predictive priority and justified its implementation in the field. A different study used VISSIM simulation software and a custom-made signal control code (through a Vehicle Actuation Program [VAP] interface) to analyze a proposed LRT line in the city of Nottingham, UK, that would combine LRT priority with adaptive traffic control (*11*). The experiences from these two studies prove that the newly developed traffic simulation technology can be used to analyze very complex traffic and transit operations in a simulation environment.

The goal of this study is to evaluate light rail priority strategies along the 400 S / 500 S corridor in Salt Lake County through analyzing benefits and impacts of the priority on transit and vehicular traffic through microsimulation. The objectives of the study are traffic analysis of the vehicular travel times along the corridor, transit travel times, intersection performance, and LRT station data. The area of study consists of a 2-mile corridor with 12 signalized intersections along the 400 S / 500 S corridor, where the university light rail line operates. The study uses VISSIM microsimulation models to estimate light rail operations, as well as impacts that light rail priority has on transit and general purpose traffic.

The report is organized as follows: Section 1 describes the project corridor; Section 2 describes the data collection processes and gives basic traffic and transit inputs; Section 3 describes the existing train priority strategies and their basic functional aspects; Section 4 describes the modeling methodology for the developed VISSIM models; Section 5 provides major results and findings obtained through the microsimulation; Section 6 discusses the given results and proposes certain recommendations; and Section 7 provides the major conclusions of the study. The Annexes that follow contain detailed data and analysis obtained through the field measurements and simulations.

1. PROJECT DESCRIPTION

The University TRAX line connects the University of Utah Campus and Downtown Salt Lake City, providing further connections to many other transit lines, such as the Sandy TRAX line and the FrontRunner. It is the major transit line in this part of the county. The line is 5.7 miles long with 14 stations, as shown in Figure 1.1. The terminal stations of the line are Medical Center, located at 10 N Medical Drive, and Salt Lake Central Station, located at 250 S 600 W. The line operates at 15-minute headways Monday through Saturday and 20-minute headways on Sundays.

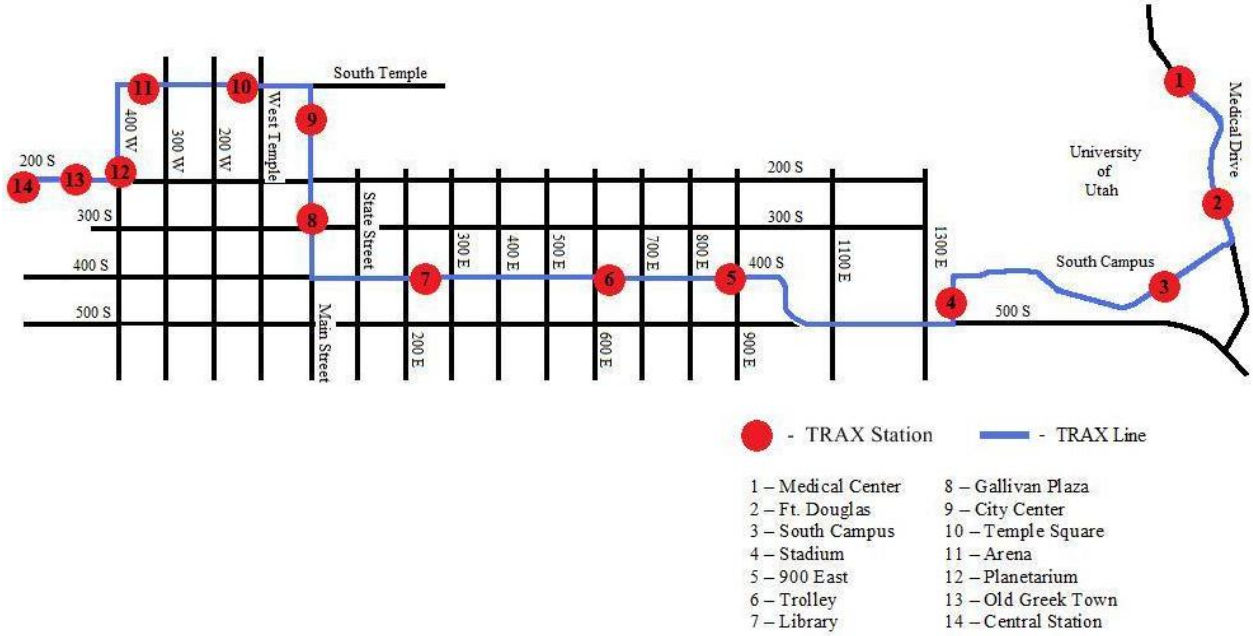


Figure 1.1 University TRAX line

This project addresses a university line corridor along 400 S / 500 S, from Main Street to 1300 East (stadium station). This corridor is 2.07 miles long with 12 signalized intersections. Along this corridor, the line crosses some of the major north-south arterials, such as 1300 E, 700 E, and State Street. A combination of predictive TSP strategies is enabled for the line, at all intersections except 700 E. These priority strategies are addressed in more detail in Section 3.

The 400 S / 500 S corridor is also one of the busiest traffic corridors in this part of the county, carrying more than 26.000 vehicles per day on certain segments. Along the studied corridor, signal coordination is provided along 400 S / 500 S, except for 700 E, where the coordination is provided for the northbound and southbound traffic.

2. DATA COLLECTION

2.1 Travel Time Measurements

Travel time was measured both for TRAX and vehicular traffic. TRAX travel times were measured from Gallivan Plaza to the Medical Center station, while the car travel times were measured along 400 South and 500 South, from Main street to 1580 East. The measurements were obtained using GPS technology. A GPS receiver was connected to a laptop or PDA device, which collected data on a second-by-second basis. All travel time measurements were performed for the AM (7:00 – 9:00 AM) and PM (4:00 – 6:00 PM) peaks, both eastbound and westbound.

These measurements were collected over three days in August (August 5, 6 and 7), and three days in September (September 9, 10 and 11). Beside these measurements, UTA provided travel time data for the TRAX line from their databases, which were also obtained through GPS measurements. These two data sets were combined to get more complete and reliable information on travel times. The travel time data are also used to create, calibrate, and validate the VISSIM simulation model. Table 2.1 shows the format of travel time runs conducted by the researchers, while Table 2.2 shows the original TRAX data obtained from UTA.

Table 2.1 The Format of the GPS Data Collection

Run	Date	Time	Speed	Latitude	Longitude	HDOP	Quality	Sat Used
1	9/9/2008	7:02:30	12.1	40.760528	-111.891205	1.3	1	7
1	9/9/2008	7:02:31	12.4	40.760518	-111.891125	1.3	1	7
1	9/9/2008	7:02:32	13.6	40.760513	-111.891047	2.1	1	6
1	9/9/2008	7:02:33	13.9	40.760512	-111.890965	1.9	1	7
1	9/9/2008	7:02:34	15.9	40.760513	-111.890873	2.1	1	6
1	9/9/2008	7:02:35	17.7	40.760518	-111.890785	2.1	1	6
1	9/9/2008	7:02:36	19.6	40.760520	-111.890687	1.3	1	7
1	9/9/2008	7:02:37	21.2	40.760520	-111.890577	2.1	1	6
1	9/9/2008	7:02:38	22.6	40.760523	-111.890460	1.9	1	7
1	9/9/2008	7:02:39	23.6	40.760522	-111.890333	1.9	1	7
1	9/9/2008	7:02:40	24.7	40.760520	-111.890203	3.2	1	5
1	9/9/2008	7:02:41	25.8	40.760525	-111.890065	2.6	1	6
1	9/9/2008	7:02:42	26.1	40.760528	-111.889923	1.1	1	7
…	…	…	…	…	…	…	…	…

Table 2.2 The Format of the TRAX GPS Data Obtained from UTA

Direction	Vehicle	Stop Name	Stop Index	Stop Type	Arrival Time	Departure Time	Longitude	Latitude
WB	1004	MEDCTR	0	0	15:51:33	16:00:50	-111.8387883	40.76949500
WB	1004	FTDOUGLS	1	0	16:02:18	16:02:40	-111.8365667	40.76418667
WB	1004	SOCAMPUS	2	0	16:04:09	16:05:10	-111.8398583	40.76020500
WB	1004	STADIUM	3	0	16:07:28	16:08:06	-111.8520283	40.75901000
WB	1004	900EAST	4	0	16:10:38	16:12:01	-111.8648117	40.76068167
WB	1004			3	16:12:45	16:14:00	-111.8704600	40.76067167
WB	1004	TROLLEY	5	0	16:14:40	16:17:20	-111.8733517	40.76071000
WB	1004			3	16:17:54	16:17:56	-111.8762817	40.76068500
WB	1004			3	16:18:26	16:18:30	-111.8791633	40.76067833
WB	1004	LIBRARY	6	0	16:19:22	16:20:06	-111.8847800	40.76069167
WB	1004			3	16:20:37	16:20:44	-111.8874250	40.76066167
WB	1004			3	16:21:26	16:21:39	-111.8901133	40.76069167
WB	1004	GALLPLZA	7	0	16:22:48	16:24:17	-111.8911283	40.76341833
WB	1004	CITYCTR	8	0	16:25:08	16:26:07	-111.8911283	40.76801667
WB	1004	TEMPLESQ	9	0	16:26:54	16:28:11	-111.8934633	40.76933167
WB	1004	ARENA	10	0	16:29:26	16:30:31	-111.9009417	40.76941167
WB	1004	PLANTRUM	11	0	16:31:36	16:32:35	-111.9025650	40.76624667
WB	1004	GREKTOWN	12	0	16:33:23	16:34:40	-111.9049917	40.76499000
WB	1004	SLCSTATN	13	0	16:35:47	16:35:50	-111.9083533	40.76201667
EB	1004	SLCSTATN	0	0	16:35:50	16:38:14	-111.9083533	40.76201667
EB	1004	GREKTOWN	1	0	16:39:49	16:40:27	-111.9063417	40.76499333
EB	1004	PLANTRUM	2	0	16:41:03	16:42:55	-111.9034983	40.76499167
EB	1004	ARENA	3	0	16:44:15	16:44:40	-111.9006050	40.76928833
EB	1004	TEMPLESQ	4	0	16:45:27	16:46:25	-111.8962417	40.76937667
EB	1004	CITYCTR	5	0	16:47:42	16:48:14	-111.8911333	40.76790500
EB	1004	GALLPLZA	6	0	16:49:06	16:50:51	-111.8908683	40.76333167
EB	1004			3	16:51:50	16:52:08	-111.8891533	40.76065000
EB	1004	LIBRARY	7	0	16:52:59	16:54:25	-111.8845450	40.76061000
…	…	…	…	…	…	…	…	…

Tables 2.3–2.10 show average travel speeds and average travel times for general purpose traffic and TRAX, given for the entire studied corridor (from Main Street to 1300 E), as well as for the 11 segments (between each pair of signalized intersections).

Travel time measurements were also used to determine the Level of Service (LOS) for the general purpose traffic along the 400 S / 500 S corridor. According to the Highway Capacity Manual (HCM) (*12*), LOS on urban streets is defined based on the urban street class and the average travel speed along segments and corridors. The 400 S / 500 S corridor belongs to the 3rd urban street class with typical free-flow speed of 35 mph (which is the actual posted speed limit along the studied corridor). LOS is calculated separately for each travel time run, in AM and PM peaks, eastbound and westbound. Detailed LOS tables are given in Annex 1, while Tables 2.3–2.10 show average values of LOS for general purpose traffic.

Table 2.3 Travel Speed, Travel Time and Level of Service for August, AM Peak, Eastbound

Segments	General Purpose Traffic			TRAX
	Average Speed (mph)	Average Travel Time (s)	Average LOS	Average Travel Time (s)
Main St. - State St.	14.00	53	D	51
State St. - 200 E	27.91	21	B	29
200 E - 300 E	31.67	17	A	70
300 E - 400 E	26.60	26	B	24
400 E - 500 E	14.71	42	D	18
500 E - 600 E	24.29	24	B	19
600 E - 700 E	18.33	42	C	110
700 E - 800 E	30.18	17	A	23
800 E - 900 E	30.07	27	A	74
900 E - 1100 E	25.08	60	B	54
1100 E - 1300 E	16.92	80	D	44
Total:	**18.64**	**409**	**C**	**516**

Table 2.4 Travel Speed, Travel Time and Level of Service for August, AM Peak, Westbound

Segments	General Purpose Traffic			TRAX
	Average Speed (mph)	Average Travel Time (s)	Average LOS	Average Travel Time (s)
1300 E - 1100 E	31.66	37	A	34
1100 E - 900 E	28.22	53	B	59
900 E - 800 E	32.27	18	A	66
800 E - 700 E	13.84	64	E	37
700 E - 600 E	34.92	16	A	56
600 E - 500 E	18.86	40	C	23
500 E - 400 E	20.88	39	C	19
400 E - 300 E	27.08	26	B	24
300 E - 200 E	25.17	34	B	53
200 E - State St.	15.51	55	D	27
State St. - Main St.	24.56	43	B	49
Total:	**18.00**	**425**	**C**	**447**

Table 2.5 Travel Speed, Travel Time and Level of Service for August, PM Peak, Eastbound

Segments	General Purpose Traffic			TRAX
	Average Speed (mph)	Average Travel Time (s)	Average LOS	Average Travel Time (s)
Main St. - State St.	11.81	53	E	56
State St. - 200 E	25.84	25	B	23
200 E - 300 E	19.55	47	C	79
300 E - 400 E	25.81	29	B	25
400 E - 500 E	17.41	37	D	40
500 E - 600 E	22.95	30	C	20
600 E - 700 E	14.30	72	D	104
700 E - 800 E	31.46	17	A	17
800 E - 900 E	27.84	25	B	71
900 E - 1100 E	25.24	62	B	80
1100 E - 1300 E	15.01	84	D	51
Total:	**15.93**	**481**	**D**	**566**

Table 2.6 Travel Speed, Travel Time and Level of Service for August, PM Peak, Westbound

Segments	General Purpose Traffic			TRAX
	Average Speed (mph)	Average Travel Time (s)	Average LOS	Average Travel Time (s)
1300 E - 1100 E	32.56	35	A	44
1100 E - 900 E	25.40	62	B	73
900 E - 800 E	23.56	33	C	63
800 E - 700 E	15.83	50	D	84
700 E - 600 E	27.09	25	B	67
600 E - 500 E	23.61	34	C	23
500 E - 400 E	24.01	35	B	20
400 E - 300 E	14.14	62	D	27
300 E - 200 E	20.28	29	C	74
200 E - State St.	11.22	73	E	44
State St. - Main St.	11.05	65	E	48
Total:	**15.00**	**503**	**D**	**567**

Table 2.7 Travel Speed, Travel Time and Level of Service for September, AM Peak, Eastbound

Segments	General Purpose Traffic			TRAX
	Average Speed (mph)	Average Travel Time (s)	Average LOS	Average Travel Time (s)
Main St. - State St.	17.97	43	D	40
State St. - 200 E	29.98	20	B	27
200 E - 300 E	28.69	20	B	84
300 E - 400 E	29.37	19	B	18
400 E - 500 E	23.28	28	C	16
500 E - 600 E	23.17	26	C	19
600 E - 700 E	18.30	41	C	102
700 E - 800 E	25.30	23	B	22
800 E - 900 E	20.89	48	C	109
900 E - 1100 E	23.54	66	C	57
1100 E - 1300 E	15.99	90	D	86
Total:	**18.65**	**424**	**C**	**580**

Table 2.8 Travel Speed, Travel Time and Level of Service for September, AM Peak, Westbound

Segments	General Purpose Traffic			TRAX
	Average Speed (mph)	Average Travel Time (s)	Average LOS	Average Travel Time (s)
1300 E - 1100 E	30.52	41	A	46
1100 E - 900 E	25.80	60	B	61
900 E - 800 E	29.12	22	B	72
800 E - 700 E	8.57	76	F	53
700 E - 600 E	32.42	19	A	58
600 E - 500 E	18.25	45	C	18
500 E - 400 E	22.20	32	C	19
400 E - 300 E	23.34	33	C	27
300 E - 200 E	25.89	28	B	64
200 E - State St.	12.71	57	E	27
State St. - Main St.	22.67	38	C	61
Total:	**16.79**	**451**	**D**	**506**

Table 2.9 Travel Speed, Travel Time and Level of Service for September, PM Peak, Eastbound

Segments	General Purpose Traffic			TRAX
	Average Speed (mph)	Average Travel Time (s)	Average LOS	Average Travel Time (s)
Main St. - State St.	14.36	57	D	59
State St. - 200 E	28.37	20	B	26
200 E - 300 E	19.86	49	C	93
300 E - 400 E	27.90	22	B	21
400 E - 500 E	17.61	34	D	25
500 E - 600 E	20.99	30	C	26
600 E - 700 E	17.15	61	D	99
700 E - 800 E	29.32	18	B	22
800 E - 900 E	20.37	39	C	79
900 E - 1100 E	23.72	66	C	56
1100 E - 1300 E	17.92	78	D	114
Total:	**16.17**	**474**	**D**	**620**

Table 2.10 Travel Speed, Travel Time and Level of Service for September, PM Peak, Westbound

Segments	General Purpose Traffic			TRAX
	Average Speed (mph)	Average Travel Time (s)	Average LOS	Average Travel Time (s)
1300 E - 1100 E	29.68	40	B	48
1100 E - 900 E	24.34	63	B	66
900 E - 800 E	16.28	46	D	64
800 E - 700 E	15.62	45	D	91
700 E - 600 E	28.67	21	B	63
600 E - 500 E	17.16	50	D	26
500 E - 400 E	18.70	39	C	18
400 E - 300 E	15.03	51	D	27
300 E - 200 E	18.64	37	C	81
200 E - State St.	12.12	63	E	47
State St. - Main St.	12.93	64	E	62
Total:	**14.50**	**519**	**D**	**593**

The data collected in TRAX were also used to determine the average time that trains spend stopped at stations and at traffic signals. Tables 2.11 and 2.12 show these results.

Table 2.11 Average TRAX Station Dwell Times and Traffic Stops (August)

Station	Average Dwell Time AM Eastbound (s)
Library	33
Trolley	32
900 East	39
Traffic Stops	44

Station	Average Dwell Time AM Westbound (s)
900 East	28
Trolley	26
Library	25
Traffic Stops	19

Station	Average Dwell Time PM Eastbound (s)
Library	33
Trolley	35
900 East	38
Traffic Stops	88

Station	Average Dwell Time PM Westbound (s)
900 East	29
Trolley	32
Library	40
Traffic Stops	109

Table 2.12 Average TRAX Station Dwell Times and Traffic Stops (September)

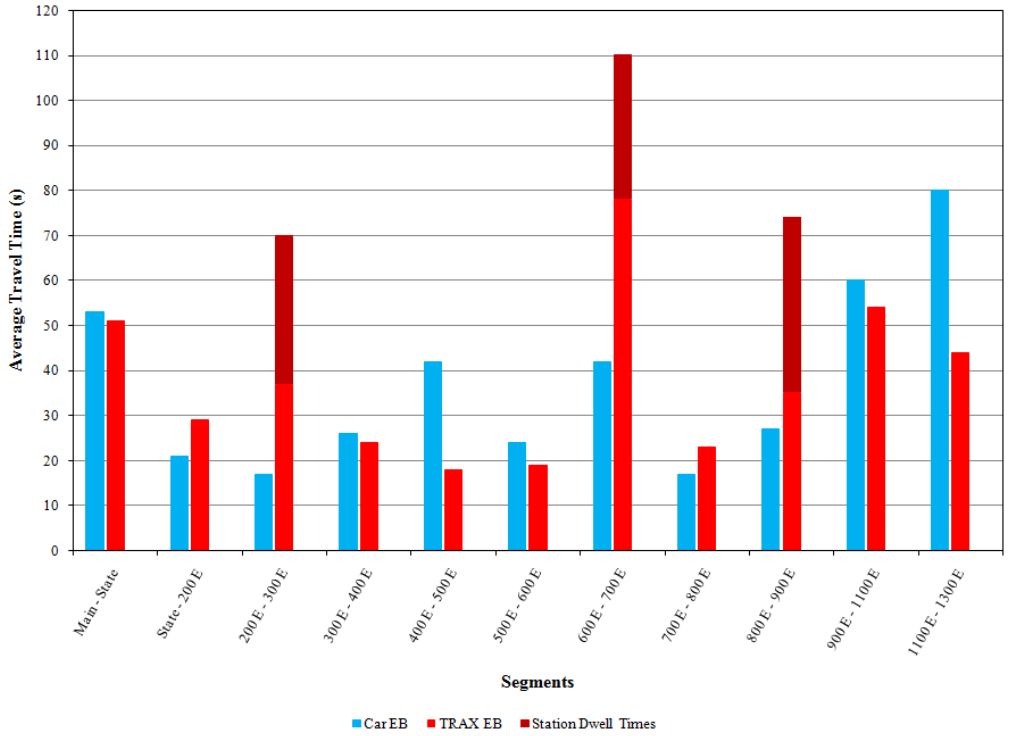
Station	Average Dwell Time AM Eastbound (s)
Library	43
Trolley	49
900 East	58
Traffic Stops	81

Station	Average Dwell Time AM Westbound (s)
900 East	30
Trolley	26
Library	30
Traffic Stops	54

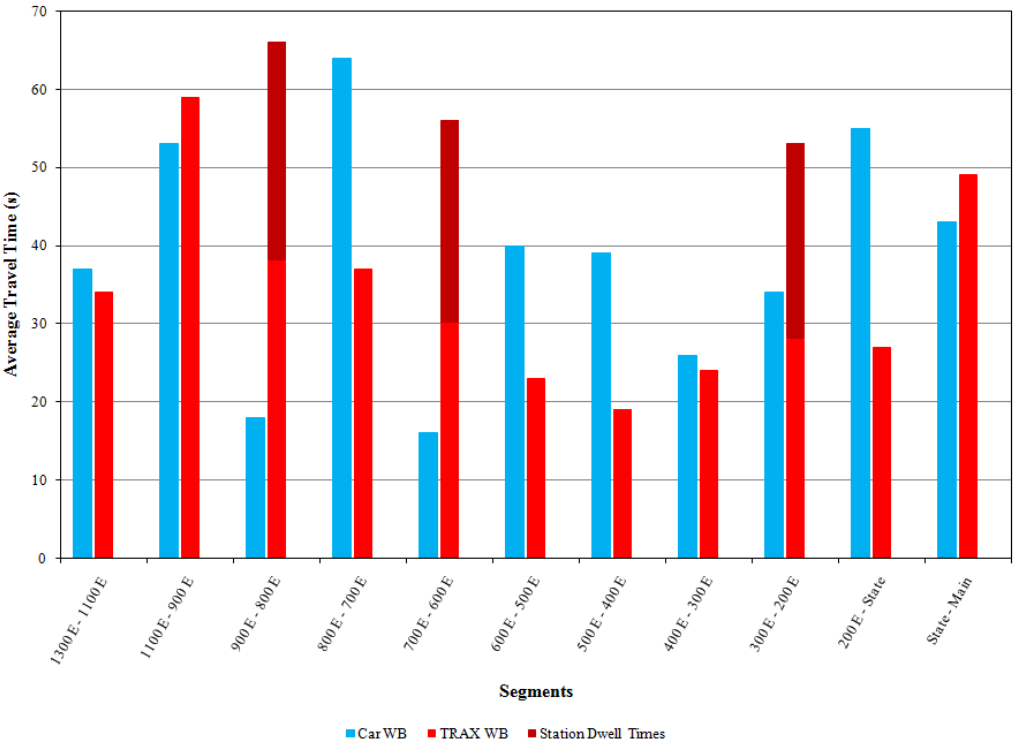
Station	Average Dwell Time PM Eastbound (s)
Library	41
Trolley	38
900 East	44
Traffic Stops	132

Station	Average Dwell Time PM Westbound (s)
900 East	29
Trolley	32
Library	48
Traffic Stops	105

Figures 2.1–2.4 show comparison of average travel times for general purpose traffic and TRAX (presented in Tables 2.3–2.10). Travel times for TRAX incorporate the amount of travel time that trains spend on stations (Tables 2.11 and 2.12). Detailed times – space diagrams plotted according to the data collected in the field – are given in Annex 2.

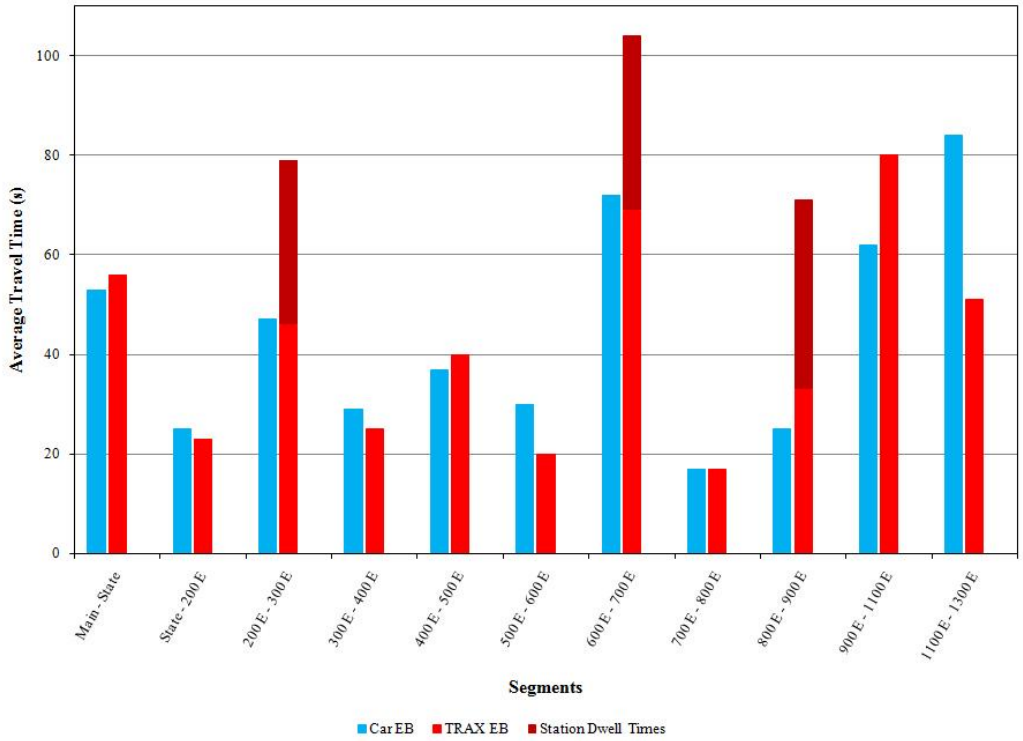


a) Eastbound

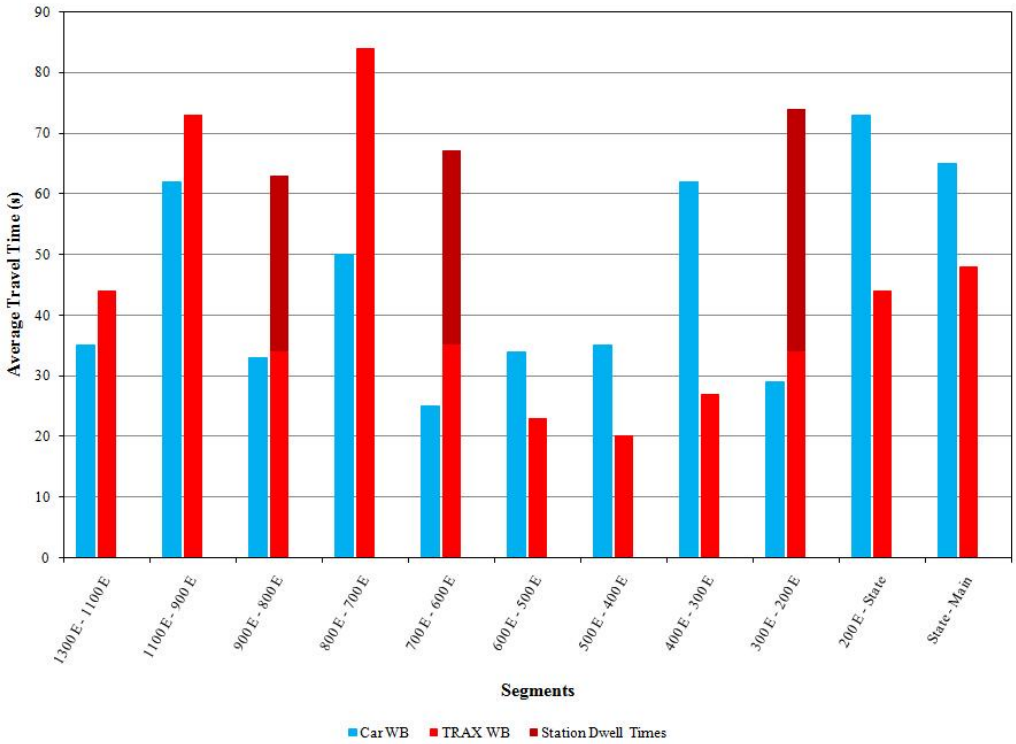


b) Westbound

Figure 2.1 Average Travel Times Comparison for August, AM Peak

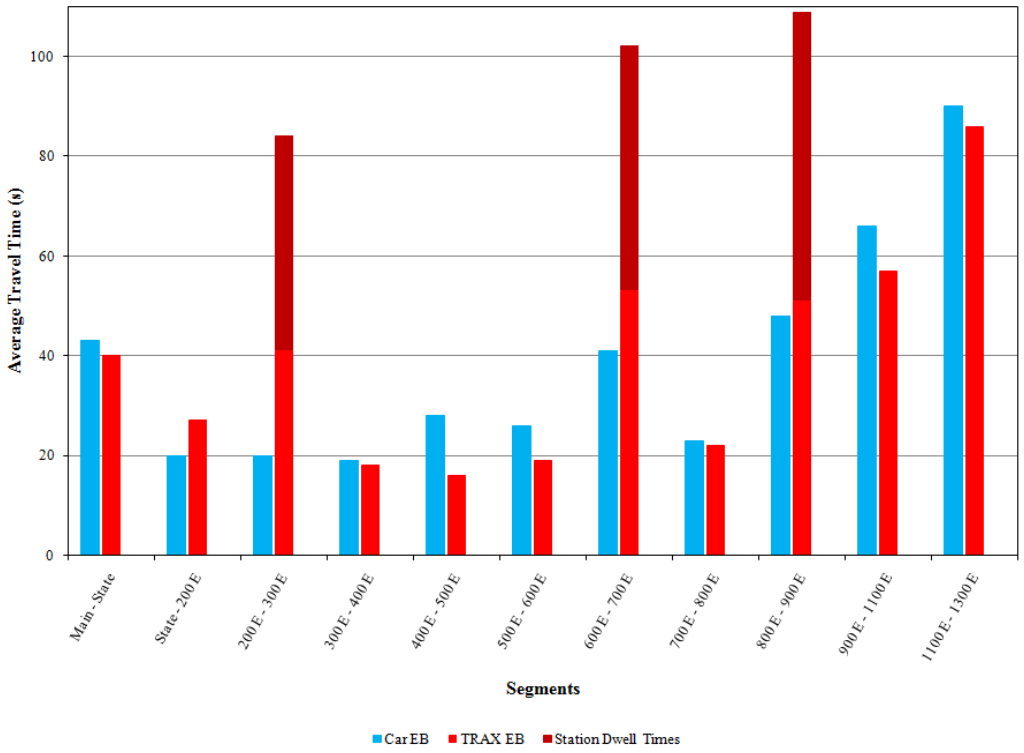


a) Eastbound

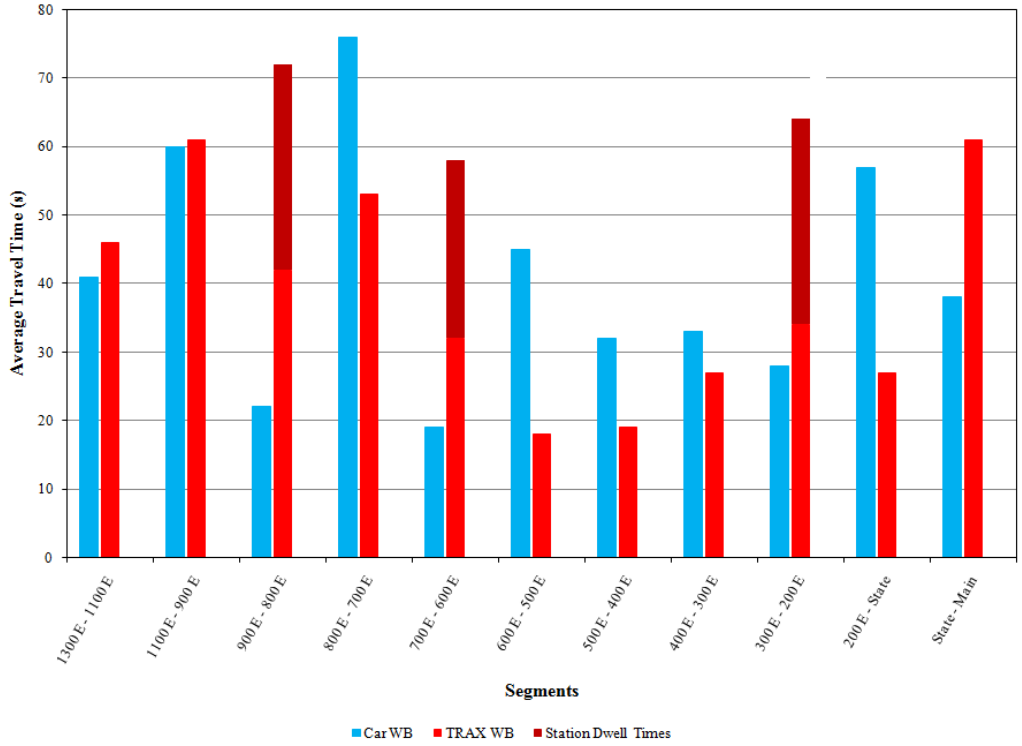


b) Westbound

Figure 2.2 Average Travel Times Comparison for August, PM Peak

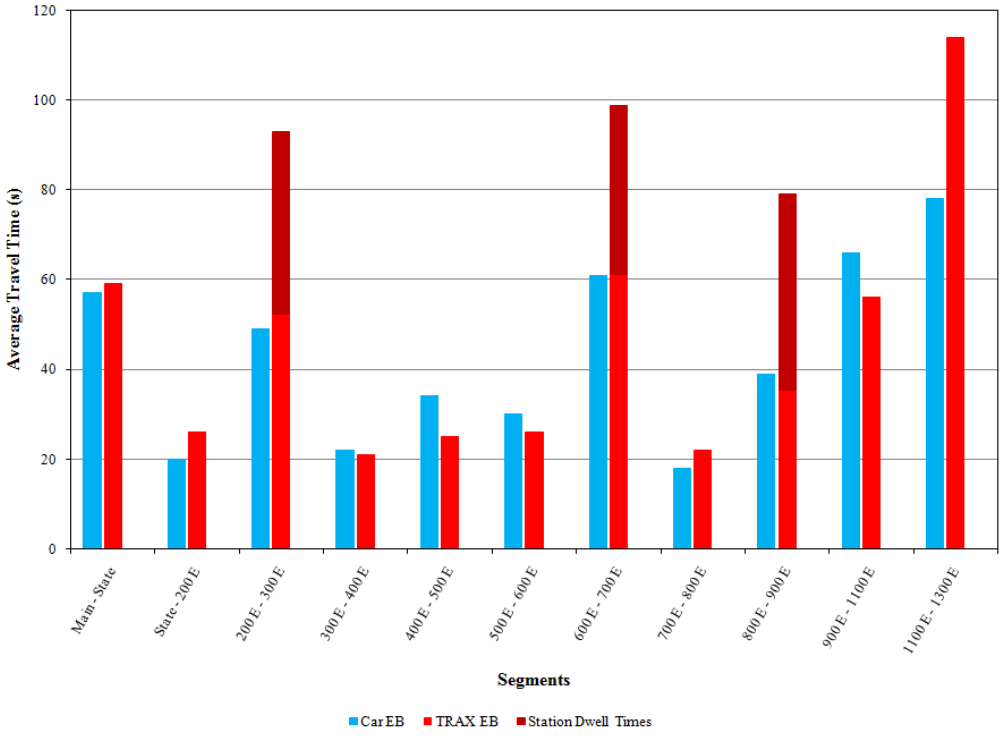


a) Eastbound

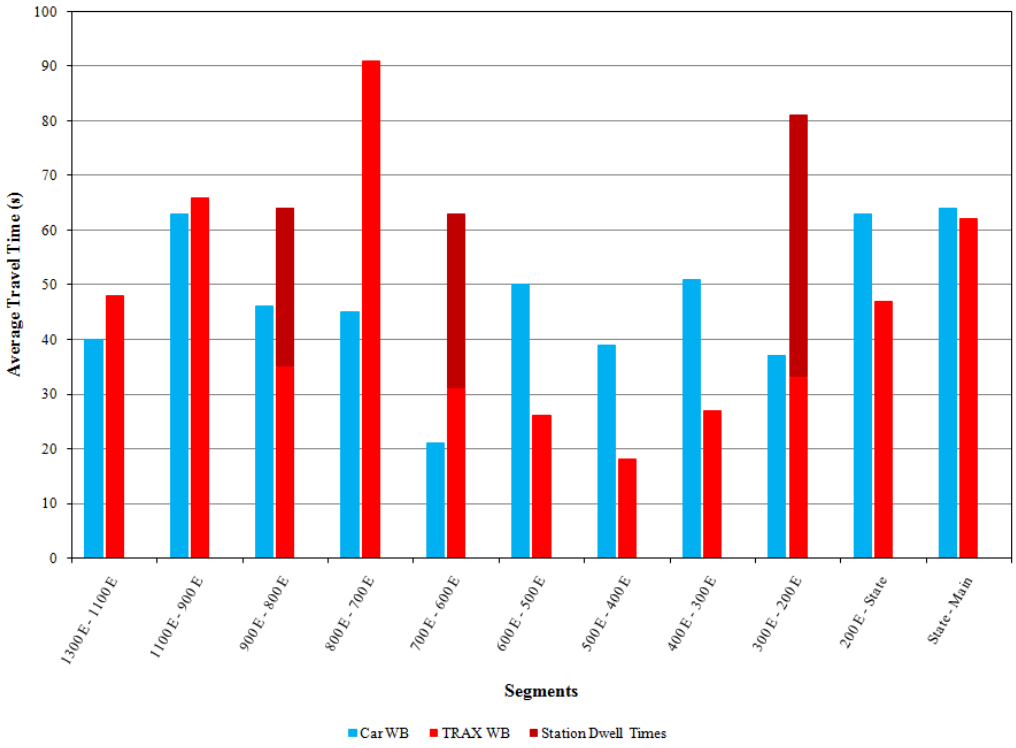


b) Westbound

Figure 2.3 Average Travel Times Comparison for September, AM Peak



a) Eastbound



b) Westbound

Figure 2.4 Average Travel Times Comparison for September, PM Peak

TRAX travel time data for September were also obtained from UTA, which conducts GPS travel time measuring on TRAX vehicles. These data show actual arrival and departure times for each TRAX station so they can be used to calculate travel times between stations. These averaged travel times from UTA are presented in Table 2.13.

Table 2.13 Average Inter-Station TRAX Travel Times

Eastbound AM		
From	To	Average Travel Time (s)
Gallivan Plaza	Library	147
Library	Trolley	95
Trolley	900 East	56
900 East	Stadium	194
Stadium	South Campus	130
South Campus	Ft. Douglas	91
Ft. Douglas	Medical Center	81

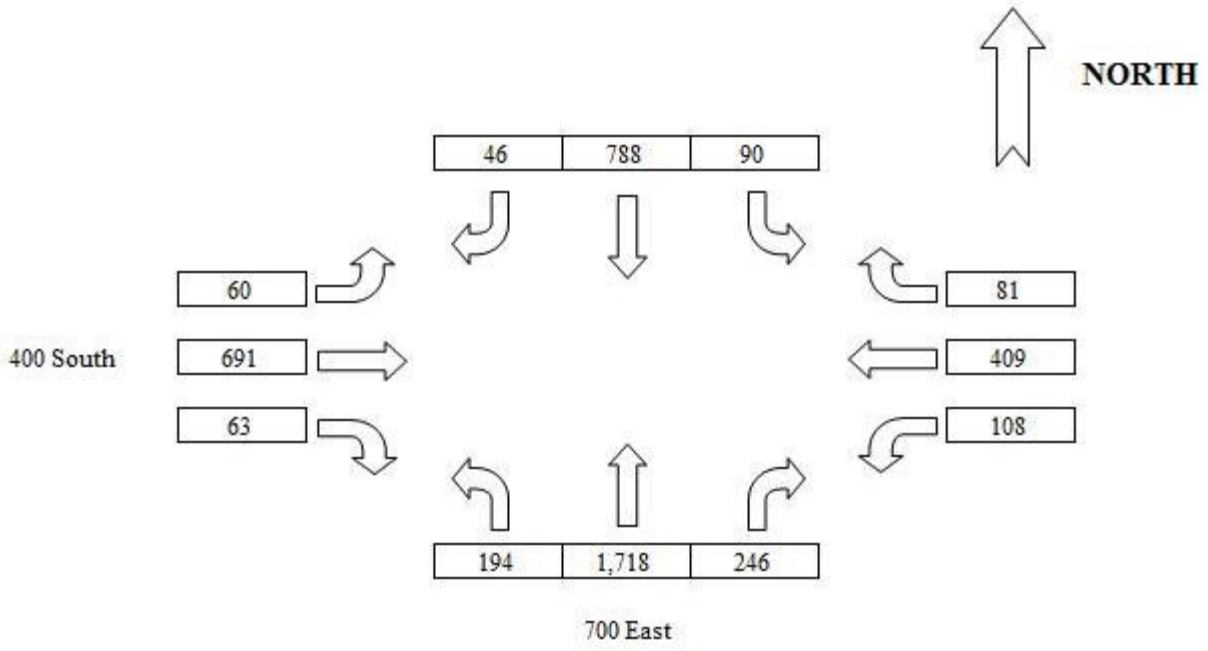
Westbound AM		
From	To	Average Travel Time (s)
Medical Center	Ft. Douglas	83
Ft. Douglas	South Campus	82
South Campus	Stadium	133
Stadium	900East	145
900 East	Trolley	97
Trolley	Library	98
Library	Gallivan Plaza	144

Eastbound PM		
From	To	Average Travel Time (s)
Gallivan Plaza	Library	161
Library	Trolley	102
Trolley	900 East	52
900 East	Stadium	193
Stadium	South Campus	124
South Campus	Ft. Douglas	90
Ft. Douglas	Medical Center	78

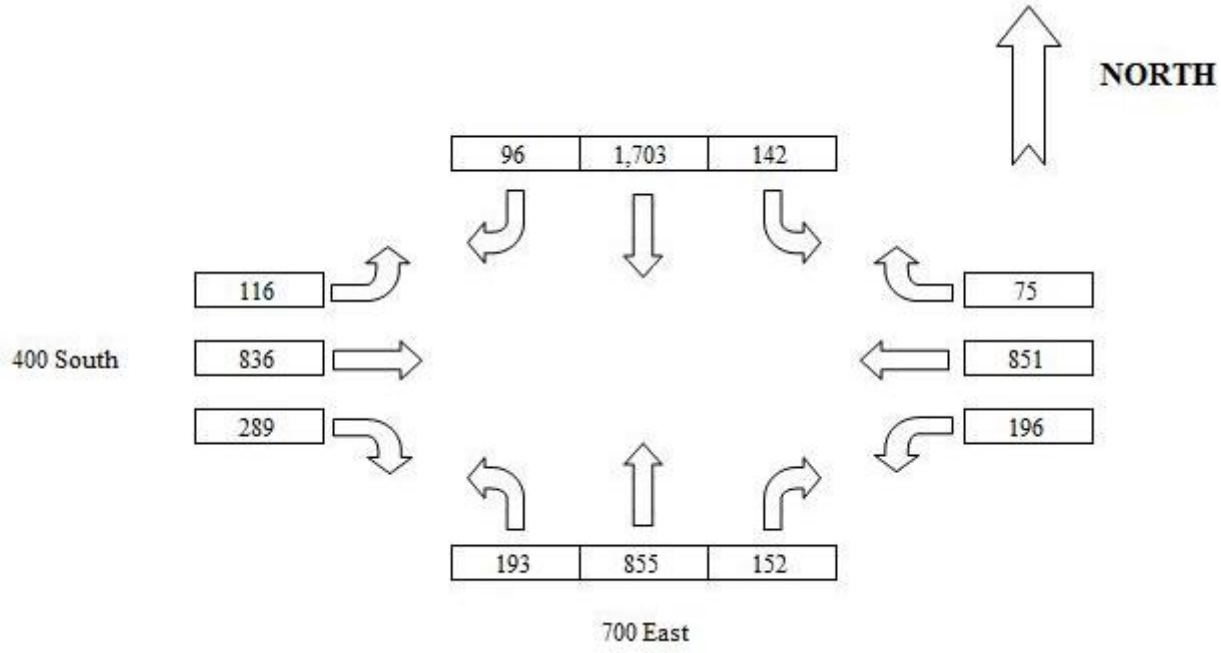
Westbound PM		
From	To	Average Travel Time (s)
Medical Center	Ft. Douglas	83
Ft. Douglas	South Campus	80
South Campus	Stadium	133
Stadium	900East	146
900 East	Trolley	101
Trolley	Library	105
Library	Gallivan Plaza	153

2.2 Traffic Counts

Traffic movement counts were collected for the three main intersections along the 500 S / 400 S corridor, 700 E and 400 S, 1300 E and 500 S, and State Street and 400 S. Data were collected for the AM (7:00–9:00 AM) and PM (4:00–6:00 PM) peaks on Monday, September 15, 2008 (1300 E and 500 S), Wednesday, September 17, 2008 (700 E and 400 S), and for PM peak on Wednesday, December 2, 2009 (State Street and 400 S). Traffic movements were counted for 5-minute intervals. Peak hour volumes for these three intersections are shown on Figures 2.5–2.7. The complete traffic counts are given in Annex 3.

