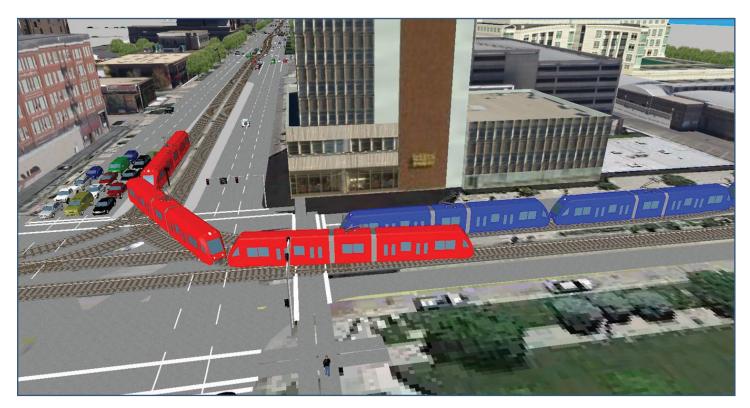
MOUNTAIN-PLAINS CONSORTIUM

MPC 14-270 | Xuesong Zhou, Peter T. Martin, Milan Zlatkovic, and Ivana Tasic | JULY 2014

Traffic Modeling of Transit Oriented Development: Evaluation of Transit Friendly Strategies and Innovative Intersection Designs in West Valley City, UT





A University Transportation Center sponsored by the U.S. Department of Transportation serving the Mountain-Plains Region. Consortium members:

Colorado State University North Dakota State University South Dakota State University University of Colorado Denver University of Denver University of Utah Utah State University University of Wyoming

TRAFFIC MODELING OF TRANSIT ORIENTED DEVELOPMENT: EVALUATION OF TRANSIT FRIENDLY STRATEGIES AND INNOVATIVE INTERSECTION DESIGNS IN WEST VALLEY CITY, UT

Dr. Xuesong Zhou Dr. Peter T. Martin Dr. Milan Zlatkovic Ivana Tasic

Department of Civil & Environmental Engineering University of Utah

July 2013

Acknowledgements

The authors would like to thank the Utah Transit Authority for funding this study in its first phase; Mountains Plains Consortium for supporting the continuation of this study; the Avenue Consultants, Dr. Reid Ewing, Laney Jones (Lochner), Dr. Muhammad Farhan and Andy Li for providing their insights and suggestions for the methodology developed in this study; Wasatch Front Regional Council, Resource System Group, and Utah Department of Transportation for providing the needed data for this study. The authors especially thank Richard L. Brockmyer, Dr. Fabian CevallosDr. Jennifer Dill, Dr. Ruth L. Steiner, and Dr. Vikash V. Gayah, for serving as the reviewers of this report and contributing with their comments and suggestions that significantly improved this research.

Disclaimer

The contents of this report reflect the views of the authors, who are responsible for the facts and accuracy of the information presented herein. This document is disseminated under the sponsorship of the Department of Transportation, University Transportation Center program, in the interest of information exchange. The U.S. Government assumes no liability for the contents or use thereof.

North Dakota State University does not discriminate on the basis of age, color, disability, gender expression/identity, genetic information, marital status, national origin, public assistance status, sex, sexual orientation, status as a U.S. veteran, race or religion. Direct inquiries to the Vice President for Equity, Diversity and Global Outreach, 205 Old Main, (701)231-7708.

ABSTRACT

Street networks designed to support Transit Oriented Development (TOD) increase accessibility for nonmotorized traffic. However, the implications of TOD supportive networks for still dominant vehicular traffic are rarely addressed. Due to this lack of research, decision making in favor of TOD supportive street networks is often a difficult process. The goal of this project is to quantify the traffic impacts of TOD using a study network in West Valley City, Utah. In our methodology, the test network is modified using not only designs typical for TODs, but also some network designs that enhance traffic operations. Proposed network designs represent the alternatives to traditional street widening approaches that should increase traffic efficiency while not discouraging non-motorized modes. This approach would increase the potential of the test network to become a TOD in the future, with two Bus Rapid Transit (BRT) lines already in place. The results indicate that network designs that could be beneficial for TOD, such as enhanced street connectivity, innovative intersection designs, traffic calming measures and Transit Friendly Designs (TFD), do not necessarily decrease the efficiency of vehicular traffic for the most critical travel demand conditions. The major contributions of this study are the indications that TODsupportive network designs are not necessarily associated with negative effects for vehicular traffic, even in conditions where mode shift does not occur and auto-mode travel demand remains the same. This is a significant finding that could be useful for metropolitan regions looking to retrofit the suburban neighborhoods into multimodal developments.

TABLE OF CONTENTS

1.	INTRODUCTION	1
2.	LITERATURE REVIEW	3
	 2.1 Impact of Built Environment on Travel Choices 2.2 Street Connectivity. 2.3 Innovative Intersections 2.4 Traffic Calming Measures 2.5 Toward Successful TOD. 2.6 Transit Friendly Designs. 2.7 Summary of the Literature Review. 	. 10 . 18 . 27 . 38 . 45
3.	DESIGN PRINCIPLES	55
	 3.1 Design Principles of Street Connectivity	. 57 . 60
4.	MODELING METHODOLOGY	64
	 4.1 Base VISUM/VISSIM Network Model 4.2 Traffic and Transit Data	. 66 . 68 . 71
5.	TRAFFIC ANALYSIS RESULTS AND DISCUSSION	74
	 5.1 Base Case Scenarios	. 78 . 87 . 91
6.	STREET CONNECTIVITY AND TRANSIT ACCESSIBILITY	. 96
-	6.1 Measuring Street Connectivity6.2 Measuring Transit Accessibility	101
7.	CONCLUSIONS AND RECOMMENDATIONS 1	110
RI	FERENCES 1	12
AI	PPENDIX A: TRANSIT SCHEDULES AND TIMETABLES	\-1
AI	PPENDIX B: BASE CASE SCENARIOS CALIBRATION RESULTS I	B-1
AI	PPENDIX C: VISSIM BASED TRAFFIC ANALYSIS	C-1
AI	PPENDIX D: GIS METADATA FOR CONNECTIVITY MEASURES I)-1

LIST OF TABLES

Table 2.1	Impacts of Built Environment D Variables on Travel Choices (1)	4
Table 2.2	Model Variables (3)	8
Table 2.3	Possible Smart Growth Functional Classification (10)	
Table 2.4	Possible Street Types according to Model Design Manual for Living Streets (11)	14
Table 2.5	Summary of Street Connectivity Measures from the Literature (17)	16
Table 2.6	Costs and Benefits of TOD	
Table 2.7	Transit Service Related to Density (49)	46
Table 3.2	Traffic Calming Measures	58
Table 5.1	Intersection Level of Service for 2009 AM, 2009 PM, 2040 AM, and 2040 PM	
Table 5.2	Network Performance for Base case Scenarios	77
Table 5.3	Travel Times and LOS for Test Network Corridors	77
Table 5.4	Intersection LOS for Street Connectivity Scenarios	80
Table 5.5	Travel Times and Corridor LOS for Street Connectivity Scenario 1	85
Table 5.6	Travel Times and Corridor LOS for Street Connectivity Scenario 2	
Table 5.7	Travel Times and Corridor LOS for Street Connectivity Scenario 3	85
Table 5.8	Travel Times and Corridor LOS for Street Connectivity Scenario 4	
Table 5.9	Travel Times and Corridor LOS for Street Connectivity Scenario 5	
Table 5.10	Network-Wide Performance: Street Widening vs. Enhanced Connectivity	
Table 5.11	Intersection LOS with Traffic Calming for 2009 AM, 2009 PM, 2040 AM, and	
	2040 PM peak periods	
Table 5.12	Travel Times and Corridor LOS with and without Traffic Calming	
Table 5.13	Network Performance for Traffic Calming Scenario	
Table 5.14	Network-Wide Performance: Base Case vs. Innovative Intersections	
Table 5.15	5600 W @ 3500 S Intersections Performance Comparison for 2040 PM	
Table 5.16	Arterial Travel Times Comparison for 2040 PM	95
Table 6.1	GIS Output for Street Connectivity Measurements	100

LIST OF FIGURES

Figure 1.1	Project Network	2
Figure 2.1	Conceptual Study Network	5
Figure 2.2	Framework and Traffic Impact Adjustments	7
Figure 2.3	Benefits of Street Connectivity (7)	11
Figure 2.4	The example of two neighborhoods with different levels of connectivity	
e	(from New Jersey DOT)	12
Figure 2.5	Relationship between Mobility and Land Access in FHWA Classification	
Figure 2.6	Median U-turn	
Figure 2.7	Bowtie Intersection	
Figure 2.8	Single Quadrant Intersection	
Figure 2.9	Jughandle Intersection.	
Figure 2.10	Split Intersection.	
Figure 2.11	Superstreet Intersection	
Figure 2.12	Continuous Flow Intersection (CFI)	
Figure 2.13	Traffic Calming Measures (36)	
Figure 2.14	Typical Site Layout for Data Collection	
Figure 2.15	Perspectives of TOD as Differentiated by Regional Context	
Figure 2.16	Perspectives of TOD as Differentiated by Regional Context.	
Figure 2.17	Perspectives of TOD as Differentiated by Degree of Land Use Mix-	
Figure 2.18	Undesirable and Desirable Designs for Walking Access	
Figure 2.19	Automobile and Transit Street Organization	
Figure 2.20	Undesirable and Desirable Access	
Figure 2.20 Figure 2.21	Desirable Corner Development	
Figure 2.21 Figure 2.22	Undesirable and Desirable Transit Routing	
-		
Figure 2.23	Bus Queue Jump Lane	
Figure 2.24	Typical Design of a Bus Stop with Shelter	33
Figure 3.1	Possible New Network with Increased Connectivity	
Figure 3.2	Possible Traffic Calming Locations	
Figure 3.3	Innovative Intersections Implementation	61
Figure 3.4	Enhanced Transit Network	63
Figure 4.1	Modeling Methodology	65
Figure 4.2	VISUM/VISSIM Network of Existing Conditions	
Figure 4.3	Network TAZs	
Figure 4.4	Junction Editor for Signalized Intersections	
Figure 4.5	Calibration Process	
Figure 4.6	VISUM PrT Assignment for the Base OD Matrix, Auto Mode, PM Peak, 2009	
Figure 4.7	VISUM PrT Assignment Analysis for the Base OD Matrix, Auto Mode,	
8	PM Peak, 2009	71
Figure 4.8	VISUM PrT Assignment for the TFlowFuzzy Corrected OD Matrix, Auto Mode	
i iguie no	PM Peak, 2009	72
Figure 4. 9	VISUM PrT Assignment Analysis for the TFLowFuzzy Corrected OD Matrix,	,2
-0	Auto Mode, PM Peak, 2009	73
	1200 12000, 1 ht 1 out, 2007 million in the internet in the in	
Figure 5.1	Intersection Delay Comparisons for 2009 and 2040, for AM and PM Peak Periods	76
Figure 5.2	Street Connectivity Scenarios	

Figure 5.3	Comparisons of Intersection Delays for Base Case, Street Widening (a) and Increased	
-	Connectivity (b) Scenarios for AM Peak Period	81
Figure 5.4	Comparisons of Intersection Delays for Base Case, Street Widening (a) and Increased	
C	Connectivity (b) Scenarios for PM Peak Period	82
Figure 5.5	Comparisons of Intersection Delays for Base Case, and Increased Connectivity	
-	Scenarios for AM Peak Period	83
Figure 5.6	Comparisons of Intersection Delays for Base Case, and Increased Connectivity	
	Scenarios for PM Peak Period	84
Figure 5.7	Innovative Intersections Design, Traffic Volume Assignment and Delay Analysis	92
Figure 5.8	Intersection Delay Analysis for Different Intersection Designs	93
Figure 5.9	Average Corridor Travel Time for Different Intersection Designs	93
Figure 6.1	Census Block Area (GIS Output)	100
Figure 6.2	Space -Time Prism (62)	102
Figure 6.3	Network with Transit Lines and Stops	103
Figure 6.4	Traffic and Transit Data Input and Shortest Path Procedure	105
Figure 6.5	Transit Accessibility Measurements - Conceptual Framework	106
Figure 6.6	Transit Accessibility for Time Variable Service Schedule	
Figure 6.7	Transit Accessibility as a Function of the Acceptable Walking Distance	
Figure 6.8	Transit Accessibility as a Function of the Available Time Budget	

EXECUTIVE SUMMARY

Transit Oriented Development (TOD) creates high density, mixed land use patterns with pedestrian friendly environment concentrated around transit stations. This enables people to walk to transit stops or to their daily destinations, and decreases the need for private vehicle use.

Throughout the Wasatch Front Metropolitan Region, the majority of land use development forces people to drive in order to access their destinations. This is due to low density and mostly single use developments built on poorly connected street networks with several cul-de-sacs and few routing options for transport system users. Even though the development of Wasatch Front has the legacy of transit supportive land uses in the region's city centers and previous street car suburbs, the connection between them is still such that it encourages driving as the dominant mode of transportation. Designing streets and street networks that would support TOD environments is still considered with hesitation as the potential solution for traffic congestion and increasing travel demand. One of the reasons for this might be the need to evaluate the effects that TOD has on traffic operations.

This project aims to quantify the traffic impacts of TOD using a study network located in West Valley City, Utah, bordered by 3500 S and 4700 S (north-south), and 4800 W and 5600 W (east-west). This part of West Valley City will go through many development and land use changes in the next 15 years. The Mountain View Corridor is being built along 5600 W, and many other road and transit projects are planned in the vicinity. This area will be focused on transit use, so there is a need to design the best possible TOD features for the planned conditions.

The purpose of TOD is to motivate people to change their travel mode choices. Built environment could be the answer to this challenge. Changing the environment to accommodate walking and transit vehicles could increase the number of transit users. The main points and guidelines of the literature review have been adapted and applied to the project network. The design principles are given separately for each set of improvement measures. The improvement measure designs given in this document are:

- Enhanced street connectivity
- Traffic calming measures
- Innovative intersections
- Transit friendly designs

Once the designs were reviewed, edited, and approved by UTA, we created detailed design for each measure and applied them to the project network. Performance evaluation measures we used are related to traffic analysis, street connectivity, and transit accessibility. The report provides recommendations for future development of the observed network into a TOD-supportive environment.

1. INTRODUCTION

As our urban network traffic grows, we address congestion in a variety of ways. We increase the capacity of the network through improved traffic management, and we apply Intelligent Transportation Systems to optimize our resources. This capacity-based approach is overshadowed by the near default approach, which is simply to expand our roads with extra lanes and larger intersections. This serves to meet increasing traffic demand through increasing highway capacity. Collectors become distributors, which grow into arterials, which evolve into major highways. At a certain level, roads sever communities rendering pedestrian movements unfeasible.

So while this often repeated development has been shown to accommodate traffic growth, at least for a while, it does little to promote transit, bikes, and walking. We know that Transit Oriented Development (TOD) helps communities grow in a way that promotes accessibility and mobility, but we do not understand the traffic implications. This project takes a partially developed urban network in West Valley as its field case, and models the relationship between TOD and traffic impacts. Taking contemporary principles of urban design, the study will take an existing network as a control, and compare its traffic characteristics to a proposed network. This new network will embrace the best practices of TOD and livable streets.

The goal of the project is to quantify the traffic impacts of TOD using a study network. The network selected for this project is located in West Valley City, Utah, bordered by 3500 S and 4700 S (north-south), and 4800 W and 5600 W (east-west), as shown in Figure 1.1. The following objectives are identified for this project:

- Comprehensive literature review of TOD strategies and impacts
- Development of different design principles
- Creation, calibration, and validation of base network models
- Development of enhanced TOD networks and corresponding models
- Analysis of traffic impacts
- Synthesis of available transit performance measures
- Measuring transit accessibility of base and enhanced network models
- Recommendations for future TOD on the analyzed site

This part of West Valley City will go through many development and land use changes in the next 15 years. The Mountain View Corridor is being built along 5600 W, and many other road and transit projects are planned in the vicinity. This area will be focused on transit use, so there is a need to design the best possible TOD features for the planned conditions.

The first chapter of this report is the introductions with the problem statement. The second chapter is the literature review on the relationship between travel and the built environment, with the purpose to introduce the effects that environments such as TOD have on transportation outcomes and travelers' choices. The third chapter of the report elaborates on the proposed design principles for the selected case study network. After meeting with experts from the DOTs, transit authorities, consulting, and academia, four design approaches were established to be evaluated within this study, including innovative intersection designs, enhanced connectivity, traffic calming, and transit friendly designs. Modeling methods for evaluation of these principles that have the potential to be TOD-supportive are presented in chapter four. Results and discussion are provided in chapter five, while chapter six represents some additional tools for transit accessibility measurements that can be used as indicators for TOD implementation. The final chapter presents the conclusions of the study.

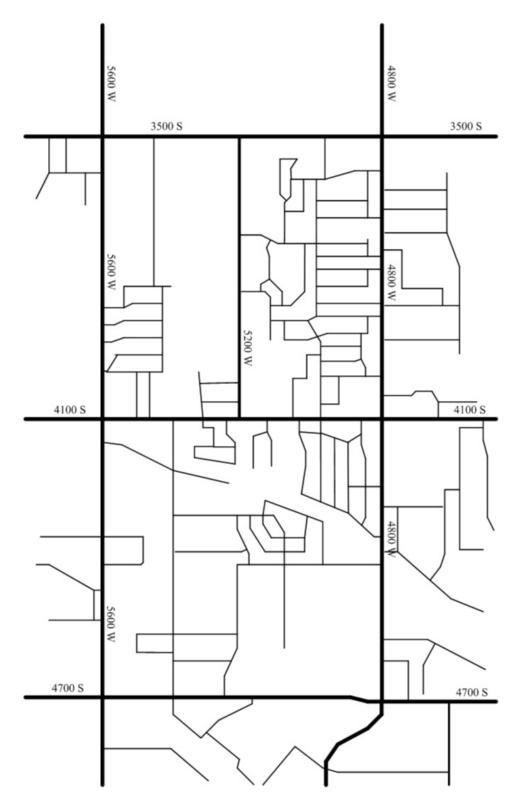


Figure 1.1 Project Network

2. LITERATURE REVIEW

2.1 Impact of Built Environment on Travel Choices

The purpose of TOD is to motivate people to change their travel mode choices. Built environment could be the answer to this challenge. Changing the environment to accommodate walking and transit vehicles could increase the number of transit users.

While TOD is defined as a strategy that concentrates housing, jobs and our daily needs around transit stations, creating a walkable environment and mixed land uses, the term TOD should not be confused with two other similar concepts. The first is a concept of Transit Friendly Design (TFD), focused on the design solutions that support transit and access to transit, explained in detail in chapter three of this report. The second is a concept of Transit Adjacent Development, which involves car-oriented environments near transit stations. These three concepts, TOD, TFD, and TAD, all represent different relationships between travel and built environment, addressed in the research reviewed in this chapter.

The first three papers, which are reviewed in this section, consider urban and land use planning as the solution for reducing automobile use. The first paper draws conclusions from many reviewed studies through meta-analysis. The second paper quantifies urban design principles that increase walkability. The third paper explains the impact of Mixed-Use Development on travel choices. This, in addition to the existing research on street connectivity, innovative intersection designs, traffic calming measures, and designs that support transit development in general.

This study (2) presents an effort to comprehensibly and objectively quantify subjective qualities of the urban street environment. Five qualities are the focus of the study: imageability, enclosure, human scale, transparency and complexity. The emphasis is on the subjective perception of the urban environment, rather than the mere physical characteristics, such as block length, street and sidewalk width, or building height. These physical characteristics do not tell much about the experience of walking down an urban street, and they do not capture people's perceptions of the street environment. The conceptual framework of the study is shown in Figure 2.1.

Travel and the Built Environment – A Meta-Analysis

Meta-analysis conducted by Ewing and Cervero (1) is the most extensive study on the relationships between the built environment and travel choices available to date. This study summarizes findings from 62 studies on associations between the built environment and travel. The authors looked for the characteristics of built environment that affect motorized and non-motorized trips. The purpose is to measure the magnitude of such relationships.

The authors started this research with their previous study from 2001, where they reviewed 14 studies in this area. This meta-analysis includes more studies. The authors used different web search tools, existing literature reviews, and Transportation Research Board papers. They contacted other researchers from this area and, finally, collected more than 200 studies that relate built environment to travel.

Meta-analysis is the summary of findings from the collected studies. This approach uses summary statistics from individual primary studies as the data points in the new analysis. The main advantage of meta-analysis is that it aggregates all previous research on a topic, allowing common threads to emerge. The drawback is combining stronger studies with weaker ones that may contaminate the results.

Meta-analysis requires a common measure of effect size to combine results from different studies. The common measure was the elasticity defined as the ratio of the percentage change in one variable with the percentage change of other variable. In this case, the authors measured the elasticity of some travel outcome with respect to one of the D variables:

- Density is the variable of interest (population, employment, vehicles) per unit of area
- Diversity is the number of different land uses in the given area and the degree to which they are represented in land area, floor area, or employment. Low diversity values indicate single-use environments. Higher diversity values indicate more varied land uses.
- Design includes block size, proportion of four-way intersections, number of intersections per square mile, sidewalk coverage, average building setbacks, average street width, number of pedestrian crossings, street trees, and other elements typical for pedestrian-oriented environments.
- Destination accessibility may be regional or local. Regional accessibility is the distance to the central business district. Local accessibility is the distance from home to the closest store.
- Distance to transit is an average of the shortest street routes from the residencies or workplaces in an area to the nearest rail station or bus stop. It can also be measured as transit route density, distance between transit stops, or the number of stations per unit area.

The authors found that the relationships between travel variables and built environment variables are inelastic. However, the combined effect of several built environment variables on travel could be quite large.

Travel Choice	Significant D Variable (Descending Significance)		
Motorized	1) Destination Accessibility		
	2) Distance to Downtown		
Trips	3) Design (Intersection Density, Street Connectivity)		
	1) Intersection Density		
	2) Jobs-Housing Balance		
Non-Motorized	3) Distance to Stores		
Trips	4) Distance to Transit Stops (less than 0.25 miles)		
	5) Street Connectivity		
	6) Land Use Mix		

Table 2.1	Impacts	of Built	Environment D	Variables on	Travel Choices (1)
-----------	---------	----------	---------------	--------------	----------------------

The approach of this study is to link specific physical features to urban design quality ratings. For this purpose, a panel of 10 urban design and planning experts from professional practice and academia has been assembled to participate in the study. The role of the panel members was to qualitatively define urban design qualities of streetscapes, rate different scenes according to these qualities, explain their ratings, discuss the ways of measuring urban design qualities, and review the field survey methodology. The panel members were shown dozens of video clips of different streetscapes from different cities across the United States. The investigators developed a filming technique to mimic the experience of pedestrians with motion, movements, peripheral vision, and scanning the environments. The panelists rated scenes and commented on the physical features that impacted their ratings with respect to each urban design quality.

The panel ratings were used as dependent, and the physical characteristics of the street environment as independent, variables in the estimation of statistical models. These models helped answer several questions: which physical characteristics are statistically associated with each perceptual quality; what is the direction of the association; what are the physical characteristics that impacted the variation in ratings of each quality; and what is the share of total variation in rating. These models helped select the five

qualities: imageability, enclosure, human scale, transparency, and complexity. Coefficients that determine the level of significance of different features for each quality are calculated and used to sort those features.

Imageability can be defined as a quality of a physical environment that evokes a strong mental image in an observer. It is a quality of a place that makes it distinct, recognizable, and memorable. The study found that the following features have the most impacts on imageability (in order of significance):

- Number of people
- Proportion of historic buildings
- Number of courtyards, plazas, and parks
- Presence of outdoor dining
- Number of buildings with non-rectangular silhouettes
- Noise level (the only negative relation to perceptions)
- Number of major landscape features
- Number of buildings with identifiers

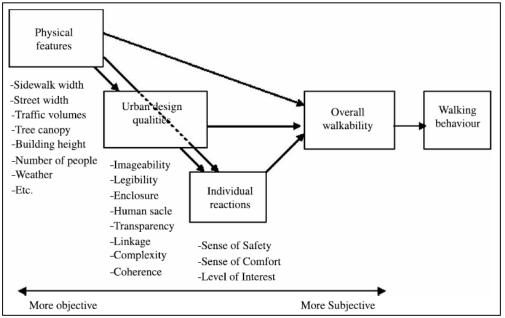


Figure 2.1 Conceptual Study Network (2)

Enclosure can be referred to as the degree to which streets and public spaces are visually defined by buildings, walls, trees, and other vertical elements. The study found the following features to significantly contribute to the perception of enclosure (in order of significance):

- Proportion of street wall (same and opposite side of street)
- Proportion of sky across street
- Number of long sight lines
- Proportion of sky ahead

Human scale refers to a size, texture, and articulation of physical elements that match the size and proportion of humans, and correspond to the speed of human walking. The most important features that contribute to the human scales found in the study are (in order of significance):

- Number of long sight lines
- Number of pieces of street furniture and other items

- Proportion of the first floor with windows
- Building height
- Number of small planters

Transparency refers to the degree to which people can see or perceive beyond the edge of a street. For the most part, it takes into account the degree of human activity that can be seen or perceived from the street. The study identified three features that significantly contribute to the perception of transparency (in order of significance):

- Proportion of the first floor with windows
- Proportion of active uses
- Proportion of street wall

Complexity refers to the visual richness of a place. It is related to the number of noticeable differences to which a viewer is exposed. The study identified six features that significantly contribute to the perception of complexity (in order of significance):

- Number of people
- Number of dominant building colors
- Number of buildings
- Presence of outdoor dining
- Number of accent colors
- Number of pieces of public art

The results of the study can be used in research, planning, and design of urban streets and public spaces. Researchers can measure urban design qualities in efforts to explain walking, use of public space, and other potential outcomes. Planners can assess physical characteristics of these qualities to identify problems and develop strategies for improving public spaces. Urban designers can give more attention to the features that are shown to be associated with each urban design quality. The findings of this study are of major importance when designing a TOD.

The purpose of this study (*3*) is to develop a methodology that would more accurately predict the traffic impacts of mixed-use developments (MXDs). It is estimated that the existing trip generation methodology does not capture the role of the MXDs the right way. The study uses data from six large and diverse metropolitan regions. Hierarchical modeling was used to estimate models for internal capture of trips within MXDs, walking and transit use on external trips, and trip length for external automobile trips. An accurate estimation of the proportion of internal trips within MXDs is important for an effective use of available land and developing master plans that would minimize traffic congestion.

Currently, the traffic impact analysis uses trip generation rates given in the Institute of Transportation Engineers (ITE) Trip Generation Manual. Although it provides a simple and straightforward methodology, it has certain weaknesses when dealing with MXDs. The following are defined as weaknesses of this methodology:

- It is based on a limited number of multi-use sites from Florida, so it needs a recalibration when used for different sites
- Only residential, retail, and office land uses are included in the methodology
- The scale of development is disregarded; the manual does not distinguish large and small sites
- The land use context of development is ignored
- The possibility of mode shift is not explicitly considered
- The length of external private vehicle trips is not considered

The study proposes a framework (also shown in Figure 2.2) in which travel to/from MXDs is conceived as a series of choices. Based on this, a methodology for adjusting ITE trip generation rates is proposed as follows:

- The first adjustment is made for trips that remain within the development; destination choice is conceived as dichotomous, where a traveler may choose a destination within or outside the development
- The second adjustment is made for walking or transit use for trips that leave the development; mode choices are conceived as dichotomous, where a traveler may choose to walk or not and to use transit or not
- The last adjustment is made for external personal vehicle trips, where the traveler chooses a destination that can be near or far

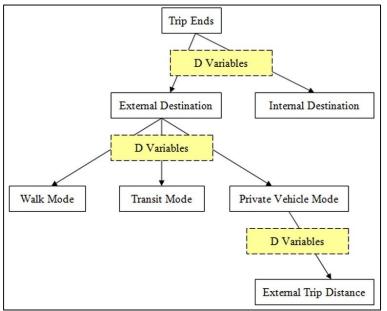


Figure 2.2 Framework and Traffic Impact Adjustments (3)

The researchers had to select a number of metropolitan regions to apply their methodology. The main criterion for selection was data availability. The data needed were on regional household travel surveys with XY coordinates for trip ends, and land use databases at the parcel level with detailed land use classification. Among the many metropolitan regions, six satisfied the criterion: Atlanta, Boston, Houston, Portland, Sacramento, and Seattle.

The proposed methodology defines data and model structure as hierarchical. The choices facing travelers are modeled in a three-level framework. Individual trips uniquely identified within MXDs form Level 1, MXDs form Level 2, and regions form Level 3. Models were estimated with HLM 6 software (Hierarchical Linear and Nonlinear Modeling). Linear models were used for the continuous variables (trip distance), while nonlinear models were used for the dichotomous variables (internal/external, walk/other, transit/other). Table 2 presents the list of variables that were used within this model.

Outcome Variables	Definition			
INTERNAL	Dummy variable indicating that a trip remains internal to the MXD (1=internal, 0=external)			
WALK	Dummy variable indicating that the travel mode on an external trip is walking (1=walk, 0=other)			
TRANSIT	Dummy variable indicating that the travel mode on an external trip is public bus or rail (1=transit, 0=other)			
TDIST	Network trip distance between origin and destination locations for an external private vehicle trip, in miles			
Explanatory Variables				
* *	Level-1 Traveler/Household Level			
CHILD	variable indicating that the traveler is under 16 years of age (1=child, 0=adult)			
HHSIZE	Number of members of the household			
VEHCAP	Number of motorized vehicles per person in the household			
BUSSTOP	Dummy variable indicating that the household lives within ¹ / ₄ mile of a bus stop (1=yes, 0=no)			
	Level-2 MXD Level Variables			
AREA	Gross land area of the MXD in square miles			
POP	Resident population within the MXD			
EMP	Employment within the MXD			
ACTIVITY	Resident population plus employment within the MXD			
ACTDEN	Activity density per square mile within the MXD			
DEVLAND	Proportion of developed land within the MXD			
JOBPOP	Index that measures balance between employment and resident population within MXD			
LANDMIX	Diversity index that captures the variety of land uses within the MXD			
STRDEN	Centerline miles of all streets per square mile of gross land area within the MXD			
INTDEN	Number of intersections per square mile of gross land area within the MXD			
EMPMILE	Total employment outside the MXD within one mile of the boundary			
EMP30T	Total employment accessible within 30-minute travel time of the MXD using transit			
EMP10A, EMP20A, EMP30A	Share of total employment accessible within 10-minutes, 20-minutes, and 30-minutes travel time of the MXD using an automobile at midday			
STOPDEN	Number of transit stops within the MXD per square mile of land area			
RAILSTOP	Rail station located within the MXD (1=yes, 0=no)			
	Level 3 Regional Explanatory Variables			
REGPOP	Population within the region			
REGEMP	Employment within the region			
REGACT	Activity within the region (population + employment)			
SPRAWL	Measure of regional sprawl			

 Table 2.2
 Model Variables (3)

Four outcomes are modeled in this study: choice of internal destination, choice of walking on external trips, choice of transit on external trips, and distance of external trips by private vehicle. Models apply to trips produced by and trips attracted to MXDs and are estimated separately by trip purpose: home-based work, home-based other, and non-home-based.

For internal capture of trips, coefficients and their significance levels (p-values) are calculated for homebased work, home-based other, and non-home-based trips. The coefficients are elasticities of the odds of internal capture with respect to the various independent variables. In the case of home-based work trips, the odds of an internal trip decline with household size and vehicle ownership, and increase with an MXD's job-population balance. Therefore, the internal capture is related to two D variables: diversity and demographics. For home-based other trips, the odds of internal capture decline with household size and vehicle ownership, and increase with an MXD's land area, job-population balance, and intersection density. Internal capture for trips from home to non-work destinations is therefore related to development scale, diversity, design, and demographics. For non-home-based trips, the odds of internal capture decline with household size and vehicle ownership, and increase with land area, employment, and intersection density of the MXD. In this case, the internal capture is related to design, development scale, and demographics.

The results for the walk mode choice on external trips are also given for home-based work, home-based other, and non-home based trips. The analysis is based on the same coefficients as in the previous case. For external home-based work trips, the odds of walking decline with household size and vehicle ownership. They increase with job-population balance within the MXD and number of jobs outside the MXD within a mile of the boundaries. Therefore, walking on external home-based work trips is related to three types of D variables: diversity, destination accessibility, and demographics. For external home-based other trips, the odds of walking decline with household size and vehicle ownership, and with the land area of the MXD. These odds increase with the activity density of the MXD, the job-population balance within the MXD, and number of jobs outside the MXD within a mile of the boundaries. For external non-home-based trips, the odds of walking decline with household size and vehicle ownership, and with the land area of the MXD, and number of jobs outside the MXD within a mile of the boundaries. So this choice is related to development scale, density, diversity, destination accessibility, and demographics. For external non-home-based trips, the odds of walking decline with household size and vehicle ownership, and increase with the activity density of the MXD, the intersection density of the MXD, and the number of jobs outside the MXD, the intersection density of the MXD, and the number of jobs outside the MXD within a mile of the boundaries. Walking on these trips is therefore related to measures of density, destination accessibility, and demographics.

The same approach is used for predicting transit mode choice on external trips. For external home-based work trips, the odds of transit use decline with household size and vehicle ownership. They increase with the intersection density of the MXD and the number of jobs within a 30-minute trip by transit. Transit use on home-based work trips is therefore related to measures of design, destination accessibility, distance to transit, and demographics. For external home-based other trips, the odds of transit use decline with household size and vehicle ownership, and increase with the activity density within the MXD. Finally, the odds of transit use on external non-home-based trips decline with household size and vehicle ownership per capita, and increase with the number of jobs within a 30-minute trip by transit.

The last output from the model is related to the trip distance for external automobile trips. The same approach and coefficients were used as in the previous cases. For external home-based work trips, trip distance increases with household size, vehicle ownership per capita, and land area of the MXD. The distance declines with a project's job-population balance and the share of regional jobs reachable within 30 minutes by automobile. Trip distance for these trips is therefore related to four types of D variables: development scale, diversity, destination accessibility, and demographics. For external home-based other trips, trip distance increases with household size and vehicle ownership. It declines with the job-population balance within the MXD and the share of regional jobs reachable within 20 minutes by automobile. Trip distance in this case is related to measures of diversity, destination accessibility, and

demographics. For external non-home-based trips, trip distance increases with household size and vehicle ownership. It declines with the job-population balance within the MXD, intersection density within the MXD, and the share of regional jobs reachable within 20 minutes by automobile. External trip length for these trips is therefore related to measures of diversity, design, destination accessibility, and demographics.

The models were validated by comparing model estimates to in-field traffic counts on a sample of 22 MXDs for which traffic counts of external vehicle trips were available. The results showed that the models were capable of predicting a wide range of internal capture rates and mode shares for external trips, taking into account development scale, site design, and regional context. The model was able to predict total vehicle counts within 20% of the actual number of trips observed for 13 of the 22 validation sites, within 30% for four sites, and within 40% for another four. Only one site was off by more than 40%. A strong association was also observed between predicted and measured external vehicle counts using the developed models.

This study developed models that can be used to predict trip productions plus attractions for three separate trip purposes. The results can be used to adjust the current trip generation rates given in the ITE Trip Generation Manual. This is the first national study of the traffic generation by mixed-use developments. The study found that an average of three out of 10 trips generated by MXDs put no strain on the external street network and generate relatively few vehicle miles traveled. It also revealed the primary factors affecting this reduction in automobile travel as:

- The total and the relative amounts of population and employment on the site
- The site size and activity density
- The size of households and their auto ownership
- The amount of employment within walking distance of the site
- The block size on the site
- The access to employment within a 30-minute transit ride of the site

The study is aimed to help guide planners and developers of mixed-use projects on design features that would minimize traffic generation and negative impacts associated with it. It could also help produce new analysis techniques for a more realistic quantification of impacts and infrastructure size for mixed-use development plans. Since TOD encourages mixed-use development, the findings of this study can be important for the project we are dealing with.

2.2 Street Connectivity

Developing a network that would be able to accommodate transit in the future requires adjustments for multi-modal transportations systems. This network would not only include cars, but also transit, biking and pedestrian routes. In order to encourage alternative modes of transport, a network needs to be denser, with frequent intersections, short walking distances, route choice options, and good access management. In short, streets in the TOD network need to be better connected. The term street "connectivity" brings us back to "the original purpose of streets," where streets should connect and enable movements between different parts of the network (4). The quality of connections or the "connectivity" of the street network influences the accessibility of potential destinations and has important implications for travel choices, emergency access, and, more generally, quality of life (4). Street connectivity is a measure of density of connections serving the same origins and destinations in the street network. It relates to how an entire area is connected by a street system, both internally and externally (5).

The motives for increasing street connectivity include: reducing traffic on arterial streets, providing continuous and more direct routes, providing greater emergency vehicle access, and improving the quality

of utility connections. Figure 2.3 shows the benefits of street connectivity. The Congress for New Urbanism is also promoting the concept of connectivity as part of an effort to create more livable and sustainable communities (6). The design principles that New Urbanists suggest for street connectivity include:

- Interconnected street network to disperse traffic and ease walking
- A hierarchy of narrow streets, boulevards, and alleys
- High quality pedestrian network

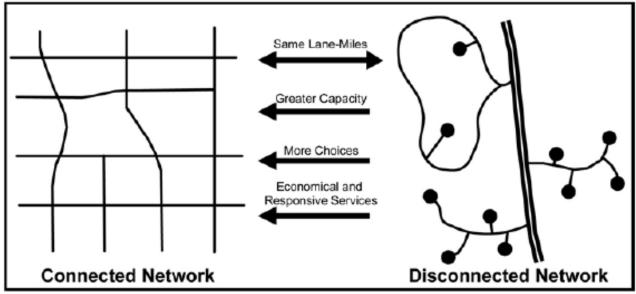


Figure 2.3 Benefits of Street Connectivity (7)

Street connectivity in the literature is usually presented in comparison to a "cul-de-sac" street pattern with dead-end streets. Here we examine connectivity versus expansion of arterial streets and present the existing measures of impacts that connectivity has on traffic. Increased connectivity will help (8):

- Decrease traffic on arterial streets
- Reduce travel time and VMT by creating shorter travel distances
- Provide continuous and more direct routes for walking and biking, and improve residents' health
- Provide better and redundant emergency vehicle access and reduce response time
- Provide improved utility connections, easier maintenance, and more efficient trash and recycling pick up
- Lower speeds and reduce accident severity
- Better accommodate transit use

Potential benefits of increased street connectivity are known; however, its traffic impacts are rarely quantified. It is certain that increased connectivity is more efficient than cul-de-sac patterns, although it raises some questions about community crime rates when compared to cul-de-sacs. But increasing connectivity and slowing down further development of arterial streets could lower the efficiency of the entire area network. Street connectivity in the existing literature will be reviewed from the cost-benefit perspective in comparison with arterial network expansion. The goal is to investigate potential parameters that could later be included in TOD modeling. Figure 2.4 shows the example of two neighborhoods with different levels of connectivity and explains the impacts on travel choices.

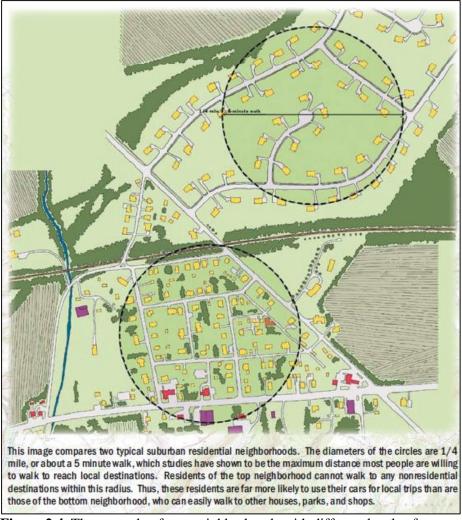


Figure 2.4 The example of two neighborhoods with different levels of connectivity (Source: New Jersey DOT)

U.S. Street Functional Hierarchy

Functional classification from the perspective of traffic engineers and community planners differs. Federal Highway Administration (FHWA) functional classification (9) is traffic oriented and recommends roadway design principles that relate to existing demand and requiring capacity. Planning oriented functional classification includes multi-modality, separates local from through traffic, and follows the concepts of sustainability and context sensitive design. While the definitions of freeways and expressways are similar, there are major differences between planners and traffic engineers related to street network design. Here we compare these two types of classification on the level of street network in order to establish the possible directions for future network development.

FHWA classification uses network density and functional class as inputs to the design process to control the basic size, speed, and accessibility of the roadway in the current design practice. Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide. Defining the function that the roadway facility needs to serve is the first step in the design process. The level of service required for this function for the anticipated volume and composition of traffic is a basis for design speed and geometric criteria selection.

Functional classification of streets depends on the traffic and the degree of land access they allow (see Figure 2.5). Standard street classification includes arterial streets, collector streets, and local streets. There is a basic relationship between functionally classified highway systems in serving traffic mobility and land access. Arterials provide a high level of mobility and a greater degree of access control, while local roads provide a high level of access to adjacent properties but a low level of mobility. Collector roadways provide a balance between mobility and land access.

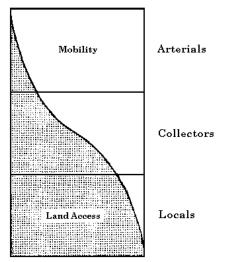


Figure 2.5 Relationship between Mobility and Land Access in FHWA Classification (source: FHWA)

Arterials provide the highest level of service at the greatest speed for the longest uninterrupted distance, with some degree of access control. They carry traffic between communities and connect communities to major intrastate and interstate highways.

Collectors provide a lower level of service at a lower speed for shorter distances by collecting traffic from local roads and connecting them with arterials. They convey traffic between arterials and from lower-order streets to arterials. They are the primary routes within residential and commercial areas.

Local streets primarily provide access to land with little or no through movement. Sub-collectors are local streets that provide frontage for individual lots and carry small amounts of through-traffic between collectors or from access streets to collectors. Access streets are local streets that provide frontage for individual lots and carry only traffic with an origin or destination on the streets themselves.

The joint ITE and the Congress for the New Urbanism project (10) proposed a functional classification that pairs existing design criteria with urban characteristics. Street connectivity is usually addressed as a part of context-sensitive design of street networks. It supports multi-modal transportation systems, walkability, and mixed use environments. Network density and functional class are used as inputs to the design process. They control the number of lanes, speed, and accessibility of the designed roadway. From the aspect of traffic engineering, street network development is focused on minimizing travel time and congestion. This approach tends to maintain network hierarchy and meet capacity-based needs. From the aspect of planning, streets' contribution to the community is also important. This approach is more open to various transport modes and promotes increased network density as an alternative to simple roadway expansion through lane addition. The goal of this classification system is to support diverse economic, social, and environmental needs of metropolitan communities.

The purpose of the joint ITE and New Urbanism project was to develop a street system concept that supports smart growth. The intent of this project was to encourage the practice of context-sensitive design. They introduced boulevards and avenues instead of major and minor arterials. Boulevards and avenues would accommodate local traffic to a greater extent than minor arterials. Collectors would no longer be used. Instead, connectors would link neighborhoods to town centers. The street system puts limits on the number of traffic lanes. It recommends reducing spacing between major streets rather than adding more lanes, in case more capacity is needed. Parking serves to shield and separate pedestrians from passing traffic. The purpose is to make walking as convenient as possible. The possible street typology is presented in Table 2.3.

Smart Growth	Conventional Equivalent	Max. Lanes	Max. Speed	Curb Parking	Adjacent Sidewalk	Functions under Smart Growth
Freeway	Freeway	6	55	No	No	Through, longer distance traffic
Expressway	Expressway	6	45	No	No	Through, longer distance traffic
Boulevard	Minor Arterial	6	35	Yes	Both Sides	Inter-neighborhood traffic and local circulation
Avenue	Minor Arterial	4	30	Yes	Both Sides	Inter-neighborhood traffic and local circulation
Connector	Collector	2	25	Yes	Both Sides	No collector function, connects to town, village centers
Local	Local	2	25	Yes	Both Sides	Local property access

 Table 2.3 Possible Smart Growth Functional Classification (10)

The Federal Highway Function and Classification system contains the conventional classification system commonly accepted to define the functional and operational requirements for streets. Traffic volume, trip characteristics, speed and level of service, and other factors in the functional classification system relate to the mobility of motor vehicles, not bicyclists and pedestrians, and do not consider the context or land use of the surrounding environment. This approach, while appropriate for high speed rural and some suburban roadways, does not provide designers with guidance on how to design for living streets or in a context-sensitive manner. The street types described in Table 3 provide mobility for all modes of transportation with a greater focus on pedestrians. There is a need for greater flexibility in applying design criteria, based more on context and the need to create a safe environment for pedestrians. The Model Design Manual for Living Streets (*11*) describes the terms for street types that are more context-oriented and do not follow conventional classification so strictly. Table 4 below provides another list of possible street types.

Table 2.4	Possible Street	Types according to	o Model Design Manu	al for Living Streets (11)

Street Type	Conventional Match	Description	Comment
Boulevard	Arterials	Traverses and connects districts and cities; primary a larger distance route for all vehicles including transit	Often has a planted median
Avenue	Collectors	Traverses and connects districts, links streets with boulevards, for all vehicles including transit	May or may not have a median
Street	Local Streets	Serves neighborhood, connects to adjoining neighborhoods, serves local function for vehicles and transit	
Alley (Lane)		Link between streets, allows access to garages	Narrow and without sidewalks

Well-planned street networks help create sustainable cities that support the environmental, social, and economic needs of their residents. Sustainable street networks improve traffic safety. Hierarchical street patterns with cul-de-sac subdivisions depending on arterials do not perform as well as sustainable street networks and cause more traffic crashes. Hierarchical street networks divert traffic to high-speed arterials that have large intersections. Most crashes occur at intersections. The speed on arterial streets increases the likelihood and severity of crashes. A 2011 study of 24 California cities found a 30% higher rate of severe injury and a 50% higher chance of fatality in cities dominated by sparsely connected cul-de-sacs compared with cities with dense, connected street networks (*12*). A 2009 study from Texas found that each mile of arterial is associated with a 10% increase in multiple-vehicle crashes, a 9.2% increase in pedestrian crashes, and a 6.6% increase in bicyclist crashes (*13*).

Sustainable street networks increase the number of people walking and bicycling and reduce vehicle miles traveled. Connectivity enables people to take shorter routes. It also enables them to travel on quieter streets, more conductive for bicycling and walking. These street networks allow more effective emergency response. Studies in Charlotte, North Carolina, found that when one connection was added between cul-de-sac subdivisions, the local fire station increased the number of addresses served by 17%. Emergency responders favor well-connected networks with a redundancy of routes to maximize access to emergencies.

These studies and others provide strong evidence that the benefits of a well-designed street network go beyond safety, and include environmental, social, and economic gains. Interconnected street networks can preserve habitat and important ecological areas by condensing development, reducing city edges, and reducing sprawl. A denser street network constrains traffic growth by limiting the number of lanes on each street while providing maximum travel options by collectively providing more lanes on more streets.

Street Connectivity Measures

There are many studies that deal with the problem of measuring street connectivity. One of the most common issues addressed in these studies is choosing the appropriate measure and method of measuring street connectivity. Each connectivity measure links travel behavior to urban forms. The purpose is to determine the standards and ranges of connectivity that would both benefit residential areas and increase regional traffic efficiency.

Dill (14) analyzes different connectivity measures for biking and pedestrian network development. The paper suggests the advantage of grid-like networks over cul-de-sacs and long blocks. Connectivity measures can be deployed as performance standards for new and/or existing development. Tresidder (15) uses GIS to measure network connectivity. He concluded that utilizing the connectivity measures requires a great amount of detail and explanation regarding the calculation of those measures. Scoppa et al. (16) analyzed the effects of street connectivity on the distribution of vehicular traffic in Metropolitan Atlanta. They used three measures of street connectivity: metric reach, directional reach, and global metric betweenness. Metric reach is a measure of street density and represents total street length, which is accessible from a street segment within a given network distance. Directional reach is a syntactic measure that represents total street length, which is accessible from a street segment within a given number of direction changes. Global metric betweenness expresses the extent to which a given road segment is a shortcut for all possible connections in the region. The study showed that street width has stronger association with traffic volumes than street connectivity. Yi (17) used GIS to compare the levels of connectivity and pedestrian accessibility of cul-de-sac and grid-like neighborhood networks. The paper was motivated by the debate between New Urbanists, the proponents for the grid pattern, and developers who want to continue cul-de-sac practice. The results showed that street connectivity is highest in the neighborhoods with grid street patterns. Cul-de-sacs had better overall pedestrian accessibility than the grid urban form. Creating pedestrian-friendly neighborhoods is more important than choosing between

grids or cul-de-sacs. The study also finds GIS as an essential tool for measuring street connectivity and pedestrian accessibility. Table 2.5 is the summary of street connectivity measures most commonly addressed in the existing research.

Traffic Impacts of Street Connectivity

The published research on street connectivity tends to support the argument that greater connectivity will reduce traffic volumes on arterials. This reduction can be attributed to two factors: the dispersal of vehicle trips throughout the network and the decrease in total amount of vehicle travel. Connectivity might reduce vehicle trips by reducing trip distances, reducing the number of trips, or encouraging a shift to transit or non-motorized modes. Existing studies agree that average trip distance and congestion will be lower in areas with rectilinear street patterns than in areas with conventional suburban street patterns only if the number of trips made by car does not increase.

Measure	Definition	Standard	Research
Block Length	Length from the curve of one side of the block	330 ft preferred	Cervero et al. (1997)
	to the curb on the other side of the bloc. Can	528 ft maximum	Handy et al. (2003)
	also be measured from intersection centerline.		
Block Size	Area of block perimeter.	1000 ft preferred	Hess et al. (1999)
		1400 ft maximum	Reilly (2002)
			Song (2003)
			CNU et al. (2005)
Block Density	Mean number of blocks per mi ²	160 preferred	Cervero et al. (1995)
		100 minimum	Cervero et al. (1997)
T 100 (A T1 A			Frank et al. (2000)
Effective Walking	Number of parcels within ¹ / ₄ mi walking		
Area	distance from origin point/ Number of parcels		
D. L. d. f	within ¹ / ₄ mi radius of origin point		
Pedestrian	Pedestrian network area/Total area		
Catchment Area Pedestrian Route	The metic of monte distance to starisht line	15	Hess (1997)
	The ratio of route distance to straight line	1.5 preferred 1.8 maximum	
Directedness	distance for two selected points	160 preferred	Randall et al. (2001)
Intersection Density	Number of intersections per unit of area	100 preferred	Cervero et al. (1995) Cervero et al. (1997)
		100 minimum	Reilly (2002)
			Metro (2004)
Grid Pattern	Percentage of area with four-way intersections	95% preferred	Boarnet et al. (2001)
Percentage of Four-	reicentage of area with four-way intersections	85% minimum	Greenwald et al. (2001)
way Intersections		8570 IIIIIIIIIIIIIII	Greenwald et al. (2001)
Street Density	Number of linear miles of streets per square	26 mi preferred	Handy (1996)
Succe Density	mile of land	18 mi minimum	Mately et al. (2001)
Percentage of Cul-de-	Number of cul-de-sacs/Number of nodes		
Sacs			
Connectivity Index	Number of links divided by the number of	1.4 preferred	Ewing (1996)
-	nodes in an area	1.2 minimum	Handy (2003)
Connected Node	Number of street intersections divided by the	1 preferred	Allen (1997)
Ratio	number of intersections plus cul-de-sacs	0.7 minimum	Song (2003)
Link Node Ratio	Same as connectivity index		
Gamma Index	Number of existing links/Number of possible		
	links		
Alpha Index	Number of actual circuits/ Number of possible		
	circuits		

 Table 2.4 Summary of Street Connectivity Measures from the Literature (17)

The results of several simulation efforts support the theory that greater street connectivity will reduce traffic volumes on arterials. McNally and Ryan (18) used a travel demand forecasting model to predict traffic in two hypothetical neighborhoods. One neighborhood was a conventional planned development

with curvilinear network, and the other a traditional rectilinear grid. The simulation showed significant decreases in vehicle miles traveled, trip lengths, and travel time in the traditional grid. In a similar simulation study in Portland, Oregon, analysts found that total vehicle miles traveled were 43% less in a traditional neighborhood with highly connected street patterns than in a conventional neighborhood with hierarchical street patterns (19). Portland Metro's study results show that medium and high levels of connectivity improved traffic flow on arterials. Overall, vehicle hours of delay, vehicle miles traveled, and average trip lengths declined in each area when connectivity increased from low to medium levels. Traffic volumes approaching key intersections also declined. The results from Portland Metro also show that greater connectivity could have negative impacts on both residential streets and on arterials. The model showed some use of local streets to bypass congested intersections and/or arterial sections when doing so yielded better travel times. The researchers noticed that arterials might lose some capacity due to increased number of intersections. The results generally show that an optimal level of connectivity needs to be determined.

Some research studies examined the possibility that greater network connectivity could increase the frequency of trips. Crane (20) concluded that grids tend to increase car trips and, as a result, total vehicle travel would also increase even if trip lengths decreased. Handy (21) found evidence in a study of neighborhoods in the San Francisco Bay Area that improved accessibility can lead to greater trip frequencies. Ewing and Cervero (1) completed a comprehensive review of studies that tested the link between street networks and vehicle travel and concluded that the evidence is inconclusive.

The major benefit of street connectivity is traffic redistribution that provides network-wide capacity increase. Street connectivity takes local trips off the arterials and reduces the need for street widening. The question remains how much traffic local streets can take and preserve level livability.

Alba and Beimborn (22) explain how poor street connectivity leads to higher traffic concentration on arterials and creates the need for street widening. In other words, better connectivity could prevent the need for street widening. Their study further presents the relationship between connectivity of local streets and arterial traffic. There are many debates on whether increased connectivity reduces arterial traffic or stimulates further demand increase and congestion. The advantage of this study is that it provides a quantitative analysis of the subject. The study is based on a detailed travel demand analysis of local street networks. The test network was chosen in an area of mixed lane use, high activity levels, and poor connectivity. The authors used demographic and employment information to provide details on trip origins and destinations. They coded the local streets in greater detail to show the existing street pattern and then added new links to provide better connectivity. The network models had different combinations of speed to determine how speed affects flows. The study compared the existing network to the new network with increased connectivity. A method developed to assess the impacts of connectivity on arterial traffic shows that improved connectivity can reduce arterial traffic levels. The study compares traffic volume differences along the arterials for the existing and new network. The comparison almost always showed volume reduction for the new, better connected network. This reduction depends on relative speed on the arterial versus local roads and the extent to which arterials carry through traffic. Impacts are greatest when the speed differential is small and there is limited through traffic. Very few arterial segments experienced a traffic volume increase with increased connectivity. The results of this study show a contradiction in the role of local streets in the neighborhoods. Local streets are successful in serving internal traffic when speeds on the local streets are close to those on the arterials. However, traffic calming as a strategy shows opposite results and requires operating at lower speeds. So these two strategies have conflicting approaches to the same goal. This is why street network design in neighborhoods is a very complex process.

Increased street connectivity increases non-motorized travel due to shorter walking distances. The entire community benefits from this since walking means an increase in physical activity. The damaging environmental consequences of car dependence are also reduced if other travel modes are encouraged. Ewing and Cervero (1) concluded that it is hard to predict which modes will be dominant in grid-like networks. Handy et al. (21) found that the rates of walking are higher in traditional grid pattern areas. This shows that it is important to jointly plan land use and connectivity requirements.

The most appropriate way to measure street connectivity and how much connectivity is the sufficient amount are still questions (21). There is a need to quantify and compare higher connectivity impacts versus conventional solutions in order to answer these questions. Further research in this area would lead to an optimal street network design for achieving the desired level of connectivity.

2.3 Innovative Intersections

Innovative intersections (also known as unconventional intersections) are generally defined as any atgrade design concepts that are able to reduce the number of phases at the main intersection, thereby increasing the efficiency and capacity of the signal (28). In most cases, this is accomplished by rerouting left turns at a point well ahead of the main intersection, or accomplishing left turns through a combination of through, right, and U-turn movements. These designs are regarded to be "unconventional" because they incorporate geometric features or movement restrictions that would be permissible at standard atgrade intersections (29). Such elements include the elimination and/or relocation of various through and turning maneuvers, the use of indirect turning movements, and the inclusion of roundabout designs.

The general goal of innovative intersections is to improve the overall operation of the intersection by favoring heavy volume through movements on the arterial street. They often manage to relieve traffic congestion, and in most cases their cost is relatively modest. The ways that innovative intersections improve traffic conditions can be summarized as follows:

- Reducing the number of conflict points, or improving safety and capacity by spreading them out
- Restricting and/or rerouting movements
- Reducing the complexity of traffic signal phasing

One of the recognized problems with new implementations of innovative intersections is unusual driver expectancy. Perfect driver expectancy can only be achieved with conventional intersection design. Also, some "unusual" intersection designs are in use in some states (median U-turn in Michigan, or jughandle in New Jersey), making them familiar to the drivers in these states, but not in others. For that reason, a DOT agency must provide adequate education and guidance to cope with drivers' confusion during the initial period following the installation.

Different intersection designs have appeared during the last few decades that are considered "unconventional." These new designs for urban intersections are context sensitive, efficient, and often affordable, especially if such a design is envisioned when adjacent land uses are first established (28). In most cases, they can accommodate more traffic than grade-separated designs, with much lower construction and maintenance costs.

Median U-Turn Intersection

The main objective of the median U-turn intersection (a.k.a. Michigan U-turn, through-turn) is to remove all left-turn traffic from the main intersection. It redirects left turns through a combination of through, right, and U-turn movements (28 - 31). A schematic diagram of this intersection type is given in Figure 2.6.

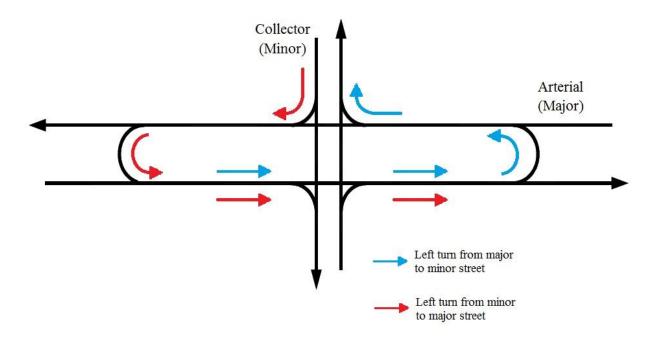


Figure 2.6 Median U-turn

Vehicles turning left from the major to minor street continue through the intersection, make a U-turn at the designated place on the major street, and then turn right at the intersection. Vehicles turning left from the minor to major street first turn right at the intersection, make a U-turn at the designated place on the major street and then continue straight through the intersection. The relocation of left turns at the intersection simplifies its signal phasing. The intersection can operate on a simple two-phase timing plan, increasing capacity, reducing delays, and improving intersection coordination. Safety at this intersection is also improved, since it eliminates conflicts between left-turning and through vehicles. For the same reason, it is more pedestrian-friendly, since there are no conflicts between pedestrians and left-turning vehicles. Studies on median U-turn intersections show an increase in capacity of about 50% when compared with double left turns, and a crash rate that is 20% lower (*28*).

The main disadvantage of the median U-turn is increased delay and travel distance for left-turning vehicles. In some cases, the U-turn may require a separate signal if the traffic volumes on the major street are too high. Also, sometimes it may be necessary to expand the roadway at the U-turn section, which takes up more space.

This type has been in use in Michigan since the 1960s (hence its name). The drivers in Michigan are used to this design type, so it does not conflict their expectancy. They are not so common in other states, which can cause unusual driver expectancy in the early stages of implementation.

Bowtie Intersection

The turning movements at Bowtie intersections are similar to median U-turn intersections. The difference is that Bowtie uses roundabouts located on the minor road, as shown in Figure 2.7 (28, 29, 32, 33). The advantages are similar to those seen at median U-turns, with elimination of left-turn phases, increased capacity, and improved safety. Also, Bowties eliminate the necessity of having signalized U-turns, since roundabouts are used in this case. Having a roundabout on the minor street is also an advantage, because the turning movements face lower traffic volumes. The roundabouts in the Bowtie variation also provide

unique opportunities for side-street tie-ins, improved aesthetics, and traffic calming, which are qualities attractive for livable corridors.

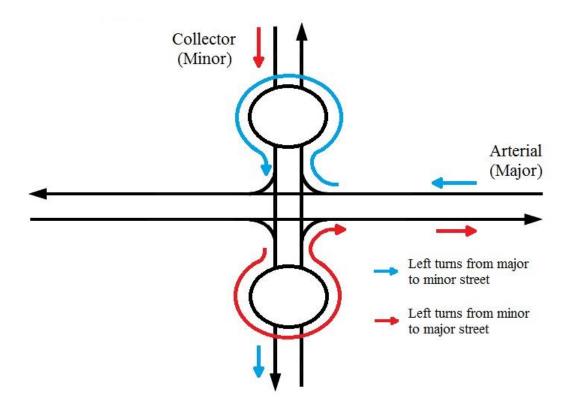


Figure 2.7 Bowtie Intersection

The distance between the main intersection and the roundabouts depends on the amount of storage space required for minor street approach queuing. The size of the roundabouts would depend on the design speed and design vehicles in a particular location.

Bowties increase delays and travel distances for left-turning vehicles, which is the major disadvantage. Also, the roundabouts in the Bowtie require additional space for construction. Unusual driver expectancy should also be considered with this intersection type.

Quadrant Intersections

At a Quadrant intersection, left turns are redirected onto an adjacent roadway that connects two legs of the intersection at locations that could allow traffic to bypass the main intersection. This decomposes the main large intersection into three smaller signalized intersections. All left-turn movements from both roads are completed prior to or after the main intersection on a bypass road (28, 29, 32). The diagram of a single Quadrant intersection is given in Figure 2.8. It is possible to achieve all left turns with a single quadrant, although it is not recommended.

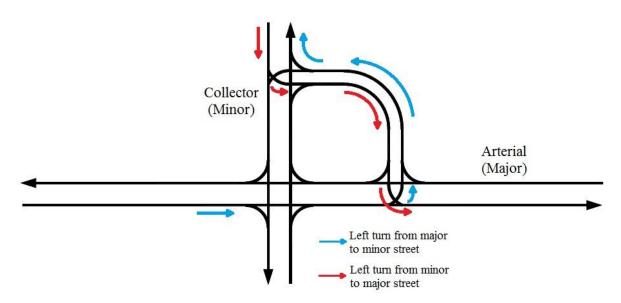


Figure 2.8 Single Quadrant Intersection

Eliminating left-turn movements at the main intersection increases the intersection capacity and efficiency by eliminating left-turn signal phases, which in turn provides more green time to through traffic. Without left-turn movements, a simple two-phase signal can be used, which may increase corridor capacity by as much as 50%. Eliminating the left-turn movements also improves intersection safety by decreasing the number of vehicular and pedestrian conflict points, therefore reducing the opportunity for collisions. In the case of a single Quadrant intersection, a key component is the coordination of the three signals. The left-turning movements into and out of the quadrant roadway occur during the phase that overlaps the coinciding movement at the main intersection, which minimizes (or even eliminates) the number of stops required to complete the left turn. The length of the quadrant roadway and the locations of its accompanying intersections are dictated by a trade-off between the amount of storage required for leftturn queuing and distance and time required to travel to the intended direction. Although building a Quadrant intersection is more costly, it provides access to and from developments within the selected quadrant. A Quadrant intersection can also provide opportunity for additional storefront opportunities. A higher number of vehicles on the connector roadway will provide a unique and potentially profitable location for businesses. Aesthetic improvements can also be made to the quadrant to help improve its appeal. Some other advantages of this design include a reduction in conflict points at the main intersection, and reduced intersection widths that benefit pedestrians.

The main disadvantage of this intersection type is increased delay and travel distance for left-turning vehicles. This configuration could also be more confusing for drivers, because the left-turn movements are not the same for different directions. Left turns for two of the approach directions would be made prior to the main intersection and the other two approaches would initiate their left-turn maneuvers after the main intersection. Some of these problems can be solved by introducing two or four Quadrant intersections.

Jughandle Intersection

The Jughandle intersection introduces a design similar to quadrant intersections. The principle of the jughandle design is to remove all turning traffic (including right turns) from the main intersection by shifting them from the major street approaches and onto an adjacent ramp (28, 29). A diagram of the Jughandle intersection is given in Figure 2.9.

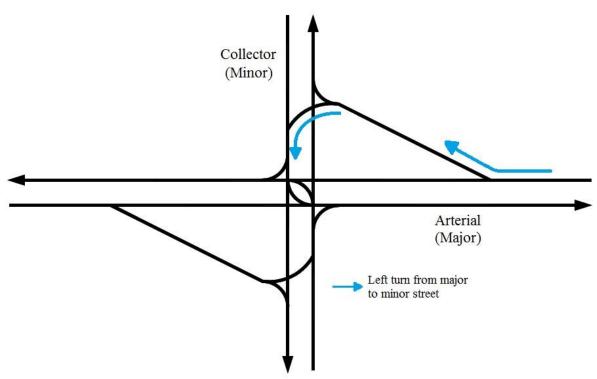
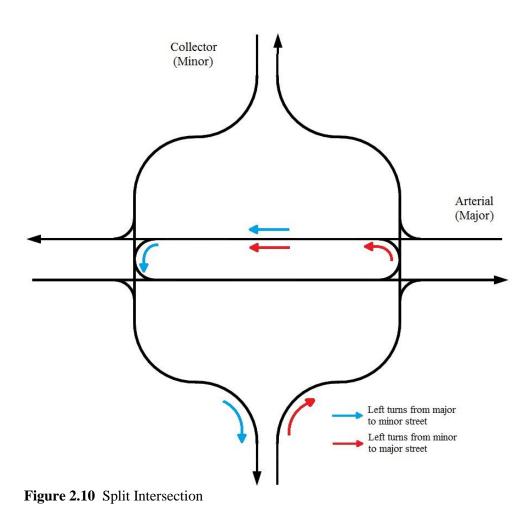


Figure 2.9 Jughandle Intersection

The turning maneuvers are completed at an intersection created between the ramp and the minor highway, and then proceed through the main intersection, similar to the Quadrant intersection. However, a difference is that left turns from the minor street are permitted onto the major roadway. This design type is best suited for high volume arterial roadways with moderate to low left-turn volumes. It eliminates the need for a left-turn phase on the major roadway (although it may be needed for the minor road, depending on the volumes). Other advantages and disadvantages are the same as for the Quadrant intersection.

Split Intersection

The Split intersection separates directional traffic flows into two offset one-way roads. This configuration is similar to an at-grade diamond interchange without a separate bypass for through traffic (29). A diagram of this intersection is given in Figure 2.10.



The separation of flows reduces delay and eliminates turning conflicts compared with a conventional four-legged intersection. The majority of the delay reduction results from the elimination of one of the four traffic-signal phases of the intersections. This adds more green time to the cycle for left-turning vehicles. Reducing the number of conflicts between left-turning and through vehicles has been shown to increase safety. The main disadvantages of the Split intersection are the high initial cost, right-of-way acquisition, and possible wrong-way movements by unfamiliar drivers. Split intersections can also be achieved by separating flows for the major and minor roadway (or two roadways of the same class). In that case, it is known as the Town Center Intersection or the Square-about. The Split intersection is a common design in New Jersey.

Superstreet Intersection

The Superstreet intersection has many similarities with the Median U-turn intersection. In this case, the main intersection is closed for both through and left movements from the minor street. They are achieved through a combination of a right and U-turn movement. The effect of this configuration is that it allows a four-approach intersection to operate as two separate three-approach intersections, and allows each direction of the major street to operate on an independent timing pattern (28, 29). In this case, left turns from the major roadway on to the minor street are allowed at the main intersection. This configuration is shown in Figure 2.11.

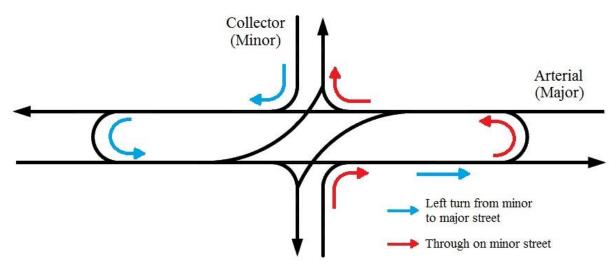


Figure 2.11 Superstreet Intersection

Because of the ability to independently control the major street directions, the superstreet design permits coordinated progression for the major street regardless of its spacing relative to upstream and downstream intersections. This significantly reduces delays on the major roadway. The most significant disadvantage is that it does not permit through or direct left-turn movements from the minor roadway. This increases delays and travel distances for those movements. The driver expectancy can also be a problem. Pedestrians are required to cross the main intersection at an angle, parallel to the left-turn crossovers, requiring a longer pedestrian phase.