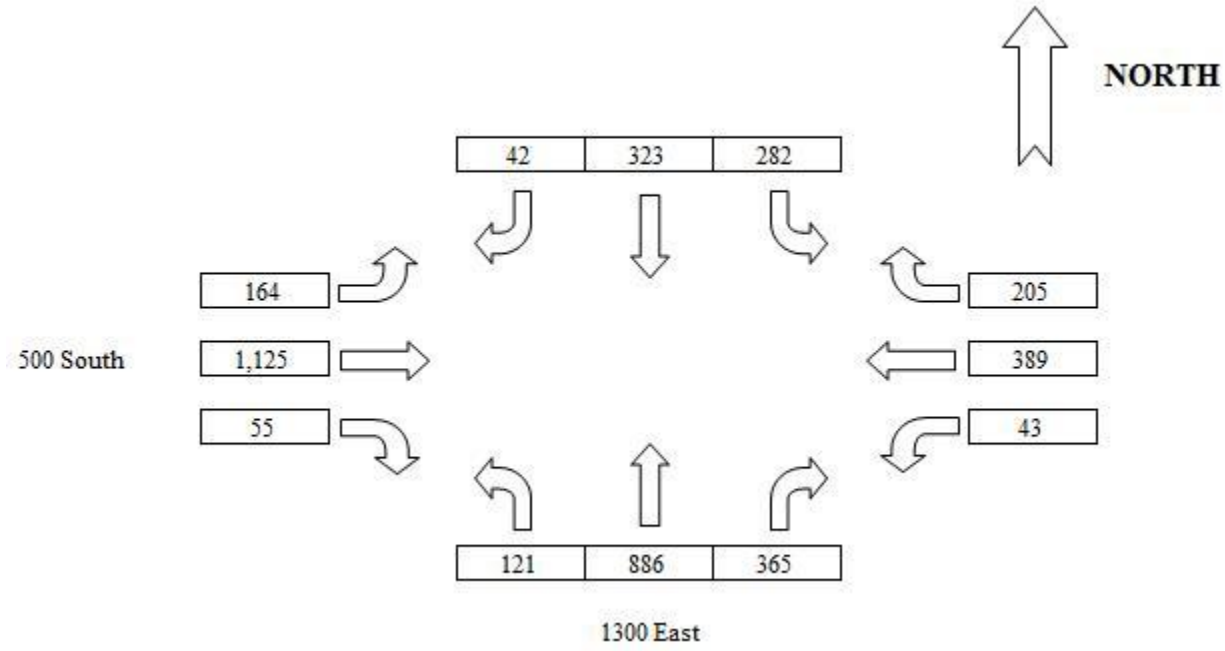


a) 400 S and 700 E AM

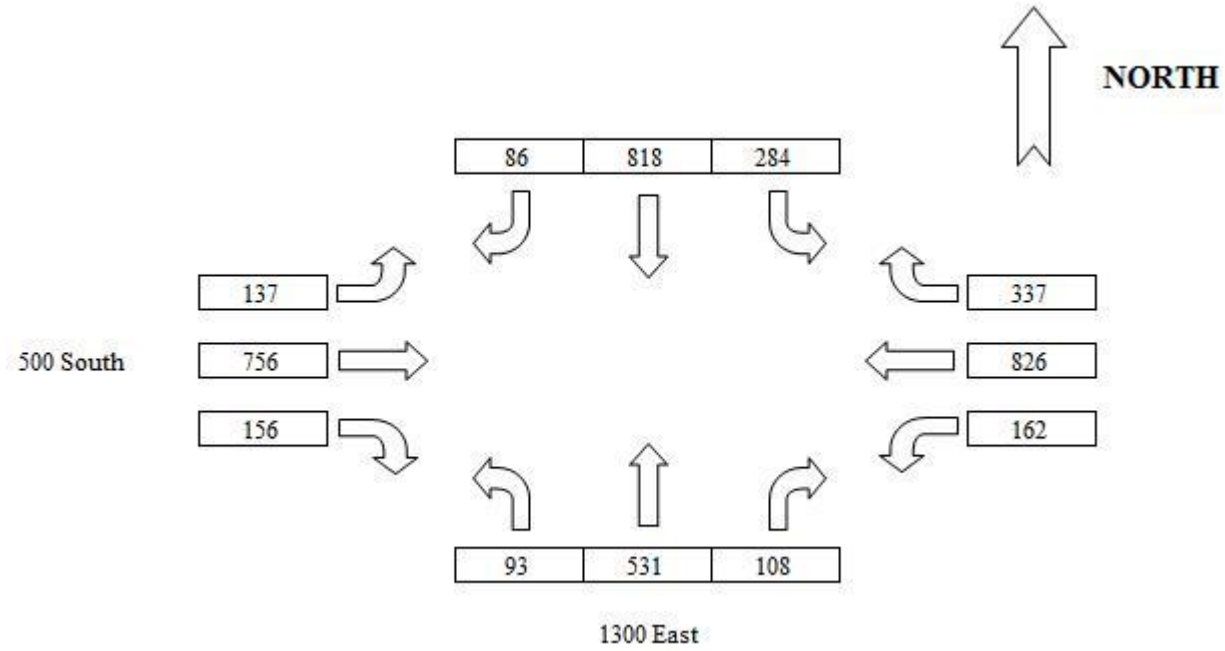


b) 400 S and 700 E PM

Figure 2.5 Peak Hour Traffic Volumes at 400 S and 700 E



a) 500 S and 1300 E AM



b) 500 S and 1300 E PM

Figure 2.6 Peak Hour Traffic Volumes at 500 S and 1300 E

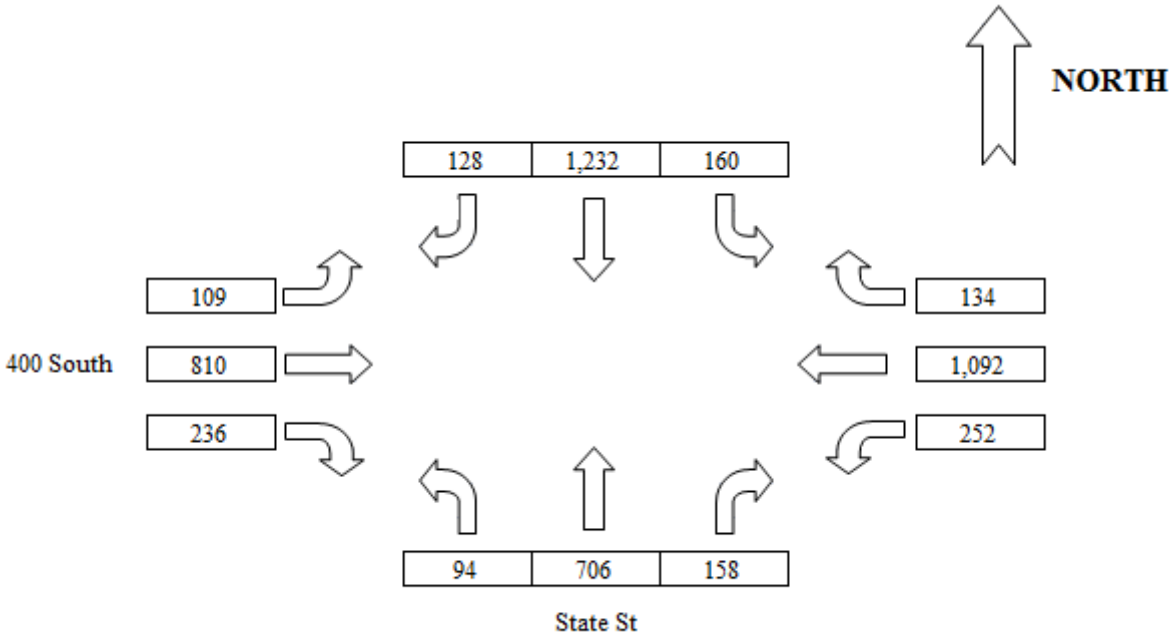


Figure 2.7 Peak PM Hour Traffic Volumes at 400 S and State Street

3. LIGHT RAIL PRIORITY SETTINGS

With the exception of the 700 E intersection, all intersections eastbound and westbound trains get priority over general purpose traffic. The priority is achieved using overlap intersection phasing, and through a series of logical commands that are set within the Siemens NextPhase traffic controllers. Basically, for every intersection controller, the signal settings have nine major parts:

1. General intersection setup
2. LRT priority setup
3. Green extend / Insertion phases
4. Early phase termination
5. Left turn swapping (Phase rotation strategies)
6. Queue jumping
7. Peer-to-peer calls
8. LRT signage
9. Directional / Shared lane logic

The general intersection setup defines general inputs (detector actuations) and outputs (vehicular phases, vehicular overlaps, pedestrian phases, pedestrian overlaps, and LRT overlaps), as well as the default NEMA TS/2 cabinet functions. It also defines inputs for shared lane sites, which will be addressed later in the text.

LRT priority setup defines basic LRT inputs, such as eastbound and westbound LRT check-in and check-out actuations, LRT advanced and midblock calls. The outputs in this case are so called state phases (generally, they turn the train approaching and/or "Stay off track" signs on), and these outputs also serve as inputs for intersection priority logic activation.

Green extend / Insertion phases logic allows extra green time for LRT vehicles once they have been detected approaching an intersection. In general, there are several phases in phase rings which can be used by the LRT overlap phases, depending on the moment within a cycle when an LRT vehicle has been detected (different phases will be inserted). General logic for an intersection in this case is to extend the LRT phase overlaps until the train has cleared the intersection (reached the check-out point). However, this maximum time allowed for the LRT vehicles is limited by the maximum phase time for the inserted phases, or until the LRT detectors have timed out. Usually, if the LRT detector is activated more than 90 seconds, it will be turned off automatically, which prevents LRT calls in a case of a detector failure (such as check-out failure).

If the LRT overlap is timing red when a train is approaching an intersection, the Early phase termination logic will terminate all the conflicting phases that are timing green at that moment, in order to allow the LRT overlap to be serviced with priority. This logic turns the conflicting phases' detectors off, allowing these phases to be terminated once they have achieved the minimum green time.

The intersections along the 400 S / 500 S corridor, from State Street to 1300 E Street, operate with leading left turns and lagging through movements (an exception was the old timing for 1300 E, where the eastbound left turns were leaded, while the westbound left turns were lagged). If the LRT overlap is timing red when a train is approaching an intersection, the Left turn swapping logic will rotate phases for through movements and left turns, allowing the through movements with concurrent LRT overlaps to be serviced first, and the left turns after that. This is achieved by using additional left turn phases within the ring, which time after the corresponding through movements, and these phases are activated through the Left turn swapping logic. This priority strategy is also known as the Phase rotation strategy.
The LRT overlaps are timing concurrently with vehicular through movements. However, if a train and through vehicles are waiting at the red light at an intersection, the Queue jumping logic will allow an earlier start for the train. The start of the through movements will be delayed for five seconds, allowing

the train to clear the intersection before the vehicles. The intention of this strategy is to improve safety, so there would be no confused drivers who would attempt a left turn once the through movements turn green and directly conflict the train.

A Peer-to-peer call is basically information about the presence of trains being sent from one intersection to the neighboring one. In that way an intersection can start the preparation for the approaching trains, turning the train approaching and/or "Stay off track" signs and going into transition to allow train priority.

Special outputs from the controller logic settings are devoted to the LRT signage, meaning that they turn the train approaching and/or "Stay off track" signs on when a train is approaching an intersection, and turning them off once the train has left the intersection.

The Directional / Shared lane logic is a special type of function active at the shared lane sites. Those are the sites where left turns and trains share the same lane within the right-of-way. Along the 400 S / 500 S corridor, those are 1300 E, 1100 E (westbound), 700 E (where the LRT priority is not active) and State Street. This logic activates track clearance, by allowing left turns before the train, if there are left turning vehicles in the shared lane. The "Stay off track" signs are aimed to inform drivers not to enter the sharing left turn lane, but it often happens that there are some vehicles in the lane in front of the train. This logic allows discharging of the left turning vehicles, and then allows the train to clear the intersection.

4. MODELING METHODOLOGY

LRT operations and the benefits and impacts of the train priority 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 model scenarios are used in the process: Existing model, No Priority model, and 700 E Priority model.

The simulation network includes the corridor along 400 S / 500 S from 1300 E to Main Street, as described in the Project Corridor section. This corridor is 2.07 miles long with 12 signalized intersections.

4.1 Modeling Process: Existing Model

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. VISSIM Version 5.10 is used for this study.

The existing network is modeled, calibrated, and validated based on the field data, such as network geometry and traffic operations. The final output from this process is a validated and calibrated simulation model of the existing conditions for the PM peak period (4:00 to 6:00 PM, with 15-minute build-up time). The same network model is later used in hypothetical scenarios. All VISSIM simulations are run for five random seeds, and all the results represent averaged values from five measurements.

The main sources of data for the network geometry were aerial maps and images, roadview maps, and field observations, and each intersection is modeled with as much detail as possible. The network is loaded with traffic according to the data collected in the field in 2008 and 2009. 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. The speed distribution for vehicles along the corridor is defined according to the posted speed limits (35 mph along the main corridor), as well as field observations and measurements.

The field traffic controllers at intersections are Siemens NextPhase 1.7.4 controllers, which determined the choice of the signal control emulator within the VISSIM simulation model. In this study, the Siemens NextPhase 1.4.4 Software-in-the-Loop (SIL), Virtual NextPhase (VNP), is used to model the actual traffic control because it uses the same traffic control algorithm as NextPhase 1.7.4. However, there were some limitations with the VNP controllers, where some were the results of the different NextPhase versions and some were the limitations within the VNP itself. The solution for some of the problems was suggested by UDOT. For example, the peer-to-peer calls could not be modeled as they are in the field, so for this purpose the advanced/midblock train detectors are used. The biggest limitations are at the shared lane sites and the Main Street intersection, because of the lack of detectors that can be used with VNP. VNP allows a maximum of 14 detectors per controller, while at these sites more detectors are needed. While in the field some of these detectors are not physical detectors but are mapped through the controller logic, VNP demands all the VISSIM detectors to be physical detectors and present in the field. In the model, this problem is overcome by defining maximum recall for the main coordinated phases, which means that these phases are called to their maximum times during each cycle, and there is no need for detection, so these detectors are used for other purposes. Also, the advanced and midblock train detectors (which should be two different calls at these sites) are set to be the same. This fixed the problems for most of the sites. However, due to a very complex controller structure at the Main Street intersection, it could not be modeled in VNP in the exact way as it is in the field, so, in the model, it operates slightly differently. But being the entering/exiting point of the model, and operating in free mode, operations at this intersection have no impacts on other intersections.

The signal timing settings for the intersections are downloaded using UDOT's i2 software, which enables a direct communication link to the field controllers, while the general logic controller settings are obtained from UDOT.

The LRT operations are also modeled according to the data from the field. The entering university line trains in the model are modeled to start according to the train schedule. Also, the passenger activity at each LRT station in the model is modeled approximately to the field data, which were obtained from UTA. The UTA data consisted of daily passenger volumes at each station. For the PM peak period in the model, the passenger volumes are taken to be approximately 25%–30% of the weekday daily volumes.

4.2 Calibration and Validation of the Existing Model

The Existing model had to be calibrated and validated for the purpose of the study. Calibration and validation are based on the traffic data collected in the field. Model calibration is performed based on traffic movement counts for three major signalized intersections in the network: 1300 E, 700 E, and State Street. Travel times between each pair of signalized intersections, which were collected using GPS and floating vehicle technique, are used to validate the model.

4.2.1 Calibration

Traffic movements on 1300 E, 700 E, and State Street are used to calibrate the model. The traffic counts for 1300 E and 700 E were collected in September 2008, while the counts at State Street were collected in December 2009. VISSIM is programmed to collect the same data on these signalized intersections. Calibration is performed by comparing data from the field counts with the data from the simulation.

Figure 4.1 shows this comparison after the calibration was completed. The high R square value of 0.99 shows a good correlation between the two data sets. The correlation is also double checked using a two-tailed T test for paired samples, with a 5% level of confidence (α=0.05). The traffic volumes at these intersections are tested, and the result is 0.87, which proves good calibration efforts.

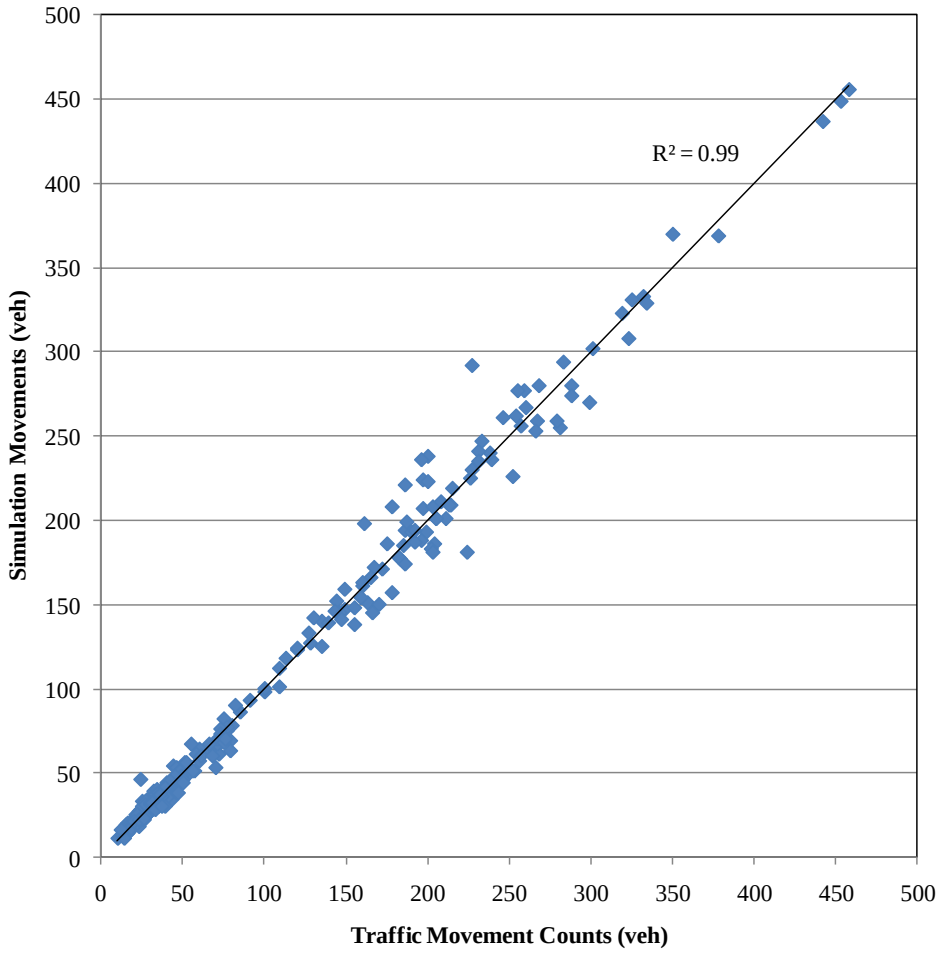


Figure 4.1 Existing Model Calibration

4.2.2 Validation

The 400 S/500 S corridor is divided into 11 eastbound segments (Main Street to 1300 E) and 10 westbound segments (1300 E to State Street), between adjacent signalized intersections. In the westbound direction, the segment between State and Main Street is not considered because of the inability of VNP to model operations at Main Street. Travel times for each segment were measured in the field using GPS in PM peaks, as given in the Data Collection section. Travel time measuring points in VISSIM are set for the same segments. Travel times from the field are used to validate those from the model. Figure 4.2 shows a comparison of travel times after the validation is completed. For both directions, the R square value between the two sets is 0.91. In the eastbound direction, the R square value is close to 0.96, while in the northbound direction this value is 0.79.

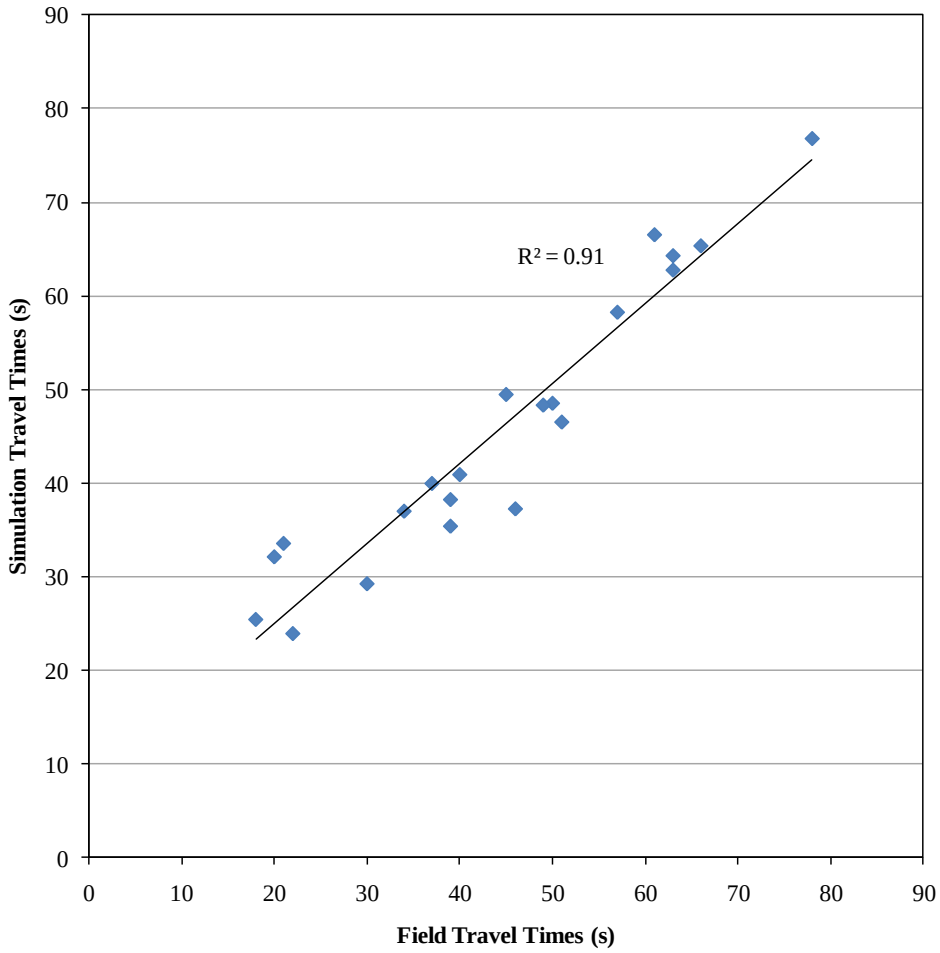


Figure 4.2 Model Validation – Travel Times Comparison

4.2.3 Validation of Transit Operations

In order to assess all aspects of transit operations within the model, it is very important to validate transit operations and make sure they perform similarly to the field operations. Three aspects of transit operations are used in the validation process: station dwell times, passenger volumes at stations, and TRAX travel times for the segments (as given for vehicles).

VISSIM is coded to collect dwell times at each TRAX station, and these times were averaged for the PM peak period, and then compared with the dwell times from the field. This comparison is given in Table 4.1.

Table 4.1 Station Dwell Times Comparison

Station	Average Dwell Time Eastbound (s)	
	Field	Simulation
Library	41.0	38.8
Trolley	38.0	36.0
900 East	44.0	38.4

Station	Average Dwell Time Westbound (s)	
	Field	Simulation
900 East	29.0	36.3
Trolley	32.0	41.2
Library	48.0	49.1

Passenger volumes in the simulation were recorded for each station during the PM peak period. It is assumed that these volumes should be in a range of 25%–30% of the weekday daily volumes from the field. Table 4.2 shows a percentage of passenger volumes at each station, recorded in the simulation.

Table 4.2 Peak Period Passenger Volume Percentage

Station	Daily Passenger Volumes (%) (VISSIM)
Library	30.3
Trolley	25.6
900 East	29.1
Stadium	20.4

TRAX travel times from the simulation for each defined segment along the corridor are compared with the field travel times, and the comparison is given in Figure 4.3. The R square value between the two data sets is 0.93 in the eastbound and 0.86 in the westbound direction, while in both directions this value is 0.89.

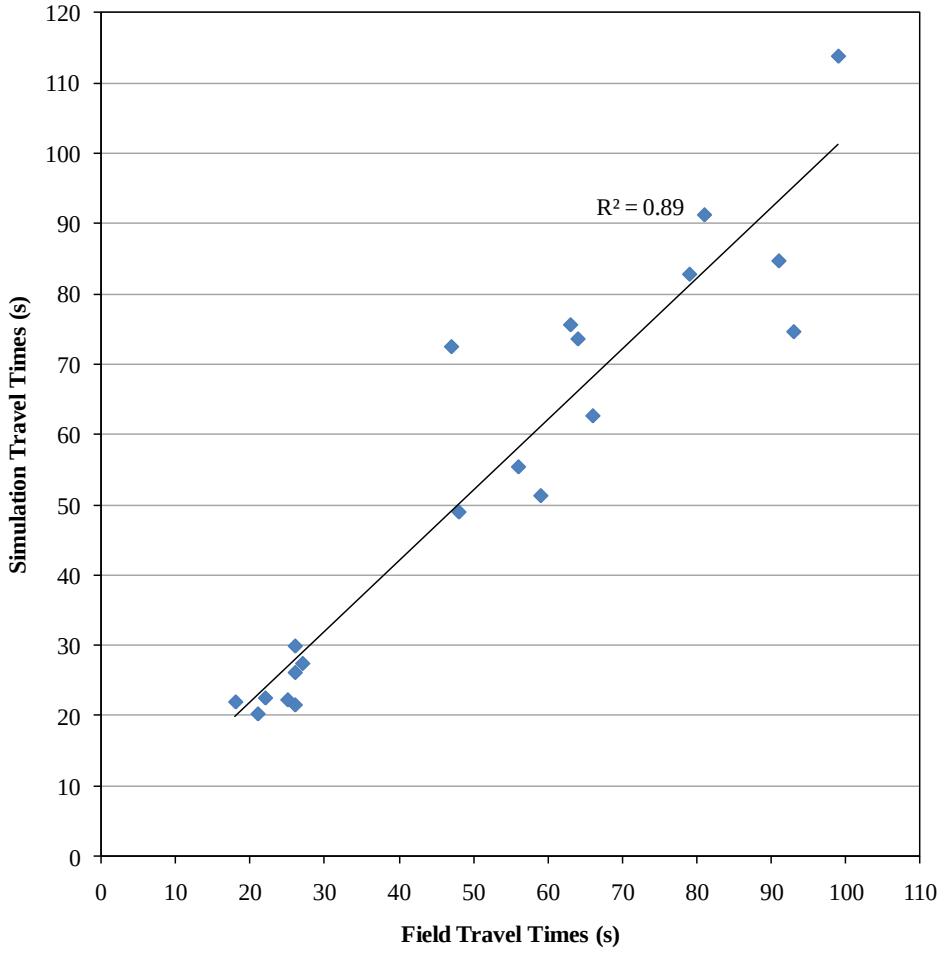


Figure 4.3 Validation of Transit Operations – TRAX Travel Times Comparison

4.3 Modeling Process: No Priority Model

In order to assess traffic impacts that the train priority has on general purpose traffic, the No Priority model was created, and then the results compared with the Existing model. The No Priority model uses the same elements as the Existing model, only in this case the train priority is completely disabled. In the VISSIM model, this was done by removing train detection at intersections.

4.4 Modeling Process: 700 E Priority Model

For the existing conditions, train priority exists at all intersections along the studied corridor, except at the 700 E intersection. 700 E is a major north–south arterial in this part of the county, and it carries more traffic than 400 S. That is the reason for north–south signal coordination at this intersection, and train priority has not been activated to avoid coordination disruptions and increase in delays for the major traffic flows. However, train priority strategies for this intersection are already defined by UDOT, while the study's methodology defined phase splits for LRT phases. For the purpose of evaluation of priority strategies, a VISSIM model with enabled train priority strategies was created, and the results from the simulation were compared with the existing conditions in order to assess all benefits and impacts that train priority at 700 E would have on transit and general purpose traffic.

5. RESULTS

This section provides major results from each model scenario obtained through VISSIM simulations. These results incorporate vehicular travel times along the corridor, TRAX travel times, intersection Measures of Effectiveness (MOE), and station data.

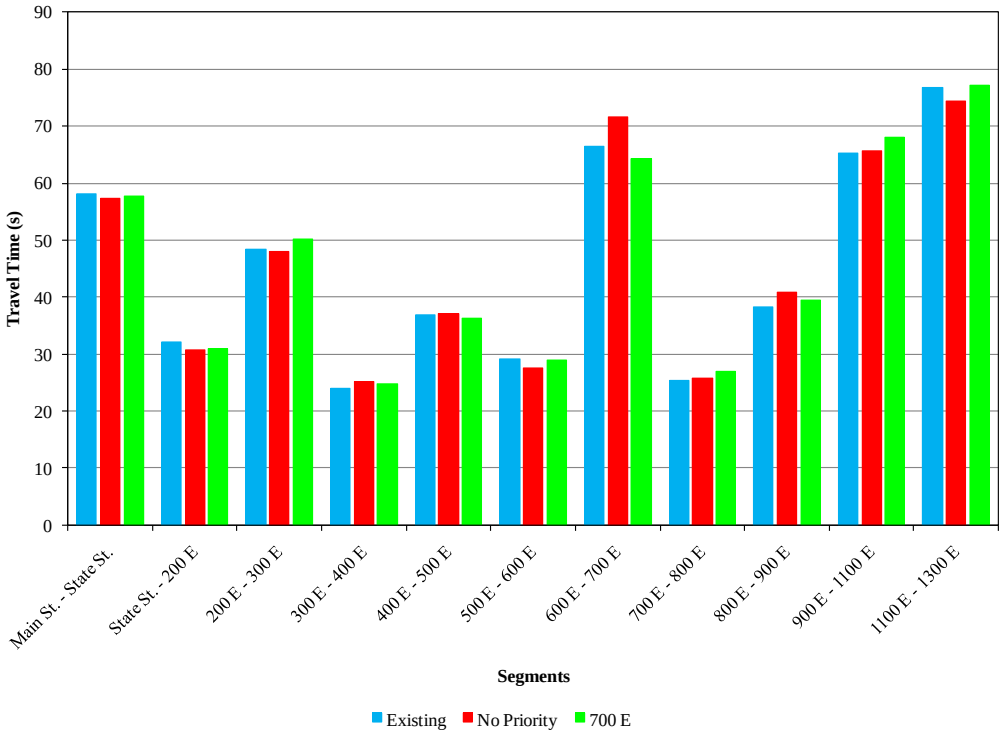
5.1 Vehicular Travel Times

Usually, a change in intersection signal timings and/or providing priority for transit vehicles can have some impacts on vehicular travel times along a corridor. A comparison of travel times for the three described model scenarios is given in Table 5.1 and Figure 5.1.

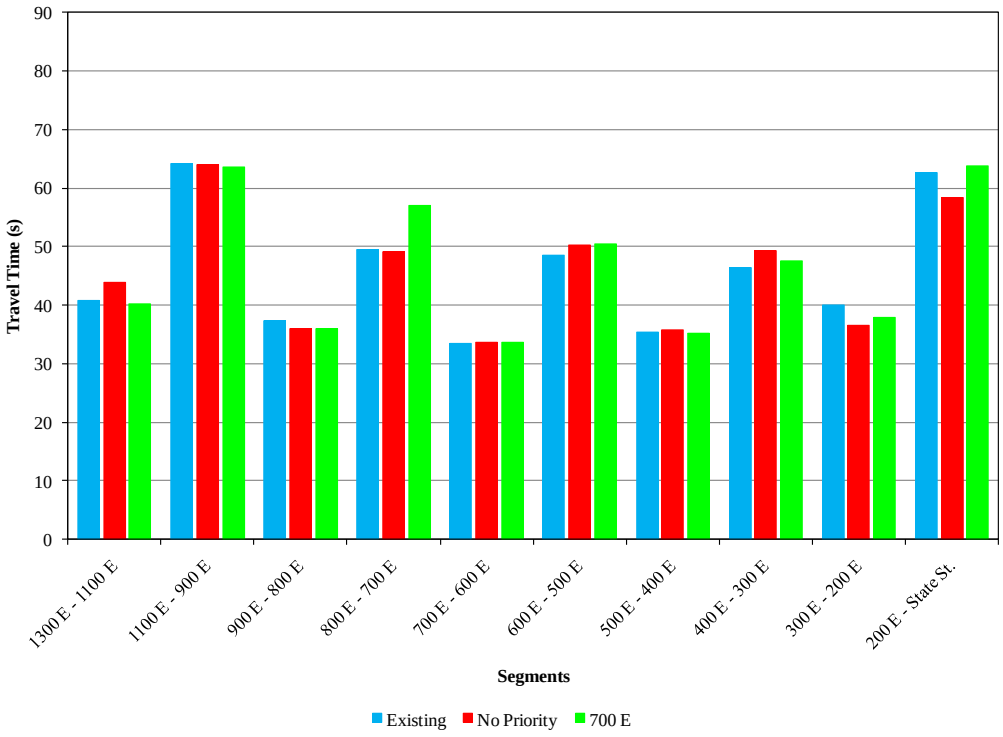
Table 5.1 Vehicular Travel Time Comparison

EB Segment	Existing	No Priority	700 E
Main St. - State St.	58.2	57.2	57.7
State St. - 200 E	32.1	30.7	31.0
200 E - 300 E	48.3	48.1	50.2
300 E - 400 E	23.9	25.2	24.7
400 E - 500 E	37.0	37.1	36.3
500 E - 600 E	29.2	27.6	29.0
600 E - 700 E	66.5	71.7	64.2
700 E - 800 E	25.4	25.9	26.9
800 E - 900 E	38.2	40.9	39.5
900 E - 1100 E	65.3	65.7	68.1
1100 E - 1300 E	76.8	74.3	77.2
Total	**500.9**	**504.4**	**504.7**

WB Segment	Existing	No Priority	700 E
1300 E - 1100 E	40.9	43.9	40.3
1100 E - 900 E	64.3	63.9	63.6
900 E - 800 E	37.2	36.0	36.0
800 E - 700 E	49.4	49.1	57.1
700 E - 600 E	33.5	33.5	33.6
600 E - 500 E	48.5	50.2	50.4
500 E - 400 E	35.4	35.7	35.3
400 E - 300 E	46.5	49.3	47.5
300 E - 200 E	39.9	36.6	37.8
200 E - State St.	62.7	58.4	63.7
Total	**458.4**	**456.6**	**465.3**



a)



b)

Figure 5.1 Vehicular Travel Times Comparison – Model Scenarios: a) Eastbound; b) Westbound

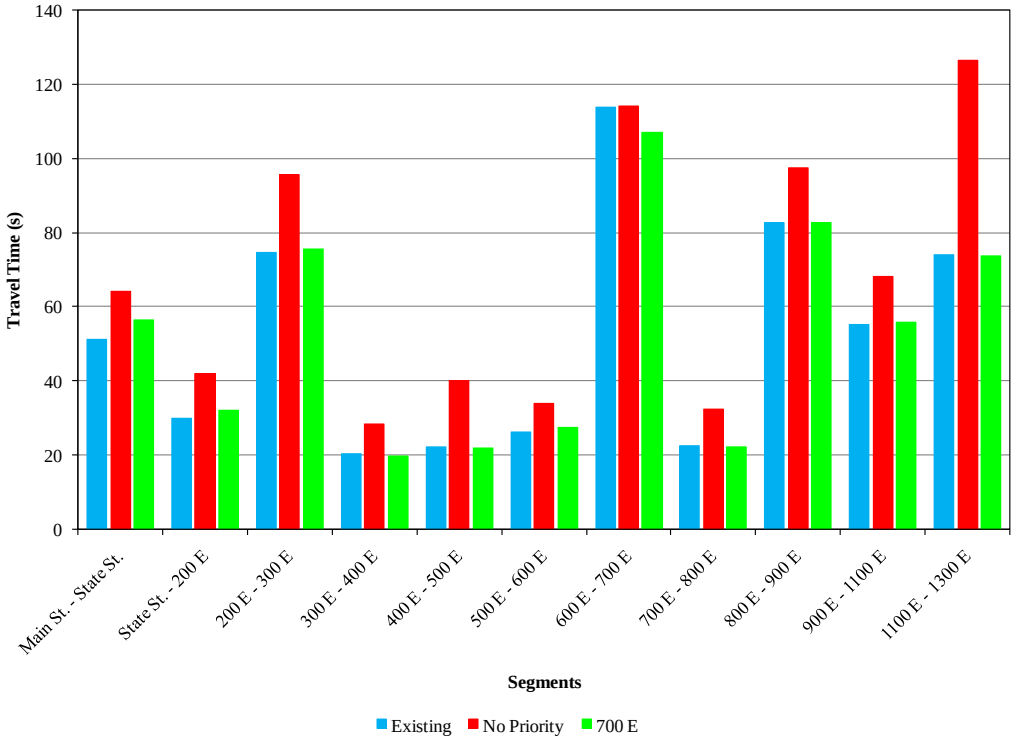
5.2 Transit Travel Times

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 three model scenarios were used to compare and estimate TRAX travel times along the corridor, and these travel times are given in Table 5.2 and Figure 5.2.

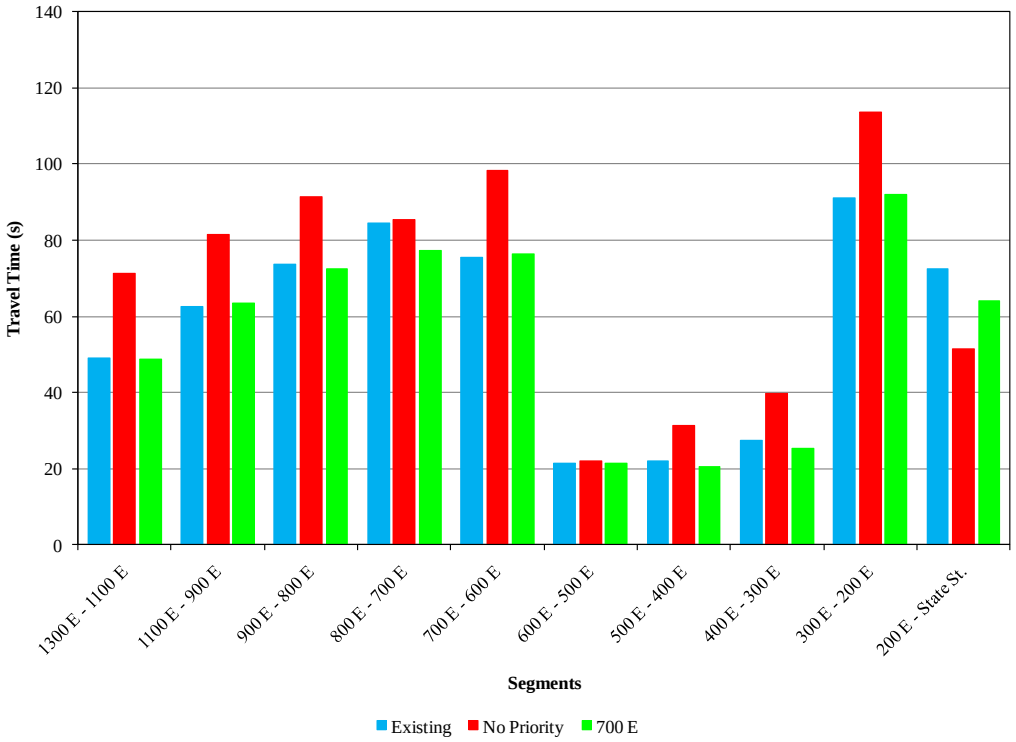
Table 5.2 Transit Travel Time Comparison

EB Segment	Existing	No Priority	700 E
Main St. - State St.	51.2	64.0	56.6
State St. - 200 E	29.9	41.8	31.9
200 E - 300 E	74.6	95.7	75.4
300 E - 400 E	20.2	28.4	19.8
400 E - 500 E	22.2	40.2	21.8
500 E - 600 E	26.1	33.9	27.6
600 E - 700 E	113.8	114.1	107.0
700 E - 800 E	22.5	32.3	22.1
800 E - 900 E	82.7	97.5	82.7
900 E - 1100 E	55.3	68.1	55.9
1100 E - 1300 E	74.1	126.5	73.7
Total	**572.6**	**742.5**	**574.6**

WB Segment	Existing	No Priority	700 E
1300 E - 1100 E	48.9	71.3	48.6
1100 E - 900 E	62.6	81.5	63.4
900 E - 800 E	73.5	91.3	72.4
800 E - 700 E	84.6	85.5	77.3
700 E - 600 E	75.6	98.3	76.4
600 E - 500 E	21.5	22.0	21.5
500 E - 400 E	21.9	31.2	20.5
400 E - 300 E	27.4	39.7	25.3
300 E - 200 E	91.2	113.6	92.0
200 E - State St.	72.4	51.4	64.0
Total	**579.6**	**685.7**	**561.4**



a)



b)

Figure 5.2 TRAX Travel Times Comparison – Model Scenarios**:** a) Eastbound; b) Westbound

5.3 Intersection Measures of Effectiveness

5.3.1 Intersection Delays and Level of Service

Performance of a signalized intersection can be assessed in the best way through control delays and a corresponding LOS. Table 5.3 shows intersection delays and LOS for cars and LRVs and the average for all vehicles for the three scenarios. Detailed data on delays and LOS for each intersection and each movement are given in Annex 4.

Table 5.3 Average Intersection Delays and Level of Service

Intersection	Mode	Existing		No Priority		700 E	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
State St.	Car	39.1	D	34.6	C	38.0	D
	LRT	37.0	D	36.1	D	35.3	D
	All	38.8	D	34.8	C	37.6	D
200 E	Car	30.8	C	27.4	C	31.3	C
	LRT	16.5	B	36.9	D	17.3	B
	All	28.6	C	28.8	C	29.2	C
300 E	Car	39.0	D	36.8	D	38.7	D
	LRT	14.5	B	31.8	C	14.3	B
	All	35.5	D	36.1	D	35.2	D
400 E	Car	14.1	B	13.7	B	14.1	B
	LRT	4.2	A	11.3	B	3.1	A
	All	12.7	B	13.3	B	12.5	B
500 E	Car	39.4	D	38.6	D	41.3	D
	LRT	2.2	A	11.3	B	2.0	A
	All	34.1	C	34.7	C	35.7	D
600 E	Car	22.6	C	20.4	C	22.0	C
	LRT	12.2	B	22.8	C	13.2	B
	All	21.0	C	20.8	C	20.7	C
700 E	Car	35.1	D	36.9	D	37.7	D
	LRT	63.1	E	56.6	E	56.7	E
	All	39.1	D	39.7	D	40.4	D
800 E	Car	25.1	C	21.9	C	25.2	C
	LRT	11.8	B	25.1	C	11.2	B
	All	23.2	C	22.4	C	23.2	C
900 E	Car	28.3	C	26.5	C	28.2	C
	LRT	12.1	B	25.6	C	12.4	B
	All	25.8	C	26.4	C	25.8	C
1100 E	Car	26.1	C	24.8	C	26.0	C
	LRT	5.8	A	23.0	C	6.2	A
	All	23.0	C	24.5	C	22.9	C
1300 E	Car	41.3	D	41.6	D	41.3	D
	LRT	36.3	D	88.5	F	31.5	C
	All	40.6	D	48.3	D	39.9	D

The data on delays for different scenarios can be used to compare changes in delays between them. Table 5.4 shows changes in delays for cars and LRVs and average values compared among the scenarios.

Table 5.4 Percentage Change in Delays Between Scenarios

Intersection	Mode	Existing vs. No Priority	Existing vs. 700 E	No Priority vs. 700 E
State St.	Car	-11.5	-2.7	9.0
	LRT	-2.3	-4.4	-2.2
	All	-10.2	-3.0	7.5
200 E	Car	-11.3	1.7	12.7
	LRT	124.3	4.9	-113.7
	All	0.7	2.0	1.2
300 E	Car	-5.4	-0.8	4.7
	LRT	119.1	-1.3	-122.1
	All	1.8	-0.8	-2.7
400 E	Car	-3.4	-0.2	3.1
	LRT	168.7	-26.7	-266.6
	All	4.7	-1.5	-6.3
500 E	Car	-2.1	4.7	6.5
	LRT	412.2	-8.0	-456.5
	All	1.7	4.5	2.7
600 E	Car	-9.8	-2.7	7.3
	LRT	87.1	8.4	-72.6
	All	-1.2	-1.7	-0.6
700 E	Car	5.2	7.2	1.9
	LRT	-10.3	-10.3	0.0
	All	1.6	3.2	1.5
800 E	Car	-12.5	0.4	12.9
	LRT	113.5	-5.2	-125.2
	All	-3.3	0.0	3.4
900 E	Car	-6.4	-0.5	6.0
	LRT	111.3	2.1	-106.9
	All	2.0	-0.3	-2.4
1100 E	Car	-4.9	-0.5	4.4
	LRT	299.9	7.1	-273.5
	All	6.8	-0.2	-7.0
1300 E	Car	0.6	0.0	-0.6
	LRT	143.6	-13.2	-180.6
	All	18.8	-1.7	-20.9
Corridor	**Car**	**-5.6**	**0.6**	**6.2**
	LRT	**142.5**	**-4.2**	**-156.4**
	All	**2.1**	**0.0**	**-2.1**

Currently, there is no priority for LRVs at the 700 E intersection. Enabling the priority within the 700 E simulation model scenario can provide information on delays at this intersection for each particular movement. This can be beneficial for deciding whether to provide priority at this intersection or not. Table 5.5 shows intersection delays and LOS in current conditions, the data for a priority scenario, and the percentage change in delays for each movement and the entire intersection.

Table 5.5 Intersection Delay and LOS Comparison: Existing vs. 700 E Scenario

Movement	Existing		700 E		Percentage Change
	Delay (s)	LOS	Delay (s)	LOS	
EBR	22.0	C	21.2	C	-3.6
EBT	48.4	D	46.5	D	-3.9
EBL	67.0	E	66.2	E	-1.2
WBR	5.9	A	6.4	A	8.0
WBT	34.4	C	42.6	D	23.9
WBL	60.9	E	67.9	E	11.5
NBR	5.2	A	5.4	A	2.9
NBT	25.9	C	27.8	C	7.4
NBL	55.2	E	57.9	E	4.8
SBR	9.9	A	11.9	B	19.2
SBT	30.3	C	34.4	C	13.7
SBL	56.4	E	63.8	E	13.2
EBT LRT	61.1	E	55.6	E	-9.1
WBT LRT	65.2	E	57.7	E	-11.4
Car	35.1	D	37.7	D	7.2
LRT	63.1	E	56.7	E	-10.3
All	**39.1**	**D**	**40.4**	**D**	**3.2**

5.3.2 Person Delays

When transit systems are being analyzed, a good MOE would be analyzing person delays. This analysis contains a combination of vehicle occupancy, vehicle delay, and average delay per person. For this matter, it is important to know the average ridership of a transit line (or lines) and average vehicle occupancy for the particular area where the analysis is conducted. Transit ridership for the TRAX line is obtained from UTA. The Utah Traffic Lab (UTL) conducted a survey in October 2008 about the average vehicle occupancy along Foothill Drive in Salt Lake City. The results show that the average vehicle occupancy during the PM peak period is 1.26 persons per vehicle, and this value is adopted in the analysis. These data enabled calculating the average number of persons along the network, while VISSIM provided the data on the average delay per person for each intersection. Table 6.6 shows the number of persons at each intersection during the two hour PM peak period, average delay per person, and the total person delay, given for each scenario. Detailed data on person delays for each intersection and each movement are given in Annex 5.

Table 5.6 Person Delays

Intersection	Mode	Existing			No Priority			700 E		
		Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)
State St.	Car	12689	39.3	140.58	12686	34.8	125.63	12698	38.1	137.52
	LRT	643	37.1	6.91	658	36.1	6.41	656	35.5	6.51
	All	13332	39.0	147.49	13344	35.0	132.04	13354	37.7	144.04
200 E	Car	8261	31.1	56.81	8270	27.6	51.33	8269	31.6	54.92
	LRT	637	16.5	2.95	658	36.9	7.09	653	17.3	3.12
	All	8898	28.8	59.76	8928	29.0	58.42	8922	29.4	58.04
300 E	Car	8329	39.1	74.51	8341	36.9	74.23	8343	38.7	75.39
	LRT	662	14.5	2.48	643	31.8	5.35	663	14.3	2.40
	All	8991	35.6	76.99	8984	36.2	79.57	9006	35.2	77.79
400 E	Car	8411	14.3	33.69	8419	13.8	34.34	8423	14.2	34.26
	LRT	664	4.2	0.75	632	11.3	1.94	663	3.1	0.52
	All	9075	12.8	34.44	9051	13.4	36.28	9086	12.6	34.78
500 E	Car	9285	39.6	85.50	9297	38.8	85.41	9293	41.4	88.08
	LRT	663	2.2	0.35	653	11.3	1.64	655	2.0	0.33
	All	9948	34.2	85.85	9950	34.8	87.05	9948	35.8	88.40
600 E	Car	7111	23.0	40.89	7085	20.8	38.38	7117	22.4	40.33
	LRT	663	12.2	2.45	652	22.9	4.46	655	13.2	2.58
	All	7774	21.3	43.34	7737	21.1	42.84	7772	21.0	42.91
700 E	Car	12609	35.4	121.41	12605	37.4	127.03	12620	38.0	133.49
	LRT	764	63.1	13.59	770	56.7	12.36	768	56.7	12.19
	All	13373	39.4	135.00	13375	40.2	139.39	13388	40.7	145.68
800 E	Car	6444	25.2	30.70	6454	22.1	28.75	6467	25.3	30.86
	LRT	764	11.8	3.10	770	25.2	6.31	768	11.2	2.91
	All	7208	23.3	33.80	7224	22.5	35.06	7235	23.3	33.77
900 E	Car	8974	28.5	57.38	8988	26.6	53.74	8979	28.4	56.77
	LRT	889	12.1	1.83	886	25.6	5.71	895	12.4	1.98
	All	9863	26.0	59.21	9874	26.4	59.44	9874	25.9	58.75
1100 E	Car	5520	26.1	25.36	5486	24.8	26.18	5538	25.9	25.63
	LRT	891	5.7	1.90	889	23.0	6.72	888	6.2	2.00
	All	6411	23.0	27.26	6375	24.5	32.90	6426	22.9	27.63
1300 E	Car	10146	41.8	119.04	10114	41.6	115.81	10120	41.1	117.11
	LRT	880	36.3	10.86	887	88.5	23.41	888	31.6	9.06
	All	11026	41.0	129.90	11001	48.3	139.22	11008	39.8	126.17

5.4 Station Dwell and Waiting Times

Indicators of changes in transit operations can also be station dwell times (the time that an LRV spends stopped at a station) and passenger station waiting time (the time that a passenger waits at the station). VISSIM was coded to record these times for each station in each direction, and that enabled a comparison of the obtained results among the three scenarios. These results are given in Table 5.7.

Table 5.7 Station Data Comparison: Dwell Times and Passenger Waiting Times

Station	Existing		No Priority		700 E	
	Station Dwell Time (s)	Passenger Waiting Time (s)	Station Dwell Time (s)	Passenger Waiting Time (s)	Station Dwell Time (s)	Passenger Waiting Time (s)
900 E WB	36.3	404.5	36.3	425.0	36.3	388.3
900 E EB	38.4	447.0	38.5	464.7	38.5	444.1
Trolley WB	41.2	427.5	41.2	420.7	41.2	432.2
Trolley EB	36.0	431.5	36.0	444.4	36.0	434.7
Library WB	49.1	444.3	49.4	459.1	49.2	450.2
Library EB	38.8	430.4	38.9	421.1	38.8	431.2
Stadium WB	47.1	415.8	47.1	415.8	47.1	415.8
Stadium EB	40.2	446.7	40.6	481.8	40.2	461.8
Average	**40.9**	**431.0**	**41.0**	**441.6**	**40.9**	**432.3**

6. DISCUSSION

This section provides major findings, which 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

A comparison of vehicular travel times along the corridor given in Table 6.1 and Figure 6.1 shows that the general purpose traffic is not affected by the implemented LRT priority strategies, nor would it be affected if the train priority was given at the 700 E intersection. Some smaller changes in travel times along certain segments are caused by the changes in coordination patterns, caused by the presence or absence of train priority.

6.2 Transit Travel Times

Opposite from the vehicular travel times, the TRAX travel times would experience major impacts without the priority. The results given in Table 6.2 and Figure 6.2 show that without the existing priority, TRAX travel times would increase approximately 30% in the eastbound and 20% in the westbound direction. On the other hand, the 700 E scenario results show that the eastbound TRAX travel times would not be affected, while in the westbound direction the travel times would decrease approximately 3%, with a 10% decrease on the segment between 800 E and 700 E. Overall, from the aspect of TRAX travel times, providing LRT priority is justified.

6.3 Intersection Measures of Effectiveness

6.3.1 Intersection Delays and Level of Service

The results on the average intersection delay and changes, given in Tables 6.3 and 6.4, can give an overall picture of the intersection delays along the corridor. The existing train priority increases delays for vehicles at intersections, and along the studied corridor this increase is almost 6%. Detailed data on intersection delays, given in Annex 4, show that the majority of the increase in delays is caused by the increase in delays on side streets, but some can also be attributed to the through and left movements along the main corridor. The increase in delays on side streets is caused by earlier phase terminations/later phase starts when LRT priority is active. Left turns along the main corridor are impacted by the phase rotation strategy, which delays the start of left turns when it is active, thus increasing delays for vehicles. The through movements along the main corridor are impacted by the queue jump strategy, which delays the phase starts when this strategy is active, but also by the changes in coordination patterns. When LRT priority is active, it forces signal controllers to go through the transition process, which can impact the coordination along the corridor.

The real extent of the priority strategies can be seen when intersection delays for trains are analyzed. Along the studied corridor, without the priority, LRV delays would increase more than 140%, with a four times increase at some intersections (500 E). If the train priority was introduced at 700 E, it would slightly impact vehicular traffic by increasing delays, mostly at this intersection, as expected, but also along the main corridor. The main corridor would be affected by the phase rotation strategy (left turns), and the queue jump strategy and coordination (through movements). Along the entire studied corridor, priority at 700 E has almost no impacts on vehicular traffic (0.6% increase in delays), and it slightly decreases intersection delay for trains (approximately 4%).

Detailed delay analysis for 700 E, given in Table 6.5, can give a clearer picture of priority impacts on each intersection movement individually. The results show that the southbound and westbound movements would experience a certain increase in delays (from 8% to 24%), but the LOS would

remained unchanged, except for the westbound through movement, where the LOS would drop from C to D. Another movement with a slight increase in delays would be the northbound through movement, while changes in delays for all other movements would be unnoticeable. Both light rail movements would experience a decrease in delays from 9% to 11%. Overall, priority at 700 E would increase delays for vehicular traffic approximately 7%, while decreasing delays for trains approximately 10%.

6.3.2 VPerson Delays

Similarly to vehicular delays, the train priority along the corridor slightly increases total delays for car passengers approximately 3%, but at the same time decreases total person delays for train passengers more than 70% (Table 6.6). Priority at 700 E would increase total person delays for car passengers approximately 10% at this intersection, while at the same time decreasing total person delays for train passengers by the same percentage.

6.4 Station Dwell and Waiting Times

The results on station dwell and passenger waiting times, given in Table 6.7, show that priority has no impacts on station dwell times (they depend on the number of passengers and the boarding/alighting process), but priority can slightly help decrease passenger waiting time at stations. Enabling priority at 700 E would have no impacts on dwell or waiting times, when compared with the existing conditions.

6.5 Summary of Findings

For a detailed insight and traffic analysis of the existing and possible train priority strategies along the 400 S / 500 S corridor, the following scenarios are designed and analyzed:

- The Existing scenarios, which represent current traffic and transit conditions along the corridor, with the existing train priority
- The No Priority scenario, which analyzes traffic and transit conditions in a case of absence of train priority
- The 700 E scenario, which analyzes benefits and impacts of the possible train priority at the 700 E intersection

The scenarios are compared in various ways in order to determine the benefits and impacts train priority strategies on general purpose traffic and LRT. These effects are summarized and presented in Table 6.1. In order to have a better insight in results, the No Priority scenario is taken as the base case, and the other two scenarios are compared to it.

Table 6.1 Effects of LRT Priority on Traffic and Transit Operations

Scenario	No Priority	Existing	700 E
Traffic / Transit Component	Traffic Impacts		
Through Traffic Along the Main Corridor	N/A	N/A	N/A
	Major Improvement	Major Improvement	Major Improvement
	Minor Improvement	Minor Improvement	Minor Improvement
	Neutral	Neutral	Neutral
	Minor Impact	Minor Impact	Minor Impact
	Major Impact	Major Impact	Major Impact
Left Turns Along the Main Corridor	N/A	N/A	N/A
	Major Improvement	Major Improvement	Major Improvement
	Minor Improvement	Minor Improvement	Minor Improvement
	Neutral	Neutral	Neutral
	Minor Impact	Minor Impact	Minor Impact
	Major Impact	Major Impact	Major Impact
Side Street Traffic	N/A	N/A	N/A
	Major Improvement	Major Improvement	Major Improvement
	Minor Improvement	Minor Improvement	Minor Improvement
	Neutral	Neutral	Neutral
	Minor Impact	Minor Impact	Minor Impact
	Major Impact	Major Impact	Major Impact
LRT Operations	N/A	N/A	N/A
	Major Improvement	Major Improvement	Major Improvement
	Minor Improvement	Minor Improvement	Minor Improvement
	Neutral	Neutral	Neutral
	Minor Impact	Minor Impact	Minor Impact
	Major Impact	Major Impact	Major Impact

6.6 Recommendations

The predictive priority strategies that are implemented along the studied corridor have proven to be beneficial to transit operations, while at the same time trying to minimize impacts on vehicular traffic. The absence of priority at 700 E breaks the line of train priority causing increased delays for LRT vehicles. A big concern is how the priority at 700 E would impact vehicular traffic along the coordinated north-south corridor that conflicts with the LRT line. The analysis shows that certain impacts on vehicular traffic can be expected. However, these impacts are minor on the coordinated north-south through movements, so impacts on coordination along 700 E would be minimal. Waging these impacts to the benefits that LRT would experience, it is recommended to enable train priority at 700 E.

The second recommendation is related to the priority calls at those intersections which are adjacent to train stations. The priority call for a certain intersection is placed when the train is at the previous one. However, the train dwells at the station for a certain amount of time (30 to 50 seconds, depending on the station and direction), so the priority call comes too early. This causes the intersection to prepare for the train priority, and the priority is active even if the train is stopped at the station. This minimizes benefits that trains have from the priority, while at the same time impacts all conflicting traffic flows. Sometimes it can even cause the priority to be active during two consecutive cycles, which increases impacts to vehicular traffic. That is why it is recommended to delay the priority call for those intersections for at least 30 seconds, which would give some more time to serve conflicting traffic, thus minimizing impacts, and the trains would get priority once they clear the station and approach the intersection.

The third recommendation is about the queue jump priority strategy. When trains and vehicles are waiting at the red light, this strategy gives an earlier start to trains by delaying the through movements for five seconds. The intention of this strategy is to improve safety, so there would be no confused drivers who would attempt a left turn once the through movements turn green and directly conflict the train. However, all the left turns along the main corridor are protected, with an improved signage in a case of the approaching train. Also, this line is in service for a long time, and most of the regular drivers along the corridor are familiar with the traffic patterns. These reasons can justify the idea of removing the queue jump strategy. It would decrease delays for the through movements and improve coordination along the corridor that is disrupted by the priority.

These recommendations should be considered by traffic and transit officials. If there is an agreement to apply these recommendations in the field, the authors believe it would be beneficial for both vehicular traffic and LRT.

7. CONCLUSIONS

The goal of this study is to evaluate LRT priority strategies along the 400 S / 500 S corridor in Salt Lake County through analyzing benefits and impacts of LRT priority on transit and vehicular traffic through microsimulation. 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 LRT station data. The study uses VISSIM microsimulation models to estimate LRT operations, as well as impacts that LRT priority has on transit and general purpose traffic.

The LRT priority has certain impacts on vehicular traffic, mostly on side streets and left turns along the main corridor. On the other hand, priority brings major improvements to LRT, making it faster, more reliable, and more competitive to cars. Being the major transit line in this part of the county, and carrying a lot of passengers throughout the day, the fast and reliable functioning of this line is essential. This justifies the implemented priority strategies, and its impacts on vehicular traffic are minimal when compared with the benefits it brings to transit.

A big concern of traffic and transit officials is the impact of train priority at the 700 E intersection. The analysis shows that certain impacts can be expected, but they are minor for the coordinated north-south through movements, so impacts on coordination along 700 E in this should be minimal. On the other hand, it would bring certain benefits for LRT, so enabling priority at this intersection should be considered.

Along with recommending LRT priority at 700 E, the authors have two more recommendations. The first one is resetting priority parameters at intersections adjacent to LRT stations so that the priority call encompasses station dwell times. The second one is to consider removing the queue jump strategies to reduce delays for the corridor through movements and help preserve coordination patterns.

Future work on this project should follow any changes in traffic and transit patterns, such as changes in traffic volumes, signal retiming, transit ridership, train schedules, etc. The microsimulation models which are developed for the study can be used to test any priority strategy, changes in signal timings, or even design changes prior to their implementation in the field. It can help to decide whether or not the proposed changes are justified.

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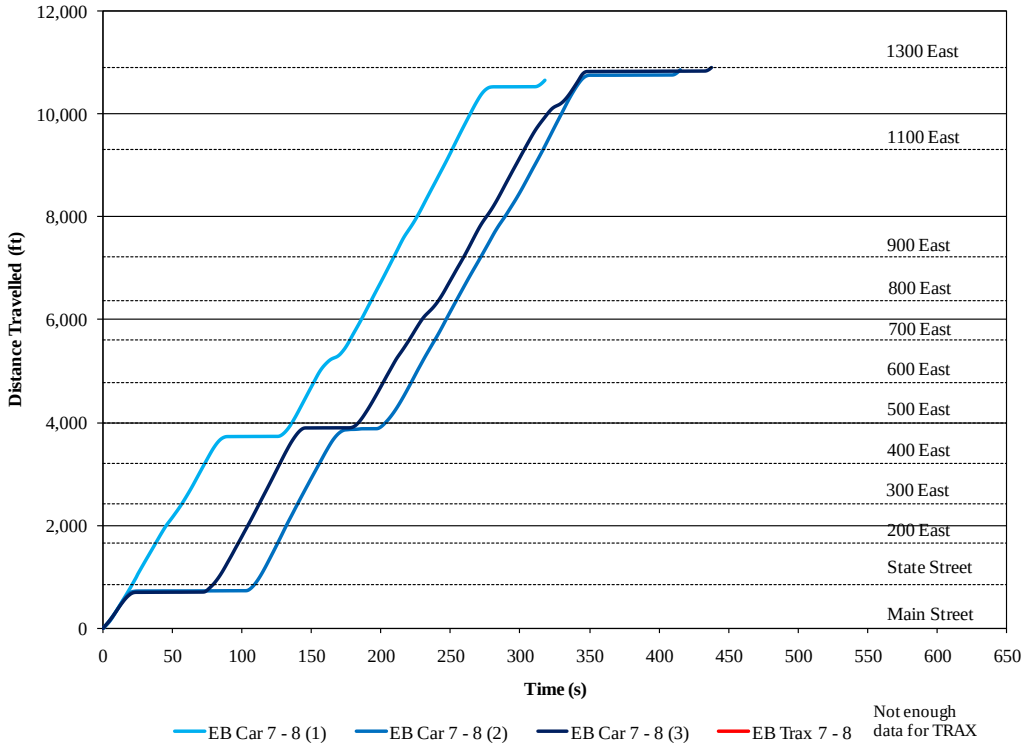
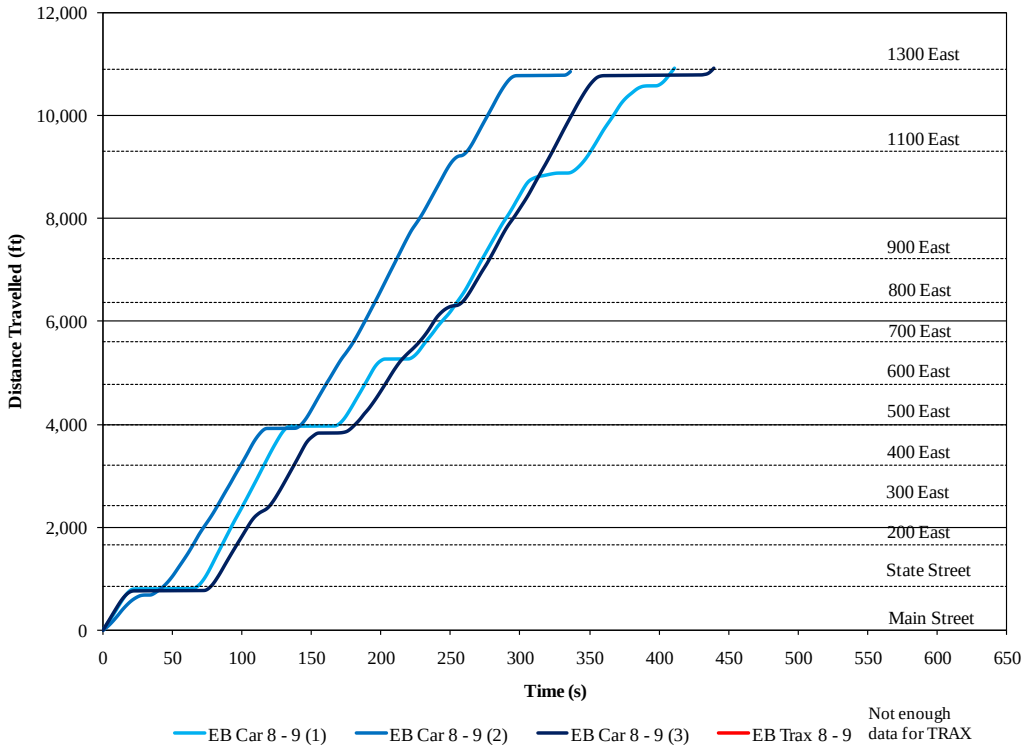
ANNEX 1. TIME – SPACE DIAGRAMS