Continuous Flow Intersection

The Continuous Flow Intersection (CFI) is another complex unconventional intersection design in terms of the amount and proximity of channelizing and control features. The basic concept of the CFI is to move left-turn traffic from all approaches of the main intersection across the opposing traffic lanes prior to the main intersection (28, 29, 34). Left-turn maneuvers are then completed simultaneously and unopposed with their accompanying and opposing through movements, allowing the intersection to operate on a two-phase signal. For comparison, a standard signal with protected left-turn arrows must serve eight major movements, four left turns and four through movements, but only two movements can occur at a time, which demands a four-phase signal. The left turns prior to the intersection are also signalized, but they are coordinated with the main signal allowing the left-turning vehicles to cross the main intersection without stopping. The diagram of a CFI intersection is given in Figure 2.12. It shows only the CFI design on the major roadway, although it can be implemented on all approaches.

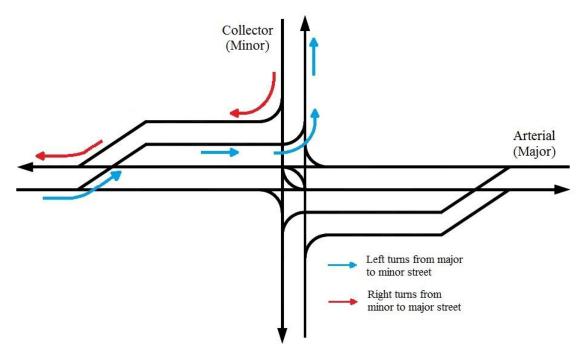


Figure 2.12 Continuous Flow Intersection (CFI)

It has proven to be simple for drivers to get used to, and in some cases can fit within existing rights-ofway (28). A full four-approach CFI with two to three lanes per approach can handle about 10,000-14,000 vehicles per hour at LOS E. A standard intersection with the same number of through lanes and with dual left-turn lanes on all approaches can handle about 6,000-8,000 per hour at the same level of service. The CFI design can greatly increase capacity and reduce delays.

The CFI also has some disadvantages. Drivers need to be aware of the need to make left turns prior to the intersection, so clear guidance must be given to warn them of the impending roadway and guide them into the appropriate lanes. Because of the multiple lane crossings within the intersection, pedestrian would also need to be guided and informed of the vehicle approach direction. Other disadvantages include the need for U-turn opportunities because access to and egress from intersections' quadrant developments would be difficult for most approach movements. The CFI would be most appropriate for high volume arterials with few needs for U-turns. Another important consideration is the level of development near the intersection. Because of the locations of the left- and right-turn lanes, the CFI does not provide easy access to and from adjacent properties.

Evaluations of Innovative Intersection Designs

One of the most widely used designs is the median U-turn. A comparative evaluation of conventional two-way left turn, median U-turn, and super-street median geometric designs was compared to assess the performance of these designs (*30*). Models of a typical suburban arterial corridor near Detroit, Michigan, were created in CORSIM simulation software. The modeled corridor was 2.5 miles long and included five signalized intersections, with varied intersection spacing (1,600 to 3,500 feet). Separate models were created for each design, where all the signalized intersections were modeled according to the specific design (two-way left turn, median U-turn, and super-street median). Each model scenario was repeated for four different levels of traffic volumes obtained from the field for the AM peak, noon-period, midday off-peak, and PM peak.

The analysis of variance (ANOVA) focused on the total system-wide travel time, average stops per vehicle, and average speed. The ANOVA results indicated that the arterial geometry was a significant factor at a 99.99% level of confidence for each dependent variable. The median U-turn scenario yielded the lowest travel times and highest speeds for all levels of traffic volumes. Super-street median provided lower travel times and higher speeds than the conventional design for peak period traffic volumes. Median U-turn and super-street median have experienced higher numbers of stops per vehicle than the conventional design for all volume levels. Because of their ability to reduce peak period delays without the need of additional capacity, the authors recommended considering these unconventional designs for implementation in the field.

A continuation of this study performed by the same authors looked into the performances of seven types of unconventional intersection designs (*31*). They analyzed the quadrant roadway intersection, median U-turn, superstreet median, bowtie, jughandle, split intersection, and CFI designs. Simulation experiments in CORSIM were conducted using turning movement data from seven existing intersections in Virginia and North Carolina to compare the travel time of conventional and unconventional designs. The volume levels used in experiments were the off-peak, PM peak, and a volume 15% greater than the PM peak period.

A combination of different designs at different volume levels was simulated for each intersection. The analysis focused on total system travel time rather than intersection delays (to adequately capture the effects of these designs on left-turn movements). The results from these experiments yielded several conclusions:

- The conventional design never produced the lowest average total time. At least one of the unconventional designs always had a lower average total time.
- The conventional design usually produced the lowest number of stops per vehicle.
- The quadrant roadway intersection and median U-turn designs usually vied for the lowest average total time.
- The quadrant roadway and median U-turn designs produced the most miles driven at each intersection.
- The split intersection competed well with all designs tested at off-peak volume levels and had lower average total times than the conventional design at most intersections.
- The CFI always had the highest move-to-total-time ratio of all designs, keeping traffic moving as its name implies.
- The superstreet median and bowtie designs were only competitive with the conventional design at intersections with two-lane cross streets.
- The jughandle design never performed better than the conventional design in average travel time.

Among all the designs, the quadrant intersection and median U-turn are viewed as the most effective designs. The authors recommended considering these unconventional designs for implementation in the field where traffic conditions are similar to the studied intersections and where the extra right-of-way can be reasonably procured.

There have been several implementations of innovative intersection designs. Despite the disadvantages, in most cases it was proven that these designs perform better than conventional intersections. Some of the designs can have a great impact on land use development and business opportunities, mainly the quadrant and town-center (split) intersections. Some potential locations can use the existing roadways, which can be easily transformed into innovative designs. Within the project network, there are several locations that are potential candidates for some of the innovative designs. The project will look into some options and recommend the best solutions. With the help of micro simulation, a comparison of different alternatives can be easily performed. We will develop several simulation models that will include some of the

innovative solutions (with UTA's approval), identify advantages and disadvantages of each of them, perform traffic analyses, and recommend the solution that would be best for the observed network.

2.4 Traffic Calming Measures

Traffic Calming Measures (TCM) are developed to reduce congestion and increase safety in residential environments. They have been around for more than 40 years. Many researchers have examined their impact on traffic. The general conclusion is that the implementation of TCM improves the quality of residential environment.

This literature review is related to the project that examines the impact of Transit Oriented Development (TOD) on traffic. The street network needs to be adjusted to TOD. Speeds and traffic volumes need to be reduced; street design needs to be changed to accommodate transit vehicle movements; pedestrians and transit users' requirements need to be considered. TCM have an important role in all these adjustments. Engineers use TCM as a tool to develop a transit-friendly environment. TCM affect both traffic and environment livability.

History and Definition of TCM

The idea of traffic calming started in Europe in the 1960s. Angry residents of the Dutch City of Delft fought cut-through traffic by turning their streets into "woonerven," or "living yards." This was followed by the development of European slow streets (designed for 30 kph [or 20 mph]) in the late 1970s. The application of traffic calming principles to intercity highways through small Danish and German towns and urban arterials in Germany and France followed in the 1980s (*35*).

In the United States, a version of traffic calming was practiced as early as the late 1960s and early 1970s in such places as Berkeley, CA, Seattle, WA, and Eugene, OR. The first national study of traffic calming was completed in 1980. It explored residential preferences related to traffic, collected performance data on speed humps, and reviewed legal issues. Almost 20 years later, with a track record in place, the Federal Highway Administration (FHWA) funded another study in 1998 that led to the ITE report, "Traffic Calming: State of the Practice," by Reid Ewing. As compared with the 1980 study, this report goes beyond residential streets to major thoroughfares, beyond speed humps to a toolbox of calming measures, and beyond legal issues to policy, procedural, and political challenges.

Definitions of traffic calming vary, but they all share the goal of reducing vehicle speeds, improving safety, and enhancing quality of life. Some include all three "Es," traffic education, enforcement, and engineering. Most definitions focus on engineering measures to change driver behavior. Some focus on engineering measures that compel drivers to slow down, excluding those that use barriers to divert traffic. The following are some example definitions.

- Institute of Transportation Engineers (ITE) Traffic calming involves changes in street alignment, installation of barriers, and other physical measures to reduce traffic speeds and/or cut-through volumes in the interest of street safety, livability, and other public purposes.
- Federal Highway Administration (FHWA) The term "traffic calming" is often described as the combination of mainly physical measures that reduce the negative effects of motor vehicle use and improve conditions for non-motorized street users. However, the term "traffic calming" also applies to a number of transportation techniques developed to educate the public and provide awareness to unsafe driver behavior.

According to the FHWA, general objectives of traffic calming are:

- To encourage citizen involvement in the traffic calming process by incorporating preferences and requirements of the citizens
- To reduce vehicular speeds
- To promote safe and pleasant conditions for motorists, bicyclists, pedestrians, and residents
- To improve the environment and livability of neighborhood streets
- To improve real and perceived safety for non-motorized street users
- To discourage use of residential streets by non-citizens cutting through vehicular traffic

Traffic calming is a way to design streets to improve safety, reduce the amount of cut-through traffic traveling on residential streets, and generally encourage people to drive more slowly. It relies on physical and visual cues in the roadway to induce drivers to travel at slower speeds. Traffic calming is self-enforcing. The design of the roadways results in the desired effect. It does not rely on complying with traffic control devices such as signals and signs. Street trees and lighting complement traffic calming devices and are often used to provide the visual cues that encourage people to drive more slowly. Traffic calming is such a powerful tool because it is effective. Some of the effects of traffic calming, such as fewer and less severe crashes, are clearly measurable. Others, such as supporting community livability, are less tangible, but equally important. Experience through Europe, Australia, and North America has shown that traffic calming, if done correctly, reduces traffic speeds, the number and severity of crashes, and noise level. Research on traffic calming projects in the United States supports their effectiveness at decreasing automobile speeds, reducing the number of crashes, and reducing noise levels in certain locations.

Traffic Calming Devices and Techniques

Traffic calming schemes generally incorporate a wide range of measures designed to complement each other in both speed reduction and environmental terms. Schemes are designed to be self-enforcing, although the effectiveness of this varies according to the measures employed. The Institute of Traffic Engineers defines four categories of TCM techniques:

- Vertical deflections
- Horizontal deflections
- Road narrowing
- Closures

The following descriptions of different TCM techniques and devices are based on a study conducted by Ewing (*36*). The study emphasizes the importance of the design principles for TCM. These measures must abide the standards for dimensions and horizontal and vertical curvature. Some of the principles for signs and markings are defined in the Manual on Uniform Traffic Control Devices (MUTCD), but there are no clear standards. Some of the principles are adopted from standards used by different DOTs in the United States, or in Europe and Australia. However, it should be noted that during the time this report was written and published (in 1999), the actual MUTCD edition was from 1988. The latest MUTCD edition (December 2009) includes standards and guidelines for signs and markings for TCM. The other important feature of TCM is the aesthetic appearance. For that reason, the use of landscaping is recommended in TCM areas.

Vertical deflections

Speed humps are rounded raised areas placed across the roadway. ITE guidelines specify that a speed hump should be 12 feet long (in the direction of travel), 3 to 4 inches high, and parabolic in shape, with the design speed of 15 to 20 mph. The profile of a speed hump can be circular, parabolic, or sinusoidal.

They are often tapered as they reach the curb on each end to allow unimpeded drainage. Speed humps are good for locations where very low speeds are desired and reasonable, and noise and fumes are not a major concern. In a survey by the Urban Transportation Monitor, speed humps were rated both the best and the worst traffic calming technique. They were rated best for their relatively low cost and their effectiveness in reducing vehicle speed. They were rated worst for various reasons, including appearance, liability, and "rough ride" because of their height.

Speed tables are flat-topped speed humps often constructed with brick or other textured materials on the flat section. Speed tables are typically long enough for the entire wheelbase of a passenger car to rest on the flat section. Their long flat fields give speed tables higher design speeds than speed humps. The brick or other textured materials improve the appearance of speed tables, draw attention to them, and may enhance safety and speed-reduction. Speed tables are good for locations where low speeds are desired but a somewhat smooth ride is needed for larger vehicles.

Raised crosswalks are speed tables outfitted with crosswalk markings and signage to channelize pedestrian crossings, providing pedestrians with a level street crossing. Also, by raising the level of the crossing, pedestrians are more visible to approaching motorists. Raised crosswalks are good for locations where pedestrian crossings occur at haphazard locations and vehicle speeds are excessive.

Raised intersections are flat raised areas covering an entire intersection, with ramps on all approaches and often with brick or other textured materials on the flat section. They are usually raised to the level of the sidewalk, or slightly below to provide a "lip" that is detectable by the visually impaired. By modifying the level of the intersection, the crosswalks are more readily perceived by motorists to be "pedestrian territory." Raised intersections are good for intersections with substantial pedestrian activity, and areas where other TCM would be unacceptable because they take away scarce parking spaces.

Textured and colored pavement includes the use of stamped pavement or alternate paving materials to create an uneven surface for vehicles to traverse. They may be used to emphasize either an entire intersection or a pedestrian crossing, and are sometimes used along entire street blocks. Textured pavements are good for "main street" areas where there is substantial pedestrian activity and noise is not a major concern.

Horizontal deflections

Traffic circles are raised islands, placed in intersections, around which traffic circulates. They are good for calming intersections, especially within neighborhoods, where large vehicle traffic is not a major concern but speeds, volumes, and safety are problems.

Roundabouts require traffic to circulate counterclockwise around a center island. Unlike traffic circles, roundabouts are used on higher volume streets to allocate right-of-way between competing movements.

Chicanes are curb extensions that alternate from one side of the street to the other, forming S-shaped curves. Chicanes can also be created by alternating on-street parking, either diagonal or parallel, between one side of the street and the other. Each parking bay can be created either by restriping the roadway or by installing raised, landscaping islands at the ends of each parking bay. Good for locations where speeds are a problem but noise associated with speed humps and related measures would be unacceptable.

Lateral shifts are curb extensions on otherwise straight streets that cause travel lanes to bend one way and then bend back the other way to the original direction of travel. They are one of the few measures that have been used on collectors or even arterials, where high traffic volumes and high posted speeds preclude more abrupt measures.

Realigned intersections are changes in alignment that convert T-intersections with straight approaches into curving streets that meet at right angles. A former "straight-through" movement along the top of the T becomes a turning movement. While not commonly used, they are one of the few TCM for T-intersections, because the straight top of the T makes deflection difficult to achieve, as needed for traffic circles. They are good for T-intersections.

Narrowings

Neckdowns are curb extensions at intersections that reduce the roadway width from curb to curb. They "pedestrianize" intersections by shortening crossing distances for pedestrians and drawing attention to pedestrians via raised peninsulas. They also tighten the curb radii at the corners, reducing the speeds of turning vehicles. They are good for intersections with substantial pedestrian activity and areas where vertical TCM would be unacceptable because of noise considerations.

Center island narrowing is a raised island located along the centerline of a street that narrows the travel lanes at that location. Center island narrowings are often landscaped to provide a visual amenity. Placed at the entrance to a neighborhood, and often combined with textured pavement, they are often called "gateway islands." Fitted with a gap to allow pedestrians to walks through at a crosswalk, they are often called "pedestrian refuges." Center island narrowings are good for entrances to residential areas, and wide streets where pedestrians need to cross.

Chokers are curb extensions at midblock locations that narrow a street by widening the sidewalk or planting strip. If marked as crosswalks, they are also known as safe crosses. Two-lane chokers leave the street cross section with two lanes that are narrower than the normal cross section. One-lane chokers narrow the width to allow travel in only one direction at a time, operating similarly to one-lane bridges. They are good for areas with substantial speed problems and no on-street parking shortage.

Closures

Full street closures are barriers placed across a street to completely close the street to through-traffic, usually leaving only sidewalks open. They are good for locations with extreme traffic volume problems and several other measures have been unsuccessful.

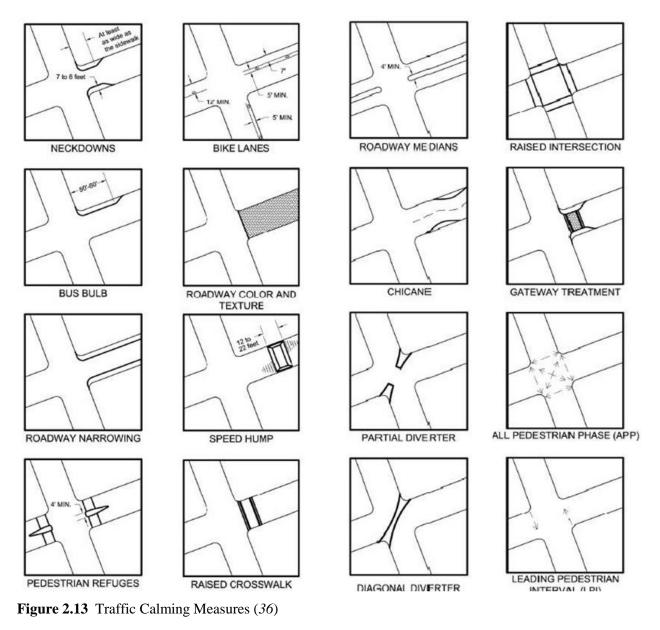
Half closures are barriers that block travel in one direction for a short distance on otherwise two-way streets. They are good for locations with extreme traffic volume problems and non-restrictive measures have been unsuccessful.

Diagonal diverters are barriers placed diagonally across an intersection, blocking through movements and creating two separate, L-shaped streets. Like half closures, diagonal diverters are often staggered to create circuitous routes through the neighborhood as a whole, discouraging non-local traffic while maintaining access for local residents. They are good for inner-neighborhood locations with non-local traffic volume problems.

Median barriers are islands located along the centerline of a street and continuing through an intersection so as to block through movement at a cross street.

Summary of TCM techniques

The ITE report by Reid Ewing (*36*) also classifies TCM according to their dominant effect on traffic volume or traffic speed. All closure measures are classified as *volume control measures*. Their primary purpose is to discourage or eliminate through traffic. Vertical deflections, horizontal deflections, and narrowings are classified as *speed control measures*. Their purpose is to slow traffic.



Traffic Impacts

The study conducted by Ewing (37) quantifies the kinds of impacts from various types of TCM. The main conclusion is that the TCM generally have the desired impacts on reducing speeds, volumes, and collisions. The practical value of this impact analysis is demonstrated in Portland, Oregon's North Ida Avenue project. TCM resulted with 85th percentile speed decline and lower daily traffic volumes.

Impact on Traffic Speed

The impact of TCM on traffic speed is examined using many before-and-after studies. Three measures of impact were used in this study:

- Average 85th percentile speed after the treatment
- Average absolute change in 85th percentile speed from before to after treatment
- Average percentage change in the 85th percentile speed from before to after treatment

Of all TCM, speed humps impacted 85th percentile speed the most, reducing it by 7 mph or 20%. Among speed control measures, raised intersections and narrowings have the least impact. Interestingly, half closures, a volume control measure, have an impact on speeds comparable to speed tables.

Speed impacts of TCM depend primarily on geometrics and spacing. Geometrics determine the speeds at which motorists travel through slow points. Spacing determines the extent to which motorists speed up between slow points.

The study uses a sample of 58 streets in 10 communities to measure 85th percentile speeds before traffic calming, 85th percentile speeds at midpoints after traffic calming, and spacing between slow points. These data were combined with known crossing speeds at slow points and used to estimate speed models. The relation between speeds before and after the treatment is obtained through partial correlation. Midpoint speeds are related to all other variables. The authors used nonlinear regression to model the midpoint speeds. It is assumed that midpoint speed equals 85th percentile speed when slow points are closely spaced. Midpoint speeds would rise asymptotically toward 85th percentile speed as slow points become widely spaced. The model of midpoint speeds was based on these assumptions. This model calculates the midpoint speed for different values of other variables.

The results showed that speed humps (14-foot length, 3-inch height) reduced 85th percentile speed from 32 mph to about 25 mph. Speed tables deployed on higher order streets (22-foot length, 3-inch height) reduced 85th percentile speed from 40 mph to about 32 mph. Traffic speed at the humps was reduced by 30% in both cases. The speed 100 feet upstream and downstream from the humps was 3-6 mph greater than the speed at the installed hump.

Impact on Traffic Volume

Volume impacts depend on the entire network, not just the characteristics of the street itself. The availability of alternate routes and the application of other measures in area-wide treatments may have large impact on traffic volumes.

In particular, volume impacts depend fundamentally on the split between local and through traffic. TCM will not affect the amount of locally bound traffic unless they are so severe or restrictive as to "degenerate" motor vehicle trips. The concept of suppressing motor vehicle travel with increased costs is still new and it is unlikely to succeed in the United States. TCM may reroute non-local traffic instead of dealing with local.

The statistics on volume impacts are based on before-and-after studies. The author chose two measures of impacts: average absolute change in daily traffic from before to after treatment, and average percentage change in daily traffic from before to after treatment. The type of TCM was independent variable. As expected, the largest volume reductions occur with street closures and other volume control measures. However, significant reductions also occur with speed humps and other speed control measures.

Volume impacts of TCM prediction was based on given origin-destination data for trips on the local street network, and estimates of link speeds after treatment. The author used a traffic assignment program that seeks the path with the minimum travel time for each trip. The statistical model was estimated through multiple classification analysis.

Volume controls reduce traffic volumes by about 39%, disregarding the type of TCM. Full closures reduce traffic volumes by an additional 5%. Speed control measures reduce traffic volumes by 15%. Speed humps reduce volumes by an additional 5%. The percentage of traffic volume reduction is weakly related to the percentage of speed reduction.

The results also depend on the location where the measurements are taken. Volume impacts of traffic calming measures depend on the availability and quality of alternate routes. Impacts for streets calmed with street closures, diverters, and other volume control measures would also be expected to depend on which movements are blocked. Volume impacts would be expected to vary with the degree of speed reduction for streets calmed with speed control measures. TCM also impact travel time and thus route choice, increasing traffic volumes on the routes with shorter travel times.

Impact on Traffic Safety

TCM may result in fewer collisions by slowing traffic, eliminating conflicting movements, and/or sharpening drivers' attention. Collisions may be less severe when they occur, due to lower speeds. According to Ewing's study (*37*) traffic circles and chicanes have the most favorable impact on safety, reducing collision frequency by an average of 82%. Circles have this effect because they are located at intersections, where a great number of collisions occur. Chicanes might have this effect due to heightened attention. Speed humps were almost as effective as circles and chicanes, reducing collision frequency by an average of 75%. This is counterintuitive, because humps create wide speed variations in the traffic stream.

A meta-analysis of 33 studies also showed that TCM can increase safety level (*37*). It included the results from studies conducted in eight countries (Australia, Denmark, Finland, Germany, Great Britain, Netherlands, Norway, and Sweden) between 1971 and 1994. These studies include different TCM measures for volume and speed control, mostly implemented in residential areas. The analysis mainly focused on studies that were non-experimental, reported the number of different types of accidents before and after TCM implementation, and used tested and comparison groups in their analyses. The method used in this paper is the log odds method of meta-analysis and it included a 95% confidence interval for the weighted mean estimate of effects.

Four characteristics of the evaluated studies were used in the analysis: study design, data on traffic volumes, accident severity, and the type of road. For study design, a distinction was made between studies using a matched comparison group, studies using a general comparison group, and studies not using a comparison group. For accident severity, the studies were classified for injury accidents, property damage only accidents, and studies that did not report the severity. For the type of road, the analysis included the whole area, main roads, and local roads.

The analysis of the evaluation studies shows that area-wide traffic calming reduces the number of accidents by about 15% in the whole area affected by the measures (main roads and local roads combined). The greatest reduction was recorded in studies where the accident severity was not reported. A greater reduction in the number of accidents is observed on local roads (about 25%) than on main roads (about 10%). Also, the results of the evaluation studies are quite robust with respect to study design. Studies were classified in five groups, depending on the confounding factors. There is a tendency for

weakly controlled studies to find greater effects of TCM than well-controlled studies. The results are stable over time and of similar magnitude in these eight countries.

Confidence in safety impacts of TCM is limited. TCM are mostly implemented in low-volume residential areas, where collisions occur infrequently. This makes the statistical significance of TCM safety impacts lower. TCM safety effects in the United States are less favorable than elsewhere. One possible explanation is that European TCM are more intensive and more integrated with their surroundings than the U.S. treatments.

Impact on Transit Vehicles

TCM raise a number of special issues for the operation of buses. Several considerations should be taken into account when TCM are being designed and installed (*38*).

Buses have firmer suspension systems, similar to most other large vehicles carrying heavy loads. They are less maneuverable than cars. TCM can lead to increased wear and tear to buses. If buses are driven along a traffic calmed road many times a day, they can be damaged and maintenance costs can increase.

Bus operators have a duty of care to their passengers, particularly senior citizens and disabled, who may be standing or moving around the bus. In some situations, traffic calming can cause great discomfort, especially if the bus service has numerous vertical deflections.

Bus services operate by a timetable. Reliability is important if customer confidence is to be maintained. It is important that TCM do not cause excessively increased travel times to buses by requiring diversions or slowing down significantly more than other vehicles.

Speed cushions are the preferred vertical deflection measure for bus routes, as they have less impact on buses than speed tables, but slow vehicles to a desirable speed. It is important that there are no parked cars in the running lanes. This would prevent the bus from having to go "two wheels up" over cushions, which can be uncomfortable for bus passengers and cause delay.

Speed tables should only be used on bus routes at key locations, such as schools or shopping centers. They should not be closely spaced. The bus operators would prefer no more than five speed tables on any bus route.

Round-top speed humps are not acceptable on bus routes in London as passengers experience a double discomfort when a bus is traversing the hump, one for each set of wheels.

Suitable design schemes for TCM on bus routes should be discussed with the bus operators early in their development. Development of TCM on bus routes is often assisted by first testing bus operation on the various layouts. TCM on bus routes in London use innovative designs to achieve the required level of traffic calming without adversely affecting bus operation.

Negative Impacts of TCM

TCM could have negative effects on emergency response, slowing down the emergency vehicles. Some of the measures, especially vertical obstacles and closures, can have significant impacts on emergency response vehicles. Surveys found that fire truck engines are the most prone to be impacted by TCM measures. They are followed by ambulances carrying patients, ladder trucks, and ambulances without patients. The 12-foot hump has the most significant impact on those vehicles. Different measures have been taken to overcome these problems. TCM measures should not be applied on streets in the vicinity of fire stations, since those are the routes fire trucks use the most. Some design changes, such as speed

cushions, split humps, or sealed down deflector islands are implemented to reduce the impact on emergency vehicles. The most important part is the communication between traffic management and emergency services. TCM measures have not been shown to impact police vehicles, mainly because of the special design of those vehicles. Public works, mainly snow removal, had big theoretical concerns in some areas. However, this was not a problem in practice, and TCM measures did not impact these operations. The research conducted by the Insurance Corporation of British Columbia summarizes 43 case studies of TCM impacts. Each of these studies showed that TCM decreases collision frequencies from 8% up to 100%.

Hidas et al. (40) conducted a study that analyzes the effects of TCM that can potentially have negative impacts on certain aspects of traffic. The analysis focused on vehicle headways, delay for vehicles entering from driveways, absorption capacity, and pedestrian crossing opportunity.

The data for the study were collected at eight sites in Sidney, Australia, where raised platforms, speed humps, or median islands were implemented. Two VDAS 3000 Vehicle Detection Data Acquisition Systems, with four detectors each, were used for the surveys. These systems collected data on traffic flows, delays, and headways 100 m (300 ft) before and after the TCM device.

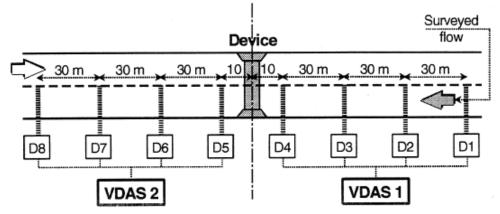


Figure 2.14 Typical Site Layout for Data Collection (40)

The results on headway distributions showed a disturbance in headways just before and after the device. However, at the points where vehicles left the detection zone, the headway distribution normalized. Average delays for vehicles entering from driveways were calculated at each observation point for each traffic flow level separately. At flows over 600 vph there is a noticeable increase in the average delays near the device, and that the increase is more pronounced at higher flows. However, the differences in average delays to vehicles were statistically significant only in the medium to high flow ranges (mostly between 500 and 900 vph) and at locations close to the device. Absorption capacity shows the maximum possible flow that can enter or cross a major flow from a minor approach such as at a T-intersection or a driveway under steady-state conditions. The maximum recorded decrease in the absorption capacity was less than 50 vph in absolute terms, which is less than 10% at all traffic flow levels at all survey sites. Statistically significant differences in the absorption capacities occurred only occasionally at traffic flows between 400 and 800 vph and close to the device. The majority of survey sites had implemented raised platforms. They were designed specifically for pedestrian crossing, but not as a dedicated "zebra crossing," meaning that pedestrians do not have the right of way. In this case, there was a statistically significant decrease for almost all traffic flows between 200 and 1000 vph at locations just before and after the devices, and this impact gradually reduced with the distance from the device. Crossing opportunities at lower crossing speeds were less influenced by the devices than at normal and higher crossing speeds.

The study also looked at the desired effects of the implemented TCM measures at analyzed sites. Speed profiles in the vicinity of the devices were constructed from the headway data. An effective reduction of average speed from around 50 km/h (31 mph) to around 35km/h (22 mph) is achieved in the vicinity of the devices at all flow levels. Accident data were collected for three years before and three years after these devices were installed. The analysis focused on accidents within 100 m (300 ft) on either side of the device. All the sites except one had a percentage drop of over 50% in the number of accidents. The reduction is even more significant in terms of injury accidents.

The study concluded that physical speed control devices do have some negative side effects, but their magnitudes are below the level that would conceivably influence traffic patterns. These minor impacts are confined to the immediate vicinity of the devices. However, they are far outweighed by the benefits in terms of accident savings as a consequence of the speed reductions.

This paper shows another aspect of TCM. The findings are important for our project, since it clearly shows that the benefits of having TCM in residential areas would be greater than the expected negative impacts.

Public Opinions on TCM

Many of the described TOD programs faced concerns, complaints, and lawsuits. However, most of them were not proven to be significant or even related to implemented measures. Still, this is an aspect that needs to be considered during the planning process. Several parties are directly impacted by TCM. For that reason, TCM become a social issue rather than just a set of technical solutions. Cruise (41) sees TCM more as people calming than traffic calming.

The social implications of TCM implementation are focused on freedom and liberty, interaction and exchange, severance and segregation, and rights and priority. Freedom and liberty mostly refer to the freedom of people to enjoy the streets. Some reviewed studies saw the presence of a large amount of traffic as a "caging effect" on residential neighborhoods. Some researchers argue that transportation should be a means and not an end in accomplishing social interactions and exchange. Too much emphasis is placed on "getting there instead of the exchange itself." The reviewed studies also argue that the automobile-based societies cause severance and segregation between social communities. According to some authors, this reduces relationships, ideas, and cultural experiences. Traffic calming can help mitigate the negative factors that residential traffic has on social interactions. The study concludes that TCM is not about applying techniques, but rather a mindset. It should be focused on changing people's perception and behavior.

The conclusion of this study can be very useful for our project. It reminds us to have a broader perspective when analyzing TCM, and not to focus only on the technical aspects. Traffic itself is a big social issue, and traffic calming is just a part of it.

TCM – Best Practices

Implementation of TCM as traffic safety countermeasures decreased crash fatality rates in NYC significantly. The study reviewed here (42) shows that TCM have the intended effect on severe crashes. NYC has the lowest fatality rates among all U. S. cities with the population over 250,000. This is why NYC needs to be considered as one of the best examples of TCM application.

Despite the great number of TCM projects in the United States, little is known about their impact on traffic safety. The study conducted by Zein et al. in 1996 summarized 43 international traffic calming case studies. It showed that collision frequency is reduced in each case. The most safety-effective TCM were traffic circles and chicanes (82%); less effective were speed humps and narrowings (75%); and the least

effective speed reductions and engineering measures. Ewing (1999) compared 85th percentile speeds and traffic collision frequencies before and after TCM were implemented in United States. Of all TCM, speed humps and bumps had the greatest impact on 85th percentile speeds, reducing them by an average of more than 7 mph, or 20%. Among speed reducers, raised intersections and narrowings had the least impact. All measures reduced the average number of collisions on treated streets. Traffic circles caused the largest collision reduction of 73%, while speed humps caused the smallest collision reduction of 14%. A study conducted in Oakland (Tester et al., 2004) showed that the presence of speed humps on a street was associated with lower odds of child pedestrians being injured within their neighborhoods or being struck in front of their homes. Improved street safety is a stated objective of many programs, and many programs prioritize projects based in part on crash statistics (Ewing and Brown, 2009). The paper reviewed here is focused on TCM implemented in NYC to reduce crashes. Traffic fatalities are the sixth leading preventable cause of death in the United States. According to NHTSA, 12% of traffic fatalities in 2009 involved pedestrians. In cities with populations over 250,000 the percentage of pedestrian crashes is even higher.

NYC maintained its low pedestrian fatality rate despite a high percentage of trips involving walking. Nearly 57% of workers in NYC used public or non-motorized transportation to travel to work in 2007. The city has accomplished this by identifying the locations where safety countermeasures need to be implemented and invested a lot to implement them.

NYC uses vertical deflection measures referred to as speed humps or speed tables to calm traffic. Speed tables are flat-topped speed humps usually constructed of asphalt, with brick or other textured materials on the flat section. They are typically long enough for the wheelbase of passenger car to rest on top of them. Longer ones may even accommodate trucks and buses. Speed tables enable higher design speeds and smother rides due to their lengths and flat fields.

The authors use a quasi-experimental before-after study design with a comparison group to examine the effect of speed tables. The goal is to assess the impact of speed tables on the frequency of various types of crashes. The study compares crashes before and after TCM treatment and refers to matched comparison streets. This design is called "an untreated control group design with pretest and posttest samples."

The comparison of crashes before and after TCM treatment shows the effect of speed tables on crash reduction. The comparison between treated and untreated streets is conducted to capture whether the crash reduction would occur without the treatment. This makes the study more valid than the previous studies in this area. T-test is used to show how significant the effect of the treatment is.

The sample used for this study consists of NYC streets treated with speed tables between 1996 and 2006. Two years of crash data before the treatment were compared to two years of crash data after the treatment. The sample of untreated streets was drawn from the same years. The treated and untreated streets with similar characteristics were matched for the comparison.

The outcome variable was the difference in police-reported crashes that occur on roadway segment before and after installation of speed tables. The authors computed the difference in crash frequency after treatment relative to before the treatment, less the equivalent difference for untreated streets. This is how they determined whether the relative change in crashes is significant.

The results showed that the treated and untreated streets comparability is weak. This is because treated streets had significantly higher crash frequencies before the treatment than the untreated streets. However, the expectation of reduction in crashes due to implementation of speed tables proved to be correct. The reduction was more significant for pedestrian crashes than crashes as a whole. This suggests that TCM reduce severity of crashes.

This study has several major contributions. It shows the need for more tests to establish the TCM effects, since NYC had a decreasing trend in crashes with each passing year. TCM reduce the severity of crashes, although the impact on reduction in crashes as a whole is marginal. The major limitation of the study is that only one type of TCM is examined. The study also does not consider inconsistency in traffic volumes in NYC. The authors conclude that although the effect on crash frequency is barely significant, TCM improve the quality of residential environment while being cost-effective.

2.5 Toward Successful TOD

A report done by Nelson et al. (43) develops planning methodology for TOD. This methodology involves increasing the density of housing, offices, retail, and services around mass transit stations in an urban region. It makes pedestrian access very easy and encourages more use of transit and a reduction in automobile driving. TOD is intended to influence all travel purposes. The report mostly focuses on non-work travel and its implications on TOD. The objectives of the study described in the report were: Analyze non-work travel demand as influenced by retail market dynamics on a national and regional level

- Review the state-of-the-art in regional transportation planning by metropolitan planning organizations (MPOs) with respect to non-work travel
- Create a planning template for regional transportation and land use planners for TOD that encompasses non-work travel

TOD Planning

Nelson et al. (43) explains the change of thinking that lead to TOD planning. Low density, separated use developments that were predominant in the United States stimulated travel by automobile. This caused an increase in congestions, delays, air and noise pollution, and a deteriorated life quality. One of the solutions to these problems was encouraging TODs. During the 1990s, TODs became one of the leading urban planning concepts. Proponents of TODs envision dense, mixed-use activity centers connected by high quality transit systems. MPOs, local governments, and public transit agencies have launched major efforts to direct growth of the TODs.

TOD is defined as a center with a mix of high-density residential, retail, office, public and open space uses. Retail shops and services are in a commercial core within an easy walk of homes (a walking radius of about 10 minutes). A transit station is at the center of the core. Uses in the core are "vertically integrated," where apartments and offices rise above ground-floor stores. Secondary areas for lower intensity uses surround the core to a distance of about a mile. These areas might be locations for single-family housing in a range of sizes, small parks, schools, and light industry. Streets largely conform to a grid pattern and provide direct walking and biking access to the core.

Factors that determine the success of a TOD can be viewed on a station area and regional aspects. The main factors that determine the success of a TOD are following:

Number and siting of TODs	Employment and housing density	Travel be
Transit quality	Commercial mix	Zoning fl
Transit technology	Retail siting area	Resident
Street pattern	Regional market structure	Housing
Station area parking	Consumer activity patterns	Residenti
		~

Travel behavior Zoning flexibility Resident reactions Housing type preference Residential self-selection Government policies Another indicator of the success is the cost/benefit ratio.

Cost	Benefit
Transit system construction	Congestion reduction
Transit system operations	Air quality improvement
Mitigation of traffic congestion caused by compact development	Reduced infrastructure
TOD planning and development incentives	Personal travel time, vehicle operation savings
	Personal vehicle ownership reduction

 Table 2.5
 Costs and Benefits of TOD

Since the 1970s, there has been a big increase in personal travel. It has largely resulted from increased frequencies of non-work trips, especially for shopping and other family and personal business activities. Retail activities account for more than half of all person trips, and most are made to locations where the traveler has more than one choice of destination. Many retail trips are linked in tours that involve several stops for a variety of purposes. Several studies found that private vehicles dominate in the mode share for these trips. The goal of a TOD is to change the mode share distribution and facilitate non-motorized and transit mode for non-work trips.

Changes in the retail marketplace are observed as the predominant factor of the increase in non-work trips. It is characterized by a great variety and opportunity. For that reason, it plays a major role in the TOD planning and design process.

Finally, the TOD planning process has to account for a large number of non-work trips. The main steps that have to be taken are as follows:

- Emphasizing non-work trips in urban transportation planning
- Assembling data to describe these trips and the activities and destinations that cause them
- Assessing the complexity, risk and uncertainty that these data reveal for transportation in the future
- Adjusting the direction of public policy in response to the revealed data and the assessment of what they mean for the future

This study describes the most important factors that have to be considered for a TOD planning process. TODs insist on mixed land-use developments, which increase the number of non-work-related trips. The study focuses on those types of trips and describes the main elements that have to be considered from this aspect. The findings can be very useful for our project.

TOD Design Issues

TOD dimensions considered from the design aspect are regional context, land use mix, and primary transit mode (44).

There are two perspectives for the regional context dimension: city center TODs and suburban TODs. A city center's TOD emphasizes a transit-accessible urban development to increase transit ridership and to encourage pedestrian activity. Some aspects of the city center, such as grid street patterns and ground-level retail uses, are attributes usually shared with TODs. Most TOD implementations reported an increased transit ridership, encouraged pedestrian activity, and required less parking than more traditional

projects. Suburban TODs are generally built on or around park-and-ride lots. TOD has become viable on these sites in part because metropolitan areas have expanded outward beyond the ends of the transit lines. However, balancing TOD and parking provisions have shown to be among the greatest challenges in planning suburban TODs. Transit mode share for suburban TOD is higher than for traditional suburban development, but the automobile still plays a predominant role in providing mobility.

	City Center Context	Suburban Context
Transit Markets	Urban sites are often directly accessible to and from multiple transit markets. For example, Gallery Place Metro station in Washington, DC, is fed by three rail lines originating from five different suburban areas and passing through different downtown areas, all offering one-seat rides to the station.	Markets served by high-quality transit service may be limited. For example, Ballston Metro station in Arlington, Virginia, is fed by a single east-west rail line originating from two suburban areas. Other transit riders from around the metropolitan area must transfer to arrive at the station and/or use bus service.
Drive Markets	Highway accessibility remains important to the urban real-estate market. Automobile-oriented commuting is prominent even in the most transit accessible locations.	Mode of access to suburban transit station developments tends to remain dominated by the automobile and therefore automobile accessibility is of substantial importance.
Parking Management	It may be more acceptable to constrain and manage parking in downtown areas, especially by using pricing. Constrained parking leads to higher transit attractiveness. People may own fewer cars in central areas due in part to good transit service availability and easy walking access to utility retail.	It may be difficult to manage parking; the suburban real estate market may dictate parking space ratios that are higher-than- optimal for transit. Examples abound where developers build more parking than is required. Also, higher rates of automobile ownership among residents are present.
Phasing Effects	Existing nearby land uses may support a TOD project in reducing single- occupant vehicle usage for midday trips. Alternatively, nearby legacy development may retain automobile orientation and dampen the behavior impacts of adjacent TOD.	Neighborhood services supportive of non- automobile, non-work travel may not pre- exist. Thus, until such uses are part of the TOD, the early phases of a new TOD may exhibit higher automobile mode share than the later phases of a more mature TOD.

Figure 2.15 Perspectives of TOD as Differentiated by Regional Context (44)

In general, more diverse TODs from the aspect of land use generate more non-motorized and transit trips. The analysis of different TOD sites showed that a TOD that enables its occupants to address daily needs within the site would result in fewer automobile trips per person.

The traveler response can further be analyzed by the specific land use type. The most common land use types are residential, office, and retail. TODs that are focused on residential use offer enhanced opportunity for residents to accomplish commuter trips and off-peak activities using transit. Off-peak and other non-work activities in particular may also be met by walking, especially if convenience retail is located nearby. Office development has strong peak-period travel demand as workers arrive and depart the facilities at similar times. It also generates midday travel demand. Transit-oriented office centers enable building-to-building travel by walking and easy connections to other activity centers via transit, reducing the number of automobile trips. TODs that focus on retail also showed an increased number of non-automobile trips. Longer trips are usually accomplished by transit, while walking was predominant for short trips.

Almost 90% of the TODs analyzed in this report are built at rail transit stations, most of it around heavy rail transit (HRT) and light rail transit (LRT). Other modes, sorted by the level of influence on TODs, are commuter rail, bus rapid transit (BRT), and traditional bus.

	Less-Diverse TOD Project	More-Diverse TOD Project
Transit Markets	Unless the TOD is a shopping complex, it is likely that peak- period (commuter) transit travel, mainly in one direction, will predominate.	Peak-period travel is likely to be oriented around commuter trips, but possibly more balanced by direction, and some land uses, such as shopping and entertainment, may generate off-peak transit trips.
Travel Needs	Tenants are more likely to require vehicle travel to satisfy daily needs.	Tenants are more likely to find at least some of their needs can be met without requiring out-of-project travel. Substitution of walk trips is thus facilitated.
Parking Requirements	Proximity to transit may lead to higher project transit mode shares than for non-TOD development and correspondingly lower development parking requirements.	Possibility for higher project transit mode shares and walk mode of access to transit shares, coupled with potential for shared parking among uses, may lead to lower overall parking requirements than for less- diverse TOD or non-TOD centers.
Auto Ownership	Need/desire to own and use a car may be higher in a less diverse context than in a more diverse context.	Walking is a likely mode for the short distance travel allowed by a more diverse context. This may lead to a reduced requirement for automobile ownership.

Figure 2.16 Perspectives of TOD as Differentiated by Degree of Land Use Mix (44)

The most important underlying traveler response factors that influence mode share are recognized as follows:

- Land use and site design
- Automobile ownership
- Transit service characteristics
- Highway access and congestion
- Parking supply
- Parking pricing and transit support
- Self-selection of residents

Mode	Typical Attributes	Considerations	Examples
Heavy Rail Transit (HRT)	Motorized cars draw power from a third rail and operate on exclusive right-of-way with no at-grade crossings. Off- board fare payment at or verified by fare gates.	Large investment in HRT leads to very extensive station-area planning. High service levels and traffic-free operation attract substantial proportions of transit-using TOD residents. Special challenge with HRT suburban stations is finding balance with vast numbers of park-and-ride spaces.	Atlanta, GA Chicago, IL San Francisco, CA Washington, DC
Light Rail Transit (LRT)	Motorized cars draw power from overhead wires and operate on some or all non- exclusive right-of-way with at- grade crossings. Off-board fare payment verified by random ticket inspection.	LRT stations tend to be smaller scale and more closely spaced than HRT. Park-and-ride use can be a challenge. Substantial investment is required to build LRT, sparking similar levels of planning attention as HRT.	Dallas, TX Denver, CO Portland, OR San Diego, CA
Commuter Railroad (CRR)	Railroad cars motorized or pushed/pulled by a locomotive. Often share tracks or corridor with freight trains. Ticket purchase verified by on-board conductor.	Not all systems offer off-peak service or weekend service. Notable TOD projects are most associated with seven-day service and peak period headways of 20 minutes or so. Park-and-ride is an important CRR rider market.	San Francisco, CA Chicago, IL New York - New Jersey
Bus Rapid Transit (BRT)	Premium bus service including: special vehicles, exclusive right-of-way segments, signal priority, upgraded waiting areas. Various fare payment methods employed including off-board.	BRT systems involving special vehicles, dedicated lanes, and frequent seven-day service can logically have the same TOD possibilities as LRT. Park-and- ride can be a significant land use near berthing areas.	Boston, MA Pittsburgh, PA Ottawa, Canada
Traditional Bus	Scheduled, fixed-route local and express bus services. Predominantly on-street running; may operate on special facilities. On-board fare payment.	High-frequency traditional bus services (at least four vehicles per hour) can offer the potential to support TOD. Also, bus lines play a supportive role at most rail TODs.	Boulder, CO Renton, WA

Figure 2.17 Perspectives of TOD as Differentiated by Primary Transit Mode (44)

The most important underlying traveler response factors that influence mode share are recognized as follows:

- Land use and site design
- Automobile ownership
- Transit service characteristics
- Highway access and congestion
- Parking supply
- Parking pricing and transit support
- Self-selection of residents

Land use and site design are focused on density, diversity, and design from a TOD-supportive perspective. Higher development and trip densities go hand-in-hand with TOD. Increased development density places more housing, jobs, and activities within the same land area. This creates a higher number of trips starting and ending within the TOD, creating high trip densities. The added ridership potential of TOD-supportive densities facilitates a cost effective, higher-quality transit service. More diverse TOD projects offer the possibility of a greater proportion of activities being conducted within the center and a corresponding reduction in motorized travel generation. Diverse land use enables more needs to be satisfied on a single visit and allow internal walking trips to serve for visiting more destinations. The compact, pedestrian-friendly design of a TOD leads to higher transit usage and walking because of the underlying traveler responses to this environment. The shorter walking distances encourage transit usage and walking overall.

Many studies recognize automobile ownership to be a key factor in mode choice. Individuals living in households without an automobile, or with fewer automobiles than licensed drivers, are more likely to use transit, walk, or rideshare. Automobile ownership levels among station-area residents have been seen to be lower as compared with non-station-area residents.

The traveler response to TOD is influenced by the service characteristics of the one or more transit modes providing access to and from the location. TODs with better transit service characteristics have higher transit ridership levels. Also, some studies suggest that such TODs are more likely to attract residents interested in making use of transit. The most important service characteristics are service coverage, hours of operation, frequency, travel time, fares, and perceptions of safety and security.

Highway access is very important to TOD, especially in the suburban context. A significant number of residents, employees, and customers still travels to and from a TOD using private vehicles. The higher densities associated with the typical TOD may contribute to localized congestion. When such congestion causes automobile travel times to decline relative to transit operating on an exclusive right-of-way or in reserved lanes, it tends to encourage transit use at the TOD. Similarly, walking rather than driving may be encouraged for short trips to the extent that good pedestrian connections are available.

Parking supply within a TOD has a major role in travel mode selection. It must be held at a reasonable level and carefully planned, since a significant number of vehicles still need to access the TOD by automobile. Insufficient parking supply near transit stations can reduce transit ridership by limiting the auto access ridership component. On the other hand, excessive parking can create a hostile environment for pedestrians and transit. There are two components of the parking supply within a TOD: parking for the development at the station and parking for transit users. Both components are equally important for a carefully planned TOD.

Parking pricing offers a mechanism to manage demand and maintain availability of constrained parking in TODs. Transit support is aimed to encourage transit use. Two demand management programs exist within

the studied TOD implementations: employer-based programs and transit pass programs. These programs impact both parking and transit support.

Studies showed that residents who live near transit stations almost always have higher transit mode shares than residents outside these areas. A certain number of people choose to live near transit stations because of the easier access to transit. This process has been labeled as "self-selection of residents."

A certain number of related impacts and information that impacts TOD development was also studied in this report. Related information and impacts are grouped as:

- Household characteristics
- Trip characteristics and congestion
- Pre- and post-TOD travel modes
- Vehicle trip, VMT, energy, and environmental relationships
- Health and safety benefits
- Economic benefits
- Transit-oriented development index

Households in TODs have exhibited different demographic and socioeconomic attributes than non-TOD households in several surveys. Some of this difference is explained by common attributes of individual households that choose to live in TOD housing rather than being an effect of the TOD on households. In general, smaller-than-average households appear to have been attracted to TOD projects.

A high-density development of a TOD leads to a greater concentration of residents, workers, or shoppers in a localized area. Since a significant number of those people uses automobiles to access the TOD, congestion may appear. Higher transit ridership associated with the TOD can help mitigate the congestion. Also, some trips that would otherwise require an automobile may be replaced with internal walking trips. The most important aspects of these TOD characteristics are trip generation, trip chaining, midday trip making, and congestion.

A few studies looked into the travel modes of TOD residents or workers before and after relocating to a TOD. The travel mode shifts upon relocation into TODs range from 2% to 16% in transit commute mode share gain.

Reductions in automotive trips and VMT come primarily from either mode shifts or reductions in trip length. These reductions lead to further energy savings, air and noise pollution reductions, and an overall improvement in the quality of life.

A TOD has many health and safety benefits. Three main categories are most recognized: health benefits attributable to increased walking opportunities, health benefits from improved regional air quality, and safety benefits derived from an improved pedestrian environment.

Certain economic benefits are also associated with a TOD. The most attention is given to property values. Some studies showed a correlation between the proximity of a transit station and an increased property value. Apartments and offices near stations also tend to rent for more. This, on the other hand, brings more property tax revenue for government agencies.

The "TOD Index" was imagined as a way to characterize the degree to which a project functions as a TOD. It is a preliminary design planning guidance tool. A national survey of 30 professionals highlighted 15 success measures of a TOD. All the indicators are related to travel behavior, built environment, and economics.

2.6 Transit Friendly Designs

TOD and Transit Friendly Designs (TFD) are often seen as the same concept. However, after reviewing literature on different transit practices, we were able to draw a line between the two concepts. TOD is a comprehensive planning approach toward creating dense, diverse, mixed land-use communities concentrated in the vicinity of major transit stations. It focuses on massive transit systems, such as heavy, commuter, and light rail, or, in some cases, BRT or enhanced bus service lines. TFD is an engineering approach that facilitates transit on an area-wide scale. It considers all transit modes, but is more focused on bus transit that is more flexible and can cover a wider service area. TFD is an integral part of TOD, but it also can be implemented as a stand-alone concept. In the second case, TFD can be one of the first steps toward creating TOD. This section provides the most important concepts of TFD, current state of practice, and lessons learned from its implementations.

What is Transit Friendly Design?

TFD can be defined as a set of techniques for improved integration of transit into residential and nonresidential areas (46). It can be incorporated into the planning process for new developments, or can be applied to existing ones.

Transit friendly streets make transit use more efficient and convenient. It also makes the street less convenient for automobiles while still accommodating them. At the same time, other functions of a street are recognized so that transit does not overwhelm the street. Transit friendly streets accomplish the following four goals (47):

- Establish a clear priority for transit vehicle operations with convenient, accessible transit stops
- Reduce conflicts between cars and other private vehicles, including reduction of vehicle speeds
- Create a strong pedestrian orientation, including adequate circulation space, ease in crossing streets, and appropriate amenities, all of which contribute to comfort and convenience
- Integrate the whole process of planning shared transit streets into a larger community development or livability-enhancing strategy, working closely with the communities impacted by the program

Transit friendliness applies to shopping, industrial and office park developments, as well as residential areas. There is mutual gain when transit and enterprise support each other. Transit can provide employees and customers easy access to commercial enterprises and business activities. These activities generate trips on transit and help support quality transit options (46). TFD provides transportation options and improves access to employment, supporting economic development. It also reduces dependence on the private automobile, resulting in reduced traffic congestion, reduced fuel consumption, improved air quality, and a decrease in demand for new roads (48).

Transit Friendly Design Principles

There are several engineering techniques that help define transit friendly designs. Some of them overlap with the principles of TOD, which are incorporated into the community development plans. Others can be achieved as stand-alone implementations that help improve existing communities and bring transit to a higher level. The set of applicable techniques can be classified into the following eight principles (46):

- 1) Provide appropriate community densities
- 2) Minimize walking distance
- 3) Provide mixed land uses
- 4) Organize density, land use, and buildings to benefit from transit
- 5) Create a pedestrian friendly environment

- 6) Route transit into the community
- 7) Reduce transit travel time
- 8) Build quality, user friendly transit facilities

Provide Appropriate Community Densities

To be cost-effective, transit must reach a sufficiently sized pool of potential riders and must reach a minimum threshold population (46, 48, 49). Development of population or jobs above minimum levels should be encouraged. Population and employment densities affect the quality (frequency of service), range (service choices), and duration (hours of operation) of transit service that can be provided in an area. Low densities provide an insufficient pool of potential riders and cannot support desirable service options. Table 7 provides the requirements of density (given as dwellings per hectare) for different transit services obtained through research of transit properties across North America (49).

Transit Service Description	Density (dwellings/ha)
Local bus, daytime hourly service	9.88
Local bus, extended hours and 60 min service, or 30 min daytime service	17.29
Frequent bus service, some express	22.23
Very frequent service $(5 - 10 \text{ min})$	37.05

Table 2.6	Transit Service Related to Density	(49)
	Transit ber vice related to Density	(1 / 1

Minimize Walking Distance

A commonly accepted walking distance is about one-quarter mile, or five minutes of walking time. This distance is adopted as the gauge to locate distance to transit from the majority of dwelling units in transit friendly communities (46, 48). Pedestrians are discouraged by a long, indirect walk to transit, especially in inclement weather. They are more likely to use transit services if the beginning and the end of their trip is close to a transit stop or station. Efficient community design that addresses both walking distance and the need to minimize transit travel distance will reduce the costs associated with providing and operating transit service. Block lengths and street pattern are the main features that affect the walking distance (46, 49, 50). For a high degree of walkability, block lengths of about 300 feet are desirable. Blocks of 400 to 500 feet are still acceptable. However, as blocks grow to 600 to 800 feet or to superblock dimensions, adjacent blocks become isolated from each other. If blocks are scaled to the automobile (more than 600 to 800 feet), lighted pedestrian pathways, midblock crosswalks, and pass-throughs are recommended.

Also, narrower streets on a grid pattern with more intersections to slow local traffic down are recommended to minimize walking distance and make walking trips more interesting and safe. The grid network should be designed for convenient, direct pedestrian access to services, shops, and transit that are located on the arterial road. This convenience results in more pedestrian activity and higher transit ridership. Figure 2.18, adapted from (46), shows some undesirable and desirable designs from the aspect of walking distance.

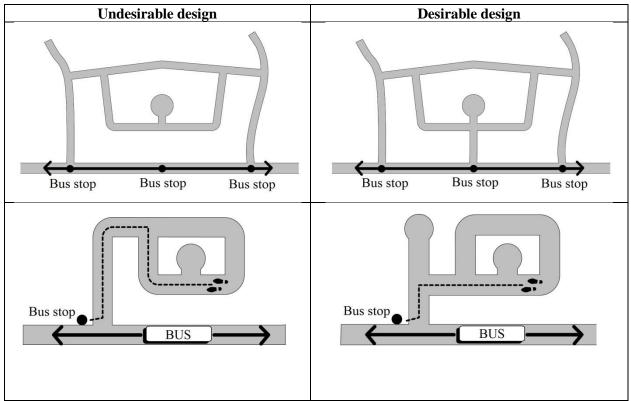


Figure 2.18 Undesirable and Desirable Designs for Walking Access (46)

Provide Mixed Land Uses

As a part of TOD, TFD promotes development that includes residential, commercial, employment, institutional, and recreational uses (46, 48, 49). Mixed land uses (or activities) contribute to enhanced transit operation by accommodating a range of travel options or trip purposes. Transit riders gain the ability to undertake multi-purpose trips on the way to or from work. Diverse uses along a street also create activity and a greater sense of personal security for those walking or waiting for transit service. Mixing land uses means combining commercial uses of various types, permitting personal services and restaurants to be located near industry or commerce. Most importantly, residential subdivisions should include convenience services within walking distance. The opportunity to walk to and from bus stops and accomplish errands conveniently is further motivation to use transit rather than drive. Retail facilities can become independent transit destinations if they are located on transit routes.

TFD should feature pedestrian oriented streetscapes, with building entrances directly at the sidewalk within a few steps of transit, and with sidewalks that have amenities such as trees, benches, and some border between the sidewalk and the street. People living in this type of development are more inclined to use public transit because their familiarity of the area is not dependent on automobile use. Many places are easily accessible from the sidewalk as opposed to being hidden inside an enclosed space like a mall. A mix of land uses in close proximity to each other makes it easy for people to accomplish several trip purposes by walking, a single transit trip, or a single automobile trip, rather than several destinations. The key to reducing single automobile trips with mixed land uses is to incorporate road designs and pathways that allow direct pedestrian access.

Organize Density, Land Use and Buildings to Benefit from Transit

The developments should be organized in such a way to take the most advantage of transit service (46, 48, 49, 50). Bringing transit closer to people makes travel much easier and encourages transit use. The highest density uses should be closest to transit. Commercial sites that are transit supportive usually face the street and provide ease of access for patrons who are approaching by foot, not by automobile. A transit supportive streetscape provides the majority of parking behind buildings, rather than having angle parking or large lots in front. Some retail businesses are automobile oriented, resulting in heavy traffic on streets where they are located. Typically, these businesses have parking directly off the street. Some examples, adapted from (46) and (50) and given in Figures 2.19 and 2.20, show the undesirable and desirable site organization. The undesirable organization is automobile oriented, while desirable is transit oriented.

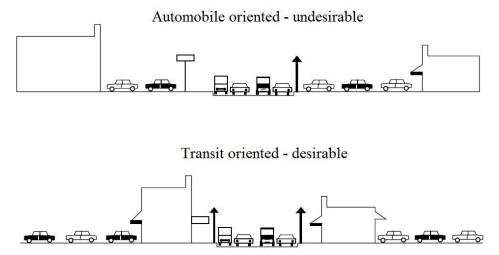


Figure 2.19 Automobile and Transit Street Organization

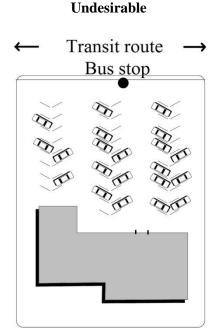
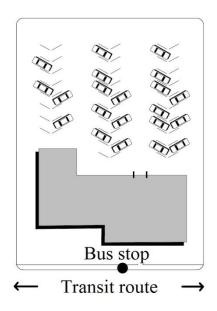


Figure 2.20 Undesirable and Desirable Access (46, 50)

Desirable



Buildings should be clustered at intersections close to the street to make them convenient to bus stops and to organize street crossing. Developments or single sites that cluster the buildings close to the street should incorporate a street level design that encourages pedestrian activities. To be more convenient for pedestrian access, buildings should be set back no farther than 25 feet from the street edge. Ideally, buildings should be flush with the sidewalk or set back just far enough for a modest yard, forecourt, or landscaped area in front. Surface parking will be to the side or rear of buildings. Parked cars should not dominate the streetscape by projecting beyond adjacent building fronts. If any off-street parking is allowed in front, and it is best not to allow any, it should be no deeper than a row or two. An example of a desirable design, adapted from (46), is shown in Figure 21.

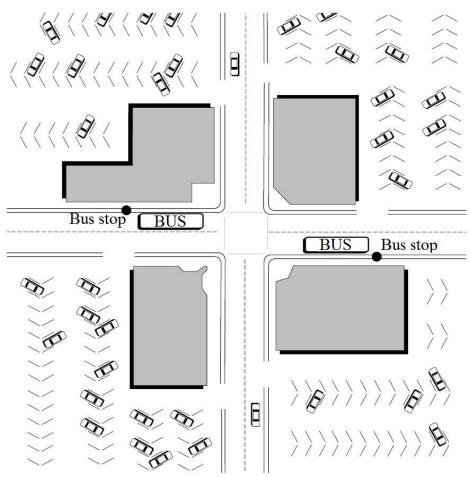


Figure 2.21 Desirable Corner Development (46)

Landscaped setbacks should be carefully designed to avoid long walking distances for transit users and to avoid isolating those waiting for buses. Pedestrian connections linking the building and transit services should be provided. Where the normal sidewalk system is inadequate, dedicated pedestrian walkways should be used to provide access to transit services.

Create a Pedestrian Friendly Environment

Transit and pedestrian friendly designs are two inseparable parts for successful developments that do not rely on automobile. Since the majority of transit trips begin and end with walking, special attention should be given to this mode to make it more beneficial for transit use (46, 50). For that reason, pedestrian

facilities are required in all areas of a development. The pedestrian system should provide for a continuous high-quality barrier-free walking surface and be directly linked to transit stops or rail stations. Barrier-free sidewalks and pathways to transit service are necessary for all transit customers, especially for those with reduced mobility. Manuals of traffic engineering establish minimum sidewalk widths of 4 to 8 feet, depending on the functional class of road and the abutting land use (*50*). For example, a 5-foot sidewalk is wide enough for two people to walk comfortably abreast, and may represent a good dimension where pedestrian traffic is light, street furniture is limited, and buildings are set back from the sidewalk. Where these conditions are not met, as in any respectable downtown, wider sidewalks are warranted.

Pathways should be used to supplement the normal street network. Pathways that provide transit access should be short, direct, and lighted. They would serve regular transit customers making trips after dark. Every effort should be made to maximize opportunities for community surveillance of the pedestrian network that provides transit access.

Another important pedestrian feature is marked and lighted crosswalks. Crosswalks provide easier access to and from transit service, but are also an important safety feature. Some pedestrian facilities' design manuals recommend marked crosswalks every 100 feet on pedestrian streets (*50*). This would mean more mid-block pedestrian crossings, which can serve as a traffic calming measure. Pedestrian crossings can be simplified, and pedestrian safety improved, by designing street corners to be sharp rather than rounded. This means using lower street corner radii, up to 10 feet according to the aforementioned manuals. Traffic calming measures, such as neckdowns, chockers, raised crossings, and textured pavement, can be successfully used in pedestrian facility design (*47*).

Route Transit into the Community

The most desirable option for transit is to integrate transit service into the heart of the community or development. The quarter-mile walking standard should be incorporated wherever possible. This means a careful routing of transit and bus stop location selections. The optimal spacing of routes is about half a mile for parallel transit lines. This assumes that transit stops are closely spaced along routes, and that local streets lead directly to stops. If stops are infrequent or local streets are curvilinear, parallel routes must be even closer together. Many TOD manuals recommend transit routes every half mile, and collectors or arterials spaced accordingly. Collectors and arterials are favored for transit use over local streets because of their wider lanes and greater distances end to end. Half-mile spacing of higher-order streets and transit routes is a recommended value for network density.

Transit friendly street networks are interconnected street patterns that provide direct pedestrian access through neighborhoods to a centrally located bus stop (48). Street networks with curvilinear characteristics and grid networks may be considered transit friendly as long as shared use paths creating short, direct connections are provided.

For a public transit agency to provide service that is fast and convenient, road design should take into consideration two factors:

- Pedestrian access to the transit route should be safe, comfortable, barrier free, and direct
- Roadways should be designed to allow transit movements that are competitive with automobile travel time

Important activity sites like shopping centers, and educational and medical facilities should be designed to provide convenient on-site transit facilities. On-site facilities provide reduced walking distances for riders and may promote transit use because they are highly visible to new or occasional riders.

Surroundings of a mass transit stations (such as light rail) offer a great opportunity to link high-quality transit facilities with adjacent land uses for long-term mutual gain. This is especially important for the planning process, where this type of development should be planned well ahead.

Reduce Transit Travel Time

Transit travel time can be considered the single attribute of a transit system that customers care the most about, especially for trips made for work purposes. Travel time for transit riders has several parts: the time spent walking to transit, waiting for the bus or train, and time spent travelling on transit. Community design can help reduce walking and vehicle travel distances. These measures contribute to a shorter and more direct transit trip. The street system within a community must provide for the efficient circulation of transit vehicles in a manner that effectively links the activities and residents. The walking distance guideline of 400 meters should be used to develop an appropriate transit route, and within this guideline, directness of travel should be emphasized.

The routing of transit lines can help lower the transit vehicle travel times. The transit routes should be as direct as possible. Some examples of undesirable and desirable transit routings are given in Figure 2.22, adapted from (46).

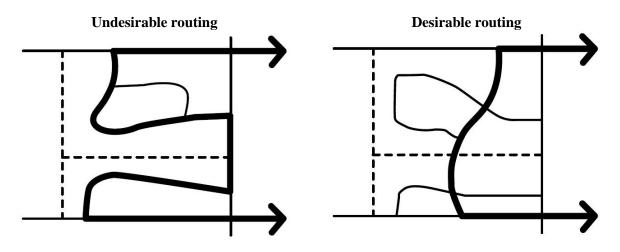


Figure 2.22 Undesirable and Desirable Transit Routing (46)

There are several strategies that are used to reduce transit travel times. The most common used are transitonly links, transit-only lanes, transit signal priority and preemption, and queue jump lanes. A transit-only lane is a strategy used to improve transit efficiency on a commercial street, either as part of larger projects (such as a transit mall) or separately (47). However, their implementation can sometimes be limited by the available resources. Transit signal priority and preemption are operational strategies that prioritize transit vehicles at signalized intersections, reducing their delays and therefore lowering the travel time. These operational strategies improve schedule reliability, make transit more competitive to private cars, and have a potential to increase market share of trips (49). Queue jump lanes are separate lanes at intersection approaches that allow transit vehicles to "jump" ahead of waiting vehicles. These lanes are sometimes integrated with right-turn-only lanes. The use of queue jump lanes can also be limited by the available resources. A schematic diagram of a queue jump lane is shown in Figure 2.23.

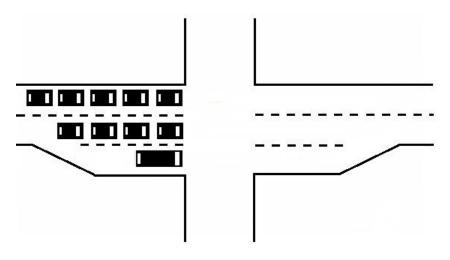


Figure 2.23 Bus Queue Jump Lane (49)

Build Quality, User Friendly Transit Facilities

Transit facilities should be planned and designed to provide a quality and safe environment for transit users. In general, transit facilities should be considered a long-term project that is designed to accommodate modifications as new circumstances and service options develop (46). Facilities should be managed to ensure constant effort toward expanding activities and enhancing the market and community potential of the site. Ease of maintenance and adaptability are important factors to consider in the initial design.

The enhancement of transit-friendly streets should include the design of the curb and the sidewalk space (47). Bus stops spaced along a street are the most common transit amenities. Bus stop and passenger shelter locations should be based on the level of ridership activity. Developments along transit routes should include appropriate locations for bus stops with paved passenger boarding areas and passenger shelters for stops with higher activity. Stops should be located where it is safe for passengers to wait and board. Transit stops at large commercial and office developments should be centrally located, or located on streets and not within the development. This would maximize the use of stops and minimize transit distances and travel times. Passenger shelters should be included at stops with higher ridership activity. Shelters protect passengers from inclement weather and provide a safe place to wait for transit. They should be enclosed at three sides and located at least five feet from the curb. They also must comply with ADA requirements. A commonly used design of a bus stop with shelter is given in Figure 2.24, which is adapted from (48).