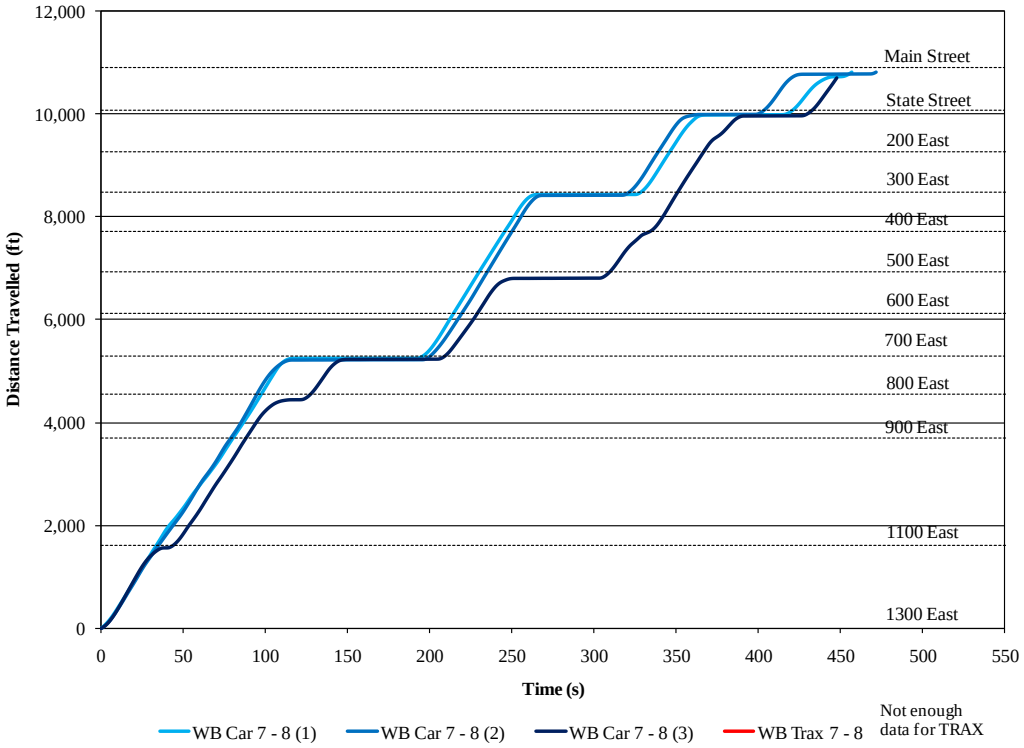


a) Eastbound 7 AM – 8 AM

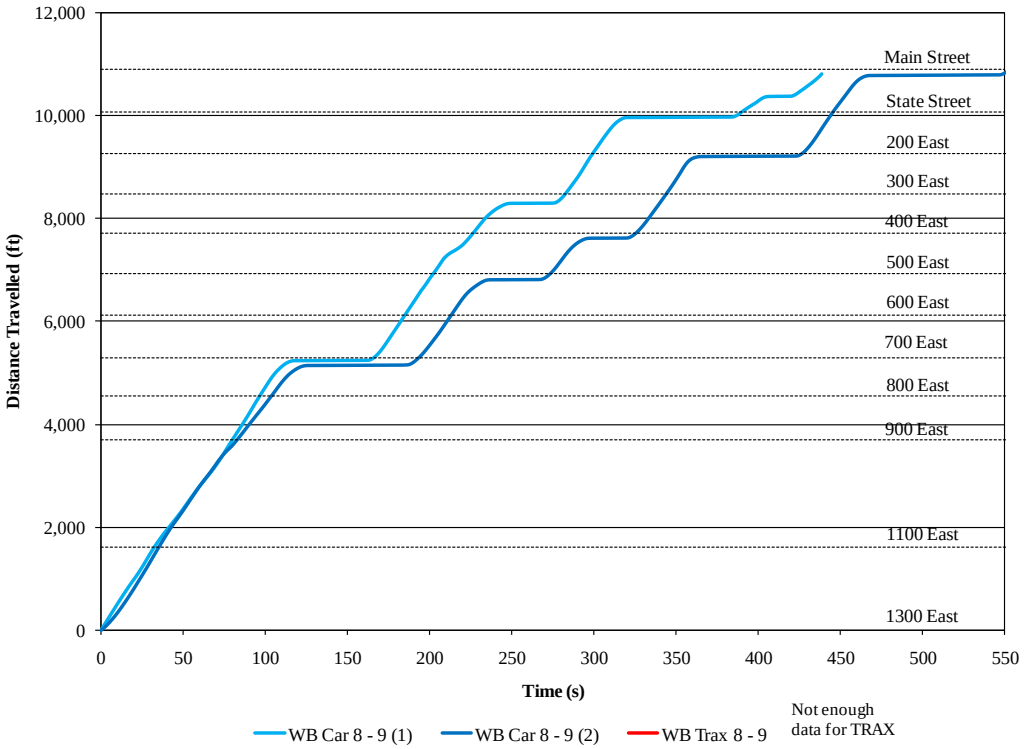


b) Eastbound 8 AM – 9 AM

August 05, 2008, AM Peak Eastbound

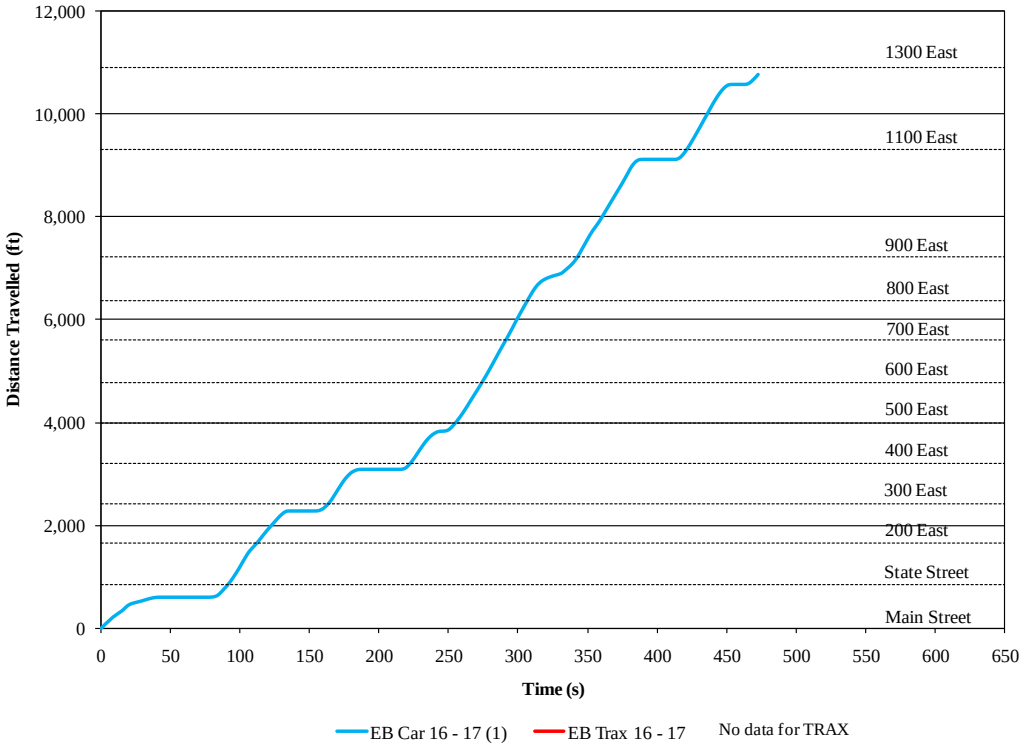


a) Westbound 7 AM – 8 AM

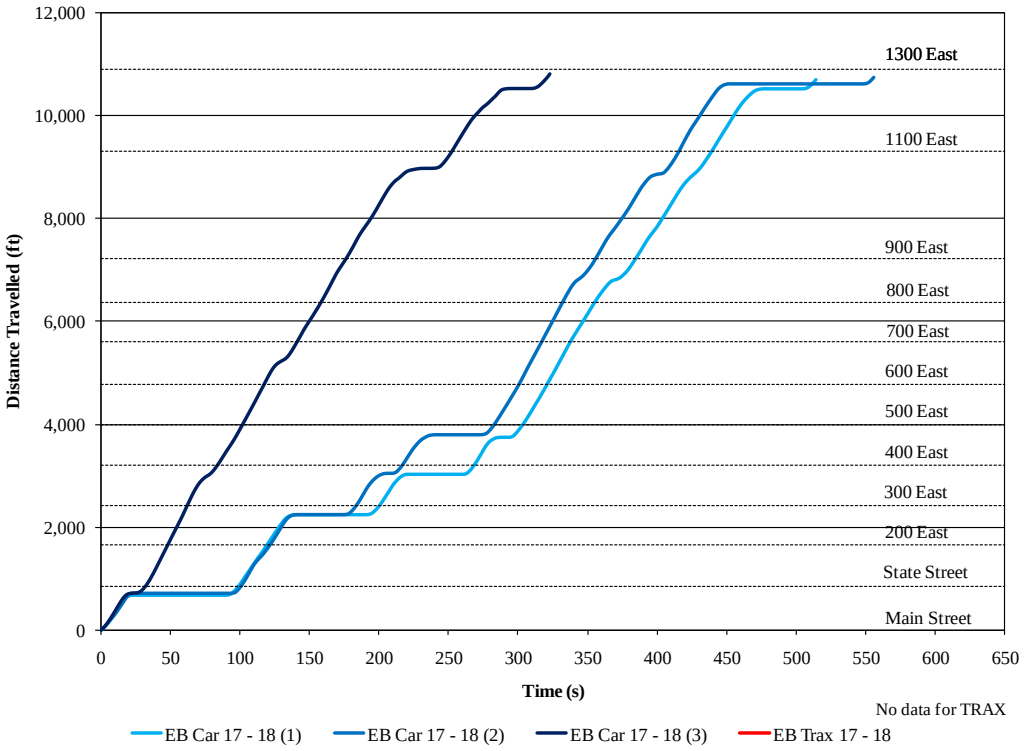


b) Westbound 8 AM – 9 AM

August 05, 2008, AM Peak Westbound

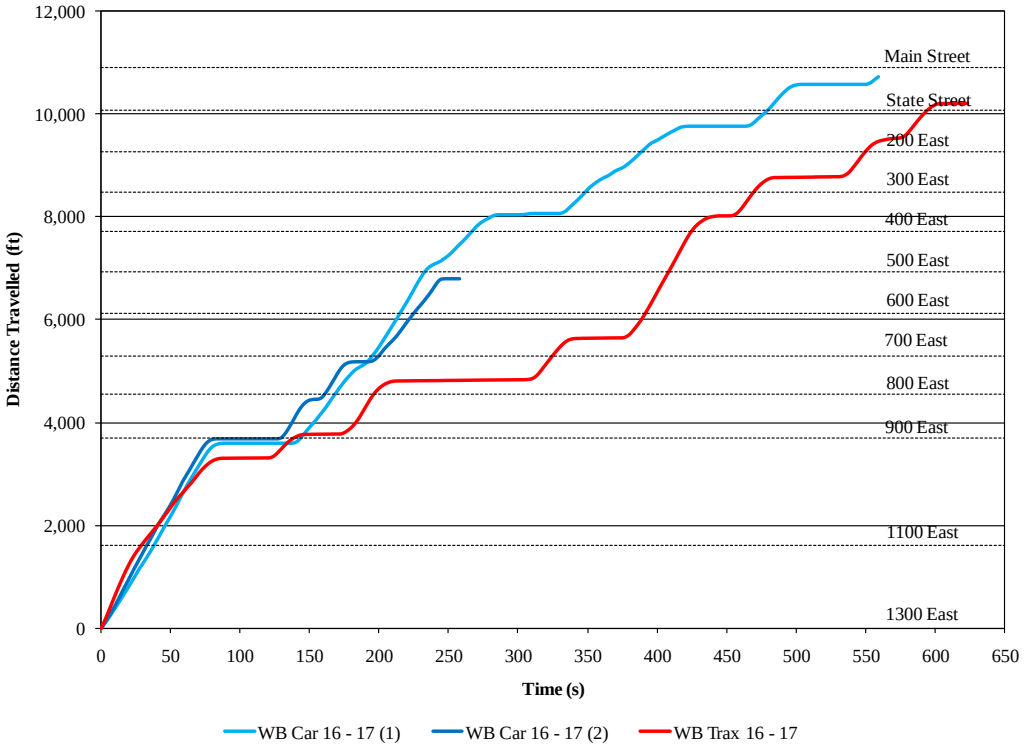


a) Eastbound 4 PM – 5 PM

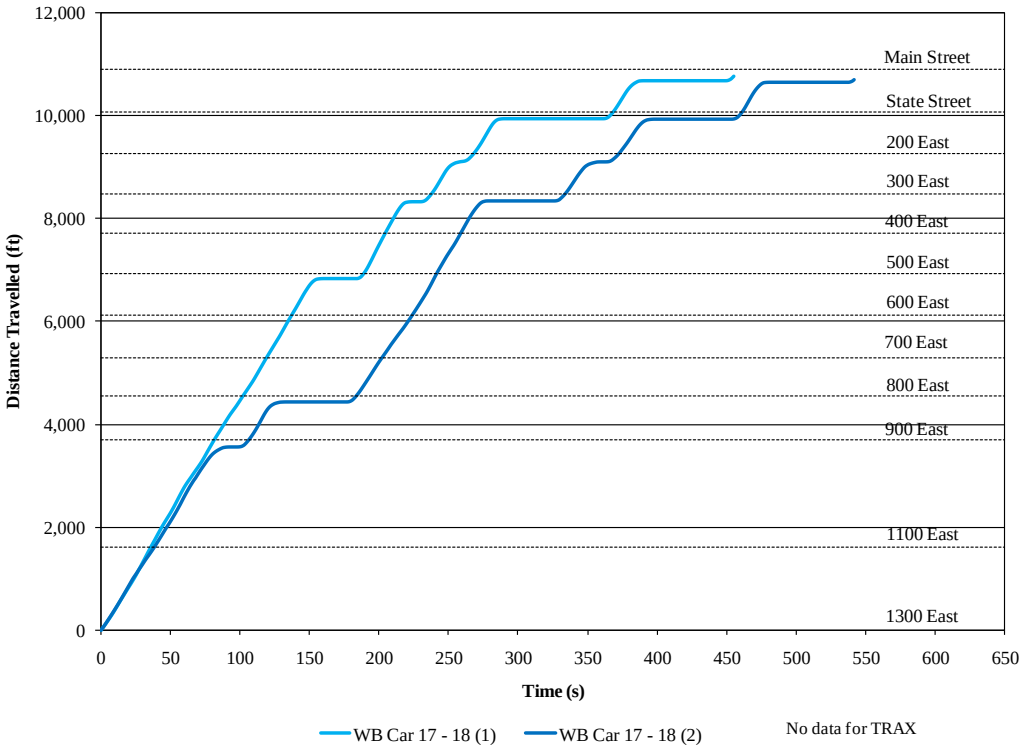


b) Eastbound 5 PM – 6 PM

August 05, 2008, PM Peak Eastbound

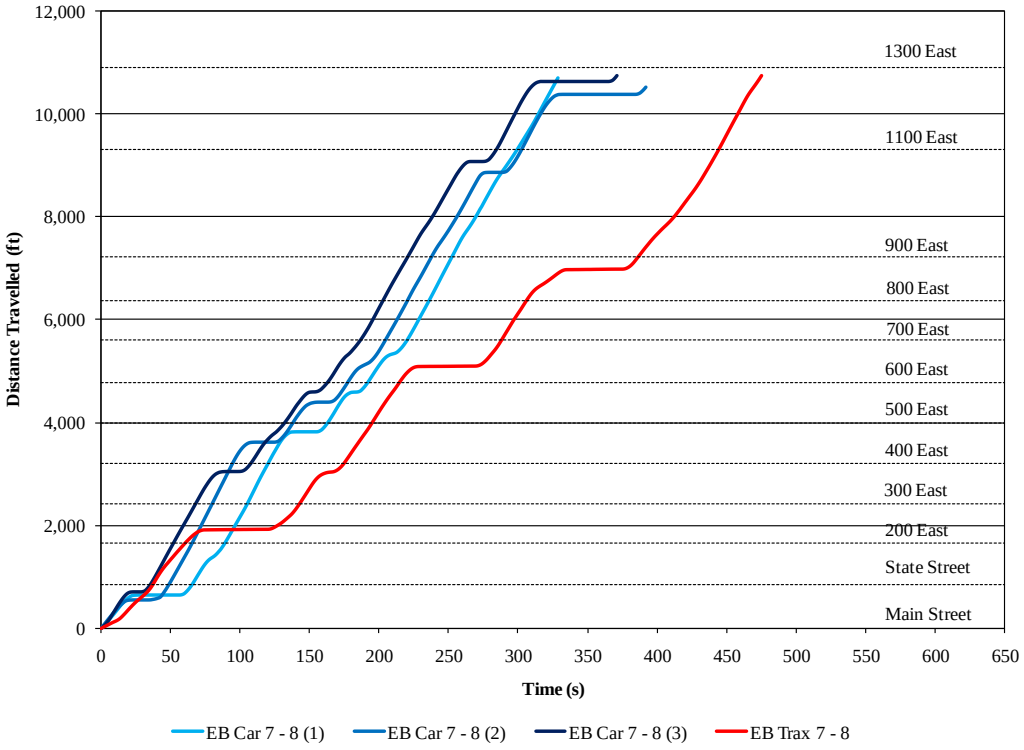


a) Westbound 4 PM – 5 PM

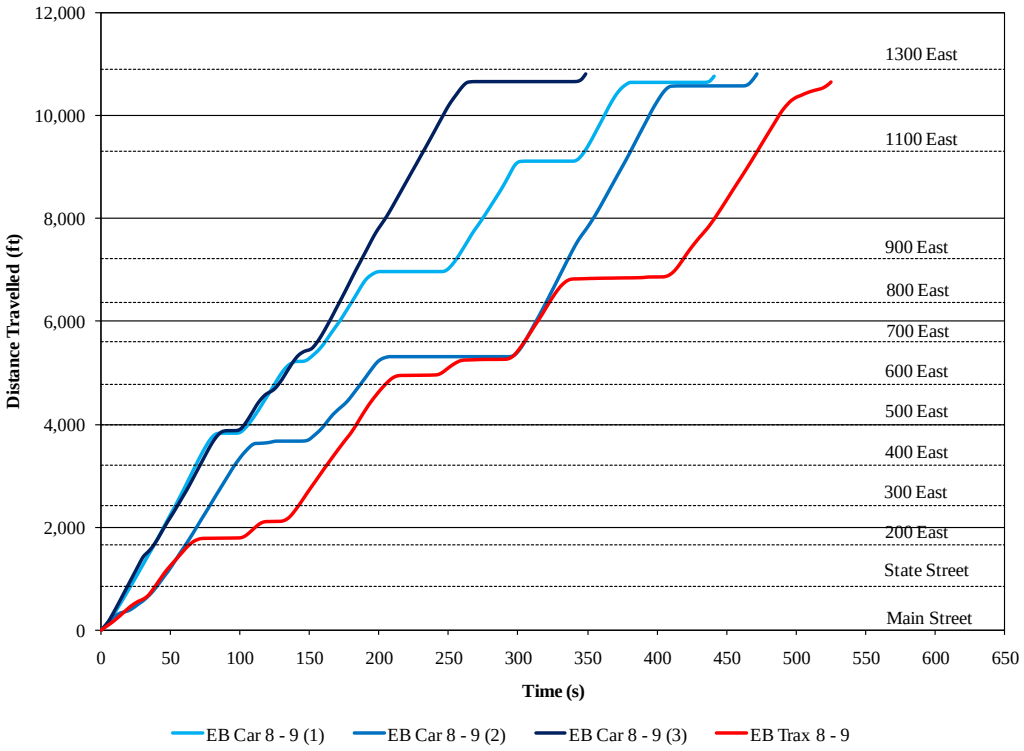


b) Westbound 5 PM – 6 PM

August 05, 2008, PM Peak Westbound

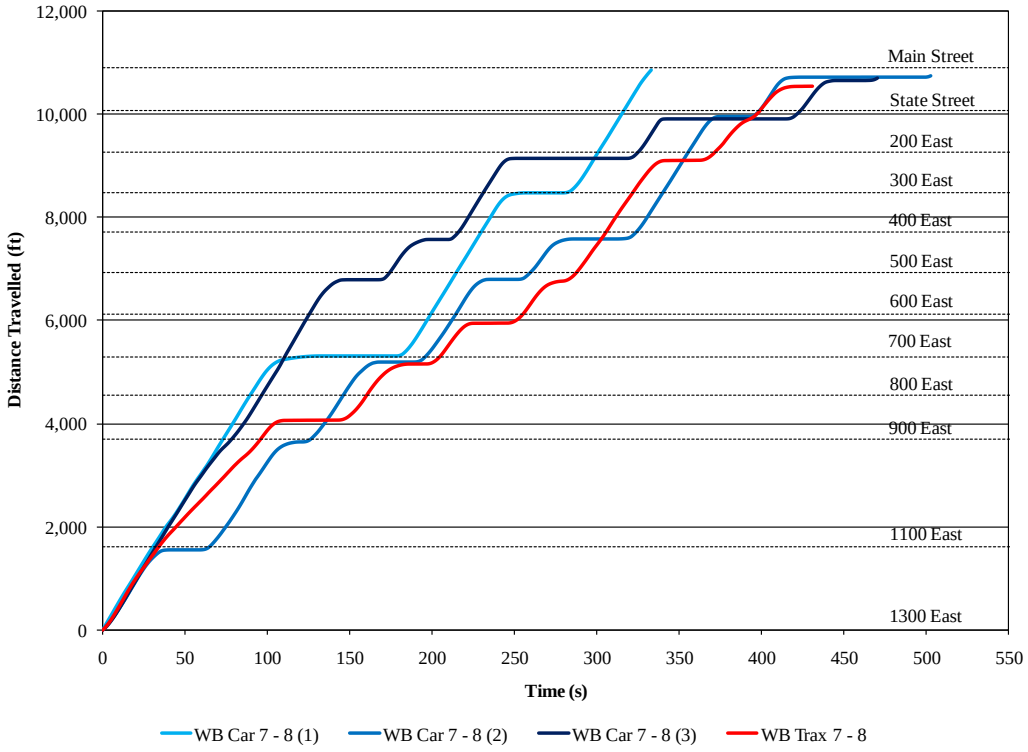


a) Eastbound 7 AM – 8 AM

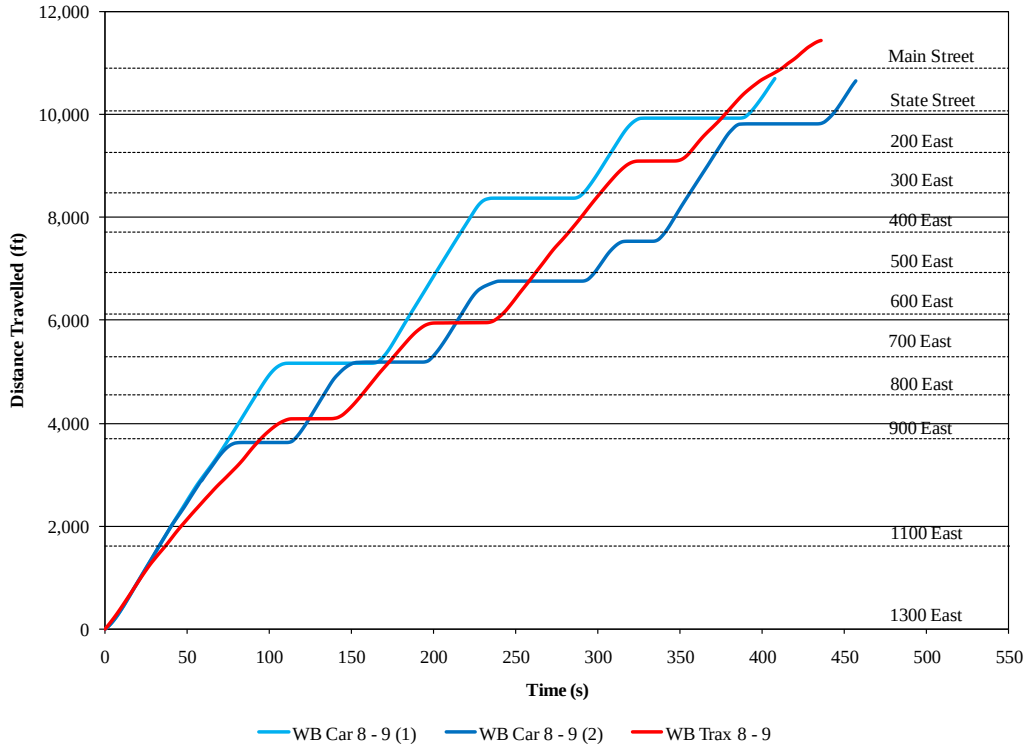


b) Eastbound 8 AM – 9 AM

August 06, 2008, AM Peak Eastbound



a) Westbound 7 AM – 8 AM



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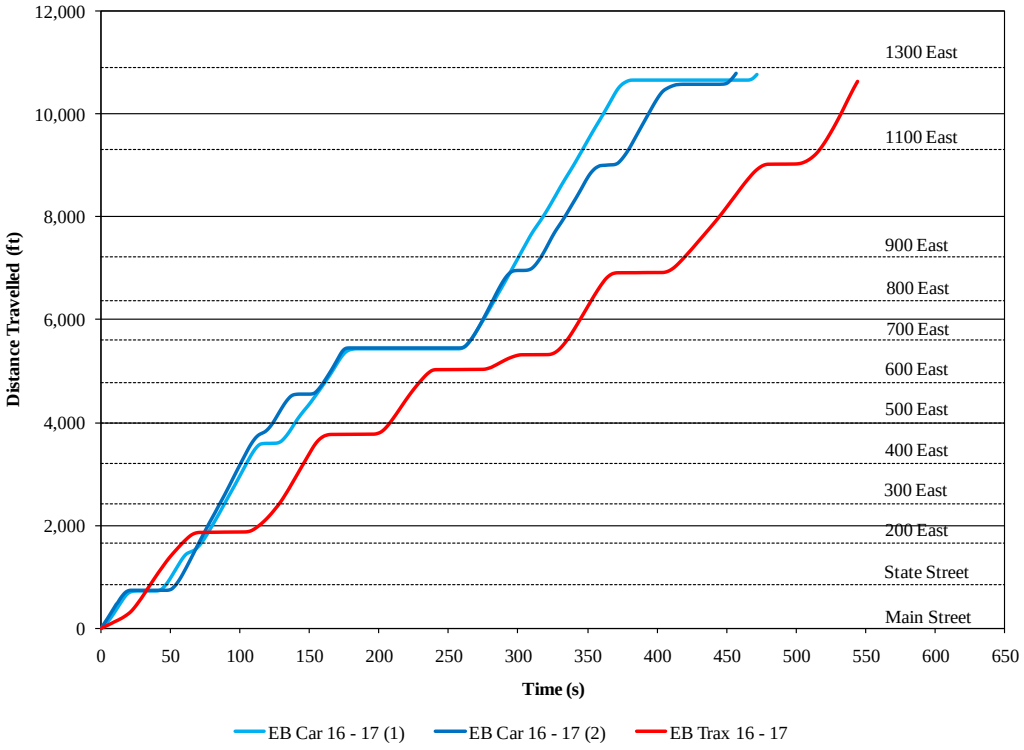
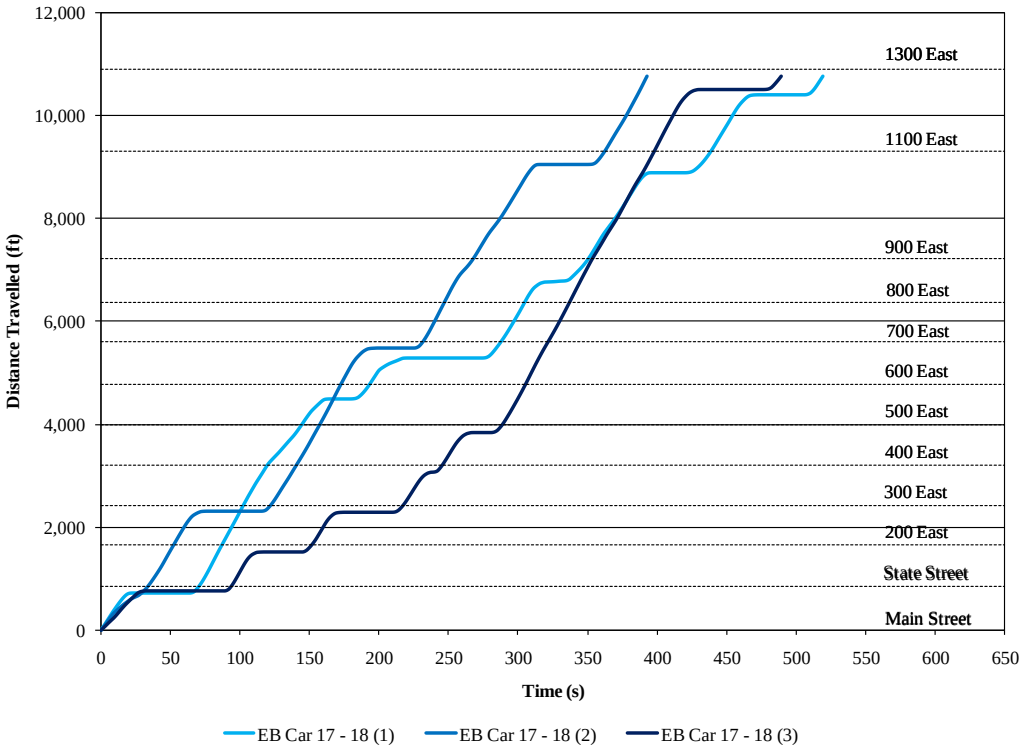
August 06, 2008, AM Peak Westbound

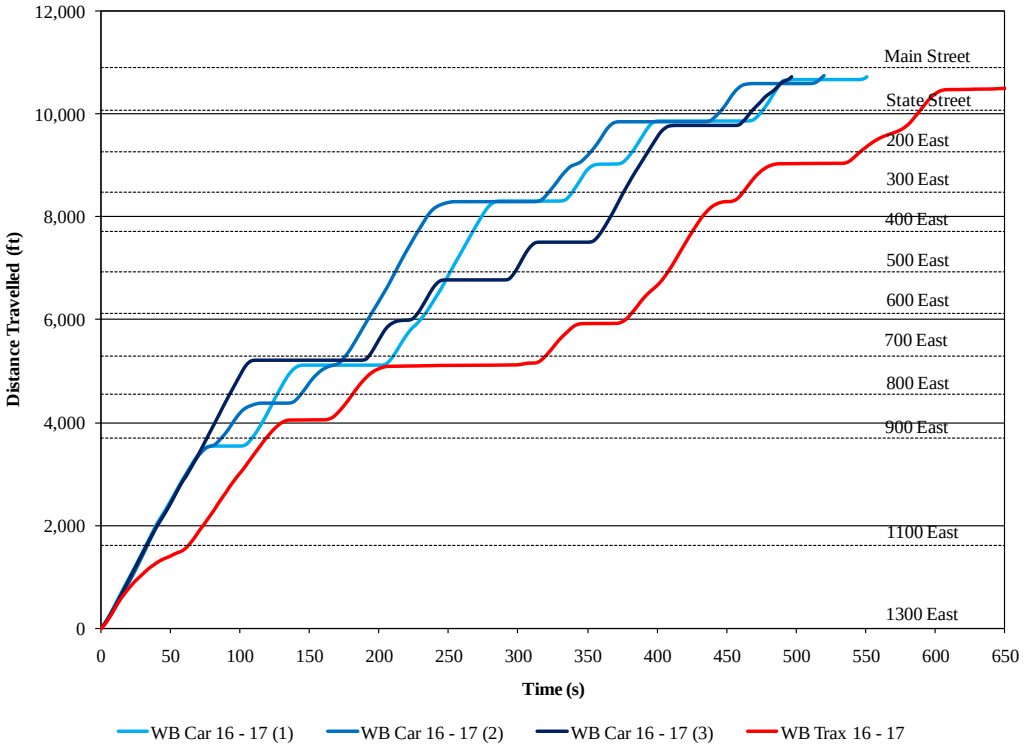


a) Eastbound 4 PM – 5 PM

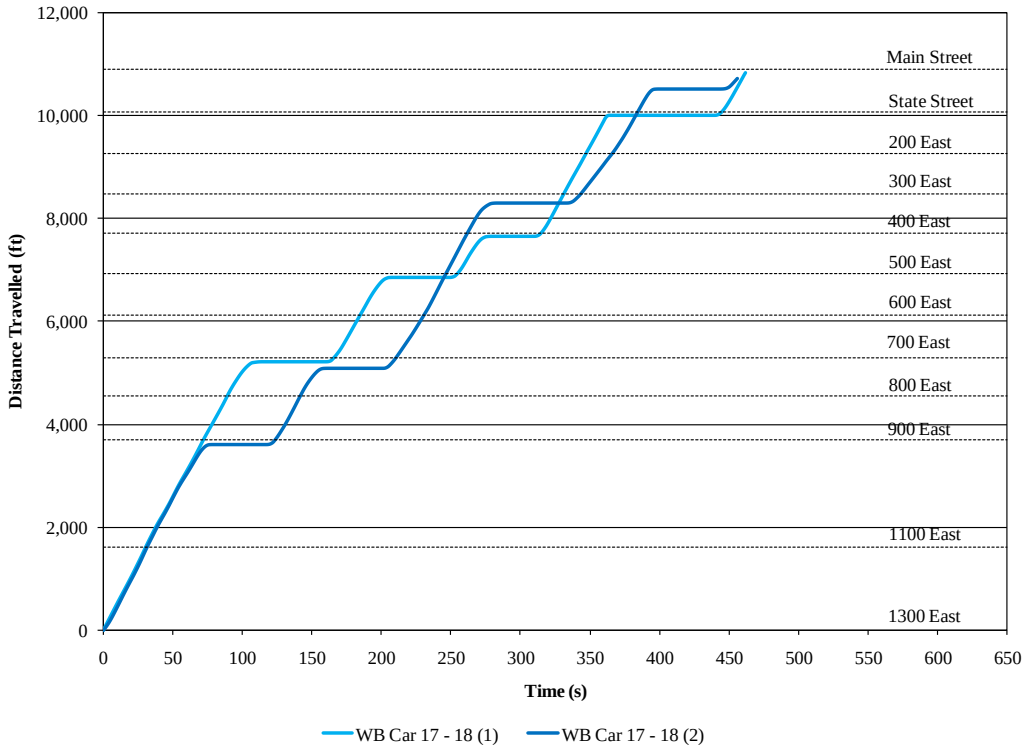


b) Eastbound 5 PM – 6 PM

August 06, 2008, PM Peak Eastbound

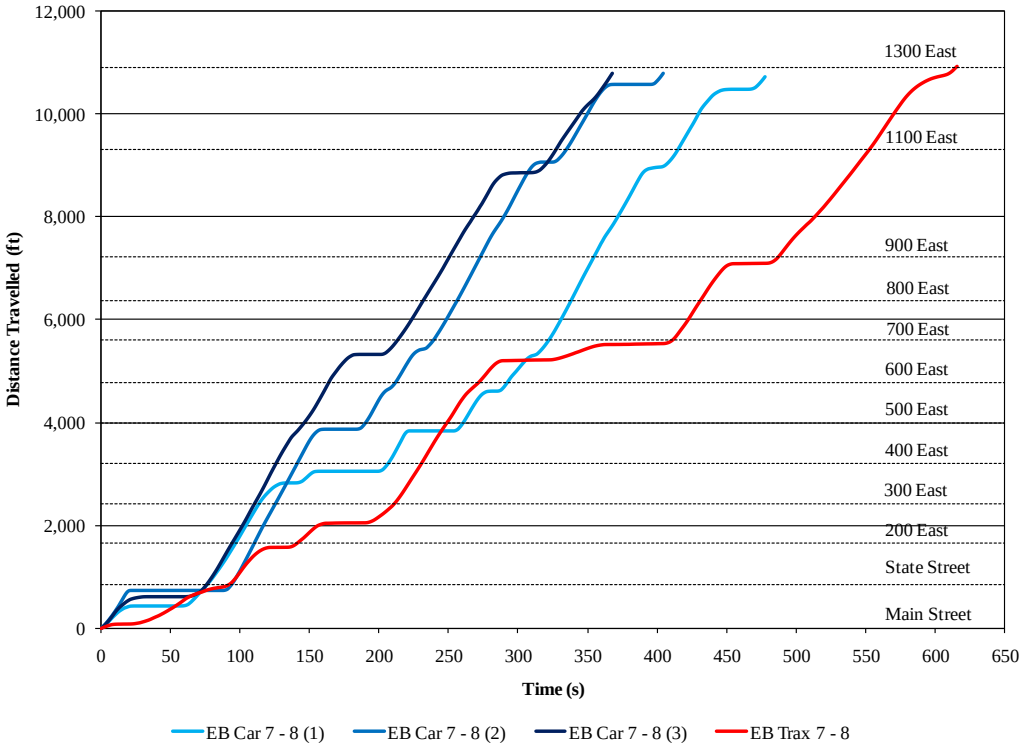


a) Westbound 4 PM – 5 PM

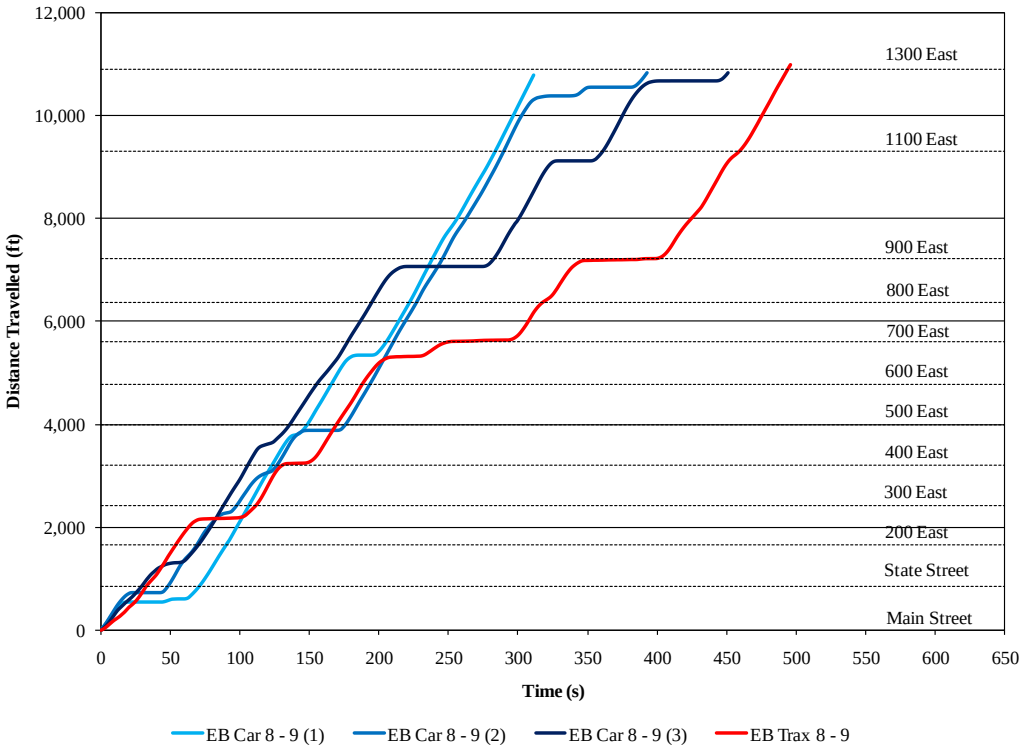


b) Westbound 5 PM – 6 PM

August 06, 2008, PM Peak Westbound

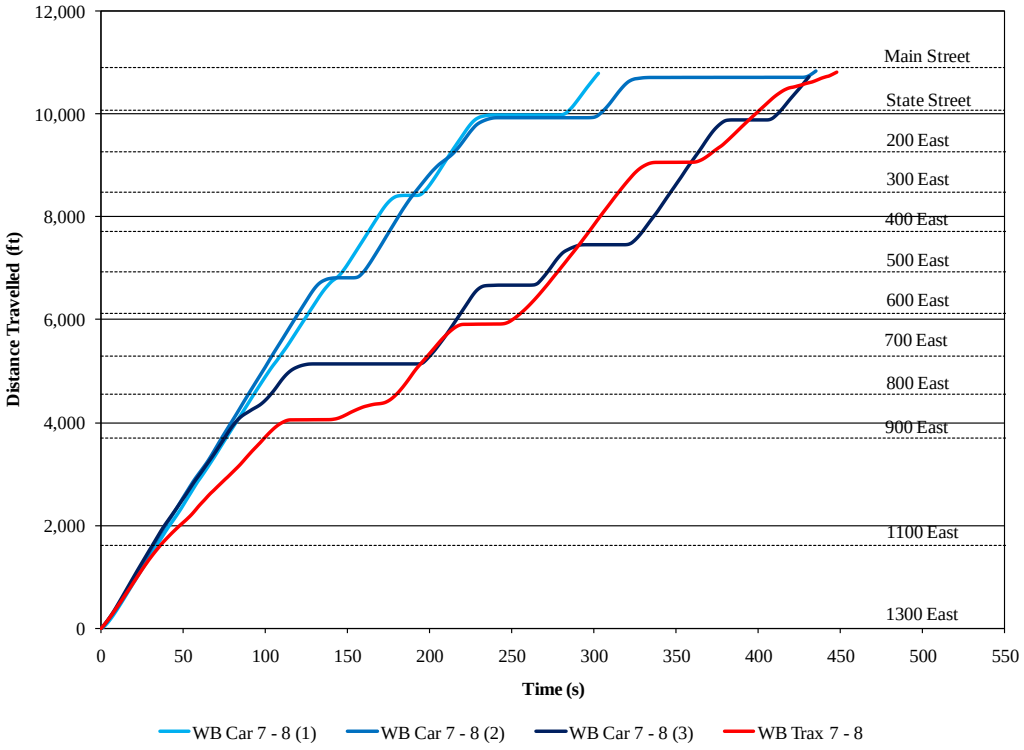


a) Eastbound 7 AM – 8 AM



b) Eastbound 8 AM – 9 AM

August 07, 2008, AM Peak Eastbound



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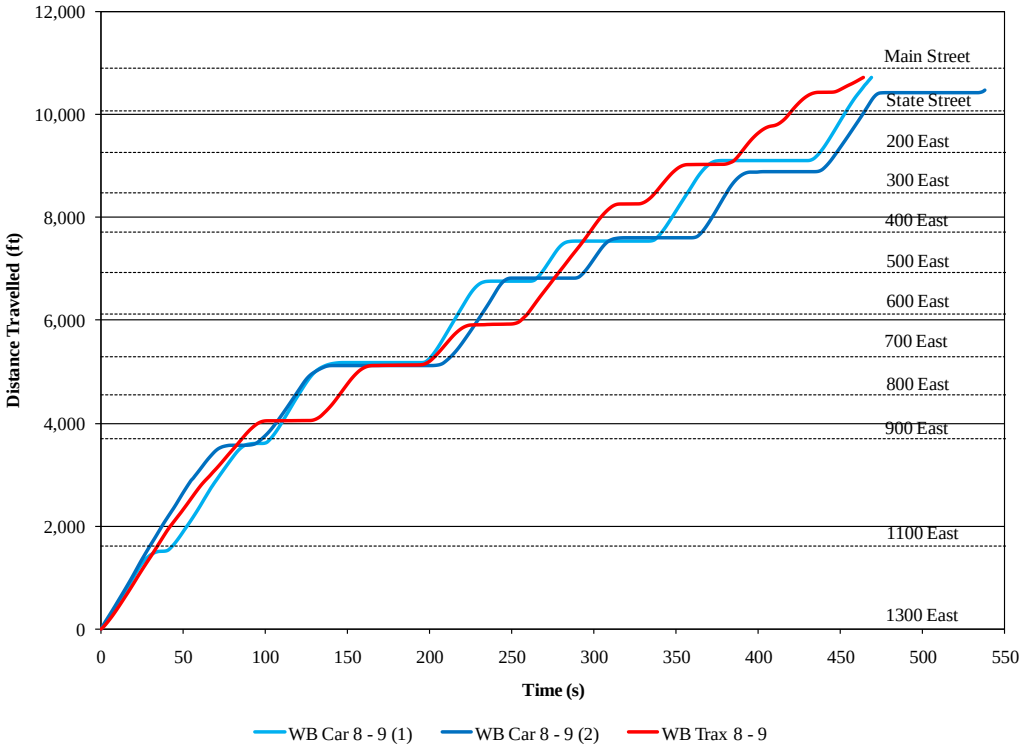
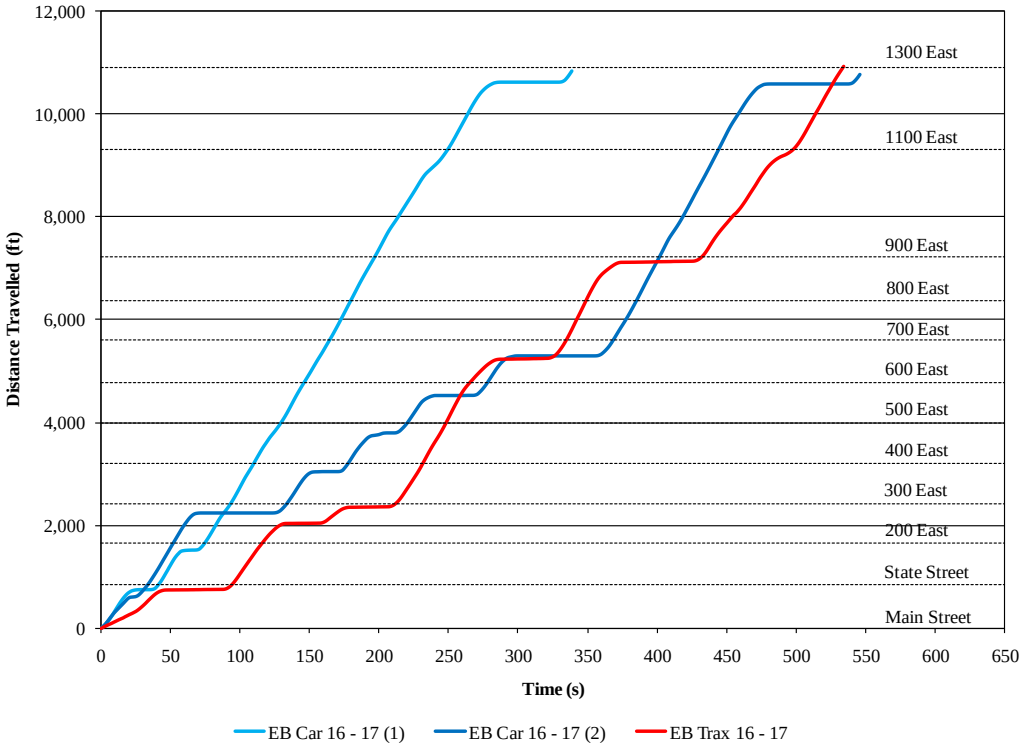


b) Westbound 8 AM – 9 AM

August 07, 2008, AM Peak Westbound



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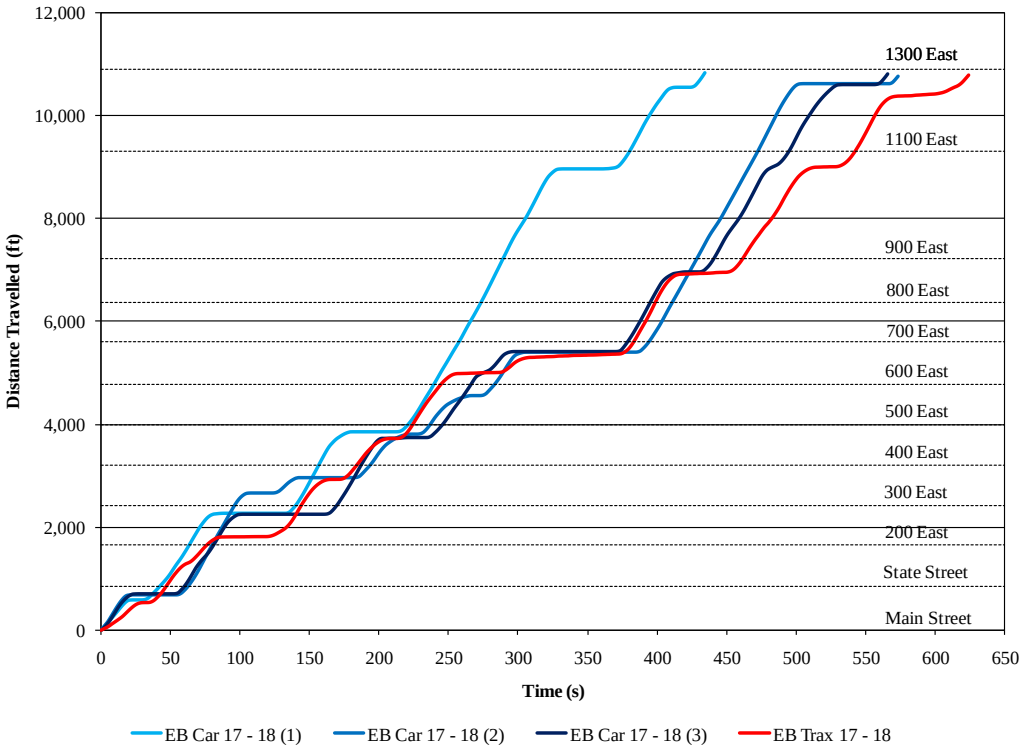

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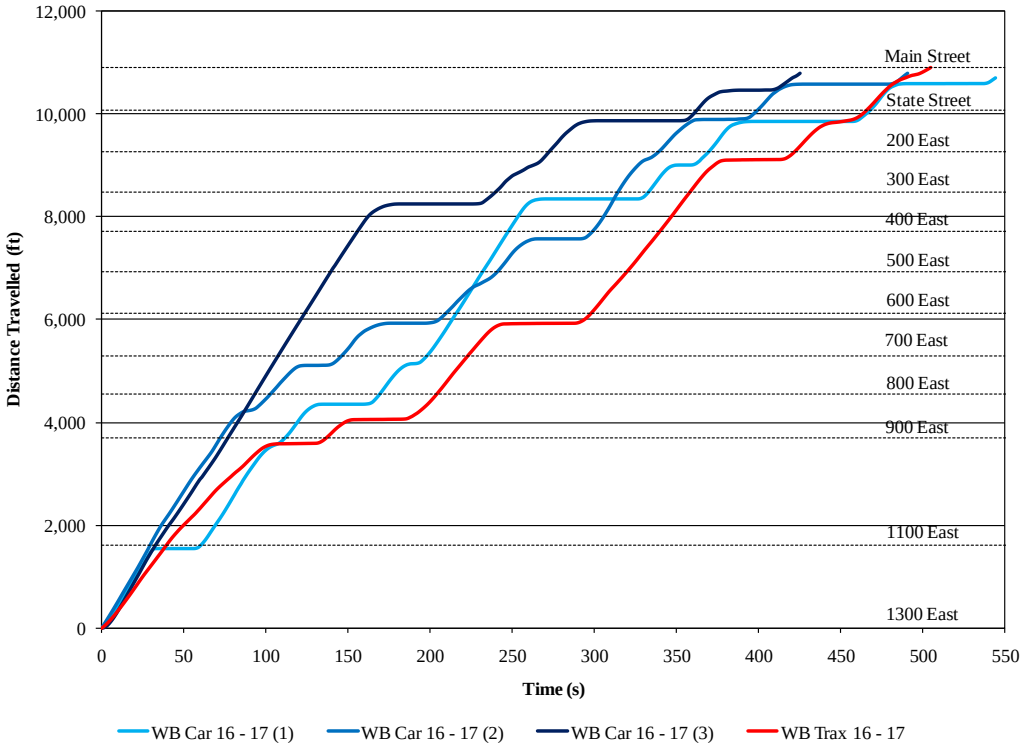
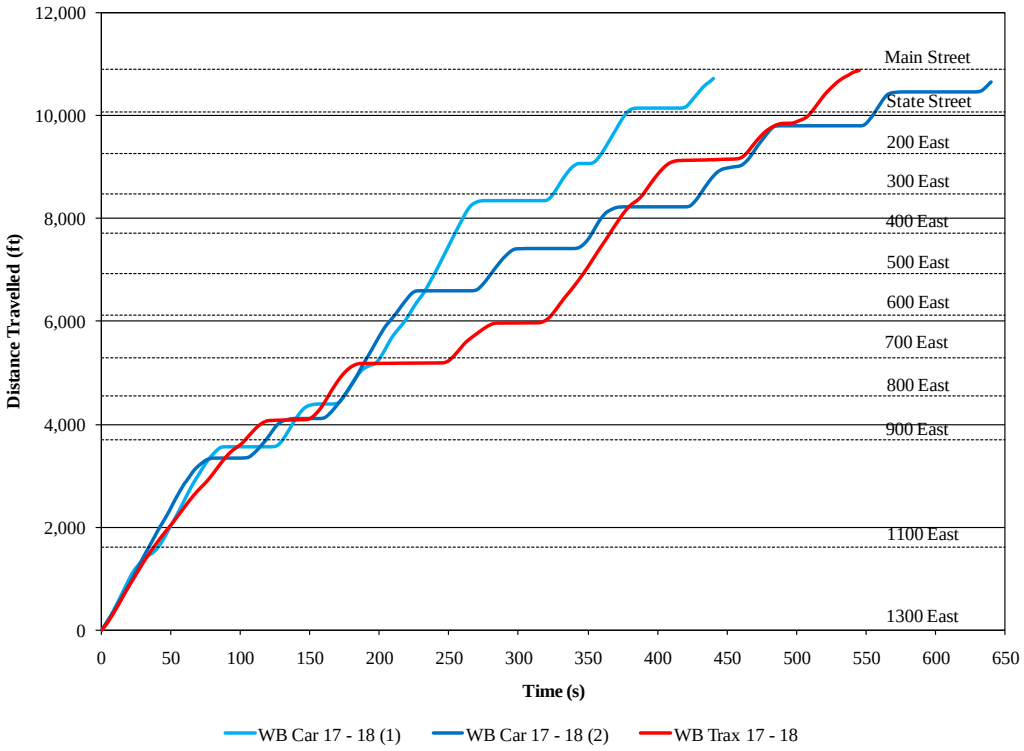
August 07, 2008, PM Peak Eastbound

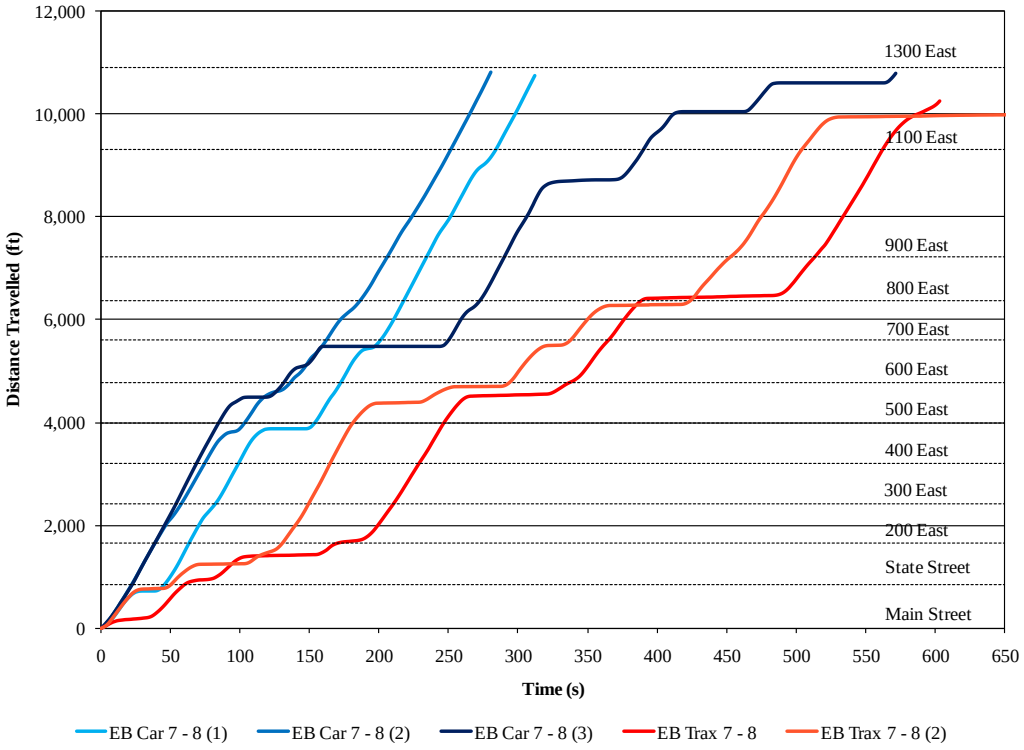


a) Westbound 4 PM – 5 PM

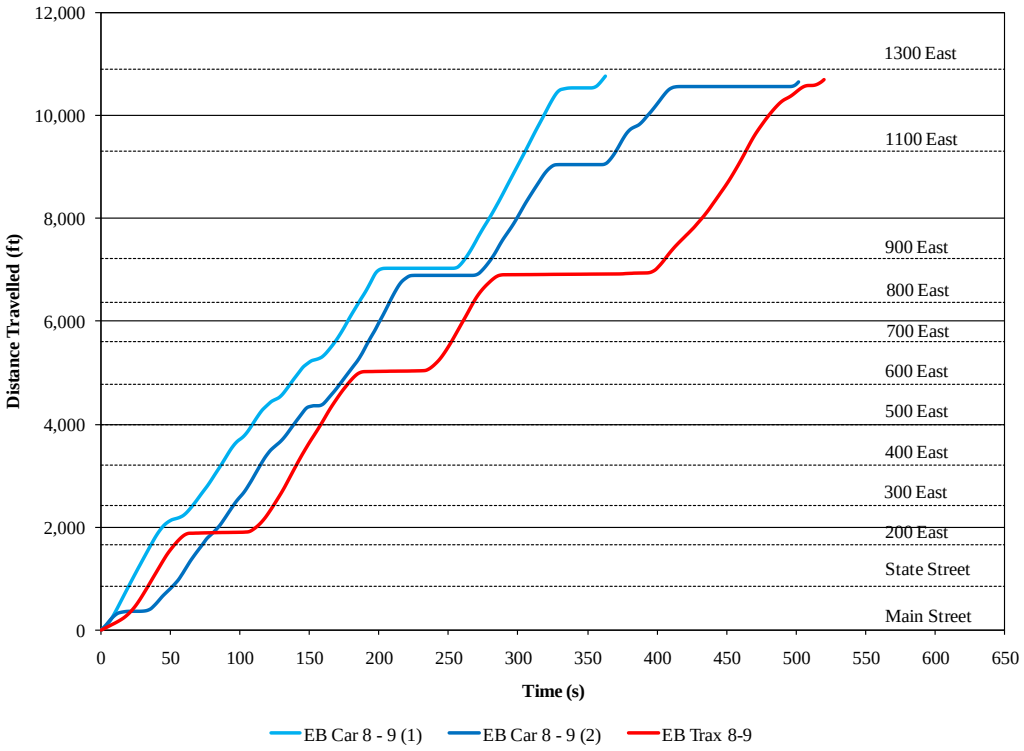


b) Westbound 5 PM – 6 PM

August 07, 2008, PM Peak Westbound

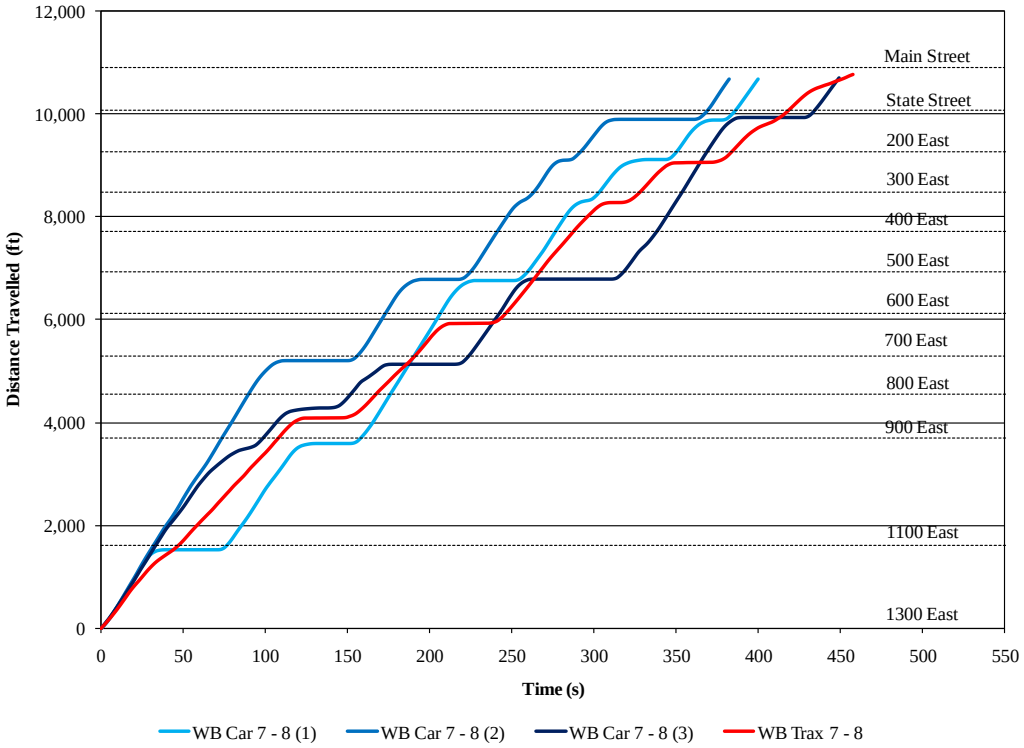


a) Eastbound 7 AM – 8 AM



b) Eastbound 8 AM – 9 AM

September 09, 2008, AM Peak Eastbound



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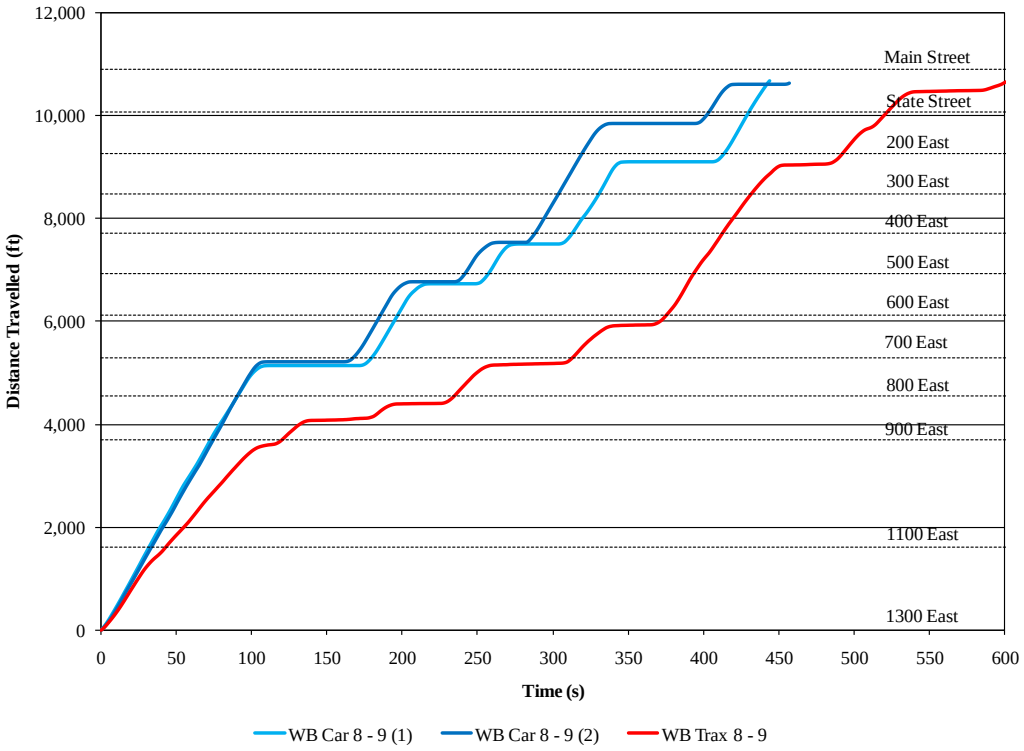

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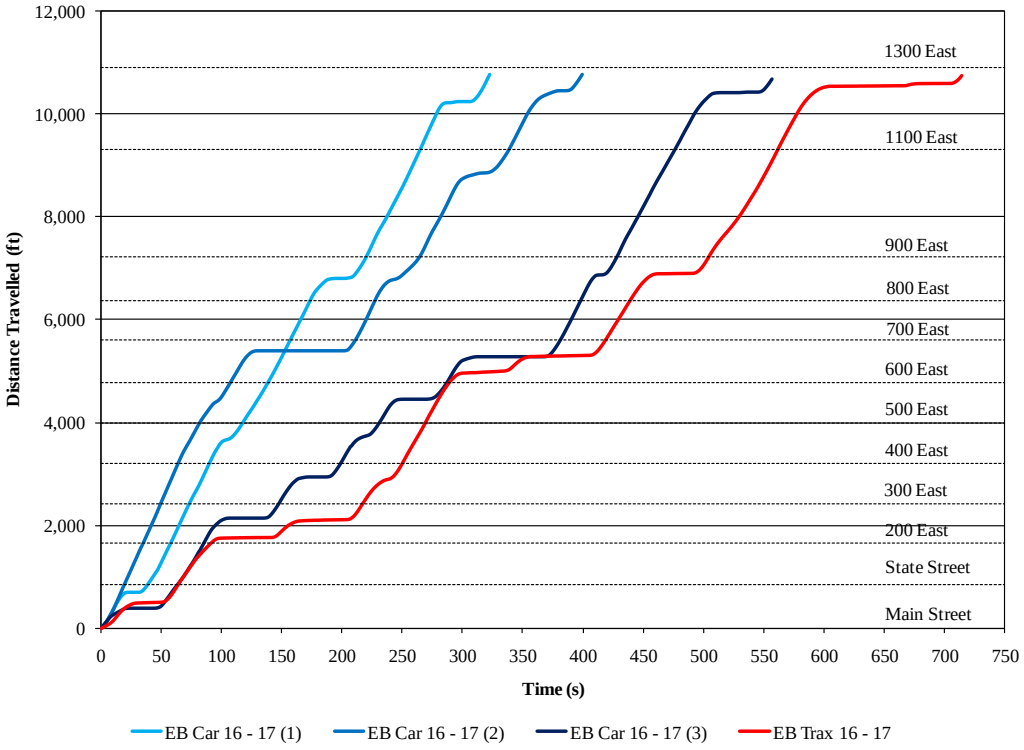
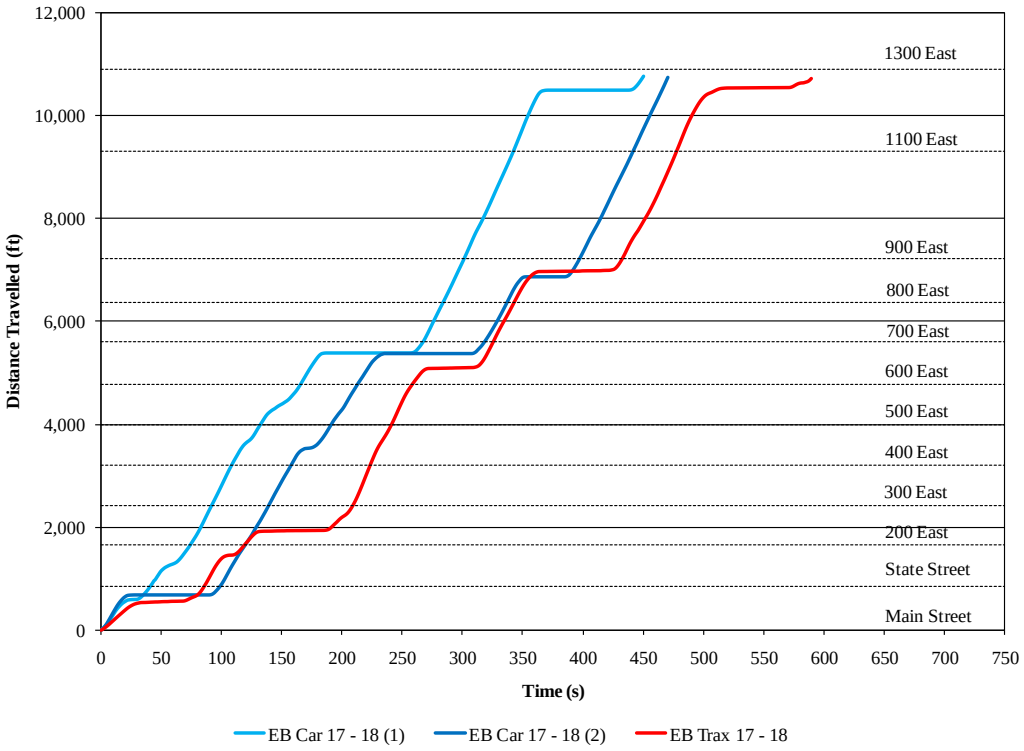
September 09, 2008, AM Peak Westbound



a) Eastbound 4 PM – 5 PM



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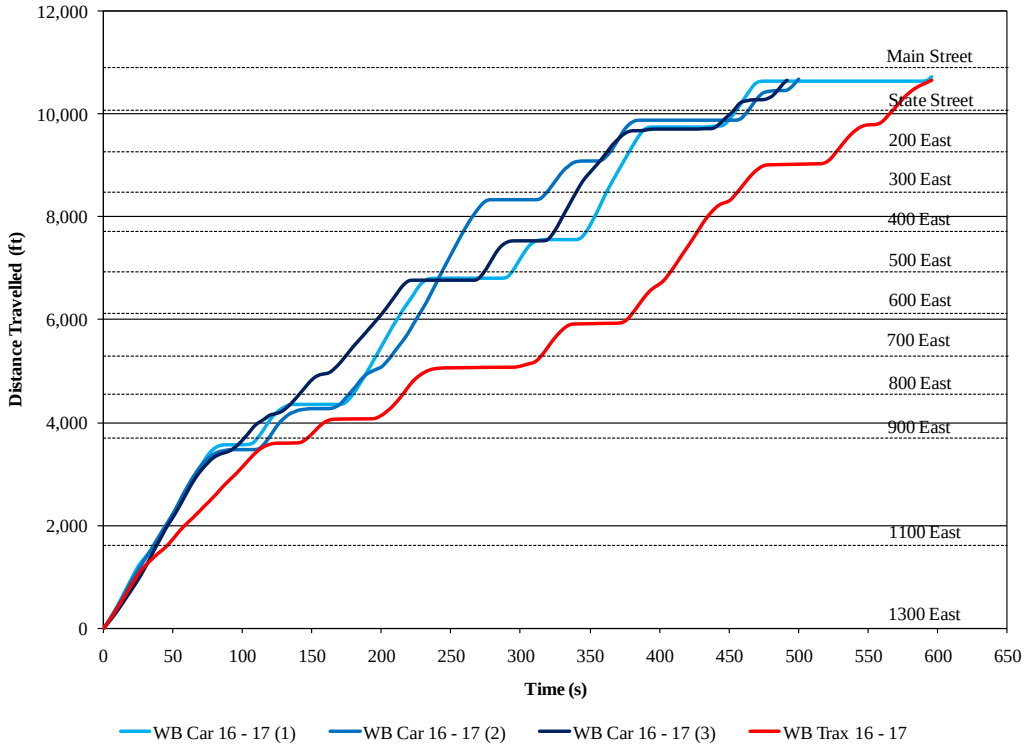
September 09, 2008, PM Peak Eastbound



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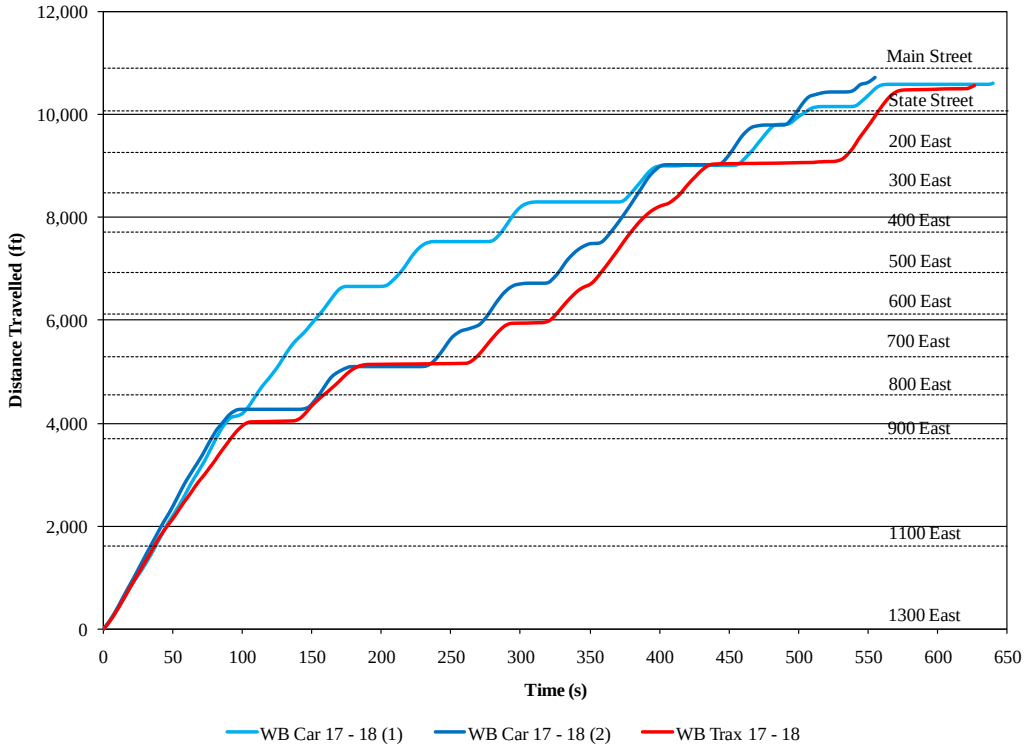

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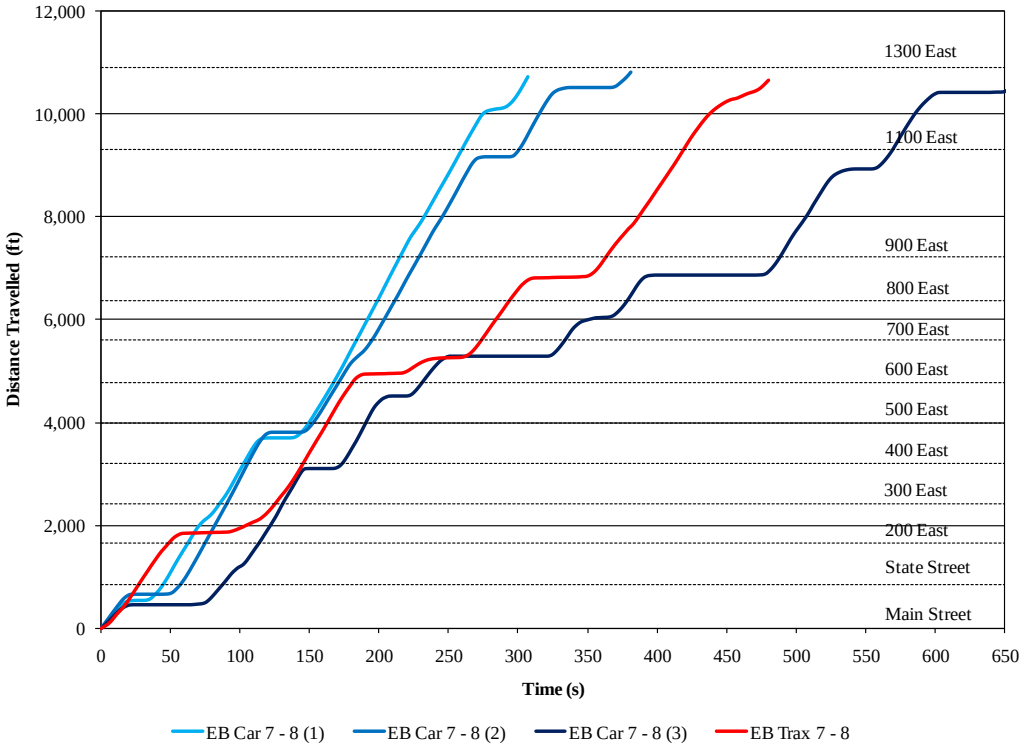
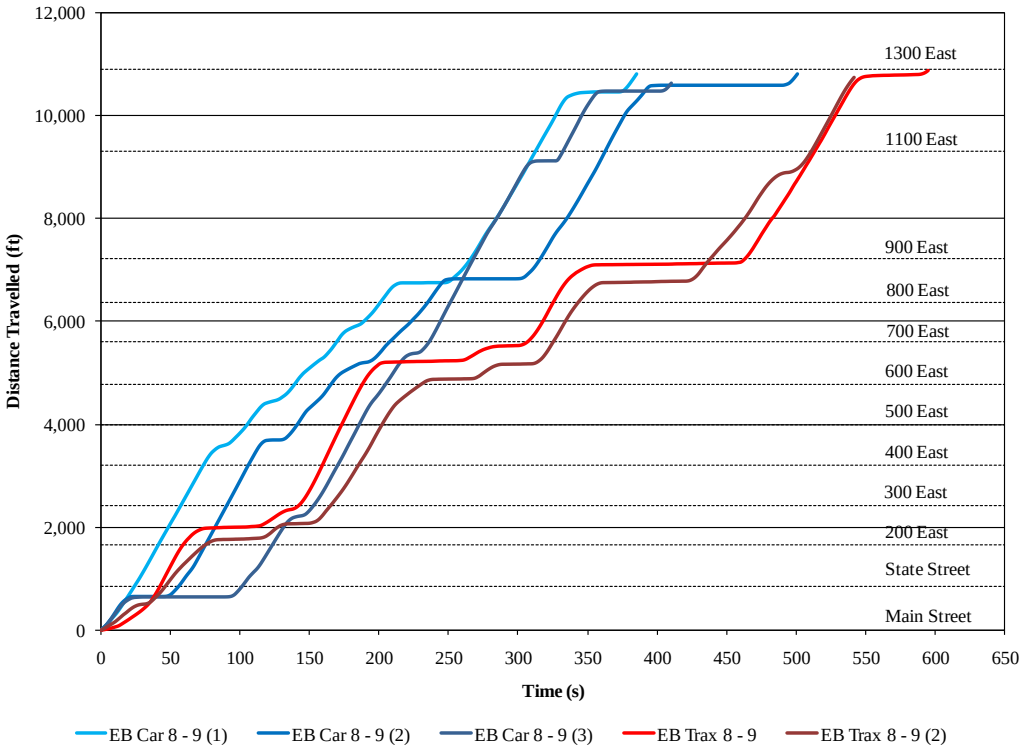
September 09, 2008, PM Peak Westbound

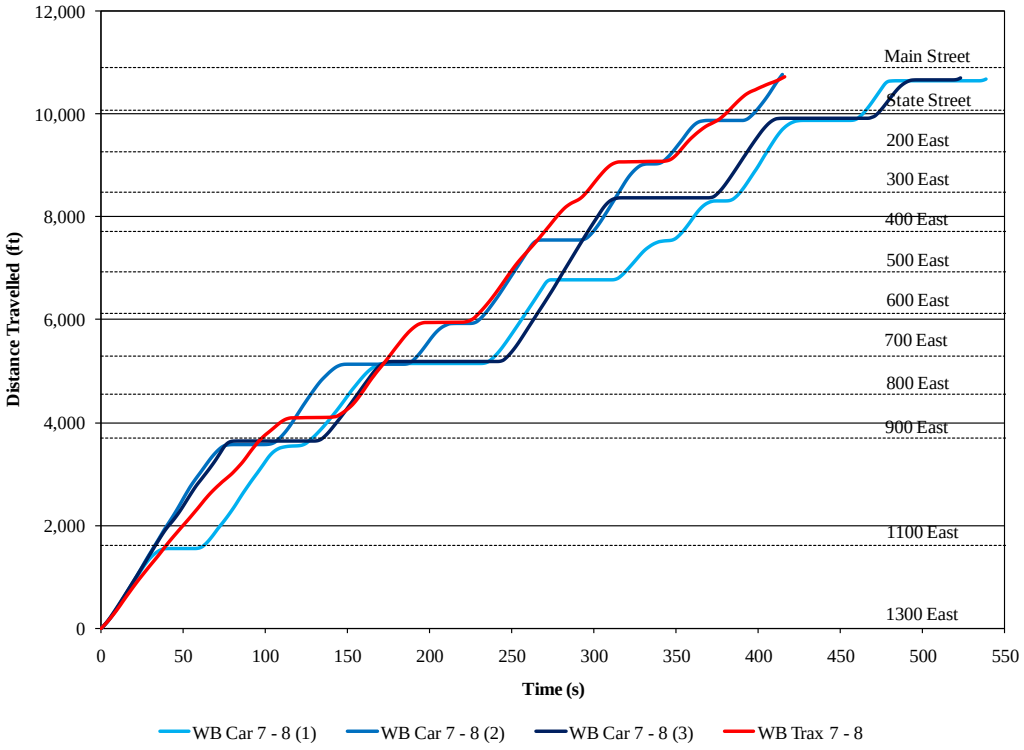


a) Eastbound 7 AM – 8 AM

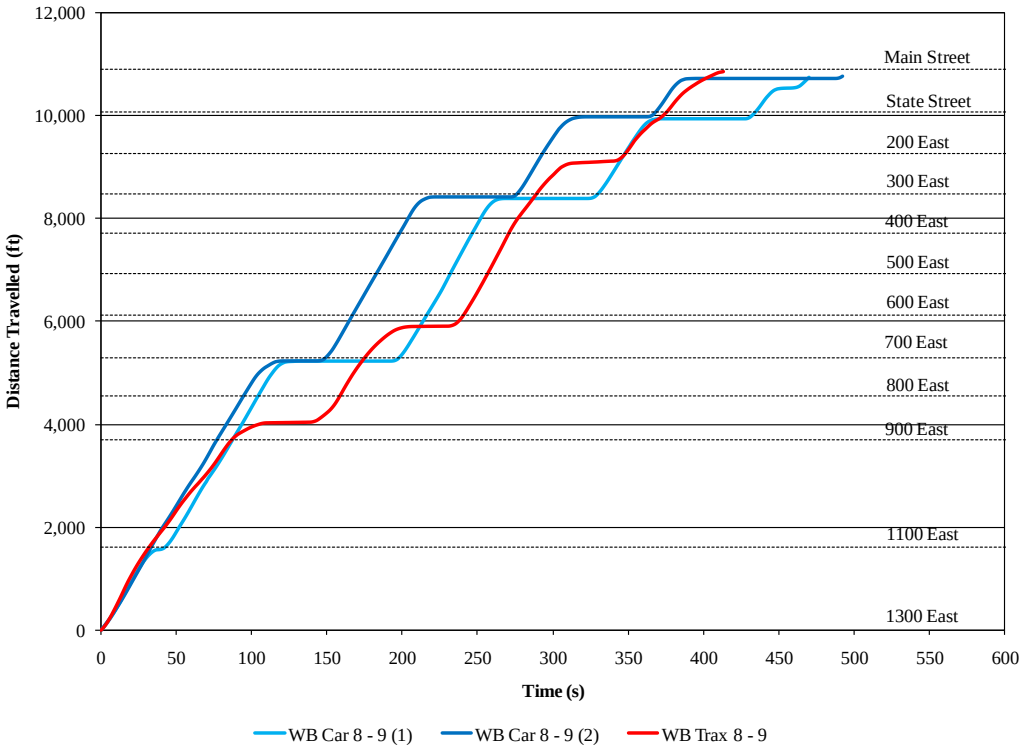


b) Eastbound 8 AM – 9 AM

September 10, 2008, AM Peak Eastbound

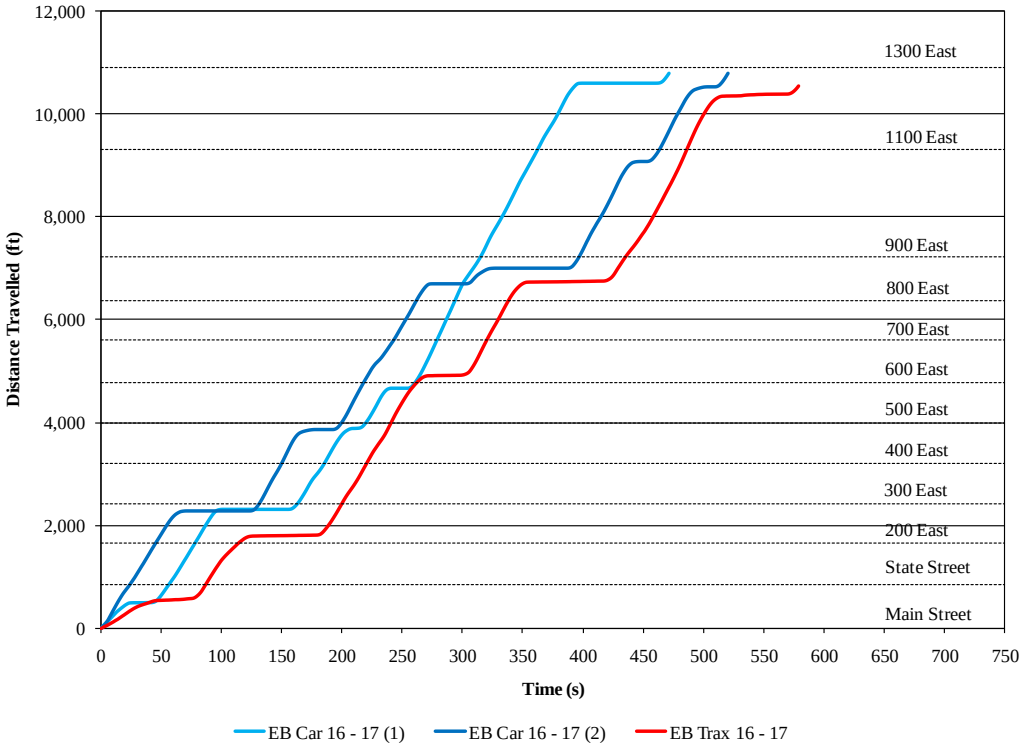


a) Westbound 7 AM – 8 AM



b) Westbound 8 AM – 9 AM

September 10, 2008, AM Peak Westbound



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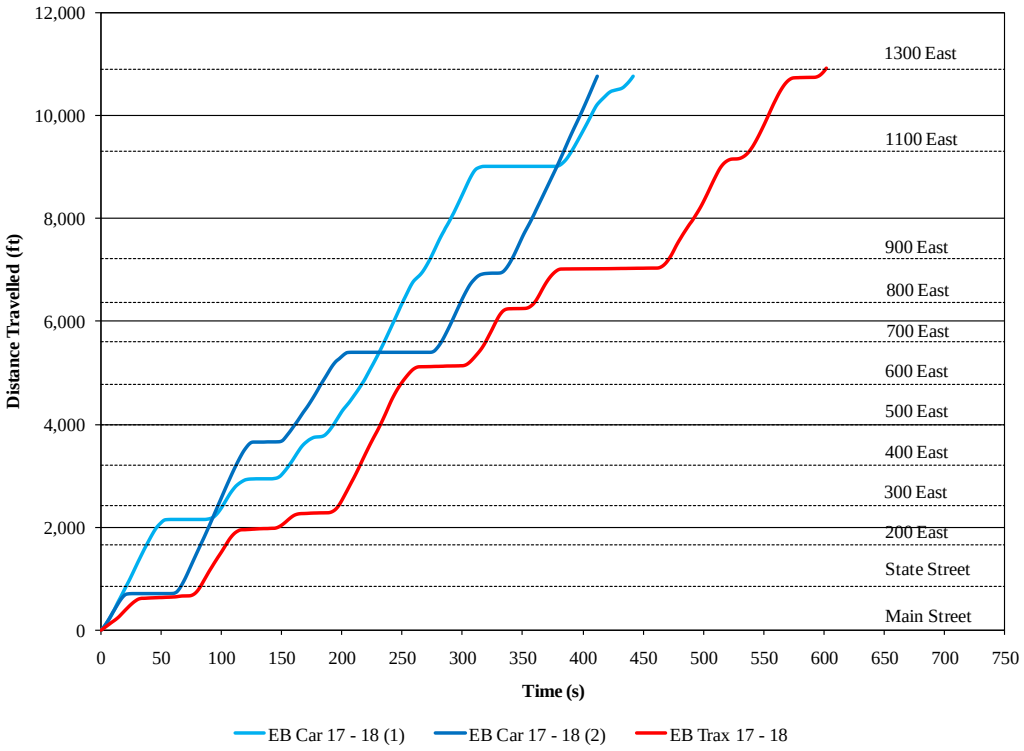

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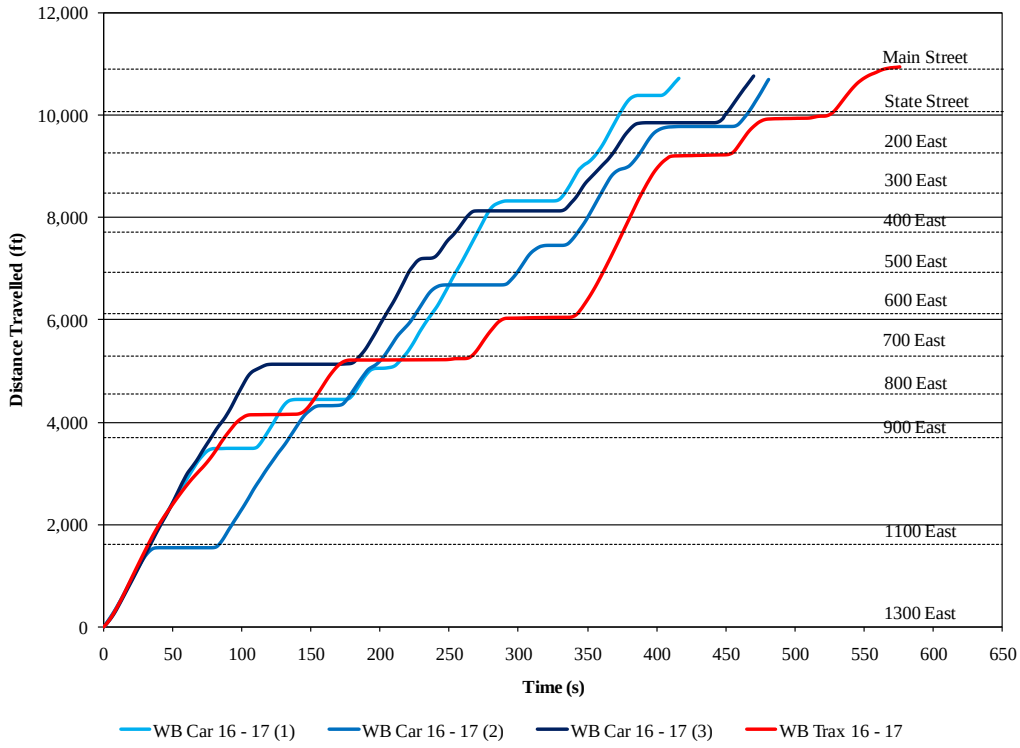
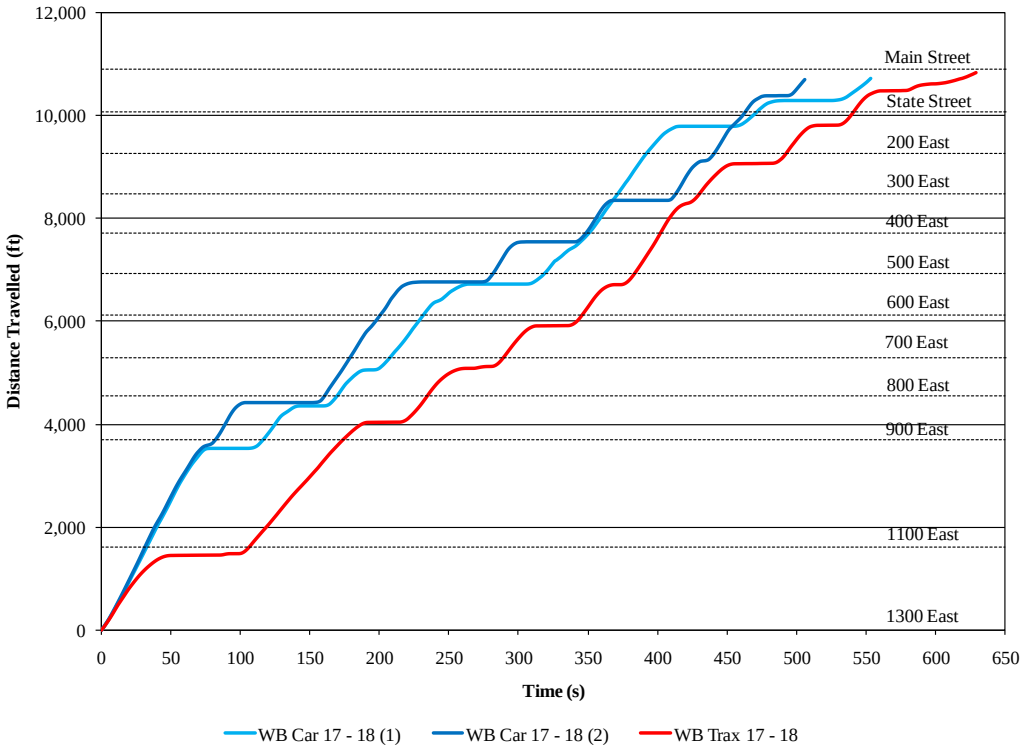
September 10, 2008, PM Peak Eastbound