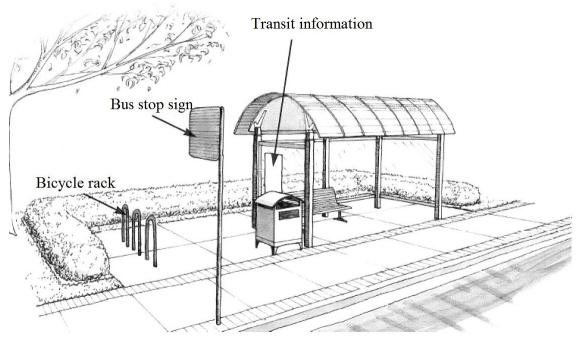


Figure 2.24 Typical Design of a Bus Stop with Shelter (48)

When transit amenities are located on sidewalks, they are usually part of a range of "street furniture," making a street more pleasant and comfortable to use (47). In addition to bus shelters, amenities can include seating (on benches or planter ledges), trees, telephones, light fixtures, trash receptacles, and information kiosks; clocks, fountains, sculptures, drinking fountains, banners, and flags are sometimes provided as well. Well-maintained bus stops and passenger shelters encourage transit use and enhance the aesthetics of the surrounding area.

TFD is an engineering approach that facilitates transit on an area-wide scale. Effective TFD standards are implemented through comprehensive plan policies, inclusion in development regulations, and through consideration during the development review process. TFD benefits the entire community through fundamental elements of design that can be included in existing development regulations and adopted as development policy.

TFD is an integral part of TOD, but it can also be implemented as a stand-alone concept to improve transit use and efficiency in existing and developing communities. This review offers some guidelines of achieving TFD through engineering measures, which is a good first step toward TOD. The guidelines are summarized from the best practices of TFD implementations. TFD guidelines can be successfully combined with other practices presented in this document to the project network. All these measures combined can create a transit and pedestrian oriented development that can improve the quality of life of its patrons.

2.7 Summary of the Literature Review

Within the last two decades, the concept of urban planning has changed its focus toward managing travel demands and encouraging the use of alternative transportation modes. Diverse and mixed land-use designs have started to replace separated, single use and automobile friendly developments. The emphasis is on livability, walkability, safety, and overall improvements in the quality of residential life.

These new planning concepts use different traffic management strategies and measures. Every implemented measure has certain effects on traffic and travel choices. However, it is more important to assess the effects of combinations of measures, since these effects can be quite large. In order to affect people's travel choices, the planners must be able to recognize the qualities of urban design that have the greatest effect and plan accordingly. Mixed used developments offer big possibilities for implementing quality urban designs that emphasize walking and non-motorized travel modes.

Street connectivity is another important aspect of urban design, whether it is aimed toward motorized or non-motorized users. Destination accessibility largely depends on street connectivity. A measure that can help relieve congestion and, to some degree, affect business opportunities and transit operations is the implementation of innovative intersection designs. Indirectly, these designs help to redefine the quality of urban design and also affect non-motorized users.

Traffic calming measures and TOD planning concepts work together in changing people's travel and driving behavior. TOD emphasizes non-motorized travel modes, especially the use of public transit for meeting daily needs. It also insists on diverse, dense, mixed land-use developments where many trips within a zone can be accomplished by walking. Traffic calming aims to discourage motorized trips that cut through residential areas, and/or to reduce their negative impacts by lowering speeds and creating a safer environment. Traffic calming can be implemented independently, while TOD always incorporates some traffic calming measures. That way the benefits of both concepts are combined to create developments with improved walkability and safety for all users. TFD concepts are another part of TOD, although they can be implemented separately. TFD creates developments with strong transit orientation, and it insists on non-motorized travel modes. Good connectivity and destination accessibility are the most important underlying principles of TFD.

The set of design principles described in this document are recognized as the principles with the highest impacts for creating livable, safe transit and pedestrian friendly developments. Although some of these principles discourage the use of private automobiles, they do not ban it altogether. All these principles are highly applicable to the project network. The developments within this network are suitable for implementations of designs that support transit and walking. The network is bordered by major arterials that carry a lot of traffic and provide good connections to other networks. Some of the designs can be applied to these arterials, improving the traffic flow efficiency and creating better connections with the observed network. This project will look into the different combinations of measures and recommend the most suitable designs for creating a livable, safe, and traffic-efficient development.

3. DESIGN PRINCIPLES

The main points and guidelines of the literature review have been adapted and applied to the project network. The design principles are given separately for each set of improvement measures. The improvement measure designs given in this document are:

- Enhanced street connectivity
- Traffic calming measures
- Innovative intersections
- Transit friendly designs

Once the designs have been reviewed, edited, and approved by UTA, we created detailed designs for each measure and applied them to the project network.

3.1 Design Principles of Street Connectivity

In order to accommodate transit in the future, this study explores the effects of both increasing street network connectivity and the traditional street widening approach on the network traffic operations. Design principles for improving the way streets are connected are adapted from the reviewed literature and presented in Table 2.5. The approach used in this study increases the connectivity between the streets in the study network gradually, until the recommended level of network connectedness is achieved.

Since this study is not focused on land use but on modifying the street network for the purpose of future land use development, street connectivity is deployed as one of the ways of facilitating the future TOD on the site. It should be considered that for this purpose, the street network consists of densely spaced streets rather than wide streets in order to accommodate not only transit and private vehicles, but to enable walking and biking, too. Keeping the streets narrow and increasing the number of intersections will help pedestrians access to transit stops.

The advantage of this test network is that it is in fact a grid-like network; however, the spacing between the streets does not encourage alternative modes. This simplifies the task of testing various connectivity levels on the network. The literature shows that denser street networks decrease the need for private vehicle use, but this study does not consider any mode shifts in order to account for the worst-case travel demand scenario. The design principles are focused on street spacing and traffic speeds on the existing and newly added corridors. Based on the recommendations from the literature (*51*), the intersection spacing goes as low as 400 feet, while speeds, even on arterials, go up to 35 mph.

It should be noted that the goal of the proposed network modifications/connectivity improvements is not to eliminate driving or force people to use other modes of transportation. The purpose is to actually enable alternative modes of transport and to make them part of the choice, especially for those who cannot or choose not to drive. The streets in a TOD are balanced to accommodate all users, and while the space for cars is still there, the right of way is shared with other modes. Table 2.5 gives an overview of the most widely used street connectivity measures. It is based on the definitions and existing standards obtained from the literature. The recommendations and guidelines obtained from the literature are applied to the study network. Figure 3.1 shows a possible new network with enhanced street connectivity.

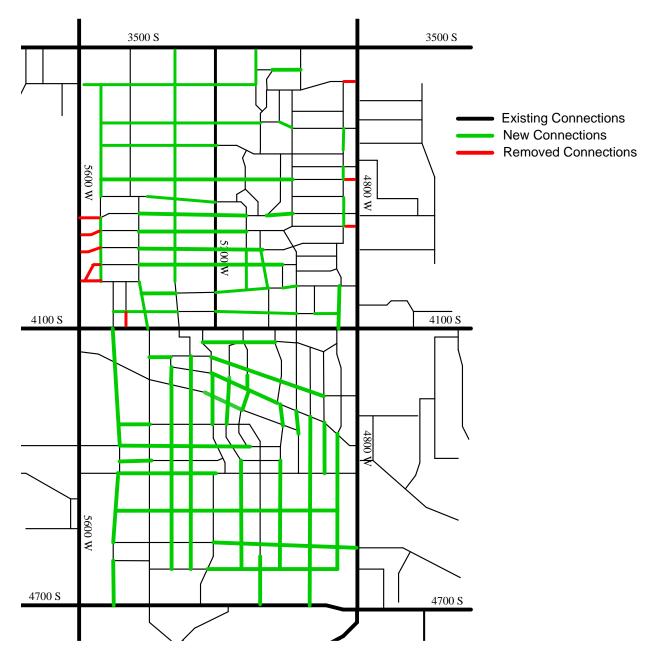


Figure 3.1 Possible New Network with Increased Connectivity

3.2 Design Principles of Traffic Calming Measures

The literature provides several results on traffic calming implementations. The most significant impacts of traffic calming are observed on traffic volumes, vehicle speeds and traffic safety. Although traffic calming measures are divided into volume and speed control, both categories have higher or lower impacts on both traffic parameters. Some studies also explored negative impacts of traffic calming measure selection can be the cost of each particular device. The costs can be relatively low for some devices, such as speed humps and tables, or much higher for neckdowns, roundabouts, or full closures.

Table 3.2 shows the most important effects of traffic calming measures, along with the actual costs of implementation, summarized from the literature. For the project network, the researchers recommend some of the low cost effective measures, such as speed humps and tables, raised crosswalks, and textured pavement. Some traffic calming measures can be combined with the innovative intersection designs, where the roundabout in a bowtie intersection also serves as a traffic calming device. Traffic calming devices that benefit pedestrians, such as raised crosswalks and textured pavement, are recommended in this case, since the future network will be transit oriented with high pedestrian activity.

Figure 3.2 provides a set of possible locations for traffic calming implementation. These locations are mostly in the vicinity of pedestrian activity centers, such as schools, churches, daycare centers, and parks. Some locations are selected based on anticipated traffic volumes. They are considered to be more attractive for drivers to use them as shortcuts through the network, and the traffic calming implementation should divert those drivers. The simulation models will be able to capture the effects of traffic calming measures on traffic volume and distributions.

Traine Canning	Impact on		Impact on	Disauvantages	
Measure	Speed	Volumes	Safety (Crash		Estimates
G 1 1	220/ 1	100/ 1	Frequency)		* 2 000
Speed Humps	22% decrease	18% decrease	13% decrease	Slowing down emergency	\$ 2,000
	(12ft hump)	(12ft hump)	(12ft hump)	vehicles; Increasing noise and	
	23% decrease	22% decrease	40% decrease	pollution	
	(14ft hump)	(14ft hump)	(14ft hump)		
Speed Tables	18% decrease		45% decrease	Increasing noise and air pollution; Costs and aesthetics	\$ 2,000
Raised Crosswalks	18% decrease	12% decrease	45% decrease	Increasing noise and air pollution; Impact on drainage	\$ 4,000
Raised	1% decrease			Costs; Impact on drainage; Less	\$ 12,500
Intersections				effective in reducing speeds	
Textured	No data	No data	No data	Costs; Impact on people with	Varies by the
Pavement				disabilities	area covered
Traffic Circles	11% decrease	5% decrease	29% - 73%	Difficult for large vehicles	Varies by the
			decrease	maneuvering; On-street parking	area covered
				elimination; Maintenance	
Roundabouts			29% decrease	Difficult for large vehicles	Varies by the
				maneuvering; On-street parking	area covered
				elimination; Maintenance	
Chicanes	No data	No data	No data	Maintenance, Impact on drainage;	\$ 14,000
				On-street parking elimination;	
				Could cause deviation out of the	
				appropriate lane	
Re-aligned	No data	No data	No data	Costs; Additional right of way	Varies by the
Intersections					area covered
Neckdowns	7% decrease	20% decrease		Slowing down emergency	\$40,000 -
				vehicles; On-street parking	\$80,000
				elimination; Merging bicycles with	. ,
				vehicular traffic	
Center – Island	7% decrease	10% decrease		On-street parking elimination	\$8,000 -
Narrowings					\$15,000
Chokers	7% decrease			Merging bicycles with vehicular	\$7,000 -
				traffic; on-street parking	\$10,000
				elimination	+,
Full Closures		44% decrease		Require legal procedures;	\$120,000
				Difficulties for emergency	. ,
				vehicles; Costs; Limiting access to	
				businesses	
Half Closures		42% decrease		Difficulties for emergency	\$40,000
				vehicles; Costs; Limiting access to	
				businesses; Drivers might be able	
				to circumvent the barrier	
Diagonal		35% decrease		Difficulties for emergency	\$85,000
Diverters				vehicles; Costs; Costs; Require the	,
				reconstruction of corner curbs	
Median		31% decrease		Require available street width on	\$15,000 -
Barriers				the major street; Limit turns to and	\$20,000
				from the side street; Difficulties for	per 100 ft
1				amangan ay yahialag	1

 Table 3.1 Traffic Calming Measures

Impact on

Impact on

Impact on

Disadvantages

emergency vehicles

Cost

Traffic Calming

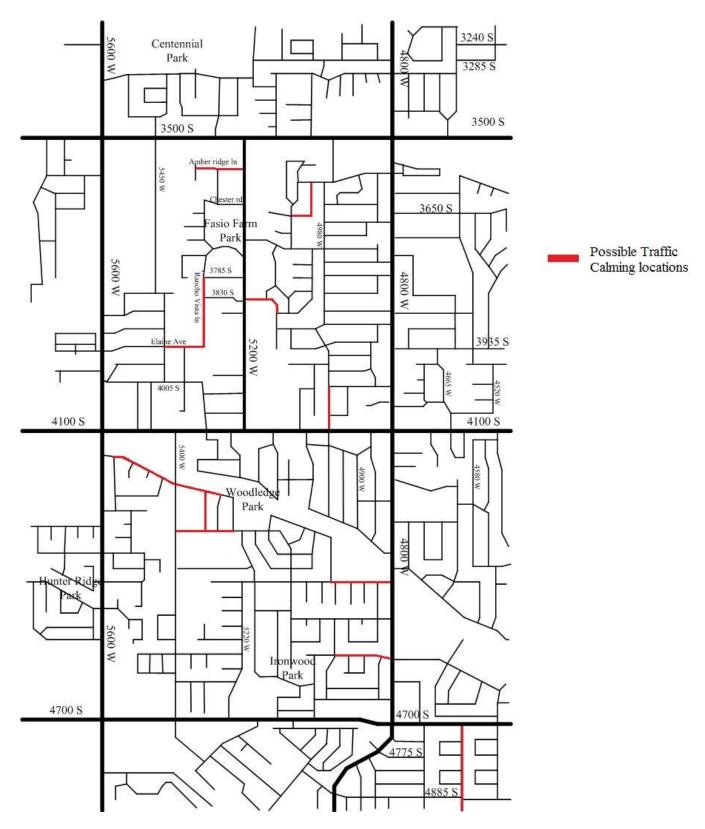
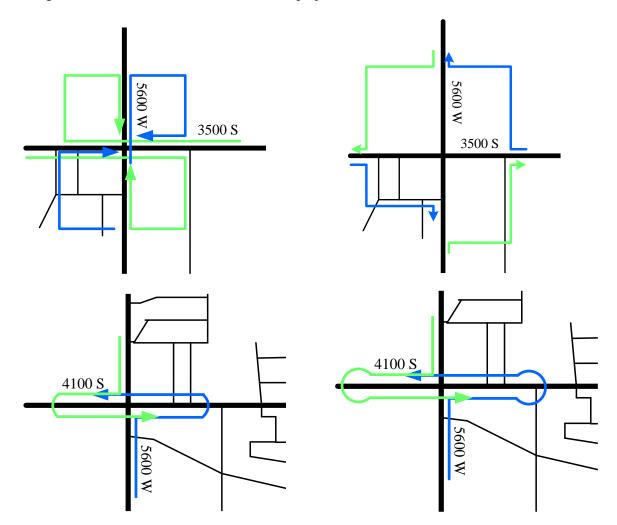


Figure 3.2 Possible Traffic Calming Locations

3.3 Design Principles of Innovative intersections

The project network is very convenient for the implementation of innovative intersections. Avenue Consultants already developed a set of design scenarios for innovative intersections along the 5600 W corridor. It is estimated that this type of design brings more benefits to the overall traffic than simple road widening, and they are very convenient for the inclusion of center running transit lines (whether BRT or LRT). The 5600 W corridor offers opportunities for innovative intersections at all three intersections within the project network (3500 S, 4100 S and 4700 S). Another possible location is the intersection of 3500 S and 4800 W. Based on the traffic volumes at other intersections along 4800 W, the implementation of innovative intersections cannot be justified at this point. Figure 3.3 provides a set of designs for innovative intersections within the project network.



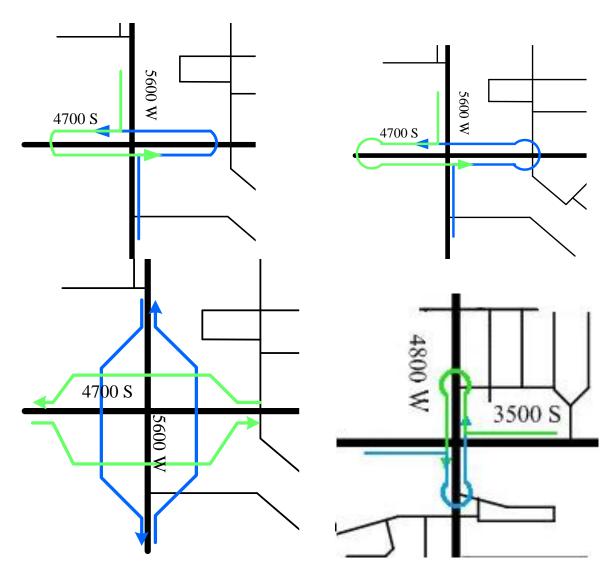


Figure 3.3 Innovative Intersections Implementation

3.4 Design Principles of Transit Friendly Designs (TFD)

TFD can be defined as a set of techniques for improved integration of transit into residential and nonresidential areas. It can be incorporated into the planning process for new developments, or can be applied to existing ones.

Transit-friendly streets make transit use more efficient and convenient. It also makes the street less convenient for automobiles while still accommodating them. At the same time, other functions of a street are recognized so that transit does not overwhelm the street. TFD is a very important step toward achieving a functional TOD.

The main guidelines for TFD can be summarized as follows:

- Provide appropriate community densities
- Minimize walking distance: 0.25 miles maximum walking distance to stop
- Provide mixed land uses
- Organize density, land use, and buildings to benefit from transit
- Create a pedestrian friendly environment
- Route transit into the community: 0.50 miles maximum spacing between parallel lines
- Reduce transit travel time
- Increase transit frequency: up to 15-minute headways
- Build quality, user friendly transit facilities

Figure 3.4 provides a version of TFD applied to the project network. In general, frequencies on the existing transit lines within the area should be increased according to the guidelines. Also, an addition of three transit lines will increase the transit spatial coverage and satisfy the TFD recommendations. These lines should run along 5200 W, 3780 S, and 4400 S. Street connections should be added into this network to accommodate the new transit lines. Transit stops should be redistributed to minimize the walking distance and serve high activity centers.

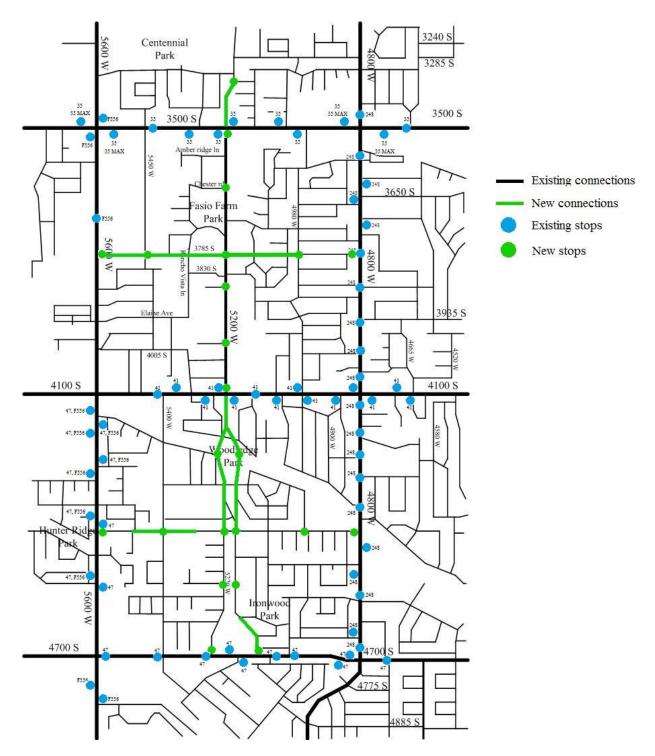


Figure 3.4 Enhanced Transit Network

4. MODELING METHODOLOGY

The effects of the implemented design principles will be assessed through combined macro and micro traffic simulations. The models are being developed simultaneously in VISUM (macro) and VISSIM (micro) simulation software. The main inputs used in the state of development and calibration of models are network geometry, traffic analysis zone (TAZ) data, origin-destination (OD) trip distribution, link volumes (AM, midday, and PM peak), signal timing data, and transit ridership data. The network geometry data are obtained through aerial and street view maps and used for coding the network. TAZ data, along with OD trip distribution and link volumes, are obtained from the Wasatch Front Regional Council, and these data exist for the years 2009 (existing) and 2040 (forecasted). Signal timing data for signalized intersections are downloaded using UDOT's i2 software, which allows a direct communication link to the field traffic controllers and control program databases. Traffic signals are coded simultaneously in VISUM and VISSIM. Transit ridership data, that also include boarding and alighting information for transit stops within the network, are obtained from UTA. These data are used for transit assignment projections in the simulation models.

VISUM macrosimulation is a tool for traffic planning, travel demand modeling, and traffic and transit assignments. VISSIM microsimulation is a tool for traffic performance analysis and provides detailed measure of effectiveness (MOE) data for many parameters. These two tools are used simultaneously throughout this project to exploit the benefits that both can offer. The fact that they are mutually interchangeable (macrosimulation can be exported to microsimulation and vice versa) simplifies their use and creates additional benefits. Figure 4.1 shows how each model based on the proposed methodology is developed. The main steps for creating each simulation scenario are defined as follows:

- 1) Build the base network in VISUM using the aerial maps
- 2) Input traffic and transit data (TAZ data, OD matrices, targeted link volumes, signal timing data, and transit ridership)
- 3) Perform Dynamic Traffic Assignment (DTA) in VISUM
- 4) Perform OD matrix correction and calibration
- 5) Export the calibrated network to VISSIM
- 6) Fine tune the network and perform model validation
- 7) Optimize signal timing using available data and Synchro software where needed
- 8) Perform traffic analysis using VISSIM

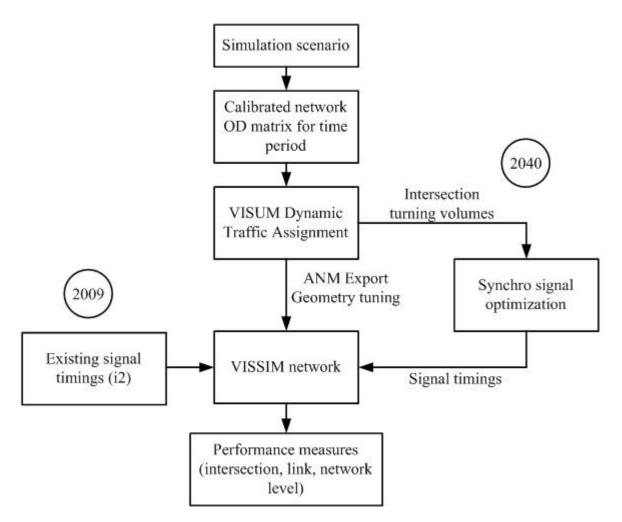


Figure 4.1 Modeling Methodology

4.1 Base VISUM/VISSIM Network Model

The choice of base network for this project is based on the fact that two BRT lines are already in place on 5600 West and 3500 South Streets. The Wasatch Choice for 2040 emphasizes future main activity centers in the Salt Lake Valley, locating a town center at 3500 South & 5600 West intersection. According to the Wasatch Front Regional Council (WFRC) plan for 2040, town centers have a strong sense of community identity and are well served by transit and streets. The current state of our test network indicates that network design changes, other than traditional street widening, are needed in order to accommodate for non-motorized modes in the future.

The first step in our methodology is building the test network in VISUM with the help of aerial and street view maps used in this process. The network model consists of the arterials, collectors, and local streets in the area, and it also includes links that represent big traffic generators. Each link is modeled to represent the length, number of lanes, location of intersections, speed limits, and the type of intersection control from the field. Transit lines and stops located within the area are also included in the model. Figure 4.2 shows the completed and interchangeable VISUM/VISSIM models of the existing conditions.

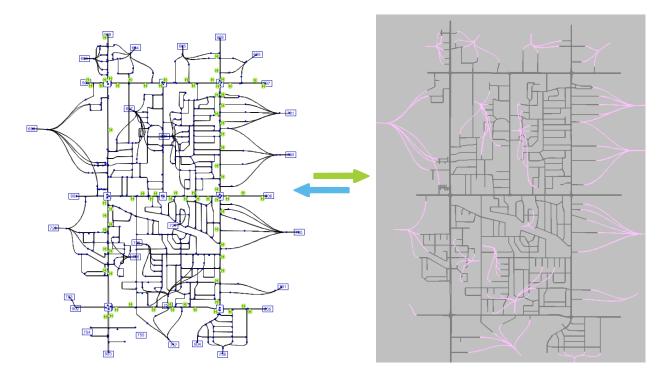


Figure 4.2 VISUM/VISSIM Network of Existing Conditions

4.2 Traffic and Transit Data

The next step in the modeling process is to input the traffic and transit data (TAZ data, OD matrices, targeted link volumes, signal timing data, and transit ridership). The TAZ data are obtained from the WFRC, and they include zone numbering, socio-economic data, trip data (generation attraction for different trip modes) for each zone, as well as zone-to-zone travel data (OD matrices). There are 21 actual TAZs within the project network. Since this network is a cut of the overall Salt Lake Valley transportation network, the model includes 10 dummy zones to account for the traffic that traverses the project network. These zones are located on arterials at the borders of the network. The locations of the TAZs incorporated in the modes are shown in Figure 4.3.

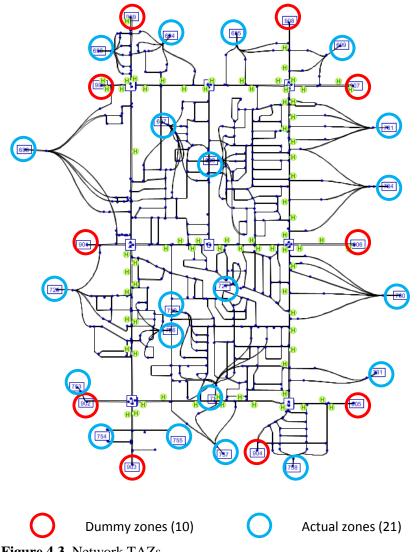


Figure 4.3 Network TAZs

An OD matrix of traffic demand is created for the simulation models for the 31 zones based on the available data. The OD demand for the actual zones is based on the WFRC trip data, while for the dummy zones the OD demand is developed based on the link volumes and the differences in trip data for the actual zones. These data are also used for network calibration.

There are eight signalized intersections within the network, and they are modeled based on the signal timing data obtained from UDOT. These intersections are coded into the simulation networks using VISUM's junction editor, as given in Figure 4.4. The model also includes transit lines and transit stops located or traversing the network.

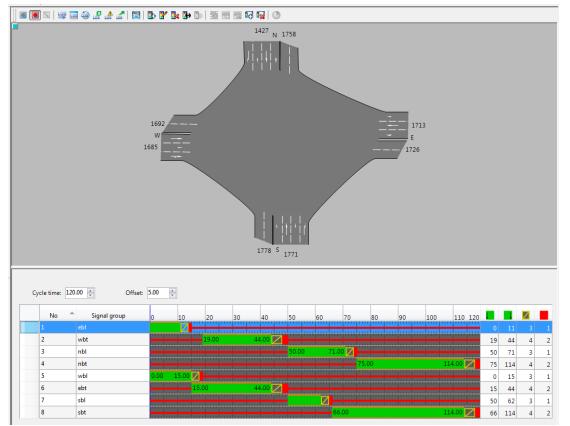


Figure 4.4 Junction Editor for Signalized Intersections

Six current transit lines with 120 stops are allocated on the network according to available public transit stops data from the Utah Transit Authority (UTA) and Google maps. Timetables for each line and transit route are also based on data available from the UTA. Transit ridership for each line and each transit stop is based on the transit boarding data for this are for the year 2011, and transit OD demand for the years 2009 and 2040.

4.3 Traffic Assignment in VISUM

VISUM is a useful tool for fast and accurate DTA. The DTA for the project network is performed based on the OD matrices created for the network from the available data. The OD matrices are coded in VISUM, along with the data on current link volumes, which are also used for model calibration.

The first step toward DTA was to input link volume data from WFRC into the VISUM network. Data are available for the years 2009 and 2040, for the main links on the VISUM network. VISUM links option "Add Value 1" is used for link volume inputs. Each link in VISUM also has data about link capacity, so the volume/capacity ratio can be computed.

The fact that links in VISUM have some volume data assigned does not indicate what volume of the links will be after the DTA. The link volume depends on the OD matrix. So the second step in DTA was to build the OD matrix for the existing and dummy zones. The total attractions and distributions for the existing zones are part of the WFRC trip data for the West Valley City network. Data are available for auto, transit, and non-motorized trips. The data for OD trips are available on a daily level, while we have link volumes for AM peak, PM peak, and evening periods. This allows the calculation of coefficients that will narrow daily OD data to period OD data for these four periods. For example, if we need OD trips for

PM peak period, we use the relationship between link volumes for PM peak and OD trips on the daily level from the corresponding TAZ to obtain the OD trips for PM peak period.

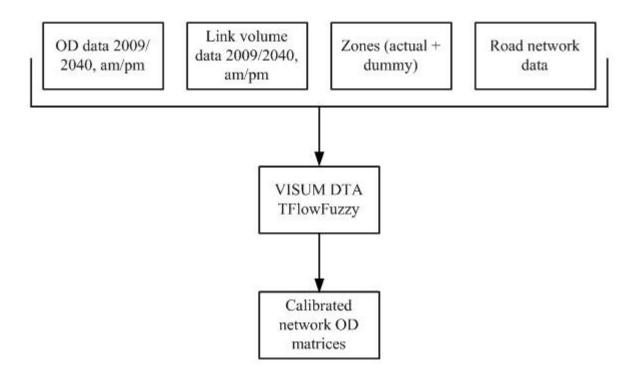


Figure 4.5 Calibration Process

An OD matrix, built in the described manner for AM peak, midday, and PM peak period, for auto mode is the basis for DTA in VISUM. We use "Calculate/Procedures/PrT Assignment" from the VISUM main menu to perform the assignment. Figure 3.4 presents the assignment results demonstration from VISUM.

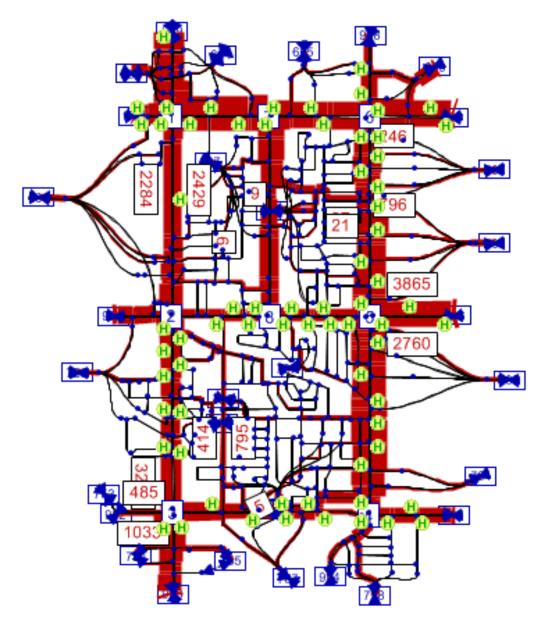


Figure 4.6 VISUM PrT Assignment for the Base OD Matrix, Auto Mode, PM Peak, 2009

There is an option in VISUM main menu, "Calculate/Procedures/Assignment Analysis," that allows us to evaluate the assignment from Figure 3.4. This evaluation is in Figure 3.5 and shows how low the correlation is between OD auto trips data for PM peak period and link volume data for PM period for 2009. This requires further matrix correction until the assignment evaluation shows satisfying results.

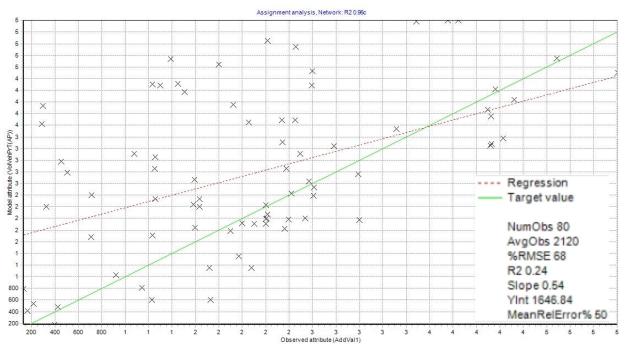


Figure 4.7 VISUM PrT Assignment Analysis for the Base OD Matrix, Auto Mode, PM Peak, 2009

4.4 OD Matrix Correction and Model Calibration

The option of performing "TFlowFuzzy" matrix correction in VISUM until the assignment analysis shows high data correlation enables the changes in the base matrix. After applying TFlowFuzzy, the base matrix in VISUM is corrected and the new matrix can be used to repeat the assignment and the assignment analysis. The assignment results based on the corrected matrix in VISUM for PM peak period in 2009, for auto mode are in Figure 4.8.

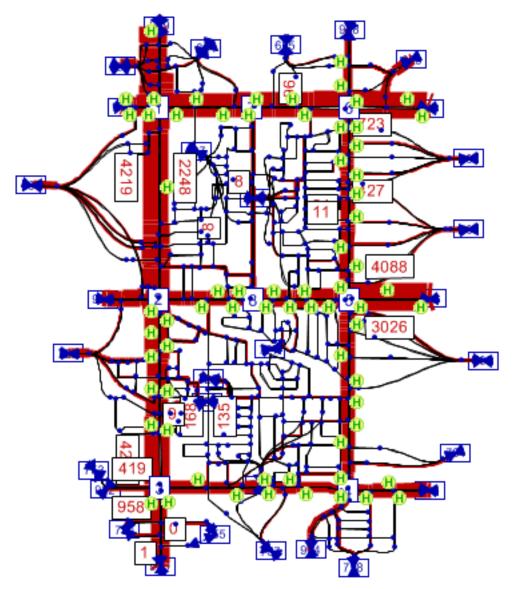


Figure 4.8 VISUM PrT Assignment for the TFlowFuzzy Corrected OD Matrix, Auto Mode, PM Peak, 2009

The assignment analysis of corrected matrix from Figure 4.8 shows a satisfying correlation between link volume data from WFRC and the assigned volumes in VISUM. Figure 4.9 presents the results of this evaluation. Transit assignment is performed and evaluated in a similar manner as PrT assignment in VISUM, but the data for assignment analysis come from a different source. The data about transit ridership for the three periods AM peak, midday, and PM peak are available from the UTA. The OD transit trips on the daily level from the WFRC are narrowed down to these three periods in the same way as they were for auto trips. The assignment after the matrix correction evaluated, as shown in Figure 4.8, can be exported to VISSIM for further evaluation of this project network.

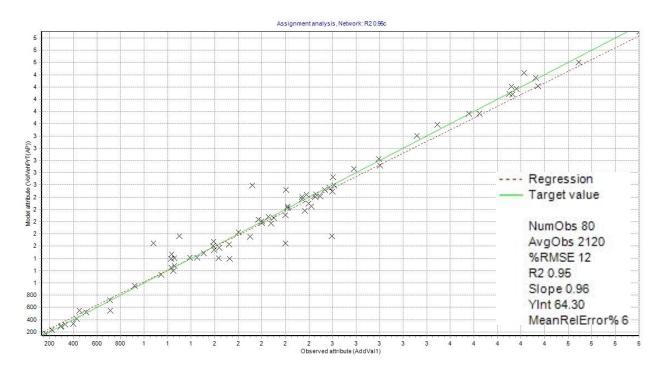


Figure 4.9 VISUM PrT Assignment Analysis for the TFLowFuzzy Corrected OD Matrix, Auto Mode, PM Peak, 2009

4.5 **Performance Measures**

Calibrated matrix with auto and transit assignment is exported from VISUM to VISSIM. The microsimulation environment will allow for a very detailed evaluation of performance measures related to traffic efficiency:

- Level of Service for intersections based on intersection delay
- Travel time and trip distance for a few representative trips
- Number of left turn movements
- Network performance through average speed, average number of stops, total delay

Since the imported network includes both auto and transit mode, VISSIM could measure average speed for both modes as an indicator of mobility. The additional performance measures that could serve to compare this base network with new network designs are the increase in trip redundancy and the number of cars rerouted from 5600 West. The goal is to meet the demand on 5600 West by introducing the optimal intersection design, rather than by rerouting the vehicles to the local network.

5. TRAFFIC ANALYSIS RESULTS AND DISCUSSION

The results presented in this chapter show the existing traffic conditions on our test network, expected traffic conditions in "no build case," and traffic implications of proposed network designs. The measures of effectiveness are analyzed on intersection, corridor, and network-wide level. For the analysis on the intersection level, we defined nodes at the most important intersections. Travel time sections defined in VISSIM evaluate performance along the corridors. Finally, network performance evaluations in VISSIM provides the results on the network wide level. The results are given for 2009 AM, 2009 PM, 2040 AM, and 2040 PM peak hours.

5.1 Base Case Scenarios

Base case results (Table 5.1) show measures of effectiveness for AM and PM peak hour for the year 2009, compared to measurements for 2040, based on forecasted OD demand. The results are given in the following order: intersection analysis, corridor travel times, network performance, and 2009/2040 comparison.

From the results shown in Table 5.1, the intersection LOS values are D or higher for the year 2009, AM and PM peak periods, which is in agreement with UDOT recommendations for this area. However, the results based on travel forecasts for 2040 show that LOS for two intersections along 5600 W corridor and one intersection on 4800 W are F for PM peak hour, which becomes the critical focus of further analysis in this study.

Further results of intersection delay (Figure 5.1) show that delays increase for all intersections along 5600 W street, when compared between the 2009 and 2040 forecasts. Increase in delay for individual intersections is greater during the PM peak period. The 5600 W corridor is important to observe in this network because of its proximity to the new freeway that will take place on the west side of the corridor. This is the reason why volumes will increase and intersection delay will be more than double compared with the existing state for the PM peak period. This corridor will also have a BRT line implemented by 2015, and other transit improvements will follow. Transit service changes will surely bring some mode shift changes; however, current MPO forecasts for 2040 show that transit service alone will not suffice the travel demand, which is why both network/corridor/intersection design and traffic operations' modifications should be considered.

Network performance results (Table 5.2) also show the highest average and total delay values for 2040 PM peak period. Corridor related performance measures (Table 5.3) show satisfying LOS for most all corridors in the network except for 4700 South Bound direction, which means that the critical points and causes of congestion will be intersections, which is why the study is expanded beyond the typical TOD measures to examine the performance of innovative intersection designs.

Using results from the base case scenario, this study is focused on the PM peak periods, and introduces transit, traffic operations, and street network alterations that are TOD supportive in order to examine the impacts they have on vehicular traffic. Traffic analyses of enhanced networks are presented in the following sections of this chapter.

Table 3.1 Interse		er of Servic	e 101 2009	AM, 2009	FWI, 2040	Alvi, and 20	J40 F MI	
Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W
	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S
Vehicles	8349	7431	5609	2980	2934	5761	6835	4744
Delay (s)	26.6	26.9	22.2	3.0	2.1	24.8	40.5	12.9
Stop delay (s)	16.4	19.4	14.6	1.1	0.5	13.7	28.6	6.5
Stops	0.7	0.6	0.6	0.2	0.1	0.7	1.1	0.6
Avg Queue (ft)	46.7	48.2	28.7	1.5	0.4	48.8	111.9	12.8
Max Queue (ft)	269.5	291.3	220.5	117.3	54.1	371.2	512.8	167.5
LOS	С	С	С	А	А	С	D	В
Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W
Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S
Vehicles	9560	8592	7099	4853	4414	7891	9971	5439
Delay (s)	29.8	28.3	19.4	3.7	5.8	15.5	30.3	13.4
Stop delay (s)	20.8	19.8	12.0	1.2	2.9	8.9	19.3	6.5
Stops	0.7	0.7	0.6	0.2	0.2	0.5	0.9	0.6
Avg Queue (ft)	60.1	61.6	28.8	2.9	3.4	23.9	94.5	14.0
Max Queue (ft)	336.7	343.2	299.9	108.8	123.9	228.5	568.6	168.6
LOS	С	С	В	А	А	В	С	В
Interestion	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W
Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S
Vehicles	6148	7849	9425	4526	5203	6826	8138	7031
Delay (s)	29.4	34.1	69.1	3.2	6.7	31.1	21.1	12.3
Stop delay (s)	21.2	26.0	21.8	0.9	2.3	18.7	11.4	4.9
Stops	0.6	0.7	1.0	0.1	0.3	0.8	0.8	0.5
Avg Queue (ft)	43.3	67.2	97.7	1.3	6.9	93.7	41.3	17.6
Max Queue (ft)	249.8	343.3	555.0	125.6	345.5	598.9	339.5	191.9
LOS	С	С	E	А	А	С	С	В
Interestion	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W
Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S
Vehicles	11872	11028	12067	8634	7600	11511	11256	9515
Delay (s)					10.0	15.9	37.5	95.9
	149.8	29.7	129.6	5.9	10.8	15.7	57.5	<i>JJJJ</i>
Stop delay (s)		29.7 19.7	129.6 49.3	5.9 1.6	10.8 3.7	7.9	25.9	47.0
Stop delay (s) Stops								
1 2 ,	80.4	19.7	49.3	1.6	3.7	7.9	25.9	47.0
Stops	80.4 2.7	19.7 0.8	49.3 2.4	1.6 0.2	3.7 0.4	7.9 0.6	25.9 0.9	47.0 2.7

Table 5.1 Intersection Level of Service for 2009 AM, 2009 PM, 2040 AM, and 2040 PM

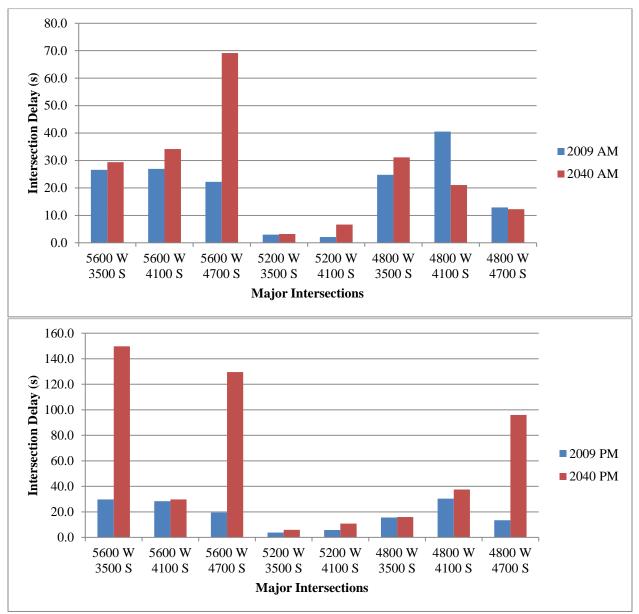


Figure 5.1 Intersection Delay Comparisons for 2009 and 2040, for AM and PM Peak Periods

Parameter	2009 AM	2009 PM	2040 AM	2040 PM
Number of vehicles in the network	546	719	655	1493
Number of vehicles that have left the network	23504	32839	27213	37576
Total number of vehicles	24050	33558	27868	39069
Average delay time per vehicle (s)	51	44.79	67.446	201.423
Average stopped delay per vehicle (s)	28	23.196	29.459	101.017
Average number of stops per vehicles	1.2	1.09	1.333	3.764
Total delay time (h)	339.6	417.514	522.11	2185.938
Total stopped delay (h)	190.1	216.229	228.049	1096.285
Total number of stops	30013	36573	37160	147067
Average speed (mph)	26.141	26.429	23.931	16.379
Total travel time (h)	1569.8	2156.765	2035.068	4320.68
Total distance traveled (mi)	41037.6	57000.92	48701.431	70769.321

 Table 5.2 Network Performance for Base case Scenarios

 Table 5.3 Travel Times and LOS for Test Network Corridors

		2	2009 AM		2	2040 AM	
Segment	Section (mi)	Avg TT (s)	Speed (mph)	LOS	Avg TT (s)	Speed (mph)	LOS
5600 W SB	2.830	275.2	37.0	А	323.7	31.5	В
5600 W NB	2.830	288.4	35.3	Α	321.9	31.7	В
5200 W SB	0.987	108.0	32.9	В	102.0	34.8	В
5200 W NB	0.983	96.1	36.8	А	96.3	36.7	А
$4800 \le SB$	2.802	396.4	25.5	С	361.1	27.9	С
4800 W NB	2.802	450.4	22.4	С	407.6	24.7	С
3500 S EB	1.592	208.9	27.4	С	244.1	23.5	С
3500 S WB	1.592	200.8	28.5	В	201.7	28.4	В
4100 S EB	1.692	270.7	22.5	С	254.5	23.9	С
4100 S WB	1.692	255.8	23.8	С	232.9	26.1	С
4700 S EB	1.802	265.9	24.4	С	292.4	22.2	С
4700 S WB	1.796	276.9	23.3	С	264.6	24.4	С
		2	2009 PM		2	2040 PM	
Segment	Section (mi)	Avg TT (s)	Speed (mph)	LOS	Avg TT (s)	Speed (mph)	LOS
5600 W SB	2.830	281.346	36.2	А	551.5	18.5	D
5600 W NB	2.830	309.920	32.9	В	412.9	24.7	С
5200 W SB	0.987	121.813	29.2	В	109.3	32.5	В
5200 W NB	0.983	97.559	36.3	А	99.4	35.6	А
$4800 \le SB$	2.802	395.502	25.5	С	394.4	25.6	С
4800 W NB	2.802	401.576	25.1	С	517.0	19.5	D
3500 S EB	1.592	212.856	26.9	С	210.4	27.2	С
3500 S WB	1.592	213.796	26.8	С	221.8	25.8	С
4100 S EB	1.692	251.723	24.2	С	251.3	24.2	С
4100 S WB	1.692	234.671	26.0	С	268.4	22.7	С
4700 S EB	1.802	295.026	22.0	D	343.4	18.9	D
4700 S WB	1.796	276.204	23.4	С	700.1	9.2	F

5.2 Street Connectivity Scenarios

We tested five new network design scenarios with different connectivity levels, versus five street widening scenarios, making sure the length of new connections and additional lanes is equivalent for each of five scenario pairs. We also compared the impact of different levels of network connectivity on traffic operations, including the existing conditions and enhanced connectivity, with the presence of traffic calming measures. Each scenario and approach rendered a different traffic assignment in VISUM, and thus different vehicle inputs and routing decisions in VISSIM models. The results are shown on the intersection, corridor, and network-wide level. Figure 5.2 shows the street connectivity scenarios we modeled and tested.

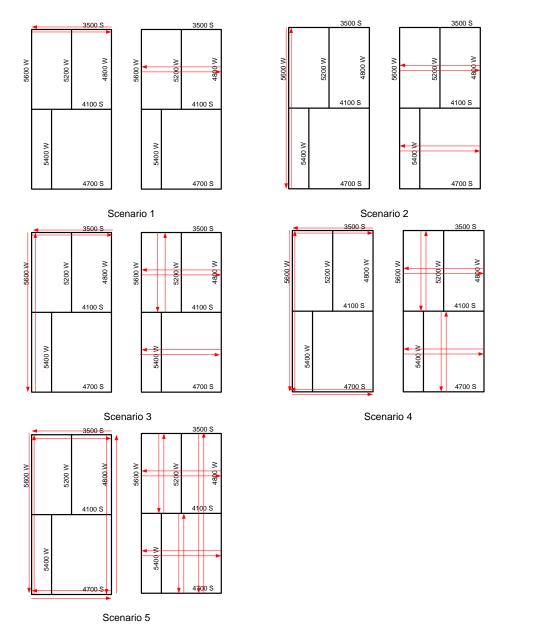


Figure 5.2 Street Connectivity Scenarios

Highly connected street networks increase accessibility for multimodal transport, but their effects on the efficiency of still dominant vehicular traffic is rarely addressed. This section discusses the implications of connectivity on traffic operations on part of the West Valley City network in Utah. Our test network has two Bus Rapid Transit (BRT) lines in place with the potential Transit Oriented Development (TOD) site according to regional plans for 2040. Since predicted traffic demand for 2040 requires modifications of this network, the question is if enhanced connectivity, as a TOD supportive approach, can accommodate that demand and replace the traditional street widening solution.

Intersection analysis (Table 5.4) shows that increased street connectivity does not improve intersection performance, and that critical intersections along the future BRT corridor retain low LOS. Street widening and increased connectivity even tend to increase intersection delay for PM peak period (Figures 5.3 and 5.4). As street connectivity increases (Figures 5.5 and 5.6) intersection delays also increase for the year 2040 for all intersections except those on 3500 S and 5600 W corridors.

Travel times, speeds, and LOS on the corridor level for street widening and connectivity scenarios are given in Tables 5.5 - 5.9. Additional connections to 5600 W do not cause the traffic to detour from this corridor and use other streets as alternatives in the southbound direction. The decrease in LOS and speeds, and increase in travel time along this corridor, with even only one additional street connection to the parallel arterial shows that more drivers would choose this corridor if more connections were provided. The LOS decreases on 5200 W corridor, too, as an alternative approach to 5600 W and 35 S intersection.

Additional street connections to the 5600 W corridor decreases its LOS in both southbound and northbound directions. Since the LOS does not change on the parallel 4800 W arterial, the traffic is coming to 5600 W from other directions, and not rerouting from 4800 W. This implies that simple street widening or adding connections that feed into this corridor will not improve its performance. As additional connections are added parallel to the corridor, travel time on 5600 W starts to decrease (Scenarios 3, 4, and 5). In these cases, improved connectivity proves to be a better alternative than street widening from the operational standpoint.

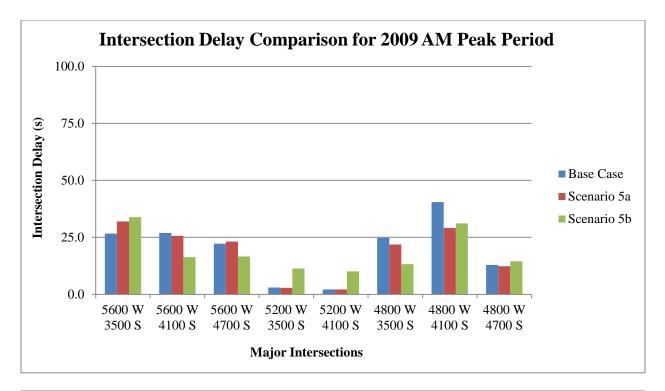
Traffic analysis of street connectivity scenarios on the network-wide level is given in Table 5.11. Enhanced street connectivity increases the overall network delay when compared with street widening and base case scenarios. The complete network analysis shows that networks with enhanced connectivity accommodate more vehicles during the same period of time. So it is a trade-off between capacity and delay whether the existing state of the network will be kept or connectivity will be increased for the current traffic conditions.

Considering the travel forecasts for 2040 AM and PM peak periods, however, enhanced connectivity contributes up to 30 seconds to average delay per vehicle, while it accommodates about 2,000 vehicles more than the base case or street widening scenarios. So for future network modifications, street connectivity with additional intersection design and operations might be the network development that could address the demand.

Our results show that enhanced connectivity opens new routes and provides better dispersion of intrazonal traffic, without rerouting external-external trips from the major arterial. As connectivity increases, network designs with enhanced connectivity accommodate more traffic than designs with street widening. However, none of the proposed solutions will meet the 2040 traffic demand unless mode shift occurs.

	Scenario	Intersection	5600 W 3500 S	5600 W 4100 S	5600 W 4700 S	5200 W 3500 S	5200 W 4100 S	4800 W 3500 S	4800 W 4100 S	4800 W 4700 S
		1a	B	4100 S	4700 S	A	4100 S	C	4100 S	4700 S
	2009 AM	la 1b	Б С	C C	B	B	A	B	D C	B
		10 1a	C	<u>с</u>	B	A	A	B	<u>с</u>	B
.io	2009 PM	1a 1b	C C	B	B	A	A	B	D	B
nai		10 1a	C	C B	E B	A	A	C B	C D	B
Scenario	2040 AM	1a 1b	C C	C C	E	B	A	B	C C	B
v		10 1a	E	<u>с</u>	F	A	B	B	D	F
	2040 PM	1b	F	C	F	В	A	B	F	F
		2a	C	C	C	A	A	C	D	B
	2009 AM	24 2b	C	C	B	В	A	B	C	B
0		20 2a	C	C	C	A	A	B	D	B
rio	2009 PM	2a 2b	C C	B	B	A	A	B	D	B
na		20 2a	C	C	E	A	A	C	C	B
Scenario 2	2040 AM	24 2b	C	C C	F	В	B	B	C C	B
		20 2a	F	C	F	A	B	B	D	F
	2040 PM	24 2b	F	C C	F	C	B	B	F	F
		3a	C	C	C	A	A	C	D	B
	2009 AM	3b	C	B	B	В	В	B	C	B
ω -		3a	C	C	C	A	A	B	C	B
Scenario	2009 PM	3b	C C	B	B	A	A	B	C C	B
na		3a	C	C	E	A	A	C	C	B
ç	2040 AM	3b	C	C C	E	В	В	B	C C	B
		3a	F	C	F	A	B	B	D	F
	2040 PM	3b	F	C C	F	C	B	B	F	F
		4a	C	C	C	A	A	C	D	B
	2009 AM	4b	C	B	B	В	В	B	C	B
4 -		4a	C	C	B	A	A	B	C	B
nio	2009 PM	4b	C	B	B	A	A	B	C	B
Scenario	2040 135	4a	C	C	E	A	A	C	C	B
Š	2040 AM	4b	С	С	Е	В	В	В	С	В
•1		4a	F	C	F	А	В	В	D	Е
	2040 PM	4b	F	С	F	С	В	В	F	F
	2000 136	5a	С	С	С	А	А	С	С	В
	2009 AM	5b	C	В	В	В	A	В	C	В
5	2000 534	5a	C	C	B	A	A	B	C	B
Scenario	2009 PM	5b	C	В	В	A	A	В	C	В
na'	0040 135	5a	C	C	E	A	A	B	B	B
Sce	2040 AM	5b	C	C	Ē	В	В	B	C	C
•1	0040 53 5	5a	F	C	F	A	B	B	C	E
	2040 PM	5b	F	C	F	В	B	B	F	F

 Table 5.4 Intersection LOS for Street Connectivity Scenarios



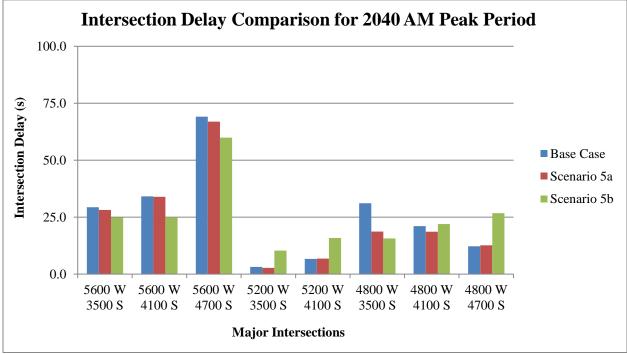
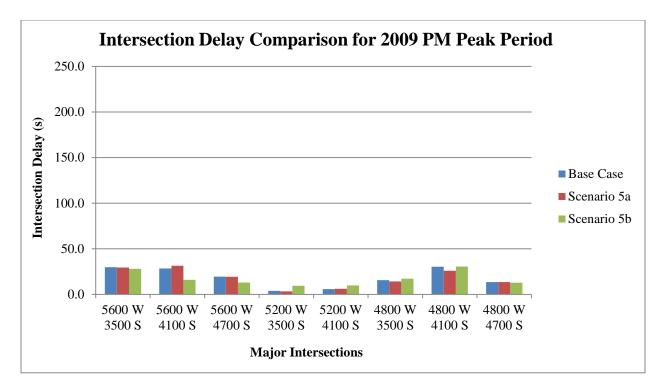


Figure 5.3 Comparisons of Intersection Delays for Base Case, Street Widening (a) and Increased Connectivity (b) Scenarios for AM Peak Period



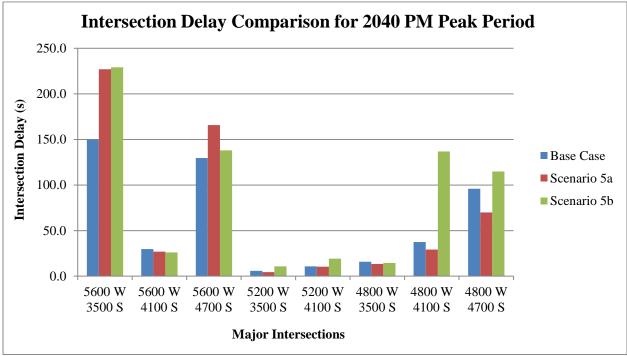
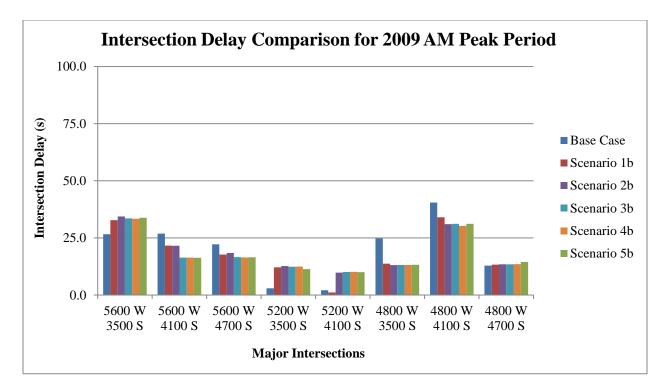


Figure 5.4 Comparisons of Intersection Delays for Base Case, Street Widening (a) and Increased Connectivity (b) Scenarios for PM Peak Period



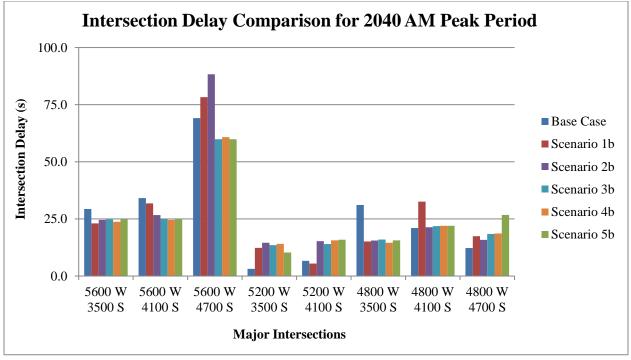
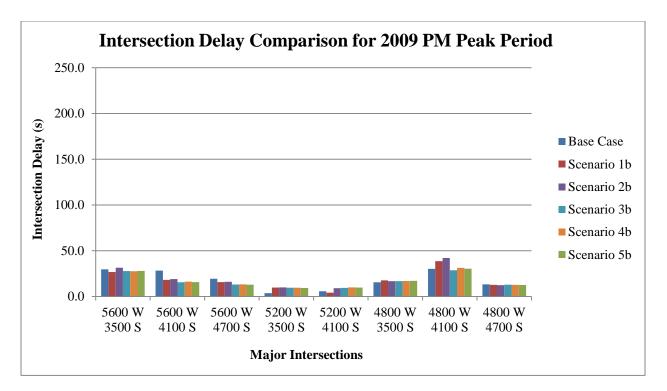


Figure 5.5 Comparisons of Intersection Delays for Base Case, and Increased Connectivity Scenarios for AM Peak Period



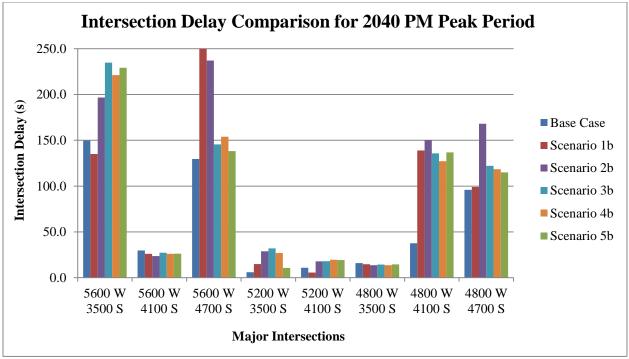


Figure 5.6 Comparisons of Intersection Delays for Base Case, and Increased Connectivity Scenarios for PM Peak Period

			Base Case		Scenario 1							
Segment	Section (mi)				Stre	et Widening		Street Connectivity				
		Avg TT	(s Speed (mph)	LOS	Avg TT (s)	Speed (mph)	LOS	Avg TT (s)	Speed (mph)	LOS		
5600 W SB	2.830	551.5	18.5	D	408.8	24.9	С	533.6	19.1	D		
5600 W NB	2.830	412.9	24.7	С	400.9	25.4	С	823.2	12.4	F		
5200 W SB	0.987	109.3	32.5	В	108.7	32.7	В	95.6	37.2	А		
5200 W NB	0.983	99.4	35.6	А	99.3	35.6	Α	151.7	23.3	С		
4800 W SB	2.802	394.4	25.6	С	400.9	25.2	С	410.6	24.6	С		
4800 W NB	2.802	517.0	19.5	D	523.6	19.3	D	535.5	18.8	D		
3500 S EB	1.592	210.4	27.2	С	214.6	26.7	С	210.2	27.3	С		
3500 S WB	1.592	221.8	25.8	С	203.6	28.2	В	217.6	26.3	С		
4100 S EB	1.692	251.3	24.2	С	252.8	24.1	С	242.1	25.2	С		
4100 S WB	1.692	268.4	22.7	С	270.8	22.5	С	520.0	11.7	F		
4700 S EB	1.802	343.4	18.9	D	344.6	18.8	D	318.9	20.3	D		
4700 S WB	1.796	700.1	9.2	F	714.6	9.0	F	586.2	11.0	F		

 Table 5.5
 Travel Times and Corridor LOS for Street Connectivity Scenario 1

 Table 5.6 Travel Times and Corridor LOS for Street Connectivity Scenario 2

		Base Case			Scenario 2						
Segment	Section (mi)				Stre	et Widening		Street	Connectivity		
		Avg TT (s Speed (mph)	LOS	Avg TT (s)	Speed (mph)	LOS	Avg TT (s)	Speed (mph)	LOS	
5600 W SB	2.830	551.5	18.5	D	790.4	12.9	F	608.1	16.8	Е	
5600 W NB	2.830	412.9	24.7	С	384.7	26.5	С	902.7	11.3	F	
5200 W SB	0.987	109.3	32.5	В	108.8	32.7	В	97.9	36.3	Α	
5200 W NB	0.983	99.4	35.6	А	99.7	35.5	Α	207.1	17.1	D	
4800 W SB	2.802	394.4	25.6	С	402.4	25.1	С	439.1	23.0	С	
4800 W NB	2.802	517.0	19.5	D	519.6	19.4	D	586.1	17.2	D	
3500 S EB	1.592	210.4	27.2	С	211.3	27.1	С	209.4	27.4	С	
3500 S WB	1.592	221.8	25.8	С	225.3	25.4	С	234.0	24.5	С	
4100 S EB	1.692	251.3	24.2	С	252.4	24.1	С	254.4	23.9	С	
4100 S WB	1.692	268.4	22.7	С	268.9	22.7	С	594.1	10.3	F	
4700 S EB	1.802	343.4	18.9	D	334.8	19.4	D	323.7	20.0	D	
4700 S WB	1.796	700.1	9.2	F	758.2	8.5	F	770.9	8.4	F	

 Table 5.7 Travel Times and Corridor LOS for Street Connectivity Scenario 3

			Base Case		Scenario 3							
Segment	Section (mi)				Stre	et Widening		Street	Connectivity			
		Avg TT ((s) Speed (mph)	LOS	Avg TT (s)	Speed (mph)	LOS	Avg TT (s)	Speed (mph)	LOS		
5600 W SB	2.830	551.5	18.5	D	771.4	13.2	Е	582.4	17.5	D		
5600 W NB	2.830	412.9	24.7	С	382.5	26.6	С	692.3	14.7	Е		
5200 W SB	0.987	109.3	32.5	В	109.4	32.5	В	97.4	36.5	Α		
5200 W NB	0.983	99.4	35.6	Α	99.3	35.6	А	246.5	14.4	Е		
4800 W SB	2.802	394.4	25.6	С	399.1	25.3	С	403.4	25.0	С		
4800 W NB	2.802	517.0	19.5	D	528.3	19.1	D	513.2	19.7	D		
3500 S EB	1.592	210.4	27.2	С	211.8	27.1	С	215.1	26.7	С		
3500 S WB	1.592	221.8	25.8	С	206.8	27.7	С	227.7	25.2	С		
4100 S EB	1.692	251.3	24.2	С	252.7	24.1	С	260.8	23.4	С		
4100 S WB	1.692	268.4	22.7	С	266.2	22.9	С	515.7	11.8	F		
4700 S EB	1.802	343.4	18.9	D	334.0	19.4	D	312.7	20.8	D		
4700 S WB	1.796	700.1	9.2	F	756.3	8.5	F	643.1	10.1	F		

		I	Base Case		Scenario 4						
Segment	Section (mi)				Stre	et Widening		Street	Connectivity		
		Avg TT (s	Speed (mph)	LOS	Avg TT (s)	Speed (mph)	LOS	Avg TT (s)	Speed (mph)	LOS	
5600 W SB	2.830	551.5	18.5	D	714.5	14.3	Е	564.3	18.1	D	
5600 W NB	2.830	412.9	24.7	С	372.8	27.3	С	614.0	16.6	Е	
5200 W SB	0.987	109.3	32.5	В	109.6	32.4	В	98.1	36.2	Α	
5200 W NB	0.983	99.4	35.6	А	100.0	35.4	А	202.2	17.5	D	
4800 W SB	2.802	394.4	25.6	С	391.6	25.8	С	394.5	25.6	С	
4800 W NB	2.802	517.0	19.5	D	478.2	21.1	D	538.8	18.7	D	
3500 S EB	1.592	210.4	27.2	С	212.9	26.9	С	209.1	27.4	С	
3500 S WB	1.592	221.8	25.8	С	208.4	27.5	С	215.0	26.7	С	
4100 S EB	1.692	251.3	24.2	С	251.7	24.2	С	262.1	23.2	С	
4100 S WB	1.692	268.4	22.7	С	269.1	22.6	С	499.3	12.2	F	
4700 S EB	1.802	343.4	18.9	D	313.2	20.7	D	322.9	20.1	D	
4700 S WB	1.796	700.1	9.2	F	915.7	7.1	F	628.0	10.3	F	

Table 5.8 Travel Times and Corridor LOS for Street Connectivity Scenario 4

 Table 5.9 Travel Times and Corridor LOS for Street Connectivity Scenario 5

		Base Case			Scenario 5					
Segment	Section (mi)				Stre	et Widening		Street	Connectivity	
		Avg TT (s	s Speed (mph)	LOS	Avg TT (s)	Speed (mph)	LOS	Avg TT (s)	Speed (mph)	LOS
5600 W SB	2.830	551.5	18.5	D	827.4	12.3	F	608.1	16.8	Е
5600 W NB	2.830	412.9	24.7	С	376.5	27.1	С	598.3	17.0	D
5200 W SB	0.987	109.3	32.5	В	109.2	32.5	В	97.9	36.3	Α
5200 W NB	0.983	99.4	35.6	А	99.4	35.6	Α	111.9	31.6	В
4800 W SB	2.802	394.4	25.6	С	361.4	27.9	С	392.8	25.7	С
4800 W NB	2.802	517.0	19.5	D	477.9	21.1	D	528.3	19.1	D
3500 S EB	1.592	210.4	27.2	С	210.3	27.3	С	207.9	27.6	С
3500 S WB	1.592	221.8	25.8	С	203.6	28.1	В	231.0	24.8	С
4100 S EB	1.692	251.3	24.2	С	246.6	24.7	С	261.9	23.3	С
4100 S WB	1.692	268.4	22.7	С	261.9	23.3	С	531.3	11.5	F
4700 S EB	1.802	343.4	18.9	D	314.1	20.7	D	318.7	20.4	D
4700 S WB	1.796	700.1	9.2	F	795.8	8.1	F	657.3	9.8	F