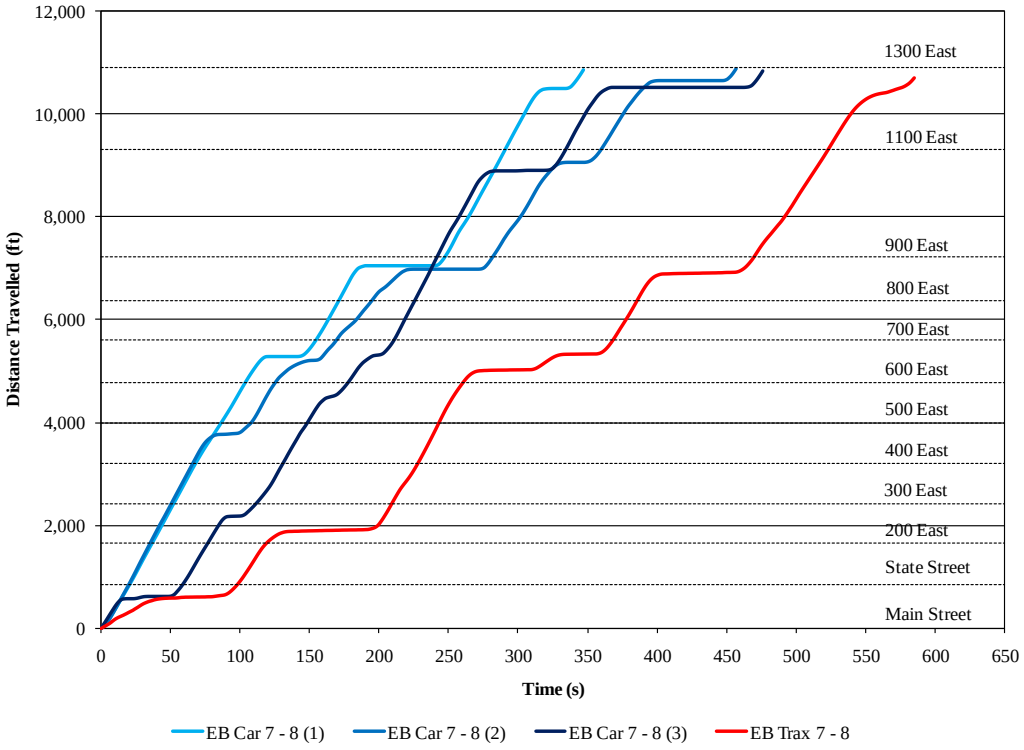


a) Westbound 4 PM – 5 PM

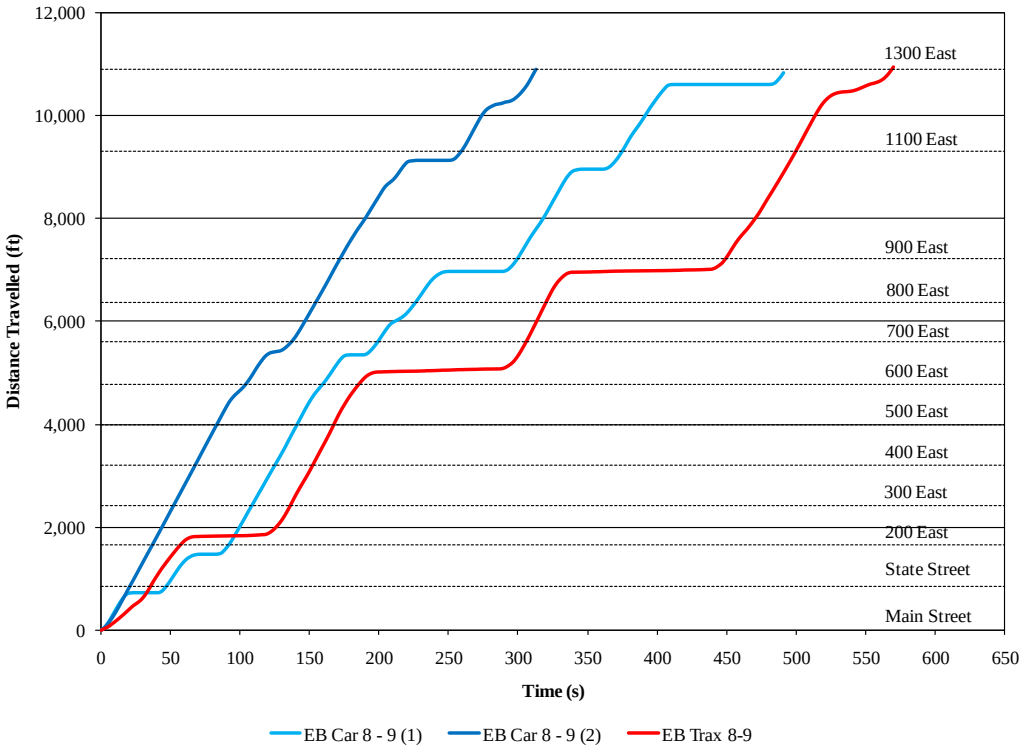


b) Westbound 5 PM – 6 PM

September 10, 2008, PM Peak Westbound

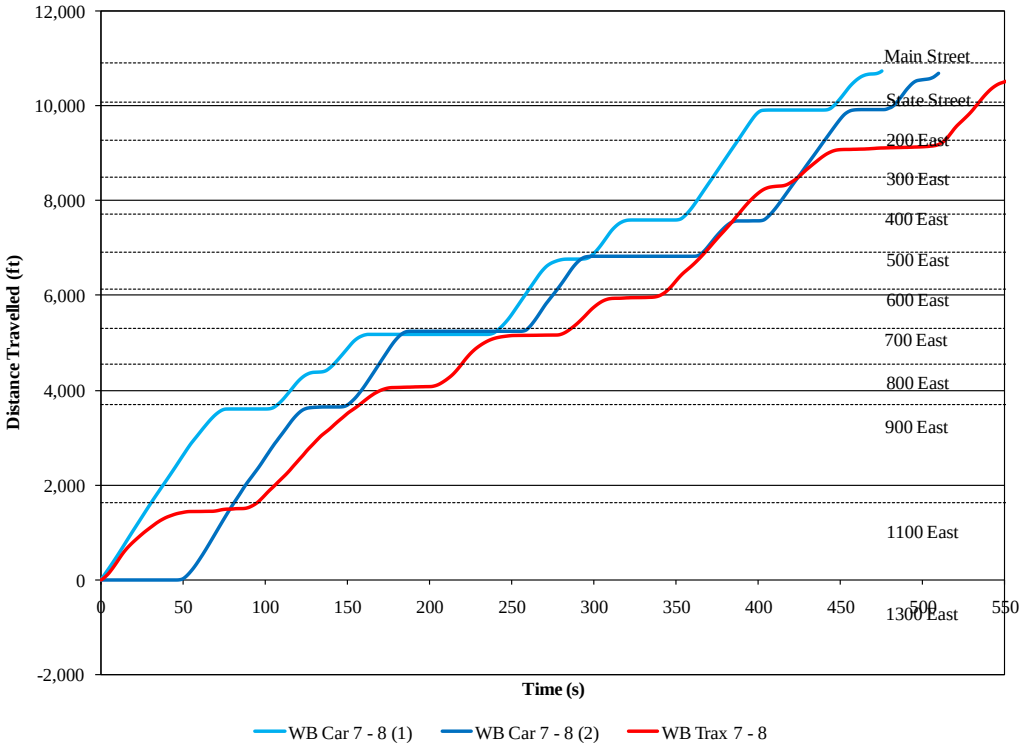


a) Eastbound 7 AM – 8 AM

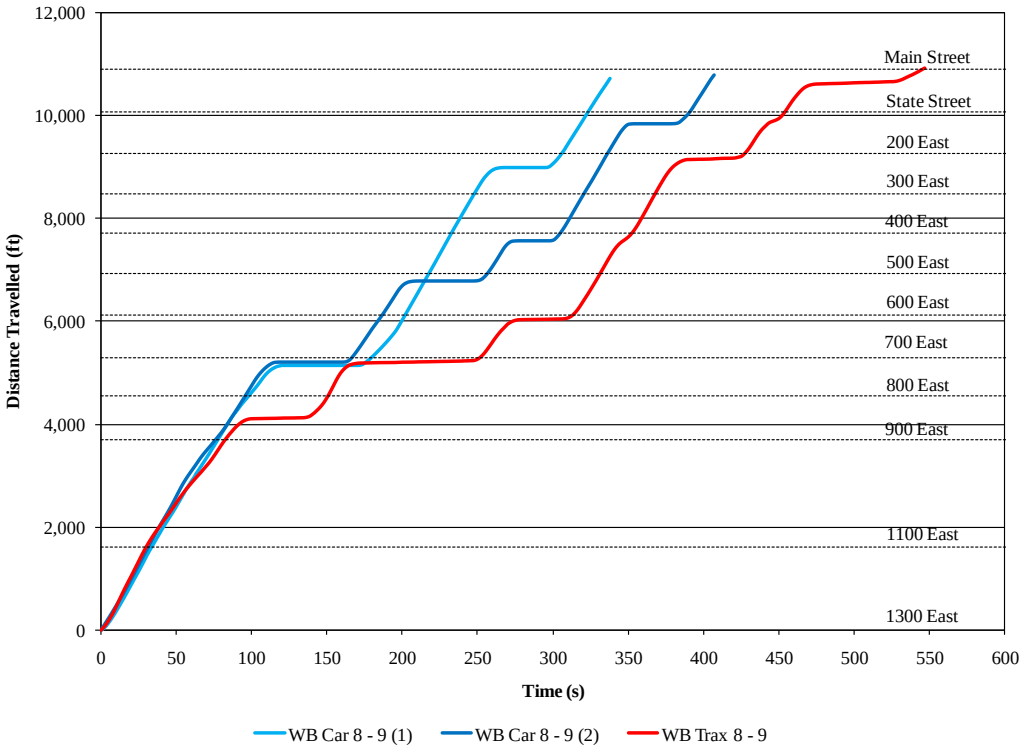


b) Eastbound 8 AM – 9 AM

September 11, 2008, AM Peak Eastbound

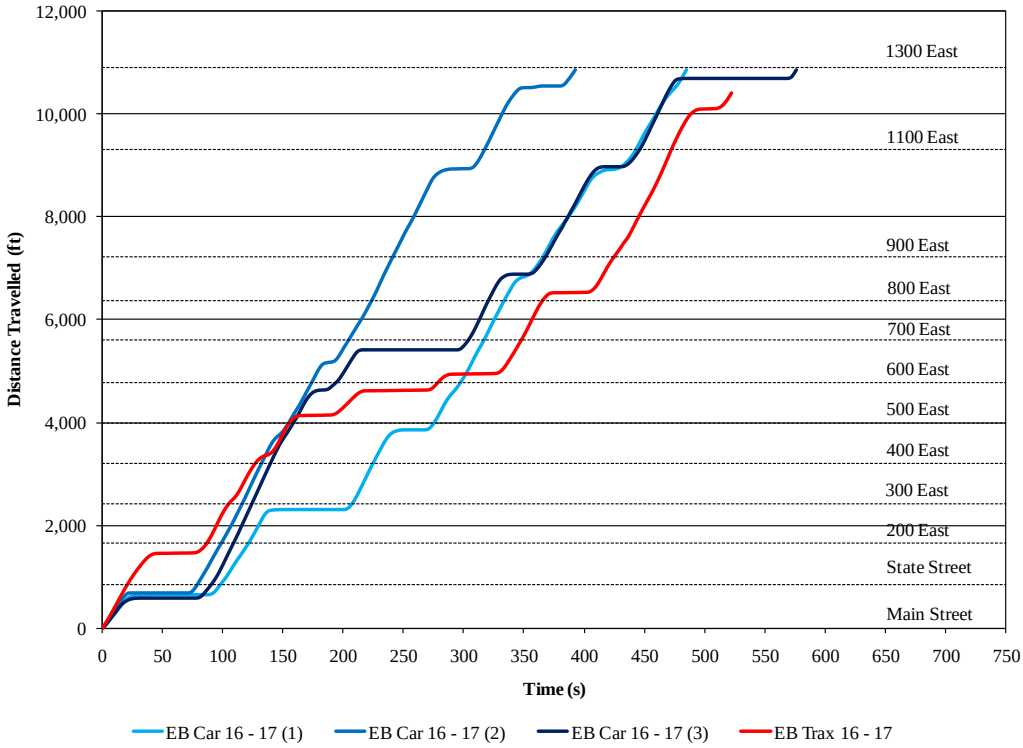


a) Westbound 7 AM – 8 AM

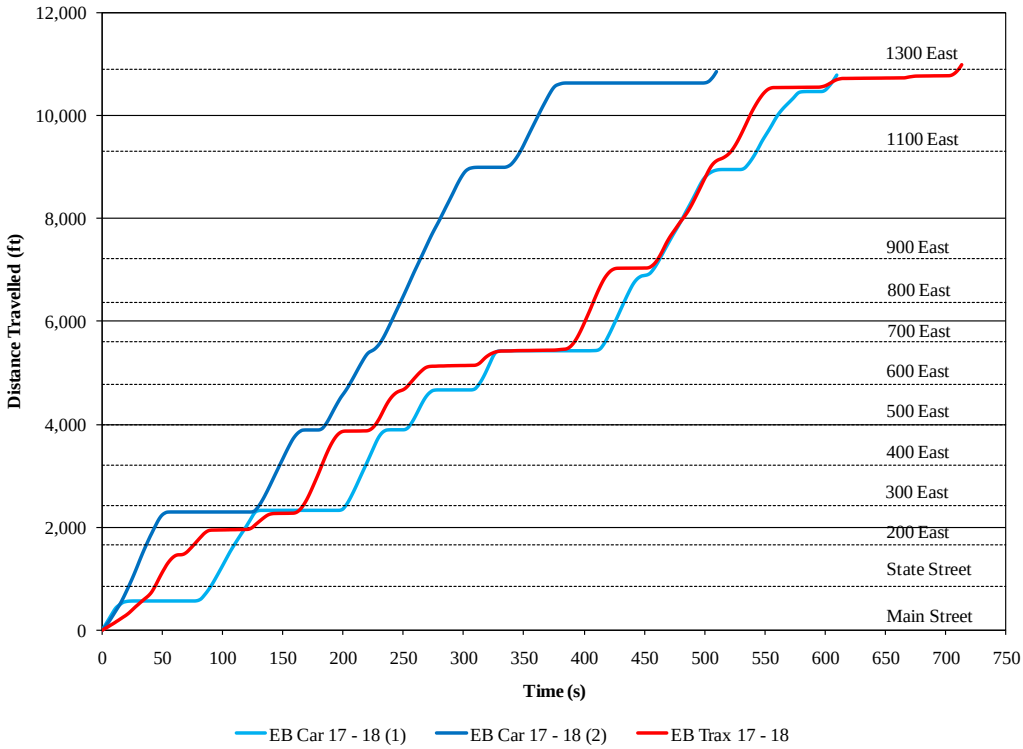


b) Westbound 8 AM – 9 AM

September 11, 2008, AM Peak Westbound

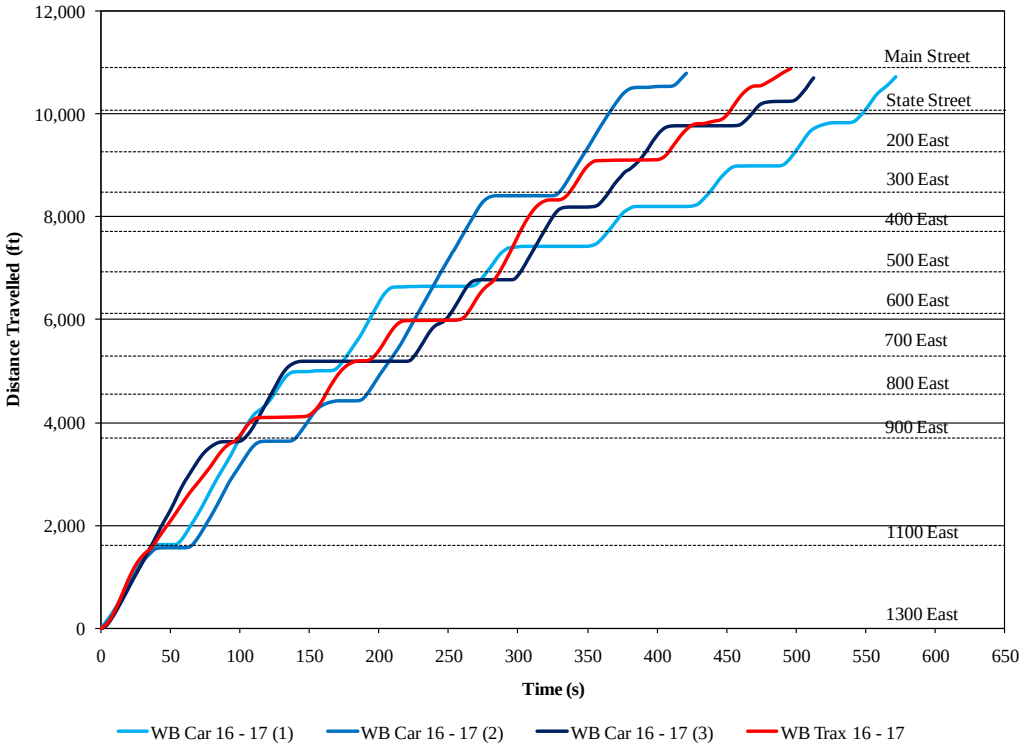


a) Eastbound 4 PM – 5 PM

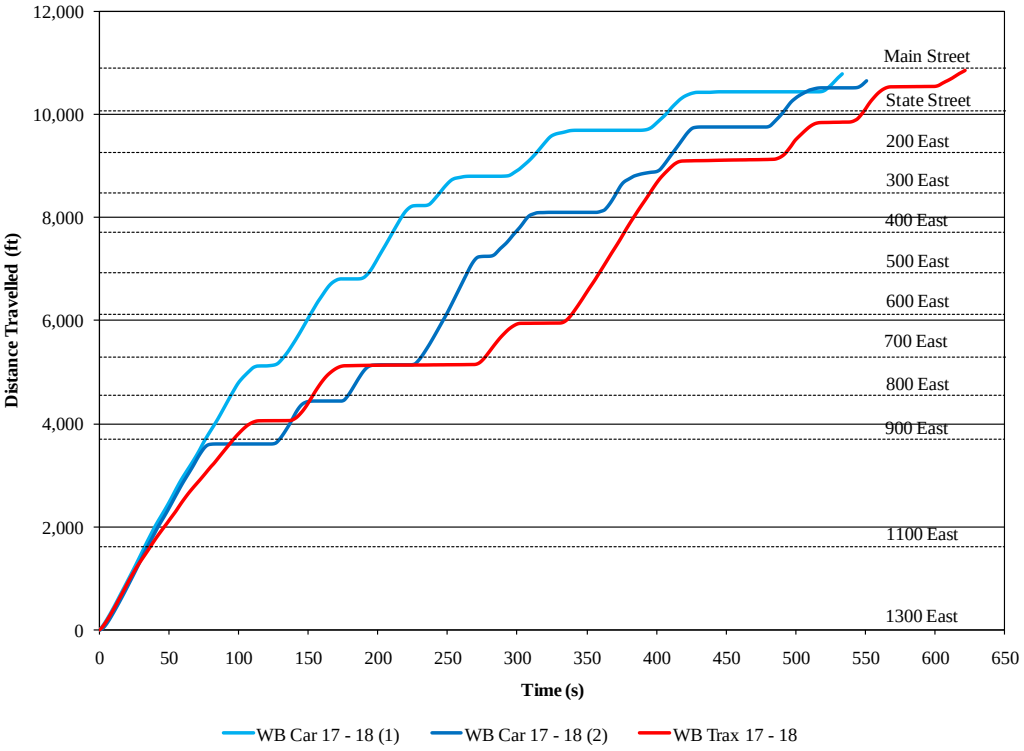


b) Eastbound 5 PM – 6 PM

September 11, 2008, PM Peak Eastbound



a) Westbound 4 PM – 5 PM



b) Westbound 5 PM – 6 PM

September 11, 2008, PM Peak Westbound

ANNEX 2. ARTERIAL SPEED AND LEVEL OF SERVICE

August 06, AM Peak, Eastbound

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	1	6:56:11			
State St.	1	6:57:13	0.158	9.2	F
200 E	1	6:57:37	0.154	23.0	C
300 E	1	6:57:53	0.147	33.1	A
400 E	1	6:58:09	0.147	33.1	A
500 E	1	6:58:51	0.149	12.8	E
600 E	1	6:59:19	0.150	19.3	C
700 E	1	6:59:46	0.158	21.1	C
800 E	1	7:00:04	0.144	28.7	B
900 E	1	7:00:20	0.160	36.1	A
1100 E	1	7:01:06	0.394	30.9	A
1300 E	1	7:01:40	0.305	32.3	A
		Total:	**2.067**	**22.6**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	3	7:16:38			
State St.	3	7:17:20	0.158	13.5	E
200 E	3	7:17:38	0.154	30.7	A
300 E	3	7:17:52	0.147	37.8	A
400 E	3	7:18:07	0.147	35.3	A
500 E	3	7:18:49	0.149	12.8	E
600 E	3	7:19:28	0.150	13.8	E
700 E	3	7:19:54	0.158	21.9	C
800 E	3	7:20:12	0.144	28.7	B
900 E	3	7:20:29	0.160	34.0	A
1100 E	3	7:21:33	0.394	22.2	C
1300 E	3	7:23:10	0.305	11.3	E
		Total:	**2.067**	**19.0**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	5	7:36:51			
State St.	5	7:37:26	0.158	16.3	D
200 E	5	7:37:42	0.154	34.6	A
300 E	5	7:37:58	0.147	33.1	A
400 E	5	7:38:37	0.147	13.6	E
500 E	5	7:39:02	0.149	21.5	C
600 E	5	7:39:32	0.150	18.0	C
700 E	5	7:39:54	0.158	25.9	B
800 E	5	7:40:12	0.144	28.7	B
900 E	5	7:40:29	0.160	34.0	A
1100 E	5	7:41:32	0.394	22.5	C
1300 E	5	7:43:02	0.305	12.2	E
		Total:	**2.067**	**20.1**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	7	8:01:34			
State St.	7	8:01:54	0.158	28.4	B
200 E	7	8:02:11	0.154	32.5	A
300 E	7	8:02:27	0.147	33.1	A
400 E	7	8:02:42	0.147	35.3	A
500 E	7	8:03:20	0.149	14.2	D
600 E	7	8:03:38	0.150	30.0	A
700 E	7	8:04:13	0.158	16.3	D
800 E	7	8:04:33	0.144	25.8	B
900 E	7	8:05:48	0.160	7.7	F
1100 E	7	8:07:19	0.394	15.6	D
1300 E	7	8:08:55	0.305	11.4	E
		Total:	**2.067**	**16.9**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	9	8:24:52			
State St.	9	8:25:28	0.158	15.8	D
200 E	9	8:25:49	0.154	26.3	B
300 E	9	8:26:07	0.147	29.4	B
400 E	9	8:26:25	0.147	29.4	B
500 E	9	8:27:29	0.149	8.4	F
600 E	9	8:27:55	0.150	20.8	C
700 E	9	8:29:52	0.158	4.9	F
800 E	9	8:30:09	0.144	30.4	A
900 E	9	8:30:25	0.160	36.1	A
1100 E	9	8:31:10	0.394	31.5	A
1300 E	9	8:32:44	0.305	11.7	E
		Total:	**2.067**	**15.8**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	11	8:47:19			
State St.	11	8:47:37	0.158	31.6	A
200 E	11	8:47:56	0.154	29.1	B
300 E	11	8:48:13	0.147	31.2	A
400 E	11	8:48:30	0.147	31.1	A
500 E	11	8:49:02	0.149	16.8	D
600 E	11	8:49:26	0.150	22.5	C
700 E	11	8:49:52	0.158	21.9	C
800 E	11	8:50:09	0.144	30.4	A
900 E	11	8:50:25	0.160	36.1	A
1100 E	11	8:51:10	0.394	31.5	A
1300 E	11	8:53:08	0.305	9.3	F
		Total:	**2.067**	**21.3**	**C**

August 06, AM Peak, Westbound

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	2	7:06:48			
1100 E	2	7:07:18	0.305	36.6	A
900 E	2	7:08:00	0.394	33.8	A
800 E	2	7:08:16	0.160	36.0	A
700 E	2	7:09:51	0.144	5.5	F
600 E	2	7:10:07	0.158	35.6	A
500 E	2	7:10:22	0.150	36.0	A
400 E	2	7:10:37	0.149	35.8	A
300 E	2	7:11:32	0.147	9.6	F
200 E	2	7:11:48	0.147	33.1	A
State St.	2	7:12:04	0.154	34.7	A
Main St.	2	7:12:21	0.158	33.5	A
		Total:	**2.066**	**22.3**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	4	7:26:34			
1100 E	4	7:27:38	0.305	17.2	D
900 E	4	7:28:40	0.394	22.9	C
800 E	4	7:28:58	0.160	32.0	A
700 E	4	7:29:50	0.144	10.0	E
600 E	4	7:30:07	0.158	33.5	A
500 E	4	7:30:51	0.150	12.3	E
400 E	4	7:31:56	0.149	8.3	F
300 E	4	7:32:13	0.147	31.1	A
200 E	4	7:32:28	0.147	35.3	A
State St.	4	7:33:09	0.154	13.5	E
Main St.	4	7:34:57	0.158	5.3	F
		Total:	**2.066**	**14.8**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	6	7:48:32			
1100 E	6	7:49:02	0.305	36.6	A
900 E	6	7:49:48	0.394	30.8	A
800 E	6	7:50:06	0.160	32.0	A
700 E	6	7:50:22	0.144	32.4	A
600 E	6	7:50:35	0.158	43.8	A
500 E	6	7:51:23	0.150	11.3	E
400 E	6	7:52:05	0.149	12.8	E
300 E	6	7:52:21	0.147	33.1	A
200 E	6	7:53:54	0.147	5.7	F
State St.	6	7:55:32	0.154	5.7	F
Main St.	6	7:56:22	0.158	11.4	E
		Total:	**2.066**	**15.8**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	8	8:15:00			
1100 E	8	8:15:31	0.305	35.4	A
900 E	8	8:16:14	0.394	33.0	A
800 E	8	8:16:30	0.160	36.0	A
700 E	8	8:17:49	0.144	6.6	F
600 E	8	8:18:04	0.158	37.9	A
500 E	8	8:18:19	0.150	36.0	A
400 E	8	8:18:35	0.149	33.5	A
300 E	8	8:19:50	0.147	7.1	F
200 E	8	8:20:06	0.147	33.1	A
State St.	8	8:21:31	0.154	6.5	F
Main St.	8	8:21:48	0.158	33.5	A
		Total:	**2.066**	**18.2**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	10	8:38:29			
1100 E	10	8:39:00	0.305	35.4	A
900 E	10	8:40:23	0.394	17.1	D
800 E	10	8:40:40	0.160	33.9	A
700 E	10	8:41:48	0.144	7.6	F
600 E	10	8:42:04	0.158	35.6	A
500 E	10	8:43:23	0.150	6.8	F
400 E	10	8:44:06	0.149	12.5	E
300 E	10	8:44:22	0.147	33.1	A
200 E	10	8:44:38	0.147	33.1	A
State St.	10	8:45:49	0.154	7.8	F
Main St.	10	8:46:06	0.158	33.5	A
		Total:	**2.066**	**16.3**	**D**

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	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	2	16:17:40			
State St.	2	16:18:26	0.158	12.4	E
200 E	2	16:18:51	0.154	22.1	C
300 E	2	16:19:08	0.147	31.2	A
400 E	2	16:19:24	0.147	33.1	A
500 E	2	16:19:59	0.149	15.4	D
600 E	2	16:20:20	0.150	25.7	B
700 E	2	16:22:03	0.158	5.5	F
800 E	2	16:22:21	0.144	28.7	B
900 E	2	16:22:38	0.160	34.0	A
1100 E	2	16:23:24	0.394	30.9	A
1300 E	2	16:25:32	0.305	8.6	F
		Total:	**2.067**	**15.8**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	4	16:41:38			
State St.	4	16:42:31	0.158	10.7	E
200 E	4	16:42:47	0.154	34.6	A
300 E	4	16:43:03	0.147	33.1	A
400 E	4	16:43:18	0.147	35.3	A
500 E	4	16:43:42	0.149	22.4	C
600 E	4	16:44:18	0.150	15.0	D
700 E	4	16:46:02	0.158	5.5	F
800 E	4	16:46:18	0.144	32.3	A
900 E	4	16:46:53	0.160	16.5	D
1100 E	4	16:47:55	0.394	22.9	C
1300 E	4	16:49:15	0.305	13.7	E
		Total:	**2.067**	**16.3**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	6	17:07:36			
State St.	6	17:08:46	0.158	8.1	F
200 E	6	17:09:02	0.154	34.6	A
300 E	6	17:09:17	0.147	35.3	A
400 E	6	17:09:35	0.147	29.4	B
500 E	6	17:10:00	0.149	21.5	C
600 E	6	17:10:49	0.150	11.0	E
700 E	6	17:12:21	0.158	6.2	F
800 E	6	17:12:39	0.144	28.7	B
900 E	6	17:13:24	0.160	12.8	E
1100 E	6	17:14:52	0.394	16.1	D
1300 E	6	17:16:15	0.305	13.2	E
		Total:	**2.067**	**14.3**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	8	17:34:08			
State St.	8	17:34:41	0.158	17.2	D
200 E	8	17:35:00	0.154	29.1	B
300 E	8	17:36:09	0.147	7.7	F
400 E	8	17:36:28	0.147	27.9	B
500 E	8	17:36:45	0.149	31.6	A
600 E	8	17:37:00	0.150	36.0	A
700 E	8	17:37:58	0.158	9.8	F
800 E	8	17:38:14	0.144	32.3	A
900 E	8	17:38:34	0.160	28.9	B
1100 E	8	17:40:08	0.394	15.1	D
1300 E	8	17:40:41	0.305	33.3	A
		Total:	**2.067**	**18.9**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	10	17:56:51			
State St.	10	17:58:24	0.158	6.1	F
200 E	10	17:59:21	0.154	9.7	F
300 E	10	18:00:27	0.147	8.0	F
400 E	10	18:00:54	0.147	19.6	C
500 E	10	18:01:38	0.149	12.2	E
600 E	10	18:01:54	0.150	33.8	A
700 E	10	18:02:09	0.158	38.0	A
800 E	10	18:02:26	0.144	30.4	A
900 E	10	18:02:42	0.160	36.1	A
1100 E	10	18:03:26	0.394	32.3	A
1300 E	10	18:05:00	0.305	11.7	E
		Total:	**2.067**	**15.2**	**D**

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	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	1	16:06:38			
1100 E	1	16:07:09	0.305	35.4	A
900 E	1	16:08:26	0.394	18.4	C
800 E	1	16:08:43	0.160	33.9	A
700 E	1	16:10:08	0.144	6.1	F
600 E	1	16:10:29	0.158	27.1	B
500 E	1	16:10:47	0.150	30.0	A
400 E	1	16:11:03	0.149	33.5	A
300 E	1	16:12:15	0.147	7.4	F
200 E	1	16:12:58	0.147	12.3	E
State St.	1	16:14:31	0.154	6.0	F
Main St.	1	16:15:49	0.158	7.3	F
		Total:	**2.066**	**13.5**	**E**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	3	16:31:14			
1100 E	3	16:31:46	0.305	34.3	A
900 E	3	16:32:39	0.394	26.8	B
800 E	3	16:33:36	0.160	10.1	E
700 E	3	16:34:09	0.144	15.7	D
600 E	3	16:34:27	0.158	31.6	A
500 E	3	16:34:44	0.150	31.8	A
400 E	3	16:35:00	0.149	33.5	A
300 E	3	16:36:35	0.147	5.6	F
200 E	3	16:37:04	0.147	18.2	C
State St.	3	16:38:37	0.154	6.0	F
Main St.	3	16:39:54	0.158	7.4	F
		Total:	**2.066**	**14.3**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	5	16:54:48			
1100 E	5	16:55:19	0.305	35.4	A
900 E	5	16:56:02	0.394	33.0	A
800 E	5	16:56:18	0.160	36.0	A
700 E	5	16:58:00	0.144	5.1	F
600 E	5	16:58:33	0.158	17.2	D
500 E	5	16:59:42	0.150	7.8	F
400 E	5	17:00:44	0.149	8.7	F
300 E	5	17:01:01	0.147	31.1	A
200 E	5	17:01:18	0.147	31.1	A
State St.	5	17:02:33	0.154	7.4	F
Main St.	5	17:03:05	0.158	17.8	D
		Total:	**2.066**	**15.0**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	7	17:21:16			
1100 E	7	17:21:46	0.305	36.6	A
900 E	7	17:22:28	0.394	33.8	A
800 E	7	17:22:45	0.160	33.9	A
700 E	7	17:24:04	0.144	6.6	F
600 E	7	17:24:20	0.158	35.6	A
500 E	7	17:25:30	0.150	7.7	F
400 E	7	17:26:30	0.149	8.9	F
300 E	7	17:26:47	0.147	31.1	A
200 E	7	17:27:02	0.147	35.3	A
State St.	7	17:28:40	0.154	5.7	F
Main St.	7	17:28:58	0.158	31.6	A
		Total:	**2.066**	**16.1**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	9	17:44:39			
1100 E	9	17:45:09	0.305	36.6	A
900 E	9	17:46:41	0.394	15.4	D
800 E	9	17:46:58	0.160	33.9	A
700 E	9	17:48:08	0.144	7.4	F
600 E	9	17:48:27	0.158	29.9	B
500 E	9	17:48:43	0.150	33.8	A
400 E	9	17:48:58	0.149	35.8	A
300 E	9	17:50:20	0.147	6.5	F
200 E	9	17:50:42	0.147	24.1	B
State St.	9	17:51:01	0.154	29.2	B
Main St.	9	17:52:15	0.158	7.7	F
		Total:	**2.066**	**16.3**	**D**

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	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	1	6:52:35			
State St.	1	6:53:51	0.158	7.5	F
200 E	1	6:54:12	0.154	26.4	B
300 E	1	6:54:29	0.147	31.1	A
400 E	1	6:56:02	0.147	5.7	F
500 E	1	6:56:55	0.149	10.1	E
600 E	1	6:57:27	0.150	16.9	D
700 E	1	6:57:58	0.158	18.3	C
800 E	1	6:58:13	0.144	34.6	A
900 E	1	6:58:30	0.160	33.9	A
1100 E	1	6:59:30	0.394	23.6	C
1300 E	1	7:00:32	0.305	17.4	D
		Total:	**2.066**	**15.6**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	3	7:15:53			
State St.	3	7:17:26	0.158	6.1	F
200 E	3	7:17:43	0.154	32.6	A
300 E	3	7:17:58	0.147	35.3	A
400 E	3	7:18:14	0.147	33.1	A
500 E	3	7:19:03	0.149	10.9	E
600 E	3	7:19:24	0.150	25.7	B
700 E	3	7:19:52	0.158	20.3	C
800 E	3	7:20:09	0.144	30.5	A
900 E	3	7:20:25	0.160	36.0	A
1100 E	3	7:21:27	0.394	22.9	C
1300 E	3	7:22:36	0.305	15.7	D
		Total:	**2.066**	**18.4**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	5	7:40:32			
State St.	5	7:41:48	0.158	7.5	F
200 E	5	7:42:06	0.154	30.8	A
300 E	5	7:42:22	0.147	33.1	A
400 E	5	7:42:38	0.147	33.1	A
500 E	5	7:42:58	0.149	26.8	B
600 E	5	7:43:16	0.150	30.0	B
700 E	5	7:44:06	0.158	11.4	E
800 E	5	7:44:24	0.144	28.8	B
900 E	5	7:44:43	0.160	30.3	A
1100 E	5	7:45:59	0.394	18.7	C
1300 E	5	7:46:39	0.305	26.8	B
		Total:	**2.066**	**20.2**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	7	8:02:36			
State St.	7	8:03:46	0.158	8.1	F
200 E	7	8:04:06	0.154	27.7	B
300 E	7	8:04:22	0.147	33.1	A
400 E	7	8:04:39	0.147	31.1	A
500 E	7	8:05:04	0.149	21.5	C
600 E	7	8:05:22	0.150	30.0	B
700 E	7	8:06:01	0.158	14.6	D
800 E	7	8:06:18	0.144	30.5	A
900 E	7	8:06:34	0.160	36.0	A
1100 E	7	8:07:19	0.394	31.5	A
1300 E	7	8:07:46	0.305	39.2	A
		Total:	**2.066**	**23.9**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	9	8:22:28			
State St.	9	8:23:16	0.158	11.9	E
200 E	9	8:23:37	0.154	26.4	B
300 E	9	8:24:05	0.147	18.9	C
400 E	9	8:24:34	0.147	18.2	C
500 E	9	8:25:23	0.149	10.9	E
600 E	9	8:25:41	0.150	30.0	B
700 E	9	8:25:59	0.158	31.6	A
800 E	9	8:26:15	0.144	32.4	A
900 E	9	8:26:34	0.160	30.3	A
1100 E	9	8:27:18	0.394	32.2	A
1300 E	9	8:29:00	0.305	10.7	E
		Total:	**2.066**	**18.9**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	11	8:45:16			
State St.	11	8:45:45	0.158	19.6	C
200 E	11	8:46:26	0.154	13.5	E
300 E	11	8:46:44	0.147	29.4	B
400 E	11	8:47:01	0.147	31.1	A
500 E	11	8:47:31	0.149	17.9	D
600 E	11	8:47:51	0.150	27.0	B
700 E	11	8:48:14	0.158	24.7	B
800 E	11	8:48:31	0.144	30.5	A
900 E	11	8:49:58	0.160	6.6	F
1100 E	11	8:51:17	0.394	18.0	D
1300 E	11	8:52:46	0.305	12.2	E
		Total:	**2.066**	**16.5**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	13	9:05:30			
State St.	13	9:06:58	0.158	6.5	F
200 E	13	9:07:17	0.154	29.2	B
300 E	13	9:07:33	0.147	33.1	A
400 E	13	9:08:07	0.147	15.6	D
500 E	13	9:09:29	0.149	6.5	F
600 E	13	9:09:46	0.150	31.8	A
700 E	13	9:11:32	0.158	5.4	F
800 E	13	9:11:48	0.144	32.4	A
900 E	13	9:12:05	0.160	33.9	A
1100 E	13	9:13:02	0.394	24.9	B
1300 E	13	9:14:54	0.305	9.8	F
		Total:	**2.066**	**13.2**	**E**

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	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	2	7:08:29			
1100 E	2	7:09:03	0.305	32.3	A
900 E	2	7:09:45	0.394	33.8	A
800 E	2	7:10:02	0.160	33.9	A
700 E	2	7:10:18	0.144	32.4	A
600 E	2	7:10:35	0.158	33.5	A
500 E	2	7:10:56	0.150	25.7	B
400 E	2	7:11:12	0.149	33.5	A
300 E	2	7:11:45	0.147	16.0	D
200 E	2	7:12:02	0.147	31.1	A
State St.	2	7:13:14	0.154	7.7	F
Main St.	2	7:13:31	0.158	31.6	A
		Total:	**2.066**	**24.5**	**B**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	4	7:28:32			
1100 E	4	7:29:04	0.305	34.3	A
900 E	4	7:29:45	0.394	34.6	A
800 E	4	7:30:01	0.160	36.0	A
700 E	4	7:30:16	0.144	34.6	A
600 E	4	7:30:32	0.158	35.6	A
500 E	4	7:31:11	0.150	13.8	E
400 E	4	7:31:27	0.149	33.5	A
300 E	4	7:31:43	0.147	33.1	A
200 E	4	7:32:07	0.147	22.1	C
State St.	4	7:33:38	0.154	6.1	F
Main St.	4	7:35:46	0.158	4.4	F
		Total:	**2.066**	**17.1**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	6	7:52:35			
1100 E	6	7:53:06	0.305	35.4	A
900 E	6	7:53:50	0.394	32.2	A
800 E	6	7:54:18	0.160	20.6	C
700 E	6	7:55:55	0.144	5.3	F
600 E	6	7:56:14	0.158	29.9	B
500 E	6	7:57:07	0.150	10.2	E
400 E	6	7:58:05	0.149	9.2	F
300 E	6	7:58:22	0.147	31.1	A
200 E	6	7:58:39	0.147	31.1	A
State St.	6	7:59:29	0.154	11.1	E
Main St.	6	7:59:45	0.158	33.5	A
		Total:	**2.066**	**17.3**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	8	8:12:32			
1100 E	8	8:13:15	0.305	25.5	B
900 E	8	8:14:15	0.394	23.6	C
800 E	8	8:14:32	0.160	33.9	A
700 E	8	8:15:53	0.144	6.4	F
600 E	8	8:16:09	0.158	35.6	A
500 E	8	8:17:00	0.150	10.6	E
400 E	8	8:18:13	0.149	7.3	F
300 E	8	8:18:29	0.147	33.1	A
200 E	8	8:19:49	0.147	6.6	F
State St.	8	8:20:06	0.154	32.6	A
Main St.	8	8:20:20	0.158	37.9	A
		Total:	**2.066**	**15.9**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	10	8:34:26			
1100 E	10	8:34:56	0.305	36.6	A
900 E	10	8:36:04	0.394	20.9	C
800 E	10	8:36:24	0.160	28.8	B
700 E	10	8:37:59	0.144	5.5	F
600 E	10	8:38:18	0.158	29.9	B
500 E	10	8:39:20	0.150	8.7	F
400 E	10	8:40:32	0.149	7.5	F
300 E	10	8:40:47	0.147	35.3	A
200 E	10	8:41:54	0.147	7.9	F
State St.	10	8:42:11	0.154	32.6	A
Main St.	10	8:43:23	0.158	7.8	F
		Total:	**2.066**	**13.8**	**E**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	12	8:58:29			
1100 E	12	8:59:17	0.305	22.9	C
900 E	12	9:00:08	0.394	27.8	B
800 E	12	9:00:26	0.160	32.0	A
700 E	12	9:01:52	0.144	6.0	F
600 E	12	9:02:09	0.158	33.5	A
500 E	12	9:02:24	0.150	36.0	A
400 E	12	9:02:39	0.149	35.8	A
300 E	12	9:02:54	0.147	35.3	A
200 E	12	9:03:08	0.147	37.8	A
State St.	12	9:03:53	0.154	12.3	E
Main St.	12	9:04:07	0.158	37.9	A
		Total:	**2.066**	**21.9**	**C**

August 07, PM Peak, Eastbound

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	2	16:15:39			
State St.	2	16:16:20	0.158	13.9	E
200 E	2	16:16:53	0.154	16.8	D
300 E	2	16:17:12	0.147	27.9	B
400 E	2	16:17:29	0.147	31.1	A
500 E	2	16:17:48	0.149	28.2	B
600 E	2	16:18:05	0.150	31.8	A
700 E	2	16:18:24	0.158	29.9	B
800 E	2	16:18:39	0.144	34.6	A
900 E	2	16:18:56	0.160	33.9	A
1100 E	2	16:19:48	0.394	27.3	B
1300 E	2	16:21:17	0.305	12.2	E
		Total:	**2.066**	**21.9**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	4	16:38:05			
State St.	4	16:38:38	0.158	17.2	E
200 E	4	16:38:57	0.154	29.2	B
300 E	4	16:40:19	0.147	6.5	F
400 E	4	16:41:03	0.147	12.0	E
500 E	4	16:41:45	0.149	12.8	E
600 E	4	16:42:43	0.150	9.3	F
700 E	4	16:44:14	0.158	6.3	F
800 E	4	16:44:30	0.144	32.4	A
900 E	4	16:44:47	0.160	33.9	A
1100 E	4	16:45:29	0.394	33.8	A
1300 E	4	16:47:10	0.305	10.8	E
		Total:	**2.066**	**13.6**	**E**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	6	17:04:03			
State St.	6	17:04:45	0.158	13.5	E
200 E	6	17:05:06	0.154	26.4	B
300 E	6	17:06:23	0.147	6.9	F
400 E	6	17:06:39	0.147	33.1	A
500 E	6	17:07:43	0.149	8.4	F
600 E	6	17:08:02	0.150	28.4	B
700 E	6	17:08:20	0.158	31.6	A
800 E	6	17:08:36	0.144	32.4	A
900 E	6	17:08:52	0.160	36.0	A
1100 E	6	17:10:23	0.394	15.6	D
1300 E	6	17:11:16	0.305	20.3	C
		Total:	**2.066**	**17.1**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	8	17:25:36			
State St.	8	17:26:38	0.158	9.2	F
200 E	8	17:26:56	0.154	30.8	A
300 E	8	17:27:12	0.147	33.1	A
400 E	8	17:28:49	0.147	5.5	F
500 E	8	17:29:32	0.149	12.5	E
600 E	8	17:30:19	0.150	11.5	E
700 E	8	17:32:10	0.158	5.1	F
800 E	8	17:32:27	0.144	30.5	A
900 E	8	17:32:44	0.160	33.9	A
1100 E	8	17:33:28	0.394	32.2	A
1300 E	8	17:35:08	0.305	10.9	E
		Total:	**2.066**	**13.0**	**E**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	10	17:51:46			
State St.	10	17:52:45	0.158	9.6	F
200 E	10	17:53:07	0.154	25.2	B
300 E	10	17:54:36	0.147	5.9	F
400 E	10	17:54:53	0.147	31.1	A
500 E	10	17:55:52	0.149	9.1	F
600 E	10	17:56:12	0.150	27.0	B
700 E	10	17:58:05	0.158	5.0	F
800 E	10	17:58:21	0.144	32.4	A
900 E	10	17:59:07	0.160	12.5	E
1100 E	10	18:00:01	0.394	26.3	B
1300 E	10	18:01:11	0.305	15.5	D
		Total:	**2.066**	**13.1**	**E**

August 07, PM Peak, Westbound

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	1	16:04:48			
1100 E	1	16:05:48	0.305	18.3	C
900 E	1	16:06:39	0.394	27.8	B
800 E	1	16:07:37	0.160	9.9	F
700 E	1	16:08:06	0.144	17.9	D
600 E	1	16:08:24	0.158	31.6	A
500 E	1	16:08:40	0.150	33.8	A
400 E	1	16:08:55	0.149	35.8	A
300 E	1	16:10:21	0.147	6.2	F
200 E	1	16:10:57	0.147	14.7	D
State St.	1	16:12:36	0.154	5.6	F
Main St.	1	16:13:51	0.158	7.5	F
		Total:	**2.066**	**13.7**	**E**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	3	16:25:49			
1100 E	3	16:26:19	0.305	36.6	A
900 E	3	16:27:01	0.394	33.8	A
800 E	3	16:27:32	0.160	18.6	C
700 E	3	16:28:15	0.144	12.1	E
600 E	3	16:29:19	0.158	8.9	F
500 E	3	16:29:50	0.150	17.4	D
400 E	3	16:30:48	0.149	9.2	F
300 E	3	16:31:04	0.147	33.1	A
200 E	3	16:31:29	0.147	21.2	C
State St.	3	16:32:29	0.154	9.2	F
Main St.	3	16:33:59	0.158	6.3	F
		Total:	**2.066**	**15.1**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	5	16:52:32			
1100 E	5	16:53:05	0.305	33.3	A
900 E	5	16:53:49	0.394	32.2	A
800 E	5	16:54:05	0.160	36.0	A
700 E	5	16:54:19	0.144	37.0	A
600 E	5	16:54:36	0.158	33.5	A
500 E	5	16:54:51	0.150	36.0	A
400 E	5	16:55:08	0.149	31.6	A
300 E	5	16:56:32	0.147	6.3	F
200 E	5	16:57:04	0.147	16.5	D
State St.	5	16:58:34	0.154	6.2	F
Main St.	5	16:59:36	0.158	9.0	F
		Total:	**2.066**	**17.5**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	7	17:16:41			
1100 E	7	17:17:22	0.305	26.8	B
900 E	7	17:18:51	0.394	15.9	D
800 E	7	17:19:35	0.160	13.1	E
700 E	7	17:20:01	0.144	19.9	C
600 E	7	17:20:22	0.158	27.1	B
500 E	7	17:20:40	0.150	30.0	B
400 E	7	17:20:55	0.149	35.8	A
300 E	7	17:22:06	0.147	7.5	F
200 E	7	17:22:41	0.147	15.1	D
State St.	7	17:22:59	0.154	30.8	A
Main St.	7	17:24:00	0.158	9.2	F
		Total:	**2.066**	**16.9**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	9	17:39:17			
1100 E	9	17:39:51	0.305	32.3	A
900 E	9	17:41:15	0.394	16.9	D
800 E	9	17:42:11	0.160	10.3	E
700 E	9	17:42:28	0.144	30.5	A
600 E	9	17:42:48	0.158	28.4	B
500 E	9	17:43:57	0.150	7.8	F
400 E	9	17:45:10	0.149	7.3	F
300 E	9	17:46:28	0.147	6.8	F
200 E	9	17:47:05	0.147	14.3	D
State St.	9	17:48:34	0.154	6.2	F
Main St.	9	17:49:56	0.158	6.9	F
		Total:	**2.066**	**11.6**	**E**

September 09, AM Peak, Eastbound

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	1	7:02:30			
State St.	1	7:03:15	0.158	12.6	E
200 E	1	7:03:32	0.154	32.5	A
300 E	1	7:03:51	0.147	27.9	B
400 E	1	7:04:08	0.147	31.1	A
500 E	1	7:05:03	0.149	9.8	F
600 E	1	7:05:21	0.150	30.0	A
700 E	1	7:05:48	0.158	21.1	C
800 E	1	7:06:06	0.144	28.7	B
900 E	1	7:06:22	0.160	36.1	A
1100 E	1	7:07:12	0.394	28.4	B
1300 E	1	7:07:42	0.305	36.6	A
		Total:	**2.067**	**23.8**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	3	7:21:14			
State St.	3	7:21:35	0.158	27.1	B
200 E	3	7:21:52	0.154	32.5	A
300 E	3	7:22:11	0.147	27.9	B
400 E	3	7:22:28	0.147	31.1	A
500 E	3	7:22:57	0.149	18.5	C
600 E	3	7:23:30	0.150	16.4	D
700 E	3	7:23:54	0.158	23.7	C
800 E	3	7:24:19	0.144	20.7	C
900 E	3	7:24:38	0.160	30.4	A
1100 E	3	7:25:24	0.394	30.9	A
1300 E	3	7:25:54	0.305	36.6	A
		Total:	**2.067**	**26.6**	**B**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	5	7:39:43			
State St.	5	7:40:05	0.158	25.9	B
200 E	5	7:40:21	0.154	34.6	A
300 E	5	7:40:36	0.147	35.3	A
400 E	5	7:40:52	0.147	33.1	A
500 E	5	7:41:08	0.149	33.6	A
600 E	5	7:41:55	0.150	11.5	E
700 E	5	7:43:51	0.158	4.9	F
800 E	5	7:44:14	0.144	22.5	C
900 E	5	7:44:32	0.160	32.1	A
1100 E	5	7:46:12	0.394	14.2	D
1300 E	5	7:49:15	0.305	6.0	F
		Total:	**2.067**	**13.0**	**E**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	7	8:03:24			
State St.	7	8:03:43	0.158	29.9	B
200 E	7	8:03:59	0.154	34.6	A
300 E	7	8:04:29	0.147	17.7	C
400 E	7	8:04:50	0.147	25.2	B
500 E	7	8:05:13	0.149	23.4	C
600 E	7	8:05:40	0.150	20.0	C
700 E	7	8:06:11	0.158	18.4	C
800 E	7	8:06:29	0.144	28.7	B
900 E	7	8:07:45	0.160	7.6	F
1100 E	7	8:08:28	0.394	33.0	A
1300 E	7	8:09:27	0.305	18.6	C
		Total:	**2.067**	**20.5**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	11	8:55:12			
State St.	11	8:55:59	0.158	12.1	E
200 E	11	8:56:22	0.154	24.0	C
300 E	11	8:56:44	0.147	24.1	B
400 E	11	8:57:05	0.147	25.2	B
500 E	11	8:57:28	0.149	23.4	C
600 E	11	8:58:01	0.150	16.4	D
700 E	11	8:58:21	0.158	28.5	B
800 E	11	8:58:37	0.144	32.3	A
900 E	11	8:59:49	0.160	8.0	F
1100 E	11	9:01:19	0.394	15.8	D
1300 E	11	9:03:34	0.305	8.1	F
		Total:	**2.067**	**14.8**	**D**

September 09, AM Peak, Westbound

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	2	7:12:51			
1100 E	2	7:14:05	0.305	14.8	D
900 E	2	7:15:27	0.394	17.3	D
800 E	2	7:15:45	0.160	32.0	A
700 E	2	7:16:00	0.144	34.6	A
600 E	2	7:16:15	0.158	37.9	A
500 E	2	7:17:06	0.150	10.6	E
400 E	2	7:17:25	0.149	28.2	B
300 E	2	7:17:51	0.147	20.4	C
200 E	2	7:18:38	0.147	11.3	E
State St.	2	7:19:14	0.154	15.4	D
Main St.	2	7:19:31	0.158	33.5	A
		Total:	**2.066**	**18.6**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	4	7:31:13			
1100 E	4	7:31:43	0.305	36.6	A
900 E	4	7:32:25	0.394	33.8	A
800 E	4	7:32:41	0.160	36.0	A
700 E	4	7:33:46	0.144	8.0	F
600 E	4	7:34:04	0.158	31.6	A
500 E	4	7:34:54	0.150	10.8	E
400 E	4	7:35:11	0.149	31.6	A
300 E	4	7:35:33	0.147	24.1	B
200 E	4	7:36:02	0.147	18.2	C
State St.	4	7:37:18	0.154	7.3	F
Main St.	4	7:37:35	0.158	33.5	A
		Total:	**2.066**	**19.5**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	6	7:54:15			
1100 E	6	7:54:47	0.305	34.3	A
900 E	6	7:55:53	0.394	21.5	C
800 E	6	7:56:46	0.160	10.9	E
700 E	6	7:57:58	0.144	7.2	F
600 E	6	7:58:15	0.158	33.5	A
500 E	6	7:59:30	0.150	7.2	F
400 E	6	7:59:51	0.149	25.5	B
300 E	6	8:00:07	0.147	33.1	A
200 E	6	8:00:22	0.147	35.3	A
State St.	6	8:01:27	0.154	8.5	F
Main St.	6	8:01:44	0.158	33.5	A
		Total:	**2.066**	**16.6**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	8	8:16:53			
1100 E	8	8:17:23	0.305	36.6	A
900 E	8	8:18:04	0.394	34.6	A
800 E	8	8:18:22	0.160	32.0	A
700 E	8	8:19:52	0.144	5.8	F
600 E	8	8:20:08	0.158	35.6	A
500 E	8	8:21:07	0.150	9.2	F
400 E	8	8:22:02	0.149	9.8	F
300 E	8	8:22:21	0.147	27.9	B
200 E	8	8:23:44	0.147	6.4	F
State St.	8	8:24:00	0.154	34.7	A
Main St.	8	8:24:17	0.158	33.5	A
		Total:	**2.066**	**16.8**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	10	8:45:05			
1100 E	10	8:45:37	0.305	34.3	A
900 E	10	8:46:18	0.394	34.6	A
800 E	10	8:46:34	0.160	36.0	A
700 E	10	8:47:52	0.144	6.6	F
600 E	10	8:48:09	0.158	33.5	A
500 E	10	8:49:03	0.150	10.0	E
400 E	10	8:49:49	0.149	11.7	E
300 E	10	8:50:05	0.147	33.1	A
200 E	10	8:50:21	0.147	33.1	A
State St.	10	8:51:44	0.154	6.7	F
Main St.	10	8:52:42	0.158	9.8	F
		Total:	**2.066**	**16.3**	**D**