	Perior				0			5			
2009 AM	Base	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b
Total number of vehicles	24,050	24,051	24,692	24,063	25,904	24,073	26,245	24,056	26,172	24,060	26,616
Average delay time per vehicle (s)	51	49	50	54	49	53	45	53	45	47	45
Average number of stops per vehicles	1.2	1.2	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.3
Total delay time (h)	339.6	325.4	344.8	358.4	349.6	352.0	329.8	355.7	326.2	316.9	329.7
Average speed (mph)	26.1	26.4	26.3	25.3	26.6	25.4	27.0	25.3	27.0	25.7	26.9
Total travel time (h)	1,569.8	1,555.9	1,575.1	1,617.6	1,655.4	1,615.2	1,643.4	1,619.4	1,635.5	1,595.4	1,658.4
Total distance traveled (mi)	41,037.6	41,042.0	41,445.1	41,003.6	44,024.8	40,995.0	44,393.8	40,990.9	44,231.3	41,013.9	44,672.2
2009 PM	Base	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b
Total number of vehicles	33,558	33,555	33,846	33,583	35,081	33,572	35,142	33,568	34,991	33,561	35,349
Average delay time per vehicle (s)	45	47	46	49	48	46	44	46	43	43	42
Average number of stops per vehicles	1.1	1.1	1.3	1.2	1.4	1.1	1.2	1.1	1.3	1.1	1.2
Total delay time (h)	417.5	433.9	432.0	455.8	468.1	428.8	425.2	425.7	414.7	401.5	410.3
Average speed (mph)	26.4	26.2	26.5	25.7	26.4	26.0	26.8	26.1	27.1	26.2	27.1
Total travel time (h)	2,156.8	2,170.0	2,156.4	2,214.7	2,280.4	2,192.3	2,197.7	2,188.5	2,210.1	2,175.4	2,221.8
Total distance traveled (mi)	57,000.9	56,938.6	57,125.5	56,941.4	60,239.0	57,015.3	58,830.3	57,033.0	59,889.5	57,031.2	60,283.2
2040 AM	Base	1	1b	2	01	2.	3b	4 .	41	~	51
2040 Alvi	Dase	1a	10	2a	2b	3a	30	4a	4b	5a	5b
Total number of vehicles	27,868	27,873	24,692	2a 27,824	20 30,184	3a 27,832	31,006	4a 27,830	4b 30,901	5a 27,795	31,195
			-		-				-		
Total number of vehicles	27,868	27,873	24,692	27,824	30,184	27,832	31,006	27,830	30,901	27,795	31,195
Total number of vehicles Average delay time per vehicle (s)	27,868 67	27,873 67	24,692 50	27,824 67	30,184 71	27,832 67	31,006 62	27,830 67	30,901 62	27,795 62	31,195 63
Total number of vehicles Average delay time per vehicle (s) Average number of stops per vehicles	27,868 67 1.3	27,873 67 1.4	24,692 50 1.4	27,824 67 1.3	30,184 71 1.7	27,832 67 1.3	31,006 62 1.5	27,830 67 1.3	30,901 62 1.5	27,795 62 1.2	31,195 63 1.5
Total number of vehicles Average delay time per vehicle (s) Average number of stops per vehicles Total delay time (h)	27,868 67 1.3 522.1	27,873 67 1.4 519.0	24,692 50 1.4 344.8	27,824 67 1.3 518.3	30,184 71 1.7 593.7	27,832 67 1.3 516.5	31,006 62 1.5 532.4	27,830 67 1.3 515.0	30,901 62 1.5 531.0	27,795 62 1.2 476.7	31,195 63 1.5 545.7
Total number of vehicles Average delay time per vehicle (s) Average number of stops per vehicles Total delay time (h) Average speed (mph)	27,868 67 1.3 522.1 23.9	27,873 67 1.4 519.0 24.0	24,692 50 1.4 344.8 26.3	27,824 67 1.3 518.3 23.7	30,184 71 1.7 593.7 23.9	27,832 67 1.3 516.5 23.6	31,006 62 1.5 532.4 24.9	27,830 67 1.3 515.0 23.6	30,901 62 1.5 531.0 24.8	27,795 62 1.2 476.7 23.9	31,195 63 1.5 545.7 24.6
Total number of vehicles Average delay time per vehicle (s) Average number of stops per vehicles Total delay time (h) Average speed (mph) Total travel time (h)	27,868 67 1.3 522.1 23.9 2,035.1	27,873 67 1.4 519.0 24.0 2,032.4	24,692 50 1.4 344.8 26.3 1,575.1	27,824 67 1.3 518.3 23.7 2,051.8	30,184 71 1.7 593.7 23.9 2,215.1	27,832 67 1.3 516.5 23.6 2,058.1	31,006 62 1.5 532.4 24.9 2,201.1	27,830 67 1.3 515.0 23.6 2,057.1	30,901 62 1.5 531.0 24.8 2,194.3	27,795 62 1.2 476.7 23.9 2,028.9	31,195 63 1.5 545.7 24.6 2,221.0
Total number of vehicles Average delay time per vehicle (s) Average number of stops per vehicles Total delay time (h) Average speed (mph) Total travel time (h) Total distance traveled (mi)	27,868 67 1.3 522.1 23.9 2,035.1 48,701.4	27,873 67 1.4 519.0 24.0 2,032.4 48,719.1	24,692 50 1.4 344.8 26.3 1,575.1 41,445.1	27,824 67 1.3 518.3 23.7 2,051.8 48,602.0	30,184 71 1.7 593.7 23.9 2,215.1 53,027.4	27,832 67 1.3 516.5 23.6 2,058.1 48,605.7	31,006 62 1.5 532.4 24.9 2,201.1 54,701.9	27,830 67 1.3 515.0 23.6 2,057.1 48,604.1	30,901 62 1.5 531.0 24.8 2,194.3 54,494.4	27,795 62 1.2 476.7 23.9 2,028.9 48,546.6	31,195 63 1.5 545.7 24.6 2,221.0 54,738.0
Total number of vehicles Average delay time per vehicle (s) Average number of stops per vehicles Total delay time (h) Average speed (mph) Total travel time (h) Total distance traveled (mi) 2040 PM	27,868 67 1.3 522.1 23.9 2,035.1 48,701.4 Base	27,873 67 1.4 519.0 24.0 2,032.4 48,719.1 1a	24,692 50 1.4 344.8 26.3 1,575.1 41,445.1 1b	27,824 67 1.3 518.3 23.7 2,051.8 48,602.0 2a	30,184 71 1.7 593.7 23.9 2,215.1 53,027.4 2b	27,832 67 1.3 516.5 23.6 2,058.1 48,605.7 3a	31,006 62 1.5 532.4 24.9 2,201.1 54,701.9 3b	27,830 67 1.3 515.0 23.6 2,057.1 48,604.1 4a	30,901 62 1.5 531.0 24.8 2,194.3 54,494.4 4b	27,795 62 1.2 476.7 23.9 2,028.9 48,546.6 5a	31,195 63 1.5 545.7 24.6 2,221.0 54,738.0 5b
Total number of vehicles Average delay time per vehicle (s) Average number of stops per vehicles Total delay time (h) Average speed (mph) Total travel time (h) Total distance traveled (mi) 2040 PM Total number of vehicles	27,868 67 1.3 522.1 23.9 2,035.1 48,701.4 Base 39,069	27,873 67 1.4 519.0 24.0 2,032.4 48,719.1 1a 39,796	24,692 50 1.4 344.8 26.3 1,575.1 41,445.1 1b 37,597	27,824 67 1.3 518.3 23.7 2,051.8 48,602.0 2a 38,501	30,184 71 1.7 593.7 23.9 2,215.1 53,027.4 2b 38,978	27,832 67 1.3 516.5 23.6 2,058.1 48,605.7 3a 38,518	31,006 62 1.5 532.4 24.9 2,201.1 54,701.9 3b 41,521	27,830 67 1.3 515.0 23.6 2,057.1 48,604.1 4a 39,087	30,901 62 1.5 531.0 24.8 2,194.3 54,494.4 4b 41,391	27,795 62 1.2 476.7 23.9 2,028.9 48,546.6 5a 38,894	31,195 63 1.5 545.7 24.6 2,221.0 54,738.0 5b 41,335
Total number of vehicles Average delay time per vehicle (s) Average number of stops per vehicles Total delay time (h) Average speed (mph) Total travel time (h) Total distance traveled (mi) 2040 PM Total number of vehicles Average delay time per vehicle (s)	27,868 67 1.3 522.1 2,035.1 48,701.4 Base 39,069 201	27,873 67 1.4 519.0 24.0 2,032.4 48,719.1 1a 39,796 179	24,692 50 1.4 344.8 26.3 1,575.1 41,445.1 1b 37,597 269	27,824 67 1.3 518.3 23.7 2,051.8 48,602.0 2a 38,501 231	30,184 71 1.7 593.7 23.9 2,215.1 53,027.4 2b 38,978 280	27,832 67 1.3 516.5 23.6 2,058.1 48,605.7 3a 38,518 231	31,006 62 1.5 532.4 24.9 2,201.1 54,701.9 3b 41,521 255	27,830 67 1.3 515.0 23.6 2,057.1 48,604.1 4a 39,087 224	30,901 62 1.5 531.0 24.8 2,194.3 54,494.4 4b 41,391 247	27,795 62 1.2 476.7 23.9 2,028.9 48,546.6 5a 38,894 219	31,195 63 1.5 545.7 24.6 2,221.0 54,738.0 5b 41,335 241
Total number of vehicles Average delay time per vehicle (s) Average number of stops per vehicles Total delay time (h) Average speed (mph) Total travel time (h) Total distance traveled (mi) 2040 PM Total number of vehicles Average delay time per vehicle (s) Average number of stops per vehicles	27,868 67 1.3 522.1 2,035.1 48,701.4 Base 39,069 201 3.8	27,873 67 1.4 519.0 24.0 2,032.4 48,719.1 1a 39,796 179 3.4	24,692 50 1.4 344.8 26.3 1,575.1 41,445.1 1b 37,597 269 5.2	27,824 67 1.3 518.3 23.7 2,051.8 48,602.0 2a 38,501 231 4.4	30,184 71 1.7 593.7 23.9 2,215.1 53,027.4 2b 38,978 280 5.9	27,832 67 1.3 516.5 23.6 2,058.1 48,605.7 3a 38,518 231 4.5	31,006 62 1.5 532.4 24.9 2,201.1 54,701.9 3b 41,521 255 5.1	27,830 67 1.3 515.0 23.6 2,057.1 48,604.1 4a 39,087 224 4.4	30,901 62 1.5 531.0 24.8 2,194.3 54,494.4 4b 41,391 247 4.9	27,795 62 1.2 476.7 23.9 2,028.9 48,546.6 5a 38,894 219 4.3	31,195 63 1.5 545.7 24.6 2,221.0 54,738.0 5b 41,335 241 4.8
Total number of vehicles Average delay time per vehicle (s) Average number of stops per vehicles Total delay time (h) Average speed (mph) Total travel time (h) Total distance traveled (mi) 2040 PM Total number of vehicles Average delay time per vehicle (s) Average number of stops per vehicles Total delay time per vehicle (h)	27,868 67 1.3 522.1 23.9 2,035.1 48,701.4 Base 39,069 201 3.8 2,185.9	27,873 67 1.4 519.0 24.0 2,032.4 48,719.1 1a 39,796 179 3.4 1,973.8	24,692 50 1.4 344.8 26.3 1,575.1 41,445.1 1b 37,597 269 5.2 2,810.0	27,824 67 1.3 518.3 23.7 2,051.8 48,602.0 2a 38,501 231 4.4 2,466.7	30,184 71 1.7 593.7 23.9 2,215.1 53,027.4 2b 38,978 280 5.9 3,028.9	27,832 67 1.3 516.5 23.6 2,058.1 48,605.7 3a 38,518 231 4.5 2,470.0	31,006 62 1.5 532.4 2.201.1 54,701.9 3b 41,521 2.55 5.1 2,937.5	27,830 67 1.3 515.0 23.6 2,057.1 48,604.1 4a 39,087 224 4.4 2,430.8	30,901 62 1.5 531.0 24.8 2,194.3 54,494.4 4b 41,391 247 4.9 2,838.2	27,795 62 1.2 476.7 23.9 2,028.9 48,546.6 5a 38,894 219 4.3 2,364.1	31,195 63 1.5 545.7 24.6 2,221.0 54,738.0 5b 41,335 241 4.8 2,766.0

Table 5.10 Network-Wide Performance: Street Widening vs. Enhanced Connectivity

5.3 Traffic Calming Scenarios

Traffic analysis of different street connectivity scenarios from the previous section shows the need to balance the level of connectivity, at least from the traffic operations standpoint. One of the ways to do that is through traffic calming that helps to avoid high traffic volumes on local streets.

Traffic calming studies are usually based on the empirical evidence and analyzed for their safety effects. While previous studies found that traffic calming has positive effects on safety, their operational effects are rarely tested. This is because traffic calming is installed in neighborhoods to lower traffic speeds. It is, however, important to examine the effects of these measures on the network-wide level, especially in TOD environments.

We used the equation from the U.S. Traffic Calming Manual to calculate the optimal spacing of traffic calming measures, depending on the midpoint speed, street speed, and low point speed. The 85th midpoint speed represents the speed 5 mph over the posted speed limit. Street speed is the posted speed limit, while low point speed is the target speed that should be achieved through traffic calming installation.

 $Spacing^{0.08} = \frac{85th \ midpoint \ speed}{1.86 \cdot (85th \ street \ speed)^{0.42} \cdot (85th \ slow \ point \ speed)^{0.23}}$

Before using these calculations to allocate traffic calming effects in the form of decreased link speeds, we compared posted speed limits with assigned traffic speeds on the base case network and network with increased connectivity. This is how we identified potential network areas where speeding might occur as the network density increases.

Tables 5.14 - 5.16 show intersection, corridor, and network analysis of scenarios that include traffic calming with the highest level of street connectivity applied in the previous section. Traffic calming measures modeled in this way reduce the level of service for intersections, considering the forecasted demand for 2040.

When we compare travel times and LOS for base case scenario, improved connectivity scenario, and traffic calming scenario, the LOS for 2040 AM peak period on the corridors becomes lower as traffic calming is introduced. Except for that period, traffic calming does not increase delays or decrease average speeds significantly along the corridors. The network analysis shows that traffic calming affects 2040 PM peak period the most, with the highest delay values.

Further research needs to be done with various combinations of street connectivity and traffic calming implementation to determine the optimal network density and speeds. Our results show that traffic calming has influence on the entire network, even though it is only applied to local streets. TOD does not necessarily require traffic calming, but in the case where network is not dense enough and intersection density alone does not decrease traffic speeds to encourage alternate modes, calming traffic is both an efficient and non-expensive way of preventing high speeds in the environment that should be pedestrian-friendly.

Nodo numbor	1	2	3	4	5	6	7	8
Node number	5600 W	2 5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W
Intersection	3500 V	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S
Vehicles	8934	6943	4689	3392	3234	5773	6532	5100
Delay (s)	33.5	16.2	16.8	11.8	9.5	13.1	33.1	14.5
Stop delay (s)	22.8	9.5	11.1	6.7	4.8	6.4	22.3	6.9
Stop denty (3)	0.8	0.5	0.6	0.4	0.4	0.5	1.0	0.7
Avg Queue (ft)	65.3	27.0	19.2	10.9	9.4	18.2	64.8	16.0
Max Queue (ft)	404.9	242.3	183.5	141.9	159.4	211.8	448.9	170.5
LOS	C	B	B	B	A	B	C	B
		2	3	4	5		7	8
Node number	1 5600 W	2 5600 W	5600 W	4 5200 W	5200 W	6 4800 W	/ 4800 W	8 4800 W
Intersection	3500 W	4100 S	4700 S	3200 W	4100 S	4800 W 3500 S	4800 W 4100 S	4800 W 4700 S
N/shisles								
Vehicles	10321	8060	5691	5295 9.7	4739	7620	9183	5618
Delay (s)	27.4	15.6	14.0	4.9	9.4 3.6	17.3	31.0	13.6
Stop delay (s)	16.4 0.8	8.1	7.4	0.4	0.4	11.6	17.9	5.0
Stops		0.6	0.6			0.5	1.0	0.6
Avg Queue (ft)	66.8	27.9	18.5	10.0	6.5	29.6	91.2	16.1
Max Queue (ft)	509.5	304.2	181.4	131.4	145.5	250.0	713.3	190.1
LOS	С	В	В	А	А	В	С	В
Node number	1	2	3	4	5	6	7	8
Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W
	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4800 W 4700 S
Vehicles		4100 S 8982						
	3500 S		4700 S	3500 S	4100 S	3500 S	4100 S	4700 S
Vehicles	3500 S 12236	8982	4700 S 9697	3500 S 7958	4100 S 3883	3500 S 10606	4100 S 6704	4700 S 7857
Vehicles Delay (s)	3500 S 12236 315.7	8982 308.1 152.9 6.7	4700 S 9697 228.2	3500 S 7958 154.0	4100 S 3883 289.5	3500 S 10606 89.7	4100 S 6704 287.3	4700 S 7857 230.8
Vehicles Delay (s) Stop delay (s)	3500 S 12236 315.7 175.8	8982 308.1 152.9	4700 S 9697 228.2 92.7	3500 S 7958 154.0 72.6	4100 S 3883 289.5 213.3	3500 S 10606 89.7 27.9	4100 S 6704 287.3 187.3	4700 S 7857 230.8 130.9
Vehicles Delay (s) Stop delay (s) Stops	3500 S 12236 315.7 175.8 5.4	8982 308.1 152.9 6.7	4700 S 9697 228.2 92.7 5.3	3500 S 7958 154.0 72.6 2.3	4100 S 3883 289.5 213.3 3.4	3500 S 10606 89.7 27.9 1.9	4100 S 6704 287.3 187.3 4.6	4700 S 7857 230.8 130.9 4.9
Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft)	3500 S 12236 315.7 175.8 5.4 1205.9	8982 308.1 152.9 6.7 868.2	4700 S 9697 228.2 92.7 5.3 760.9	3500 S 7958 154.0 72.6 2.3 674.9	4100 S 3883 289.5 213.3 3.4 631.4	3500 S 10606 89.7 27.9 1.9 391.2	4100 S 6704 287.3 187.3 4.6 560.4	4700 S 7857 230.8 130.9 4.9 783.0
Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft) LOS	3500 S 12236 315.7 175.8 5.4 1205.9 1438.4 F	8982 308.1 152.9 6.7 868.2 1452.0 F	4700 S 9697 228.2 92.7 5.3 760.9 1144.8 F	3500 S 7958 154.0 72.6 2.3 674.9 1570.9 F	4100 S 3883 289.5 213.3 3.4 631.4 1008.4 F	3500 S 10606 89.7 27.9 1.9 391.2 1129.9 F	4100 S 6704 287.3 187.3 4.6 560.4 1182.3 F	4700 S 7857 230.8 130.9 4.9 783.0 1656.0 F
Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft)	3500 S 12236 315.7 175.8 5.4 1205.9 1438.4 F 1	8982 308.1 152.9 6.7 868.2 1452.0 F 2	4700 S 9697 228.2 92.7 5.3 760.9 1144.8 F 3	3500 S 7958 154.0 72.6 2.3 674.9 1570.9 F 4	4100 S 3883 289.5 213.3 3.4 631.4 1008.4 F 5	3500 S 10606 89.7 27.9 1.9 391.2 1129.9 F 6	4100 S 6704 287.3 187.3 4.6 560.4 1182.3 F 7	4700 S 7857 230.8 130.9 4.9 783.0 1656.0 F 8
Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft) LOS	3500 S 12236 315.7 175.8 5.4 1205.9 1438.4 F 1 1 5600 W	8982 308.1 152.9 6.7 868.2 1452.0 F 2 2 5600 W	4700 S 9697 228.2 92.7 5.3 760.9 1144.8 F 3 5600 W	3500 S 7958 154.0 72.6 2.3 674.9 1570.9 F 4 5200 W	4100 S 3883 289.5 213.3 3.4 631.4 1008.4 F 5 5200 W	3500 S 10606 89.7 27.9 1.9 391.2 1129.9 F 6 4800 W	4100 S 6704 287.3 187.3 4.6 560.4 1182.3 F 7 4800 W	4700 S 7857 230.8 130.9 4.9 783.0 1656.0 F 8 4800 W
Vehicles Delay (s) Stop delay (s) Avg Queue (ft) Max Queue (ft) LOS Node number Intersection	3500 S 12236 315.7 175.8 5.4 1205.9 1438.4 F 1 5600 W 3500 S	8982 308.1 152.9 6.7 868.2 1452.0 F 2 5600 W 4100 S	4700 S 9697 228.2 92.7 5.3 760.9 1144.8 F 3 5600 W 4700 S	3500 S 7958 154.0 72.6 2.3 674.9 1570.9 F 4 5200 W 3500 S	4100 S 3883 289.5 213.3 3.4 631.4 1008.4 F 5 5200 W 4100 S	3500 S 10606 89.7 27.9 1.9 391.2 1129.9 F 6 4800 W 3500 S	4100 S 6704 287.3 187.3 4.6 560.4 1182.3 F 7 4800 W 4100 S	4700 S 7857 230.8 130.9 4.9 783.0 1656.0 F 8 4800 W 4700 S
Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles	3500 S 12236 315.7 175.8 5.4 1205.9 1438.4 F 1 5600 W 3500 S 11890	8982 308.1 152.9 6.7 868.2 1452.0 F 2 5600 W 4100 S 10019	4700 S 9697 228.2 92.7 5.3 760.9 1144.8 F 3 5600 W 4700 S 10996	3500 S 7958 154.0 72.6 2.3 674.9 1570.9 F 4 5200 W 3500 S 8491	4100 S 3883 289.5 213.3 3.4 631.4 1008.4 F 5 5200 W 4100 S 6857	3500 S 10606 89.7 27.9 1.9 391.2 1129.9 F 6 4800 W 3500 S 10723	4100 S 6704 287.3 187.3 4.6 560.4 1182.3 F 7 4800 W 4100 S 9745	4700 S 7857 230.8 130.9 4.9 783.0 1656.0 F 8 4800 W 4700 S 9389
Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s)	3500 S 12236 315.7 175.8 5.4 1205.9 1438.4 F 1 5600 W 3500 S 11890 339.2	8982 308.1 152.9 6.7 868.2 1452.0 F 2 5600 W 4100 S 10019 36.3	4700 S 9697 228.2 92.7 5.3 760.9 1144.8 F 3 5600 W 4700 S 10996 145.9	3500 S 7958 154.0 72.6 2.3 674.9 1570.9 F 4 5200 W 3500 S 8491 126.1	4100 S 3883 289.5 213.3 3.4 631.4 1008.4 F 5 5200 W 4100 S 6857 13.8	3500 S 10606 89.7 27.9 1.9 391.2 1129.9 F 6 4800 W 3500 S 10723 85.0	4100 S 6704 287.3 187.3 4.6 560.4 1182.3 F 7 4800 W 4100 S 9745 136.3	4700 S 7857 230.8 130.9 4.9 783.0 1656.0 F 8 4800 W 4700 S 9389 121.8
Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s)	3500 S 12236 315.7 175.8 5.4 1205.9 1438.4 F 1 5600 W 3500 S 11890 339.2 185.3	8982 308.1 152.9 6.7 868.2 1452.0 F 2 5600 W 4100 S 10019 36.3 23.7	4700 S 9697 228.2 92.7 5.3 760.9 1144.8 F 3 5600 W 4700 S 10996 145.9 46.7	3500 S 7958 154.0 72.6 2.3 674.9 1570.9 F 4 5200 W 3500 S 8491 126.1 22.8	4100 S 3883 289.5 213.3 3.4 631.4 1008.4 F 5 5200 W 4100 S 6857 13.8 6.5	3500 S 10606 89.7 27.9 1.9 391.2 1129.9 F 6 4800 W 3500 S 10723 85.0 21.7	4100 S 6704 287.3 187.3 4.6 560.4 1182.3 F 7 4800 W 4100 S 9745 136.3 47.8	4700 S 7857 230.8 130.9 4.9 783.0 1656.0 F 8 4800 W 4700 S 9389 121.8 55.7
Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s)	3500 S 12236 315.7 175.8 5.4 1205.9 1438.4 F 1 5600 W 3500 S 11890 339.2 185.3 5.1	8982 308.1 152.9 6.7 868.2 1452.0 F 2 5600 W 4100 S 10019 36.3 23.7 0.9	4700 S 9697 228.2 92.7 5.3 760.9 1144.8 F 3 5600 W 4700 S 10996 145.9 46.7 3.3	3500 S 7958 154.0 72.6 2.3 674.9 1570.9 F 4 5200 W 3500 S 8491 126.1 22.8 2.5	4100 S 3883 289.5 213.3 3.4 631.4 1008.4 F 5 5200 W 4100 S 6857 13.8 6.5 0.5	3500 S 10606 89.7 27.9 1.9 391.2 1129.9 F 6 4800 W 3500 S 10723 85.0 21.7 2.1	4100 S 6704 287.3 187.3 4.6 560.4 1182.3 F 7 4800 W 4100 S 9745 136.3 47.8 2.6	4700 S 7857 230.8 130.9 4.9 783.0 1656.0 F 8 4800 W 4700 S 9389 121.8 55.7 3.1
Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s)	3500 S 12236 315.7 175.8 5.4 1205.9 1438.4 F 1 5600 W 3500 S 11890 339.2 185.3	8982 308.1 152.9 6.7 868.2 1452.0 F 2 5600 W 4100 S 10019 36.3 23.7	4700 S 9697 228.2 92.7 5.3 760.9 1144.8 F 3 5600 W 4700 S 10996 145.9 46.7	3500 S 7958 154.0 72.6 2.3 674.9 1570.9 F 4 5200 W 3500 S 8491 126.1 22.8	4100 S 3883 289.5 213.3 3.4 631.4 1008.4 F 5 5200 W 4100 S 6857 13.8 6.5	3500 S 10606 89.7 27.9 1.9 391.2 1129.9 F 6 4800 W 3500 S 10723 85.0 21.7	4100 S 6704 287.3 187.3 4.6 560.4 1182.3 F 7 4800 W 4100 S 9745 136.3 47.8	4700 S 7857 230.8 130.9 4.9 783.0 1656.0 F 8 4800 W 4700 S 9389 121.8 55.7

Table 5.11 Intersection LOS with Traffic Calming for 2009 AM, 2009 PM, 2040 AM,
and 2040 PM peak periods

Period	Segment	Section (mi)					t Connectivity		116		
				Base Case	105		Speed (mph)	105		affic Calming	LOS
2009 AM	5600 W SB	2.830	275.2	37.0	A	284.0	35.9	A	284.5	35.8	A
	5600 W NE		288.4	35.3	A	308.3	33.0	В	304.4	33.5	В
	5200 W SB		108.0	32.9	В	91.6	38.8	A	91.6	38.8	A
	5200 W NE		96.1	36.8	A	98.7	35.8	A	98.8	35.8	A
	4800 W SB		396.4	25.5	С	359.0	28.1	В	348.5	28.9	В
	4800 W NE		450.4	22.4	c	371.7	27.1	C	369.8	27.3	C
	3500 S EB	1.592	208.9	27.4	c	218.2	26.3	c	217.8	26.3	C
	3500 S WB		200.9	28.5	В	219.8	26.1	c	219.9	26.1	C
	4100 S EB	1.692	270.7	22.5	C	232.9	26.2	c	232.8	26.2	C
	4100 S WB		255.8	23.8	c	229.4	26.5	c	228.3	26.7	C
	4700 S EB	1.802	265.9	24.4	c	272.0	23.9	c	274.4	23.6	C
	4700 S WB		276.9	23.3	c	270.5	23.9	c	276.1	23.4	C
	5600 W SB		281.346	36.2	A	309.5	32.9	B	313.033	32.5	B
	5600 W NE		309.920	32.9	В	297.3	34.3	B	299.326	34.0	B
	5200 W SB		121.813	29.2	B	96.8	36.7	A	95.972	37.0	A
	5200 W NE		97.559	36.3	A	98.8	35.8	A	98.715	35.8	A
	4800 W SB		395.502	25.5	С	376.0	26.8	С	386.164	26.1	С
	4800 W NE		401.576	25.1	c	382.8	26.3	c	391.817	25.7	C
	3500 S EB	1.592	212.856	26.9	c	203.1	28.2	В	202.694	28.3	В
	3500 S WB		212.000	26.8	c	195.0	29.4	B	195.847	29.3	B
	4100 S EB	1.692	251.723	24.2	c	231.5	26.3	C	232.614	26.2	C
	4100 S WB		234.671	26.0	c	244.3	24.9	c	246.713	24.7	C
	4700 S EB	1.802	295.026	22.0	D	267.0	24.3	c	267.692	24.2	C
	4700 S WB		276.204	23.4	c	258.9	25.0	c	257.132	25.1	C
	5600 W SB		323.7	31.5	B	329.7	30.9	B	495.1	20.6	D
	5600 W NE		321.9	31.7	В	323.6	31.5	B	2636.7	3.9	F
	5200 W SB	0.987	102.0	34.8	B	93.9	37.9	A	325.7	10.9	F
	5200 W NE		96.3	36.7	A	98.9	35.8	A	114.1	31.0	B
	4800 W SB		361.1	27.9	С	354.8	28.4	В	924.3	10.9	F
	4800 W NE		407.6	24.7	c	383.8	26.3	C	968.1	10.4	F
	3500 S EB	1.592	244.1	23.5	c	212.7	26.9	c	233.2	24.6	Ċ
	3500 S WB		201.7	28.4	В	191.4	29.9	В	690.0	8.3	F
	4100 S EB	1.692	254.5	23.9	c	250.7	24.3	C	632.1	9.6	F
	4100 S WB	1.692	232.9	26.1	c	246.9	24.7	c	917.5	6.6	F
	4700 S EB	1.802	292.4	22.2	c	310.0	20.9	D	372.2	17.4	D
	4700 S WB		264.6	24.4	c	268.0	24.1	C	886.9	7.3	F
	5600 W SB		551.5	18.5	D	608.1	16.8	E	619.5	16.4	E
	5600 W NE		412.9	24.7	C	598.3	17.0	D	702.7	14.5	E
	5200 W SB		109.3	32.5	В	97.9	36.3	A	96.9	36.7	Ā
	5200 W NE		99.4	35.6	A	111.9	31.6	В	125.7	28.2	В
	4800 W SB		394.4	25.6	С	392.8	25.7	C	420.0	24.0	C
	4800 W NE		517.0	19.5	D	528.3	19.1	D	528.7	19.1	D
	3500 S EB	1.592	210.4	27.2	C	207.9	27.6	C	207.9	27.6	C
	3500 S WB		221.8	25.8	c	231.0	24.8	c	684.4	8.4	F
	4100 S EB	1.692	251.3	24.2	c	261.9	23.3	c	262.7	23.2	Ċ
	4100 S UB		268.4	24.2	c	531.3	11.5	F	530.5	11.5	F
	4700 S EB	1.802	343.4	18.9	D	318.7	20.4	D	313.3	20.7	D
	.,	1.002	5.5.4	9.2	F	657.3	9.8	F	688.5	9.4	F

Table 5.12 Travel Times and Corridor LOS with and without Traffic Calming

Parameter	2009 AM	2009 PM	2040 AM	2040 PM
Number of vehicles in the network	548	686	4561	2512
Number of vehicles that have left the network	25963	34619	34719	38510
Total number of vehicles	26511	35305	39280	41022
Average delay time per vehicle (s)	45	42	809	324
Average stopped delay per vehicle (s)	23	18	506	131
Average number of stops per vehicles	1.3	1.2	13.1	6.4
Total delay time (h)	331.1	413.7	8829.4	3694.8
Total stopped delay (h)	169.0	176.3	5519.6	1490.9
Total number of stops	33263	43955	516448	261536
Average speed (mph)	26.861	27.068	6.001	12.481
Total travel time (h)	1651.3	2221.8	10774.8	5900.3
Total distance traveled (mi)	44353.9	60139.8	64658.5	73639.3

 Table 5.13
 Network Performance for Traffic Calming Scenario

5.4 Innovative Intersections Scenarios

Innovative intersections are intersections designed with removed left turns and reduced number of traffic signal phases in order to increase capacity and reduce the number of conflict points. These intersections require unexpected vehicle movements, such as rerouting left well ahead of the main intersection or going through the intersection and making a U-turn and a right turn in order to turn left. For the purpose of this project, only at-grade intersection design concepts are analyzed. The performance of innovative intersections within the studied network is compared to the performance of the base scenario to assess the effects that these designs have on the overall network. Innovative intersection designs for the intersection of 5600 W @ 3500 S are given in the Figure 5.8.

Overall intersection delays are the highest for 2040 PM peak period, as expected (Figure 5.9). Among the different intersection designs, innovative intersections perform better than the simple expansion of intersection capacity by adding extra lanes on all approaches. The best LOS and delay values result from the quadrant intersection design.

We used proposed intersection re-designs to measure travel times along the 5600 W corridor (Figure 5.10). While simple intersection widening improves travel times along the corridor when compared with the base case scenario, designs like Michigan U Turn or Bowtie intersection do not perform as well. Just as in the intersection analysis, best corridor travel times are achieved with quadrant intersection.

Network-wide analysis (Table 5.17) consistently shows lowest delays for quadrant intersection design, when compared with base case and other innovative designs, for the PM peak period. Results for the AM period show some inconsistencies and extremely high delay for this design in the year 2040. Quadrant intersections should, however, be considered as the future design for the intersection of two BRT lines in this network, since it is both pedestrian friendly and provides opportunity for land uses typical for town centers.

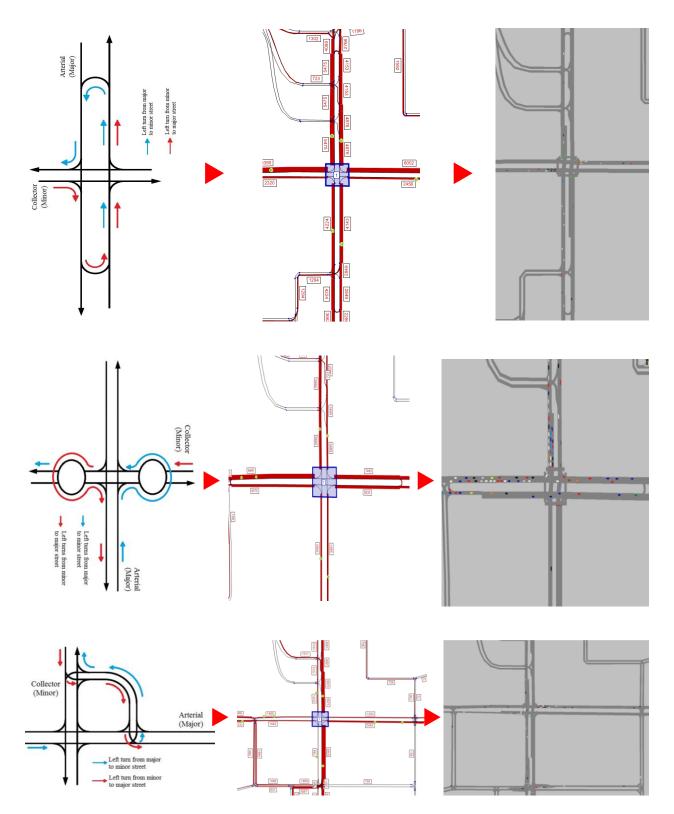


Figure 5.7 Innovative Intersections Design, Traffic Volume Assignment and Delay Analysis

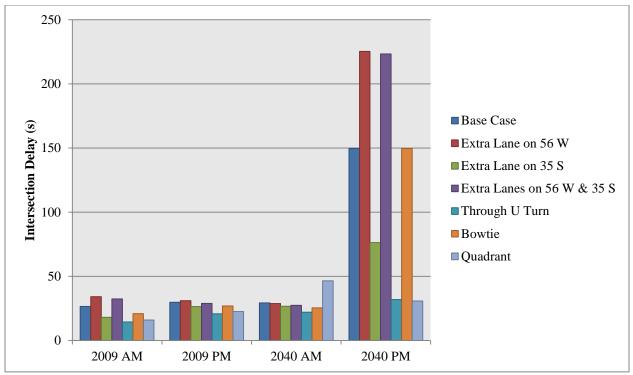


Figure 5.8 Intersection Delay Analysis for Different Intersection Designs

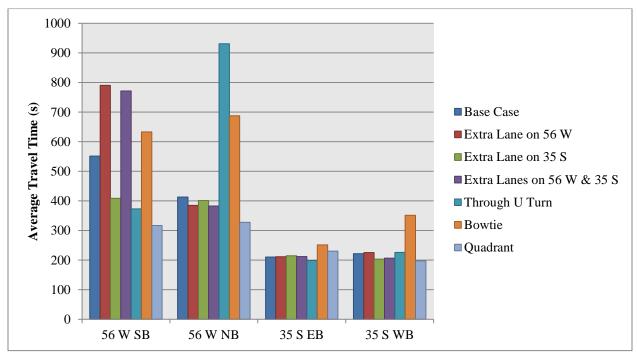


Figure 5.9 Average Corridor Travel Time for Different Intersection Designs

	2009 AM								
Parameter	Base	Bowtie	MUT	Quadrant					
Total number of vehicles	24050	24137	23665	23392					
Average delay time per vehicle (s)	51	53	65	52					
Average number of stops per vehicles	1.2	1.2	1.2	1.2					
Total delay time (h)	339.6	354.4	426.5	339.8					
Average speed (mph)	26.1	25.9	24.7	25.8					
Total travel time (h)	1569.8	1608.6	1653.2	1545.3					
Total distance traveled (mi)	41037.6	41659.2	40913.4	39912.5					
	2009 PM								
Parameter	Base	Bowtie	MUT	Quadrant					
Total number of vehicles	33558	33797	32512	32389					
Average delay time per vehicle (s)	45	61	48	43					
Average number of stops per vehicles	1.1	1.3	1.1	1.0					
Total delay time (h)	417.5	572.4	437.7	389.8					
Average speed (mph)	26.4	39.6	25.9	26.3					
Total travel time (h)	2156.8	2341.2	2119.6	2074.8					
Total distance traveled (mi)	57000.9	92598.5	54967.2	54572.1					
2040 AM									
Parameter	Base	Bowtie	MUT	Quadrant					
Total number of vehicles	27868	28497	28016	24657					
Average delay time per vehicle (s)	67	77	135	670					
Average number of stops per vehicles	1.3	1.6	1.6	8.5					
Total delay time (h)	522.1	606.9	1050.5	4588.8					
Average speed (mph)	23.9	37.2	19.0	8.1					
Total travel time (h)	2035.1	2167.1	2565.7	6047.3					
Total distance traveled (mi)	48701.4	80643.8	48691.6	49131.4					
		2040 1	PM						
Parameter	Base	Bowtie	MUT	Quadrant					
Total number of vehicles	39069	37951	37523	37115					
Average delay time per vehicle (s)	201	293	207	196					
Average number of stops per vehicles	3.8	6.6	4.2	4.7					
Total delay time (h)	2185.9	3086.6	2159.5	2024.6					
Average speed (mph)	16.4	21.3	16.2	16.5					
Total travel time (h)	4320.7	5162.5	4223.8	4063.8					
Total distance traveled (mi)	70769.3	109985.9	68284.2	67032.5					

 Table 5.14
 Network-Wide Performance: Base Case vs. Innovative Intersections

5.5 Overall Performance Comparison

Tables 5.12 and 5.13 show the comparison of intersection and corridor level performances between the base case scenario, innovative intersections, and connectivity scenarios for the critical 2040 PM peak period. Although quadrant and Michigan U-Turn intersection designs are the only alternatives that result in the acceptable LOS C, combining these intersection designs with network alterations in terms of connectivity is still recommended in order to accommodate alternative transportation modes on future TOD sites.

2040 PM 5600 W @ 3500 S Intersection Performance								
Scenario	Vehicles	Delay (s) Stops Avg Queue (ft)		LOS				
Base	11,872	150	2.7	654	F			
Bowtie	13,295	154	3.1	212	F			
MUT	11,899	32	0.7	113	С			
Quadrant	9,698	31	0.6	90	С			
1a	12,630	76	1.5	468	E			
1b	11,554	135	2.1	652	F			
2a	11,379	225	4.3	634	F			
2b	12,326	197	3.0	778	F			
3a	11,406	223	4.2	594	F			
3b	12,547	235	3.5	827	F			
4a	11,517	206	4.0	590	F			
4b	12,503	221	3.3	810	F			
5a	11,423	227	4.3	589	F			
5b	12,448	229	3.4	812	F			

 Table 5.15
 5600 W @ 3500 S Intersections Performance Comparison for 2040 PM

 Table 5.16
 Arterial Travel Times Comparison for 2040 PM

		2040 PM Arterial Travel Times (s) Comparison												
Section	Base	Bowtie	MUT	Quadrant	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b
5600 W SB	551	637	373	375	409	534	790	608	771	582	715	564	827	608
5600 W NB	413	734	931	637	401	823	385	903	382	692	373	614	377	598
5200 W SB	109	107	107	109	109	96	109	98	109	97	110	98	109	98
5200 W NB	99	94	92	92	99	152	100	207	99	247	100	202	99	112
4800 W SB	394	389	403	392	401	411	402	439	399	403	392	394	361	393
4800 W NB	517	786	501	751	524	536	520	586	528	513	478	539	478	528
3500 S EB	210	260	198	204	215	210	211	209	212	215	213	209	210	208
3500 S WB	222	405	226	209	204	218	225	234	207	228	208	215	204	231
4100 S EB	251	241	253	249	253	242	252	254	253	261	252	262	247	262
4100 S WB	268	329	315	264	271	520	269	594	266	516	269	499	262	531
4700 S EB	343	325	334	333	345	319	335	324	334	313	313	323	314	319
4700 S WB	700	854	598	857	715	586	758	771	756	643	916	628	796	657
Total Arterial TT (s)	4,080	5,162	4,330	4,472	3,943	4,645	4,356	5,228	4,318	4,710	4,338	4,548	4,284	4,545

6. STREET CONNECTIVITY AND TRANSIT ACCESSIBILITY

Implementation of previously described measures would increase transit LOS in terms of both frequency and coverage through proposed transit service improvements and street network modifications. This chapter presents frameworks for measuring street connectivity and transit accessibility, rather than using traditional mobility oriented transportation performance measures. Similar frameworks can be utilized as indicators of quality of service for alternative transportation modes, complementary to previously introduced performance measures for vehicular traffic.

6.1 Measuring Street Connectivity

Increasing street connectivity is one of the approaches used to enable streets to accommodate not only cars, but also transit, walking, and biking. Well-connected streets decrease traffic congestion and have a positive impact on people's health because they provide for walking and biking and encourage physical activity. In order to encourage alternative modes of transport, network needs to be denser, with frequent intersections, short walking distances, route choice options, and good access management. In short, streets need to be better connected.

How do we assess if a street network is well connected or not? Urban planners and street designers have developed a set of street connectivity measures over the years. The list of measures is given in Table 1 in the Appendix, with the definition of each measure and standards that street networks need to meet in order be well connected.

The goal of this analysis is to use GIS to measure street connectivity in part of the West Valley City street network in order to assess the potentials for future increase of network density, as an alternative to the traditional street widening approach used to increase the network capacity. The test network is given in Figure 1.1.

The first step toward achieving the defined project goal was to perform a literature review of authors who previously used GIS for similar purposes. Then we selected three connectivity measures that we used to evaluate test network connectivity for the purpose of this project:

- 1) Average census block area
- 2) Road length per unit area
- 3) Intersection density

The next step was to download the map of the test network and use GIS to create shapefiles for the basic network elements such as links, nodes, and centroids. Then we used the available tools in ArcMap 10 to calculate the selected street connectivity measures. The ultimate outcome of this project is the assessment of street connectivity on the test network.

Previous Experiences with Using GIS to Measure Street Connectivity

By utilizing GIS, Yi et al. (52) measured and compared the levels of street connectivity and pedestrian accessibility of cul-de-sac and grid-like street neighborhoods. This paper was motivated by the debate between New Urbanists, the proponents for the grid street pattern, and developers who want to continue designing cul-de-sac streets in practice. The study then took advantage of GIS tools provided in TransCAD GIS to measure street connectivity and pedestrian accessibility. GIS capability was essential for conducting analyses. To measure street connectivity and pedestrian accessibility, the chosen plans were first digitized using GIS software. Then centroids were assigned to all residential lots. The authors

then measured aerial and network distances from centroids to each local destination in the neighborhood. For each particular destination, the average values for areal and network distances were obtained to represent pedestrian accessibility. The authors also used buffer areas of ¹/₄ mile around each important destination to calculate other connectivity measures. The analysis indicated that when a cul-de-sac neighborhood was designed in a way to increase pedestrian accessibility and street interconnectedness with separate pedestrian trails, connectivity and accessibility measures were higher than the typical suburban neighborhood.

Tressider et al. (15) examined the different methods used in measuring connectivity, and to evaluate the effectiveness and limitations of those methods by drawing on examples from running connectivity measurements on differently sized study areas. A GIS was the methodology used in creating and evaluating the data. The study includes an examination of the various steps taken to clean and process the data, as well as the various tools used that are available in GIS, and the assumptions and tradeoffs through that process. Once the local street network was defined, the data were processed using the Polyline Tools to clean the shapefile. Using this new shapefile, the Polyline Nodes Extractor (without vertices) in Point & Polyline Tools was utilized to create the nodes (intersection) shapefile. For the connectivity measurements, only the real and dangle nodes are necessary, the vertices show points along the link, but do not correspond to an intersection. Two clean shapefiles, local street and nodes, were created this way. Then each link and node was assigned to appropriate parts of the network in order to calculate street connectivity measures.

A manual by Forsyth (53) provides protocols for measuring environmental variables associated with walking. The manual has four purposes. The first is to record the methods for environmental measurement used in the Twin Cities Walking Study. The second purpose of the manual is to provide methods for replication in future studies. The third is to provide a preliminary prototype for other manuals produced by different teams. Finally, the manual aims to make GIS research methods and data sources less opaque, particularly to first-time users.

The manual responds to a general problem in the literature on measuring environmental features thought to be associated with physical activity. Among other features, the manual contains protocols for using GIS to measure street connectivity. The protocols describe how to use ARC MAP to measure average census block areas, number of access points, road length per unit area, intersections per unit area, connected-node ratio, and link-node ratio. Basic concepts and formulas with explanations and potential difficulties a user might face are also included in the manual.

Discussion of Measuring Procedure

Our street connectivity analysis began with the choice of the test network given in Figure 2 in the Appendix. This network is the potential Transit Oriented Development (TOD) site, and dense street network is one of the characteristics of the TOD. The measures of street connectivity presented in this report will also evaluate the current possibilities of the test network to accommodate for TOD features.

In order to start the evaluation of each of the three selected connectivity measures, we needed to download the map of our test network and determine the coordinate system. Using "Database Connection" in the ArcMap 10 catalog, we connected to "gdb93.agrc.utah.gov.sde." We downloaded the "SGID93. TRANSPORTATION. Roads" polyline shapefile. This shapefile includes all roads in the state, and we only needed a part of the West Valley City network. We selected our test network and used the selected features to create the Roads_Map layer. The downloaded shapefile was projected in "NAD 1983 UTM Zone 12N" coordinate system, which will be the reference for all the new shapefiles we created. What follows is the methodology for the calculation of three selected connectivity measures in ArcMap 10.

Average Census Block Area

Our test network has six transportation analysis zones (TAZ), and for each zone we calculated the average block size. We used the data from the West Valley City census block maps to establish census block areas in each TAZ. We then used the JPEG file as the background image for our test network to make sure we were digitizing the census blocks in the right way. In order to use the JPEG file of our test network, we needed to assign the coordinates to this background image. We used a Georeferencing tool for this, and attached the points from the JPEG to the corresponding points on the Roads_Map shapefile (Map 1).

First we created TAZ and census block layer. To create the centroid layer we downloaded XTools extension from ESRI website. XTools does not limit the location of the centroids to the boundaries of a particular shape. We used the XTools option from the dropdown menu, "Convert Features/Shapes to Centroids," converted Census_Block layer, and exported a new layer that we named Centroid (Map 1). We then added TAZ and census blocks to our roads map and selected the centroids that fall inside TAZ we defined. We did this by using Selection/Selection by Location from the dropdown menu. Then we selected (Selection/Selection by Location) only census blocks that contain the centroids. Once only census blocks that contain the centroids were selected, we exported these census blocks as new layers (right click on the census block layer, Data/Export Data). This new layer is Centroid_Blocks layer on Map 1.

To calculate the area of census blocks that contain the centroids, we used "XTools/Table Operations/Calculate Area…" option. We selected our block areas to be measured in acres, and after XTools calculates the area in this way, new fields are added to the attribute table of Centroid_Blocks. To calculate the average census block size, we used spatial join to join census blocks from each TAZ to the corresponding Centroid_Block. After joining the data, in the attribute table we used option Summarize/Acres/Average to calculate the average census block size for each TAZ.

The average block size could have been calculated by simply using the field calculator from the attribute table. However, we wanted to test XTools extension and see how it creates the layers and what calculation options it offers. Map 1 presents the final results of our calculations for the census block area, and the results are also presented in Figure 1, using Graph options from the attribute table. Metadata for Map 1 are in Appendix D.

Road Length per Unit Area

Road length per unit area presents the length of road with both interstates and ramps removed, and divided roads averaged, per measurement area, with water removed from the land area calculation. Our test network does not include interstates, ramps, divided roads, or major water lands, which made the calculations simpler.

We added two layers: roads polyline and site polygon layer. To calculate the length of roads per unit area, we needed to calculate the area of the observed site and the total length of roads on that site. Since we only needed to include the roads on the observed site, we intersected the two layers using ArcToolbox Window/ Analysis Tool/ Overlay/ Intersect. This is how we exported the new layer Roads_Intersect from Map 2.

To calculate the length of intersected roads from the new layer, we used XTools/Table Operations/ Calculate Area, Length, Acres, and Hectares option. This operation adds the "Length" field to the Intersect_Roads attribute table. We can then use "Summarize" option from the attribute table to calculate the total length of all roads. In a similar way, only by using "Calculate Area" instead of "Calculate Length" from the XTools/Table Operations, we can calculate total land area. Finally, we can calculate the connectivity measure by dividing the total length of roads by the site area. The results are presented on Map 2, while metadata are in Appendix D.

Intersection Density

We used the number of intersections per acre as the measure of intersection density for our test network. We measured intersection density in each TAZ. We first added the roads polyline layer, TAZ polygon layer, and intersections point layer. Then we clipped the intersections to corresponding TAZs by using ArcToolbox Window/Analysis Tools/ Extract/ Clip. This way we created the new clipped layer. We then used this new layer to merge the intersections that are less than 100 meters apart and might work as a single intersection. We used ArcToolbox Window/Analysis Tools/ Proximity/ Buffer option. XTools extension has the option of converting "Shapes to Centroids," which can be used to merge the intersections from the new buffered layer.

To count the number of intersections in each TAZ, we used spatial join to assign the IDs from the TAZ to each intersection. Then we used "Summarize" option from the attribute table of the new joined layer to summarize the intersection count in each zone. The output was a .dbf table that contains the intersection counts for each TAZ.

We calculated the land area for each TAZ in the same way as we did for the previous connectivity measures. Finally, we divided the intersection counts for each TAZ by the corresponding TAZ area, and got the number of intersections per acre as a measure of intersection density. The results are presented on Map 3, while metadata are in the Appendix.

Results of Connectivity Measurements

The results presented in this section are related to three connectivity measures we calculated using the GIS tools. Figure 6.1 presents the average census block area for each TAZ of the test network. The other results are included in Table 6.1 and Maps 1, 2, and 3 (Appendix D). The results are presented in the same order as the methodology of obtaining the connectivity measures as discussed in the previous section.

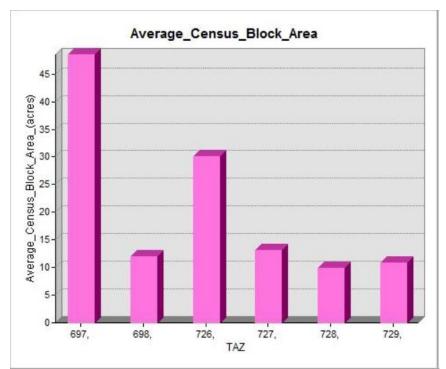


Figure 6.1 Census Block Area (GIS Output)

	5 Output for St		ly Measurements
TAZ ID	Average	Intersections	Road Length =
	TAZ Area	per Acre	40.70 miles
	(Acres)		Site Area =
697	48.51	4	2.05 miles squared
698	11.91	3	
726	30.01	3	Road Length per
727	13.14	4	Unit Area =
728	9.93	3	20.30 miles of road
729	10.86	4	per miles squared

Table 6.1 GIS Output for Street Connectivity Measurements

Summary on Street Connectivity Measurements

After using GIS to calculate three selected connectivity measures, we can make some conclusions about the test network connectivity using the standards from the literature given in Table 1 in the Appendix. In terms of average block size, each TAZ exceeds the block size recommended in the literature, so the area cannot be characterized as walkable.

The maximum recommended length of roads per unit area is 26 miles per mile squared, while the preferred road density is 18 miles of road per mile squared of land area. We measured 20 miles of roads per mile squared, which indicates that the road density criterion is met on our test network. However, this does not mean that the network is well connected, only that the significant portion of the network is "paved."

The intersection density criteria from the literature are also met. But the street network average block size indicates that some portions of the test network are dense, while others are disconnected and with many

cul-de-sacs. Other connectivity measures should be calculated to make the final decision about the potential improvements of the network design.

6.2 Measuring Transit Accessibility

Transit accessibility shows how easy it is for an individual to travel to a desired destination using public transit. For the existing transit riders, it is the indicator of the service quality; for the potential riders, it might be a factor in their mode choice. And while current policy makers still use transport system metrics that are mobility oriented, partially because they are the most available out there, these performance metrics are excluding some crucial components of urban transportation systems. This part of the study uses spatial and temporal constraints, and a set of transit features that impact access to transit, to develop a conceptual framework for transit accessibility measurements for the case study network.

The proposed methodology builds upon the traffic and transit data from the case study network, and uses an open source tool to perform transit accessibility measurements by calculating the number of accessible transit stops from each transportation analysis zone (TAZ) centroid as a defined origin. The methodology considers acceptable walking time, available time budget, transit user information, transit schedule variability, and spatial constraints as impact factors in accessibility measurements. The goal is to establish a feasible set of transit accessibility indicators that would be used for both the case study street network and transit service modifications into a transit friendly and eventually a TOD environment.

Previous Research

Accessibility is determined by activity patterns and transportation systems in the area. Important factors affecting accessibility are mobility, transport options, land use, and affordability. While there is an agreement among researchers on how to define accessibility, finding an appropriate way to measure it remains a challenge (54, 55). Several types of accessibility measures are developed in the existing research.

Cumulative or opportunity measures evaluate accessibility in terms of the number or proportion of opportunities that can be reached within specified travel distances or times from a reference location (56). Gravity-based measures weight the activity locations by time, cost, or distance needed to reach them. The differences between various studies of accessibility that utilize this method are mainly in functional forms that measure the cost to move between origin and destination and how opportunities are calculated (57, 58, 59, 60). Utility-based measures reflect the utility of all choices and calculate final choice utility relative to the utility of all other choices. Accessibility is defined as the expected value of the individual's maximum utility among the activity schedules available, given a residential location (61). The composite accessibility measure introduces a higher level of complexity where time constraints are superimposed and require more data than utility-based measures; it is even more complex in terms of calculations and, accordingly, generalizing it for usage is not an easy task. (62, 63, 64).

Accessibility is best measured if those measures capture individuals' perceptions and true access to activity opportunities. This is because accessibility is an individual construct, and each individual sees how accessible transportation mode is different, depending on their value of time and level of destination attractiveness. No one best approach to measuring accessibility exists, and different situations and purposes demand different approaches (*59*).

Space-Time Accessibility Measures

The space-time prism (STP), given in Figure 6.2, and STP-based accessibility measures are powerful techniques for assessing the ability of individuals to travel and participate in activities at different

locations and times in a given environment. With the space-time prism, accessibility can be assessed relative to spatial and temporal constraints on individual behavior. The space-time prism determines the feasible set of locations for travel and activity participation in a bounded expanse of space and a limited interval of time. A weakness of STP-based accessibility measures and accessibility measures in general, is their treatment of travel times as static. Empirical research has shown that temporal constraints can significantly impact the ability of individuals to participate in activities (*62, 63, 64*). Previous space-time accessibility measures accounted for the distance between two activities, origin and destination uncertainty, spatial distribution of urban opportunities, varying mobility due to transportation configuration and speeds over space, activity participation time, temporal availability of opportunities, various types of delay times (both static and dynamic), and the maximum travel time threshold (*65, 66*).

Transit Accessibility and Travel Choices

Trip makers would consider the public transit system as an option for trip making when the system is properly accessible to and from their trip origins/destinations (spatial coverage), and when service is available at times that one wants to travel (temporal coverage 67, 68). The relative attractiveness of public transportation depends critically on its performance in terms of the accessibility it provides to link population to employment and activity opportunities. The primary factor affecting pedestrian access is distance. Pedestrian access to a transit stop depends on route directedness and speed, safety and security, pedestrian-friendly design, and way-finding information. Based on an assumed average walking speed of about 4 ft/s, 5 minutes of walking is considered reasonable in urban areas, which is about ¼ of a mile in terms of walking distance (69, 70, 71). In general, access to transit stops affects passenger accessibility and represents the opportunity to use the public transport service. Considering spatial attributes, both the location and the spacing of bus stops significantly affect transit service performance and passenger satisfaction, as they influence travel time in addition to their role in ensuring reasonable accessibility (72, 73, 74). Measuring the ease of access to transit services is important in evaluating existing services, predicting travel demands, allocating transportation investments, and making decisions on land use development (68, 70).

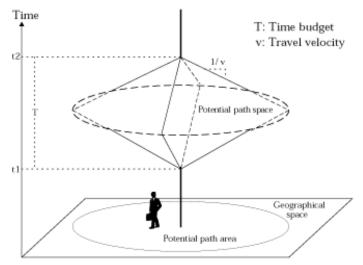


Figure 6.2 Space -Time Prism (62)

Proposed Methodology

The TOD by definition involves more accessibility for public transit passengers, due to denser street networks and mixed land use that provides more opportunities. This study develops a conceptual framework for quantifying transit accessibility based on spatio-temporal constraints. The network scenario is developed to reflect a transportation network and transit system on a future TOD location in West Valley City, Utah. Location is chosen based on Wasatch Choice for 2040 map of the potential TOD spots in the Salt Lake Region, and it represents a future town center with the intersection of two Bus Rapid Transit (BRT) lines. A case study network is given in Figure 6.3.

Transit data were provided by the Utah Transit Authority, and loaded into the network through Google Transit Feed (GTFS) (75). All GTFS files are in text format and loaded together with base network shapefiles. Particularly important for our accessibility measurements are stop time records, which include a sequence of stops along each trip. Each stop time record contains required data such as trip identification, arrival and departure time, stop identification, and stop sequence. Data prepared in this way were used for the accessibility measurements.

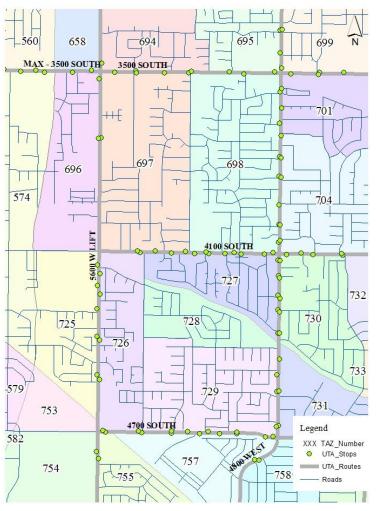


Figure 6.3 Network with Transit Lines and Stops

Accessibility measurements were based on network data shapefiles and transit data feed from Google. Both data sets prepared and adjusted in the way previously described, were loaded into NEXTA (Network Explorer for Traffic Analysis) software. NEXTA is an open-source GUI that aims to facilitate the preparation, post-processing, and analysis of transportation assignment, simulation, and scheduling datasets. One of the advantages of NEXTA is that it facilitates importing transportation network data from both micro and microsimulation environments. This means that it has the ability to integrate with our previously built traffic and transit models. Loading transit data from Google and additional features for accessibility calculations are the most recent specifications of the software.

Together with the case study network, a regional transportation and transit network is loaded to enable calculations to all available transit stops. Network TAZ centroids were defined as origins, while transit stops represent destinations. Accessibility can be calculated from each defined origin or from all origins, and accounts for time variability of transit schedules, which will be discussed later. Accessibility is expressed through a number of reachable destinations from each origin for variable space and time constraints.

For each defined set of constraints, a shortest path was calculated using the algorithm integrated into NEXTA. This algorithm first identifies accessible bus trips using the stop time records within the 15minute waiting time from the departure time at the origin and within the acceptable walking distance from the origin activity location. Then it identifies stop time records reachable from the origin of each trip within the defined time budget constraints. The number of accessible stop times is counted along each trip as the indicator of accessibility. Average measures across all origin activity locations are also considered. The data input and loading process with the shortest path algorithm procedure are given in Figure 6.4.

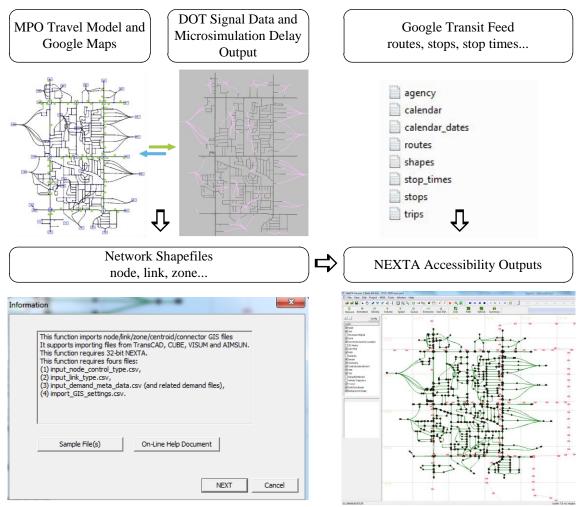


Figure 6.4 Traffic and Transit Data Input and Shortest Path Procedure

Impact Factors

For the network used as a case study, factors that impact space-time constraints are given in the conceptual framework in Figure 6.5. Service variability refers to the frequency of transit service and service span in general. Walking distance is the acceptable walking distance to transit stops. Available time budget defines the time that individuals have to access activity locations from the given trip origin. Transit speeds will differ between BRT lines and regular transit lines. User information refers to transit users' familiarity with the schedule. It is assumed that if users are familiar with the schedule, their waiting time is less than 5 minutes, and in cases where they are not familiar with the schedule, their arrivals are random. Spatial constraints refer to the destination or activity location type. Activity location can be the fixed or final, when the entire time budget is used to reach the destination, or flexible or intermediate.

Transit accessibility is expressed through the number of destinations reachable from the defined origin within the given space-time constraints, and it is calculated through the number of accessible stop times loaded from the transit feed data. In order to represent the time variability aspect of transit accessibility, we also introduce incremental change of accessibility measured with each change in control variables.

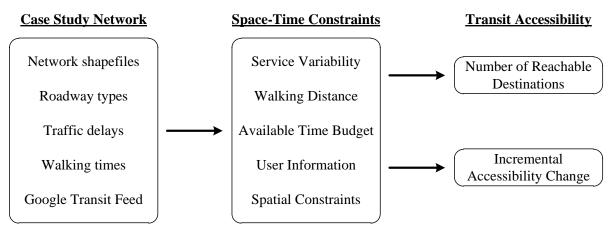


Figure 6.5 Transit Accessibility Measurements - Conceptual Framework

Concept for Accessibility Measurements/Performance Measures

This study uses a constraints-oriented approach based on Miller's interpretation of space-time prism application for transit accessibility calculations. Calculations and assumptions adapted from (62) for different space-time constraints applied to compute the number of accessible transit stops are as follows:

Accessibility Equation:

$$M = \{k \in N | T_k = t_{km} + t_t + \sum t_{walk} + t_{walt} + t_d \le T\}$$

Definitions and Assumptions: M- total number of accessible destinations k N - total number of destinations T_k - time needed to each destination k T - available time budget t_{km} - time needed for destination activities t_t - total time spent in transit, different for BRT and regular lines t_{walk} - total distance spent walking to or from the transit stop t_{wait} - total time spent waiting for transit, depending on familiarity with schedule t_d - other delays due to signals, crossing time, and transfers

Service Variability: $t_t = 15 \min frequency vs regular lines$

Walking Distance: $t_{walk} = 0.05; 0.10; 0.15; 0.20; 0.25 miles$

Available Time Budget: *T* = 30, 35, 40, 45, 50, 55, 60 *min*

User Information: $t_{wait} = 5 \min or random (for unfamiliar users)$

Spatial Constraints: Zonal Access Distribution

Results and Discussion

The impact of transit service variability on the accessibility of transit stops is given in Figure 6.6. Only results for one origin are presented to provide better visualization. Service schedule is presented dependent on time, while other variables are kept constant. Time variability is presented for the PM peak period and evening period. The assumed constant acceptable walking distance in this case is 0.25 miles, or equivalent to 5 minutes walking time. The results show emphasized peaks and drops in the number of accessible transit stops prior to 4 PM and after 6 PM. Transit service seems more constant during the peak period, which is expected considering that most of the transit lines in the case study network have higher frequency during the peak hour periods. This is a very good indicator of changes that transit schedules will need to undergo to support a transit friendlier environment. Again, a reminder from the literature, recommendations for TOD transit service frequencies are 15 minutes or less in areas similar to the one analyzed here (*21*). What the simplest analysis also indicates here is how specific transit is in terms of accessibility when compared with other modes, because it is more time dependent due to schedule variability impact.

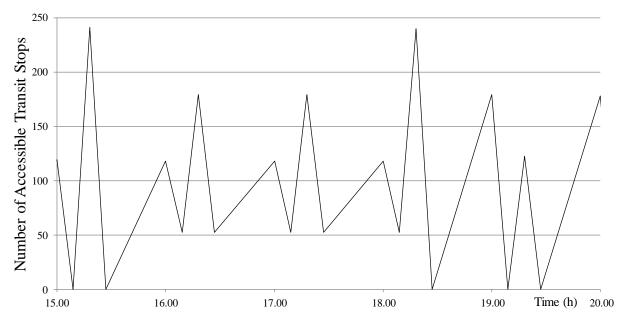


Figure 6.6 Transit Accessibility for Time Variable Service Schedule

Another impact factor analyzed here is the acceptable walking distance. Guidelines on the acceptable walking distance (20) recommend up to a quarter-mile distance acceptable from a pedestrian standpoint. While ranges from 0.05 miles to 0.25 miles of walking distance are analyzed, three representative values are given in the Figure 5, again for better visualization. All other variables are kept constant. As expected, the acceptable walking distances, there are more points when transit stops are not accessible at all. This is also not surprising, since the analyzed network has many disconnected links or cul-de-sacs, which decrease the number of potential paths to transit. As the network continues to be modified toward a more transit supportive pattern, it is likely that there will be more routing options for pedestrians. The TOD can reduce walking time at signalized intersections, too, and thus increase the potential time for walking within the available time budget, which is the following variable discussed.

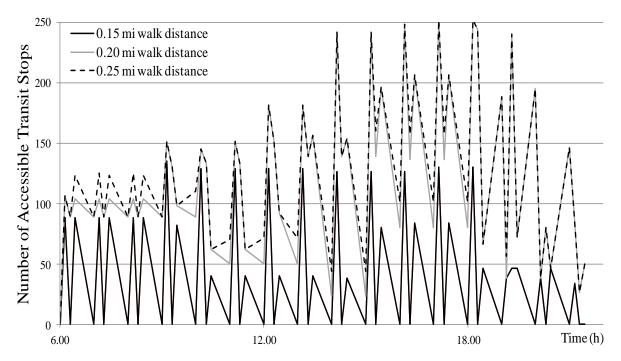


Figure 6.7 Transit Accessibility as a Function of the Acceptable Walking Distance

The impact of the available time budget on transit stops' accessibility within the analyzed network is presented in Figure 6. Three representative values for the available time budget are given to consider 30, 45, and 60 minutes available for an end-to-end transit trip. The results show that the highest number of accessible transit stops for the given time budgets occur between 9 AM and 6 PM. This includes some drops in the number of accessible stops during the midday period. The accessibility values range between 200 and 400 stops on the regional network available during this time period. Figure 6 also shows the service time span, and again the effects of time variable transit schedules. It is noticeable that early morning and late evening time periods have less frequent transit accessibility would change depending on the available user information. With the quality information available for transit users, they would spend less time waiting and would have more time to spend in transit within their available time budgets. Considering the future development plans of the case study and the regional network, this is something that should be considered as a factor for improving access to transit.

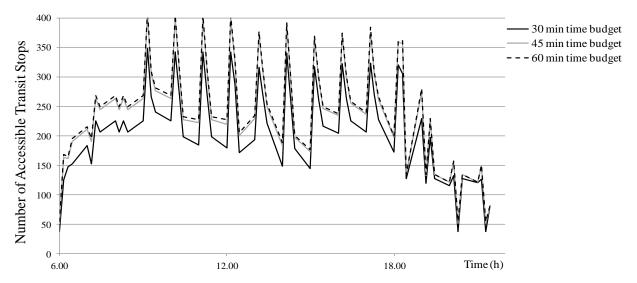


Figure 6.8 Transit Accessibility as a Function of the Available Time Budget

Summary on Transit Accessibility

Measuring accessibility to transit is more challenging when compared with other modes of transportation. The reason is the number of impact factors that affect the ability of users to access transit, starting from transit schedules and available user information, to acceptable walking distances and available time budget for transit trips.

This study presents an alternative approach for measuring transit performance through the accessibility of transit stops, considering both spatial and temporal constraints. Transit accessibility measures and impact factors presented here can easily be related to the available transit performance measures such as LOS. However, they indicate in a more apparent manner how reachable activity locations are from different origins in different times, which is what users can relate to.

The results show how access to transit varies both temporally and spatially. Specific to transit mode, service schedule variability significantly affects the changes in accessibility to transit over the course of a day. Adopted pedestrian criteria for the acceptable walking distances show their impact and the need to improve the existing network connectivity for future development. Considering quality transit service information for the users is recommended as one of the methods for accessibility improvements. The end-to-end transit trips should be shorter in the analyzed area, up to 45 minutes, because as the available time budget increases the number of accessible transit stops remains the same.