September 09, PM Peak, Eastbound

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	2	16:09:49			
State St.	2	16:10:27	0.158	15.0	D
200 E	2	16:10:46	0.154	29.1	B
300 E	2	16:11:01	0.147	35.3	A
400 E	2	16:11:18	0.147	31.1	A
500 E	2	16:11:46	0.149	19.2	C
600 E	2	16:12:07	0.150	25.7	B
700 E	2	16:12:24	0.158	33.5	A
800 E	2	16:12:41	0.144	30.4	A
900 E	2	16:13:27	0.160	12.6	E
1100 E	2	16:14:12	0.394	31.5	A
1300 E	2	16:15:12	0.305	18.3	C
		Total:	**2.067**	**23.0**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	4	16:30:39			
State St.	4	16:30:57	0.158	31.6	A
200 E	4	16:31:13	0.154	34.6	A
300 E	4	16:31:27	0.147	37.8	A
400 E	4	16:31:42	0.147	35.3	A
500 E	4	16:32:00	0.149	29.9	B
600 E	4	16:32:26	0.150	20.8	C
700 E	4	16:34:08	0.158	5.6	F
800 E	4	16:34:25	0.144	30.4	A
900 E	4	16:35:01	0.160	16.0	D
1100 E	4	16:36:15	0.394	19.2	C
1300 E	4	16:37:18	0.305	17.4	D
		Total:	**2.067**	**18.6**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	6	16:53:52			
State St.	6	16:54:54	0.158	9.2	F
200 E	6	16:55:16	0.154	25.1	B
300 E	6	16:56:18	0.147	8.5	F
400 E	6	16:57:09	0.147	10.4	E
500 E	6	16:57:41	0.149	16.8	D
600 E	6	16:58:36	0.150	9.8	F
700 E	6	17:00:09	0.158	6.1	F
800 E	6	17:00:27	0.144	28.7	B
900 E	6	17:00:56	0.160	**19.9**	C
1100 E	6	17:01:44	0.394	29.6	B
1300 E	6	17:03:09	0.305	12.9	E
		Total:	**2.067**	**13.4**	**E**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	8	17:23:44			
State St.	8	17:24:24	0.158	14.2	D
200 E	8	17:24:56	0.154	17.3	D
300 E	8	17:25:14	0.147	29.4	B
400 E	8	17:25:31	0.147	31.1	A
500 E	8	17:25:55	0.149	22.4	C
600 E	8	17:26:28	0.150	16.4	D
700 E	8	17:28:08	0.158	5.7	F
800 E	8	17:28:26	0.144	28.7	B
900 E	8	17:28:43	0.160	34.0	A
1100 E	8	17:29:24	0.394	34.6	A
1300 E	8	17:31:14	0.305	10.0	E
		Total:	**2.067**	**16.5**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	10	17:50:53			
State St.	10	17:52:31	0.158	5.8	F
200 E	10	17:52:51	0.154	27.6	B
300 E	10	17:53:11	0.147	26.5	B
400 E	10	17:53:30	0.147	27.9	B
500 E	10	17:54:03	0.149	16.3	D
600 E	10	17:54:25	0.150	24.5	C
700 E	10	17:56:08	0.158	5.5	F
800 E	10	17:56:28	0.144	25.8	B
900 E	10	17:57:27	0.160	9.8	F
1100 E	10	17:58:12	0.394	31.5	A
1300 E	10	17:58:43	0.305	35.4	A
		Total:	**2.067**	**15.8**	**D**

September 09, PM Peak, Westbound

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	1	15:57:02			
1100 E	1	15:57:37	0.305	31.4	A
900 E	1	15:58:52	0.394	18.9	C
800 E	1	16:00:00	0.160	8.5	F
700 E	1	16:00:17	0.144	30.5	A
600 E	1	16:00:34	0.158	33.5	A
500 E	1	16:01:53	0.150	6.8	F
400 E	1	16:02:46	0.149	10.1	E
300 E	1	16:03:02	0.147	33.1	A
200 E	1	16:03:18	0.147	33.1	A
State St.	1	16:04:34	0.154	7.3	F
Main St.	1	16:06:58	0.158	4.0	F
		Total:	**2.066**	**12.5**	**E**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	3	16:20:47			
1100 E	3	16:21:21	0.305	32.3	A
900 E	3	16:22:44	0.394	17.1	D
800 E	3	16:23:41	0.160	10.1	E
700 E	3	16:24:13	0.144	16.2	D
600 E	3	16:24:32	0.158	29.9	B
500 E	3	16:24:48	0.150	33.8	A
400 E	3	16:25:03	0.149	35.8	A
300 E	3	16:26:04	0.147	8.7	F
200 E	3	16:26:48	0.147	12.0	E
State St.	3	16:28:27	0.154	5.6	F
Main St.	3	16:29:07	0.158	14.2	D
		Total:	**2.066**	**14.9**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	5	16:43:14			
1100 E	5	16:43:51	0.305	29.7	B
900 E	5	16:44:53	0.394	22.9	C
800 E	5	16:45:31	0.160	15.2	D
700 E	5	16:46:06	0.144	14.8	D
600 E	5	16:46:31	0.158	22.8	C
500 E	5	16:47:44	0.150	7.4	F
400 E	5	16:48:34	0.149	10.7	E
300 E	5	16:48:51	0.147	31.1	A
200 E	5	16:49:12	0.147	25.2	B
State St.	5	16:50:41	0.154	6.2	F
Main St.	5	16:51:26	0.158	12.6	E
		Total:	**2.066**	**15.1**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	7	17:10:22			
1100 E	7	17:10:58	0.305	30.5	A
900 E	7	17:11:42	0.394	32.2	A
800 E	7	17:12:10	0.160	20.6	C
700 E	7	17:12:32	0.144	23.6	C
600 E	7	17:12:55	0.158	24.7	B
500 E	7	17:13:52	0.150	9.5	F
400 E	7	17:15:05	0.149	7.3	F
300 E	7	17:16:39	0.147	5.6	F
200 E	7	17:18:04	0.147	6.2	F
State St.	7	17:18:41	0.154	15.0	D
Main St.	7	17:21:02	0.158	4.0	F
		Total:	**2.066**	**11.6**	**E**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	9	17:40:14			
1100 E	9	17:40:47	0.305	33.3	A
900 E	9	17:41:30	0.394	33.0	A
800 E	9	17:42:47	0.160	7.5	F
700 E	9	17:44:14	0.144	6.0	F
600 E	9	17:44:49	0.158	16.3	D
500 E	9	17:45:38	0.150	11.0	E
400 E	9	17:46:15	0.149	14.5	D
300 E	9	17:46:37	0.147	24.1	B
200 E	9	17:47:42	0.147	8.1	F
State St.	9	17:48:30	0.154	11.6	E
Main St.	9	17:49:29	0.158	9.6	F
		Total:	**2.066**	**13.4**	**E**

September 10, AM Peak, Eastbound

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	1	6:48:52			
State St.	1	6:49:34	0.158	13.5	E
200 E	1	6:49:51	0.154	32.5	A
300 E	1	6:50:14	0.147	23.0	C
400 E	1	6:50:32	0.147	29.4	B
500 E	1	6:51:19	0.149	11.4	E
600 E	1	6:51:37	0.150	30.0	A
700 E	1	6:51:52	0.158	38.0	A
800 E	1	6:52:08	0.144	32.3	A
900 E	1	6:52:24	0.160	36.1	A
1100 E	1	6:53:08	0.394	32.3	A
1300 E	1	6:53:59	0.305	21.5	C
		Total:	**2.067**	**24.2**	**B**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	3	7:10:39			
State St.	3	7:11:35	0.158	10.2	E
200 E	3	7:11:53	0.154	30.7	A
300 E	3	7:12:08	0.147	35.3	A
400 E	3	7:12:24	0.147	33.1	A
500 E	3	7:13:11	0.149	11.4	E
600 E	3	7:13:29	0.150	30.0	A
700 E	3	7:13:52	0.158	24.8	B
800 E	3	7:14:09	0.144	30.4	A
900 E	3	7:14:26	0.160	34.0	A
1100 E	3	7:15:39	0.394	19.4	C
1300 E	3	7:17:00	0.305	13.6	E
		Total:	**2.067**	**19.5**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	5	7:34:35			
State St.	5	7:36:01	0.158	6.6	F
200 E	5	7:36:27	0.154	21.3	C
300 E	5	7:36:44	0.147	31.2	A
400 E	5	7:37:28	0.147	12.0	E
500 E	5	7:37:45	0.149	31.6	A
600 E	5	7:38:25	0.150	13.5	E
700 E	5	7:40:06	0.158	5.6	F
800 E	5	7:40:52	0.144	11.2	E
900 E	5	7:42:41	0.160	5.3	F
1100 E	5	7:44:02	0.394	17.5	D
1300 E	5	7:45:36	0.305	11.7	E
		Total:	**2.067**	**11.3**	**E**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	8	8:01:29			
State St.	8	8:01:52	0.158	24.7	B
200 E	8	8:02:09	0.154	32.5	A
300 E	8	8:02:25	0.147	33.1	A
400 E	8	8:02:42	0.147	31.1	A
500 E	8	8:03:14	0.149	16.8	D
600 E	8	8:03:48	0.150	15.9	D
700 E	8	8:04:17	0.158	19.6	C
800 E	8	8:04:49	0.144	16.1	D
900 E	8	8:05:53	0.160	9.0	F
1100 E	8	8:06:40	0.394	30.2	A
1300 E	8	8:07:54	0.305	14.8	D
		Total:	**2.067**	**19.3**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	10	8:24:44			
State St.	10	8:25:39	0.158	10.3	E
200 E	10	8:25:58	0.154	29.1	B
300 E	10	8:26:14	0.147	33.1	A
400 E	10	8:26:29	0.147	35.3	A
500 E	10	8:27:05	0.149	14.9	D
600 E	10	8:27:29	0.150	22.5	C
700 E	10	8:28:09	0.158	14.2	D
800 E	10	8:28:38	0.144	17.8	D
900 E	10	8:29:58	0.160	7.2	F
1100 E	10	8:30:45	0.394	30.2	A
1300 E	10	8:33:05	0.305	7.8	F
		Total:	**2.067**	**14.9**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	12	8:48:08			
State St.	12	8:49:49	0.158	5.6	F
200 E	12	8:50:10	0.154	26.3	B
300 E	12	8:50:40	0.147	17.7	D
400 E	12	8:50:58	0.147	29.4	B
500 E	12	8:51:13	0.149	35.9	A
600 E	12	8:51:32	0.150	28.4	B
700 E	12	8:52:03	0.158	18.4	C
800 E	12	8:52:18	0.144	34.4	A
900 E	12	8:52:34	0.160	36.1	A
1100 E	12	8:53:35	0.394	23.3	C
1300 E	12	8:54:58	0.305	13.2	E
		Total:	**2.067**	**18.1**	**C**

September 10, AM Peak, Westbound

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	2	6:59:39			
1100 E	2	7:00:41	0.305	17.7	D
900 E	2	7:01:46	0.394	21.8	C
800 E	2	7:02:08	0.160	26.2	B
700 E	2	7:03:38	0.144	5.8	F
600 E	2	7:03:55	0.158	33.5	A
500 E	2	7:04:55	0.150	9.0	F
400 E	2	7:05:30	0.149	15.3	D
300 E	2	7:06:06	0.147	14.7	D
200 E	2	7:06:22	0.147	33.1	A
State St.	2	7:07:21	0.154	9.4	F
Main St.	2	7:08:38	0.158	7.4	F
		Total:	**2.066**	**13.8**	**E**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	4	7:24:37			
1100 E	4	7:25:08	0.305	35.4	A
900 E	4	7:26:24	0.394	18.7	C
800 E	4	7:26:43	0.160	30.3	A
700 E	4	7:27:49	0.144	7.9	F
600 E	4	7:28:28	0.158	14.6	D
500 E	4	7:28:45	0.150	31.8	A
400 E	4	7:29:32	0.149	11.4	E
300 E	4	7:29:50	0.147	29.4	B
200 E	4	7:30:21	0.147	17.1	D
State St.	4	7:31:11	0.154	11.1	E
Main St.	4	7:31:32	0.158	27.1	B
		Total:	**2.066**	**17.9**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	6	7:49:39			
1100 E	6	7:50:11	0.305	34.3	A
900 E	6	7:51:52	0.394	14.0	D
800 E	6	7:52:13	0.160	27.4	B
700 E	6	7:53:45	0.144	5.6	F
600 E	6	7:54:02	0.158	33.5	A
500 E	6	7:54:18	0.150	33.8	A
400 E	6	7:54:33	0.149	35.8	A
300 E	6	7:55:53	0.147	6.6	F
200 E	6	7:56:10	0.147	31.1	A
State St.	6	7:57:31	0.154	6.8	F
Main St.	6	7:58:22	0.158	11.2	E
		Total:	**2.066**	**14.2**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	9	8:12:31			
1100 E	9	8:13:11	0.305	27.5	B
900 E	9	8:13:57	0.394	30.8	A
800 E	9	8:14:14	0.160	33.9	A
700 E	9	8:15:49	0.144	5.5	F
600 E	9	8:16:06	0.158	33.5	A
500 E	9	8:16:21	0.150	36.0	A
400 E	9	8:16:36	0.149	35.8	A
300 E	9	8:18:00	0.147	6.3	F
200 E	9	8:18:17	0.147	31.1	A
State St.	9	8:19:43	0.154	6.4	F
Main St.	9	8:20:21	0.158	15.0	D
		Total:	**2.066**	**15.8**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	11	8:37:18			
1100 E	11	8:37:50	0.305	34.3	A
900 E	11	8:38:34	0.394	32.2	A
800 E	11	8:38:51	0.160	33.9	A
700 E	11	8:39:48	0.144	9.1	F
600 E	11	8:40:03	0.158	37.9	A
500 E	11	8:40:19	0.150	33.8	A
400 E	11	8:40:34	0.149	35.8	A
300 E	11	8:41:54	0.147	6.6	F
200 E	11	8:42:10	0.147	33.1	A
State St.	11	8:43:24	0.154	7.5	F
Main St.	11	8:45:30	0.158	4.5	F
		Total:	**2.066**	**15.1**	**D**

September 10, PM Peak, Eastbound

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	2	16:09:56			
State St.	2	16:10:51	0.158	10.3	E
200 E	2	16:11:13	0.154	25.1	B
300 E	2	16:12:38	0.147	6.2	F
400 E	2	16:13:00	0.147	24.1	B
500 E	2	16:13:35	0.149	15.4	D
600 E	2	16:14:16	0.150	13.2	E
700 E	2	16:14:32	0.158	35.6	A
800 E	2	16:14:48	0.144	32.3	A
900 E	2	16:15:08	0.160	28.9	B
1100 E	2	16:15:56	0.394	29.6	B
1300 E	2	16:17:47	0.305	9.9	F
		Total:	**2.067**	**15.8**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	4	16:36:24			
State St.	4	16:36:47	0.158	24.7	B
200 E	4	16:37:08	0.154	26.3	B
300 E	4	16:38:34	0.147	6.2	F
400 E	4	16:38:53	0.147	27.9	B
500 E	4	16:39:44	0.149	10.5	E
600 E	4	16:40:01	0.150	31.8	A
700 E	4	16:40:25	0.158	23.7	C
800 E	4	16:40:45	0.144	25.8	B
900 E	4	16:42:59	0.160	4.3	F
1100 E	4	16:44:06	0.394	21.2	C
1300 E	4	16:45:04	0.305	18.9	C
		Total:	**2.067**	**14.3**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	6	17:00:36			
State St.	6	17:00:56	0.158	28.4	B
200 E	6	17:01:13	0.154	32.5	A
300 E	6	17:02:16	0.147	8.4	F
400 E	6	17:03:11	0.147	9.6	F
500 E	6	17:03:48	0.149	14.5	D
600 E	6	17:04:12	0.150	22.5	C
700 E	6	17:04:29	0.158	33.5	A
800 E	6	17:04:45	0.144	32.3	A
900 E	6	17:05:08	0.160	25.1	B
1100 E	6	17:07:05	0.394	12.1	E
1300 E	6	17:07:58	0.305	20.7	C
		Total:	**2.067**	**16.8**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	10	17:53:25			
State St.	10	17:54:30	0.158	8.8	F
200 E	10	17:54:47	0.154	32.5	A
300 E	10	17:55:01	0.147	37.8	A
400 E	10	17:55:17	0.147	33.1	A
500 E	10	17:56:05	0.149	11.2	E
600 E	10	17:56:27	0.150	24.5	B
700 E	10	17:58:05	0.158	5.8	F
800 E	10	17:58:22	0.144	30.4	A
900 E	10	17:59:04	0.160	13.7	E
1100 E	10	17:59:47	0.394	33.0	A
1300 E	10	18:00:17	0.305	36.6	A
		Total:	**2.067**	**18.1**	**C**

September 10, PM Peak, Westbound

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	1	16:00:36			
1100 E	1	16:01:08	0.305	34.3	A
900 E	1	16:02:31	0.394	17.1	D
800 E	1	16:03:35	0.160	9.0	F
700 E	1	16:04:13	0.144	13.6	E
600 E	1	16:04:31	0.158	31.6	A
500 E	1	16:04:48	0.150	31.8	A
400 E	1	16:05:04	0.149	33.5	A
300 E	1	16:06:08	0.147	8.3	F
200 E	1	16:06:30	0.147	24.1	B
State St.	1	16:06:48	0.154	30.8	A
Main St.	1	16:07:32	0.158	12.9	E
		Total:	**2.066**	**17.9**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	3	16:26:49			
1100 E	3	16:28:11	0.305	13.4	E
900 E	3	16:29:02	0.394	27.8	B
800 E	3	16:29:45	0.160	13.4	E
700 E	3	16:30:11	0.144	19.9	C
600 E	3	16:30:32	0.158	27.1	B
500 E	3	16:31:44	0.150	7.5	F
400 E	3	16:32:28	0.149	12.2	E
300 E	3	16:32:47	0.147	27.9	B
200 E	3	16:33:14	0.147	19.6	C
State St.	3	16:34:32	0.154	7.1	F
Main St.	3	16:34:50	0.158	31.6	A
		Total:	**2.066**	**15.5**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	5	16:51:07			
1100 E	5	16:51:39	0.305	34.3	A
900 E	5	16:52:24	0.394	31.5	A
800 E	5	16:52:43	0.160	30.3	A
700 E	5	16:54:13	0.144	5.8	F
600 E	5	16:54:30	0.158	33.5	A
500 E	5	16:54:46	0.150	33.8	A
400 E	5	16:55:19	0.149	16.3	D
300 E	5	16:56:50	0.147	5.8	F
200 E	5	16:57:14	0.147	22.1	C
State St.	5	16:58:37	0.154	6.7	F
Main St.	5	16:58:57	0.158	28.4	B
		Total:	**2.066**	**15.8**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	7	17:14:49			
1100 E	7	17:15:21	0.305	34.3	A
900 E	7	17:16:44	0.394	17.1	D
800 E	7	17:17:37	0.160	10.9	E
700 E	7	17:18:15	0.144	13.6	E
600 E	7	17:18:38	0.158	24.7	B
500 E	7	17:20:03	0.150	6.4	F
400 E	7	17:20:35	0.149	16.8	D
300 E	7	17:20:57	0.147	24.1	B
200 E	7	17:21:17	0.147	26.5	B
State St.	7	17:22:36	0.154	7.0	F
Main St.	7	17:24:02	0.158	6.6	F
		Total:	**2.066**	**13.4**	**E**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	9	17:43:10			
1100 E	9	17:43:40	0.305	36.6	A
900 E	9	17:44:31	0.394	27.8	B
800 E	9	17:45:49	0.160	7.4	F
700 E	9	17:46:08	0.144	27.3	B
600 E	9	17:46:28	0.158	28.4	B
500 E	9	17:47:49	0.150	6.7	F
400 E	9	17:48:56	0.149	8.0	F
300 E	9	17:50:02	0.147	8.0	F
200 E	9	17:50:27	0.147	21.2	C
State St.	9	17:50:50	0.154	24.1	B
Main St.	9	17:51:36	0.158	12.4	E
		Total:	**2.066**	**14.7**	**D**

September 11, AM Peak, Eastbound

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	1	7:05:38			
State St.	1	7:05:58	0.158	28.4	B
200 E	1	7:06:14	0.154	34.6	A
300 E	1	7:06:29	0.147	35.3	A
400 E	1	7:06:46	0.147	31.1	A
500 E	1	7:07:04	0.149	29.9	B
600 E	1	7:07:22	0.150	30.0	A
700 E	1	7:08:11	0.158	11.6	E
800 E	1	7:08:28	0.144	30.4	A
900 E	1	7:09:44	0.160	7.6	F
1100 E	1	7:10:27	0.394	33.0	A
1300 E	1	7:11:25	0.305	18.9	C
		Total:	**2.067**	**21.4**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	3	7:27:26			
State St.	3	7:27:45	0.158	29.9	B
200 E	3	7:28:00	0.154	36.9	A
300 E	3	7:28:16	0.147	33.1	A
400 E	3	7:28:32	0.147	33.1	A
500 E	3	7:29:14	0.149	12.8	E
600 E	3	7:29:31	0.150	31.8	A
700 E	3	7:30:14	0.158	13.3	E
800 E	3	7:30:40	0.144	19.9	C
900 E	3	7:32:06	0.160	6.7	F
1100 E	3	7:33:24	0.394	18.2	C
1300 E	3	7:35:03	0.305	11.1	E
		Total:	**2.067**	**16.3**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	5	7:50:39			
State St.	5	7:51:37	0.158	9.8	F
200 E	5	7:51:55	0.154	30.7	A
300 E	5	7:52:28	0.147	16.1	D
400 E	5	7:52:49	0.147	25.2	B
500 E	5	7:53:06	0.149	31.6	A
600 E	5	7:53:35	0.150	18.6	C
700 E	5	7:54:07	0.158	17.8	D
800 E	5	7:54:23	0.144	32.3	A
900 E	5	7:54:39	0.160	36.1	A
1100 E	5	7:56:11	0.394	15.4	D
1300 E	5	7:58:35	0.305	7.6	F
		Total:	**2.067**	**15.6**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	7	8:14:45			
State St.	7	8:15:32	0.158	12.1	E
200 E	7	8:16:17	0.154	12.3	E
300 E	7	8:16:33	0.147	33.1	A
400 E	7	8:16:50	0.147	31.1	A
500 E	7	8:17:06	0.149	33.6	A
600 E	7	8:17:24	0.150	30.0	A
700 E	7	8:18:02	0.158	15.0	D
800 E	7	8:18:30	0.144	18.5	C
900 E	7	8:19:42	0.160	8.0	F
1100 E	7	8:20:58	0.394	18.7	C
1300 E	7	8:22:56	0.305	9.3	F
		Total:	**2.067**	**15.2**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	9	8:35:43			
State St.	9	8:36:03	0.158	28.4	B
200 E	9	8:36:19	0.154	34.6	A
300 E	9	8:36:34	0.147	35.3	A
400 E	9	8:36:50	0.147	33.1	A
500 E	9	8:37:06	0.149	33.6	A
600 E	9	8:37:27	0.150	25.7	B
700 E	9	8:37:59	0.158	17.8	D
800 E	9	8:38:17	0.144	28.7	B
900 E	9	8:38:34	0.160	34.0	A
1100 E	9	8:40:02	0.394	16.1	D
1300 E	9	8:40:56	0.305	20.3	C
		Total:	**2.067**	**23.8**	**C**

September 11, AM Peak, Westbound

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	2	7:17:52			
1100 E	2	7:18:21	0.305	37.9	A
900 E	2	7:19:39	0.394	18.2	C
800 E	2	7:20:12	0.160	17.5	D
700 E	2	7:21:54	0.144	5.1	F
600 E	2	7:22:11	0.158	33.5	A
500 E	2	7:22:51	0.150	13.5	E
400 E	2	7:23:45	0.149	9.9	F
300 E	2	7:24:02	0.147	31.1	A
200 E	2	7:24:17	0.147	35.3	A
State St.	2	7:25:18	0.154	9.1	F
Main St.	2	7:25:47	0.158	19.6	C
		Total:	**2.066**	**15.7**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	4	7:41:27			
1100 E	4	7:42:47	0.305	13.7	E
900 E	4	7:43:58	0.394	20.0	C
800 E	4	7:44:15	0.160	33.9	A
700 E	4	7:45:47	0.144	5.6	F
600 E	4	7:46:03	0.158	35.6	A
500 E	4	7:47:32	0.150	6.1	F
400 E	4	7:48:12	0.149	13.4	E
300 E	4	7:48:30	0.147	29.4	B
200 E	4	7:48:46	0.147	33.1	A
State St.	4	7:49:31	0.154	12.3	E
Main St.	4	7:49:57	0.158	21.9	C
		Total:	**2.066**	**14.6**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	6	8:04:46			
1100 E	6	8:05:19	0.305	33.3	A
900 E	6	8:06:03	0.394	32.2	A
800 E	6	8:06:24	0.160	27.4	B
700 E	6	8:07:47	0.144	6.2	F
600 E	6	8:08:07	0.158	28.4	B
500 E	6	8:08:22	0.150	36.0	A
400 E	6	8:08:37	0.149	35.8	A
300 E	6	8:08:53	0.147	33.1	A
200 E	6	8:09:51	0.147	9.1	F
State St.	6	8:10:08	0.154	32.6	A
Main St.	6	8:10:24	0.158	35.6	A
		Total:	**2.066**	**22.0**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	8	8:27:04			
1100 E	8	8:27:34	0.305	36.6	A
900 E	8	8:28:19	0.394	31.5	A
800 E	8	8:28:38	0.160	30.3	A
700 E	8	8:29:51	0.144	7.1	F
600 E	8	8:30:09	0.158	31.6	A
500 E	8	8:31:17	0.150	7.9	F
400 E	8	8:32:06	0.149	10.9	E
300 E	8	8:32:23	0.147	31.1	A
200 E	8	8:32:38	0.147	35.3	A
State St.	8	8:33:33	0.154	10.1	E
Main St.	8	8:33:51	0.158	31.6	A
		Total:	**2.066**	**18.3**	**C**

September 11, PM Peak, Eastbound

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	2	16:04:58			
State St.	2	16:06:36	0.158	5.8	F
200 E	2	16:06:59	0.154	24.0	B
300 E	2	16:08:25	0.147	6.2	F
400 E	2	16:08:42	0.147	31.1	A
500 E	2	16:09:33	0.149	10.5	E
600 E	2	16:09:55	0.150	24.5	B
700 E	2	16:10:13	0.158	31.7	A
800 E	2	16:10:31	0.144	28.7	B
900 E	2	16:11:02	0.160	18.6	C
1100 E	2	16:12:20	0.394	18.2	C
1300 E	2	16:13:03	0.305	25.5	B
		Total:	**2.067**	**15.3**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	4	16:27:09			
State St.	4	16:28:27	0.158	7.3	F
200 E	4	16:28:47	0.154	27.6	B
300 E	4	16:29:04	0.147	31.2	A
400 E	4	16:29:21	0.147	31.1	A
500 E	4	16:29:43	0.149	24.4	B
600 E	4	16:30:03	0.150	27.0	B
700 E	4	16:30:32	0.158	19.6	C
800 E	4	16:30:52	0.144	25.8	B
900 E	4	16:31:09	0.160	34.0	A
1100 E	4	16:32:25	0.394	18.7	C
1300 E	4	16:33:42	0.305	14.3	D
		Total:	**2.067**	**18.9**	**C**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	6	16:53:11			
State St.	6	16:54:41	0.158	6.3	F
200 E	6	16:54:59	0.154	30.7	A
300 E	6	16:55:15	0.147	33.1	A
400 E	6	16:55:30	0.147	35.3	A
500 E	6	16:55:50	0.149	26.9	B
600 E	6	16:56:26	0.150	15.0	D
700 E	6	16:58:13	0.158	5.3	F
800 E	6	16:58:30	0.144	30.4	A
900 E	6	16:59:17	0.160	12.3	E
1100 E	6	17:00:35	0.394	18.2	C
1300 E	6	17:02:47	0.305	8.3	F
		Total:	**2.067**	**12.9**	**E**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	8	17:21:13			
State St.	8	17:22:42	0.158	6.4	F
200 E	8	17:23:02	0.154	27.6	B
300 E	8	17:24:35	0.147	5.7	F
400 E	8	17:24:51	0.147	33.1	A
500 E	8	17:25:29	0.149	14.2	D
600 E	8	17:26:25	0.150	9.6	F
700 E	8	17:28:07	0.158	5.6	F
800 E	8	17:28:24	0.144	30.4	A
900 E	8	17:28:53	0.160	19.9	C
1100 E	8	17:30:14	0.394	17.5	D
1300 E	8	17:31:23	0.305	15.9	D
		Total:	**2.067**	**12.2**	**E**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
Main St.	10	17:50:27			
State St.	10	17:50:48	0.158	27.1	B
200 E	10	17:51:03	0.154	36.9	A
300 E	10	17:52:36	0.147	5.7	F
400 E	10	17:52:54	0.147	29.4	B
500 E	10	17:53:32	0.149	14.2	D
600 E	10	17:53:51	0.150	28.4	B
700 E	10	17:54:16	0.158	22.8	C
800 E	10	17:54:33	0.144	30.4	A
900 E	10	17:54:49	0.160	36.1	A
1100 E	10	17:56:12	0.394	17.1	D
1300 E	10	17:58:57	0.305	6.7	F
		Total:	**2.067**	**14.6**	**D**

September 11, PM Peak, Westbound

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	1	15:53:28			
1100 E	1	15:54:24	0.305	19.6	C
900 E	1	15:55:08	0.394	32.2	A
800 E	1	15:55:32	0.160	24.0	B
700 E	1	15:56:26	0.144	9.6	F
600 E	1	15:56:43	0.158	33.5	A
500 E	1	15:58:04	0.150	6.7	F
400 E	1	15:59:31	0.149	6.2	F
300 E	1	16:00:45	0.147	7.2	F
200 E	1	16:01:45	0.147	8.8	F
State St.	1	16:02:34	0.154	11.3	E
Main St.	1	16:03:00	0.158	21.9	C
		Total:	**2.066**	**13.0**	**E**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	3	16:18:40			
1100 E	3	16:19:46	0.305	16.6	D
900 E	3	16:21:00	0.394	19.2	C
800 E	3	16:21:50	0.160	11.5	E
700 E	3	16:22:10	0.144	25.9	B
600 E	3	16:22:27	0.158	33.5	A
500 E	3	16:22:43	0.150	33.8	A
400 E	3	16:23:00	0.149	31.6	A
300 E	3	16:24:09	0.147	7.7	F
200 E	3	16:24:26	0.147	31.1	A
State St.	3	16:24:45	0.154	29.2	B
Main St.	3	16:25:41	0.158	10.2	E
		Total:	**2.066**	**17.7**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	5	16:42:29			
1100 E	5	16:43:04	0.305	31.4	A
900 E	5	16:44:11	0.394	21.2	C
800 E	5	16:44:29	0.160	32.0	A
700 E	5	16:46:13	0.144	5.0	F
600 E	5	16:46:37	0.158	23.7	C
500 E	5	16:47:27	0.150	10.8	E
400 E	5	16:47:45	0.149	29.8	B
300 E	5	16:48:31	0.147	11.5	E
200 E	5	16:48:57	0.147	20.4	C
State St.	5	16:50:15	0.154	7.1	F
Main St.	5	16:51:02	0.158	12.1	E
		Total:	**2.066**	**14.5**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	7	17:10:13			
1100 E	7	17:10:45	0.305	34.3	A
900 E	7	17:11:29	0.394	32.2	A
800 E	7	17:11:47	0.160	32.0	A
700 E	7	17:12:27	0.144	13.0	E
600 E	7	17:12:44	0.158	33.5	A
500 E	7	17:13:25	0.150	13.2	E
400 E	7	17:13:42	0.149	31.6	A
300 E	7	17:14:16	0.147	15.6	D
200 E	7	17:15:25	0.147	7.7	F
State St.	7	17:17:00	0.154	5.8	F
Main St.	7	17:19:06	0.158	4.5	F
		Total:	**2.066**	**14.0**	**D**

	Run	Time	L (mi)	Travel Speed (mph)	LOS
1300 E	9	17:38:21			
1100 E	9	17:38:54	0.305	33.3	A
900 E	9	17:40:29	0.394	14.9	D
800 E	9	17:41:17	0.160	12.0	E
700 E	9	17:42:11	0.144	9.6	F
600 E	9	17:42:28	0.158	33.5	A
500 E	9	17:42:42	0.150	38.6	A
400 E	9	17:43:15	0.149	16.3	D
300 E	9	17:44:30	0.147	7.1	F
200 E	9	17:45:09	0.147	13.6	E
State St.	9	17:46:28	0.154	7.0	F
Main St.	9	17:47:32	0.158	8.9	F
		Total:	**2.066**	**13.5**	**E**

ANNEX 3. TRAFFIC MOVEMENTS

Time Period		Southbound			Westbound			Northbound			Eastbound			Total
From	To	L	T	R	L	T	R	L	T	R	L	T	R	
7:00	7:05	5	22	1	4	24	8	7	73	11	3	59	1	218
7:05	7:10	1	28	1	8	18	2	4	113	10	1	41	4	231
7:10	7:15	10	48	0	4	18	2	0	64	22	8	70	5	251
7:15	7:20	2	43	1	8	26	7	5	94	19	1	30	1	237
7:20	7:25	2	45	1	6	35	3	8	59	16	6	92	1	274
7:25	7:30	2	39	1	7	19	4	4	114	20	3	38	3	254
7:30	7:35	12	33	2	6	43	8	9	59	14	3	56	6	251
7:35	7:40	3	69	4	13	11	6	10	104	13	3	48	4	288
7:40	7:45	9	43	4	8	47	8	9	89	22	7	96	8	350
7:45	7:50	8	58	5	12	28	7	17	145	18	2	56	2	358
7:50	7:55	6	51	2	6	33	8	6	99	22	3	86	6	328
7:55	8:00	6	72	6	13	29	8	13	167	23	3	50	6	396
8:00	8:05	8	45	3	4	27	4	15	128	20	1	65	3	323
8:05	8:10	6	70	1	9	46	9	11	163	18	5	48	4	390
8:10	8:15	4	64	5	8	28	10	15	114	16	5	82	6	357
8:15	8:20	6	53	6	6	15	8	13	189	29	5	23	8	361
8:20	8:25	13	58	3	6	55	8	12	118	16	9	115	6	419
8:25	8:30	5	74	4	9	35	8	26	182	14	5	50	2	414
8:30	8:35	9	60	1	11	35	5	17	132	21	1	89	4	385
8:35	8:40	6	74	2	9	20	1	18	174	19	4	32	2	361
8:40	8:45	11	58	9	11	46	9	13	113	22	7	60	9	368
8:45	8:50	6	83	2	18	31	5	24	142	32	5	31	7	386
8:50	8:55	10	66	6	6	41	4	10	108	18	8	52	6	335
8:55	9:00	6	83	4	11	30	10	20	155	21	5	44	6	395

700 E and 400 S, 5-minute AM Traffic Volumes

Time Period		Southbound			Westbound			Northbound			Eastbound			Total
From	To	L	T	R	L	T	R	L	T	R	L	T	R	
4:00	4:05	8	124	4	17	50	11	14	70	15	10	50	11	384
4:05	4:10	10	87	4	17	75	6	8	76	14	4	54	17	372
4:10	4:15	11	121	8	12	36	4	14	46	7	9	66	19	353
4:15	4:20	10	79	12	11	114	4	7	84	18	6	34	7	386
4:20	4:25	7	136	6	19	50	4	15	47	9	12	74	21	400
4:25	4:30	15	104	6	15	102	2	11	77	15	4	38	11	400
4:30	4:35	5	134	8	13	42	6	16	47	7	14	47	28	367
4:35	4:40	14	94	8	16	98	7	10	71	17	6	35	12	388
4:40	4:45	8	150	6	16	57	4	9	42	7	10	53	21	383
4:45	4:50	16	117	7	18	87	5	11	65	11	8	42	20	407
4:50	4:55	9	133	7	20	69	8	9	40	5	8	68	21	397
4:55	5:00	11	84	9	7	99	11	14	78	16	9	37	15	390
5:00	5:05	12	146	7	20	42	1	18	59	7	10	51	16	389
5:05	5:10	8	123	6	14	82	8	11	77	10	8	56	24	427
5:10	5:15	12	184	9	14	63	6	14	56	7	14	71	35	485
5:15	5:20	13	134	9	11	102	5	10	80	9	7	49	11	440
5:20	5:25	10	193	10	25	62	5	22	62	12	12	92	36	541
5:25	5:30	14	131	6	16	90	6	21	89	20	6	63	29	491
5:30	5:35	7	188	9	21	62	7	18	57	9	7	101	22	508
5:35	5:40	12	99	5	22	87	7	13	98	20	9	63	23	458
5:40	5:45	9	155	7	14	62	2	18	50	16	17	88	23	461
5:45	5:50	14	115	15	15	81	5	18	86	16	4	47	19	435
5:50	5:55	13	138	5	18	48	9	18	64	8	14	94	30	459
5:55	6:00	18	97	8	6	70	14	12	77	18	8	61	21	410

700 E and 400 S, 5-minute PM Traffic Volumes

Time Period		Southbound			Westbound			Northbound			Eastbound			Total
From	To	L	T	R	L	T	R	L	T	R	L	T	R	
7:10	7:15	19	13	0	4	17	5	5	55	14	6	47	1	186
7:15	7:20	14	13	2	4	20	12	4	37	23	2	78	4	213
7:20	7:25	25	20	3	3	25	18	3	29	26	8	95	2	257
7:25	7:30	16	16	3	4	15	9	10	54	26	10	89	4	256
7:30	7:35	14	24	2	5	27	23	7	68	28	13	78	5	294
7:35	7:40	28	24	2	2	20	15	10	37	12	14	89	1	254
7:40	7:45	15	46	1	3	30	11	10	41	21	8	51	3	240
7:45	7:50	17	31	1	6	17	15	5	29	12	7	92	3	235
7:50	7:55	12	8	5	6	32	10	3	55	21	8	106	7	273
7:55	8:00	36	48	2	2	27	13	13	73	21	11	110	3	359
8:00	8:05	25	23	1	5	36	11	9	89	31	2	47	2	281
8:05	8:10	12	25	0	2	20	15	4	56	33	8	66	0	241
8:10	8:15	14	24	1	8	24	18	12	84	32	6	88	3	314
8:15	8:20	28	41	4	2	18	21	8	60	24	11	65	1	283
8:20	8:25	24	10	4	2	34	15	7	61	40	11	95	5	308
8:25	8:30	39	38	5	2	13	18	13	74	35	9	82	3	331
8:30	8:35	22	21	6	2	43	19	5	99	36	16	111	11	391
8:35	8:40	27	33	4	3	30	21	16	90	38	14	79	7	362
8:40	8:45	12	24	4	5	45	18	4	88	43	19	57	1	320
8:45	8:50	39	35	3	3	27	18	11	81	21	11	105	6	360
8:50	8:55	18	18	0	3	34	15	10	60	16	21	83	3	281
8:55	9:00	21	25	7	2	52	12	13	68	31	6	104	7	348
9:00	9:05	23	27	1	6	32	20	13	49	21	22	134	8	356
9:05	9:10	15	27	3	5	37	10	9	72	28	18	122	0	346

1300 E and 500 S, 5-minute AM Traffic Volumes

Time Period		Southbound			Westbound			Northbound			Eastbound			Total
From	To	L	T	R	L	T	R	L	T	R	L	T	R	
4:05	4:10	24	55	9	9	83	27	9	40	10	14	27	7	314
4:10	4:15	17	41	8	5	41	23	9	41	5	12	66	2	270
4:15	4:20	44	53	12	7	114	32	12	28	12	16	46	11	387
4:20	4:25	24	40	11	10	68	24	4	47	7	11	58	9	313
4:25	4:30	26	64	8	10	80	34	8	52	12	8	41	7	350
4:30	4:35	25	31	5	11	55	22	7	21	4	15	60	7	263
4:35	4:40	10	41	12	8	87	22	6	45	9	8	60	11	319
4:40	4:45	29	54	11	13	76	29	13	38	3	6	28	8	308
4:45	4:50	21	77	17	8	51	26	7	37	5	8	42	12	311
4:50	4:55	19	65	10	20	91	41	7	41	6	11	63	6	380
4:55	5:00	23	53	11	13	47	25	13	34	7	9	47	11	293
5:00	5:05	18	37	9	20	119	34	3	25	15	7	56	9	352
5:05	5:10	31	74	4	14	54	24	5	42	7	6	34	10	305
5:10	5:15	27	76	8	8	81	20	7	46	3	9	64	16	365
5:15	5:20	19	89	6	15	80	27	1	40	4	7	45	10	343
5:20	5:25	16	76	13	22	94	37	5	39	4	13	69	6	394
5:25	5:30	24	78	10	12	86	32	9	27	9	11	59	10	367
5:30	5:35	30	72	3	13	51	40	13	47	5	15	75	17	381
5:35	5:40	16	74	9	9	71	34	8	40	15	5	55	7	343
5:40	5:45	19	44	8	18	71	20	8	39	12	11	74	35	359
5:45	5:50	23	68	8	6	63	37	13	48	14	14	57	8	359
5:50	5:55	21	39	4	19	74	21	9	73	12	17	80	15	384
5:55	6:00	36	83	7	10	40	22	7	64	14	16	65	10	374
6:00	6:05	22	45	6	16	61	23	8	26	9	13	79	12	320

1300 E and 500 S, 5-minute PM Traffic Volumes

Time Period		Southbound			Westbound			Northbound			Eastbound			Total
From	To	L	T	R	L	T	R	L	T	R	L	T	R	
4:05	4:10	10	65	11	23	105	16	5	39	11	3	74	23	385
4:10	4:15	8	119	15	14	59	14	9	54	15	8	47	18	380
4:15	4:20	12	76	8	16	117	13	9	51	11	1	76	25	415
4:20	4:25	7	108	16	22	84	13	5	59	10	11	62	26	423
4:25	4:30	8	74	10	15	74	6	4	43	13	7	57	13	324
4:30	4:35	14	106	19	7	69	6	8	53	17	7	77	12	395
4:35	4:40	12	81	4	30	106	12	6	34	14	7	61	24	391
4:40	4:45	10	77	6	29	81	5	19	67	16	9	46	18	383
4:45	4:50	11	109	8	20	92	8	13	48	10	18	93	31	461
4:50	4:55	17	101	20	17	102	12	2	69	10	6	59	11	426
4:55	5:00	12	83	7	12	91	8	11	49	8	14	77	18	390
5:00	5:05	10	99	20	20	66	12	9	67	11	7	42	8	371
5:05	5:10	15	81	6	18	113	16	2	44	11	10	87	26	429
5:10	5:15	15	98	3	36	97	12	8	44	21	6	72	27	439
5:15	5:20	11	122	11	18	89	11	3	72	15	13	54	20	439
5:20	5:25	12	113	6	19	126	11	9	78	18	3	71	19	485
5:25	5:30	17	116	14	26	54	9	8	50	11	12	95	22	434
5:30	5:35	16	94	6	15	108	11	12	68	20	11	67	33	461
5:35	5:40	11	112	10	22	89	11	11	37	13	9	65	21	411
5:40	5:45	14	116	14	21	66	3	10	75	7	6	58	13	403
5:45	5:50	10	97	11	28	91	18	9	53	13	12	63	18	423
5:50	5:55	13	102	11	21	73	8	11	70	17	5	52	13	396
5:55	6:00	13	66	18	19	63	9	8	50	10	13	70	13	352
6:00	6:05	17	100	13	15	64	11	6	70	21	6	60	24	407

State Street and 400 S, 5-minute PM Traffic Volumes

Time Period		Southbound			Westbound			Northbound			Eastbound			Total
From	To	L	T	R	L	T	R	L	T	R	L	T	R	
7:00	7:15	16	98	2	16	60	12	11	250	43	12	170	10	700
7:15	7:30	6	127	3	21	80	14	17	267	55	10	160	5	765
7:30	7:45	24	145	10	27	101	22	28	252	49	13	200	18	889
7:45	8:00	20	181	13	31	90	23	36	411	63	8	192	14	1,082
8:00	8:15	18	179	9	21	101	23	41	405	54	11	195	13	1,070
8:15	8:30	24	185	13	21	105	24	51	489	59	19	188	16	1,194
8:30	8:45	26	192	12	31	101	15	48	419	62	12	181	15	1,114
8:45	9:00	22	232	12	35	102	19	54	405	71	18	127	19	1,116