7. CONCLUSIONS AND RECOMMENDATIONS

This project examines the effects of different strategies related to street network patterns, intersection designs, and transit service improvements on traffic operations of a future TOD network in West Valley City, Utah. Evaluation methodology addresses mobility performance measures, street connectivity, and transit accessibility. Traditional mobility oriented performance measures were used with regards to the project goal, to provide the evaluation of the effects that TOD supportive solutions have on the vehicular traffic. This is due to the fact that TOD related projects are often faced with assumptions that transit supportive network designs and solutions will decrease the efficiency of vehicular traffic. In addition, connectivity and accessibility measures are applied to the case study network as potential indicators that could be used to evaluate how accessible and walkable transit environment is while it evolves into a TOD.

To evaluate the effects of network designs that have the potential to support TOD, developed scenarios included enhanced street connectivity, innovative intersection designs, and traffic calming measures. These scenarios were modeled for traffic conditions for 2009 and 2040 PM peak periods. After the implementation of the design principles, selected based on the reviewed literature and discussions with stakeholders involved in TOD projects in the region, it was assumed that mode shift did not occur. This assumption was made in order to account for the period of "transition," where street network is changing to encourage transit ridership and alternative modes of transportation, but the mode shift did not occur yet. This could be considered "the worst case scenario" from the travel demand perspective, and represents what scenario engineers would be the most concerned with as they resolve potential conflicts that arise with the attempts to accommodate multimodal transportation in TOD environments.

The analysis of our base case scenarios shows that PM peak period will be more critical in 2040, especially for 5600 W & 3500 S and 4800 W & 4700 S intersections. Both average per vehicle and total delay on the network-wide level increase by more than 50% in AM and 100% in PM peak period, when we compare 2009 and 2040, which means that, as expected, a "no build" solution is not an option. Comparison of travel times and speeds on different segments for 2009 and 2040 shows significant increase in travel time for only one of 12 segments we compared on our test network, meaning that new network designs for 2040 need to focus on intersection operations. Increased street connectivity without improving intersection operations will not accommodate traffic demand for 2040 PM peak period, under the assumption that mode shift does not occur. Comparing street connectivity scenarios for different network segments between main intersections, street widening, and enhanced connectivity show similar results, implying that enhanced connectivity could be a good alternative approach for the corridors.

Network designs with higher levels of street connectivity show better performance on the corridor level than designs with street widening. Increased connectivity, as an alternative to street widening, increases total distance traveled, but the delay values on the network-wide level show that designing the network with multiple connections, rather than simply widening the arterials, would be a good alternative. Adding traffic calming measures to the network design with increased connectivity increases total network delay.

The innovative intersections scenarios analysis shows that Quadrant and Michigan U-Turn intersections perform better than conventional intersections in all four observed time periods. Quadrant intersections not only decrease average and total delay, but also decrease total distance traveled, when compared with other observed intersection designs for 5600 W & 3500 S. So a Quadrant intersection has the potential to decrease VMT and, with the design that supports street connectivity, can improve the TOD potential of our test network. Quadrant intersection and Michigan U-Turn show better performance than the intersection with one added lane on every approach for 2040 PM peak period. In terms of travel time, intersection design with one extra lane on 5600 W performs better than other street widening scenarios and innovative designs.

All these conclusions should be observed with the assumption that enhanced network designs do not cause mode shift and thus decrease the number of private automobile users for 2040. This report also includes conceptual frameworks for measuring street connectivity and transit accessibility, which could serve as indicators of transit quality of service and both spatial and temporal coverage once proposed transit service changes are implemented as a part of the future TOD site.

Future Research Steps

The principal goal of this project was to examine the effects of planned TOD-supportive transportation solutions on vehicular traffic under the highest forecasted travel demand conditions. These solutions included a variety of design principles that were evaluated in terms of generally acknowledged mobility measures. The future research should include evaluation of the effects of combined network design strategies modeled in this study: enhanced street connectivity, innovative intersection designs, traffic calming measures, and TFDs. Future research could also account for a variety of travel demand scenarios, as more reliable data needed to build these scenarios become available.

The major limitation of this study is the applicability of proposed methods and recommendations to other potential TOD sites. While transferability of methods appears feasible, different types of TOD environments operate in different manners, from those in central business districts to developments in suburbia. Recommendations provided in this report could be applicable to potential TOD town center development types, but the analysis of multiple suburban networks from different locations is desired to advance the research presented here. The major contribution of this study are the indications that TOD-supportive network designs are not necessarily associated with negative effects for vehicular traffic, even in conditions where mode shift does not occur and travel demand in terms of auto-mode remains the same. This is a significant finding that could be useful for metropolitan regions looking to retrofit the suburban neighborhoods into multimodal developments.

REFERENCES

- 1. Ewing, R., and R. Cervero. Travel and the Built Environment: A Meta-Analysis. In *Journal of the American Planning Association*, Vol. 76, Issue 3, June 2010, pp. 265 294
- 2. Ewing, R., and S. Handy. Measuring the Unmeasurable: Urban Design Qualities Related to Walkability. In *Journal of Urban Design*, Vol. 14, Issue 1, 2009, pp. 65 84
- Ewing, R., M. Greenwald, M. Zhang, J. Walters, M. Feldman, R. Cervero, L. Frank, and J. Thomas. Traffic Generated by Mixed-Use Developments: A Six-Region Study Using Consistent Built Environmental Measures. In *Journal of the Urban Planning and Development*, Vol. 137, Issue 3, 2011.
- 4. Handy, S., R. G. Paterson, K. Butler. *Planning for Street Connectivity: Getting from Here to There*. Report No. 515, American Planning Association, 2003.
- 5. TDM Encyclopedia. *Roadway Connectivity: Creating More Connected Roadway and Pathway Networks*. Victoria Transport Policy Institute, Updated March 16, 2011
- 6. Charter of the New Urbanism. Congress for the New Urbanism. Ratified 1996.
- 7. *Street Connectivity: Improving the Function and Performance of Your Local Streets*. Leigh Valley Planning Commission Staff Project Report, June, 2011.
- 8. *Connecting Transportation & Land Use Planning: Street Connectivity*. Transportation and Growth Management, Oregon Department of Transportation, 2003
- 9. FHWA Functional Classification Guidelines. U. S. Department of Transportation, Federal Highway administration, Updated April 4, 2011
- 10. Bochner, B. and F. Dock. Street Systems and Classifications to Support Smart Growth. Urban Street Symposium, Anaheim, California, July, 2003.
- 11. Model Design Manual for Living Streets. Los Angeles County, 2011
- 12. Marshal. W. E. and N. W. Garrick. Street network Types and Road Safety: A Study of 24 California Cities. In *Urban Design International*, August, 2009.
- 13. Dumbaugh, E. and R. Rae. Safe Urban Form: Revisiting the relationship between Community Design and Traffic Safety. In *Journal of American Planning Association*. Vol. 3, No. 75, pp. 309 329.
- 14. Dill. J. Measuring Network Connectivity for Bicycling and Walking. Presented at 83rd Annual Meeting of the Transportation Research Board, Washington, D. C., 2004.
- 15. Tresidder, M. Using GIS to Measure Connectivity: An Exploration of Issues. Portland State University, School of Urban Studies and Planning, December, 2005.
- Scoppa, M., S. French, J. Peponis. The Effects of Street Connectivity upon the Distribution of Local Vehicular Traffic in Metropolitan Atlanta. Proceedings of the 7th International Space Syntax Symposium, Stockholm, June, 2009.
- Yi, C. Utilizing GIS to Measure Street Connectivity and Pedestrian Accessibility: Comparing Cul-De-Sac and Grid Neighborhoods in the Houston Metropolitan Area. GIS-T Student Paper Contest, 2008.
- 18. McNally, M. and S. Ryan. A Comparative Assessment of Travel Characteristics for NeoTraditional Development. University of California, Irvine, Institute of Transportation Studies, 1992.
- 19. Street Connectivity: An Evaluation of Case Studies in the Portland Region. Report No. 2004-11008-PLN, Portland Metro, June, 22, 2004.
- 20. Crane, R. Cars and Drivers in the New Suburbs: Linking Access to Travel in NeoTraditional Planning. In *Journal of American Planning Association*, Vol. 1, No. 62, pp. 51-65
- 21. Handy, S. Methodologies for Exploring the Link between Urban Form and Travel Behavior. In *Transportation Research D.* Vol. 1, No. 22, pp. 151-165
- 22. Alba, C. B. and E. Beimborn. Analysis of the Effects of Local Street Connectivity on Arterial Traffic. Presented at 84th Annual Meeting of the Transportation Research Board, Washington, D. C., 2005.
- 23. *Connecting Transportation & Land Use Planning: Street Connectivity*. Transportation and Growth Management, Oregon Department of Transportation, 2003

- 24. ITE Smart Growth Task Force. *Smart Growth Transportation Guidelines: An ITE Proposed Recommended Practice.* Institute of Transportation Engineers, Washington D.C., 2003.
- 25. *A Policy on Geometric Design of Highways and Streets*. American Association of State Highway and Transportation Officials, Washington D.C., 2001.
- 26. Creating Livable Streets: Street Design Guidelines for 2040 (Second Edition). Metro, Portland, 2002.
- 27. Smart Code. Transect Codeware Company, Miami, 2003.
- 28. *Innovative Intersections: Overview and Implementation Guidelines*. Wilbur Smiths Associates and HDR Thompson. Prepared for Community Planning Association of Southwest Idaho (COMPASS), April 2008.
- 29. Wolshon, B. *Toolbox on Intersection Safety and Design: Chapter 1 Geometric Design*. Prepared for The Institute of Transportation Engineers and The Federal Highway Administration, February 2004.
- 30. Reid, J. D., and J. E. Hummer. Analyzing System Travel Time in Arterial Corridors with Unconventional Designs Using Microscopic Simulation. In *Transportation Research Record: Journal* of the Transportation Research Board, No. 1678, Transportation Research Board of the National Academies, Washington, D.C., 1999, pp. 208 – 215.
- Reid, J. D., and J. E. Hummer. Travel Time Comparisons Between Seven Unconventional Arterial Intersection Designs. In *Transportation Research Record: Journal of the Transportation Research Board, No. 1751*, Transportation Research Board of the National Academies, Washington, D.C., 2001, pp. 56 – 66.
- 32. Memorandum on Mountain View Corridor Transit Project 5600 West BRT Phase 1 Design Issues. Wilbur Smith Associates, February 2010.
- 33. Innovative Intersection Safety Improvement Strategies and Management Practices: A Domestic Scan. Federal Highway Administration, Report No. FHWA-SA-06-016, September 2006.
- 34. Berkowitz, C., C. Bragdon, and F. Mier. Continuous flow intersection: A public private partnership. *Vehicle Navigation and Information Systems Conference*, 1996. VNIS '96, vol. 7, pp. 277-287, 1996.
- 35. www.trafficcalming.org
- 36. Ewing, R. *Traffic Calming: State of the Practice*. Publication FHWA-RD-99-135, Federal Highway Administration and Institute of Transportation Engineers, Washington, D.C., 1999.
- 37. Ewing, R. Impacts of Traffic Calming. In Transportation Quarterly, Vol. 55, Washington 2001
- 38. Elvik, R. Area-Wide Urban Traffic Calming Schemes: A Meta-Analysis of Safety Effects. In *Journal* of Accident Analysis and Prevention, Vol. 33, 2001, pp. 327 336
- 39. Handy, P., G. Davis, B. Arnold Traffic Calming Measures for Bus Routes. In *Bus Priority Team technical advice note*, Transport for London, September 2005
- Hidas, P., K. Weerasekera, and M. Dunne. Negative Effects of Mid-Block Speed Control Devices and their Importance in the Overall Impact of Traffic Calming on the Environment. In *Transportation Research part D*, Vol. 3, No. 1, 1998, pp. 41 – 50
- 41. Crouse, D. W. Traffic Calming: A Social Issue. In *Bulletin of Science Technology and Society*, Vol. 24, No. 2, 2004, pp. 138 144
- 42. Ewing, R., L. Chen, and C. Chen. Quasi-Experimental Study of Traffic Calming Measures in New York City. In *Journal of Accident Analysis and Prevention*, in review
- Nelson, D., J. Niles, and A. Hibshoosh. A New Planning Template for Transit Oriented Development. MTI Report 01-12, Mineta Transportation Institute, College of Business, San Jose State University, San Jose, CA, 2001.
- 44. Transportation Research Board (TRB). *Transit Oriented Development: Traveler Response to Transportation System Changes*. Transit Cooperative Research Program Report, No. 95, Transportation Research Board of the National Academies, Washington, D.C., 2007.
- 45. Ewing, R. Transportation and Land Use Innovations: When You Can't Pave Your Way Out of Congestion. American Planning Association, Chicago, IL, 1997.
- 46. *Transit Friendly Design Guide*. Calgary Transit Division, Transportation Department of the City of Calgary, April 2006.

- 47. *Transit-Friendly Streets: Design and Traffic Management Strategies to Support Livable Communities.* Transit Cooperative Research Program (TSRP) Report 33, Transportation Research Board of the National Academies, Washington D. C., 1998.
- 48. *Transit-Friendly Design Guidelines*. Transit Services of Frederick County, Frederic County, MD, 2009.
- 49. Transit and Land Use Planning. BC Transit, British Columbia, Canada, 1995.
- 50. Ewing, R. *Pedestrian and Transit-Friendly Design: A Primer for Smart Growth*. American Planning Association, 1999.
- 51. *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*. Institute of Transportation Engineers and Congress for New Urbanism. 2010
- 52. Yi, C. Utilizing GIS to Measure Street Connectivity and Pedestrian Accessibility: Comparing Cul-De-Sac and Grid Neighborhoods in Houston Metropolitan Area, The University of Texas at Austin, 2008
- 53. Forsyth, A. Environmental and Physical Activity: GIS Protocols, Twin Cities Walking Study, Version 2.2, July 1, 2005
- 54. Handy, S. and K. Clifton. 2000. *Evaluating Neighborhood Accessibility: Issues and Methods Using Geographic Information Systems*, Report SWUTC/00/167202-1. Southwest Region University Transportation Center, Center for Transportation Research, The University of Texas at Austin, November.
- 55. Litman, T. (2011). Measuring Transportation Traffic, Mobility and Accessibility, Victoria Transport Policy Institute.
- 56. Ben-Akiva, M. Dynamic Network Equilibrium Research. In Transportation Research A, 19A
- 57. Handy, S., and Niemeier, D.A. (1997). Measuring Accessibility: An Exploration of Issues and Alternatives. *Environment and Planning* A 29(7), 1175-1194.
- Handy, S. (1993). Regional versus Local Accessibility: Implications for Nonwork Travel, *Transportation Research Record: Journal of the Transportation Research Board of the National Academies* 1400, 58-66.
- 59. *Guide to Sustainable Transportation Performance Measures*, (2011). United States Environmental Protection Agency, EPA 231-K-10-004.
- 60. .Handy, S. 1996. Understanding the Link between Urban Form and Nonwork Travel Behavior: *Journal of Planning Education and Research* 15, pp. 183–98.
- 61. Ben-Akiva, M. and J. Bowman. Integration of an Activity based model System and a Residential Location Model. Massachusetts Institute of Technology
- 62. Wu, J. H., and H. J. Miller. Computational Tools for Measuring Space Time Accessibility within Dynamic Flow Transportation Networks. Bureau of transportation Statistics.
- 63. Miller, H.J. Measuring Space Time Accessibility benefits within Transportation Networks: Basic Theory and Computational Procedures. In *Geographical Analysis*, Vol. 31, 1999
- 64. Kwan, M.-P. (1998) Space-time and Integral Measures of Individual Accessibility: A Comparative Analysis Using a Point-based Framework. In *Geographical Analysis*,
- 65. Miller, J.H., (2007). Modelling accessibility using space-time prism concepts within geographical information systems, *International Journal of Geographical Information*.
- 66. Kim, H. M. Space Time Accessibility Measures: A Geocomputational Algorithm With a Focus on Feasible Opportunity Set and Possible Activity Duration. Department of Geography, Ohio State University
- 67. *Transit Capacity and Quality of Service Manual*. Transportation Research Board of the National Academies, Washington, D. C. 2003
- 68. Mamun, S. A. An Aggregated Transit Accessibility Measure. 2010
- 69. Coffel, K. et al. *Guidelines for Providing Access to Public Transportation Stations*, TCRP Report 153. Transportation Research Board of the National Academies, Washnigton D.C. 2012
- 70. A Guidebook for Developing Transit Performance Measurement System. TCRP Report 88. Transportation Research Board of the National Academies, Washnigton D.C. 2003

- 71. Lei, T. L. Mapping Transit Based Access: Integrating GIS, routes and schedules. In *International Journal of Geographical Information Science*, Vol 24, February 2010
- 72. Miller, H. J. Modeling Accessibility Using Space Time Prism Concepts within Geographical Information Systems. *In International Journal of Geographical Information Systems*, April, 2007
- 73. Ewing, R. Beyond Density, Mode Choice, and Single-Purpose Trips. *Transportation Quarterly*, Vol. 49, No. 4, Fall 1995.
- 74. AASHTO Guide for Planning, Design, and Operation of Pedestrian Facilities, (2004). 1st edition.
- 75. Google Transit Feed Data, <u>www.developers.google.com</u>

APPENDIX A: TRANSIT SCHEDULES AND TIMETABLES

Number Name	timetable				c filter: 1 Daily	🎜 🖷 Þ. P.		
Name								
Name			498	49	9 5	00 49	5 496	497
			356 SB	1 356 \$	SB 1 358	SB 1 356 1	NB 1 356 NE	B 1 356 NB 1
Line			356	35	8 3	56 35	6 356	358
Direction	ı		<	4		c >	>	>
Line rou	e		358 Si	3 356	SB 356	SB 356	NB 356 N	IB 356 NB
Time pro	file		1	1		1 1	1	1
Operato	r		1 UTA	10	TA 1 U	ITA 1 U	TA 1 UT.	A 1 UTA
Service	trip pattern numb	ber	0	c		0 0	0	0
Vehicle	ourney sections		1	1		1 1	1	1
Start sto	p point		110 11	0 110	110 110	110 105	105 105 1	05 105 105
End stop	point		106 10	6 106	106 108	106 101	101 101 1	01 101 101
Departu			04:00:0	0 04:4	5:00 05:3	0:00 05:4	5:00 08:15:	00 06:45:00
Arrival	•		04:03:4	8 04:4	8:48 05:3	3:48 05:4	3:48 06:18:	48 06:48:48
Coupled			0	c				0
	combination							
Valid da			1 Daily	/ 1 Di	aily 1 E	aily 1 D	aily 1 Dail	ly 1 Daily
	r aration time		05	0				0s
			05	01				05
rost pre	paration time							03
Filter	No Code	Nan	ne Departure (co	mpleted) Departure (completed) Departure	completed) Departure (completed) Departure (cr	ompleted) Departure (com
	5320 105	105				05:4		
	5319 104	104				05:4	3:35 06:16:	35 06:46:35
	5318 103	103				05:4	7:45 08:17:	45 08:47:45
	5317 102	102				05:4	3:20 06:18:	20 06:48:20
	5316 101	102				05:4		
	106 106	101	04:03:4	18 04:4	8:48 05-1	3:48	00.70.	00.40.40
	5321 107	106	04:01:5					
	2332 107	107	04:01:4			1:46		
			04:00:4			0:49		
	1839 109 2918 110	109	04:00:4					
	🕈 📝 🖶 Tabular timetab		Vehicle journ	P 1	c filter: 1 Daily 🔻		P₽ ₽₩ (₽) P3 ₩ [
	Number		498	499	500	495	496	497
;	Name		356 SB 1	356 SB 1	356 SB 1	356 NB 1	356 NB 1	356 NB 1
	Line		356	356	356	356	356	356
Dire Dire	Direction		<	<	<	>	>	>
Dire	Line route		356 SB	356 SB	356 SB	356 NB	356 NB	356 NB
	Time profile		1	1	1	1	1	1
	Operator		1 UTA	1 UTA	1 UTA	1 UTA	1 UTA	1 UTA
	Service trip patt	tem number	0	0	0	0	0	0
	Vehicle journey		1	1	1	1	1	1
	Start stop point		110 110	110 110	110 110	105 105	105 105	105 105
	End stop point		108 108	108 108	108 108	101 101	101 101	101 101
	Departure		04:00:00	04:45:00	05:30:00	05:45:00	08:15:00	08:45:00
	Arrival		04:03:48	04:48:48	05:33:48	05:48:48	08:18:48	06:48:48
	Coupled		0	0	0	0	0	0
	Vehicle combin	ation						
	Valid day		1 Daily	1 Daily	1 Daily	1 Daily	1 Daily	1 Daily
	Pre preparation	time	0s	Os	Os	Os	Os	Os
	Post preparation		05	05 05	0s	05 0s	05 0s	0s
	Filter No 5320	Code 105 105	Departure (completed)	Departure (completed) Departure (complete	Departure (completed 05:45:00) Departure (completed) 06:15:00	Departure (completed) 06:45:00
	5319					05:46:35	08:16:35	06:46:35
	5318					05:47:45	08:17:45	08:47:45
	5317					05:48:20	06:18:20	06:48:20
						05:48:48	06:18:48	06:48:48
	5316		04:03:48	04:48:48	05:33:48			
		106 106	04:01:58	04:48:58	05:31:58			
	106			04:46:46	05:31:46			
	106 5321	107 107	04:01:46					
	106 5321 2332	107 107 108 108	04:01:48 04:00:49	04:45:49	05:30:49			
	106 5321	107 107 108 108 109 109			05:30:49 05:30:00			

		ble							
Numb	er			304	282	305	283	306	284
Name				248 SB 1	248 NB 1	248 SB 1	248 NB 1	248 SB 1	248 NB 1
ine				Bus 248	Bus 248	Bus 248	Bus 248	Bus 248	Bus 248
Direct	on			<	>	<	>	<	>
Line ro				248 SB	248 NB	248 SB	248 NB	248 SB	248 NB
Time p				1	1	1	1	1	1
Opera	tor			1 UTA	1 UTA	1 UTA	1 UTA	1 UTA	1 UTA
Servic	e trip pat	tem numb	er	0	0	0	0	0	0
/ehicl	e journey	sections		1	1	1	1	1	1
Start s	top point			63 63	82 82	63 63	82 82	63 63	82 82
End st	op point			81 81	100 100	81 81	100 100	81 81	100 100
Depar	ture			06:13:48	06:21:15	06:43:48	06:51:15	07:13:48	07:21:15
Arrival				08:17:42	08:25:22	06:47:42	06:55:22	07:17:42	07:25:22
Couple	ed			0	0	0	0	0	0
Vehic	e combin	ation							
Valid o	lay			1 Daily	1 Daily	1 Daily	1 Daily	1 Daily	1 Daily
Pre pr	eparation	time		Os	0s	Os	0s	Os	Os
Post p	reparatio	n time		Os	0s	Os	0s	0s	0s
Post p	No	n time Code	Name	0s Departure (completed)	0s Departure (completed)	0s Departure (completed)	0s Departure (completed)	0s Departure (completed)	
			Name 82						Departure (corr
Filter	No	Code			Departure (completed)		Departure (completed)		Departure (con 07:21:15
Filter	No 3298	Code			Departure (completed) 06:21:15		Departure (completed) 06:51:15		Departure (com 07:21:15 07:21:29
Filter	No 3298 4091	Code 82	82		Departure (completed) 06:21:15 06:21:29		Departure (completed) 06:51:15 08:51:29		Departure (com 07:21:15 07:21:29
Filter	No 3298 4091 3742	Code 82 84	82		Departure (completed) 06:21:15 00:21:29 08:21:47		Departure (completed) 06:51:15 08:51:29 08:51:47		Departure (com 07:21:15 07:21:29 07:21:47
Filter	No 3298 4091 3742 85	Code 82 84 85	82 84 85		Departure (completed) 06:21:15 06:21:29 06:21:47 06:22:09		Departure (completed) 06:51:15 08:51:29 08:51:47 08:52:09		Departure (com 07:21:15 07:21:29 07:21:47 07:22:09 07:22:21
Filter	No 3298 4091 3742 85 86	Code 82 84 85 86	82 84 85 86		Departure (completed) 06:21:75 06:21:29 06:21:47 06:22:09 06:22:21		Departure (completed) 06:51:75 00:51:29 00:51:47 00:52:09 00:52:21		Departure (com 07:21:15 07:21:29 07:21:47 07:22:09 07:22:21 07:22:21
Filter	No 3298 4091 3742 85 86 3737	Code 82 84 85 86 87	82 84 85 86 87		Departure (completed) 06 21:15 06 21:29 06 21:47 06 22:09 08 22:21 06 22:33		Departure (completed) 06.51.15 06.51.29 06.51.47 06.52.09 06.52.21 06.52.33		Departure (com 07:21:15 07:21:29 07:21:47 07:22:09 07:22:21 07:22:33 07:22:41
	No 3298 4091 3742 85 86 3737 3875	Code 82 84 85 86 87 88	82 84 85 86 87 88		Departure (completed) 06 21:75 06 21:29 08 22:47 06 22:20 06 22:21 06 22:33 06 22:33		Departure (completed) 06:51:75 00:51:29 06:52:30 06:52:21 06:52:23 06:52:33		Departure (com 07:21:15 07:21:29 07:21:47 07:22:09
Filter	No 3298 4091 3742 85 86 3737 3875 3875 3726	Code 82 84 85 86 87 88 88 89	82 84 85 86 87 88 88 89		Departure (completed) 06 21:75 06 21:77 06 22:09 06 22:21 06 22:23 06 22:41 06 22:41		Departure (completed) 06:51:75 06:51:29 06:51:47 06:52:21 06:52:21 06:52:33 06:52:41 06:52:52		Departure (com 07:21:15 07:21:29 07:22:20 07:22:21 07:22:33 07:22:41 07:22:52 07:23:00
	No 3298 4091 3742 85 86 3737 3875 3875 3726 3710	Code 82 84 85 86 87 88 89 90	82 84 85 86 87 88 88 89 90		Departure (completed) 06 21:75 06 21:79 06 21:47 06 22:09 06 22:21 06 22:33 06 22:41 06 22:52 06 23:00		Departure (completed) 06:51:75 00:51:29 00:51:47 00:52:29 00:52:21 00:52:23 00:52:41 00:52:52 00:53:50		Departure (com 07:21:15 07:21:29 07:22:47 07:22:21 07:22:33 07:22:41 07:22:62
Fiter	No 3298 4091 3742 85 86 3737 3875 3726 3710 3257	Code 82 84 85 86 87 88 89 90 91	82 84 85 86 87 88 88 89 90 91		Departure (completed) 06.21:15 06.21:29 06.22:39 06.22:21 06.22:33 06.22:41 06.22:82 06.22:82 06.23.00 06.23.12		Departure (completed) 06.51:75 06.51:29 06.51:29 06.52:20 06.52:23 06.52:33 06.52:41 06.52:52 06.53:00 06.53:12		Departure (com 07:21:15 07:21:29 07:22:21 07:22:33 07:22:41 07:22:42 07:22:42 07:22:42 07:23:10
Filter	No 3298 4091 3742 85 86 3737 3875 3726 3710 3257 92	Code 82 84 85 86 87 88 89 90 91 92	82 84 85 86 87 88 89 90 91 92		Departure (completed) 06 21 / 75 06 21 / 29 06 22 / 147 06 22 20 06 22 21 06 22 23 06 22 24 06 22 33 06 22 41 06 22 30 06 23 30 06 23 12 06 23 22		Departure (completed) 06:51:75 00:51:29 06:51:47 06:52:20 06:52:31 06:52:33 06:52:41 06:52:30 06:53:00 06:53:12 00:53:12		Departure (con 07:21:15 07:21:29 07:22:47 07:22:21 07:22:33 07:22:41 07:22:62 07:23:22 07:23:22 07:23:22
Fiter	No 3298 4091 3742 85 86 3737 3875 3726 3710 3257 92 93	Code 82 84 85 86 87 88 89 90 91 92 93	82 84 85 86 87 88 89 90 91 91 92 93		Departure (completed) 06 21 - 29 06 21 - 47 06 22 - 29 06 22 - 21 06 22 - 21 06 22 - 23 06 22 - 41 06 22 - 52 06 23 - 00 06 23 - 12 06 23 - 22 06 23 - 22 06 23 - 49		Departure (completed) 06:51:75 06:51:29 06:51:47 06:52:21 06:52:21 06:52:41 06:52:52 06:53:22 06:53:22 06:53:49		Depature (con 07:21:5 07:21:5 07:22:9 07:22:3 07:22:3 07:22:41 07:22:52 07:22:41 07:22:52 07:23:00 07:23:22 07:23:49
	No 3298 4091 3742 85 86 3737 3875 3726 3710 3257 92 93 94	Code 82 84 85 86 87 88 89 90 91 92 93 94	82 84 85 86 87 88 89 90 91 91 92 93 94		Departure (completed) 06.21:75 00.21:29 06.22:47 06.22:33 00.22:21 06.22:33 00.22:41 06.22:52 06.23:00 06.23:12 06.23:22 06.23:49 06.24:41		Departure (completed) 06.51.75 00.6129 00.6129 00.6223 00.6223 00.6224 00.6223 00.6241 00.6252 00.63300 00.6312 00.6349 00.6349 00.6401		Departure (con 07.21.15 07.21.25 07.22.21 07.22.23 07.22.21 07.22.33 07.22.41 07.22.52 07.23.00 07.23.12 07.23.42 07.23.42 07.23.42 07.23.42 07.23.42

F F Tabula	r timeta	ble								
s Numbe	er			304	282	305	283	306	284	307
Name				248 SB 1	248 NB 1	248 SB 1	248 NB 1	248 SB 1	248 NB 1	248 SB
Line				Bus 248	Bus 248	Bus 248	Bus 248	Bus 248	Bus 248	Bus 24
Directi				<	>	<	>	<	>	<
Line ro				248 SB	248 NB	248 SB	248 NB	248 SB	248 NB	248 S
Time p	rofile			1	1	1	1	1	1	1
Operat	or			1 UTA	1 UTA	1 UTA	1 UTA	1 UTA	1 UTA	1 UT/
Servic	e trip pa	ttem n	umbei	0	0	0	0	0	0	0
Vehicle	e journe	y secti	ons	1	1	1	1	1	1	1
Start s	top poin	t		63 63	82 82	63 63	82 82	63 63	82 82	63 63
End st	op point			81 81	100 100	81 81	100 100	81 81	100 100	81 81
Depart	ure			06:13:48	08:21:15	06:43:48	08:51:15	07:13:48	07:21:15	07:43:4
Arrival				06:17:42	08:25:22	08:47:42	08:55:22	07:17:42	07:25:22	07:47:
Couple	d			0	0	0	0	0	0	0
Vehicle	e combi	nation								
Valid d	lav			1 Daily	1 Daily	1 Daily	1 Daily	1 Daily	1 Daily	1 Dail
	eparation	n time		0s	0s	0s	0s	0s	0s	0s
	reparatio			Os	Os	Os	Os	0s	Os	Os
· ·			_							Deserture
Dise	Ne	Carda		Dependence (second stand)	Dependence (a sevel stand)	Dependence (second stard)	Department (according to a d	Departure (secondated)	Dependence (second stand)	
Filter		Code		Departure (completed)	Departure (completed)	Departure (completed)		Departure (completed)	Departure (completed)	Departure / *
	3298		82	Departure (completed)	06:21:15	Departure (completed)	06:51:15	Departure (completed)	07:21:15	Departure
	3298 4091	82	82	Departure (completed)	06:21:15 08:21:29	Departure (completed)	06:51:15 08:51:29	Departure (completed)	07:21:15 07:21:29	Departure
	3298 4091 3742	82 84	82 84	Departure (completed)	06:21:15 08:21:29 08:21:47	Departure (completed)	06:51:15 08:51:29 08:51:47	Departure (completed)	07:21:15 07:21:29 07:21:47	Departure
	3298 4091 3742 85	82 84 85	82 84 85	Departure (completed)	06:21:15 08:21:29 08:21:47 08:22:09	Departure (completed)	06:51:15 08:51:29 08:51:47 08:52:09	Departure (completed)	07:21:15 07:21:29 07:21:47 07:22:09	E
	3298 4091 3742 85 86	82 84 85 86	82 84 85 86	Departure (completed)	06:21:15 08:21:29 08:21:47 08:22:09 08:22:21	Departure (completed)	06:51:15 08:51:29 08:51:47 08:52:09 08:52:21	Departure (completed)	07:21:15 07:21:29 07:21:47 07:22:09 07:22:21	
	3298 4091 3742 85 86 3737	82 84 85 86 87	82 84 85 86 87	Departure (completed)	06:21:15 06:21:29 06:21:47 06:22:09 06:22:21 06:22:33	Departure (completed)	06:51:15 06:51:29 06:51:47 06:52:09 06:52:21 06:52:33	Departure (completed)	07:21:15 07:21:29 07:21:47 07:22:09 07:22:21 07:22:33	
	3298 4091 3742 85 86 3737 3875	82 84 85 86 87 88	82 84 85 86 87 88	Departure (completed)	06:21:15 06:21:29 06:21:47 06:22:09 06:22:21 06:22:33 06:22:41	Departure (completed)	06:51:15 06:51:29 06:51:47 06:52:09 06:52:21 06:52:33 06:52:41	Departure (completed)	07:21:15 07:21:29 07:21:47 07:22:09 07:22:21 07:22:33 07:22:41	
	3298 4091 3742 85 86 3737 3875 3726	82 84 85 86 87 88 88 89	82 84 85 86 87 88 88 89	Departure (completed)	06:21:15 08:21:29 08:21:29 08:22:09 08:22:21 08:22:21 08:22:33 08:22:41 08:22:52	Departure (completed)	06:51:15 00:51:29 00:51:47 06:52:09 06:52:21 06:52:33 06:52:41 06:52:52	Departure (completed)	07:21:15 07:21:29 07:21:47 07:22:09 07:22:21 07:22:33 07:22:41 07:22:52	E
	3298 4091 3742 85 86 3737 3875 3875 3726 3710	82 84 85 86 87 88 89 90	82 84 85 86 87 88 89 90	Departure (completed)	0621:15 0821:29 08:21:47 08:22:09 08:22:21 08:22:33 08:22:33 08:22:41 08:22:52 08:22:52 08:22:52	Departure (completed)	06:51:15 00:51:29 00:51:47 00:52:09 00:52:21 00:52:23 00:52:33 00:52:41 00:52:52 00:53:00	Departure (completed)	07:21:15 07:21:29 07:21:47 07:22:09 07:22:21 07:22:33 07:22:241 07:22:52 07:22:52	E
	3298 4091 3742 85 86 3737 3875 3875 3726 3710 3257	82 84 85 86 87 88 89 90 91	82 84 85 86 87 88 89 90 91	Departure (completed)	06 21:15 06:21:29 08:21:47 08:22:99 08:22:21 08:22:33 08:22:41 08:22:41 08:22:42 08:22:40 09:22:52 09:22:30 09:22:12	Departure (completed)	06:51:75 00:51:29 00:51:47 00:52:09 00:52:21 00:52:23 00:52:41 00:52:42 00:53:00 00:53:12	Departure (completed)	07:21:43 07:21:29 07:21:47 07:22:09 07:22:21 07:22:33 07:22:41 07:22:82 07:23:00 07:23:00 07:23:12	E
	3298 4091 3742 85 86 3737 3875 3726 3710 3257 92	82 84 85 86 87 88 89 90 91 92	82 84 85 86 87 88 89 90 91 92	Departure (completed)	06 21:15 08:21:47 08:21:47 08:22:09 08:22:21 08:22:33 08:22:41 08:22:52 08:22:42 08:22:52 08:22:52 08:23:12 08:23:12 08:23:12	Departure (completed)	06.51.75 00.51.29 08.51.47 08.52.09 00.52.21 08.52.33 06.52.41 08.52.52 08.52.52 08.52.62 08.53.00 09.53.12 08.53.22	Departure (completed)	07:21:45 07:21:47 07:22:09 07:22:21 07:22:33 07:22:41 07:22:52 07:23:00 07:23:12 07:23:12 07:23:12	
	3298 4091 3742 85 86 3737 3875 3875 3726 3710 3257	82 84 85 86 87 88 89 90 91	82 84 85 86 87 88 89 90 91	Departure (completed)	06 21:19 00 21:29 00 21:47 06 22:09 08 22:21 06 22:21 06 22:33 08 22:41 08 22:42 08 23:00 08 23:12 08 23:12 08 23:12 08 23:22 08 23:22 08 23:49	Departure (completed)	06.51.75 00.51.29 00.51.47 00.52.09 00.52.21 00.52.31 00.52.41 00.52.52 00.53.00 00.53.12 00.53.22 00.53.22	Departure (completed)	07:21:43 07:21:29 07:21:47 07:22:09 07:22:21 07:22:241 07:22:42 07:23:00 07:23:12 07:23:12 07:23:22 07:23:22 07:23:49	
	3298 4091 3742 85 86 3737 3875 3726 3710 3257 92	82 84 85 86 87 88 89 90 91 92	82 84 85 86 87 88 89 90 91 92	Departure (completed)	06 21:15 08:21:47 08:21:47 08:22:09 08:22:21 08:22:33 08:22:41 08:22:52 08:22:42 08:22:52 08:22:52 08:23:12 08:23:12 08:23:12	Departure (completed)	06.51.75 00.51.29 08.51.47 08.52.09 00.52.21 08.52.33 06.52.41 08.52.52 08.52.52 08.52.62 08.53.00 09.53.12 08.53.22	Departure (completed)	07:21:45 07:21:47 07:22:09 07:22:21 07:22:33 07:22:41 07:22:52 07:23:00 07:23:12 07:23:12 07:23:12	
	3298 4091 3742 85 86 3737 3875 3726 3726 3710 3257 92 93	82 84 85 86 87 88 89 90 91 92 93	82 84 85 86 87 88 89 90 91 91 92 93	Departure (completed)	06 21:19 00 21:29 00 21:47 06 22:09 08 22:21 06 22:21 06 22:33 08 22:41 08 22:42 08 23:00 08 23:12 08 23:12 08 23:12 08 23:22 08 23:22 08 23:49	Departure (completed)	06.51.75 00.51.29 00.51.47 00.52.09 00.52.21 00.52.31 00.52.41 00.52.52 00.53.00 00.53.12 00.53.22 00.53.22	Departure (completed)	07:21:43 07:21:29 07:21:47 07:22:09 07:22:21 07:22:241 07:22:42 07:23:00 07:23:12 07:23:12 07:23:22 07:23:22 07:23:49	
	3298 4091 3742 85 86 3737 3875 3726 3726 3710 3257 92 93 94	82 84 85 86 87 88 89 90 91 92 92 93 94	82 84 85 86 87 88 89 90 91 91 92 93 94	Departure (completed)	06 21:29 06 21:29 06 21:47 06 22:09 08 22:47 06 22:21 06 22:33 08 22:41 06 22:52 08 23:00 08 23:12 08 23:49 08 23:49 08 24:01	Departure (completed)	06.51.75 00.51.29 00.51.47 00.52.09 00.52.21 00.52.21 00.52.22 00.52.41 00.52.52 00.53.12 00.53.49 00.53.49	Departure (completed)	07:21:43 07:21:29 07:21:47 07:22:09 07:22:29 07:22:41 07:22:42 07:23:40 07:23:45 07:23:45 07:23:45	
	3298 4091 3742 85 86 3737 3875 3726 3710 3257 92 93 94 95	82 84 85 86 87 88 89 90 91 92 93 94 95 96	82 84 85 86 87 88 89 90 91 92 93 94 95	Departure (completed)	06 21:19 06 21:29 06 21:47 06 22:09 06 22:21 06 22:41 06 22:42 06 23:00 06 23:12 06 23:12 06 23:12 06 23:12 06 23:12 06 23:12	Departure (completed)	06.51.75 00.51.29 00.51.47 00.52.09 00.52.21 00.52.33 00.52.41 00.52.42 00.53.00 00.53.12 00.53.12 00.53.12 00.53.22 00.53.40 00.53.40	Departure (completed)	07.21.19 07.21.29 07.22.09 07.22.20 07.22.21 07.22.23 07.22.33 07.22.33 07.23.30 07.23.30 07.23.30 07.23.12 07.23.42 07.23.42 07.23.42 07.23.49 07.24.01 07.24.09	

	er				1	2	3	31	4	32
Name								35 WB 1		35 WB 1
Line				Bus		Bus 35	Bus 35	Bus 35	Bus 35	Bus 35
Directi				35		> 35 EB	> 35 EB	< 35 WB	> 35 EB	< 35 WB
Line ro Time p				_	1	30 EB	30 EB	30 WB	30 EB	30 WB
Opera								1 UTA		1 UTA
Servic	e trip pat	tem numbe	er		D	0	0	0	0	0
		sections			1	1	1	1	1	1
	top point op point				8 15	8 8 15 15	8 8	11	8 8 15 15	11
Depar				05:2		05:58:00	06:26:00	06:39:24	06:56:00	07:09:24
Arrival				05:2		05:58:35	06:28:35	08:42:00	06:58:35	07:12:00
Couple					D	0	0	0	0	0
Vehicl Valid o	e combin	ation		10	-h.	1 Daily	1 Daily	1 Daily	1 Daily	1 Daily
	ay eparation	time		0		Os	Os	Os	Os	Os
	reparatio			0	s	0s	0s	0s	0s	0s
Filter	No	Code	Name		(completed)	Departure (completed)	Departure (completed)	Departure (completed)	Departure (completed)	Departure (complete
	8	8	8	05:2		05:56:00	06:26:00		06:56:00	
	1679 1676	9 10	9 10	05:2		05:58:27 05:58:38	08:28:27 08:26:38		08:58:27 08:58:38	
	4919	11	10	05:2		05:56:51	08:28:51		08:58:51	
	4696	12	12	05:2		05:57:03	08:27:03		08:57:03	
	13	13	13	05:2		05:57:38	08:27:38		06:57:38	
	4723 15	14 15	14 15	05:2		05:58:17 05:58:35	06:28:17 06:28:35		06:58:17	
	15	7	7	03.2		00.00.00	00.20.00	06:42:00	60.00.00	07:12:00
	6	6	6					08:41:25		07:11:25
	4706	5	5					08:40:45		07:10:45
	4	4	4 3					08:40:33 08:40:14		07:10:33
	4719 4721	3	3					06:39:38		07:09:38
	4918	1	1					06:39:24		07:09:24
•	2	6		,		Basic filter: 1 Daily	→ ½ 👘 Þ;	1:22902 Pr PR Pr (P) P F	454097.7948	2261377.4474
Tabu	🛛 🛛 🛲 lar timeta	6	Vehic	,	▼] [E			PF PD P C (문) P3 F	en ₽₽ P1↓	
Tabu Numt	🖉 🚥 lar timeta ber	6		,		Basic filter: 1 Daily	31		32	2261377.4474
Tabu Numi Name	🖉 🚥 lar timeta ber	6	Vehic	:le journeys	▼] [E			PF PD P C (문) P3 F	en ₽₽ P1↓	2261377.4474
Tabu Numb Name Line	ar timeta ber	6	1	:le journeys	2 Bus 35 >	3 Bus 35 >	31 35 WB 1 Bus 35 <	PF PR P도 (P) P 주 F 4 Bus 35 >	32 35 WB 1 Bus 35 <	2261377.4474
Tabu Numb Name Line Line	ar timeta per e tion	6	1 1 Bus 35 > 35 EB	:le journeys	←] E 2 Bus 35 > 35 EB	3 Bus 35 > 35 EB	31 35 WB 1 Bus 35 < 35 WB	P, P	32 35 WB 1 Bus 35 < 35 WB	2261377.4474
Tabu Numb Name Direc Line r Time	lar timeta per e tion route profile	6	1	:le journeys	2 Bus 35 >	3 Bus 35 >	31 35 WB 1 Bus 35 < 35 WB 1	PF PR P도 (P) P 주 F 4 Bus 35 >	32 32 35 WB 1 Bus 35 < 35 WB 1	2261377.4474
Tabu Numb Name Line Direc Line Time Oper	ar timeta ber tion profile ator	6	1 1 Vehic 1 Bus 35 35 EB 1	:le journeys	←] E 2 Bus 35 > 35 EB	3 Bus 35 > 35 EB	31 35 WB 1 Bus 35 < 35 WB	P, P	32 35 WB 1 Bus 35 < 35 WB	2261377.4474
Tabu Num Name Direc Line I Time Open Servi	lar timeta ber e tion route profile ator ce trip pa	able		:le journeys		Bus 35 > 30 EB 1 0 1	31 35 WB 1 Bus 35 < 35 WB 1 1 UTA	P[P] P[P] P[P] P[P] P 4 Bus 35 > 35 EB 1	32 35 WB 1 Bus 35 < 35 WB 1 1 UTA	2261377.4474
Tabu Numb Name Direc Line Time Oper Servi Vehic Start	ar timeta ber tion profile ator ce trip pa cle journe stop poir	ttem numb y sections		:le journeys		3 Bus 35 36 EB 1 0 1 8 8	31 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 1 1 1	P ^C P ^D P ^C P ^D P ^C P ^D P ^A	32 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 1 1 1 1	2261377.4474
Tabu Numb Name Direc Line I Time Oper Servi Vehic Start End s	ar timeta per e tion route profile ator ce trip pa cle journe stop point	ttem numb y sections	er 0 1 888 1515	:le journeys	2 Bus 35 > 35 EB 1 0 1 8 8 15 15	3 Bus 35 > 36 EB 1 0 1 1 88 15 15	31 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 1 11 7 7	P ^C	32 35 WB 1 Bus 35 < 35 WB 1 1 1 UTA 0 1 1 1 1 1 1 7 7	2261377.4474
Tabu Numb Name Line Direc Line Time Oper Servi Vehic Start End	ar timeta ber e tion route profile ator ce trip pa cle journe stop point stop point rture	ttem numb y sections		cle journeys		3 Bus 35 36 EB 1 0 1 8 8	31 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 1 1 1	P ^C P ^D P ^C P ^D P ^C P ^D P ^A	32 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 1 1 1 1	2261377.4474
Tabu Numb Name Line Direc Line Time Oper Servi Vehic Start End Start End Start Coup	ar timetz per e tion route profile ator ce trip pa stop point stop point rutre al leed	able	e 0 15 15 15 15 15 15 15 15 15 15 15 15 15 1	cle journeys	2 Bus 35 > 35 EB 1 0 1 8 8 15 15 05:58:00	Bus 35 > 35 EB 1 0 1 88 15 15 06 28:00	31 35 WB 1 Bus 35 < 35 WB 1 1 UTA 0 1 1 1 1 1 1 7 7 00:39:24	P, P	32 32 35 WB 1 Bus 35 < 35 WB 1 1 UTA 0 1 1 1 1 1 1 1 7 7 7 07:09:24	2251377.4474
Tabu Numb Name Line Direc Line Time Oper Servi Vehic Start End Start End Start Coup Vehic	ar timeta ber e tion moute profile ator cce trip pa atop point stop point rture at led combined	able	e 0 1 88 15 15 05.28.3 0 1 1 88 15 15 05.28.3 0 1 1 1 1 1 1 1 1 1 1 1 1 1	2 cle journeys	▼)) E 2 Bus 35 35 EB 1 0 1 8 8 15 15 06:58:35 0	3 Bus 35 > 35 EB 1 0 1 8 8 15 15 06:26:00 06:28:35 0	31 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 1 11 77 7 00:39:24 00:42:00 0	P ^C	32 35 WB 1 Bus 35 < 35 WB 1 1 UTA 0 1 1 UTA 0 1 1 1 1 1 7 7 7 07:09:24 07:12:00 0	2261377.4474
Tabu Numb Name Line Direc Line Time Opera Servi Vehic Start End s Depa Arriva Coup Vehic Valid	iar timeta ber tion tion toute profile ator top point top point true al ele combi day	ttem numb y sections t	I I Vehic I II Bus 35 35 EB 1 Bus 35 1 Bus 35 0 1 8 15 05.20:0 00:28:3	2 cle journeys	2 Bus 35 > 35 EB 1 0 1 8 8 15 15 00:58:50 05:58:35	3 Bus 35 35 EB 1 0 1 1 8 8 8 15 15 0 06.28.00 06.28.35	31 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 1 1 1 1 1 1 1 1 7 7 00:39:24 08:42:00	P, P	32 32 38 WB 1 Bus 35 4 35 WB 1 1 1 1 1 1 1 1 1 1 1 1 7 7 7 7 7 7 07:09:24 07:12:00	2251377.4474
Tabu Numl Name Direc Direc Direc Direc Direc Oper Servi Vehic Start End s Depa Arriva Coup Vehic Valid Pre p	ar timeta ber e tion moute profile ator cce trip pa atop point stop point rture at led combined	ttem numb y sections t i nation n time	e 0 1 1 8 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2 cle journeys	▼ E E E E E E E E E E E E E E E E E E E	Bus 35 35 EB 1 0 1 88 15 15 06 28 00 00 28 35 0 1 Daily	31 35 WB 1 Bus 35 < 35 WB 1 1 UTA 0 1 1 1 1 1 7 7 7 00:39:24 06:42:00 0 1 Daily	P, P	32 32 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 1 1 1 1 1 1 1 7 7 7 07:09:24 07:12:00 0 0 1 1 Daily	2261377.4474
Tabu Num Name Line Direc Line Time Oper Servi Vehic Start End s Depa Arriva Coup Vehic Valid Pre p Post	ar timeta lar timeta per e tion route profile ator ce trip pa de journe stop point rture el el de combi day reparatio	ttem numb y sections at t nation n time code	er 0 1 Depature (cor	cle journeys	2 Bus 35 > 35 EB 1 0 1 8 15 15 05.58.00 05.58.35 0 1 Daily 0s earture (complet eartur	3 Bus 35 35 EB 1 0 1 1 8 8 15 15 06 28:00 06 28:05 0 0 28:05 0 0 1 Daily 0 6 8 8	31 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 1 1 1 1 1 1 1 7 7 00:39:24 00:42:00 0 0 1 Daily 08 09	P ^C	32 32 35 WB 1 Bus 35 4 35 WB 1 1 1 UTA 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2261377.4474
Tabu Tabu Numi Name Line Direc Line Time Open Servi Vehic Start End S Depa Arriva Coup Vehic Valid Pre p Post Fitter	ar timetz per e tion route profile ator coe trip po coe trip to coe to coe trip to co	ttem numb sections t i n time on time Code 8 8 8	er 0 1 Delyature (cor 0 Departure (cor 0 05.26.0	b cle journeys cle journeys	▼) E 2 Bus 35 35 EB 1 0 1 8 8 15 15 05:56:00 05:58:35 0 1 Daily 0s os ostature (completed option of the second option	3 Bus 35 Bus 35 SE8 1 0 1 0 1 0 1 8 8 15 15 06 26 00 06 28 35 0 1 Daily 08 10 Departure (comp 66 26 00	31 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 1 1 1 1 1 1 1 7 7 00:39:24 00:42:00 0 0 1 Daily 08 09	P, P	32 32 35 WB 1 Bus 35 4 35 WB 1 1 1 UTA 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2251377.4474
Tabu Numl Name Line Direc Line Time Open Servi Vehic Start Dopa Arriva Coup Vehic Valid Pre p Post Filter	ar timeta lar timeta ber profile stop point stop point stop point day led combi day reparatio 8 8 1679	attem numb	Image: Control of the second	pleted) Dep 7	2 Bus 35 > 35 EB 1 0 1 8 15 15 05.58.00 05.58.35 0 1 Daily 0s earture (complet eartur	3 Bus 35 35 EB 1 0 1 1 8 8 15 15 06 28:00 06 28:05 0 0 28:05 0 0 1 Daily 0 6 8 8	31 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 1 1 1 1 1 1 1 7 7 00:39:24 00:42:00 0 0 1 Daily 08 09	P ^C	32 32 35 WB 1 Bus 35 4 35 WB 1 1 1 UTA 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2261377.4474
Tabu Numl Name Line Direc Line Time Oper Servi Vehic Start End a Depa Arriva Coup Vehic Valid Pre p Post Filter	ar timetz per e tion route profile ator coe trip po coe trip to coe to coe trip to co	Image: Control of the second	I III III Vehic 1 IIII III Vehic 1 Bus 35 35 EB 1 1 Bus 35 1 Departure (cor 05 26.0 0 05 26.2 1 Object 23	npleted) Dep 0 7 7 8	2 Bus 35 35 EB 1 0 1 8 8 15 15 0 5.58.35 0 1 Daily 0s 0s 0s sature (completed of the second of the s	Bus 35 Bus 35 36 EB 1 1 0 1 8 8 15 15 06 26:00 06 28:35 0 1 Daily 0s 0e 26:00 06 28:27	31 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 1 1 1 1 1 1 1 7 7 00:39:24 00:42:00 0 0 1 Daily 08 09	P ^C P ^D	32 32 35 WB 1 Bus 35 4 35 WB 1 1 1 UTA 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2261377.4474
Tabu Numl Name Line Direc Line Direc Line Direc Line Doper Servi Vehic Start Dopa Arriva Coup Vehic Valid Pre p Post Filter	In the second se	Image: Control of the second	er 0 1 1 1 3 36 EB 1 1 8 35 5 2 36 EB 1 1 8 8 15 15 05 26.0 06 528.3 0 0 05 26.0 05 26.0 05 26.0 05 26.0 05 26.2 0 05 26.0 05 26.2 0 0 05 26.0 0 05 26.0 0 0 0 0 0 0 0 0 0 0 0 0 0	perfected) Deprovements of the second	2 Bus 35 > 35 EB 1 1 8 8 15 15 05.56.00 0 5.56.00 0 5.56.00 0 1 Daily 0s 8 arture (comple 05.56.00 0 5.56.00 0 0 5.56.00 0 0 5.56.20 0 0.55.20 1 0.55.20 0 0 0.55.20 0 0 0.55.20 0 0 0.55.20 0 0.55.20 0 0 0.55.20 0 0 0.55.20 0 0 0.55.20 0 0 0.55.20 0 0 0.55.20 0 0 0.55.20 0 0 0.55.20 0.55.20	Bus 35 Bus 35 35 EB 1 0 1 0 1 1 8 8 15 15 0 0:28:35 0 1 Daily 0 6 26:00 0 0:28:27 0 0:20:31 0 0:20:51 0 0:27:03	31 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 1 1 1 1 1 1 1 7 7 00:39:24 00:42:00 0 0 1 Daily 08 09	PC PD PG (P) P3 F 	32 32 35 WB 1 Bus 35 4 35 WB 1 1 1 UTA 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2261377.4474
Tabu Numi Nami Une Direc Line Time Oper Servi Vehic Start End a Depa Arriva Coup Vehic Valid Pre p Post Filter	I I I I I I I I I I I I I I I I I I I	Image: Control of the section s	Image: Construction Vehic 1 1 Bus 35 > 35 EB 1 0 1 1 0 0 1 0 1 0 0 <	s	▼) (E 2 Bus 35 35 EB 1 0 1 8 15 15 05.68.00 05.68.35 0 0 1 Daily 05.56.03 0 05.68.35 0.5.67.38 05.57.36	Bus 35 Bus 35 35 EB 1 1 0 1 1 8 8 15 15 06 28:00 00 28:35 0 1 Daily 0s eted) Departure (comp 06 26:00 06 28:35 0 0 0 0 0 0 0 0 0 0 0 0 0	31 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 1 1 1 1 1 1 1 7 7 00:39:24 00:42:00 0 0 1 Daily 08 09	PC PD PG (P) P3 F PC PD PG (P) P3 F 4 	32 32 35 WB 1 Bus 35 4 35 WB 1 1 1 UTA 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2261377.4474
Tabu Tabu Numi Name Line Direc Line Time Oper Servi Start End Depa Arriva Coupi Coup	Image: Second	Image: Non-State Image: Non-State<	er 0 1 Departure (cor 0 05 28:0 0 05 28:3 0 05 28:3	poleted) Dep 7 1 3 3 5 7 7 5 7 7 5 7 7 5 7 7 7 7 7 7 7 7	▼ E E E E E E E E E E E E E E E E E E E	Bus 35 Bus 35 35 EB 1 1 0 1 1 8 8 15 15 06 28:00 00 28:35 0 1 Daily 08 09 eted) Departure (compl 66 26:00 00 28:45 0 0 1 Daily 08 09 09 09 09 09 00 00 00 00 00	31 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 1 1 1 1 1 1 1 7 7 00:39:24 00:42:00 0 0 1 Daily 08 09	P ^C P ^D P ^C P ^C P ^D	32 32 35 WB 1 Bus 35 4 35 WB 1 1 1 UTA 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2261377.4474
Tabu Tabu Numt Numt Uine Direcc Uine Time Oper Servi Vehic Start End Depa Arriva Couple Vehic Pre p Post Filter	Image: Second	ttem numb sy sections at n time Code 9 9 9 10 10 10 11 11 12 12 13 15 15 15 15 15 15 15 15 15 15	er 0 1 Departure (cor 0 05 28:0 0 05 28:3 0 05 28:3	poleted) Dep 7 1 3 3 5 7 7 5 7 7 5 7 7 5 7 7 7 7 7 7 7 7	▼) (E 2 Bus 35 35 EB 1 0 1 8 15 15 05.68.00 05.68.35 0 0 1 Daily 0s 0s 0s 0s 0s.68.35 0.5.87.36	Bus 35 Bus 35 35 EB 1 1 0 1 1 8 8 15 15 06 28:00 00 28:35 0 1 Daily 0s eted) Departure (comp 06 26:00 06 28:35 0 0 0 0 0 0 0 0 0 0 0 0 0	31 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 1 1 1 1 1 1 1 7 7 00:39:24 00:42:00 0 0 1 Daily 08 09	PC PD PG (P) P3 F PC PD PG (P) P3 F 4 	32 32 35 WB 1 Bus 35 4 35 WB 1 1 1 UTA 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2261377.4474
Tabu Tabu Numi Name Line Direc Line Time Oper Servi Start End Depa Arriva Coupi Coup	Image: A set of the set of t	ttem numb sy sections at n time Code 9 9 9 10 10 10 11 11 12 12 13 15 15 15 15 15 15 15 15 15 15	er 0 1 Departure (cor 0 05 28:0 0 05 28:3 0 05 28:3	poleted) Dep 7 1 3 3 5 7 7 5 7 7 5 7 7 5 7 7 7 7 7 7 7 7	▼ E E E E E E E E E E E E E E E E E E E	Bus 35 Bus 35 35 EB 1 1 0 1 1 8 8 15 15 06 28:00 00 28:35 0 1 Daily 08 09 eted) Departure (compl 66 26:00 00 28:45 0 0 1 Daily 08 09 09 09 09 09 00 00 00 00 00	31 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 UTA 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	P ^C P ^D P ^C P ^C P ^D	Image: bit is an analysis of the second se	2261377.4474
Tabu	Image: Constraint of the second	Image: Normalized state Image: Normalized state nation	er 0 1 Departure (cor 0 05 28:0 0 05 28:3 0 05 28:3	poleted) Dep 7 1 3 3 5 7 7 5 7 7 5 7 7 5 7 7 7 7 7 7 7 7	▼ E E E E E E E E E E E E E E E E E E E	Bus 35 Bus 35 35 EB 1 1 0 1 1 8 8 15 15 06 28:00 00 28:35 0 1 Daily 08 09 eted) Departure (compl 66 26:00 00 28:45 0 0 0 0 0 0 0 0 0 0 0 0 0	31 33 WB 1 Bus 35 < 35 WB 1 1 UTA 0 1 UTA 0 1 UTA 0 1 UTA 0 1 UTA 0 1 UTA 0 1 UTA 0 0 1 UTA 0 0 1 UTA 0 0 1 1 1 0 0 3 2 4 0 6 4 2 0 0 4 2 0 0 4 2 0 0 4 2 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 4 2 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 0 0 0 0 0 0 0 0 0 0	P ^C P ^D P ^C P ^C P ^D	32 35 WB 1 8 35 WB 1 1 35 WB 1 1 1 0 1 0 1 07:09:24 07:12:00 08 08 09 1 0 1 0 1 0	2261377.4474
Tabu Numt Nam Une Direc Line Time Opere Start Filte Opere Post Filte C C C C C C C C C C C C C C C C C C C	Image: A second se	Image Image attem numb -	er 0 1 Departure (cor 0 05 28:0 0 05 28:3 0 05 28:3	poleted) Dep 7 1 3 3 5 7 7 5 7 7 5 7 7 5 7 7 7 7 7 7 7 7	▼ E E E E E E E E E E E E E E E E E E E	Bus 35 Bus 35 35 EB 1 1 0 1 1 8 8 15 15 06 28:00 00 28:35 0 1 Daily 08 09 eted) Departure (compl 66 26:00 00 28:45 0 0 0 0 0 0 0 0 0 0 0 0 0	31 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 UTA 0 0 1 UTA 0 0 42.00 0 0 0 0 0 0 0 0 0 0 0 0	P ^C P ^D P ^C P ^C P ^D	Image: bit is a second secon	2261377.4474
Tabu Tabu Numi Numi Une Direc Une Opera Servi Vehic Coup Post Filter	Image: A set of the set of t	Image: Normal State	er 0 1 Departure (cor 0 05 28:0 0 05 28:3 0 05 28:3	poleted) Dep 7 1 3 3 5 7 7 5 7 7 5 7 7 5 7 7 7 7 7 7 7 7	▼ E E E E E E E E E E E E E E E E E E E	Bus 35 Bus 35 35 EB 1 1 0 1 1 8 8 15 15 06 28:00 00 28:35 0 1 Daily 08 09 eted) Departure (compl 66 26:00 00 28:45 0 0 0 0 0 0 0 0 0 0 0 0 0	31 33 WB 1 Bus 35 < 35 WB 1 1 UTA 0 1 UTA 0 1 UTA 0 1 UTA 0 1 UTA 0 1 UTA 0 1 UTA 0 0 1 UTA 0 0 1 UTA 0 0 1 1 1 0 0 3 2 4 0 6 4 2 0 0 4 2 0 0 4 2 0 0 4 2 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 4 2 0 0 4 2 0 0 0 4 2 0 0 0 4 2 0 0 0 0 0 0 0 0 0 0 0 0 0	P ^C P ^D P ^C P ^C P ^D	32 35 WB 1 8 35 WB 1 1 35 WB 1 1 1 0 1 0 1 07:09:24 07:12:00 08 08 09 1 0 1 0 1 0	2261377.4474
Tabu Tabu Num Nam Uine Direc Line Time Oper Start End Depo Start End Vehic Vehic Vehic Vehic Vehic Coup Fite	Image: A second se	Image: Non-State Image: Non-State anation anation nation material t anation Code 8 8 9 10 10 11 11 12 12 13 12 14 14 15 15 5 5 4 4 15 15 5 5 3 3 2 2	er 0 1 Departure (cor 0 05 28:0 0 05 28:3 0 05 28:3	poleted) Dep 7 1 3 3 5 7 7 5 7 7 5 7 7 5 7 7 7 7 7 7 7 7	▼ E E E E E E E E E E E E E E E E E E E	Bus 35 Bus 35 35 EB 1 1 0 1 1 8 8 15 15 06 28:00 00 28:35 0 1 Daily 08 09 eted) Departure (compl 66 26:00 00 28:45 0 0 0 0 0 0 0 0 0 0 0 0 0	31 35 WB 1 Bus 35 4 35 WB 1 1 UTA 0 1 11 77 06/39.24 00 1 1 0 1 0 1 0 1 0	P ^C P ^D P ^C P ^C P ^D	Image: bit is a second secon	2261377.4474

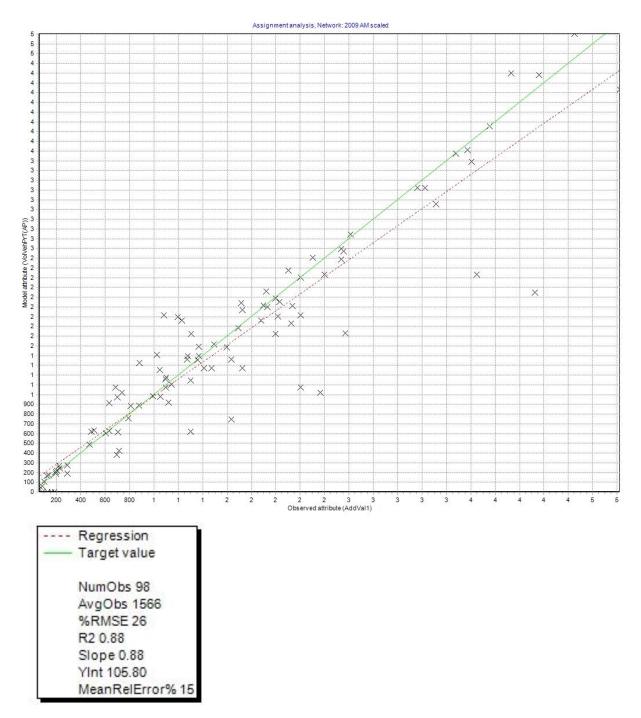
128 129 129 04/37/3 <th>None None <!--</th--><th>Name Line Directi Line ro Time p Operat Servic Vehick Start s End st Depart</th><th>e tion route profile ator ce trip pattem nu cle journey sectio</th><th></th><th></th><th>35 M EB 1 Bus 35 M</th><th>35 M EB 1</th><th>35 M EB 1</th><th>35 M EB 1</th><th>35 M WB 1</th><th>35 M EB 1</th></th>	None None </th <th>Name Line Directi Line ro Time p Operat Servic Vehick Start s End st Depart</th> <th>e tion route profile ator ce trip pattem nu cle journey sectio</th> <th></th> <th></th> <th>35 M EB 1 Bus 35 M</th> <th>35 M EB 1</th> <th>35 M EB 1</th> <th>35 M EB 1</th> <th>35 M WB 1</th> <th>35 M EB 1</th>	Name Line Directi Line ro Time p Operat Servic Vehick Start s End st Depart	e tion route profile ator ce trip pattem nu cle journey sectio			35 M EB 1 Bus 35 M	35 M EB 1	35 M EB 1	35 M EB 1	35 M WB 1	35 M EB 1
Point No No <th< th=""><th>Image Image <t< th=""><th>Line Directi Line ro Time p Operal Servic Vehick Start s End st Depart</th><th>tion route profile ator ce trip pattem nu cle journey sectio</th><th></th><th></th><th>Bus 35 M</th><th></th><th></th><th></th><th></th><th></th></t<></th></th<>	Image Image <t< th=""><th>Line Directi Line ro Time p Operal Servic Vehick Start s End st Depart</th><th>tion route profile ator ce trip pattem nu cle journey sectio</th><th></th><th></th><th>Bus 35 M</th><th></th><th></th><th></th><th></th><th></th></t<>	Line Directi Line ro Time p Operal Servic Vehick Start s End st Depart	tion route profile ator ce trip pattem nu cle journey sectio			Bus 35 M					
6 0 2 2 3 3 4 3 1 1000000000000000000000000000000000000	Decision P	Directi Line ro Time p Operat Servic Vehicle Start s End st Depart	route profile ator ce trip pattem nu cle journey sectio					Bus 35 M	Bus 35 M	BUS 30 M	Bus 35 M
Line note 330 KB 330	Line node 330 KB 330	Line ro Time p Operat Servic Vehicle Start s End st Depart	profile ator ce trip pattem nu cle journey sectio								
power power <t< td=""><td>Special Service the patient multiper Vehicle planers exclore Start data pairs End data</td><td>Operat Servic Vehicle Start s End st Depart</td><td>ator ce trip pattem nu cle journey sectio</td><td></td><td></td><td>35M EB</td><td>35M EB</td><td>35M EB</td><td>35M EB</td><td>35M WB</td><td>35M EB</td></t<>	Special Service the patient multiper Vehicle planers exclore Start data pairs End data	Operat Servic Vehicle Start s End st Depart	ator ce trip pattem nu cle journey sectio			35M EB	35M EB	35M EB	35M EB	35M WB	35M EB
serve to pattern under total to port 0	Service Displante number 0 </td <td>Servic Vehicle Start s End st Depart</td> <td>ce trip pattem nu cle journey sectio</td> <td></td> <td></td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td></td> <td>1</td>	Servic Vehicle Start s End st Depart	ce trip pattem nu cle journey sectio			1	1	1	1		1
Vanck progression 1	Vincke proprior 1	Vehicle Start s End st Depart	cle journey sectio					-			
Set all point 103 103<	Sate apport 1313 <td>Start st End st Depart</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Start st End st Depart									
end sport mail 100 103 110 103 100 103 <t< td=""><td>cpachage spachage <t< td=""><td>End st Depart</td><td>stop point</td><td>ions</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<></td></t<>	cpachage spachage spachage <t< td=""><td>End st Depart</td><td>stop point</td><td>ions</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	End st Depart	stop point	ions							
beside beside 94-87-13 69-87-13 <t< td=""><td>page med 04-07-13 06-07-14 06-47-13 06-</td><td>Depart</td><td>top point</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	page med 04-07-13 06-07-14 06-47-13 06-	Depart	top point								
manual vertice 0 <	served Coopedad 0										
Vadi do Image	Valid day I <thi< th=""> I <thi<< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></thi<<></thi<>										
Valid programment 1 Daily	Valid programments 1 Daily 0 dial 0 dia	Couple	led			0	0	0	0	0	0
Protegropation time Ga Ga <thga< th=""> Ga Ga <thg< td=""><td>Protoposation time 03 05 04 04 04 05 05 Poto proparation time Code Name 05</td><td>Vehicle</td><td>le combination</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></thg<></thga<>	Protoposation time 03 05 04 04 04 05 05 Poto proparation time Code Name 05	Vehicle	le combination								
Pet personal on time 0s 0s 0s 0s 0s 0s Image: Personal on time 20 120	Pet personation time 0% </td <td>Valid d</td> <td>day</td> <td></td> <td></td> <td>1 Daily</td> <td></td> <td></td> <td></td> <td></td> <td></td>	Valid d	day			1 Daily					
Image: section in the secti	No Code No Code Perture (completed) Departure (completed)										
120 123 <td>123 129</td> <td>Post p</td> <td>preparation time</td> <td>в</td> <td></td> <td>0s</td> <td>0s</td> <td>0s</td> <td>0s</td> <td>0s</td> <td>0s</td>	123 129	Post p	preparation time	в		0s	0s	0s	0s	0s	0s
120 123 <td>123 129</td> <td>Filter</td> <td>r No Ce</td> <td>ode</td> <td>Name De</td> <td>parture (completed) De</td> <td>eparture (completed) De</td> <td>parture (completed)</td> <td></td> <td>Departure (completed)</td> <td>Departure (compl</td>	123 129	Filter	r No Ce	ode	Name De	parture (completed) De	eparture (completed) De	parture (completed)		Departure (completed)	Departure (compl
123 123 <td>128 128 128 128 128 128 128 128 128 128 128 127 <th127< th=""> <th127< th=""> <th127< th=""></th127<></th127<></th127<></td> <td></td> <td></td> <td></td> <td>129</td> <td>04:57:13</td> <td>05:12:13</td> <td>05:27:13</td> <td>05:42:13</td> <td></td> <td>05:57:13</td>	128 128 128 128 128 128 128 128 128 128 128 127 <th127< th=""> <th127< th=""> <th127< th=""></th127<></th127<></th127<>				129	04:57:13	05:12:13	05:27:13	05:42:13		05:57:13
Image: 127 127	Image Image <th< td=""><td></td><td></td><td></td><td></td><td>04:59:00</td><td>05:14:00</td><td>05:29:00</td><td>05:44:00</td><td></td><td>05:59:00</td></th<>					04:59:00	05:14:00	05:29:00	05:44:00		05:59:00
Image: Section of the sectio	Image:										
Image: Second	Image: Second	1									
Tabular timetable 364 365 366 387 430 366 4 Number 35 M EB 1 35 M WB 1 36 M WB 1	Tabular timetable 384 385 386 367 430 368 4 Name 33 M EB 1 35 M EB 1					.11.					
Name 35 M EB 1 Bus 35 M B	Name 35 M EB 1 35 M WB 1 35 M WB 1 Bus 35 M B	. <u>p</u>			,		filter 1 Daily y	 3 			2262516.6154
Name 35 M EB 1 35 M EB 1 35 M EB 1 35 M EB 1 36 M EB 1 35 M W 1 36 M EB 1	Name 35 M EB 1 35		1 🚥 🖂 [,		filter:1Daily ▼	🎝 💷 Þ: Þ:			2262516.6154
Direction > > > > > >	$ \begin{array}{ c c c c c c c c } \hline \begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Tabular	i 🗰 🖾 🗌		III III Vehicle journ	neys 🔹 🗐 (Basio			₽₽ ₽⊊ (₽) ₽å ₽₩	₽∰ Þ†↓	2262516.6154
Internation 35M EB 35	Inter note 33M EB 35M	Tabular Numbe	ar timetable		III Vehicle journ	neys ▼] Basio	366	387	P∰ P⊊ (₽) P 1 ₽	₽₽ ₽↑↓ 388	
The profile 1 <th1< th=""> 1</th1<>	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Tabular Numbe Name	ar timetable		384 35 M EB 1	neys ▼) Basic 385 35 M EB 1	386 35 M EB 1	367 35 M EB 1	P☆ P⊊ (₽) P ⅔ P⊗ 430 35 M WB 1	268 35 M EB 1	4
Operator Image: Constraint of the pattern number Im	Operator No Operator Operator </td <td>Tabular Numbe Name Line</td> <td>ar timetable</td> <td></td> <td>384 35 M EB 1 Bus 35 M</td> <td>neys ▼</td> <td>386 35 M EB 1 Bus 35 M</td> <td>367 35 M EB 1 Bus 35 M</td> <td>P P ₽ ₽ 0 P 1 P 1 P 1 P 1 P 1 P 1 P 1 P 1 P 1 P</td> <td>368 35 M EB 1 Bus 35 M</td> <td>4 35 M</td>	Tabular Numbe Name Line	ar timetable		384 35 M EB 1 Bus 35 M	neys ▼	386 35 M EB 1 Bus 35 M	367 35 M EB 1 Bus 35 M	P P ₽ ₽ 0 P 1 P 1 P 1 P 1 P 1 P 1 P 1 P 1 P 1 P	368 35 M EB 1 Bus 35 M	4 35 M
O O	O O	Tabular Numbe Name Line Directio	ar timetable		384 35 M EB 1 Bus 35 M >	neys Basic 365 35 M EB 1 Bus 35 M >	386 35 M EB 1 Bus 35 M	367 35 M EB 1 Bus 35 M >	P☆ P↓ (P) P 1 P☆ 430 35 M WB 1 Bus 35 M <	388 35 M EB 1 Bus 35 M	4 35 M Bus
Vehicle journey sections 1 <td>Vehicle journer 1</td> <td>Tabular Numbe Name Line Directio Line rou</td> <td>ar timetable</td> <td></td> <td>384 35 M EB 1 Bus 35 M > 36M EB</td> <td>neys ▼] Basic 365 35 M EB 1 Bus 35 M > 35M EB</td> <td>386 35 M EB 1 Bus 35 M > 36M EB</td> <td>367 35 M EB 1 Bus 35 M > 35M EB</td> <td>P☆ P↓ (P) P ↑ P☆ 430 35 M WB 1 5 M WB 1 < 35 M WB</td> <td>388 35 M EB 1 Bus 35 M > 35 M EB</td> <td>4 35 M Bus</td>	Vehicle journer 1	Tabular Numbe Name Line Directio Line rou	ar timetable		384 35 M EB 1 Bus 35 M > 36M EB	neys ▼] Basic 365 35 M EB 1 Bus 35 M > 35M EB	386 35 M EB 1 Bus 35 M > 36M EB	367 35 M EB 1 Bus 35 M > 35M EB	P☆ P↓ (P) P ↑ P☆ 430 35 M WB 1 5 M WB 1 < 35 M WB	388 35 M EB 1 Bus 35 M > 35 M EB	4 35 M Bus
Start stop point 129 129 129 129 129 129 129 129 127 127 129 129 127 127 End stop point 130 130 130 130 130 130 130 130 130 130 128 128 130 130 128 128 Departure 04.57.13 056.12.13 056.27.13 056.27.13 056.43.00 056.57.03 056.57.00 Anival 04.59.00 05.10.00 052.200 05.44.00 056.43.00 056.59.00 056.40.00 056.57.00 056.40.00	Start stop point 129 129 <th129 129<="" th=""> <th129 129<="" th=""></th129></th129>	Tabular Numbe Name Line Directio Line rou Time pr Operato	ar timetable		304 364 35 M EB 1 Bus 35 M > 35M EB 1	eys ▼] Basic 385 35 M EB 1 Bus 35 M > 36M EB 1	368 35 M EB 1 Bus 35 M > 36M EB 1	367 35 M EB 1 Bus 35 M > 35M EB 1	P P (P) P	388 35 M EB 1 Bus 35 M > 35 M EB 1	4 35 M Bus 35N
End stop point 130 130 130 130 130 130 130 130 130 130 128 128 130 130 122 Departure 04:57:13 06:12:13 05:27:13 05:42:13 05:43:00 05:57:13 06:42 Artival 04:59:00 06:14:00 05:29:00 06:44:00 06:44:48 05:59:00 06:42 Coupled 0	End atop point 130 130 130 130 130 130 130 130 130 130 130 130 128 128 130 130 128 128 Departure 04 57:13 06 12:13 06 527:03 06 42:13 06 43:00 06 557:13 06 45 Coupled 0	Tabular Number Name Line Direction Line rou Time pr Operato Service	ar timetable	umber	384 384 35 M EB 1 Bus 35 M 35M EB 1 1 0	eys ▼] Basic 365 35 M EB 1 Bus 35 M > 36M EB 1 1 0	386 35 M EB 1 Bus 35 M > 38M EB 1 1	367 35 M EB 1 Bus 35 M > 35M EB 1 1	P P (₽) P	ال الح الح الح الح الح الح الح الح الح ا	4 35 M Bus 35N
Departure 04:57:13 06:12:13 06:27:13 06:42:13 06:43:00 06:57:13 06:43 Armal 04:59:00 05:14:00 06:29:00 05:44:00 06:44:46 06:59:00 06:45 Coupled 0 0 0 0 0 0 0 0 0 Vehicle combination	Departure 04:57:13 06:12:13 06:27:13 06:42:13 06:43:00 05:57:13 06:43 Arrival 04:59:00 05:14:00 05:29:00 05:44:00 05:59:00 06:45 Coupled 0 0 0 0 0 0 0 0 Vehicle combination 1 1 08:90 1 08:90 0	Tabular Numbe Name Line Directio Line rou Time pr Operato Service Vehicle	ar timetable er er ion oute oprofile too re trip pattern nu le journey section	umber	304 304 35 M EB 1 Bus 35 M 35M EB 1 1 0 1	•eys ▼] Basic 365 35 M EB 1 Bus 35 M > 35M EB 1 1 0 1	300 35 M EB 1 Bus 35 M 35 M EB 1 1 0 1	387 35 M EB 1 9us 35 M 35M EB 1 1 0 1	P P	288 388 35 M EB 1 Bus 35 M 35 M EB 1 36 M EB 1 1 0 0 1	4 35 M Bus 35M
Artival 04.59:00 05.14:00 05.29:00 05.44:60 05.59:00 05.55 Coupled 0	Artival 04.59:00 05:14:00 05:22:00 05:44:00 05:44:46 05:59:00 05:55 Coupled 0	Tabular Number Name Line Direction Line rou Time pr Operato Service Vehicle Start sto	r timetable er er on tor to	umber	364 364 35 M EB 1 Bus 35 M > 36M EB 1 1 0 1 1 128 129	•eys ▼] Basic 365 186 1 Bus 35 M EB 1 Solution 1 1 129 129	388 35 M EB 1 Bus 35 M > 35M EB 1 0 1 1 129 129	367 35 M EB 1 Bus 35 M 35M EB 1 1 0 1 1 29 129 129	P P	2008 2008 25 M EB 1 26 M EB 26 M EB 1 0 1 129 129	4 35 M Bus 35M 1 L 127
Coupled 0 </td <td>Coupled 0<!--</td--><td>Tabular Numbe Name Line Directio Line rou Time pr Operato Service Vehicle Start sto End sto</td><td>ar timetable</td><td>umber</td><td>Image: Non-Section 2014 Vehicle journ 384 35 M EB 1 Bus 35 M > 364M EB 1 0 1 122 129 130 130</td><td>reys ▼] Basic 305 35 M EB 1 Bus 35 M > 36M EB 1 0 1 129 129 130 130</td><td>300 35 M EE 1 Bus 35 M > 35M EB 1 0 1 1 129 129 130 130</td><td>387 38 M EB 1 Bus 35 M > 35M EB 1 0 1 129 129 130 130</td><td>P P € (₽) P ₹ € 430 35 M WB 1 8ua 35 M 35 M WB 1</td><td>208 25 M EB 1 8 M EB 1 3 M EB 1 3 M EB 1 0 1 1 129 129 130 130</td><td>4 35 M Bus 35M 1 L 1 L 127 128</td></td>	Coupled 0 </td <td>Tabular Numbe Name Line Directio Line rou Time pr Operato Service Vehicle Start sto End sto</td> <td>ar timetable</td> <td>umber</td> <td>Image: Non-Section 2014 Vehicle journ 384 35 M EB 1 Bus 35 M > 364M EB 1 0 1 122 129 130 130</td> <td>reys ▼] Basic 305 35 M EB 1 Bus 35 M > 36M EB 1 0 1 129 129 130 130</td> <td>300 35 M EE 1 Bus 35 M > 35M EB 1 0 1 1 129 129 130 130</td> <td>387 38 M EB 1 Bus 35 M > 35M EB 1 0 1 129 129 130 130</td> <td>P P € (₽) P ₹ € 430 35 M WB 1 8ua 35 M 35 M WB 1</td> <td>208 25 M EB 1 8 M EB 1 3 M EB 1 3 M EB 1 0 1 1 129 129 130 130</td> <td>4 35 M Bus 35M 1 L 1 L 127 128</td>	Tabular Numbe Name Line Directio Line rou Time pr Operato Service Vehicle Start sto End sto	ar timetable	umber	Image: Non-Section 2014 Vehicle journ 384 35 M EB 1 Bus 35 M > 364M EB 1 0 1 122 129 130 130	reys ▼] Basic 305 35 M EB 1 Bus 35 M > 36M EB 1 0 1 129 129 130 130	300 35 M EE 1 Bus 35 M > 35M EB 1 0 1 1 129 129 130 130	387 38 M EB 1 Bus 35 M > 35M EB 1 0 1 129 129 130 130	P P € (₽) P ₹ € 430 35 M WB 1 8ua 35 M 35 M WB 1	208 25 M EB 1 8 M EB 1 3 M EB 1 3 M EB 1 0 1 1 129 129 130 130	4 35 M Bus 35M 1 L 1 L 127 128
Vehicle combination 1	Vehicle combination Part (completed) Part (complete	Tabular Numbe Name Line Directio Line rou Time pr Operato Service Vehicle Start sto End sto Departo	ar timetable er er er ion oute oute oute oute tor be trip pattem nu le journey section tor tor tor tor tor tor tor tor tor tor	umber	384 36 M EB 1 Bus 35 M ≥ 35M EB 1 0 1 129 129 130 130 04:57.13	•eys ▼] Basic 305 35 M EB 1 Bus 35 M > 36M EB 1 0 1 129 129 130 130 06:12:13	386 35 M EB 1 Bus 35 M 35M EB 1 1 0 1 1 29 129 130 130 06:27.13	387 35 M EB 1 Bus 35 M > 3 M EB 1 0 1 1 29 129 130 130 06:42:13	P P (₽) P	bit 368 35 M EB 1 Bun 35 M EB 1 36M EB 1 1 1 1 129 129 130 129 130 129 130 129 150 157,13	4 35 M 8us 35h 1 (127 122 122 06:
Valid day 1 Daily	Valid day 1 Daily	Tabular Numbe Name Line Directio Line ror Time pr Operato Service Vehicle Start sto End sto Departu Arrival	image: a set of the s	umber	304 304 304 30 M EB 1 Bus 35 M > 35M EB 1 0 1 129 129 130 130 0.4:57:13 0.4:59:00	•eys ▼] Basic 365 35 M EB 1 Bus 35 M > 35M EB 1 0 1 129 129 130 130 05 12.13 05.14.00	388 35 M EB 1 Bus 35 M > 38M EB 1 0 1 1 29 129 129 129 130 130 0 6 27 13 0 6 29 00	307 35 M EB 1 Bus 35 M 35 M EB 1 1 1 29 129 130 130 0.642.13 0.644.00	P P	308 35 M EB 1 35 M EB 1 35 M EB 1 35 M EB 1 1 1 1 1 1 0 1 129 129 130 130 06:57:13 05:59:00	4 35 M Bus 38M 1 L 127 128 05:5
Pre preparation time Os Os <td>Pre preparation time 0s 0s 0s 0s 0s 0s Post preparation time 0s 0s</td> <td>Tabular Numbel Name Line Direction Line rou Time pr Operato Service Vehicle Start sto End sto Departu Amival Couples</td> <td>ar timetable ar timetable ar timetable ar ar timetable ar ar timetable ar ar ar timetable ar ar ar ar ar ar ar ar ar a</td> <td>umber</td> <td>304 304 304 30 M EB 1 Bus 35 M > 35M EB 1 0 1 129 129 130 130 0.4:57:13 0.4:59:00</td> <td>•eys ▼] Basic 365 35 M EB 1 Bus 35 M > 35M EB 1 0 1 129 129 130 130 05 12.13 05.14.00</td> <td>388 35 M EB 1 Bus 35 M > 38M EB 1 0 1 1 29 129 129 129 130 130 0 6 27 13 0 6 29 00</td> <td>307 35 M EB 1 Bus 35 M 35 M EB 1 1 1 29 129 130 130 0,642,13 0,644,00</td> <td>P P</td> <td>308 35 M EB 1 35 M EB 1 35 M EB 1 35 M EB 1 1 1 1 1 1 0 1 129 129 130 130 06:57:13 05:59:00</td> <td>4 35 M 8us 38M 1 L 127 127 128 05.5</td>	Pre preparation time 0s 0s 0s 0s 0s 0s Post preparation time 0s	Tabular Numbel Name Line Direction Line rou Time pr Operato Service Vehicle Start sto End sto Departu Amival Couples	ar timetable ar timetable ar timetable ar ar timetable ar ar timetable ar ar ar timetable ar ar ar ar ar ar ar ar ar a	umber	304 304 304 30 M EB 1 Bus 35 M > 35M EB 1 0 1 129 129 130 130 0.4:57:13 0.4:59:00	•eys ▼] Basic 365 35 M EB 1 Bus 35 M > 35M EB 1 0 1 129 129 130 130 05 12.13 05.14.00	388 35 M EB 1 Bus 35 M > 38M EB 1 0 1 1 29 129 129 129 130 130 0 6 27 13 0 6 29 00	307 35 M EB 1 Bus 35 M 35 M EB 1 1 1 29 129 130 130 0,642,13 0,644,00	P P	308 35 M EB 1 35 M EB 1 35 M EB 1 35 M EB 1 1 1 1 1 1 0 1 129 129 130 130 06:57:13 05:59:00	4 35 M 8us 38M 1 L 127 127 128 05.5
	Filter No Code Departure (completed) Departu	Tabular Numbe Name Line Directio Line ror Time pr Operatu Service Vehicle End sto Departu Arrival Couplei Vehicle	ar timetable er	umber	384 364 365 M EB 1 Bus 35 M 355 M EB 1 1 355 M EB 1 1 1 25 129 130 130 04:57.13 04:59.00 0 0	neys ▼ Basic 305 35 M EB 1 Bus 35 M > 38M EB 1 1 1 15 129 130 06:12:13 06:12:13 0 0 0 0	300 35 M EB 1 Bus 35 M 35M EB 1 0 1 1 129 129 130 130 0 6:29:00 0 0	387 38 M EB 1 Bus 35 M 5 35M EB 1 1 0 1 129 129 130 130 06.42.13 06.44.00 0	P P	b1 358 35 M EB 1 Bus 35 M 33M EB 1 0 1 129 129 120 130 06:57:13 05:59:00 0	4 35 M 36 M 31 1 127 128 06:6 06:6
Fiter No Code Departure (completed) Departur		Tabular Numbe Name Directic Line ro: Time pr Operati Service Vehicle Start st End sto. Departu Anival Couplet Vehicle Vehicle Vehicle	remain and the combination device combination	umber	364 364 36 M EB 1 Bus 36 M 36 M EB 1 1 0 1 1 128 129 130 130 04:57.13 04:59.00 0 0 1 Daily 0s	neys ▼] Basic 385 355 M EB 1 Bus 35 M > 35M EB 1 1 0 1 1 129 129 130 130 05:12:13 05:12:13 05:12:13 0 0 1 1 0 0 0	388 35 M EB 1 Bus 35 M 35M EB 1 0 1 1 129 129 130 130 06:27:13 06:27:13 06:27:13 06:27:13 06:27:13 06:27:13	387 38 M EB 1 Bus 35 M 35 M EB 1 0 1 129 129 130 130 06:42:13 06:4:400 0 0 1 Daily 08	P P (P) P	b1 388 35 M EB 1 Bus 35 M 35M EB 1 0 1 129 129 130 130 06:57:13 06:57:13 06:50 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4 35 M Bus 38M 1 L 127 128 05:5 06:5 06:5 1 D
129 129 129 04:57:13 05:12:13 05:27:13 05:42:13 05:57:13		Tabular Numbea Name Directio Line Directio Line rou Time pr Operati Service Start sti End sto Departi Arrival Couplei Valid di Pre pre	ar timetable ar timetable er er er ion oute oute tor oute tor oute tor oute oute oute oute oute oute oute oute	umber	364 364 36 M EB 1 Bus 36 M 36 M EB 1 1 0 1 1 128 129 130 130 04:57.13 04:59.00 0 0 1 Daily 0s	neys ▼] Basic 385 355 M EB 1 Bus 35 M > 35M EB 1 1 0 1 1 129 129 130 130 05:12:13 05:12:13 05:12:13 0 0 1 1 0 0 0	388 35 M EB 1 Bus 35 M 35M EB 1 0 1 1 129 129 130 130 06:27:13 06:27:13 06:27:13 06:27:13 06:27:13 06:27:13	387 38 M EB 1 Bus 35 M 35 M EB 1 0 1 129 129 130 130 06:42:13 06:4:400 0 0 1 Daily 08	P○ P P P P 430 35 W WB 1 Bus 35 M 35 W WB 1 35 W WB 1 1 1 1 UTA 0 1 1 1 1 UTA 0 1 1 127 127 128 128 05:43:00 05:44:48 0 0 1 1 1 Daily 0 0 0	b1 388 35 M EB 1 Bus 35 M 35M EB 1 0 1 129 129 130 130 06:57:13 06:57:13 06:50 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4 35 M Bus 35M 1 L 127 128 06:5 00:5
120 120 120 120 04:59:00 05:14:00 05:29:00 05:44:00 05:29:00	130 130 130 04:59:00 05:14:00 05:29:00 05:29:00 05:59:00	Tabular Tabular Numbe Name Directio Line ro: Time pr Operati Service Service Service Service Couplei Vehicle Vehicle Vehicle Vehicle Vehicle Perpret Vehicle Petropic Number Number Service	ar timetable er	umber ons 129	384 384 384 385 M EB 1 Bus 38 M 335M EB 1 0 1 1 1 29 129 130 130 04:57:13 04:59:00 0 1 Daily 0s Departure (completed) 04:57:73	teys	388 35 M EB 1 Bus 35 M 3 SM EB 1 0 1 129 129 130 130 06 27:13 05 29:00 0 1 Daily 0s 0s	387 35 M EB 1 Bus 35 M 3 M EB 1 0 1 1 129 129 130 130 0 64 2:13 0 64 4:00 0 1 Daily 0 s 0 8 0 9	P○ P	Image: bit is a second secon	4 35 M Bus 38M 1 L 127 128 08:5 06:5 06:5 06:5 06:0 00:0
		Tabular Tabular Numbe Name Line To Directio Line roor Operato Service Vehicle Start st Service Vehicle Valid dt Artival Coupler Vehicle Valid dt Pre pre Post pr Fiter	ar timetable	umber ons 129 130	Image: Second	neys ▼ Basic 305 35 M EB 1 Bus 35 M > 38M EB 1 1 1 0 1 1 130 130 06:12:13 06:12:13 05:14:00 0 0 1 Daily 0s 0 0 0	300 35 M EB 1 Bus 35 M 35M EB 35M EB 1 0 1 129 129 130 130 06:27:13 06:29:00 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0s 0s	387 38 M EB 1 Bus 35 M 35M EB 1 0 1 1 129 129 130 130 06.42.13 06.44.00 0 0 0 9 0 9 0 9 0 9	P○ P○	Image: Display state 308 35 M EB 1 Bus 35 M 35 M EB 1 Bus 35 M 33M EB 1 0 1 129 129 130 130 06.57.13 05.59.00 0 0 1 Daily 0 0 os 0	4 35 M Bus 35M 1 L 127 128 06.5 06.5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
		Number Name Line Directio Line rou Time pr Operato Service Vehicle Start sto End sto Departu Arrival Couple Vehicle Vehicle Vehicle	remain and the combination device combination	umber	384 36 M EB 1 Bus 35 M EB 1 Bus 35 M EB 1 1 0 1 1 129 129 130 130 0 4:57.13 0 4:59.00 0 0	teys	388 35 M EB 1 Bus 35 M 35 M EB 1 0 1 1 29 130 130 0 6:27:13 0 5:29:00 0 0 1 Daily	387 35 M EB 1 Bus 35 M 3 M EB 1 0 1 129 129 130 130 06.42:13 06.44:00 0 1 2	P P (P) P	bit 368 35 M EB 1 Bun 35 M EB 1 Bun 35 M EB 1 1 1 129 129 130 130 00:57:13 00:55:00 0 1 1 1 1 1	30 8 3 3 3 3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4
	129 129 129 04:57:13 05:12:13 05:27:13 05:42:13 05:42:13	Tabular Numbe Name Directio Line rou Operati Service Start sto Departu Arrival Couple Vehicle Vehicle Vehicle Vehicle Vehicle Post pre Post pre	ar timetable er er ion oute oute tor tor tor tor point ture le oumey section top point ture ed ed ed combination day expansion time	umber	384 35 M EB 1 Bus 35 M 35 M EB 1 1 0 1 129 129 130 130 04:57.13 04:57.03 04:57.03 04:57.00 0 0 1 Daily 0 8	neys ▼ 385 35 M EB 1 Bus 35 M > 30M EB 1 0 1 129 129 130 130 05:12:13 05:14:00 0 1 0 1 0 0 0 0 0 0 0 0	388 35 M EB 1 Bus 35 M 35 M EB 1 1 0 1 1 29 129 130 130 06:27:13 06:27:13 06:22:00 0 0 1 Dally 08 08	387 38 M EB 1 Bus 35 M 35M EB 35M EB 1 1 0 1 129 129 130 130 06 42:13 06 4:400 0 0 1 Daily 0s	P○ P	BB 35 M EB 1 Bus 35 M 35M EB 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	235 M 235 M 359 1 1 1 2 12 12 12 12 12 12 12 12 12 12 1
00.25.00 00.44.00 00.25.00 00.44.00 00.25.00		Tabular Numbe Name Directic Line rou Time pr Operati Service Start sti End sto Service Start sti End sto Couplei Vehicle Vehicle Vehicle Vehicle Vehicle Vehicle Vehicle	ar timetable er	umber ons 129	384 384 384 385 M EB 1 Bus 38 M 335M EB 1 0 1 1 1 29 129 130 130 04:57:13 04:59:00 0 1 Daily 0s Departure (completed) 04:57:73	teys	388 35 M EB 1 Bus 35 M 3 SM EB 1 0 1 129 129 130 130 06 27:13 05 29:00 0 1 Daily 0s 0s	387 35 M EB 1 Bus 35 M 3 M EB 1 0 1 1 129 129 130 130 0 64 2:13 0 64 4:00 0 1 Daily 0 s 0 8 0 9	P○ P	Image: bit is a second secon	4 35 M Bus 35M 1 L 127 128 06.5 06.5 0 0.5 0 0.5 0 0 0 0 0 0 0 0 0 0 0 0
		Tabular Tabular Numbe Une dia Une d	ar timetable	umber ons 129 130	384 384 384 385 M EB 1 Bus 38 M 335M EB 1 0 1 1 1 29 129 130 130 04:57:13 04:59:00 0 1 Daily 0s Departure (completed) 04:57:73	teys	388 35 M EB 1 Bus 35 M 3 SM EB 1 0 1 129 129 130 130 06 27:13 05 29:00 0 1 Daily 0s 0s	387 35 M EB 1 Bus 35 M 3 M EB 1 0 1 1 129 129 130 130 0 64 2:13 0 64 4:00 0 1 Daily 0 s 0 8 0 9	P○ P○	Image: bit is a second secon	4 35 M Bus 35M 1 L 127 128 06.5 06.5 0 0.5 0 0.5 0 0 0 0 0 0 0 0 0 0 0 0

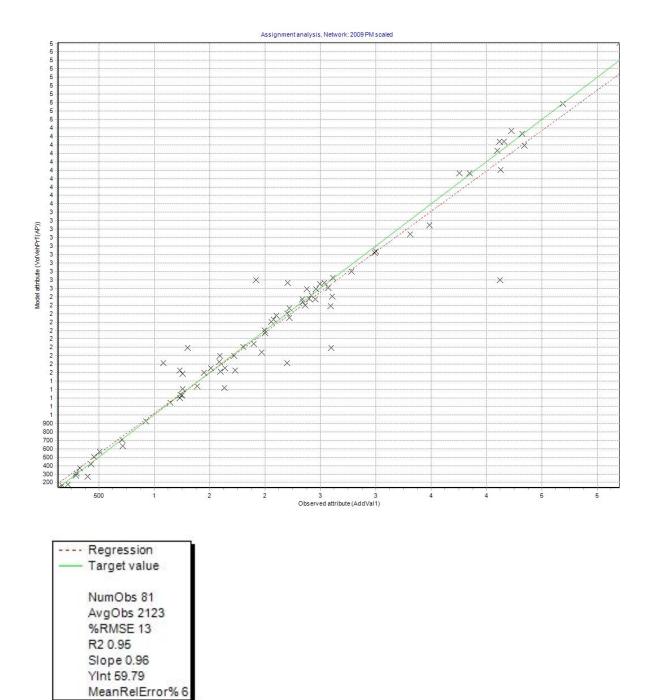
17 17 1						eys 🔹 Basic	1		🛱 P ç (P) P 🕈 🎭 🗗		_
	ular tin	_	_								
Nur	ber			_	61	62	63	64	65	116	
Nan	1e				41 EB 1	41 EB 1	41 EB 1	41 EB 1	41 EB 1	41 WB 1	4
Line					Bus 41	Bus 41	Bus 41	Bus 41	Bus 41	Bus 41	8
Dire	ction				>	>	>	>	>	<	
Line	route				41 EB	41 EB	41 EB	41 EB	41 EB	41 WB	4
Time	e profile	е			1	1	1	1	1	1	
pe	rator				1 UTA	1 UTA	1 UTA	1 UTA	1 UTA	1 UTA	1
Sen	rice trip	o pati	tem nu	mbei	0	0	0	0	0	0	
			section		1	1	1	1	1	1	
	t stop p				25 25	25 25	25 25	25 25	25 25	16 16	
	stop p				34 34	34 34	34 34	34 34	34 34	24 24	
	arture				05:27:24	05:42:24	05:57:24	06:12:24	08:27:24	06:40:11	00
Arriv					05:29:52	05:44:52	05:59:52	08:14:52	08:29:52	06:42:39	06
Cou					0	0	0	0	0	00.42.33	
		11			· ·	· ·	Ŭ	, v	v	•	
	icle co	mpin	ation		1 Delta	1.0-1-	(Delta	(D-1)	1 Daily	1 Daily	
	d day				1 Daily	1 Daily	1 Daily	1 Daily			
	prepar				0s	0s	0s	0s	0s	0s	
Post	t prepa	aration	n time		Os	Os	0s	0s	Os	0s	
Filte	er N	0	Code	_	Departure (completed)	Departure (completed)	Departure (completed)	Departure (completed)	Departure (completed)	Departure (completed)	Departu
				25	05:27:24	05:42:24	05:57:24	06:12:24	06:27:24	s spanaro (completed)	Departur 0
He		78		26	05:27:59	05:42:59	05:57:59	08:12:59	08:27:59		0
				20	05:28:11	05:43:11	05:58:11	08:13:11	08:28:11		0
					05:28:25	05:43:25	05:58:25	08:13:25	08:28:25		0
				28	05:28:25	05:43:25	05:58:25	08:13:25	08:28:25		
				29							0
				30	05:28:39	05:43:39	05:58:39	08:13:39	08:28:39		0
				31	05:28:49	05:43:49	05:58:49	08:13:49	08:28:49		0
				32	05:29:00	05:44:00	05:59:00	08:14:00	08:29:00		0
	33		33	33	05:29:35	05:44:35	05:59:35	06:14:35	06:29:35		(
	34		34	34	05:29:52	05:44:52	05:59:52	06:14:52	06:29:52		(
			24	24						06:42:39	
		45	23	23						06:42:17	
				22						06:42:06	
				21						06:41:51	
	- 20		20	20						08:41:35	
				20						08:41:35	
	19 37			20 19 18	•					06:41:35 06:41:20 06:41:00	
	19 37		19	19 18	•				1:22902 4	08:41:20 08:41:00	
	19 37: 	95	19 18	19 18 ▶	,		iller 1 Daile	≺tiline br br b		08:41:20 08:41:00 54212.9234 226	1819.7839
	19 37 	95	19 18	19 18 ▶	<	eys →] [Basic t	ilter: 1 Daily →]	™ ₱₽ ₽₽ ₽	1:22902 4 ≈ ₽⊊ (₽) ₽ ₹ ₽₅ [8	08:41:20 08:41:00 54212.9234 226	
	19 37: 	95	19 18	19 18 ▶	,	xys →][[Basic f	ilter: 1 Daily ♥	⊐⊉ ∰ Þ <u>5</u> Þ 5 Þ		08:41:20 08:41:00 54212.9234 226	
Tabu	19 37: 	95	19 18	19 18 ▶	III III Vehicle journ				P P\$ (P) P7 P\$	08:41:20 08:41:00 54212:9234 226 遼 마티	
Tabu	l 19 37 W	95	19 18	19 18 ▶	III III Vehicle journo	62	63	64	₽ ₽ ₩ (!) ₽ ₩ ₩	08-41-20 08-41-30 54212-9234 226	1819.7839
Tabu Num	l 19 37 III	95	19 18	19 18 ▶	01 41 EB 1	62 41 EB 1	63 41 EB 1	64 41 EB 1	85 41 EB 1	06.41.20 06.41.00 54212.9234 226 54212.9234 116 116 41 WB 1	1819.7839
Tabu	l 19 37 III	95	19 18	19 18 ▶	61 41 EB 1 Bus 41	62 41 EB 1 Bus 41	83 41 EB 1 Bus 41	64 41 EB 1 Bus 41	85 41 EB 1 Bus 41	06.41.20 00.41.00 54212.9234 226 59 P1 116 41 WB 1 Bus 41	1819.7839
Tabu Num	l 19 37: III Iar tim ber	95	19 18	19 18 ▶	01 41 EB 1 Bus 41 >	62 41 EB 1 Bus 41 >	63 41 EB 1	84 41 EB 1 Bus 41 >	85 41 EB 1	06.41:20 06.41:00 54212.9234 226 54212.9234 226 116 41 WB 1 Bus 41 <	1819.7839
Tabu Num Nam Line	l 19 37: III Iar tim ber	95	19 18	19 18 ▶	61 41 EB 1 Bus 41	62 41 EB 1 Bus 41	83 41 EB 1 Bus 41	64 41 EB 1 Bus 41	85 41 EB 1 Bus 41	06.41.20 00.41.00 54212.9234 226 59 P1 116 41 WB 1 Bus 41	1819.783
Tabu Num Nam Line Line	l 19 37: III III III III III III III III III I	95 metab	19 18	19 18 ▶	01 41 EB 1 Bus 41 >	62 41 EB 1 Bus 41 >	63 41 EB 1 Bus 41 >	84 41 EB 1 Bus 41 >	8 ₽₩ (₽) ₽ ₹ ₩ (₽) 85 41 EB 1 Bus 41 >	06.41:20 06.41:00 54212.9234 226 54212.9234 226 116 41 WB 1 Bus 41 <	1819.783
Tabu Num Direi	l 19 37: 11 22 1 ber tion route p profile	95 metab	19 18	19 18 ▶	01 01 41 EB 1 8 us 41 > 41 EB	62 41 EB 1 Bus 41 > 41 EB	63 41 EB 1 Bus 41 > 41 EB	84 41 EB 1 Bus 41 > 41 EB	85 41 EB 1 Bus 41 > 41 EB	06.41:20 06.41:00 54212.9234 226 7777 PTL 116 41 WB 1 Bus 41 Bus 41 K 41 WB	1819.783
Tabu Num Direc Line Direc Direc	l 19 37. III ular tim ular tim ular tim tober we ction route e profile rator	95 metab	19 18		01 01 41 EB 1 Bus 41 > 41 EB 1	62 41 EB 1 Bus 41 > 41 EB 1	83 41 EB 1 Bus 41 > 41 EB 1	84 41 EB 1 Bus 41 > 41 EB 1	P↓ (P) P # P∞ (E) 06 41 EB 1 Bus 41 > 41 EB 1	08.41.20 09.41.00 54212.9234 226 118 118 41 WB 1 Bus 41 < 41 WB 1 1 10 1	
Tabu Num Nam Line Direc Line Time Ope	l 19 37: III Jalar tim ber ree ction route p profile rator	95 eetab	19 18	19 18 •	01 01 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0	62 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0	83 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0	84 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0	P↓ (P) P P P P P P P P P P P P P P P P P P	06.41:20 06.41:00 54212.9234 226 54212.9234 226 116 41 WB 1 8 U 41 41 WB 1 41 WB 1 41 WB 1 1 U TA 0	
Tabu Num Nam Line Direc Line Serv Vehi	l 19 37: III III III III III III III III III I	95 eetab	19 18	19 18 •	01 01 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1	62 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1	63 41 EB 1 Bus 41 3 41 EB 1 1 1 UTA 0 1	84 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1	P↓ (P) P P P₀ (E) 05 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1	06.41.20 09.41:00 54212.9234 226 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	1819.783
Tabu Tabu Num Nam Line Direc Line Time Ope Serv Vehi Start	l 19 37: 11 22 1 ber tion route e profile rator cle trip cle jou stop p	95 metab	19 18	19 18 •	01 01 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0	62 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0	63 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 1 25 25	84 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 25 25	P↓ (P) P P P P P P P P P P P P P P P P P P	06.41.20 06.41.00 54212.9234 226 118 118 41 WB 1 8us 41 41 WB 1 8us 41 41 WB 1 1 1 UTA 0 1 1 1 UTA	
Tabu Num Nam Line Dire Line Time Ope Serv Vehi Start End	l 19 37: 11 22 1 ber ve ction route e profile rator rice trip ccle jou stop p	95 metab	19 18	19 18 •	Image: Non-Section 1 Vehicle journe 01 0 0 1 UTA 0 1 22 25 34 34	62 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 25 25 34 34	63 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 1 22 25 34 34	64 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 225 25 34 34	P↓	06.41:20 06.41:00 54212.9234 226 777 278 226 778 279 279 779 279 279 779 279 279 779 279 279 779 279 279 779 279 279 279 779 279 279 279 279 279 279 279 279 279	
Tabu Tabu Num Nam Line Direc Line Time Oper Serv Vehi Start End Dep	l 19 37: iiii iiiii iiiiiiiiiiiiiiiiiiiiiiii	95 metab	19 18	19 18 •	01 01 01 01 01 01 01 01 0 1 0 1 0 1 0 1 25 25 24 34 05 27:24	62 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 2 5 25 3 4 34 05.42.24	83 41 EB 1 Bus 41 > 1 1 UTA 0 1 1 25 25 34 34 06:57:24	84 41 EB 1 Bus 41 > 1 1 UTA 0 1 1 25 25 34 34 00:12:24	P↓ (P) P P P P P P P P P P P P P P P P P P	06.41:20 06.41:00 54212.9234 226 54212.9234 226 116 41 WB 1 8 US 41 41 WB 1 41 WB 1 1 41 WB 1 1 1 1 1 1 1 1 1 1 5 1 6 0 1 1 1 5 1 6 0 4 1 1 0 0 1 1 1 1 6 1 1 1 1 1 1 1 1 1 1 1	1819.783
Tabu Num Nam Direc Line Time Ope Serv Vehi Start End Dep Amiv	l 19 37: iiii iiiii iiiiiiiiiiiiiiiiiiiiiiii	95 metab	19 18	19 18 •	01 01 41 EB 1 Bus 41 2 Bus 41 1 UTA 0 1 2 8 26 3 4 34 0 9 27 24 0 6 29 82	02 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 22 25 34 34 05 44 224 05 44 52	63 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 25 25 34 34 0.05.724 0.05.724	84 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 25 25 3 4 34 0 0:12 24 0 0:12 24	PF PF<	06.41.20 09.41.00 54212.9234 226 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	
Tabu Tabu Num Nam Line Direc Serv Vehi Start End Dep Arriv Cour	l 19 37 iiii alar tim iber route p profile rator cle jou cle jou stop p arture al oled	95 metab patt opatt oint	19 18	19 18 •	01 01 01 01 01 01 01 01 0 1 0 1 0 1 0 1 25 25 24 34 05 27:24	62 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 2 5 25 3 4 34 05.42.24	83 41 EB 1 Bus 41 > 1 1 UTA 0 1 1 25 25 34 34 06:57:24	84 41 EB 1 Bus 41 > 1 1 UTA 0 1 1 25 25 34 34 00:12:24	P↓ (P) P P P P P P P P P P P P P P P P P P	06.41:20 06.41:00 54212.9234 226 54212.9234 226 116 41 WB 1 8 US 41 41 WB 1 41 WB 1 1 41 WB 1 1 1 1 1 1 1 1 1 1 5 1 6 0 1 1 1 5 1 6 0 4 1 1 0 0 1 1 1 1 6 1 1 1 1 1 1 1 1 1 1 1	1819.783
Tabu Num Nam Line Direc Line Time Ope Serv Vehi Start End Dep Aniv Couy Vehi	allar tim allar tim ber route profile rator stop p arture al bled cle con	95 metab patt opatt oint	19 18	19 18 •	Image: Second	62 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 1 25 25 34 34 05.42.24 05.44.52 0	63 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 1 22 25 34 34 05.57.24 06.59.52 0	04 41 EB 1 Bus 41 5 41 EB 1 1 UTA 0 1 1 25 25 34 34 00:12:24 00:14:52 0	P↓ P↓ P↓ P↓ P↓ 85 41 5 41 5 41 EB 1 1 1 1 UTA 0 1 1 25 25 34 34 06 27.24 06 29.52 0 0 0	06.41:20 06.41:00 54212.9234 226 54212.9234 226 116 118 41 WB 1 Bus 41 < 41 WB 1 Bus 41 < 41 WB 1 1 UTA 0 1 1 UTA 0 1 10 6 10 24 24 06.40:11 06.42:39 0	
Tabu Tabu Num Nam Line Direc Line Time Ope Serv Vehi Start End Dep Ariv Cou Vehi Valic	l 19 37. III bber re ction route e profile rator rice trip cle jou stop p arture al oled cle con	95 metab o patt mey point oint	19 18 18 18 18 10 10 10 10 10 10 10 10 10 10	19 18 •	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	62 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 22 25 34 34 05 42 24 05 44 52 0 1 Daily	83 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 1 28 26 34 34 0.557.24 00.59.52 0 1 Daily	84 41 EB 1 Bus 41 5 41 EB 1 1 UTA 0 1 28 26 34 34 00:12:24 00:12:24 00:12:24 00:12:24 0 0 1 Daily	PF (k) PR Hast (k) 05 41 EB 1 2 2 2 3	06.41.20 06.41.30 54212.9234 226 54212.9234 226 54212.9234 126 118 41 WB 1 Bus 41 < 41 WB 1 Bus 41 < 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Tabu Tabu Num Nam Line Direc Time Serv Vehi Start End Dep Aniv Couy Vehi Valic Pre j	allar tim allar tim allar tim ber route profile rator route trip cle jou stop p arture al bled cle con d day prepara	95 eetab o patt mey ooint oint mbina ation	19 18 18 10 10 10 10 10 10 10 10 10 10 10 10 10	19 18 •	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	62 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 25 25 34 34 05 42 24 05 42 24 05 42 24 0 1 Daily 0s	63 41 EB 1 Bus 41 → 41 EB 1 1 UTA 0 1 25 25 34 34 05.57.24 05.59.52 0 1 Daily 0s	84 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 25 25 34 34 90:1224 00:1452 0 0 1 Daily 0s	P. (!) P. I 05 41 EB 1 Bus 41 > 1 1 1 1 25 25 34 34 36 0:27:24 00 27:24 00 25:52 0 1 Daily 0s	06.41.20 06.41.00 54212.9234 226 51212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Tabu Num Nam Line Direc Time Ope Serv Vehi Start End Dep Amv Couy Vehi Valic Pre j	l 19 37. III bber re ction route e profile rator rice trip cle jou stop p arture al oled cle con	95 eetab o patt mey ooint oint mbina ation	19 18 18 10 10 10 10 10 10 10 10 10 10 10 10 10	19 18 •	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	62 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 22 25 34 34 05 42 24 05 44 52 0 1 Daily	83 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 1 28 26 34 34 0.557.24 00.59.52 0 1 Daily	84 41 EB 1 Bus 41 5 41 EB 1 1 UTA 0 1 28 26 34 34 00:12:24 00:12:24 00:12:24 00:12:24 0 0 1 Daily	PF (k) PR Hast (k) 05 41 EB 1 2 2 2 3	06.41.20 06.41.30 54212.9234 226 54212.9234 226	1819.783
Tabu Tabu Num Nam Line Direc Line Time Ope Serv Vehi Start End Dep Amv Couy Vehi Valic Pre p	19 37: 111 22 2 ber tion route profile profile profile profile profile cle jou stop p stop p arture al oled cle con day prepa	95 eetab o patt mey ooint oint mbina ation ration	19 18 18 10 10 10 10 10 10 10 10 10 10 10 10 10	19 18 •	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	62 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 25 25 34 34 05 42 24 05 42 24 05 42 24 0 1 Daily 0s	63 41 EB 1 Bus 41 → 41 EB 1 1 UTA 0 1 25 25 34 34 05.57.24 05.59.52 0 1 Daily 0s	84 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 25 25 34 34 90:1224 00:1452 0 0 1 Daily 0s	PF PF<	06.41.20 06.41.00 54212.9234 226 51212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Tabu Tabu Num Num Line Direc End Dep Amiv Couj Vehi Valic Pre p Post	l 19 37: iii iii iii iii iii iii iii iii iii i	95 eetab o patt mey ooint oint mbina ation ration	19 18 19 18 19 18 19 10 10 10 10 10 10 10 10 10 10 10 10 10	19 18 •	Image: Second	62 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 1 25 25 34 34 05 42 24 05 44 52 0 9 1 Daily 0s 0s	63 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 25 25 34 34 06:57:24 05:59:52 0 0 1 Daily 0s 0s	84 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 25 25 34 34 06:1224 06:1422 0 0 1 Daily 0s 0s	P. (!) P. I I 85 41 EB 1 Bus 41 > 1 41 EB 1 1 1 1 1 1 25 25 3 4 34 06 :27 :24 06 :27 :24 06 :27 :24 0 25 :52 0 1	06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1	((C
Tabu Num Nam Line Dire Line Time Ope Serv Vehi Start End Dep Arriv Couy Vehi Valic Pre J Post Filte	19 37: 111 22 1 22 1 22	95 metab patt mey point oint mbina ation ratior o (19 18 18 19 18 19 18 19 19 18 19 19 19 1 1 1 1	19 18 •	Image: Second	62 62 41 EB 1 Bus 41 → 41 EB 1 1 UTA 0 1 UTA 0 1 25 25 34 34 05.42.24 05.42.24 0 5.42.24 0 5.42.24 0 5.45.25 0 0 0 0 0 0 0 0 0 0 0 0 0	63 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 1 22 25 34 34 05.57,24 05.59,52 0 0 1 Daily 0s 0s Departure (completed)	64 41 EB 1 Bus 41 > 41 EB 1 1 1 1 1 25 25 34 34 06:12:24 0 1 1 Daily 0s Departure (completed)	P↓	06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Tabu Tabu Num Nam Line Direc Line Time Ope Serv Vehi Start End Dep Amv Vehi Start End Dep File Post	19 37: 111 22 4 22 5 22 5 22 5 22 5 22 5 22 5 22 5	95 eetab o patt mey ooint oint ation ratior o (0 22 2 78 2	19 18 align for the section ation time and time for the section ation ation ation ation for the section ation atio	19 18 • 18 • • • • • • • • • • • • •	Image: Second	02 02 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 25 25 34 34 05 42 24 05 44 52 0 1 Daily 05 05 05 05 05 05 05 05 05 05	63 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 1 25 25 34 34 0.557.24 05.57.24 0 5.57.24 0 5 5 5 2 0 0 0 5 5 5 2 0 5 5 5 2 0 5 5 5 2 1 0 5 5 5 5 2 1 0 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	84 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 25 25 34 34 06:1224 06:1224 06:1224 0 0 1 Daily 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0	P. P.<	06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1819.7833
Tabu Tabu Num Nam Line Direc Line Time Ope Serv Vehi Start End Dep Arriv Coup Vehi Start End Dep Filte	i 19 37: iii iiii iiiiiiiiiiiiiiiiiiiiiiiiii	95 eetab o patt mbina ation ratior o (0)22 2 2 78 2	19 18 ale le l	19 18	Image: Second	62 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 25 25 34 34 05 42 24 0 4 452 0 1 Daily 0s 0s Departure (completed) 05 42 24 05 42 24 05 42 24 05 42 24 05 42 24 05 42 24	63 41 EB 1 Bus 41 5 41 EB 1 1 UTA 0 1 25 25 34 34 34 34 05:57:24 0 55:9:52 0 1 Daily 0s 0s 0s 0s 0s 0s 0s 57:24 00:57:24	84 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 25 25 34 34 34 34 06:12 24 06:14 52 0 1 Daily 0s 0s 0s Departure (completed) 06:12 24 06:12 59	P.C. (P) P <td>06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1</td> <td>1819.7839</td>	06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1819.7839
I Tabu Num Nam Line Direi Line Time Oper Vehil Start End Dep Arriv Couj Vehil Valic Pe ost Filte	19 37: 111 ber te ber to profile stop p stop p arture al oled cle cou d day prepare ar r Nu 285 355 27 28	etab	19 18 19 18	19 18 • • • • • • • • • • • • • • • • • •	Image: Second	62 62 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 25 25 34 34 05.42.24 05.42.24 0 1 Daily 0s Departure (completed) 05.43:11	63 41 EB 1 Bus 41 5 41 EB 1 1 1 1 UTA 0 1 1 25 25 34 34 00.57,24 00.59,52 0 1 Daily 0s 0s Departure (completed) 05.57,34 00.58,11	64 41 EB 1 Bus 41 5 41 EB 1 1 UTA 0 1 1 UTA 0 1 25 25 34 34 00:12.24 00:12.24 00:14:52 0 1 Daily 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0	P. P.<	06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1819.7839
Tabu Num Num Direc Line Direc Line Time Oper Servi Start End Dep Arriv Colum Start End Dep Post Filte	I 19 37: III Jar tim ber re ction route profile rature al oled cle con stop p stop p arture al oled cle con stop p reparent stop p reparent stop p reparent stop p reparent cle jou stop p stop p reparent cle jou stop stop stop stop stop stop stop stop	e e e e e e e e e e e e e e e e e e e	19 18 19 18	19 18 18 18 19 18 20 25 26 27 28 29	Image: Second	62 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 25 25 34 34 05 42 24 0 1 Daily 0s 0s Departure (completed) 05 42 24 05 42 24 05 43 111 05 43 25 05 43 34	63 41 EB 1 Bus 41 → 41 EB 1 1 UTA 0 1 25 25 34 34 34 34 05.57.24 0 55.724 05.57.24 05.57.74 05.57.74 05.57.74 05.57.74 05.58.25 05.58.25 05.58.25 05.58.34	84 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 1 UTA 0 1 1 25 25 34 34 34 34 06:1224 0 0:1224 0 0 1 Daily 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0	P.C. (L) P.T. P.T. F.T. 05 41 EB 1 Bus 41 > 41 EB 1 1 1 1 1 UTA 0 1 25 25 34 34 36 00:27:24 00:27:24 00:27:24 00:27:24 00:27:24 00:27:24 00:27:24 00:27:24 00:27:24 00:27:24 00:27:24 00:27:24 00:27:24 00:27:24 00:28:25 00:28:25 00:28:24 00:28:24 00:28:24 00:28:24 00:28:25 00:28:24<	06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1819.7839
Tabu Num Nam Line Direc Line Time Ope Serv Vehil Start End Dep Aniv Vehil Valic Pre p Filte	i 19 37: iiii iiiiiiiiiiiiiiiiiiiiiiiiiiiiii	e e e e e e e e e e e e e e e e e e e	ation time Code 25 26 27 28 29 30	19 18 * mber 18 * 25 26 27 28 29 30	Image: Second	62 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 25 25 34 34 05 42 24 05 44 52 0 0 0 0 0 0 0 0 0 0 0 0 0	63 41 EB 1 Bus 41 5 41 EB 1 1 1 1 UTA 0 1 25 25 34 34 05.57.24 05.57.24 0 55.52 0 55.729 05.57.29 05.57.29 05.58.25 05.58.25 05.58.24 05.58.24 05.58.24 05.58.24	84 41 EB 1 Bus 41 > 41 EB 1 25 25 34 34 06:12-24 06:12-24 08:14.62 0 0 <td>P. P. P.<</td> <td>06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1</td> <td>Departu</td>	P. P.<	06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Departu
Tabu Tabu Tabu Tabu Tabu Num Nam Line Diree Time Ope Serv Vehi Start End Dep Aniv Vehi Valic Pre Post Filte	i 19 37: iii iiiiiiiiiiiiiiiiiiiiiiiiiiiiiii	e e patt metab e patt mbina ation ration ration 2 1 2 2 1 2 2 5 3 3 3	19 18 18 10 10 10 10 10 10 10 10 10 10 10 10 10	19 18 * mber 18 * * * * * * * * * * * * *	0 0 01 41 EB 1 Bus 41 > 41 EB 1 1 UTA 0 1 1TA 0 1 25 25 34 34 06:27:24 06:27:24 0 0 1 Daily 0s 0 0s 25:27:24 00:527:24 06:527:59 0:527:24 0:52:31 0:52:32 0:52:31 0:52:35 0:52:35 0:52:35 0:52:34 0:52:35 0:52:34	62 41 EB 1 Bus 41 → 1 UTA 0 1 1 UTA 0 1 25 25 34 34 05 44 34 05 44 32 0 1 Daily 0s 0s Departure (completed) 05 42 24 05 42 24 05 42 24 05 42 24 05 42 24 05 42 35 05 43 33 05 43 34 05 43 39 05 43 49	83 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 1 UTA 0 1 22 25 34 34 434 40 5.57.24 05.59.52 0 1 Daily 0 5 5 7.24 0 5 5 7.24 0 5 5 7.24 0 5 5 7.24 0 5 5 5 5 2 1 0 5 5 5 5 1 0 5 5 5 5 1 0 5 5 5 5 1 1 0 5 5 5 5	84 41 EB 1 Bus 41 3 41 EB 1 UTA 0 1 25 25 34 34 00:12:24 00:14:52 0 1 Daily 0s 0s 0s:12:24 00:14:52 0 0s 0s 0s 0s 0s:12:24 00:13:25 00:13:11 00:13:25 00:13:39 06:13:49	P. (k) P. (k)<	06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Departu
Table	I 19 37 III 37 III 37 IIII 37 III 37 IIII 37 III 37 IIII 37 IIIIII 37 IIII	ettab	19 18 18 10 10 10 10 10 10 10 10 10 10 10 10 10	19 18 18 18 10 10 10 10 10 10 10 10 10 10	Image: Second	02 02 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 25 25 34 34 05.42.24 05.42.24 05.42.24 0 0 1 Daily 05 0 0 0 0 0 0 0 0 0 0 0 0 0	63 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 UTA 0 5 25 25 34 34 0.5.57.24 0 5.57.25 0 5.57.20 0 5.57.24 0 5.57.20 0 0 5.57.20 0 0 5.57.20 0 5.57.20 0 5.57.20 0 5.57.20 0 0 5.57.20 00	84 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 UTA 0 1 25 25 3 4 34 0 6:12 24 0 6:12 24 0 6:12 24 0 6:12 24 0 0 1 Daily 0 6:12 24 0 0 0 1 Daily 0 6:12 24 0 0 0 1 Daily 0 6:12 24 0 0 1 Daily 0 6:12 35 0 0:13 25 0 0:13 25 0 0:13 24 0 0:13 25 0 0:13 25 0 0:13 25 0 0:13 25 0 0:13 26 0 0:1	P. P.<	06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Departu 0 0 0 0 0 0 0 0 0 0 0 0 0
Tabu Tabu Num Nam Line Diree Line Time Ope Servi Start End Dep Arriv Could Start End Dep Post Filte	i 19 37. iii iiii iiii iiiii iiiiiiiiiiii	ettab	19 19 18 18 18 18 19 18 18 19 18 18 19 19 18 18 19 19 19 18 18 19 19 19 19 19 19 19 19 19 19 19 19 19	19 18 18 18 19 19 19 19 19 19 19 19 19 19	Image: Second	62 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 UTA 0 1 UTA 1 25 25 34 34 35 25 34 34 35 424 05 4224 0 4 452 0 1 Daily 0s 0s Departure (completed) 05 42:24 05 42:59 05 43:11 05 42:55 05 43:34 05 43:39 05 44:00 05 44:00 05 44:35	63 41 EB 1 Bus 41 → 41 EB 1 1 UTA 0 1 25 25 34 34 06:57:24 0 57:24 0 57:24 0 58:57:24 0 55:58:50 0 58:57:40 0 58:57:40 0 58:57:59 0 58:58:50 58:50 58	84 41 EB 1 Bus 41 3 41 EB 1 1 1 1 25 25 34 34 06:12 24 06:12 24 06:12 24 0 1 Daily 0s 0s Departure (completed) 06:12 24 06:12 24 00:13 34 06:13 36 06:13 34 06:13 36 06:13 36 06:14 36 06:16 06:16 06:16 06:16 06:16 06:16 06:16 06:16 06:16 06	P.C. (P) P <td>06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1</td> <td>Departu</td>	06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Departu
Tabu Tabu Tabu Num Num Diree Line Time Ope Servi Start End Dep Amiv Cou Vehild Pre p Post Filte	I 19 I 37 III III III III III III III I	ettab	19 19 18 18 18 18 19 18 18 19 18 18 19 19 18 18 19 19 19 18 18 19 19 19 19 19 19 19 19 19 19 19 19 19	19 18 18 18 10 10 10 10 10 10 10 10 10 10	Image: Second	02 02 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 25 25 34 34 05.42.24 05.42.24 05.42.24 0 0 1 Daily 05 0 0 0 0 0 0 0 0 0 0 0 0 0	63 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 1 UTA 0 5 25 25 34 34 0.5.57.24 0 5.57.25 0 5.57.24 0 5.57.25 0 5.57.25 0 5.57.20 0 0 5.57.20 0 5.57.20 0 0 5.55.50 00	84 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 UTA 0 1 25 25 3 4 34 0 6:12 24 0 6:12 24 0 6:12 24 0 6:12 24 0 0 1 Daily 0 6:12 24 0 0 0 1 Daily 0 6:12 24 0 0 0 1 Daily 0 6:12 24 0 0 1 Daily 0 6:12 35 0 0:13 25 0 0:13 25 0 0:13 24 0 0:13 25 0 0:13 25 0 0:13 25 0 0:13 25 0 0:13 26 0 0:1	P. P.<	06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Compartum Compartum
Tabu Tabu Num Nam Line Dire- Dire- Dire- Dire- Dire- Dire- Serri Cour Vehih Start End Dep Post Filte	i 19 i 37 iii 6 iii 9 iii 9 ii 9 i	etab etab	19 19 18 18 18 18 19 18 18 19 18 18 19 19 18 18 19 19 18 18 19 19 18 18 18 18 18 18 18 18 18 18 18 18 18	19 18 18 18 19 19 19 19 19 19 19 19 19 19	Image: Second	62 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 UTA 0 1 UTA 1 25 25 34 34 35 25 34 34 35 424 05 4224 0 4 452 0 1 Daily 0s 0s Departure (completed) 05 42:24 05 42:59 05 43:11 05 42:55 05 43:34 05 43:39 05 44:00 05 44:00 05 44:35	63 41 EB 1 Bus 41 → 41 EB 1 1 UTA 0 1 25 25 34 34 06:57:24 0 57:24 0 57:24 0 58:57:24 0 55:58:50 0 58:57:40 0 58:57:40 0 58:57:59 0 58:58:50 58:50 58	84 41 EB 1 Bus 41 3 41 EB 1 1 1 1 25 25 34 34 06:12 24 06:12 24 06:12 24 0 1 Daily 0s 0s Departure (completed) 06:12 24 06:12 24 00:13 34 06:13 36 06:13 34 06:13 36 06:13 36 06:14	P.C. (P) P <td>06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1</td> <td>Departu</td>	06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 Bus 41 41 WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Departu
Tabu Tabu Tabu Num Nam Line Dire Line Line Line Line Line Line Line Lin	i 19 37: iiii iiiiiiiiiiiiiiiiiiiiiiiiiiiiii	etab etab	19 19 18 18 18 10 18 10 10 10 10 10 10 10 10 10 10 10 10 10	19 18 18 19 19 19 19 19 19 19 19 19	Image: Second	62 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 UTA 0 1 UTA 1 25 25 34 34 35 25 34 34 35 424 05 4224 0 4 452 0 1 Daily 0s 0s Departure (completed) 05 42:24 05 42:59 05 43:11 05 42:55 05 43:34 05 43:39 05 44:00 05 44:00 05 44:35	63 41 EB 1 Bus 41 → 41 EB 1 1 UTA 0 1 25 25 34 34 06:57:24 0 57:24 0 57:24 0 58:57:24 0 55:58:50 0 58:57:40 0 58:57:40 0 58:57:59 0 58:58:50 58:50 58	84 41 EB 1 Bus 41 3 41 EB 1 1 1 1 25 25 34 34 06:12 24 06:12 24 06:12 24 0 1 Daily 0s 0s Departure (completed) 06:12 24 06:12 24 00:13 34 06:13 36 06:13 34 06:13 36 06:13 36 06:14	P.C. (P) P <td>06.41.20 06.41.20 54212.9234 226 54212.9234 226 110 110 110 110 110 110 110 11</td> <td>Compartum Compartum Compartum</td>	06.41.20 06.41.20 54212.9234 226 54212.9234 226 110 110 110 110 110 110 110 11	Compartum Compartum
Tabu	l 19 37 milestino cetion route e profile rator ce trip ce trip ce trip ce trip ce trip ce trip ce trip ce jon ce trip ce jon stop p arture al ce con stop p prepa ce jon ce jon c	e e e e e e e e e e e e e e	19 19 18 18 10 18 10 18 10 10 10 10 10 10 10 10 10 10 10 10 10	19 18 , mber ns 25 26 27 28 29 30 31 32 33 34 24	Image: Second	62 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 UTA 0 1 UTA 1 25 25 34 34 35 25 34 34 35 424 05 4224 0 4 452 0 1 Daily 0s 0s Departure (completed) 05 42:24 05 42:59 05 43:11 05 42:55 05 43:34 05 43:39 05 44:00 05 44:00 05 44:35	63 41 EB 1 Bus 41 → 41 EB 1 1 UTA 0 1 25 25 34 34 06:57:24 0 57:24 0 57:24 0 58:57:24 0 55:58:50 0 58:57:40 0 58:57:40 0 58:57:59 0 58:58:50 58:50 58	84 41 EB 1 Bus 41 3 41 EB 1 1 1 1 25 25 34 34 06:12 24 06:12 24 06:12 24 0 1 Daily 0s 0s Departure (completed) 06:12 24 06:12 24 00:13 34 06:13 36 06:13 34 06:13 36 06:13 36 06:14	P.C. (P) P <td>06.41.20 06.41.20 54212.9234 226 54212.9234 226 118 41 WB 1 8us 41 41 WB 1 8us 41 41 WB 1 1 UTA 0 1 UTA 0 1 UTA 0 1 UTA 0 1 Daily 0s 0s Departure (completed) 06.42.39</td> <td>Departu</td>	06.41.20 06.41.20 54212.9234 226 54212.9234 226 118 41 WB 1 8us 41 41 WB 1 8us 41 41 WB 1 1 UTA 0 1 UTA 0 1 UTA 0 1 UTA 0 1 Daily 0s 0s Departure (completed) 06.42.39	Departu
Tabu	I 19 37: III 37: III 37: IIII 37: III 37:	e mbina ation ratior 221 2 235 3 45 4 45	19 18 18 19 18 19 18 19 18 19 18 19 18 19 19 18 19 19 19 19 19 19 19 19 19 19 19 19 19	19 18 18 19 19 19 19 19 19 19 19 19	Image: Second	62 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 UTA 0 1 UTA 1 25 25 34 34 35 25 34 34 35 424 05 4224 0 4 452 0 1 Daily 0s 0s Departure (completed) 05 42:24 05 42:59 05 43:11 05 42:55 05 43:34 05 43:39 05 44:00 05 44:00 05 44:35	63 41 EB 1 Bus 41 → 41 EB 1 1 UTA 0 1 25 25 34 34 06:57:24 0 57:24 0 57:24 0 58:57:24 0 55:58:50 0 58:57:40 0 58:57:40 0 58:57:59 0 58:58:50 58:50 58	84 41 EB 1 Bus 41 3 41 EB 1 1 1 1 25 25 34 34 06:12 24 06:12 24 06:12 24 0 1 Daily 0s 0s Departure (completed) 06:12 24 06:12 24 00:13 34 06:13 36 06:13 34 06:13 36 06:13 36 06:14	P.C. (P) P <td>06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 W8 1 8us 41 41 W8 1 8us 41 41 W8 1 1 1 1 1 1 1 1 1 1 1 1 1 1</td> <td>1819.7839</td>	06.41.20 06.41.00 54212.9234 226 54212.9234 226 118 41 W8 1 8us 41 41 W8 1 8us 41 41 W8 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1819.7839
Tabu	I 19 37: III 37: III 37: IIII 37: III 37:	95 eetab patt mey point oint ation ration 21 2 21 2	19 19 18 18 18 18 18 18 18 18 18 18 18 18 18	19 18 , mbea 18 25 26 27 28 29 30 31 32 23 34 24 23 22	Image: Second	62 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 UTA 0 1 UTA 1 25 25 34 34 35 25 34 34 35 424 05 4224 0 4 452 0 1 Daily 0s 0s Departure (completed) 05 42:24 05 42:59 05 43:11 05 42:55 05 43:34 05 43:39 05 44:00 05 44:00 05 44:35	63 41 EB 1 Bus 41 → 41 EB 1 1 UTA 0 1 25 25 34 34 06:57:24 0 57:24 0 57:24 0 58:57:24 0 55:58:50 0 58:57:40 0 58:57:40 0 58:57:59 0 58:58:50 58:50 58	84 41 EB 1 Bus 41 3 41 EB 1 1 1 1 25 25 34 34 06:12 24 06:12 24 06:12 24 0 1 Daily 0s 0s Departure (completed) 06:12 24 06:12 24 00:13 34 06:13 36 06:13 34 06:13 36 06:13 36 06:14	P.C. (P) P <td>06.41.20 06.41.00 54212.9234 226 54212.9234 226 1116 411WB 1 Bus 41 411WB 1 Bus 41 411WB 1 Bus 41 411WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1</td> <td>Departu</td>	06.41.20 06.41.00 54212.9234 226 54212.9234 226 1116 411WB 1 Bus 41 411WB 1 Bus 41 411WB 1 Bus 41 411WB 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Departu
I abu	i 19 37: iiii iiiiiiiiiiiiiiiiiiiiiiiiiiiiii	e e e e e e e e e e e e e e	19 19 18 18 18 18 18 18 18 18 18 18 18 18 18	19 18 , mber 18 25 26 27 28 29 30 31 32 33 34 24 23 22 21	Image: Second	62 41 EB 1 Bus 41 3 41 EB 1 1 UTA 0 1 UTA 0 1 UTA 1 25 25 34 34 35 25 34 34 35 424 05 4224 0 4 452 0 1 Daily 0s 0s Departure (completed) 05 42:24 05 42:59 05 43:11 05 42:55 05 43:34 05 43:39 05 44:00 05 44:00 05 44:35	63 41 EB 1 Bus 41 → 41 EB 1 1 UTA 0 1 25 25 34 34 06:57:24 0 57:24 0 57:24 0 58:57:24 0 55:58:50 0 58:57:40 0 58:57:40 0 58:57:59 0 58:58:50 58:50 58	84 41 EB 1 Bus 41 3 41 EB 1 1 1 1 25 25 34 34 06:12 24 06:12 24 06:12 24 0 1 Daily 0s 0s Departure (completed) 06:12 24 06:12 24 00:13 34 06:13 36 06:13 34 06:13 36 06:13 36 06:14	P.C. (P) P <td>06.41.20 06.41.20 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 1 UTA 0 1 UTA 0 1 UTA 0 1 UTA 0 1 Daily 0s 0s Departure (completed) 06.42.39 0.6</td> <td>((</td>	06.41.20 06.41.20 54212.9234 226 54212.9234 226 118 41 WB 1 Bus 41 41 WB 1 1 UTA 0 1 UTA 0 1 UTA 0 1 UTA 0 1 Daily 0s 0s Departure (completed) 06.42.39 0.6	((