700 E and 400 S, 15-minute AM Traffic Volumes

Time Period		Southbound			Westbound			Northbound			Eastbound			Total
From	To	L	T	R	L	T	R	L	T	R	L	T	R	
4:00	4:15	29	332	16	46	161	21	36	192	36	23	170	47	1,109
4:15	4:30	32	319	24	45	266	10	33	208	42	22	146	39	1,186
4:30	4:45	27	378	22	45	197	17	35	160	31	30	135	61	1,138
4:45	5:00	36	334	23	45	255	24	34	183	32	25	147	56	1,194
5:00	5:15	32	453	22	48	187	15	43	192	24	32	178	75	1,301
5:15	5:30	37	458	25	52	254	16	53	231	41	25	204	76	1,472
5:30	5:45	28	442	21	57	211	16	49	205	45	33	252	68	1,427
5:45	6:00	45	350	28	39	199	28	48	227	42	26	202	70	1,304

700 E and 400 S, 15-minute PM Traffic Volumes

Time Period		Southbound			Westbound			Northbound			Eastbound			Total
From	To	L	T	R	L	T	R	L	T	R	L	T	R	
7:10	7:25	58	46	5	11	62	35	12	121	63	16	220	7	656
7:25	7:40	58	64	7	11	62	47	27	159	66	37	256	10	804
7:40	7:55	44	85	7	15	79	36	18	125	54	23	249	13	748
7:55	8:10	73	96	3	9	83	39	26	218	85	21	223	5	881
8:10	8:25	66	75	9	12	76	54	27	205	96	28	248	9	905
8:25	8:40	88	92	15	7	86	58	34	263	109	39	272	21	1,084
8:40	8:55	69	77	7	11	106	51	25	229	80	51	245	10	961
8:55	9:10	59	79	11	13	121	42	35	189	80	46	360	15	1,050

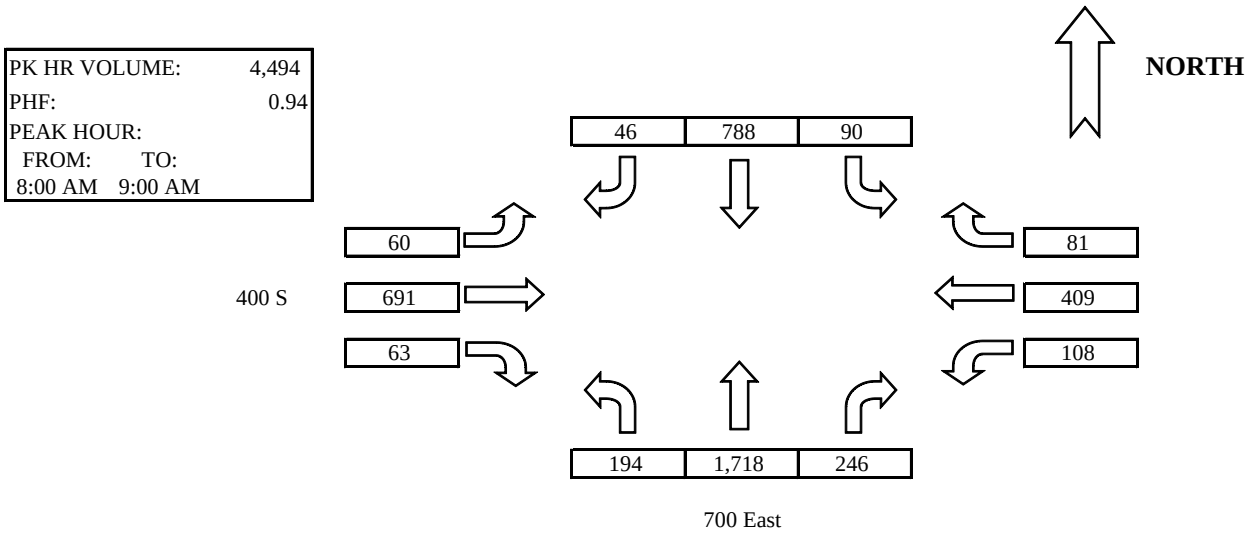
1300 E and 500 S, 15-minute AM Traffic Volumes

Time Period		Southbound			Westbound			Northbound			Eastbound			Total
From	To	L	T	R	L	T	R	L	T	R	L	T	R	
4:05	4:20	85	149	29	21	238	82	30	109	27	42	139	20	971
4:20	4:35	75	135	24	31	203	80	19	120	23	34	159	23	926
4:35	4:50	60	172	40	29	214	77	26	120	17	22	130	31	938
4:50	5:05	60	155	30	53	257	100	23	100	28	27	166	26	1,025
5:05	5:20	77	239	18	37	215	71	13	128	14	22	143	36	1,013
5:20	5:35	70	226	26	47	231	109	27	113	18	39	203	33	1,142
5:35	5:50	58	186	25	33	205	91	29	127	41	30	186	50	1,061
5:50	6:05	79	167	17	45	175	66	24	163	35	46	224	37	1,078

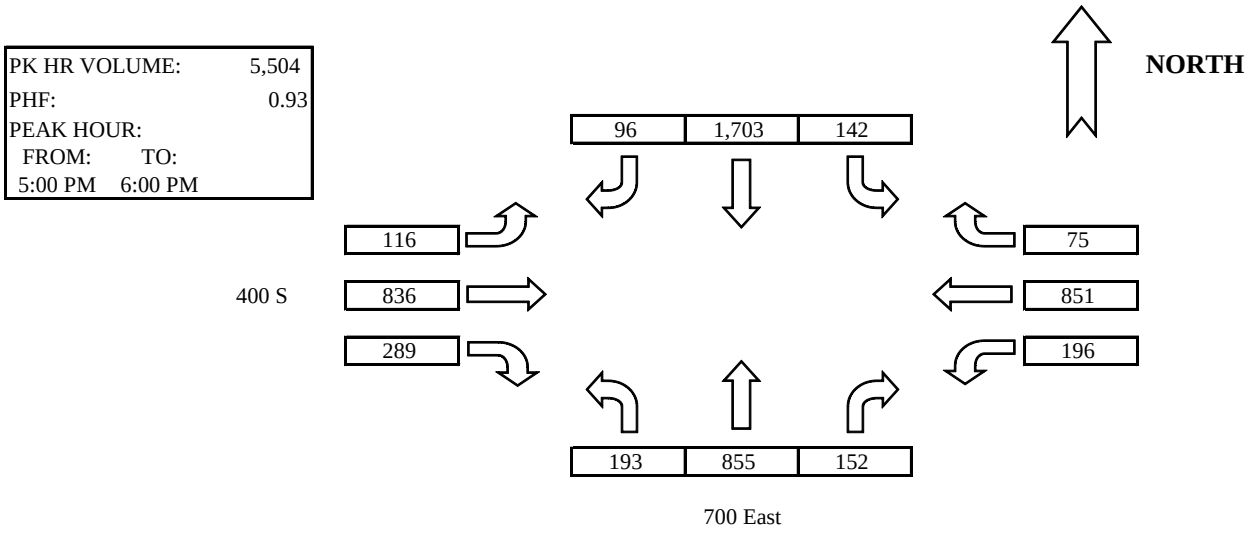
1300 E and 500 S, 15-minute PM Traffic Volumes

Time Period		Southbound			Westbound			Northbound			Eastbound			Total
From	To	L	T	R	L	T	R	L	T	R	L	T	R	
4:00	4:15	30	260	34	53	281	43	23	144	37	12	197	66	1,180
4:15	4:30	29	288	45	44	227	25	17	155	40	25	196	51	1,142
4:30	4:45	33	267	18	79	279	25	38	149	40	34	200	73	1,235
4:45	5:00	39	283	47	49	259	32	22	185	29	27	178	37	1,187
5:00	5:15	41	301	20	72	299	39	13	160	47	29	213	73	1,307
5:15	5:30	45	323	26	60	288	31	29	196	49	26	233	74	1,380
5:30	5:45	35	325	35	71	246	32	30	165	33	27	186	52	1,237
5:45	6:00	43	268	42	55	200	28	25	190	48	24	182	50	1,155

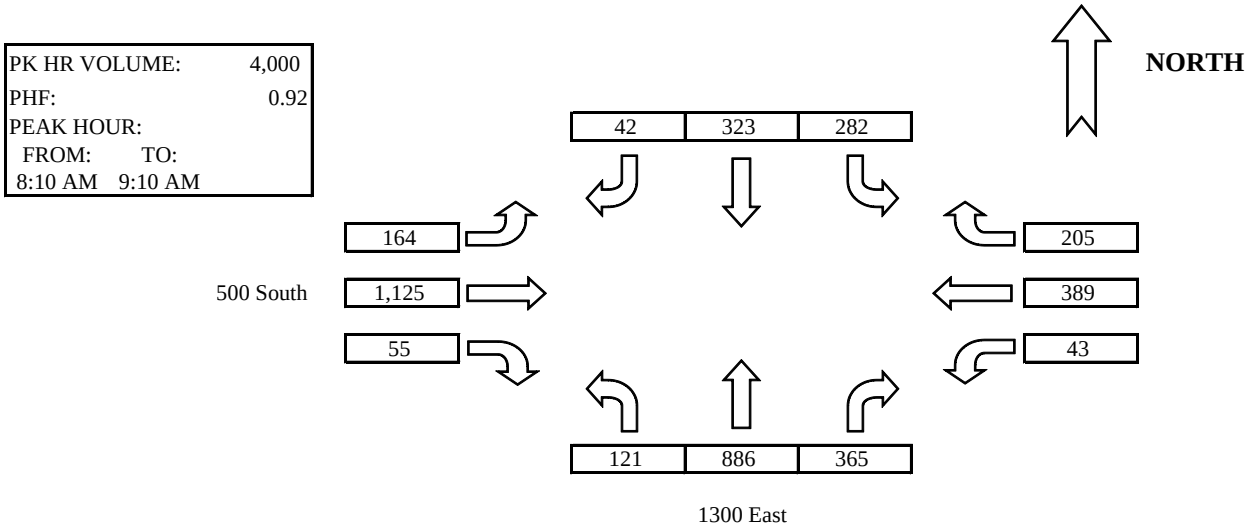
State Street and 400 S, 15-minute PM Traffic Volumes



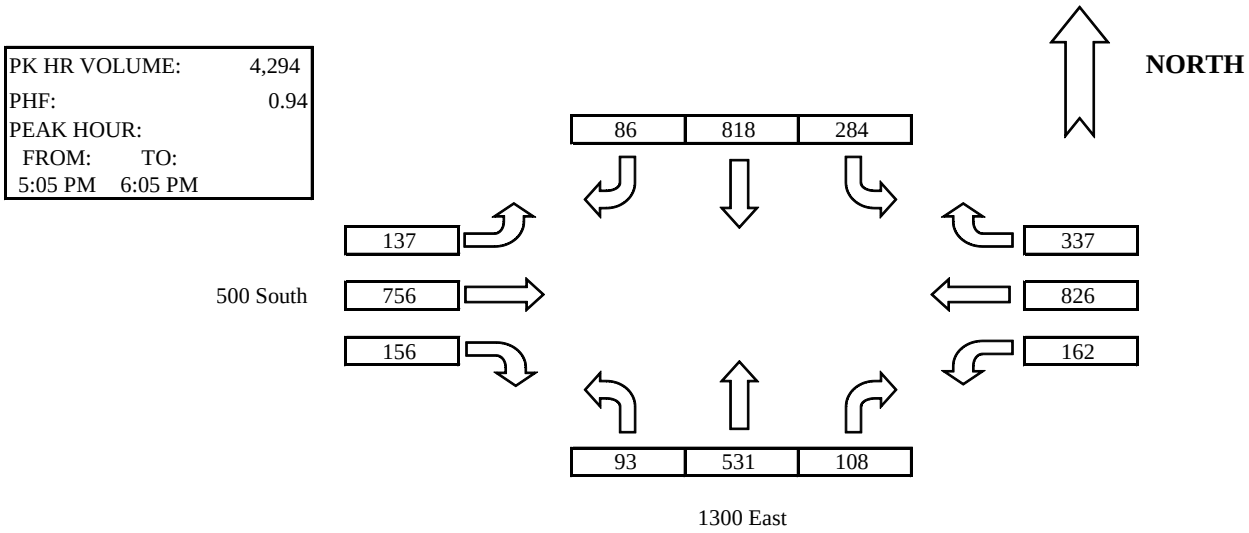
700 E and 400 S, AM Peak Hour Traffic Volumes



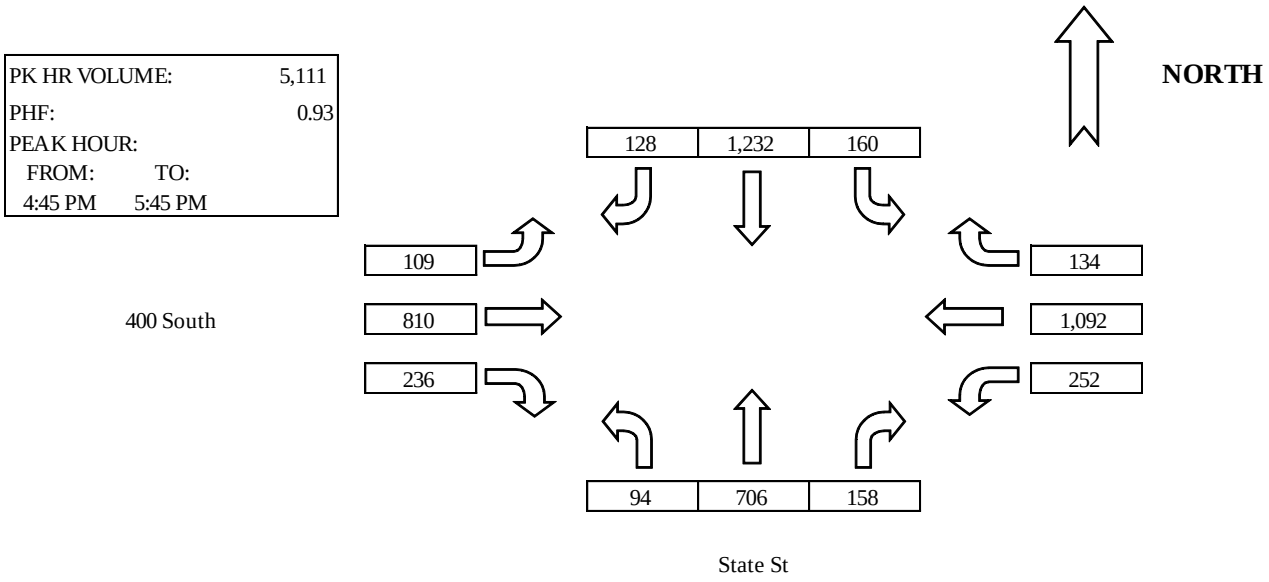
700 E and 400 S, PM Peak Hour Traffic Volumes



1300 E and 500 S, AM Peak Hour Traffic Volumes



1300 E and 500 S, PM Peak Hour Traffic Volumes



State Street and 400 S, PM Peak Hour Traffic Volumes

ANNEX 4. INTERSECTION DELAYS AND LEVEL OF SERVICE

Intersection	Movement	Existing		No TSP		700 E	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
State Street	EBR	21.1	C	20.9	C	21.5	C
	EBT	39.5	D	37.7	D	38.8	D
	EBL	72.8	E	70.9	E	71.3	E
	WBR	21.0	C	18.8	B	21.2	C
	WBT	41.1	D	37.0	D	42.0	D
	WBL	76.7	E	61.5	E	74.7	E
	NBR	7.5	A	6.8	A	7.5	A
	NBT	33.6	C	29.8	C	33.1	C
	NBL	38.3	D	33.0	C	33.7	C
	SBR	44.7	D	35.9	D	42.4	D
	SBT	40.7	D	35.4	D	39.5	D
	SBL	31.7	C	27.2	C	30.2	C
	EBT LRT	28.5	C	41.5	D	33.9	C
	WBT LRT	45.4	D	30.7	C	36.7	D
	Car AVG	39.1	D	34.6	C	38.0	D
	LRT AVG	37.0	D	36.1	D	35.3	D
	All	**38.8**	**D**	**34.8**	**C**	**37.6**	**D**

Intersection	Movement	Existing		No TSP		700 E	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
200 E	EBR	14.2	B	13.9	B	14.5	B
	EBT	18.0	B	16.8	B	17.5	B
	EBL	75.9	E	57.8	E	77.7	E
	WBR	11.0	B	8.5	A	9.8	A
	WBT	26.6	C	23.8	C	24.7	C
	WBL	NO TURN		NO TURN		NO TURN	
	NBR	6.1	A	6.0	A	5.7	A
	NBT	27.0	C	25.7	C	28.7	C
	NBL	59.3	E	56.0	E	64.1	E
	SBR	10.6	B	7.9	A	8.7	A
	SBT	30.3	C	27.6	C	30.4	C
	SBL	60.1	E	57.0	E	63.2	E
	EBT LRT	15.4	B	27.4	C	17.5	B
	WBT LRT	17.5	B	46.4	D	17.1	B
	Car AVG	30.8	C	27.4	C	31.3	C
	LRT AVG	16.5	B	36.9	D	17.3	B
	All	**28.6**	**C**	**28.8**	**C**	**29.2**	**C**

Intersection	Movement	Existing		No TSP		700 E	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
300 E	EBR	11.9	B	13.1	B	13.9	B
	EBT	28.9	C	29.2	C	30.9	C
	EBL	77.7	E	67.1	E	73.7	E
	WBR	24.9	C	28.9	C	25.3	C
	WBT	26.0	C	28.7	C	27.0	C
	WBL	68.7	E	61.2	E	67.0	E
	NBR	9.0	A	8.7	A	9.1	A
	NBT	41.4	D	39.7	D	42.3	D
	NBL	60.2	E	56.8	E	59.1	E
	SBR	11.4	B	10.7	B	11.1	B
	SBT	43.7	D	39.1	D	42.9	D
	SBL	63.7	E	59.1	E	61.6	E
	EBT LRT	19.1	B	41.0	D	20.1	C
	WBT LRT	9.9	A	22.5	C	8.5	A
	Car AVG	39.0	D	36.8	D	38.7	D
	LRT AVG	14.5	B	31.8	C	14.3	B
	All	**35.5**	**D**	**36.1**	**D**	**35.2**	**D**

Intersection	Movement	Existing		No TSP		700 E	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
400 E	EBR	11.9	B	13.1	B	13.9	B
	EBT	28.9	C	29.2	C	30.9	C
	EBL	77.7	E	67.1	E	73.7	E
	WBR	24.9	C	28.9	C	25.3	C
	WBT	26.0	C	28.7	C	27.0	C
	WBL	68.7	E	61.2	E	67.0	E
	NBR	9.0	A	8.7	A	9.1	A
	NBT	41.4	D	39.7	D	42.3	D
	NBL	60.2	E	56.8	E	59.1	E
	SBR	11.4	B	10.7	B	11.1	B
	SBT	43.7	D	39.1	D	42.9	D
	SBL	63.7	E	59.1	E	61.6	E
	EBT LRT	19.1	B	41.0	D	20.1	C
	WBT LRT	9.9	A	22.5	C	8.5	A
	Car AVG	39.0	D	36.8	D	38.7	D
	LRT AVG	14.5	B	31.8	C	14.3	B
	All	**35.5**	**D**	**36.1**	**D**	**35.2**	**D**

Intersection	Movement	Existing		No TSP		700 E	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
500 E	EBR	19.4	B	18.6	B	19.1	B
	EBT	21.3	C	21.2	C	20.7	C
	EBL	51.9	D	53.5	D	54.9	D
	WBR	27.8	C	30.6	C	29.5	C
	WBT	28.8	C	30.2	C	30.0	C
	WBL	78.2	E	72.2	E	76.9	E
	NBR	25.1	C	23.6	C	26.0	C
	NBT	32.6	C	31.6	C	32.8	C
	NBL	86.4	F	82.5	F	99.0	F
	SBR	25.5	C	25.3	C	26.9	C
	SBT	32.9	C	32.7	C	33.2	C
	SBL	43.5	D	41.2	D	46.2	D
	EBT LRT	3.5	A	21.7	C	3.1	A
	WBT LRT	0.9	A	0.9	A	0.9	A
	Car AVG	39.4	D	38.6	D	41.3	D
	LRT AVG	2.2	A	11.3	B	2.0	A
	All	**34.1**	**C**	**34.7**	**C**	**35.7**	**D**

Intersection	Movement	Existing		No TSP		700 E	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
600 E	EBR	10.8	B	9.4	A	10.3	B
	EBT	10.9	B	9.7	A	10.6	B
	EBL	53.7	D	48.8	D	52.0	D
	WBR	16.0	B	16.2	B	16.5	B
	WBT	21.2	C	21.3	C	21.2	C
	WBL	NO TURN		NO TURN		NO TURN	
	NBR	5.4	A	5.4	A	5.3	A
	NBT	27.4	C	24.4	C	26.0	C
	NBL	35.5	D	29.2	C	32.5	C
	SBR	8.3	A	7.0	A	8.5	A
	SBT	31.1	C	26.3	C	29.6	C
	SBL	28.6	C	26.8	C	29.6	C
	EBT LRT	7.1	A	14.5	B	8.7	A
	WBT LRT	17.3	B	31.1	C	17.7	B
	Car AVG	22.6	C	20.4	C	22.0	C
	LRT AVG	12.2	B	22.8	C	13.2	B
	All	**21.0**	**C**	**20.8**	**C**	**20.7**	**C**

Intersection	Movement	Existing		No TSP		700 E	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
700 E	EBR	22.0	C	25.7	C	21.2	C
	EBT	48.4	D	52.5	D	46.5	D
	EBL	67.0	E	73.9	E	66.2	E
	WBR	5.9	A	5.6	A	6.4	A
	WBT	34.4	C	34.1	C	42.6	D
	WBL	60.9	E	64.8	E	67.9	E
	NBR	5.2	A	5.7	A	5.4	A
	NBT	25.9	C	26.6	C	27.8	C
	NBL	55.2	E	57.9	E	57.9	E
	SBR	9.9	A	9.6	A	11.9	B
	SBT	30.3	C	30.7	C	34.4	C
	SBL	56.4	E	56.1	E	63.8	E
	EBT LRT	61.1	E	54.1	D	55.6	E
	WBT LRT	65.2	E	59.2	E	57.7	E
	Car AVG	35.1	D	36.9	D	37.7	D
	LRT AVG	63.1	E	56.6	E	56.7	E
	All	**39.1**	**D**	**39.7**	**D**	**40.4**	**D**

Intersection	Movement	Existing		No TSP		700 E	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
800 E	EBR	9.6	A	8.2	A	9.5	A
	EBT	12.1	B	12.8	B	13.2	B
	EBL	55.9	E	43.8	D	52.3	D
	WBR	13.6	B	12.9	B	12.5	B
	WBT	12.6	B	11.7	B	11.6	B
	WBL	50.7	D	45.0	D	52.6	D
	NBR	4.5	A	4.5	A	5.0	A
	NBT	19.4	B	17.0	B	19.5	B
	NBL	39.1	D	33.0	C	42.5	D
	SBR	6.9	A	6.9	A	6.5	A
	SBT	38.1	D	32.0	C	37.3	D
	SBL	38.4	D	35.5	D	39.5	D
	EBT LRT	5.5	A	15.3	B	5.6	A
	WBT LRT	18.0	B	35.0	D	16.8	B
	Car AVG	25.1	C	21.9	C	25.2	C
	LRT AVG	11.8	B	25.1	C	11.2	B
	All	**23.2**	**C**	**22.4**	**C**	**23.2**	**C**

Intersection	Movement	Existing		No TSP		700 E	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
900 E	EBR	15.6	B	16.4	B	16.2	B
	EBT	22.5	C	24.9	C	23.5	C
	EBL	NO TURN		NO TURN		NO TURN	
	WBR	14.2	B	14.1	B	13.5	B
	WBT	16.1	B	16.0	B	15.5	B
	WBL	55.5	E	52.2	D	58.1	E
	NBR	4.9	A	4.7	A	5.1	A
	NBT	29.7	C	25.6	C	29.7	C
	NBL	55.2	E	49.9	D	52.8	D
	SBR	10.6	B	9.0	A	9.7	A
	SBT	32.5	C	27.1	C	31.3	C
	SBL	54.8	D	51.7	D	54.8	D
	EBT LRT	22.7	C	30.9	C	22.6	C
	WBT LRT	1.5	A	20.2	C	2.1	A
	Car AVG	28.3	C	26.5	C	28.2	C
	LRT AVG	12.1	B	25.6	C	12.4	B
	All	**25.8**	**C**	**26.4**	**C**	**25.8**	**C**

Intersection	Movement	Existing		No TSP		700 E	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
1100 E	EBR	14.1	B	12.3	B	15.1	B
	EBT	17.3	B	17.4	B	19.1	B
	EBL	NO TURN		NO TURN		NO TURN	
	WBR	8.9	A	11.1	B	8.9	A
	WBT	10.2	B	12.8	B	9.9	A
	WBL	62.1	E	58.8	E	60.8	E
	NBR	5.3	A	5.0	A	5.1	A
	NBT	31.0	C	27.5	C	32.1	C
	NBL	49.3	D	45.1	D	47.4	D
	SBR	12.4	B	11.9	B	11.6	B
	SBT	30.5	C	28.5	C	30.5	C
	SBL	46.3	D	42.7	D	45.2	D
	EBT LRT	1.3	A	13.6	B	1.8	A
	WBT LRT	10.2	B	32.4	C	10.5	B
	Car AVG	26.1	C	24.8	C	26.0	C
	LRT AVG	5.8	A	23.0	C	6.2	A
	All	**23.0**	**C**	**24.5**	**C**	**22.9**	**C**

Intersection	Movement	Existing		No TSP		700 E	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
	EBR	14.1	B	12.3	B	15.1	B
	EBT	17.3	B	17.4	B	19.1	B
	EBL	NO TURN	NO TURN	NO TURN	NO TURN	NO TURN	NO TURN
	WBR	8.9	A	11.1	B	8.9	A
	WBT	10.2	B	12.8	B	9.9	A
	WBL	62.1	E	58.8	E	60.8	E
	NBR	5.3	A	5.0	A	5.1	A
	NBT	31.0	C	27.5	C	32.1	C
1300 E	NBL	49.3	D	45.1	D	47.4	D
	SBR	12.4	B	11.9	B	11.6	B
	SBT	30.5	C	28.5	C	30.5	C
	SBL	46.3	D	42.7	D	45.2	D
	EBT LRT	1.3	A	13.6	B	1.8	A
	WBT LRT	10.2	B	32.4	C	10.5	B
	Car AVG	26.1	C	24.8	C	26.0	C
	LRT AVG	5.8	A	23.0	C	6.2	A
	All	**23.0**	**C**	**24.5**	**C**	**22.9**	**C**

ANNEX 5. PERSON DELAYS

Intersection	Movement	Existing			No Priority			700 E		
		Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)
State Street	EBR	607	21.1	3.56	607	20.9	3.52	615	21.5	3.67
	EBT	2200	40.9	24.99	2199	39.4	24.09	2192	39.0	23.75
	EBL	305	72.8	6.17	294	70.9	5.79	300	71.3	5.94
	WBR	336	21.0	1.96	336	18.8	1.76	339	21.2	2.00
	WBT	2680	42.5	31.66	2675	38.4	28.56	2680	43.0	31.98
	WBL	595	76.7	12.67	582	61.5	9.95	600	74.7	12.45
	NBR	413	7.5	0.85	418	6.8	0.78	413	7.5	0.86
	NBT	1693	33.6	15.79	1706	29.8	14.10	1696	33.1	15.58
	NBL	242	38.3	2.57	237	33.0	2.17	239	33.7	2.24
	SBR	320	44.7	3.98	323	35.9	3.22	319	42.4	3.75
	SBT	2924	40.7	33.08	2936	35.4	28.86	2932	39.5	32.15
	SBL	374	31.7	3.29	373	27.2	2.82	373	30.2	3.13
	EBT LRT	264	28.5	2.09	264	41.5	3.04	264	33.9	2.49
	WBT LRT	379	45.7	4.81	394	30.7	3.36	392	37.0	4.03
	Car Total	12689	39.3	140.6	12686	34.8	125.6	12698	38.1	137.5
	LRT Total	643	37.1	6.9	658	36.1	6.4	656	35.5	6.5
	All	**13332**	**39.0**	**147.49**	**13344**	**35.0**	**132.04**	**13354**	**37.7**	**144.04**

Intersection	Movement	Existing			No Priority			700 E		
		Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)
200 E	EBR	302	14.2	1.19	301	13.9	1.16	299	14.5	1.20
	EBT	2510	20.0	13.94	2521	19.1	13.37	2504	19.5	13.57
	EBL	144	75.9	3.04	142	57.8	2.28	141	77.7	3.04
	WBR	304	11.0	0.93	302	8.5	0.71	306	9.8	0.83
	WBT	3364	27.1	25.32	3365	23.9	22.34	3376	25.1	23.53
	WBL		NO TURN			NO TURN			NO TURN	
	NBR	224	6.1	0.38	226	6.0	0.38	223	5.7	0.35
	NBT	436	27.0	3.27	436	25.7	3.12	440	28.7	3.51
	NBL	96	59.3	1.58	97	56.0	1.51	97	64.1	1.73
	SBR	176	10.6	0.52	175	7.9	0.38	176	8.7	0.43
	SBT	621	30.3	5.23	621	27.6	4.76	624	30.4	5.27
	SBL	84	60.1	1.40	84	57.0	1.33	83	63.2	1.46
	EBT LRT	264	15.4	1.13	264	27.4	2.01	264	17.5	1.28
	WBT LRT	373	17.6	1.82	394	46.4	5.08	389	17.1	1.84
	Car Total	8261	31.1	56.81	8270	27.6	51.33	8269	31.6	54.92
	LRT Total	637	16.5	2.95	658	36.9	7.09	653	17.3	3.12
	All	**8898**	**28.8**	**59.76**	**8928**	**29.0**	**58.42**	**8922**	**29.4**	**58.04**

Intersection	Movement	Existing			No Priority			700 E		
		Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)
300 E	EBR	137	11.9	0.45	139	13.1	0.50	137	13.9	0.53
	EBT	2530	29.7	20.90	2529	29.5	20.69	2530	31.5	22.15
	EBL	137	77.7	2.96	135	67.1	2.52	135	73.7	2.76
	WBR	181	24.9	1.25	179	28.9	1.44	183	25.3	1.29
	WBT	3150	27.0	23.59	3156	29.1	25.49	3153	26.8	23.45
	WBL	166	68.7	3.17	166	61.2	2.82	169	67.0	3.15
	NBR	247	9.0	0.62	247	8.7	0.60	247	9.1	0.62
	NBT	490	41.4	5.63	493	39.7	5.44	491	42.3	5.77
	NBL	255	60.2	4.26	256	56.8	4.04	255	59.1	4.19
	SBR	261	11.4	0.82	261	10.7	0.77	260	11.1	0.80
	SBT	515	43.7	6.25	517	39.1	5.61	520	42.9	6.20
	SBL	260	63.7	4.60	263	59.1	4.32	263	61.6	4.50
	EBT LRT	257	19.1	1.36	257	41.0	2.93	257	20.1	1.43
	WBT LRT	405	10.0	1.12	386	22.6	2.42	406	8.5	0.96
	Car Total	8329	39.1	74.51	8341	36.9	74.23	8343	38.7	75.39
	LRT Total	662	14.5	2.48	643	31.8	5.35	663	14.3	2.40
	All	**8991**	**35.6**	**76.99**	**8984**	**36.2**	**79.57**	**9006**	**35.2**	**77.79**

Intersection	Movement	Existing			No Priority			700 E		
		Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)
400 E	EBR	0	0.0	0.00	0	0.0	0.00	0	0.0	0.00
	EBT	3038	8.5	7.15	3038	10.1	8.49	3033	9.4	7.93
	EBL	0	0.0	0.00	0	0.0	0.00	0	0.0	0.00
	WBR	0	0.0	0.00	0	0.0	0.00	0	0.0	0.00
	WBT	3090	13.6	11.68	3100	13.6	11.68	3097	13.7	11.75
	WBL	0	0.0	0.00	0	0.0	0.00	0	0.0	0.00
	NBR	50	15.9	0.22	50	13.5	0.19	52	17.3	0.25
	NBT	805	21.6	4.82	803	20.6	4.59	808	21.4	4.81
	NBL	161	36.8	1.65	161	36.4	1.63	163	36.8	1.67
	SBR	251	19.4	1.35	252	18.4	1.29	252	17.6	1.23
	SBT	887	22.9	5.65	886	21.8	5.36	888	22.1	5.44
	SBL	129	32.5	1.16	129	31.1	1.11	130	32.6	1.18
	EBT LRT	257	4.7	0.34	257	12.3	0.88	257	4.2	0.30
	WBT LRT	407	3.7	0.42	375	10.2	1.06	406	2.0	0.22
	Car Total	8411	14.3	33.69	8419	13.8	34.34	8423	14.2	34.26
	LRT Total	664	4.2	0.75	632	11.3	1.94	663	3.1	0.52
	All	**9075**	**12.8**	**34.44**	**9051**	**13.4**	**36.28**	**9086**	**12.6**	**34.78**

Intersection	Movement	Existing			No Priority			700 E		
		Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)
500 E	EBR	392	19.4	2.11	391	18.6	2.02	392	19.1	2.08
	EBT	2422	21.8	14.67	2428	22.1	14.93	2423	21.2	14.25
	EBL	377	51.9	5.43	369	53.5	5.49	367	54.9	5.60
	WBR	278	27.8	2.14	282	30.6	2.40	280	29.5	2.29
	WBT	2397	29.8	19.83	2407	31.0	20.75	2408	31.0	20.74
	WBL	379	78.2	8.23	379	72.2	7.61	381	76.9	8.14
	NBR	98	25.1	0.68	100	23.6	0.66	97	26.0	0.70
	NBT	1032	32.6	9.33	1031	31.6	9.06	1033	32.8	9.41
	NBL	389	86.4	9.34	392	82.5	8.99	394	99.0	10.83
	SBR	301	25.5	2.14	302	25.3	2.12	301	26.9	2.25
	SBT	1066	32.9	9.73	1065	32.7	9.67	1063	33.2	9.81
	SBL	154	43.5	1.86	151	41.2	1.73	154	46.2	1.98
	EBT LRT	257	3.5	0.25	257	21.7	1.55	257	3.1	0.22
	WBT LRT	406	0.9	0.10	396	0.9	0.09	398	0.9	0.10
	Car Total	9285	39.6	85.50	9297	38.8	85.41	9293	41.4	88.08
	LRT Total	663	2.2	0.35	653	11.3	1.64	655	2.0	0.33
	All	**9948**	**34.2**	**85.85**	**9950**	**34.8**	**87.05**	**9948**	**35.8**	**88.40**

Intersection	Movement	Existing			No Priority			700 E		
		Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)
600 E	EBR	276	10.8	0.83	270	9.4	0.71	273	10.3	0.78
	EBT	2213	12.6	7.74	2202	11.2	6.85	2218	12.4	7.66
	EBL	183	53.7	2.73	181	48.8	2.45	185	52.0	2.67
	WBR	145	16.0	0.64	144	16.2	0.65	144	16.5	0.66
	WBT	2747	23.5	17.94	2739	24.0	18.26	2747	23.7	18.07
	WBL		NO TURN			NO TURN			NO TURN	
	NBR	200	5.4	0.30	200	5.4	0.30	200	5.3	0.30
	NBT	241	27.4	1.84	243	24.4	1.65	243	26.0	1.76
	NBL	195	35.5	1.92	195	29.2	1.58	194	32.5	1.75
	SBR	137	8.3	0.32	136	7.0	0.26	137	8.5	0.32
	SBT	703	31.1	6.07	703	26.3	5.14	704	29.6	5.78
	SBL	71	28.6	0.56	72	26.8	0.54	72	29.6	0.59
	EBT LRT	257	7.1	0.51	257	14.5	1.04	257	8.7	0.62
	WBT LRT	406	17.3	1.95	395	31.2	3.42	398	17.7	1.96
	Car Total	7111	23.0	40.89	7085	20.8	38.38	7117	22.4	40.33
	LRT Total	663	12.2	2.45	652	22.9	4.46	655	13.2	2.58
	All	**7774**	**21.3**	**43.34**	**7737**	**21.1**	**42.84**	**7772**	**21.0**	**42.91**

Intersection	Movement	Existing			No Priority			700 E		
		Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)
700 E	EBR	554	22.0	3.38	549	25.7	3.91	557	21.2	3.28
	EBT	1651	51.6	23.68	1649	57.3	26.23	1657	50.7	23.34
	EBL	247	67.0	4.60	249	73.9	5.11	249	66.2	4.58
	WBR	203	5.9	0.33	202	5.6	0.31	204	6.4	0.36
	WBT	2253	34.7	21.74	2254	35.2	22.03	2248	42.8	26.73
	WBL	475	60.9	8.03	474	64.8	8.53	467	67.9	8.80
	NBR	373	5.2	0.54	374	5.7	0.60	374	5.4	0.56
	NBT	2015	25.9	14.47	2015	26.6	14.91	2020	27.8	15.58
	NBL	408	55.2	6.26	408	57.9	6.56	406	57.9	6.53
	SBR	229	9.9	0.63	228	9.6	0.61	231	11.9	0.76
	SBT	3866	30.3	32.50	3868	30.7	33.01	3869	34.4	36.97
	SBL	335	56.4	5.24	335	56.1	5.22	338	63.8	5.99
	EBT LRT	209	61.1	3.55	215	54.2	3.23	214	55.6	3.30
	WBT LRT	555	65.2	10.05	555	59.2	9.12	554	57.7	8.89
	Car Total	12609	35.4	121.41	12605	37.4	127.03	12620	38.0	133.49
	LRT Total	764	63.1	13.59	770	56.7	12.36	768	56.7	12.19
	All	**13373**	**39.4**	**135.00**	**13375**	**40.2**	**139.39**	**13388**	**40.7**	**145.68**

Intersection	Movement	Existing			No Priority			700 E		
		Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)
800 E	EBR	26	9.6	0.07	28	8.2	0.06	29	9.5	0.08
	EBT	2272	12.7	7.98	2269	13.3	8.37	2279	13.4	8.49
	EBL	67	55.9	1.04	64	43.8	0.78	64	52.3	0.93
	WBR	328	13.6	1.24	331	12.9	1.19	334	12.5	1.16
	WBT	2562	14.1	10.04	2572	12.8	9.16	2574	13.5	9.65
	WBL	330	50.7	4.65	331	45.0	4.14	329	52.6	4.81
	NBR	25	4.5	0.03	25	4.5	0.03	26	5.0	0.04
	NBT	150	19.4	0.81	151	17.0	0.71	149	19.5	0.81
	NBL	81	39.1	0.88	81	33.0	0.74	82	42.5	0.97
	SBR	280	6.9	0.53	280	6.9	0.53	280	6.5	0.50
	SBT	158	38.1	1.67	156	32.0	1.38	155	37.3	1.61
	SBL	165	38.4	1.76	166	35.5	1.64	166	39.5	1.82
	EBT LRT	209	5.5	0.32	215	15.3	0.91	214	5.6	0.33
	WBT LRT	555	18.0	2.78	555	35.0	5.40	554	16.8	2.58
	Car Total	6444	25.2	30.70	6454	22.1	28.75	6467	25.3	30.86
	LRT Total	764	11.8	3.10	770	25.2	6.31	768	11.2	2.91
	All	**7208**	**23.3**	**33.80**	**7224**	**22.5**	**35.06**	**7235**	**23.3**	**33.77**

Intersection	Movement	Existing			No Priority			700 E		
		Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)
900 E	EBR	869	15.6	3.77	901	16.4	4.11	872	16.2	3.93
	EBT	1590	23.8	10.52	1562	25.6	11.10	1588	25.1	11.07
	EBL		NO TURN			NO TURN			NO TURN	
	WBR	125	14.2	0.49	126	14.1	0.49	126	13.5	0.47
	WBT	2449	16.6	11.32	2473	16.1	11.05	2454	15.7	10.71
	WBL	123	55.5	1.90	126	52.2	1.83	122	58.1	1.97
	NBR	323	4.9	0.44	324	4.7	0.42	323	5.1	0.45
	NBT	1130	29.7	9.31	1120	25.6	7.96	1128	29.7	9.31
	NBL	156	55.2	2.39	155	49.9	2.15	155	52.8	2.27
	SBR	614	10.6	1.81	612	9.0	1.53	614	9.7	1.65
	SBT	1430	32.5	12.91	1424	27.1	10.73	1434	31.3	12.46
	SBL	165	54.8	2.51	165	51.7	2.37	163	54.8	2.48
	EBT LRT	248	22.6	1.56	245	31.0	2.11	254	22.8	1.61
	WBT LRT	641	1.5	0.27	641	20.2	3.60	641	2.1	0.37
	Car Total	8974	28.5	57.38	8988	26.6	53.74	8979	28.4	56.77
	LRT Total	889	12.1	1.83	886	25.6	5.71	895	12.4	1.98
	All	**9863**	**26.0**	**59.21**	**9874**	**26.4**	**59.44**	**9874**	**25.9**	**58.75**

Intersection	Movement	Existing			No Priority			700 E		
		Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)
1100 E	EBR	117	14.1	0.46	116	12.3	0.39	118	15.1	0.49
	EBT	1964	17.2	9.38	1922	17.4	9.26	1958	18.9	10.26
	EBL		NO TURN			NO TURN			NO TURN	
	WBR	126	8.9	0.31	125	11.1	0.39	127	8.9	0.31
	WBT	2447	10.6	7.17	2454	12.7	8.63	2467	9.7	6.63
	WBL	123	62.1	2.12	125	58.8	2.04	123	60.8	2.08
	NBR	131	5.3	0.19	131	5.0	0.18	130	5.1	0.19
	NBT	123	31.0	1.06	123	27.5	0.94	123	32.1	1.10
	NBL	118	49.3	1.62	120	45.1	1.50	117	47.4	1.54
	SBR	123	12.4	0.42	122	11.9	0.40	123	11.6	0.40
	SBT	127	30.5	1.08	127	28.5	1.01	129	30.5	1.09
	SBL	121	46.3	1.56	121	42.7	1.43	123	45.2	1.55
	EBT LRT	250	1.2	0.08	248	13.6	0.94	247	1.9	0.13
	WBT LRT	641	10.2	1.82	641	32.4	5.78	641	10.5	1.87
	Car Total	5520	26.1	25.36	5486	24.8	26.18	5538	25.9	25.63
	LRT Total	891	5.7	1.90	889	23.0	6.72	888	6.2	2.00
	All	**6411**	**23.0**	**27.26**	**6375**	**24.5**	**32.90**	**6426**	**22.9**	**27.63**

Intersection	Movement	Existing			No Priority			700 E		
		Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)	Persons	Delay Per Person (s)	Total Person Delay (h)
1300 E	EBR	300	11.8	0.98	295	11.1	0.91	296	11.9	0.98
	EBT	1588	43.4	19.15	1566	40.9	17.80	1584	44.1	19.38
	EBL	316	77.9	6.83	314	88.3	7.70	314	71.1	6.20
	WBR	844	17.0	3.99	843	20.2	4.72	842	16.1	3.77
	WBT	2218	39.7	24.48	2214	39.5	24.31	2211	37.5	23.02
	WBL	372	63.9	6.61	370	67.4	6.92	368	64.0	6.54
	NBR	247	6.1	0.42	248	6.3	0.43	246	6.4	0.44
	NBT	1244	37.7	13.02	1251	36.0	12.51	1246	38.6	13.37
	NBL	231	65.3	4.19	231	63.6	4.08	231	66.4	4.26
	SBR	270	11.1	0.83	268	8.6	0.64	267	9.8	0.73
	SBT	1802	43.4	21.71	1798	41.2	20.56	1799	43.2	21.60
	SBL	714	84.8	16.83	716	76.6	15.23	716	84.5	16.81
	EBT LRT	239	18.6	1.24	246	73.8	5.04	247	20.1	1.38
	WBT LRT	641	54.1	9.63	641	103.2	18.37	641	43.1	7.68
	Car Total	10146	41.8	119.04	10114	41.6	115.81	10120	41.1	117.11
	LRT Total	880	36.3	10.86	887	88.5	23.41	888	31.6	9.06
	All	**11026**	**41.0**	**129.90**	**11001**	**48.3**	**139.22**	**11008**	**39.8**	**126.17**