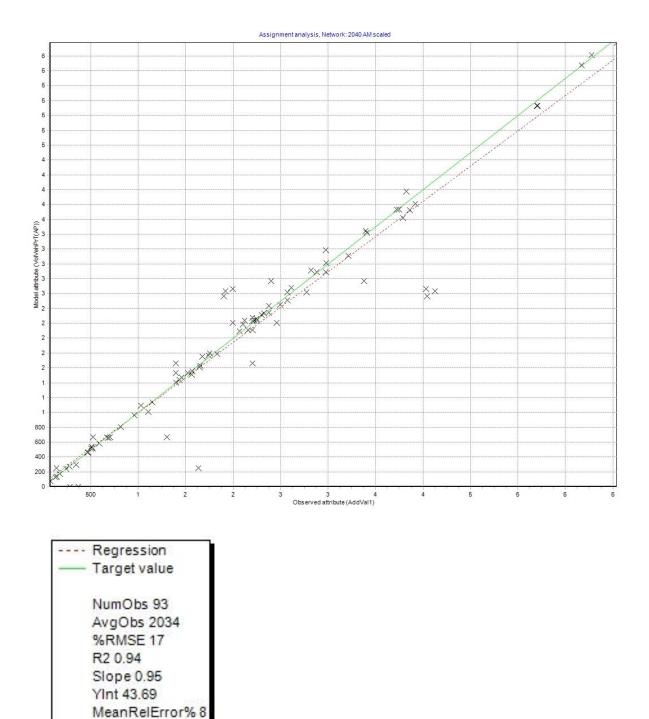
Number	175	228 47 WB 1	178	229 47 WB 1	177	230 47 WB 1
Name Line	47 EB 1 Bus 47	47 WB 1 Bus 47	47 EB 1 Bus 47	Bus 47	47 EB 1 Bus 47	Bus 47
Direction	>	<	>	<	>	<
Line route	47 EB	47 WB	47 EB	47 WB	47 EB	47 WB
Time profile	1 1 UTA	1 1 UTA	1 1 UTA	1 1 UTA	1 1 UTA	1 1 UTA
Operator Service trip pattern number		0	0	0	0	0
Vehicle journey sections	1	1	1	1	1	1
Start stop point	48 48	35 35	48 48	35 35	48 48	35 35
End stop point	62 62	47 47	62 62	47 47	62 62	47 47
Departure	07:00:43	07:05:34	07:15:43	07:20:34	07:30:43	07:35:34 07:39:07
Arrival Coupled	07.04.45	07.05.07	07.13.43	07.24.07	07.34.45	07.35.07
Vehicle combination						
Valid day	1 Daily	1 Daily	1 Daily	1 Daily	1 Daily	1 Daily
Pre preparation time	0s	Os	0s	0s	0s	Os
Post preparation time	0s	Os	Os	0s	0s	0s
Filter No Code 4268 55 55	Departure (completed) 07:03:09	Departure (completed)	Departure (completed) 07:18:09	Departure (completed)	Departure (completed) 07:33:09	Departure (completed)
3600 56 56	07:03:27		07:18:27		07:33:27	
4043 57 57	07:03:36		07:18:36		07:33:36	
58 58 58	07:03:46		07:18:46		07:33:46	
5299 59 59	07:04:00		07:19:00		07:34:00	
3426 60 60 61 61 61	07:04:20 07:04:35		07:19:20 07:19:35		07:34:20 07:34:35	
61 61 61 62 62 62	07:04:35		07:19:35		07:34:35	
47 47 47		07:09:07		07:24:07		07:39:07
46 46 46		07:08:54		07:23:54		07:38:54
4637 45 45		07:08:32		07:23:32		07:38:32
5309 44 44		07:08:09		07:23:09		07:38:09
5308 43 43 42 42 42		07:07:41		07:22:41		07:37:41
42 42 42 4266 41 41	-	07:06:56		07:21:56		07:36:56
4914 40 40		07:06:45		07:21:45		07:36:45
→ 39 39 39 < ···· →	< III	07:06:29		07:21:29		07:36:29
Number	169	170	171	172	173	226
	47 EB 1	47 EB 1		17.50.4		
Name		47 ED 1	47 EB 1	47 EB 1	47 EB 1	47 WB 1
Line	Bus 47	Bus 47	Bus 47	Bus 47	Bus 47	Bus 47
Line Direction	>	Bus 47 >	Bus 47 >	Bus 47 >	Bus 47 >	Bus 47 <
Line Direction Line route		Bus 47	Bus 47	Bus 47	Bus 47	Bus 47
Line Direction	> 47 EB	Bus 47 > 47 EB	Bus 47 > 47 EB	Bus 47 > 47 EB	Bus 47 > 47 EB	Bus 47 < 47 WB
Line Direction Line route Time profile Operator Service trip pattern numb	47 EB 1 UTA er 0	Bus 47 > 47 EB 1 1 UTA 0	Bus 47 > 47 EB 1 1 UTA 0	Bus 47 > 47 EB 1 1 UTA 0	Bus 47 > 47 EB 1 1 UTA 0	Bus 47 < 47 WB 1 1 UTA 0
Line Direction Line route Time profile Operator Service trip pattern numb Vehicle journey sections	> 47 EB 1 1 UTA et 0 1	Bus 47 > 47 EB 1 1 UTA 0 1	Bus 47 > 47 EB 1 1 UTA 0 1	Bus 47 > 47 EB 1 1 UTA 0 1	Bus 47 > 47 EB 1 1 UTA 0 1	Bus 47 < 47 WB 1 1 UTA 0 1
Line Direction Line route Time profile Operator Service trip pattern numb Vehicle journey sections Start stop point	47 EB 1 UTA er 0	Bus 47 > 47 EB 1 1 UTA 0	Bus 47 > 47 EB 1 1 UTA 0	Bus 47 > 47 EB 1 1 UTA 0	Bus 47 > 47 EB 1 1 UTA 0	Bus 47 < 47 WB 1 1 UTA 0
Line Direction Line route Time profile Operator Service trip pattern numb Vehicle journey sections	+ + + + + + + + + + + + + + + + + + +	Bus 47 > 47 EB 1 1 UTA 0 1 48 48	Bus 47 > 47 EB 1 1 UTA 0 1 48 48	Bus 47 > 47 EB 1 1 UTA 0 1 48 48	Bus 47 > 47 EB 1 1 UTA 0 1 48 48	Bus 47 < 47 WB 1 1 UTA 0 1 35 35
Line Direction Line route Time profile Operator Service trip pattern numb Vehicle journey sections Start stop point End stop point	A7 E8 47 E8 1 UTA er 0 1 48 48 62 62 06:30:43 06:30:43	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:45:43 06:49:49	Bus 47 > 47 EB 1 UTA 0 1 48 48 02 62	Bus 47 > 47 EB 1 1 UTA 0 1 45 48 62 62 08:15:43 06:19:49	Bus 47 > 47 EB 1 1 UTA 0 1 45 48 62 62 06:30:43 06:34:49	Bus 47 < 47 WB 1 1 UTA 0 1 36 35 47 47 00:35:34 06:39:07
Line Direction Line rotle Time profile Operator Service tip pattern numt Vehicle journey sections Start stop point End stop point Departure Armval Coupled	A7 EB 1 1 UTA er 0 1 1 48 48 62 62 05:30:43	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 05:45:43	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:00.43	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:15:43	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 60 62 06:30.43	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 00:35:34
Line Direction Line route Time profile Operator Service trip pattern numt Vehicle journey sections Start stop point End stop point Departure Artival Coupled Vehicle combination	+ + + + + + + + + + + + + + + + + + +	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 05:45:43 05:49:49 0	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:00:43 06:04:49 0	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:15:43 06:19:49 0	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:30:43 06:34:49 0	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 00:33:34 00:33:07 0
Line Direction Line rotle Time profile Operator Service tip pattern numt Vehicle journey sections Start stop point End stop point Departure Armval Coupled	A7 E8 47 E8 1 UTA er 0 1 48 48 62 62 06:30:43 06:30:43	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:45:43 06:49:49	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 08:00-43 00:04:49	Bus 47 > 47 EB 1 1 UTA 0 1 45 48 62 62 08:15:43 06:19:49	Bus 47 > 47 EB 1 1 UTA 0 1 45 48 62 62 06:30:43 06:34:49	Bus 47 < 47 WB 1 1 UTA 0 1 36 35 47 47 00:35:34 06:39:07
Line Direction Line route Time profile Operator Service tip pattern numt Vehicle journey sections Start stop point End stop point Departure Arrival Coupled Vehicle combination Valid day Pre preparation time Post preparation time	+ + + + + + + + + + + + + + + + + + +	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 82 06:45:43 06:45:43 06:45:49 0 0 1 Daily 0s 0s	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 48 48 49 50 40	Bus 47 > 47 EB 1 1 UTA 0 1 48 49 49 0 1 1 1 1 1 1 1 1 1 1 1 1 1	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:30:43 06:34:49 0 1 Daily	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 00:30:34 00:39:07 0 1 1 Daily 0s 0s
Line Direction Line route Time profile Operator Service trip pattern numt Vehicle journey sections Start stop point End stop point End stop point Oupled Antval Coupled Vehicle combination Valid day Pre preparation time Fiter No Code	>	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 05:45:43 05:49:49 0 0 1 Daily 0s 0s	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:00:43 06:04:49 0 0 1 Daily 0s Departure (completed)	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:15:43 06:19:49 0 0 1 Daily 0s Departure (completed)	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:30:43 06:34:49 0 0 1 Daily 0s Departure (completed)	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 00:35:34 00:35:34 00:35:07 0 1 Daily 0s 0s
Line Direction Line route Time profile Operator Service trip pattern numb Vehicle journey sections Stat stop point Departure Artival Coupled Vehicle combination Valid day Pre preparation time Filter No Code	> -> 47 EB 1 1 UTA - 1 UTA - 62 02 - 05:30:43 - 00:34:49 - 0 - 1 Daily - 0s - Departure (completed) - 05:30:43 -	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 02 06:45:43 06:45:43 06:45:49 0 0 1 Daily 0s 0s	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 02 06:00:43 06:00:49 0 0 1 Daily 0s 0s	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 02 06:15:43 06:19:49 0 - - 1 Daily 0s 0s	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 02 06 30 43 06 33 49 0 1 Daily 0s 0s	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 00 35 34 00 35 34 00 39 07 0 1 Daily 0s 0s
Line Direction Line route Time profile Operator Service trip pattern numt Vehicle journey sections Start stop point End stop point End stop point Oupled Antval Coupled Vehicle combination Valid day Pre preparation time Fiter No Code	> 47 EB 1 1 1 UTA 1 48 48 0 05:30:43 0 0 1 1 Daily 0 0s 0s 0s:30:43 0.5:30:43	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 62 05 45 43 05 45 43 0 1 Daily 0s 0s 0 0 0 0 0 0 0 0 0 0 0 0 0	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 02 06:00.43 06:00.43 0 0 0 0 0 0 0 0 0 0 0 0 0	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:15:43 06:19:49 0 1 Daily 0s Departure (completed) 06:15:43	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06 30 43 06 34 49 0 1 Daily 0s 0s Departure (completed) 06 30 43	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 00 35 34 00 35 34 00 39 07 0 1 Daily 0s 0s
Line Direction Line route Time profile Operator Service trip pattern numb Vehicle journey sections Stat stop point Departure Artival Coupled Vehicle combination Valid day Pre preparation time Filter No Code 48 48 50 50 2938 51	> 47 EB 1 1 UTA 0 1 48 48 62 62 05:30:43 00:34:49 0 1 Daily 08 09:30:43 00:31:01 00:31:25	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 02 05:45.43 05:45.43 05:45.43 05:45.43 0 5 Departure (completed) 05:46.01 05:46.09 05:46.25	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 83 62 06:00.43 06:04.49 0 0 1 Daily 0s 0s 0s Departure (completed) 06:01.03 06:01.09 06:01.25	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 63 62 06:15:43 06:15:43 06:15:43 06:15:43 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 63 62 06 30 43 06 34 49 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 00 35 34 00 35 34 00 39 07 0 1 Daily 0s 0s
Line Jirection Line route Time profile Operator Service trip pattern numb Vehicle journey sections Stat stop point End stop point Departure Armval Coupled Vehicle combination Vialid day Pre preparation time Post cocde Filter No Code	> -> 47 EB 1 1 UTA - 1 UTA -	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 02 02:45:43 05:45:43 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 0 c 02 0 c 00-43 0 c 00-43 0 0 0 0 0 0 0 0 0 0 0 0 0	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 02 00:15:43 00:19:49 0 0 1 Daily 0s 0s Departure (completed) 06:15:43 00:10:25 00:10:25 00:10:42	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:30:43 06:33:49 0 0 0 0 0 0 0 0 0 0 0 0 0	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 00:35:34 00:35:34 00:35:07 0 1 Daily 0s 0s
Line Direction Line route Time profile Operator Service tip pattern numk Vehicle journey sections Start stop point End stop point Departure Arrival Coupled Vehicle combination Valid day Pre preparation time Post preparation time Pitter No Code Ref 48 45 4679 49 45 50 51 4444 52 55 5 2973 53 55	> 47 EB 1 1 UTA 0 48 48 62 62 06:30.43 0 0 1 Daily 08 09:30.43 00 09 08 09:31.01 06:31.02 06:31.03 06:31.03 06:31.04 06:31.05 06:31.02 06:31.03 06:31.04 06:31.05 06:31.02 06:31.03	Bus 47	Bus 47	Bus 47	Bus 47	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 00:35:34 00:35:34 00:35:07 0 1 Daily 0s 0s
Line Jirectoin Line route Time profile Operator Service tip pattern rums Service tip pattern pattern rums Tope profile Coupled Coupled Vehicle journey sections Service combination Vehicle combination Vehicle combination Valid day Pre preparation time Filter No Code 487 48 48 467 49 45 50 50 50 2938 51 51 4444 52 52 2937 53 52 3472 54 54	> 47 EB 1 1 UTA 0 48 48 62 62 06:30:43 0 1 Daily 0s 0s 0s:31:09 06:31:09 06:31:25 00:31:24 06:31:25 00:31:25 00:31:25 00:31:25	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 02 02:45:43 05:45:43 0 5 0 0 0 0 0 0 0 0 0 0 0 0 0	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 0 c 02 0 c 00-43 0 c 00-43 0 0 0 0 0 0 0 0 0 0 0 0 0	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 02 00:15:43 00:19:49 0 0 1 Daily 0s 0s Departure (completed) 06:15:43 00:10:25 00:10:25 00:10:42	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:30:43 06:33:49 0 0 0 0 0 0 0 0 0 0 0 0 0	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 00:35:34 00:35:34 00:35:07 0 1 Daily 0s 0s
Line Direction Line route Time profile Operator Service tip pattern numk Vehicle journey sections Start stop point End stop point Departure Arrival Coupled Vehicle combination Valid day Pre preparation time Post preparation time Pitter No Code Ref 48 45 4679 49 45 50 51 4444 52 55 5 2973 53 55	> 47 EB 1 1 UTA 0 1 48 48 62 62 05:30:43 00:34:49 0 1 1 0	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 05:45:43 05:49:49 0 1 Dally 0 6 5 05 05 49 0 0 5 5 05 05 40 0 0 5 40 0 0 5 40 0 0 5 40 0 0 5 40 0 0 5 40 0 0 5 47 3 0 5 1 0 5 1 0 5 1 0 1 0 5 1 1 1 1 1 1 1 1 1 1 1 1 1	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 0 6:00.43 0 6:04.49 0 1 Dally 0 5 0 5 0 5 0 5 0 5 0 5 0 5 0 5	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:15:43 06:15:43 06:15:43 06:15:43 06:15:43 06:15:43 06:15:43 06:15:43 06:15:43 06:15:43 06:15:43 06:16:09 06:16:09 06:16:09 06:16:25 06:16:42 06:17:34 06:17:34	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:30.43 06:34.49 0 1 Dally 0s 0s Departure (completed) 06:31:09 06:31:09 06:31:25 06:32.41 06:32.41 06:32.41	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 06:38:34 06:38:07 0 1 Daily 0s 0s
Line Direction Line route Time profile Operator Service trip pattern rumt Vehicle journey sections Stat stop point Departure Armal Coupled Vehicle combination Valid day Pre preparation time Post code 444 50 2973 53 24268 55	> 47 EB 1 1 UTA 1 UTA 6 0 48 48 62 62 05:30:43 0 0 1 Daily 0s 0s </td <td>Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 02 05 45 43 05 49 49 0 1 Daily 0s Departure (completed) 05 45 43 05 45 45</td> <td>Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:00:43 06:00:43 06:00:43 0 06:00:43 0 0 0 0 0 0 0 0 0 0 0 0 0</td> <td>Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:15:43 06:19:49 0 1 Daily 0s Departure (completed) 06:16:01 06:16:01 06:16:25 06:17:34 06:17:51 06:17:51 06:18:09</td> <td>Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06 30 43 06 34 49 0 1 Daily 0s Departure (completed) 06 31:09 06 33:25 06 33:24 06 32:51 06 33:09</td> <td>Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 06:38:34 06:38:07 0 1 Daily 0s 0s</td>	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 02 05 45 43 05 49 49 0 1 Daily 0s Departure (completed) 05 45 43 05 45 45	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:00:43 06:00:43 06:00:43 0 06:00:43 0 0 0 0 0 0 0 0 0 0 0 0 0	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:15:43 06:19:49 0 1 Daily 0s Departure (completed) 06:16:01 06:16:01 06:16:25 06:17:34 06:17:51 06:17:51 06:18:09	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06 30 43 06 34 49 0 1 Daily 0s Departure (completed) 06 31:09 06 33:25 06 33:24 06 32:51 06 33:09	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 06:38:34 06:38:07 0 1 Daily 0s 0s
Line Direction Line route Time profile Operator Service trip pattern numb Vehicle journey sections Stat stop point Departure Artival Coupled Vehicle combination Valid day Pre preparation time Filter No Code 48 48 46/73 49 50 50 2938 51 24444 52 3472 54 4268 55 3472 54 4268 55 3472 57 458 58	> 47 EB 1 1 UTA 0 1 48 48 62 62 05:30:43 0 1 Daily 0	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 02 05 45 43 05 45 43 05 45 43 05 45 43 0 5 40 5 45 43 0 5 40 5 0 5 40 5 0 5 40 5 0 5 40 5 0 5 40 5 0 5 40 5 1 0 5 40 5 1 0 5 40 5 1 0 5 45 43 0 5 45 45 0 5 45 45 0 5 6 5 45 0 5 6	Bus 47	Bus 47	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06 30 43 06 34 49 0 0 1 Daily 0s 0s 0 0 0 0 0 0 0 0 0 0 0 0 0	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 00 35 34 00 35 34 00 39 07 0 1 Daily 0s
Line Direction Line route Time profile Operator Service trip pattern numb Vehicle journey sections Start stop point Departure Artwal Coupled Vehicle combination Valid day Pre preparation time Post preparation time Filter No Code 4444 52 2973 53 3472 54 4268 55 3600 56 58 88 59 59 58 88 5299 59	> 47 EB 1 1 UTA 1 UTA 1 UTA 1 UTA 1 UTA 1 0 48 48 02 02 05:30:43 0 1 Daily 08 Departure (completed) 06:31:01 06:31:01 06:31:02 06:31:03 06:31:03 06:31:04 06:32:34 06:32:91 06:33:08 06:33:08 06:33:08 06:33:08 06:33:08 06:33:08 06:33:08 06:33:08 06:33:08 06:33:08 06:33:08	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 0 2 02 02:45:43 05:45:43 05:45:49 0 1 Daily 0s 0s Departure (completed) 05:45:43 05:45:43 05:45:43 05:45:43 05:46:25 05:4	Bus 47 > 47 EB 1 1 1 UTA 0 1 1 48 48 62 62 62 06:00-43 06:00-43 06:00-44 0 0 1 Daily 0s 0s Departure (completed) 06:00-13 06:01-01 06:01-03 06:01-01 06:01-02 06:01-25 06:01-42 06:02-34 06:03-39 06:03-36 06:03-40 06:03-40 06:03-40	Bus 47 > 47 EB 1 1 UTA 0 1 1 48 48 60:02 02 60:15:43 00:15:43 00:15:43 00 1 Daily 0s 0 1 Daily 0s 0 1 Daily 0s 0 1 Daily 0s 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06:30-43 06:31-49 0 0 0 0 0 0 0 0 0 0 0 0 0	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 06:38:34 06:38:07 0 1 Daily 0s 0s
Line Direction Line route Time profile Operator Service tip pattern numt Vehicle journey sections Start stop point Departure Arrival Coupled Vehicle combination Valid day Pre preparation time Post preparation time Post preparation time Filter No Code 48 48 48 45 50 50 50 50 50 50 50 50 50 50 50 50 50	> 47.EB 1 1 1 47.EB 1 1 1 48.48 62.62 06:30.43 0 <tr< td=""><td>Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 02 05 45 43 05 45 43 05 45 43 05 45 43 05 45 43 05 45 43 05 46 09 05 46 25 05 46 25 05 46 25 05 46 25 05 46 25 05 46 25 05 48 27 05 48 28 05 05 05 05 05 05 05 05 05 05</td><td>Bus 47</td><td>Bus 47</td><td>Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06 30 43 06 34 49 0 0 1 Daily 0s 0s 0 0 0 0 0 0 0 0 0 0 0 0 0</td><td>Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 00 35 34 00 35 34 00 39 07 0 1 Daily 0s</td></tr<>	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 02 05 45 43 05 45 43 05 45 43 05 45 43 05 45 43 05 45 43 05 46 09 05 46 25 05 46 25 05 46 25 05 46 25 05 46 25 05 46 25 05 48 27 05 48 28 05 05 05 05 05 05 05 05 05 05	Bus 47	Bus 47	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 62 62 06 30 43 06 34 49 0 0 1 Daily 0s 0s 0 0 0 0 0 0 0 0 0 0 0 0 0	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 00 35 34 00 35 34 00 39 07 0 1 Daily 0s
Line Direction Line route Time profile Operator Service trip pattern numb Vehicle journey sections Start stop point Departure Artwal Coupled Vehicle combination Valid day Pre preparation time Post preparation time Filter No Code 4444 52 2973 53 3472 54 4268 55 3600 56 58 88 59 59 58 88 5299 59	> 47 EB 1 1 1 1 48 48 62 62 06:30:43 00:34:49 0 1 0	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 02 22 06:45:43 06:45:43 06:45:49 0 1 Daily 05 05 05 05 05 05 05 05 05 05	Bus 47	Bus 47	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 0 c 22 0 c 30.43 0 c 3.49 0 0 1 Daily 0 s 0 s 0 2 Departure (completed) 0 c 30.42 0 c 31.25 0 c 31.42 0 c 31.40 0 c 31.40 0 c 31.40 0 c 31.42 0 c 31.40 0 c 31.42 0 c 31.40 0 c 31.42 0 c 31.40 0 c 31.42 0 c 31.40 0 c 31.	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 00 35 34 00 35 34 00 39 07 0 1 Daily 0s
Line Direction Line route Time profile Operator Service tip pattern numt Vehicle journey sections Start stop point Departure Arrival Coupled Vehicle combination Valid day Post preparation time Post	> 47.EB 1 1 1 47.EB 1 1 1 48.48 62.62 06:30.43 0 0 1 0 <tr< td=""><td>Bus 47 > 47 EB 1 1 UTA 0 1 48 48 82 62 05:45:43 05:45:43 05:45:43 05:45:43 05:45:43 05:45:43 05:45:43 05:45:43 05:46:01 05:46:09 05:46:09 05:46:25 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:26 05:46:27 05:46:26 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26</td><td>Bus 47</td><td>Bus 47</td><td>Bus 47 > 47 EB 1 1 UTA 0 1 48 48 63 62 06 30 43 06 34 49 0 0 1 Daily 0s 0s 0 0 0 0 0 0 0 0 0 0 0 0 0</td><td>Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 06:35:34 06:35:34 06:35:07 0 0 0 0 0 0 0 0 0 0 0 0 0</td></tr<>	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 82 62 05:45:43 05:45:43 05:45:43 05:45:43 05:45:43 05:45:43 05:45:43 05:45:43 05:46:01 05:46:09 05:46:09 05:46:25 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:26 05:46:27 05:46:26 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26	Bus 47	Bus 47	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 63 62 06 30 43 06 34 49 0 0 1 Daily 0s 0s 0 0 0 0 0 0 0 0 0 0 0 0 0	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 06:35:34 06:35:34 06:35:07 0 0 0 0 0 0 0 0 0 0 0 0 0
Line Direction Line route Time profile Operator Service trip pattern numb Vehicle journey sections Stat stop point Departure Artival Coupled Vehicle combination Valid day Pre preparation time Post Departure Att 48 4673 2938 2038 2037 347 2045 2053 3472 2043 51 4444 52 3472 58 58 58 58 58 59 51 62 62 63 64 62 63 64 64 65 58 58 58	> 47.EB 1 1 1 47.EB 1 1 1 48.48 62.62 06:30.43 0 0 1 0 <tr< td=""><td>Bus 47 > 47 EB 1 1 UTA 0 1 48 48 82 62 05:45:43 05:45:43 05:45:43 05:45:43 05:45:43 05:45:43 05:45:43 05:45:43 05:46:01 05:46:09 05:46:09 05:46:25 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:26 05:46:27 05:46:26 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26</td><td>Bus 47</td><td>Bus 47</td><td>Bus 47 > 47 EB 1 1 UTA 0 1 48 48 63 62 06 30 43 06 34 49 0 0 1 Daily 0s 0s 0 0 0 0 0 0 0 0 0 0 0 0 0</td><td>Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 06:35:34 06:35:34 06:35:34 06:35:07 0 1 Daily 0s 0s 0s 0 2 Departure (completed</td></tr<>	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 82 62 05:45:43 05:45:43 05:45:43 05:45:43 05:45:43 05:45:43 05:45:43 05:45:43 05:46:01 05:46:09 05:46:09 05:46:25 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26 05:46:26 05:46:27 05:46:26 05:46:26 05:46:27 05:46:26 05:46:27 05:46:26	Bus 47	Bus 47	Bus 47 > 47 EB 1 1 UTA 0 1 48 48 63 62 06 30 43 06 34 49 0 0 1 Daily 0s 0s 0 0 0 0 0 0 0 0 0 0 0 0 0	Bus 47 < 47 WB 1 1 UTA 0 1 35 35 47 47 06:35:34 06:35:34 06:35:34 06:35:07 0 1 Daily 0s 0s 0s 0 2 Departure (completed

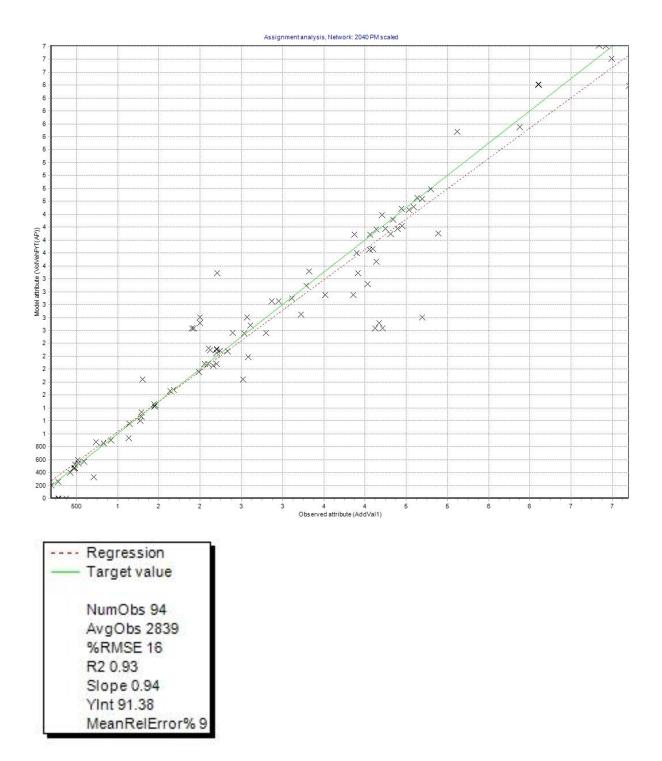
abular timetable							
lumber	327	346	328	347	329	348	330
lame	556 NB 1	556 SB 1	556 NB 1	556 SB 1	556 NB 1	556 SB 1	556 NB :
ine	Bus F556	Bus F558	Bus F558	Bus F558	Bus F558	Bus F558	Bus F55
Direction	>	<	>	<	>	<	>
ine route	556 NB	556 SB	556 NB	556 SB	556 NB	556 SB	556 NB
îme profile	1	1	1	1	1	1	1
perator	1 UTA 0	1 UTA 0	1 UTA 0	1 UTA 0	1 UTA 0	1 UTA 0	1 UTA 0
ervice trip pattem numbe lehicle journey sections	1	1	1	1	1	1	1
tart stop point	111 111	117 117	111 111	117 117	111 111	117 117	111 111
and stop point	116 116	126 126	116 116	126 126	116 116	126 126	116 116
)eparture	06:35:08	06:58:27	07:05:08	07:31:27	07:35:08	07:58:27	08:04:08
mival	08:38:41	07:02:38	07:08:41	07:35:38	07:38:41	08:02:38	08:07:41
Coupled	0	0	0	0	0	0	0
ehicle combination							
/alid day	1 Daily	1 Daily	1 Daily	1 Daily	1 Daily	1 Daily	1 Daily
re preparation time	0s	0s	0s	0s	0s	0s	0s
ost preparation time	0s	0s	0s	0s	0s	0s	0s
Filter No Code	Departure (completed)	Departure (completed)	Departure (completed)	Departure (completed)	Departure (completed)	Departure (completed)	Departure (cor
5322 111 11			07:05:08		07:35:08		08:04:08
112 112 112	06:36:29		07:08:29		07:38:29		08:05:25
5323 113 113			07:06:43		07:38:43		08:05:43
114 114 114			07:07:00		07:37:00		08:06:00
115 115 115			07:07:58		07:37:56		08:08:56
5324 116 110			07:08:41		07:38:41		08:07:41
126 126 126		07:02:38		07:35:38		08:02:38	
2954 125 125		07:01:57 07:01:40		07:34:57 07:34:40		08:01:57 08:01:40	
4582 124 124 2933 123 123		07:01:40		07:34:40		08:01:40	
		07:01:09		07:34:23		08:01:09	
122 122 122 121 121 121 121		07:00:51		07:33:51		08:00:51	
120 120 120 120		07:00:47		07:33:47		08:00:47	
		08:59:33		07:32:33		07:59:33	
5325 118		08:59:00		07:32:00		07:59:00	
2899 117 112							
· · · · · · · · · · · · · · · · · · ·	•	06:58:27	line	07:31:27			0850.2792
· · · · · · · · · · · · · · · · · · ·			filter: 1 Daily v		1:22902 4 유 우두 (분) 우국 태종 [[54358.3491 226	
i III + + + + + + + + + + + + + + + + +	Vehicle journ	eys ▼] Basic t		∀ 👘 P; P; P	후 P두 (P) P3 😼 🛛	54358,3491 226 ∰ Þ†↓	0850.2792
i III iI	Vehicle journ	eys ▼][Basic t	328	▼ ■ P# P# P 347	₽ ₽₽ (₽) ₽ ₽ ₽ ₽ ₽	54358.3491 226	0850.2792
III + + + + + + + + + + + + + + + + + +	<	eys ▼) [Basic 1 346 556 88 1	328 556 NB 1	√ [[]] P [™] P [™] P [™] P 347 556 SB 1	₽₩ (분) ₽ ₹ ₩ (€) 329 556 NB 1	54358.3491 226 ▶11 348 566 88 1	0850.2792
III Aumber Vame Jine	 < Ⅲ ↓ (Vehicle journ 327 550 NB 1 Bus F550 	eys ▼][Basic t	328	1 1 1 1 1 1 1 1 1 1	₽₩ (₽) ₽ ₹ ₩ (€) 329 556 NB 1 Bus F556	54358.3491 226	0850.2792
III Abular timetable Umber Iame Ine Iirection	<	eys	328 556 NB 1 Bus F558	√ [[]] P [™] P [™] P [™] P 347 556 SB 1	₽₩ (분) ₽ ₹ ₩ (€) 329 556 NB 1	54358.3491 226 ▶11 348 566 88 1	0850.2792
III Additional and a second s	 m Vehicle journ 327 550 NB 1 Bus F550 > 	eys ▼) Basic 1 346 568 SB 1 Bus F550 <	328 556 NB 1 Bus F556 >	347 556 88 1 Bus F55 <	P↓ (P) P ₹ P₀ (E) 329 556 NB 1 Bus F556 >	54358.3491 226 348 560 8B 1 Bus F500 <	0850.2792
III III III III III III III III III II	4 III 327 550 NB 1 Bus P550 > 550 NB >	eys [Basic 1 346 566 SB 1 Bus F556 < 566 SB	328 556 NB 1 Bus F556 > 556 NB	347 500 SB 1 Bus F550 <	□ □	54358.3491 226	0850.2792
III	 III Vehicle journ 327 500 NB 1 Bus F550 > 560 NB 1 1 UTA 	eys ♥) [Basic 1 348 556 58 1 8us F559 < 555 58 1	328 556 NB 1 Bus F556 > 556 NB 1	★ 1 1 PE PE P 347 556 88 1 Bus F550 < 556 58 1	P↓	54358.3491 226 → ▶1 → ▶1 → ↓1 → ↓↓1 → ↓1 → ↓1 → ↓↓1 → ↓1 → ↓↓1 → ↓↓↓1 → ↓↓1 → ↓↓1 → ↓↓1 → ↓	0850.2792
	 III Vehicle journ 327 500 NB 1 Bus F550 > 560 NB 1 1 UTA 	eys	328 556 NB 1 Bus F550 > 556 NB 1 1 UTA	№ №	₽₩ ₽ ₽₩ ₽ ₽ <td>54358.3491 226 348 348 550 SB 1 Bus F550 < 550 SB 1 1 UTA 0 1</td> <td>0850.2792</td>	54358.3491 226 348 348 550 SB 1 Bus F550 < 550 SB 1 1 UTA 0 1	0850.2792
III III III III III III III II	 III Vehicle journ 327 550 NB 1 Bus F550 > 550 NB 1 1 UTA 0 1 11 111 	eys	328 556 NB 1 Bus F550 > 556 NB 1 1 UTA 0 1 1 1 111	N PE PF P 347 556 58 1 1 Bus F550 <	№ ₽. ₽. ₽. ₽. ₽. ₽. ₽. ₽. 8. 1.<	54358.3491 226 24358.3491 226 348 348 566 58 1 Bus F556 < 565 58 1 1 1 UTA 0 1 117 117	0850.2792
Itt Part and a set of the set of th	 III S27 S58 NB 1 Bus F560 > S58 NB 1 1000 1000 1000 1000 1000 1100 1100 	eys Basic 1 Basic	328 558 NB 1 Bus F550 > 0558 NB 1 1 UTA 0 1 1 1 11111 1111111 118 118	№ ₽	□ P. P.<	54358.3491 226 54358.3491 226 348 566 58 1 Bus F550 ≪ 565 58 1 1 UTA 0 1 117 117 128 128	0850.2792
III IIII IIII IIII IIII IIII IIII IIII III	 < III 327 550 NB 1 Bus P550 > 560 NB 1 1 UTA 0 111 111 110 110 00 35 08 	eys ▼) Basic 1 348 566 SB 1 Bus F560 < 566 SB 1 1 UTA 0 1 17 117 120 128 00:58.27	328 566 NB 1 Bus F550 > 555 NB 1 1 UTA 0 1 1 111 111 110 118 07.05.08	№ P# PF P	P↓ P↓ P↓ P↓ P↓ 329 556 NB 1 Bus F550 > 555 NB 1 1 1 1 UTA 0 1 1 111 111 110 116 07.35.08	54358.3491 226 54358.3491 226 348 348 556 58 1 Bus F556 < < 556 58 1 1 UTA 0 1 117 117 120 120 07.8€27	0850.2792
III IIII	III 327 556 NB 1 Bus P550 > 556 NB 1 1 UTA 0 1 111 116 116 00 35.08 06 38.41	eys →) Basic 1 340 560 SB 1 Bus F500 < 560 SB 1 UTA 0 1 117117 120 120 00:58.27 07:02:38	328 556 NB 1 Bus F550 > 556 NB 1 1 UTA 0 1 1 111 111 111 111 111 115 07 05.08 07.08.41	347 560 SB 1 Bus F500 < 500 SB 1 1 UTA 0 1 117 117 128 128 07.31.27 07.35.38	№ ₽. ₽. ₽. ₽. ₽. ₽. ₽. ₽. ₽. 1 329 556 NB 1 Bus F650 >. 5 556 NB 1	54358.3491 226 348 348 550 SB 1 Bus F550 < 550 SB 1 1 UTA 0 1 117 117 128 128 07.58.27 08.02.38	0850.2792
	 < III 327 550 NB 1 Bus P550 > 560 NB 1 1 UTA 0 111 111 110 110 00 35 08 	eys ▼) Basic 1 348 566 SB 1 Bus F560 < 566 SB 1 1 UTA 0 1 17 117 120 128 00:58.27	328 566 NB 1 Bus F550 > 555 NB 1 1 UTA 0 1 1 111 111 110 118 07.05.08	№ P# PF P	P↓ P↓ P↓ P↓ P↓ 329 556 NB 1 Bus F550 > 555 NB 1 1 1 1 UTA 0 1 1 111 111 110 116 07.35.08	54358.3491 226 54358.3491 226 348 348 556 58 1 Bus F556 < < 556 58 1 1 UTA 0 1 117 117 120 120 07.8€27	0850.2792
Itt itt itt itt itt itt itt itt itt itt itt itt itt itt itt itt itt itt itt itt itt itt itt ittt ittt itt ittt ittt ittt ittt ittt ittt itttt ittt itttt itttt itttt itttt	III 327 550 NB 1 Bus 550 > 500 NB 1 1 1 1/17A N 0 1 1111111 110 116 0033.08 0 0033.41 0	eys Basic 1	328 556 NB 1 Bus F550 > 5556 NB 1 1 UTA 0 1 1 111111 116 116 07.05.08 07.08.41 0	№ P# P#<	P↓ P↓ P↓ P↓ P↓ 329 556 NB 1 Bus F556 > 556 NB 1 Bus F556 > > 1 UTA 0 1 1 1111 116 116 07.35.08 07.38.41 0	54358.3491 226 54358.3491 226 348 560 58 1 Bus F550 < 550 58 1 1 UTA 0 1 117 117 120 128 07.58.27 08.02.38 0	0850.2792
	✓ III 327 550 NB 1 Bus F550 > 550 NB 1 1 UTA 0 111 111 100 53.08 00:33.41 0 1 1 Daily	eys ▼) Basic 1 348 566 SB 1 Bus F550 < 550 SB 1 1 UTA 0 1 1 17 117 120 128 00.58.27 07.02.38 0 1 Daily	328 556 NB 1 Bus F550 > 556 NB 1 1 1 UTA 0 1 1 111111 118 116 07.05.08 07.08.41 0 0 1 Daily	▼ P≓ P≓ P≓ P P P≓ P <td>R P↓ P↓<</td> <td>54358.3491 226 54358.3491 226 348 560 SB 1 Bus F550 < < 550 SB 1 1 UTA 0 1 1 UTA 0 1 117 117 120 120 07.58.27 08.02.38 0 1 1 Daily</td> <td>0850.2792</td>	R P↓ P↓<	54358.3491 226 54358.3491 226 348 560 SB 1 Bus F550 < < 550 SB 1 1 UTA 0 1 1 UTA 0 1 117 117 120 120 07.58.27 08.02.38 0 1 1 Daily	0850.2792
	III 327 550 NB 1 Bus 550 > 500 NB 1 1 1 1/17A N 0 1 1111111 110 116 0033.08 0 0033.41 0	eys Basic 1	328 556 NB 1 Bus F550 > 5556 NB 1 1 UTA 0 1 1 111111 116 116 07.05.08 07.08.41 0	№ P# P#<	P↓ P↓ P↓ P↓ P↓ 329 556 NB 1 Bus F556 > 556 NB 1 Bus F556 > > 1 UTA 0 1 1 1111 116 116 07.35.08 07.38.41 0	54358.3491 226 54358.3491 226 348 560 58 1 Bus F550 < 550 58 1 1 UTA 0 1 117 117 120 128 07.58.27 08.02.38 0	0850.2792
	III III Vehicle journ S27 550 NB 1 Bus F550 > 568 NB 1 1 1 UTA 1 1 11 TA 0 1 11 TA 0 111 111 116 116 06 35.08 0 1 Daily 0 0 S 0 0 S 0 0 S 0	eys ▼) Basic 1 340 556 SB 1 Bus F550 < 555 SB 1 1 UTA 0 1 117117 128 120 06:88.27 07:02.38 0 1 1 Daily 0s 0s	328 556 NB 1 Bus F556 556 NB 1 1 UTA 0 1 1 111 111 110 116 07.05.08 07.08.41 0 0 1 Daily 0s	Image: Second	P. P. (P) P. P. P. (P) P. P. P. (P) P.	54358.3491 226 348 348 556 SB 1 Bus F550 ≪ 560 SB 1 1 1 1 1 1 1 17 17 120 128 0, 5238 0 1 Daily 0s	0850.2792
III	III Vehicle journ 327 550 NB 1 Bus F550 > 550 NB 1 1 1 11 111111 1017A 0 0 0 1 0	eys ▼) Basic 1 340 556 SB 1 Bus F550 < 555 SB 1 1 UTA 0 1 117117 128 120 06:88.27 07:02.38 0 1 1 Daily 0s 0s	328 550 NB 1 Bus F550 550 NB 1 1 UTA 0 1 UTA 0 1 1 111 111 110 116 07.05.08 07.08.41 0 1 Daily 0s 0s Depature (completed)	№ №	P. P.<	54358.3491 226 54358.3491 226 348 550 SB 1 Bus F550 < 500 SB 1 1 UTA 0 1 1 UTA 0 1 1 UTA 0 1 1 17 117 128 128 07.58 27 08.02.38 0 1 1 Daily 0a 0a 0a	0850.2792
Itt	✓ III ✓ III ✓ III ✓ Vehicle journ ✓ 550 NB 1 Bus F550 > 560 NB 1 1 1 UTA 1 11111 116 110 00:33.41 0 1 1 10:33.41 0	eys ▼) Basic 1 340 556 SB 1 Bus F550 < 555 SB 1 1 UTA 0 1 117117 128 120 06:88.27 07:02.38 0 1 1 Daily 0s 0s	328 556 NB 1 Bus F550 > 556 NB 1 1 UTA 0 1 1 111 111 111 115 0 705.08 07.08.41 0 0 1 Daily 0s 0s Departure (completed) 07.05.08	№ №	P↓ P↓ P↓ P↓ P↓ 329 556 NB 1 Bus F650 > 5 556 NB 1 1 1 UTA 0 1 111 111 116 07.35.08 07.38.41 0 1 Daily 0s 0s 0 0.7.35.08 07.35.08	54358.3491 226 54358.3491 226 348 556 SB 1 Bus F550 < 565 SB 1 1 UTA 0 1 1 UTA 0 1 1 UTA 0 1 1 17 117 128 128 07.58 27 06 802.38 0 1 1 Daily 0a 0a 0a	0850.2792
Itt	III Image: Second secon	eys ▼) Basic 1 340 556 SB 1 Bus F550 < 555 SB 1 1 UTA 0 1 117117 128 120 06:88.27 07:02.38 0 1 1 Daily 0s 0s	328 550 NB 1 Bus F550 550 NB 1 1 UTA 0 1 1 1 UTA 0 1 1 1 111 111 110 116 07.05.08 07.08.41 0 0 5 0 5 0 5 0 5 0 5 0 5 0 7.05.09 07.05.09	№ №	P↓ P↓ P↓ P↓ 329 550 NB 1 Bus F550 > 5550 NB 1 1 1 1 1 1 1 11 11 11 10 1 1 01 1 0 07.38.41 0 0 03 0s 0s 09.735.09 07.35.29 07.36.29	54358.3491 226 54358.3491 226 348 556 SB 1 Bus F550 < 565 SB 1 1 UTA 0 1 1 UTA 0 1 1 UTA 0 1 1 17 117 128 128 07.58 27 06 802.38 0 1 1 Daily 0a 0a 0a	0850.2792
Itt	III III Vehicle journ 327 556 NB 1 Bus P550 > 568 NB 1 1 1 UTA 1 1 UTA 0 1 11 111 116 116 06 35.08 00 00 38.41 0 0 55 08 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0.03.43 0 00.37.00 0	eys	328 556 NB 1 Bus F556 5 556 NB 1 1 UTA 0 1 1 UTA 0 1 1 111111 116 116 07.05.08 07.05.08 07.05.08 0 0 0 0 0 0 0 0 0 0 0 0 0	№ №	P↓	54358.3491 226 54358.3491 226 348 556 SB 1 Bus F550 < 565 SB 1 1 UTA 0 1 1 UTA 0 1 1 UTA 0 1 1 17 117 128 128 07.58 27 06 802.38 0 1 1 Daily 0a 0a 0a	0850.2792
III	III III Vehicle journ 327 550 NB 1 Bus F550 > 560 NB 1 1 1 UTA 0 1 111 111 100 35.08 00 33.41 0 0 1 Departure (completed) 06 35.09 00 30.43 00 30.43 00.37.00 5 06 37.56	eys	328 550 NB 1 Bus F550 > 550 NB 1 1 UTA 0 1 1 UTA 0 1 1 111 111 110 116 0 7.05.08 07.08.41 0 0 1 Daily 0 5 0 8 2 0 7.05.08 07.05.08 07.00.43 07.07.00	№ №	P↓ P↓ P↓ P↓ P↓ 329 556 NB 1 Bus F550 > 5 556 NB 1 1 1 UTA 0 1 11 116 116 07.35.08 07.38.41 0 0 1 Daily 0s 0s Departure (completed) 07.35.08 07.38.43 07.38.43 07.37.00 07.37.00	54358.3491 226 54358.3491 226 348 556 SB 1 Bus F550 < 565 SB 1 1 UTA 0 1 1 UTA 0 1 1 UTA 0 1 1 17 117 128 128 07.58 27 06 802.38 0 1 1 Daily 0a 0a 0a	0850.2792
III + IIII + IIIII + IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	III 327 555 NB 1 Bus F550 > 505 NB 1 Bus F550 1 1 1 117A N 0 1 111111 111 111 116 116 00 33.41 0 0 36 0 36 0 36 0 36 0 36 0 36.43 0 06.37.50 06.38.43 06.37.56 06.38.47 66.38.47	eys	328 556 NB 1 Bus F556 5 1 1 UTA 0 1 1 111 111 110 116 07.05.08 07.08.41 0 1 Daily 0s 0s 0s 0s 0cs 05 07.06.29 07.06.43 07.07.50	№ PE PE<	P↓	54358.3491 226 54358.3491 226 348 348 560 58 1 Bus F550 < 550 58 1 1 117 117 120 128 07.58.27 08.02.38 0 1 Daily 0s Departure (completed) 08.02.38	0850.2792
Itt	 < III ✓ III ✓ S27 550 NB 1 Bus F550 > > 550 NB 1 I UTA I UTA I 1 I 111 I 10 TA I 1 I 10 TA 0 0 63.508 00 53.61 00 53.62 00 53.62 00 53.62 00 53.63 00 53.700 06 58.41 06 58.41 06 55.06 06 58.43 06 57.00 06 58.41 06 58.41 06 58.41 06 58.41 06 58.43 06 57.700 06 58.41 	eys	328 556 NB 1 Bus F556 5 1 1 UTA 0 1 1 111 111 110 116 07.05.08 07.08.41 0 1 Daily 0s 0s 0s 0s 0cs 05 07.06.29 07.06.43 07.07.50	Image: Second	P↓	54358.3491 226 54358.3491 226 348 556 SB 1 Bus F550 < 6 050 SB 1 1 UTA 0 1 1 UTA 0 1 1 UTA 0 1 1 UTA 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1	0850.2792
Itt	✓ III ✓ III S27 560 NB 1 Bus F550 > 560 NB 1 Bus F550 > 1 1 UTA 1 1111111 11013 0033.41 0 1 0	eys	328 556 NB 1 Bus F556 5 1 1 UTA 0 1 1 111 111 110 116 07.05.08 07.08.41 0 1 Daily 0s 0s 0s 0s 0cs 05 07.06.29 07.06.43 07.07.50	№ №	P↓	54358.3491 226 54358.3491 226 348 550 SB 1 Bus F50 < 505 SB 1 1 UTA 0 1 UTA 0 1 UTA 0 1 117 117 128 128 07.58.27 08.02.38 0 0 1 Departure (completed) 0 6 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 1 1 1 1 1 1 1 1 1 1 1 1 1	0850.2792
Itt	III Image: Second secon	eys	328 556 NB 1 Bus F556 5 1 1 UTA 0 1 1 111 111 110 116 07.05.08 07.08.41 0 1 Daily 0s 0s 0s 0s 0cs 05 07.06.29 07.06.43 07.07.50	№ PE PE<	P↓	54358.3491 226 54358.3491 226 348 560 58 1 Bus F550 ≪ 565 58 1 1 UTA 0 1 117117 128 128 07.58.27 08.02.38 0 1 Daily 0s 0s Departure (completed) 68.02.28 08.01.57 08.01.40 08.01.23	0850.2792
III III III IIII Tabular time table IIII Tabular time table IIIII Tabular time table IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Image: constraint of the second sec	eys ▼) Basic 1 348 566 SB 1 Bus F656 < 558 SB 1 UTA 0 1 1UTA 0 1 117 117 120 128 00.58.27 07.02.38 0 1 Daily 0s 0s Departure (completed) 07.02.38 07.01.57 07.01.40 07.01.23 07.01.23 07.01.99	328 556 NB 1 Bus F556 5 1 1 UTA 0 1 1 111 111 110 116 07.05.08 07.08.41 0 1 Daily 0s 0s 0s 0s 0cs 05 07.06.29 07.06.43 07.07.50	№ PF PF PF P 347 556 58 1 1 8 565 8 1 Bus F650 <	P↓	54358.3491 226 54358.3491 226 348 550 58 1 Bus F050 < 550 58 1 1 1 UTA 0 1 1 UTA 0 1 1 UTA 0 1 1 Dalby 0s 0s Departure (completed) 0s.01:23 08.01:39	0850.2792
Itt	 ✓ III ✓ III ✓ Vehicle journ ✓ 500 NB 1 Bus F550 > 500 NB 1 Bus F550 > 1 I UTA I UTA I UTA I 1 I 111 I 10 10 00 35.08 00 33.41 0 00 35.41 0 00 35.41 0 00 35.41 00 35.29 00 36.43 00 37.50 06 37.56 06 38.47 	eys	328 556 NB 1 Bus F556 5 1 1 UTA 0 1 1 111 111 110 116 07.05.08 07.08.41 0 1 Daily 0s 0s 0s 0s 0cs 05 07.06.29 07.06.43 07.07.50	Image: Second	P↓	54358,3491 226 54358,3491 226 348 5550 SB 1 Bus F550 ≪ 5550 SB 1 1 UTA 0 1 UTA 0 1 UTA 0 1 1171 117 126 128 0 · .058 27 0 · .058 28 0 · .058 0 ·	0850.2792
Itt Itt Itt Itt Tabular timetable Itt Vamber Vamber Vamber Vamber Vamber Vamber Direction Itt Direction Itt Direction Statistic Statistic point Peparter Statistic point Peparter Statistic point Peparter Point Peparter Statistic point Peparter Coupled Vehicle combination Valid day Very preparation time Point Statistic point Statistic point Statistic point Statistic point Peparter Point Statistic point Statistic point Peparter Statistic point Tintintintion Statisti	< III 327 550 NB 580 NB 1 BBLR F550 > 580 NB 1 1 1/17A 0 1 11111 110 1003.8.41 0 0 0	eys	328 556 NB 1 Bus F556 5 1 1 UTA 0 1 1 111 111 110 116 07.05.08 07.08.41 0 1 Daily 0s 0s 0s 0s 0cs 05 07.06.29 07.06.43 07.07.50	№ PE PE<	P↓	54358.3491 226 54358.3491 226 348 348 560 58 1 Bus F550 4 555 58 1 1 UTA 0 1 117117 128 128 07.58.27 06.02.38 0 0 0 0 0 0 0 0 0 0 0 0 0	0850.2792
Itt Itt Itt Itt Tabular timetable Itt Number Itt Name Itt Direction Itt Direction Itt Direction Itt Service trip pattern number Service trip pattern number Satet stop point Departure Vertrade stop point Departure Solupled Vertrade stop point Satet stop point Departure Vertrade stop point Departure Solupled Vertrade stop 112 112 111 112 112 111 112 112 111 112 112 111 112 112 111 112 112 111 113 114 114 114 114 114 114 111 115 115 111 115 115 115 116 111 115	< III 327 550 NB 580 NB 1 BBLR F550 > 580 NB 1 1 1/17A 0 1 11111 110 1003.8.41 0 0 0	eys ▼) Basic 1 348 566 88 1 Bus F550 < 566 88 1 UTA 0 1 UTA 0 1 117 117 129 128 06:58.27 07:02:38 0 1 Daily 05 0 Departure (completed) 07:02:28 07:01:23 07:01:23 07:01:23 07:01:23 07:01:9 07:00:51 07:00:47 06:59:33	328 556 NB 1 Bus F556 5 1 1 UTA 0 1 1 111 111 110 116 07.05.08 07.08.41 0 1 Daily 0s 0s 0s 0s 0cs 05 07.06.29 07.06.43 07.07.50	№ PF PF PF P 347 556 58 1 8 1 8 556 58 1 1 11 117 117 120 128 0 1 1 117 117 120 128 0 7.31 27 07.35 .38 0 0 1 1 117 117 120 128 0 7.35 .38 0 0 1 1 117 117 120 128 0 7.35 .38 0	P↓	54358.3491 226 54358.3491 226 348 560 58 1 Bus F550 < 550 58 1 1 UTA 0 1 UTA 0 1 UTA 0 1 Daily 0s 0 0 0 0 0 0 0 0 0 0 0 0 0	0850.2792
Itt Itt Itt Itt Tabular timetable Itt Vamber Vamber Vamber Vamber Vamber Vamber Direction Itt Direction Itt Direction Statistic Statistic point Peparter Statistic point Peparter Statistic point Peparter Point Peparter Statistic point Peparter Coupled Vehicle combination Valid day Very preparation time Point Statistic point Statistic point Statistic point Statistic point Peparter Point Statistic point Statistic point Peparter Statistic point Tintintintion Statisti	✓ III ✓ III ✓ Encle journ 327 550 NB 1 Bus F550 > 560 NB 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 1 0 1 1 1 1 1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	eys	328 556 NB 1 Bus F556 5 1 1 UTA 0 1 1 111 111 110 116 07.05.08 07.08.41 0 1 Daily 0s 0s 0s 0s 0cs 05 07.06.29 07.06.43 07.07.50	№ PE PE<	P↓	54358.3491 226 54358.3491 226 348 348 560 58 1 Bus F550 4 555 58 1 1 UTA 0 1 117117 128 128 07.58.27 06.02.38 0 0 0 0 0 0 0 0 0 0 0 0 0	0850.2792

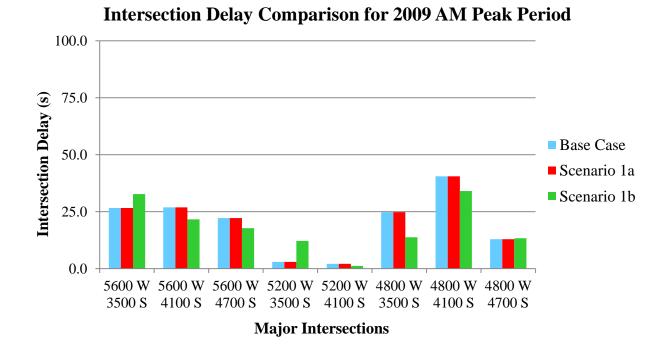
APPENDIX B: BASE CASE SCENARIOS CALIBRATION RESULTS



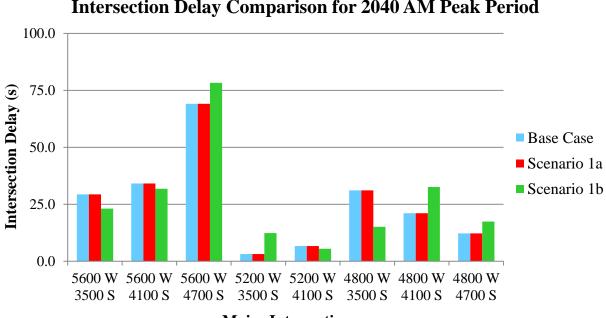






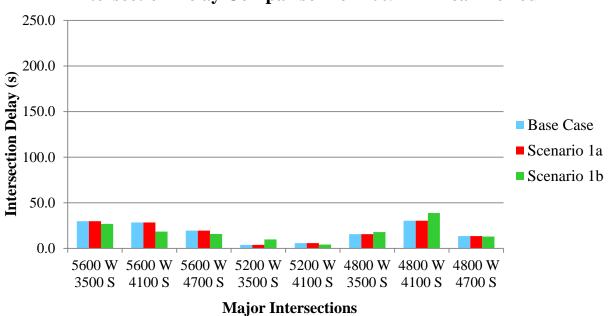


APPENDIX C: VISSIM BASED TRAFFIC ANALYSIS

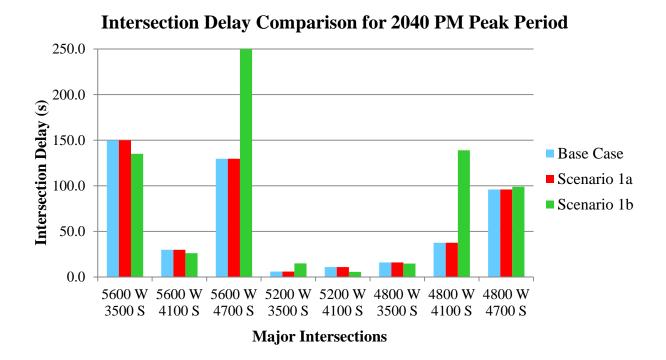


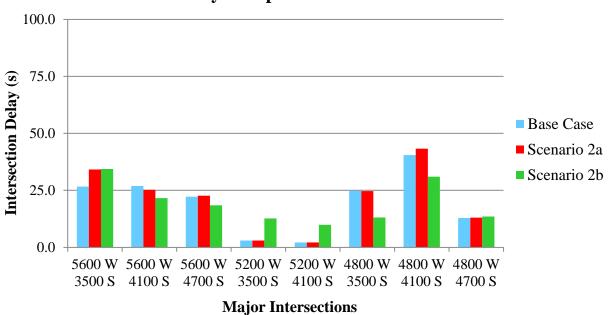
Intersection Delay Comparison for 2040 AM Peak Period



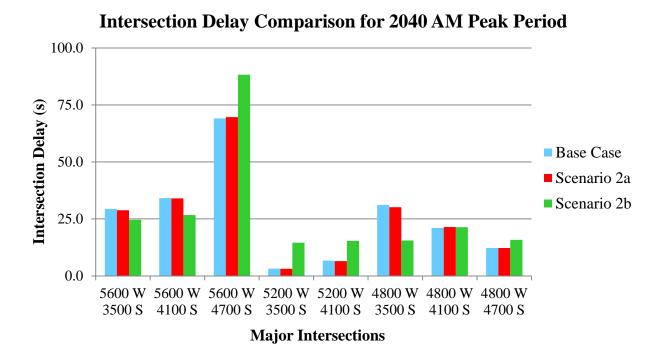


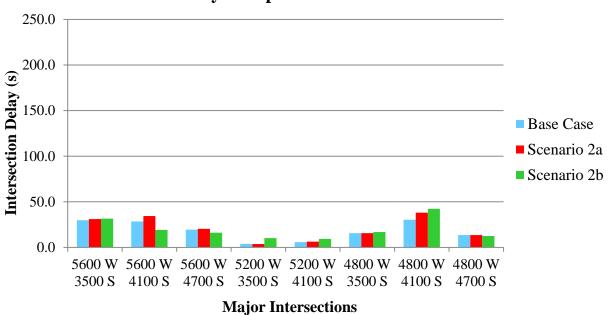
Intersection Delay Comparison for 2009 PM Peak Period





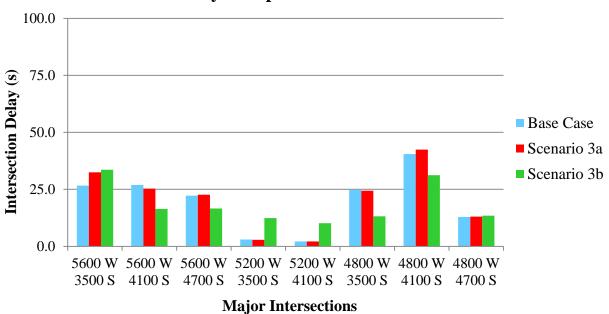
Intersection Delay Comparison for 2009 AM Peak Period



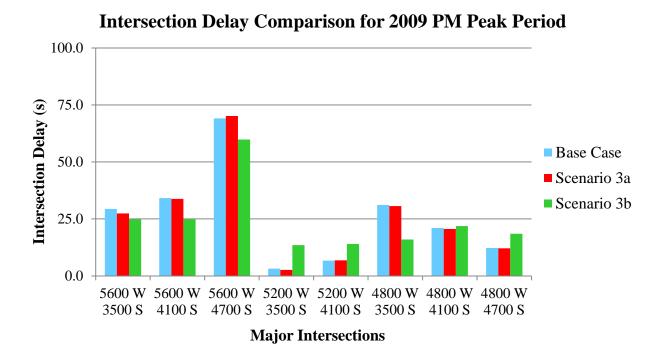


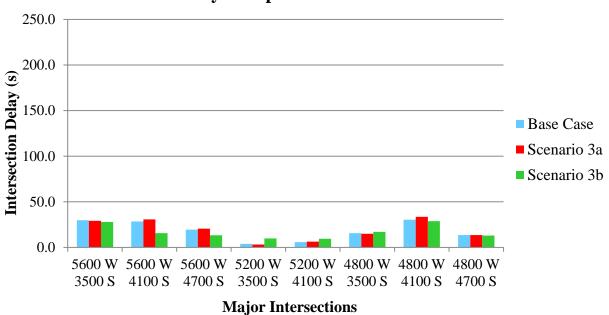
Intersection Delay Comparison for 2040 PM Peak Period 250.0 200.0 Intersection Delay (s) 150.0 Base Case Scenario 2a 100.0 Scenario 2b 50.0 0.0 5600 W 5600 W 5600 W 5200 W 5200 W 4800 W 4800 W 4800 W 3500 S 4100 S 3500 S 4100 S 4700 S 3500 S 4100 S 4700 S **Major Intersections**

Intersection Delay Comparison for 2009 PM Peak Period

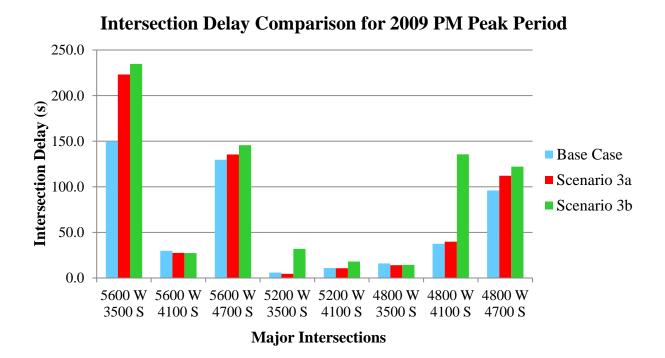


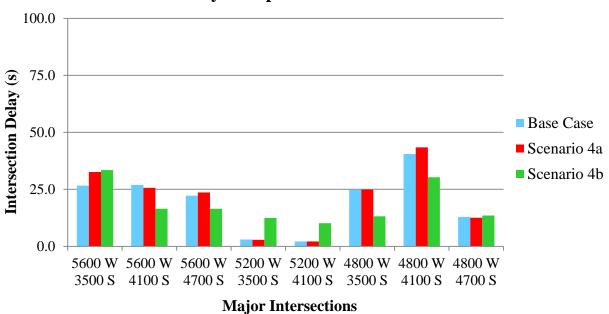
Intersection Delay Comparison for 2009 AM Peak Period



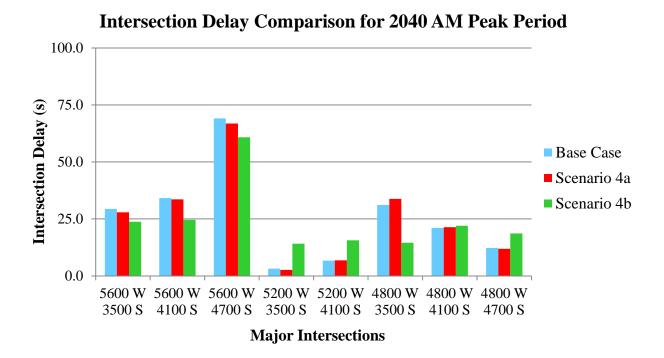


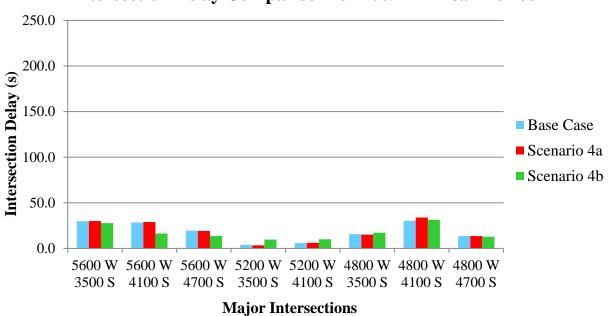
Intersection Delay Comparison for 2009 PM Peak Period



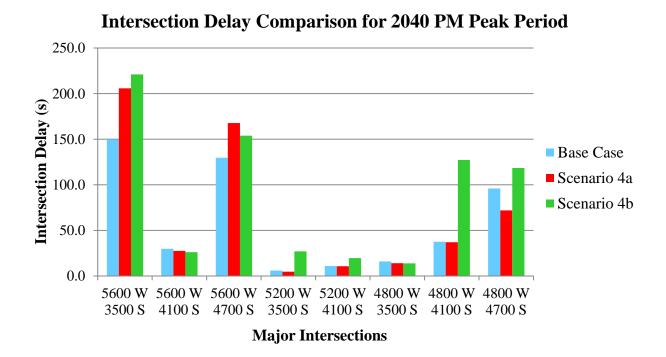


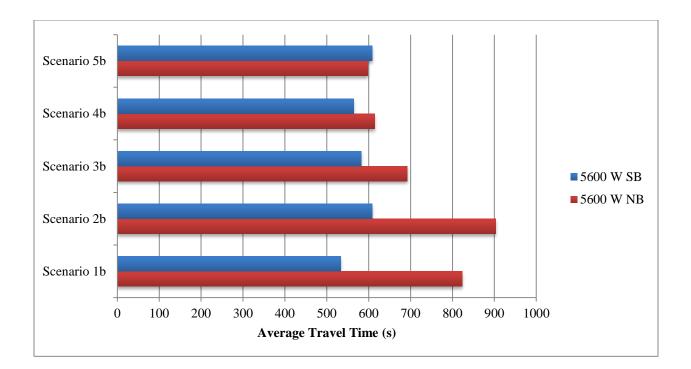
Intersection Delay Comparison for 2009 AM Peak Period





Intersection Delay Comparison for 2009 PM Peak Period





56 W 35 S															
Vehicles	SBL	SBT	SBR	WBL	WBT	WBR	NBL	NBT	NBR	EBL	EBT	EBR	Total	Left Turns	% Left
Base Case	1847	1575	815	441	2592	1312	668	401	84	200	1090	847	11872	3156	26.58
Widening 1	2107	1857	1009	439	2584	1329	671	399	84	210	1056	885	12630	3427	27.13
Connectivity 1	1768	1489	701	454	2588	1416	607	327	68	200	1090	846	11554	3029	26.22
Widening 2	1697	1399	677	441	2589	1312	655	389	85	200	1089	846	11379	2993	26.30
Connectivity 2	1621	1538	624	446	2617	1687	1128	318	66	198	1094	989	12326	3393	27.53
Widening 3	1701	1405	677	436	2583	1327	652	392	85	207	1056	885	11406	2996	26.27
Connectivity 3	1569	1770	660	388	2601	1649	1145	403	80	198	1010	1074	12547	3300	26.30
Widening 4	1719	1423	697	437	2583	1330	677	416	87	208	1056	884	11517	3041	26.40
Connectivity 4	1581	1772	655	385	2586	1643	1136	382	86	198	1006	1073	12503	3300	26.39
Widening 5	1681	1385	662	459	2581	1322	682	414	87	209	1055	886	11423	3031	26.53
Connectivity 5	1521	1712	641	389	2628	1655	1137	388	88	199	1009	1081	12448	3246	26.08
, Traffic Calming	1534	1732	642	345	2299	1513	1083	371	85	198	1007	1081	11890	3160	26.58
MUT	0	2566	1544	0	2597	1399	0	1133	440	0	1166	1054	11899	0	0.00
Bowtie	0	1669	2315	0	3062	1451	0	362	593	0	2895	948	13295	0	0.00
Quadrant	0	2108	1027	0	2583	1304	0	585	75	0	1165	851	9698	0	0.00
56 W 41 S															
Vehicles	SBL	SBT	SBR	WBL	WBT	WBR	NBL	NBT	NBR	EBL	EBT	EBR	Total	Left Turns	% Left
Base Case	292	2939	103	428	2742	0	746	1144	157	15	2459	3	11028	1481	13.43
Widening 1	298	3272	105	427	2742	0	745	1141	157	15	2459	3	11364	1485	13.07
Connectivity 1	265	2858	107	336	1412	0	522	941	0	15	2455	3	8914	1138	12.77
Widening 2	552	0	297	0	3102	483	0	0	0	351	2804	0	7589	903	11.90
Connectivity 2	634	2727	93	326	1911	0	500	887	0	15	2457	2	9552	1475	15.44
Widening 3	288	2828	99	427	2745	0	724	1117	151	15	2457	3	10856	1454	13.39
Connectivity 3	250	3369	93	11	1749	0	1032	1298	0	15	2439	5	10050	1310	12.75
Widening 4	288	2843	100	428	2735	0	743	1166	154	15	2457	3	10932	1474	13.48
Connectivity 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Widening 5	285	2825	105	427	2728	0	742	1167	154	15	2457	3	10908	1469	13.47
Connectivity 5	249	3328	93	10	1731	0	972	1194	0	15	2457	5	10050	1246	12.40
Traffic Calming	250	3318	82	10	1254	0	1441	1205	0	21	2433	5	10050	1722	17.19
MUT	508	2926	103	744	2710	0	678	996	145	15	2455	3	11285	1945	17.24
Bowtie	466	2532	98	744	2728	0	630	935	143	15	2457	3	10757	1862	17.24
Quadrant	506	3247	100	432	2724	0	665	970	142	15	2457	3	11271	1618	14.36
Quadrant	500	5247	100	432	2724	0	005	970	150	15	2439	5	112/1	1010	14.50
56 W 47 S															
Vehicles	SBL	SBT	SBR	WBL	WBT	WBR	NBL	NBT	NBR	EBL	EBT	EBR	Total	Left Turns	% Left
Base Case	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Widening 1	797	2583	763	2084	587	603	82	1223	2267	445	832	116	12382	3408	27.52
Connectivity 1	867	2383	606	2034	610	513	55	752	1473	439	800	110	10682	3536	33.10
Widening 2	795	2281	597	2049	568	596	72	1151	2189	439	832	117	11683	3361	28.77
Connectivity 2	838	2191	593	2049	626	510	51	644	1444	443	832	117	11083	3508	33.60
Widening 3	794	2191	615	2035	566	594	73	1164	2196	429	814	116	10441	3347	28.57
Connectivity 3	794	2280	644	2033	648	11	94	1164	2522	443	760	110	11/16	2877	25.95
	70	2339	625	2232	603	594	94 85	1238	2322	481	823	110	11087	3407	28.23
Widening 4 Connectivity 4	0	0	625	2087	0	594 0	0	0	0	439	823	0	12067	3407	28.23
,		2286	607	2084	605			1238	2343	439		116	12017	3402	28.31
Widening 5	795					597	84				823				
Connectivity 5	68	2328	640	2235	669	7	93	1141	2514	480	759	110	11044	2876	26.04
Traffic Calming	70	2308	638	2228	653	11	94	1147	2498	480	759	110	10996	2872	26.12
MUT	801	2608	735	2090	592	597	59	966	1731	439	829	117	11564	3389	29.31
Bowtie	784	2341	665	2079	596	568	54	885	1658	439	823	116	11008	3356	30.49
Quadrant	798	2611	723	2088	602	563	62	955	1741	445	832	117	11537	3393	29.41

48 W 47 S															
Vehicles	SBL	SBT	SBR	WBL	WBT	WBR	NBL	NBT	NBR	EBL	EBT	EBR	Total	Left Turns	% Left
Base Case	832	744	161	0	1996	592	1172	321	0	441	1626	1630	9515	2445	25.70
Widening 1	838	746	159	0	1998	590	1161	321	0	441	1624	1632	9510	2440	25.66
Connectivity 1	758	706	147	0	1882	729	1324	359	0	342	1276	1347	8870	2424	27.33
Widening 2	819	750	160	0	1996	591	1110	307	0	439	1593	1601	9366	2368	25.28
Connectivity 2	702	633	143	0	1812	681	1170	319	0	234	1273	1373	8340	2106	25.25
Widening 3	812	743	159	0	1980	586	1101	300	0	440	1594	1604	9319	2353	25.25
Connectivity 3	1072	913	76	0	1593	955	1127	683	0	187	1183	1465	9254	2386	25.78
Widening 4	812	743	159	0	2007	577	1311	357	0	448	1661	1648	9723	2571	26.44
Connectivity 4	1084	910	76	0	1592	953	1124	682	0	190	1167	1451	9229	2398	25.98
Widening 5	804	744	161	0	2019	577	1286	348	0	452	1660	1648	9699	2542	26.21
Connectivity 5	1112	936	0	0	1585	942	1127	679	0	212	1259	1498	9350	2451	26.21
Traffic Calming	1112	918	0	0	1596	958	11127	677	0	255	1259	1493	9389	2431	26.46
MUT	832	785	161	0	2002	596	1173	327	0	366	1388	1497	9058	2404	26.18
Bowtie	543	0	656	0	3098	483	0	0	0	351	2980	0	8111	894	11.02
Quadrant	829	777	160	0	1960	588	1019	294	0	387	1368	1435	8817	2235	25.35
Quaurant	829	111	100	0	1900	366	1019	294	0	367	1308	1455	0017	2255	25.55
48 W 41 S															
Vehicles	SBL	SBT	SBR	WBL	WBT	WBR	NBL	NBT	NBR	EBL	EBT	EBR	Total	Left Turns	% Left
Base Case	427	1425	475	736	3214	476	204	718	465	857	1699	560	11256	2224	% Len 19.76
Widening 1	427	1425	473	730	3214	476	204	715	405	861	1705	558	11250	2224	19.70
Connectivity 1	521	1433	409	593	1409	1563	173	1049	403	722	1484	415	10448	2009	19.72
Widening 2	424	1422	412	737	3214	476	204	718	474	858	1484	557	11226	2003	19.23
<u> </u>													9652	2025	20.98
Connectivity 2 Widening 3	522 420	1251 1407	414 477	512 736	1413 3214	1487 476	173 204	672 715	307 452	818 857	1703 1692	380 555	11205	2023	19.79
÷		990	369	568	1623		0	697	336	715		304	9622	1801	19.79
Connectivity 3	518					1718					1784				
Widening 4	420	1408	471	736	3214	476	204	744	469	857	1689	560	11248 9744	2217	19.71
Connectivity 4	517	1007	374	580	1657	1756	0	692	341	721	1789	310		1818	18.66 19.72
Widening 5	411	1397	462	736	3214	476	204	736	466	860	1694	556	11212 9625	2211	
Connectivity 5	517	1003	373	574	1592	1690	0	710	338	723	1793	312		1814	18.85
Traffic Calming	509	1088	371	565	1586	1687	0	765	386	724	1754	310	9745	1798	18.45
MUT	426	1233	412	736	3224	472	204	685	464	864	1696	769	11185	2230	19.94
Bowtie	0	0	0	580	4194	0	201	0	197	0	2786	204	8162	781	9.57
Quadrant	425	1234	412	737	3220	472	203	672	449	854	1693	764	11135	2219	19.93
1011105 0															
48 W 35 S	CDI	ODT	CDD	WDI	WDT	WDD	NIDI	NIDT	NDD	CDI	EDT	CDD	T (1	LOT	0/ 1 0
Vehicles	SBL	SBT	SBR	WBL	WBT	WBR	NBL	NBT	NBR	EBL	EBT	EBR	Total	Left Turns	% Left
Base Case	185	670	1125	794	3971	215	48	410	653	83	2860	497	11511	1110	9.64
Widening 1	185	670	1125	794	3978	216	49	411	653	90	3062	506	11739	1118	9.52
Connectivity 1	177	711	1178	766	3911	175	0	415	665	71	2828	465	11362	1014	8.92
Widening 2	185	670	1125	792	3971	215	48	410	651	72	2756	481	11376	1097	9.64
Connectivity 2	176	703	1179	651	4072	181	0	391	574	64	2833	448	11272	891	7.90
Widening 3	185	670	1125	796	3978	216	50	409	651	67	2765	453	11365	1098	9.66
Connectivity 3	176	714	1169	651	4073	181	0	415	617	67	2929	231	11223	894	7.97
Widening 4	185	670	1126	797	3978	216	50	419	668	67	2782	454	11412	1099	9.63
Connectivity 4	177	716	1168	649	4063	181	0	422	620	66	2928	236	11226	892	7.95
Widening 5	189	661	1127	796	3978	216	49	416	663	65	2748	448	11356	1099	9.68
Connectivity 5	177	716	1168	650	4064	181	0	422	487	66	3026	228	11185	893	7.98
Traffic Calming	169	709	1123	613	3752	171	0	425	485	65	2982	229	10723	847	7.90
MUT	185	670	1126	796	3970	210	56	405	654	59	1787	247	10165	1096	10.78
Bowtie	185	670	1123	794	3956	213	56	404	649	77	2742	301	11170	1112	9.96
Quadrant	185	670	1125	794	3970	215	55	396	644	38	1487	238	9817	1072	10.92

Base Case														-
2009 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
	mersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	8349	7431	5609	2980	2934	5761	6835	4744	237	508	433	262	713
	Delay (s)	26.6	26.9	22.2	3.0	2.1	24.8	40.5	12.9	0.4	2.3	0.7	1.8	1.1
	Stop delay (s)	16.4	19.4	14.6	1.1	0.5	13.7	28.6	6.5	0.0	0.0	0.0	0.1	0.0
	Stops	0.7	0.6	0.6	0.2	0.1	0.7	1.1	0.6	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	46.7	48.2	28.7	1.5	0.4	48.8	111.9	12.8	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	269.5	291.3	220.5	117.3	54.1	371.2	512.8	167.5	0.0	0.0	0.0	0.0	0.0
	LOS	С	С	С	Α	А	С	D	В	А	Α	Α	Α	Α
2009 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
		3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	9560	8592	7099	4853	4414	7891	9971	5439	484	425	897	423	1029
	Delay (s)	29.8	28.3	19.4	3.7	5.8	15.5	30.3	13.4	1.2	2.1	0.7	2.4	1.6
	Stop delay (s)	20.8	19.8	12.0	1.2	2.9	8.9	19.3	6.5	0.0	0.0	0.0	0.1	0.0
	Stops	0.7	0.7	0.6	0.2	0.2	0.5	0.9	0.6	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	60.1	61.6	28.8	2.9	3.4	23.9	94.5	14.0	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	336.7	343.2	299.9	108.8	123.9	228.5	568.6	168.6	0.0	0.0	0.0	0.0	0.0
	LOS	С	С	В	А	А	В	С	В	А	Α	Α	Α	Α
									-					
2040 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
		3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	6148	7849	9425	4526	5203	6826	8138	7031	676	362	1013	408	886
	Delay (s)	29.4	34.1	69.1	3.2	6.7	31.1	21.1	12.3	1.0	1.8	0.4	3.1	1.4
	Stop delay (s)	21.2	26.0	21.8	0.9	2.3	18.7	11.4	4.9	0.0	0.0	0.0	0.4	0.0
	Stops	0.6	0.7	1.0	0.1	0.3	0.8	0.8	0.5	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	43.3	67.2	97.7	1.3	6.9	93.7	41.3	17.6	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	249.8	343.3	555.0	125.6	345.5	598.9	339.5	191.9	0.0	0.0	0.0	0.0	0.0
	LOS	С	С	E	А	А	С	С	В	Α	Α	Α	Α	Α
									0		10			
2040 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
		3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	11872	11028	12067	8634	7600	11511	11256	9515	1333	215	1685	549	963
	Delay (s)	149.8	29.7	129.6	5.9	10.8	15.9	37.5	95.9	1.6	1.9	0.5	3.4	1.5
	Stop delay (s)	80.4	19.7	49.3	1.6	3.7	7.9	25.9	47.0	0.0	0.2	0.0	0.6	0.0
	Stops	2.7	0.8	2.4	0.2	0.4	0.6	0.9	2.7	0.0	0.0	0.0	0.1	0.0
	Avg Queue (ft)	653.9	73.4	685.6	8.1	18.5	31.0	119.4	381.6	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	1106.7	426.2 C	1210.5 F	220.3 A	390.6 B	287.8 B	635.4 D	1077.2 F	0.0 A	0.0 A	0.0	0.0 A	0.0
	LOS	F										A		A

Connectiv	ity 1a													
2009 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
	_	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	8359	7406	5602	3000	2934	5788	6835	4743	237	508	433	262	713
	Delay (s)	18.1	26.9	22.2	2.9	2.1	24.9	43.7	13.0	0.4	2.4	0.8	2.0	1.1
	Stop delay (s)	11.5	19.3	14.6	1.0	0.5	13.9	30.9	6.5	0.0	0.0	0.0	0.2	0.0
	Stops	0.4	0.6	0.6	0.2	0.1	0.7	1.1	0.6	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	23.8	47.8	28.6	1.3	0.4	46.9	124.1	12.9	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	228.2	292.1	224.0	98.0	53.2	338.9	539.2	163.6	0.0	0.0	0.0	0.0	0.0
	LOS	В	С	С	Α	А	С	D	В	Α	Α	Α	Α	А
2009 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
	¥	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	9550	8624	7057	4869	4428	7899	9964	5385	494	425	907	423	1015
	Delay (s)	26.5	29.7	20.0	3.2	6.3	15.0	33.2	13.6	1.2	2.2	0.8	2.3	1.6
	Stop delay (s)	18.6	20.6	12.0	1.2	3.2	8.8	21.1	6.5	0.0	0.0	0.0	0.1	0.0
	Stops	0.6	0.7	0.6	0.2	0.2	0.5	1.0	0.6	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	51.6	62.0	28.4	2.4	3.9	21.9	108.6	14.2	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	322.7	373.0	251.2	100.1	115.5	234.0	497.4	187.8	0.0	0.0	0.0	0.0	0.0
	LOS	С	С	В	А	А	В	С	В	А	А	А	А	А
2040 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
	T ()	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	6164	7840	9412	4552	5216	6843	8134	7033	681	362	1019	408	887
	Delay (s)	26.7	33.3	69.4	2.8	6.9	31.8	20.6	12.3	1.1	1.9	0.4	2.9	1.4
	Stop delay (s)	19.6	25.2	21.9	0.9	2.3	19.2	11.0	4.9	0.0	0.0	0.0	0.2	0.0
	Stops	0.6	0.7	1.0	0.1	0.3	0.8	0.7	0.5	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	32.0	65.8	99.1	1.2	6.7	90.9	39.2	17.9	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	204.8	351.2	510.4	122.0	338.6	564.8	363.5	270.5	0.0	0.0	0.0	0.0	0.0
	LOS	С	С	E	А	Α	С	С	В	А	А	А	А	Α
2040 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
	mersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	12630	11364	12382	8846	7590	11739	11257	9510	1329	215	1677	549	967
	Delay (s)	76.4	30.0	129.0	4.7	10.5	14.6	41.4	96.0	1.7	1.8	0.5	3.7	1.5
	Stop delay (s)	43.2	19.7	51.3	1.4	3.5	7.5	28.8	47.5	0.0	0.1	0.0	0.7	0.0
	Stops	1.5	0.8	2.4	0.2	0.4	0.6	1.0	2.7	0.0	0.0	0.0	0.1	0.0
	Avg Queue (ft)	468.2	77.2	661.2	5.7	17.8	24.7	142.4	372.2	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	967.2	479.0	1243.8	154.7	414.0	227.1	746.2	1122.8	0.0	0.0	0.0	0.0	0.0
	LOS	Е	С	F	Α	В	В	D	F	А	А	А	Α	А

Connectiv	rity 2a													
2009 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
		5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	8353	7427	5597	2969	2937	5763	6843	4735	237	508	433	262	713
	Delay (s)	34.1	25.3	22.7	3.0	2.1	24.7	43.3	13.1	0.4	2.3	0.8	1.9	1.1
	Stop delay (s)	21.6	18.5	14.9	1.1	0.5	13.6	30.6	6.5	0.0	0.0	0.0	0.1	0.0
	Stop dealy (8)	0.8	0.6	0.6	0.2	0.1	0.7	1.1	0.6	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	76.8	37.2	27.9	1.5	0.4	48.3	124.0	12.7	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	280.5	208.0	212.2	106.1	36.8	368.6	543.6	151.0	0.0	0.0	0.0	0.0	0.0
	LOS	C	C	C	A	A	C	D	B	A	A	A	A	A
	200							2	2					
2009 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
	x	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	9565	8580	7052	4876	4416	7900	9962	5425	484	425	897	423	1028
	Delay (s)	31.1	34.4	20.2	3.6	6.2	15.5	38.1	13.4	1.2	2.1	0.8	2.3	1.5
	Stop delay (s)	21.9	24.7	12.2	1.1	3.1	8.8	24.3	6.5	0.0	0.0	0.0	0.1	0.0
	Stops	0.7	0.8	0.6	0.2	0.2	0.5	1.0	0.6	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	61.2	72.6	28.2	2.9	3.5	23.5	141.2	14.1	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	289.1	410.4	269.2	105.0	99.5	227.7	643.0	176.9	0.0	0.0	0.0	0.0	0.0
	LOS	С	С	С	А	Α	В	D	В	А	Α	Α	А	А
2040 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
	- ·	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	6153	7836	9362	4525	5208	6824	8146	6993	676	362	1012	408	886
	Delay (s)	28.8	34.0	69.7	3.2	6.5	30.1	21.4	12.3	1.0	1.8	0.4	2.9	1.4
	Stop delay (s)	20.6	25.6	22.4	0.9	2.2	17.9	11.6	4.9	0.0	0.0	0.0	0.3	0.0
	Stops	0.6	0.7	1.0	0.1	0.3	0.8	0.8	0.5	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	41.5	63.3	89.4	1.1	6.0	87.6	42.0	17.1	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	242.6	337.1	515.8	110.0	287.4	600.2	338.6	240.8	0.0	0.0	0.0	0.0	0.0
	LOS	С	С	Е	Α	Α	С	С	В	Α	Α	Α	Α	Α
2040 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
	Into	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	11379	10783	11683	8472	7589	11376	11226	9366	1333	215	1684	549	963
	Delay (s)	225.3	27.4	137.3	5.9	10.7	15.8	39.4	108.7	1.7	1.8	0.5	3.8	1.4
	Stop delay (s)	131.4	18.1	53.2	1.6	3.8	7.9	27.4	54.4	0.0	0.1	0.0	0.8	0.0
	Stops	4.3	0.7	2.7	0.2	0.4	0.6	0.9	3.0	0.0	0.0	0.0	0.1	0.0
	Avg Queue (ft)	633.7	59.4	523.1	7.2	18.6	30.6	131.0	400.6	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	1050.3	375.4	946.3	209.3	431.7	291.2	729.7	1239.9	0.0	0.0	0.0	0.0	0.0
	LOS	F	С	F	А	В	В	D	F	А	А	А	А	Α

Connectiv	rity 3a													
2009 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
	•	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	8362	7404	5588	2990	2938	5793	6835	4734	237	508	433	262	713
	Delay (s)	32.5	25.3	22.7	2.9	2.1	24.4	42.5	13.0	0.4	2.3	0.8	1.9	1.1
	Stop delay (s)	21.1	18.6	14.8	1.0	0.5	13.8	29.8	6.4	0.0	0.0	0.0	0.1	0.0
	Stops	0.8	0.6	0.6	0.2	0.1	0.7	1.1	0.6	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	68.1	37.1	27.7	1.3	0.3	46.0	119.9	12.6	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	240.9	211.8	217.3	87.9	37.3	364.5	532.9	151.7	0.0	0.0	0.0	0.0	0.0
	LOS	С	С	С	Α	Α	С	D	В	А	Α	Α	Α	А
2009 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	9560	8624	7108	4889	4431	7897	9964	5426	494	425	907	423	1015
	Delay (s)	29.0	30.7	20.4	3.1	6.3	14.8	33.5	13.4	1.2	2.1	0.8	2.3	1.6
	Stop delay (s)	20.5	21.9	12.2	1.1	3.1	8.7	21.4	6.4	0.0	0.1	0.0	0.1	0.0
	Stops	0.7	0.7	0.6	0.1	0.2	0.5	1.0	0.6	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	55.4	61.7	28.8	2.4	3.8	21.2	111.3	14.1	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	351.0	316.8	229.6	85.7	171.0	241.8	565.9	175.1	0.0	0.0	0.0	0.0	0.0
	LOS	С	С	С	Α	А	В	С	В	Α	Α	Α	Α	Α
2040 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
		3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	6166	7825	9350	4550	5215	6851	8138	6988	681	362	1018	408	887
	Delay (s)	27.4	33.8	70.2	2.6	6.9	30.7	20.6	12.1	1.1	1.8	0.4	2.9	1.4
	Stop delay (s)	20.1	25.5	22.7	0.8	2.3	18.9	10.9	4.8	0.0	0.0	0.0	0.2	0.0
	Stops	0.6	0.7	0.9	0.1	0.3	0.7	0.7	0.5	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	32.2	63.4	91.6	1.1	6.6	85.2	39.6	16.5	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	213.6	325.4	501.0	91.7	328.2	560.6	346.6	216.9	0.0	0.0	0.0	0.0	0.0
	LOS	С	С	E	Α	Α	С	С	В	Α	А	Α	А	A
2040 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
		3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	11406	10856	11716	8440	7584	11365	11205	9319	1330	215	1675	548	968
	Delay (s)	223.3	27.5	135.4	4.4	10.5	14.0	39.8	112.1	1.6	1.8	0.6	3.6	1.4
	Stop delay (s)	131.9	18.2	50.4	1.3	3.6	7.4	27.5	56.2	0.0	0.1	0.0	0.6	0.0
	Stops	4.2	0.7	2.7	0.2	0.4	0.5	1.0	3.1	0.0	0.0	0.0	0.1	0.0
	Avg Queue (ft)	594.2	60.3	534.9	4.9	18.4	23.5	129.6	405.9	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	863.0	373.2	933.8	126.3	397.9	214.0	686.0	1287.2	0.0	0.0	0.0	0.0	0.0
	LOS	F	С	F	Α	В	В	D	F	A	Α	Α	A	A

Connectiv	vity 4a											
1	2	3	4	5	6	7	8	9	10	11	12	13
5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
8352	7400	5570	2985	2936	5797	6853	4737	237	508	433	262	711
32.6	25.7	23.6	2.8	2,1	24.9	43.4	12.5	0.5	2.3	0.8	1.8	1.1
21.0	18.8	15.7	1.0	0.5	14.0	30.4	6.2	0.0	0.0	0.0	0.1	0.0
0.8	0.6	0.6	0.2	0.1	0.7	1.1	0.6	0.0	0.0	0.0	0.0	0.0
71.2	37.9	29.3	1.4	0.4	48.3	125.9	11.0	0.0	0.0	0.0	0.0	0.0
236.8	206.8	246.9	95.2	37.4	364.8	497.3	146.0	0.0	0.0	0.0	0.0	0.0
C	C	C	A	A	C	D	В	A	A	A	A	A
1	2	3	4	5	6	7	8	9	10	11	12	13
5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
9553	8622	7097	4890	4419	7907	9990	5429	487	425	900	423	1014
29.9	28.8	19.1	3.2	6.1	15.0	33.8	13.5	1.3	2.1	0.8	2.3	1.6
21.2	20.4	11.2	1.2	3.0	8.8	21.4	6.5	0.0	0.0	0.0	0.1	0.0
0.7	0.7	0.5	0.2	0.2	0.5	1.0	0.6	0.0	0.0	0.0	0.0	0.0
58.2	57.2	25.5	2.5	3.6	21.9	116.1	13.5	0.0	0.0	0.0	0.0	0.0
343.6	271.9	231.5	87.8	117.6	252.6	629.0	173.9	0.0	0.0	0.0	0.0	0.0
C	C	В	A	A	В	C	В	A	A	A	A	A
						-						
1	2	3	4	5	6	7	8	9	10	11	12	13
5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
6165	7817	9341	4554	5212	6850	8176	6986	676	362	1014	408	889
27.9	33.6	66.9	2.7	6.8	33.8	21.4	11.9	1.0	1.8	0.4	3.0	1.5
20.4	25.3	20.5	0.8	2.3	21.0	11.5	4.7	0.0	0.0	0.0	0.3	0.0
0.6	0.7	0.8	0.1	0.3	0.8	0.8	0.5	0.0	0.0	0.0	0.0	0.0
33.2	62.6	77.8	0.9	6.6	102.6	44.1	13.2	0.0	0.0	0.0	0.0	0.0
199.0	312.1	471.6	103.6	354.1	540.7	461.6	202.9	0.0	0.0	0.0	0.0	0.0
С	С	Е	А	А	С	С	В	А	А	А	А	А
									10	11	10	13
1	2	3	4	5	6	7	8	9	10	11	12	13
1 5600 W	2 5600 W	5600 W	4 5200 W	5 5200 W	6 4800 W	7 4800 W	4800 W	9 5200 W	10 4980 W	5200 W	5400 W	5215 W
-		-	-		-	-	-	-	-			-
5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
5600 W 3500 S	5600 W 4100 S	5600 W 4700 S	5200 W 3500 S	5200 W 4100 S	4800 W 3500 S	4800 W 4100 S	4800 W 4700 S	5200 W 3745 S	4980 W 3725 S	5200 W 4025 S	5400 W 4210 S	5215 W 4415 S
5600 W 3500 S 11517	5600 W 4100 S 10932	5600 W 4700 S 12067	5200 W 3500 S 8469	5200 W 4100 S 7595	4800 W 3500 S 11412	4800 W 4100 S 11248	4800 W 4700 S 9723	5200 W 3745 S 1335	4980 W 3725 S 215	5200 W 4025 S 1682	5400 W 4210 S 549	5215 W 4415 S 966
5600 W 3500 S 11517 205.9	5600 W 4100 S 10932 27.5	5600 W 4700 S 12067 167.7	5200 W 3500 S 8469 4.6	5200 W 4100 S 7595 10.7	4800 W 3500 S 11412 14.0	4800 W 4100 S 11248 36.9	4800 W 4700 S 9723 71.9	5200 W 3745 S 1335 1.6	4980 W 3725 S 215 1.8	5200 W 4025 S 1682 0.5	5400 W 4210 S 549 3.6	5215 W 4415 S 966 1.5
5600 W 3500 S 11517 205.9 121.8	5600 W 4100 S 10932 27.5 18.0	5600 W 4700 S 12067 167.7 78.3	5200 W 3500 S 8469 4.6 1.4	5200 W 4100 S 7595 10.7 3.6	4800 W 3500 S 11412 14.0 7.4	4800 W 4100 S 11248 36.9 25.3	4800 W 4700 S 9723 71.9 33.0	5200 W 3745 S 1335 1.6 0.0	4980 W 3725 S 215 1.8 0.1	5200 W 4025 S 1682 0.5 0.0	5400 W 4210 S 549 3.6 0.7	5215 W 4415 S 966 1.5 0.0
5600 W 3500 S 11517 205.9 121.8 4.0	5600 W 4100 S 10932 27.5 18.0 0.7	5600 W 4700 S 12067 167.7 78.3 2.8	5200 W 3500 S 8469 4.6 1.4 0.2	5200 W 4100 S 7595 10.7 3.6 0.4	4800 W 3500 S 11412 14.0 7.4 0.5	4800 W 4100 S 11248 36.9 25.3 0.9	4800 W 4700 S 9723 71.9 33.0 2.1	5200 W 3745 S 1335 1.6 0.0 0.0	4980 W 3725 S 215 1.8 0.1 0.0	5200 W 4025 S 1682 0.5 0.0 0.0	5400 W 4210 S 549 3.6 0.7 0.1	5215 W 4415 S 966 1.5 0.0 0.0

Connectiv	vity 5a													
2009 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
		5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	8370	7401	5573	2999	2941	5813	6844	4735	239	507	435	262	713
	Delay (s)	32.0	25.6	23.1	2.9	2.1	21.9	29.1	12.3	0.4	2.4	0.7	1.9	1.1
	Stop delay (s)	20.6	18.8	15.3	1.1	0.5	12.8	21.1	5.8	0.0	0.0	0.0	0.1	0.0
	Stops	0.8	0.6	0.6	0.2	0.1	0.7	0.8	0.6	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	67.2	38.0	28.6	1.4	0.3	25.3	44.5	9.8	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	246.6	213.5	210.1	81.4	37.4	190.6	263.9	115.3	0.0	0.0	0.0	0.0	0.0
	LOS	С	С	С	А	Α	С	С	В	А	Α	Α	А	Α
2009 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13
	*	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	9561	8608	7091	4865	4422	7903	9991	5442	488	423	900	423	1017
	Delay (s)	29.4	31.3	19.2	3.3	6.1	14.2	25.9	13.5	1.2	2.3	0.8	2.3	1.5
	Stop delay (s)	20.9	22.4	11.3	1.2	3.0	8.6	16.8	6.2	0.0	0.0	0.0	0.1	0.0
	Stops	0.7	0.8	0.5	0.2	0.2	0.5	0.8	0.6	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	56.1	62.0	25.9	2.6	3.6	14.9	53.6	13.8	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	428.0	268.0	238.4	94.7	117.0	171.7	313.5	185.6	0.0	0.0	0.0	0.0	0.0
	LOS	С	С	В	А	Α	В	С	В	А	Α	Α	А	Α
2040 AM	Node number		2	3	4	5	6	7	8	9	10	11	12	13
	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
	mersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	6162	7809	9316	4551	5210	6871	8132	6978	676	364	1014	408	889
	Delay (s)	28.2	33.9	66.9	2.8	6.8	18.7	18.7	12.7	1.0	1.9	0.4	2.9	1.5
	Stop delay (s)	20.8	25.6	20.5	0.8	2.2	11.7	10.3	5.0	0.0	0.0	0.0	0.3	0.0
	Stops	0.6	0.7	0.9	0.1	0.3	0.5	0.7	0.5	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	33.0	63.8	73.3	1.2	6.5	27.3	29.3	14.2	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	208.9	331.0	410.6	104.0	333.1	216.6	270.8	179.1	0.0	0.0	0.0	0.0	0.0
	LOS	С	С	E	Α	Α	В	В	В	Α	А	Α	А	Α
2040 PM	Node number		2	3	4	5	6	7	8	9	10	11	12	13
	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W
		3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S
	Vehicles	11423	10908	12017	8416	7581	11356	11212	9699	1334	213	1683	549	961
	Delay (s)	227.1	26.9	165.8	4.5	10.5	13.4	29.2	70.0	1.6	2.1	0.5	3.7	1.4
	Stop delay (s)	133.9	17.7	79.7	1.3	3.6	7.1	20.0	30.4	0.0	0.1	0.0	0.7	0.0
	Stops	4.3	0.7	2.7	0.2	0.4	0.5	0.8	2.1	0.0	0.0	0.0	0.1	0.0
	Avg Queue (ft)	588.7	58.5	493.3	5.2	19.6	18.7	73.3	309.9	0.0	0.0	0.0	0.0	0.0
	Max Queue (ft)	862.3	414.3	790.0	133.6	441.3	172.5	465.5	480.4	0.0	0.0	0.0	0.0	0.0
	LOS	F	C	F	А	В	В	С	E	А	А	Α	А	Α

Burners South <	connectiv	/ity 1b																			
Intraction strons LowLow<		<u> </u>	-																	18	19
Ventes St71 St66 St61 St7 OP St8 O 252 To To St81 Dely Dely <thdely< th=""> <thdely< th=""> <thdely< th=""></thdely<></thdely<></thdely<>		Intersection																		4800 W	4800 W 4400 S
Deby 227 12 11 14 14 64 62 13 60 00 01 20 12 43 42 12 13 66 10 00		Vehicles																		3533	2888
																				8.3	6.7
Arg Quesc (0) 9.4 182.2 9.00 117 0.1 19.5 7.35 15.8 0.0																				2.5	2.3
No. Queue (n) Stot A Tot S Stot A No.																				0.4	0.3 4.5
LOS C B B A B C B A SA A A A A																				150.1	128.7
Interscale 500 w 500 w 500 w 400 w 500 w 400 w 500 w																				Α	Α
Interscale 500 w 500 w 500 w 400 w 500 w 400 w 500 w				-	-		_	-	_		-										
Intervents Jame Jam Jame Jame	2009 PM																			18 4800 W	19 4800 W
Dely (n) 268 H.3 15.2 9.8 4.2 17.7 B.7 12.8 0.8 0.0 0.1 1.8 0.7 4.2 4.9 0.8 0.0 0.0 0.0 0.1 0.0 0.1 0.0 <th< th=""><th></th><th>Intersection</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>3800 S</th><th>4400 S</th></th<>		Intersection																		3800 S	4400 S
Sup deity (n) 159 10.2 AS 4.8 1.1 11.6 2.1.2 3.2 0.0 0.0 0.0 1.0 0.5 0.0 0.0 0.0 0.0 1.0 0.5 0.0			9533		7080	4927		7659										1360		4583	4306
Sope 08 0.7 0.6 0.4 0.2 0.1 0.2 0.0 <th></th> <th>10.1</th> <th>6.7</th>																				10.1	6.7
Arg Queer (h) 0.11 31.9 34.2 11.5 21.1 39.2 36.4 Bit 11.2 0.00 0.00 0.00 0.00 2.9 1.4 0.00																				0.5	1.4 0.3
LOS C B B A A B D B A NA A																				6.7	4.1
Node number Interscene 3005 Aff 005 Node number 500 V Size Allow 500 V Size 500 V <																				174.4	149.0
Interversa Solon		LOS	С	В	В	A	A	В	D	В	A	N/A	A	A	A	A	A	A	A	A	A
Interaction Solon W Solo W Solo W Solo W Solon W Solo W Solon W Solo W Solo W Solo W	2040 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
C Dois 4103 2003 41																				4800 W	4800 W
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$																				3800 S	4400 S
Sup date (c) 14.3 20.4 20.7 5.5 1.4 7.1 20.0 6.9 0.0																				3590 8.3	3110 7.6
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$																				1.5	2.1
Max Quee (h) 2266 716.2 1107.7 2880 244.4 317.9 469.6 524.1 0.0<		Stops	0.7			0.5	0.2	0.5	1.0	0.6	0.0	0.0	0.0		0.0	0.1	0.1	0.0	0.0	0.3	0.4
LOS C C E B A B C B A N/A A A A A																				4.7 187.6	5.8 121.4
200 PM Note number 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 1010 PM 5000 W 500 W <																				187.0 A	121.4 A
Intersection 5600 W 5000 W 5				-				-	-												
Intersection 3300 S 4100 S 3300 S	2040 PM	Node number					5													18	19
Venkes 11554 9914 1082 9180 5189 11362 1040 915 325 107 4889 4773 3070 6248 517 Debay (s) 135.0 26.0 29.9 14.8 56.6 14.7 130.0 90.0 10.0 8.1 4.2 0.9 118.6 18.8 Stop delay (s) 20.1 0.7 57 0.4 0.2 2.9 0.0 <th></th> <th>Intersection</th> <th></th> <th>4800 W 3800 S</th> <th>4800 W 4400 S</th>		Intersection																		4800 W 3800 S	4800 W 4400 S
Delay (s) 1350 260 249.9 14.8 5.6 14.7 1300 99.0 15 0.0 0.1 2.0 1.0 8.1 4.2 0.9 118.6 18.8 Stop 48(s) (s) 0.1 1.7.1 12.1 8.0 1.6 7.3 5.6 4.9 0.0 0		Vehicles																		5122	3987
Stogs 2.1 0.7 5.7 0.4 0.2 0.5 2.7 2.9 0.0 </th <th></th> <th>18.5</th> <th>6.7</th>																				18.5	6.7
Avg Queue (h) 652.2 14.2.9 762.8 24.6 4.4 30.4 556.9 388.7 0.0 0.0 0.0 0.0 91.1 0.8 0.0 713.2 33 Max Queue (h) 1053.5 562.9 1186.9 377.1 201.8 306.7 991.8 916.9 0.0 <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>6.5</th><th>1.5</th></t<>																				6.5	1.5
Max Queue (h) 1053.5 562.9 1186.9 377.1 20.18 306.7 91.8 91.6.9 0.0 0.0 0.0 20.9 4 93.6 0.0 917.0 675 LOS F C F B A B F F A N/A A																				33.7	0.2 4.3
Connectivity 2b -																				679.7	208.9
2009 AM Node number 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 11 Intersection 5600 W 5600 W 5600 W 5600 S00 S 4100 S 3500 S 4100 S 3745 S 3725 S 421 S 441 S 3800 S 4400 S 3800 S Vehicles 8971 7283 5495 3840 3926 5918 6590 4692 1207 0 1213 26 1677 4892 3172 1783 33287 322 Delay (s) 34.4 21.0 11.6 7.0 4.7 6.1 20.7 6.2 0.0		LOS	F	С	F	В	Α	В	F	F	Α	N/A	Α	Α	Α	Α	Α	А	F	В	A
2009 AM Node number 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 11 Intersection 5600 W 5600 W 5600 W 5600 S00 S 4100 S 3500 S 4100 S 3745 S 3725 S 421 S 441 S 3800 S 4400 S 3800 S Vehicles 8971 7283 5495 3840 3926 5918 6590 4692 1207 0 1213 26 1677 4892 3172 1783 33287 322 Delay (s) 34.4 21.0 11.6 7.0 4.7 6.1 20.7 6.2 0.0																					
2009 AM Node number 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 11 Intersection 5600 W 5600 W 5600 W 5600 S00 S 4100 S 3500 S 4100 S 3745 S 3725 S 421 S 441 S 3800 S 4400 S 3800 S Vehicles 8971 7283 5495 3840 3926 5918 6590 4692 1207 0 1213 26 1677 4892 3172 1783 33287 322 Delay (s) 34.4 21.0 11.6 7.0 4.7 6.1 20.7 6.2 0.0	Connectio	dity 2h																			
Intersection 3500 S 4100 S 4700 S 3500 S 4100 S 3500 S 4100 S 375 S 372 S 402 S 4210 S 4415 S 3800 S 4400 S 3800 S 4700 S 3800 Vehicles 8971 7283 5495 3840 9926 5918 6690 4692 120 0 1213 26 1677 4892 3172 1783 3287 32 Debay (s) 34.4 21.6 18.4 12.7 9.8 13.1 13.0 13.0 0.0		<u> </u>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
23005 41005 33005 41005 33005 41005 34005 <th< th=""><th></th><th>Intersection</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>4800 W</th><th>4800 W</th></th<>		Intersection																		4800 W	4800 W
Delay (s) 34.4 21.6 18.4 12.7 9.8 13.1 31.0 13.5 0.4 0.0 0.2 1.2 2.4 4.1 2.2 1.6 0.9 8. Stop delay (s) 23.5 12.0 11.6 7.0 4.7 6.1 20.7 6.2 0.0																				3800 S 3279	4400 S 2322
Stops 0.8 0.7 0.7 0.4 0.4 0.5 0.9 0.6 0.0 0.0 0.0 0.0 0.1 0.1 0.0 0.0 0.0 Avg Queue (f) 68.3 129.8 22.4 12.1 12.0 18.3 56.4 13.9 0.0 0.0 0.0 0.0 0.0 2.9 0.7 0.0 0.0 0.0 16.1 15.7 0.0 0.0 15.7 LOS C C B B A B C B A N/A A																				8.4	1.8
Avg Queue (t) 68.3 129.8 22.4 12.1 12.0 18.3 56.4 13.9 0.0 0.0 0.0 0.0 2.9 0.7 0.0 0.0 6.6 Max Queue (t) 425.4 337.9 185.8 147.3 157.4 261.6 380.4 156.8 0.0 0.0 0.0 0.0 174.1 59.6 0.0 0.0 174.1 59.6 0.0 0.0 174.1 59.6 0.0 0.0 174.1 59.6 0.0 0.0 174.1 59.6 0.0 0.0 175.7 20.0 175.7 22.0 8 0 N/A A<		Stop delay (s)	23.5	12.0		7.0	4.7	6.1	20.7	6.2	0.0	0.0	0.0	0.0	0.0	1.3	0.1	0.1	0.0	2.7	0.3
Max Queue (ft) 425.4 337.9 185.8 147.3 157.4 261.6 380.4 156.8 0.0 0.0 0.0 0.0 174.1 59.6 0.0 0.0 153 LOS C C B A B C B A NA <																				0.4	0.1
LOS C C B A B C B A N/A A <th></th> <th>6.2 153.9</th> <th>0.4 92.3</th>																				6.2 153.9	0.4 92.3
Intersection 5600 5600 5200 4200 4800 4800 4800 4900 5200									-											A	A
Intersection 5600 5600 5200 4200 4800 4800 4800 4900 5200																					
Intersection 3300 S 4100 S 3700 S 4100 S 3500 S 4100 S 3700 S 374 S S 372 S S 4210 S 4415 S 3800 S 4400 S 3800 S 4700 S 3800 S 4700 S 3800 S 4100 S 372 S S 4210 S 4415 S 3800 S 4400 S 3800 S 4700 S 3800 S 4700 S 3800 S 410 S 3800 S 4415 S 3800 S 4400 S 3830 S 4700 S 3800 S 410 S 3800 S 410 S 3800 S 400 S 3830 S 4700 S 3800 S 410 S 3800 S 400 S 3830 S 4700 S 3800 S 410 S 3800 S 400 S 3830 S 470 S 3800 S 410 S 380 S 400 S 3830 S 410 S 3830 S 410 S 380 S <th>2009 PM</th> <th>Node number</th> <th></th> <th>18 4800 W</th> <th>19 4800 W</th>	2009 PM	Node number																		18 4800 W	19 4800 W
Delay (s) 31.5 19.0 16.1 10.0 9.2 16.8 42.2 12.4 0.7 0.0 0.2 1.9 2.3 3.9 4.6 1.5 1.0 9. Stop dely (s) 18.8 10.8 8.3 5.1 3.5 10.9 24.0 4.7 0.0 0.0 0.0 0.0 0.9 0.4 0.0<		Intersection																		3800 S	4400 S
Stop delay (s) 18.8 10.8 8.3 5.1 3.5 10.9 24.0 4.7 0.0 0.0 0.0 0.9 0.4 0.0 0.0 2.2 Stops 0.9 0.7 0.6 0.4 0.4 0.5 1.2 0.6 0.0		Vehicles	10442	8551	7103	5633	5785	7842	9584	5363	1405	0	1846	7	2462	5494	4080	2633	3437	4046	3177
Stops 0.9 0.7 0.6 0.4 0.4 0.5 1.2 0.6 0.0 0.0 0.0 0.0 0.1 0.2 0.0 0.0 0.0 Avg Queue (f) 92.9 34.5 26.0 11.0 8.6 29.2 142.2 12.1 0.0 0.0 0.0 0.0 2.9 1.3 0.0 0.0 55 Max Queue (f) 641.9 324.9 320.7 137.8 155.8 248.4 914.0 168.2 0.0 0.0 0.0 0.0 2.11 9.0 0.0 10.9 2.11 9.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.11 9.0 7.7 0.0 15.3 LOS C B A A B D B A A B P 10 11 12 13 14 15 16 17 18																				9.3	3.2
Avg Queue (t) 92.9 34.5 26.0 11.0 8.6 29.2 14.2.2 12.1 0.0 0.0 0.0 2.9 1.3 0.0 0.0 5.0 Max Queue (t) 641.9 324.9 230.7 137.8 155.8 248.4 914.0 168.2 0.0 0.0 0.0 0.0 211.9 90.2 7.7 0.0 153 LOS C B A A B D B A N/A A																				0.4	0.5
LOS C B B A A B D B A N/A A <th></th> <th>5.4</th> <th>1.1</th>																				5.4	1.1
2040 AM Node number 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 11 Intersection 5600 W 5600 W 5000 W 5200 W 4800 W 4800 W 5200 W 5200 W 5400 W 5215 W 5600 W 5600 W 5200 W 4800 W 4800 W 3745 S 3725 S 4025 S 4210 S 4415 S 3800 S 4400 S 3800 S 3800 S 4400 S 3800 S 3400 S 3800 S 4400 S 3800 S 4400 S 3800 S 3415 S 3800 S 4400 S 3800 S 3400 S 3800 S 4400 S 3800 S 4400 S 3800 S 440 S 3800 S 440 S 3800 S 440 S 3800 S 440 S 380 S <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th>153.3</th><th>121.3</th></t<>																				153.3	121.3
Intersection 5600 w 5600 w 5600 w 5200 w 5200 w 4800 w 5200 w 4800 w 5200 w 4800 w 5200 w 5		LOS	С	В	В	A	A	В	D	В	A	N/A	A	A	A	A	A	A	A	A	A
Intersection 3500 \$ 4100 \$ 4700 \$ 3500 \$ 4100 \$ 4700 \$ 3745 \$ 3725 \$ 4025 \$ 4210 \$ 3800 \$ 4400 \$ 3800 \$ 4700 \$ 3800 \$ Vehicles 7216 8296 9499 5793 6834 7001 8006 6956 1542 0 1873 8 2509 3352 3212 2466 5651 319	2040 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Vehicles 7216 8296 9499 5793 6834 7001 8006 6956 1542 0 1873 8 2509 3352 3212 2466 5651 319		Intersection																		4800 W	4800 W
																				3800 S	4400 S 2294
																				7.8	2294
Stop dekay (s) 15.2 17.7 22.1 7.2 7.4 7.7 12.4 6.5 0.0 0.0 0.0 0.0 0.0 0.6 0.1 0.0 0.1 1.																				1.5	0.3
																				0.3	0.1
																				3.8 105.4	0.6 72.4
																				A	72.4 A
	2040 PM	Node number																		18 4800 W	19 4800 W
Intersection		Intersection																		4800 W 3800 S	4800 W 4400 S
		Vehicles	12326	9552	10441	9666	8162	11272	9652	8340	2507	0	2645	10	3361	5592	4484	4660	6584	4440	0
		Delay (s)	196.8	23.5	237.1	28.8	17.9	13.6	150.3	168.0	1.5	0.0	0.3	1.8	3.4	8.0	3.9	2.0	133.3	13.6	0.0
Vehicles 12326 9552 10441 9666 8162 11272 9652 8340 2507 0 2645 10 3361 5592 4484 4660 6584 444 Delay (s) 1968 23.5 237.1 28.8 17.9 13.6 150.3 168.0 1.5 0.0 0.3 1.8 3.4 8.0 3.9 2.0 133.3 13.3		Stop delay (s)	116.3	15.0	118.1	16.5	9.3	6.7	58.7	84.1	0.0	0.0	0.0	0.0	0.0	2.2	0.3	0.1	33.8	4.7	0.0
Vehicles 12326 9552 10441 9666 8162 11272 9652 8340 2507 0 2645 10 3361 5592 4484 4660 6584 444 Delay (s) 196.8 23.5 237.1 28.8 17.9 13.6 150.3 168.0 1.5 0.0 0.3 1.8 3.4 8.0 3.9 2.0 133.3 13.3 Stop delay (s) 116.3 15.0 118.1 16.5 9.3 6.7 58.7 84.1 0.0 0.0 0.0 0.0 2.2 0.3 0.1 33.8 4.2																				0.6	0.0
Vehicks 12326 9552 10441 9666 8162 11272 9652 8340 2507 0 2645 10 3361 5592 4484 4660 6584 444 Delay (s) 196.8 23.5 237.1 28.8 17.9 13.6 150.3 168.0 1.5 0.0 0.3 1.8 3.4 8.0 3.9 2.0 133.3 13.3 13.3 13.3 13.3 13.4 15.0 10.0 0.0 0.0 0.0 2.2 0.3 0.1 33.8 4: Stop dekty (s) 16.3 15.0 11.5 9.3 6.7 5.87 84.1 0.0 0.0 0.0 0.0 2.2 0.3 0.1 33.8 4: Stop dekty (s) 16.3 15.0 0.7 0.6 0.5 3.0 4.5 0.0 0.0 0.0 0.0 0.2 0.3 0.1 0.0 3.1 0.0		Max Queue (ft)	1366.7	342.0	1198.2	479.8	394.3	321.0	851.3	1166.1	0.0	0.0	0.0	0.0	0.0	225.2	165.4	24.7	811.4	242.5	0.0
Vehicles 12326 9552 10441 9666 8162 11272 9652 8340 2507 0 2645 10 3361 5592 4484 4660 6584 444 Delay(s) 196.8 23.5 237.1 28.8 17.9 13.6 150.3 168.0 1.5 0.0 0.3 1.8 3.4 8.0 3.9 2.0 133.3 13.3 Stop delay(s) 116.3 15.0 118.1 16.5 9.3 6.7 58.7 84.1 0.0 0.0 0.0 0.0 2.2 0.3 0.1 33.8 4.4 Stop delay(s) 116.3 15.0 0.7 0.6 0.5 3.0 4.4 0.0 0.0 0.0 0.0 0.0 3.3 1.3 13.3 13.4 Stop delay(s) 3.0 0.7 5.6 0.7 0.6 5.5 3.0 4.5 0.0 0.0 0.0 0.0 0.0 3.1 0.0		LOS	F	С	F	С	В	В	F	F	А	N/A	А	А	А	А	А	А	F	В	N/A

Connectiv	vity 3b																			
2009 AM	Node number	1 5600 W	2 5600 W	3 5600 W	4 5200 W	5 5200 W	6 4800 W	7 4800 W	8 4800 W	9 5200 W	10 4980 W	11 5200 W	12 5400 W	13 5215 W	14 5600 W	15 5600 W	16 5200 W	17 5200 W	18 4800 W	19 4800 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S	3800 S	4400 S	3800 S	4700 S	3800 S	4400 S
	Vehicles Delay (s)	8964 33.6	6991 16.4	4686 16.6	3735 12.4	3458 10.1	5869 13.2	6506 31.2	4666 13.5	0.4	0	1174 0.2	0.0	3817 3.1	4980 4.2	3603 6.9	1699 1.5	2667 1.0	3195 8.3	3339 5.1
	Stop delay (s)	22.9	9.7	10.9	6.8	5.1	6.1	21.0	6.2	0.0	0.0	0.0	0.0	0.1	1.3	2.7	0.0	0.0	2.6	0.8
	Stops Avg Queue (ft)	0.8 65.6	0.6 27.1	0.6 19.0	0.4	0.4	0.5 18.7	0.9 57.3	0.6	0.0	0.0	0.0	0.0	0.0	0.1 3.5	0.4 4.1	0.0	0.0	0.4 5.6	0.3
	Max Queue (ft)	373.8	246.2	179.5	148.7	162.6	186.3	387.8	150.1	0.0	0.0	0.0	0.0	25.6	185.2	101.1	0.0	0.0	138.2	89.3
	LOS	С	В	В	В	В	В	С	В	A	N/A	A	N/A	A	A	A	A	A	A	Α
2009 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W
	Vehicles	3500 S 10257	4100 S 7784	4700 S 5489	3500 S 5254	4100 S 4797	3500 S 7363	4100 S 8837	4700 S 5010	3745 S 1247	3725 S 0	4025 S 1689	4210 S 71	4415 S 5194	3800 S 5464	4400 S 4754	3800 S 2319	4700 S 1734	3800 S 3501	4400 S 4809
	Delay (s)	27.8	15.5	13.2	9.7	9.4	16.9	28.7	12.9	0.8	0.0	0.3	4.6	3.3	3.9	8.2	1.4	0.8	8.8	7.4
	Stop delay (s) Stops	16.5 0.8	8.2 0.6	6.8 0.5	4.9 0.4	3.7 0.4	0.5	16.5 0.9	4.6 0.6	0.0	0.0	0.0	0.0	0.1	0.8	2.4	0.0	0.0	2.1 0.4	1.3 0.4
	Avg Queue (ft)	69.6	26.1	16.0	9.8	6.6	27.3	78.5	14.8	0.0	0.0	0.0	0.0	0.0	2.9	4.3	0.0	0.0	4.5	3.6
	Max Queue (ft) LOS	445.7 C	248.8 B	169.7 B	154.4 A	123.8 A	254.2 B	714.6 C	199.1 B	0.0 A	0.0 N/A	0.0 A	0.0 A	39.2 A	183.7 A	125.0 A	0.0 A	0.0 A	139.4 A	123.5 A
							5				1011									
2040 AM	Node number	1 5600 W	2 5600 W	3 5600 W	4 5200 W	5 5200 W	6 4800 W	7 4800 W	8 4800 W	9 5200 W	10 4980 W	11 5200 W	12 5400 W	13 5215 W	14 5600 W	15 5600 W	16 5200 W	17 5200 W	18 4800 W	19 4800 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S	3800 S	4400 S	3800 S	4700 S	3800 S	4400 S
	Vehicles	7376	8285	9910	5642	6132	6895	7664	7323	1532	0	1922	0	4301	3610	4344	2427	5522	3010	3103
	Delay (s) Stop delay (s)	24.9 15.3	24.9 16.4	59.9 16.5	13.5 6.3	14.0 6.4	16.0 8.0	21.9 12.8	18.5 7.8	0.7	0.0	0.2	0.0	6.2 0.4	3.7 0.5	6.4 1.4	0.1	2.0	8.1	5.6
	Stops	0.7	0.6	0.9	0.5	0.5	0.5	0.7	0.7	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.0	0.0	0.3	0.3
	Avg Queue (ft) Max Queue (ft)	39.8 254.1	47.7 320.3	164.1 1036.1	15.7 255.1	24.5 285.1	37.1 492.0	38.9 360.8	44.4 491.1	0.0	0.0	0.0	0.0	2.7 182.3	1.3 96.6	3.2 146.4	0.0	0.2	4.1 180.2	2.6 108.4
	LOS	C	C	E	B	B	B	C	В	A	N/A	A	N/A	A	A	A	A	A	A	A
2040 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
2040 F IVI	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	$4800 \mathrm{W}$	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W
		3500 S 12547	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S	3800 S	4400 S	3800 S	4700 S	3800 S	4400 S
	Vehicles Delay (s)	234.7	10273 27.2	11087 145.6	9492 31.9	7617 18.0	11223 14.3	9622 135.7	9254 122.1	2542 1.5	0.0	2698 0.3	0.0	6195 9.4	6116 38.3	6402 8.5	4641 1.9	6317 119.7	4253 13.4	4587 46.6
	Stop delay (s)	145.1	18.1	46.9	19.3	9.2	6.9	45.7	56.7	0.0	0.0	0.0	0.0	1.5	20.5	2.2	0.1	29.4	4.5	25.3
	Stops Avg Queue (ft)	3.5 827.3	0.7 66.8	3.3 859.7	0.7 78.4	0.6 31.3	0.5 29.6	2.5 591.4	3.2 529.8	0.0	0.0	0.0	0.0	0.2 41.4	1.1 67.1	0.3	0.0	2.8 539.2	0.5	1.3 152.7
	Max Queue (ft)	1242.7	409.5	1209.6	467.9	339.7	320.4	983.8	1396.0	0.0	0.0	0.0	0.0	863.1	655.8	176.0	22.1	766.3	224.6	1023.2
	LOS	F	С	F	С	В	В	F	F	A	N/A	A	N/A	A	D	A	A	F	В	D
Connectiv		1	2	3	4	5		7	0	9	10	11	12	13	14	15	16	17	18	19
2009 AM	Node number Intersection	1 5600 W	2 5600 W	5600 W	4 5200 W	5200 W	6 4800 W	4800 W	8 4800 W	9 5200 W	4980 W	5200 W	5400 W	5215 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W
		3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S	3800 S	4400 S	3800 S	4700 S	3800 S	4400 S
	Vehicles Delay (s)	8924 33.4	6943 16.4	4680 16.5	3742 12.5	3465 10.2	5878 13.2	6507 30.3	4667 13.5	1159 0.4	0	1180 0.2	0.0	3650 3.0	4931 4.2	3544 6.9	1704 1.5	2655 0.9	3196 8.4	3336 5.1
	Stop delay (s)	22.8	9.7	10.8	6.9	5.2	6.2	20.3	6.2	0.0	0.0	0.0	0.0	0.1	1.3	2.8	0.0		2.7	0.8
	Stops								0.6	0.0	0.0	0.0	0.0	0.0				0.0		
	Avg Oueue (ft)	0.8 64.4	0.6	0.5 18.8	0.4	0.4	0.5	0.9 54.2				0.0	0.0	0.1	0.1	0.4 4.1	0.0	0.0	0.4	0.3
	Avg Queue (ft) Max Queue (ft)	64.4 379.4	0.6 26.9 245.2	18.8 166.6	11.7 156.2	12.1 159.1	18.6 179.4	54.2 407.4	13.6 158.7	0.0 0.0	0.0	0.0 0.0	0.0	0.1 26.7	3.1 172.0	4.1 121.2	0.0 0.0 0.0	0.0 0.0 0.0	0.4 5.8 139.4	0.3 1.6 104.0
		64.4	0.6 26.9	18.8	11.7	12.1	18.6	54.2	13.6	0.0	0.0				3.1	4.1	0.0 0.0	0.0 0.0	0.4 5.8	0.3 1.6
2009 PM	Max Queue (ft)	64.4 379.4 C	0.6 26.9 245.2 B 2	18.8 166.6 B 3	11.7 156.2 B 4	12.1 159.1 B	18.6 179.4 B 6	54.2 407.4 C 7	13.6 158.7 B	0.0 0.0 A 9	0.0 0.0 N/A 10	0.0 A 11	0.0 N/A 12	26.7 A 13	3.1 172.0 A 14	4.1 121.2 A 15	0.0 0.0 0.0 A 16	0.0 0.0 0.0 A 17	0.4 5.8 139.4 A 18	0.3 1.6 104.0 A 19
2009 PM	Max Queue (ft) LOS	64.4 379.4 C 1 5600 W	0.6 26.9 245.2 B 2 2 5600 W	18.8 166.6 B 3 5600 W	11.7 156.2 B 4 5200 W	12.1 159.1 B 5 5200 W	18.6 179.4 B 6 4800 W	54.2 407.4 C 7 4800 W	13.6 158.7 B 8 4800 W	0.0 0.0 A 9 5200 W	0.0 0.0 N/A 10 4980 W	0.0 A 11 5200 W	0.0 N/A 12 5400 W	26.7 A 13 5215 W	3.1 172.0 A 14 5600 W	4.1 121.2 A 15 5600 W	0.0 0.0 A 16 5200 W	0.0 0.0 A 17 5200 W	0.4 5.8 139.4 A 18 4800 W	0.3 1.6 104.0 A 19 4800 W
2009 PM	Max Queue (ft) LOS	64.4 379.4 C	0.6 26.9 245.2 B 2	18.8 166.6 B 3	11.7 156.2 B 4	12.1 159.1 B	18.6 179.4 B 6	54.2 407.4 C 7	13.6 158.7 B	0.0 0.0 A 9	0.0 0.0 N/A 10	0.0 A 11	0.0 N/A 12	26.7 A 13	3.1 172.0 A 14	4.1 121.2 A 15	0.0 0.0 0.0 A 16	0.0 0.0 0.0 A 17	0.4 5.8 139.4 A 18	0.3 1.6 104.0 A 19
2009 PM	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s)	64.4 379.4 C 1 5600 W 3500 S 10318 27.6	0.6 26.9 245.2 B 2 5600 W 4100 S 8054 16.3	18.8 166.6 B 3 5600 W 4700 S 5674 13.4	11.7 156.2 B 4 5200 W 3500 S 5359 9.6	12.1 159.1 B 5 5200 W 4100 S 5003 10.0	18.6 179.4 B 6 4800 W 3500 S 7662 17.0	54.2 407.4 C 7 4800 W 4100 S 9112 31.3	13.6 158.7 B 8 4800 W 4700 S 5270 12.8	0.0 0.0 A 9 5200 W 3745 S 1337 0.8	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0	0.0 A 11 5200 W 4025 S 1813 0.2	0.0 N/A 12 5400 W 4210 S 0 0.0	26.7 A 13 5215 W 4415 S 5180 3.3	3.1 172.0 A 14 5600 W 3800 S 5591 3.8	4.1 121.2 A 15 5600 W 4400 S 4858 8.9	0.0 0.0 A 16 5200 W 3800 S 2491 1.4	0.0 0.0 A 17 5200 W 4700 S 1759 0.8	0.4 5.8 139.4 A 18 4800 W 3800 S 3758 8.9	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6
2009 PM	Max Queue (ft) LOS Node number Intersection Vehicles	64.4 379.4 C 1 5600 W 3500 S 10318	0.6 26.9 245.2 B 2 5600 W 4100 S 8054	18.8 166.6 B 3 5600 W 4700 S 5674	11.7 156.2 B 4 5200 W 3500 S 5359	12.1 159.1 B 5 5200 W 4100 S 5003	18.6 179.4 B 6 4800 W 3500 S 7662	54.2 407.4 C 7 4800 W 4100 S 9112	13.6 158.7 B 4800 W 4700 S 5270	0.0 0.0 A 9 5200 W 3745 S 1337	0.0 0.0 N/A 10 4980 W 3725 S 0	0.0 A 11 5200 W 4025 S 1813	0.0 N/A 12 5400 W 4210 S 0	26.7 A 13 5215 W 4415 S 5180	3.1 172.0 A 14 5600 W 3800 S 5591	4.1 121.2 A 15 5600 W 4400 S 4858	0.0 0.0 A 16 5200 W 3800 S 2491	0.0 0.0 A 17 5200 W 4700 S 1759	0.4 5.8 139.4 A 18 4800 W 3800 S 3758	0.3 1.6 104.0 A 19 4800 W 4400 S 5051
2009 PM	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft)	64.4 379.4 C 5600 W 3500 S 10318 27.6 16.3 0.8 69.9	0.6 26.9 245.2 B 2 5600 W 4100 S 8054 16.3 8.5 0.6 30.4	18.8 166.6 B 3 5600 W 4700 S 5674 13.4 7.0 0.5 17.5	11.7 156.2 B 4 5200 W 3500 S 5359 9.6 4.8 0.4 9.8	12.1 159.1 B 5200 W 4100 S 5003 10.0 4.0 0.5 7.6	18.6 179.4 B 6 4800 W 3500 S 7662 17.0 11.2 0.5 29.1	54.2 407.4 C 7 4800 W 4100 S 9112 31.3 18.2 1.0 90.9	13.6 158.7 B 4800 W 4700 S 5270 12.8 4.3 0.6 14.4	0.0 0.0 A 9 5200 W 3745 S 1337 0.8 0.0 0.0 0.0	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 A 11 5200 W 4025 S 1813 0.2 0.0 0.0 0.0 0.0	0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0	26.7 A 5215 W 4415 S 5180 3.3 0.2 0.1 0.1	3.1 172.0 A 5600 W 3800 S 5591 3.8 0.9 0.1 3.0	4.1 121.2 A 5600 W 4400 S 4858 8.9 2.5 0.4 5.1	0.0 0.0 A 16 5200 W 3800 S 2491 1.4 0.0 0.0	0.0 0.0 A 17 5200 W 4700 S 1759 0.8 0.0 0.0	0.4 5.8 139.4 A 18 4800 W 3800 S 3758 8.9 2.1 0.4 4.7	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6 1.4 0.4 4.1
2009 PM	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s)	64.4 379.4 C 1 5600 W 3500 S 10318 27.6 16.3 0.8	0.6 26.9 245.2 B 2 5600 W 4100 S 8054 16.3 8.5 0.6	18.8 166.6 B 5600 W 4700 S 5674 13.4 7.0 0.5	11.7 156.2 B 4 5200 W 3500 S 5359 9.6 4.8 0.4	12.1 159.1 B 5 5200 W 4100 S 5003 10.0 4.0 0.5	18.6 179.4 B 6 4800 W 3500 S 7662 17.0 11.2 0.5	54.2 407.4 C 7 4800 W 4100 S 9112 31.3 18.2 1.0	13.6 158.7 B 4800 W 4700 S 5270 12.8 4.3 0.6	0.0 0.0 A 9 5200 W 3745 S 1337 0.8 0.0 0.0	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0	0.0 A 11 5200 W 4025 S 1813 0.2 0.0 0.0	0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0	26.7 A 5215 W 4415 S 5180 3.3 0.2 0.1	3.1 172.0 A 14 5600 W 3800 S 5591 3.8 0.9 0.1	4.1 121.2 A 15 5600 W 4400 S 4858 8.9 2.5 0.4	0.0 0.0 A 16 5200 W 3800 S 2491 1.4 0.0 0.0	0.0 0.0 A 17 5200 W 4700 S 1759 0.8 0.0 0.0	0.4 5.8 139.4 A 4800 W 3800 S 3758 8.9 2.1 0.4	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6 1.4 0.4
	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft) LOS	64.4 379.4 C 1 5600 W 3500 S 10318 27.6 16.3 0.8 69.9 483.9 C	0.6 26.9 245.2 B 25600 W 4100 S 8054 16.3 8.5 0.6 30.4 315.0 B	18.8 166.6 B 5600 W 4700 S 5674 13.4 7.0 0.5 17.5 193.0 B	11.7 156.2 B 4 5200 W 3500 S 5359 9.6 4.8 0.4 9.8 138.9 A	12.1 159.1 B 5 5200 W 4100 S 5003 10.0 4.0 0.5 7.6 139.4 A	18.6 179.4 B 6 4800 W 3500 S 7662 17.0 11.2 0.5 29.1 248.2 B	54.2 407.4 C 7 4800 W 4100 S 9112 31.3 18.2 1.0 90.9 700.2 C	13.6 158.7 B 4800 W 4700 S 5270 12.8 4.3 0.6 14.4 199.5 B	0.0 0.0 A 9 5200 W 3745 S 1337 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 A 11 5200 W 4025 S 1813 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 A	0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 N/A	26.7 A 5215 W 4415 S 5180 3.3 0.2 0.1 0.1 22.0 A	3.1 172.0 A 14 5600 W 3800 S 5591 3.8 0.9 0.1 3.0 231.1 A	4.1 121.2 A 15 5600 W 4400 S 4858 8.9 2.5 0.4 5.1 170.1 A	0.0 0.0 A 16 5200 W 3800 S 2491 1.4 0.0 0.0 0.0 0.0 0.0 A	0.0 0.0 A 17 5200 W 4700 S 1759 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 A	0.4 5.8 139.4 A 4800 W 3800 S 3758 8.9 2.1 0.4 4.7 122.5 A	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6 1.4 0.4 4.1 137.4 A
2009 PM	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stop delay (s) Stop action Node number	64.4 379.4 C 5600 W 3500 S 10318 27.6 16.3 0.8 69.9 483.9	0.6 26.9 245.2 B 2 5600 W 4100 S 8054 16.3 8054 16.3 8.5 0.6 30.4 315.0	18.8 166.6 B 3 5600 W 4700 S 5674 13.4 7.0 0.5 17.5 193.0	11.7 156.2 B 4 5200 W 3500 S 5359 9.6 4.8 0.4 9.8 138.9 A 4	12.1 159.1 B 5 5200 W 4100 S 5003 10.0 4.0 0.5 7.6 139.4	18.6 179.4 B 6 4800 W 3500 S 7662 17.0 11.2 0.5 29.1 248.2	54.2 407.4 C 7 4800 W 4100 S 9112 31.3 18.2 1.0 90.9 700.2	13.6 158.7 B 4800 W 4700 S 5270 12.8 4.3 0.6 14.4 199.5	0.0 0.0 A 9 5200 W 3745 S 1337 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 A 11 5200 W 4025 S 1813 0.2 0.0 0.0 0.0 0.0 0.0 0.0 A 11	0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	26.7 A 13 5215 W 4415 S 5180 3.3 0.2 0.1 0.1 0.1 0.1 22.0 A 13	3.1 172.0 A 14 5600 W 3800 S 5591 3.8 0.9 0.1 3.0 231.1 3.0 231.1 4	4.1 121.2 A 15 5600 W 4400 S 4858 8.9 2.5 0.4 5.1 170.1	0.0 0.0 0.0 A 16 5200 W 3800 S 2491 1.4 0.0 0.0 0.0 0.0 A A 16	0.0 0.0 0.0 A 17 5200 W 4700 S 1759 0.8 0.0 0.0 0.0 0.0 0.0 0.0 17	0.4 5.8 139.4 A 4800 W 3800 S 3758 8.9 2.1 0.4 4.7 122.5	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6 1.4 0.4 4.1 137.4
	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stop delay (s) Stop delay (s) Nag Queue (ft) LOS Node number Intersection	64.4 379.4 C 5600 W 3500 S 10318 27.6 16.3 0.8 69.9 483.9 C C 1 5600 W 3500 S	0.6 26.9 245.2 B 2 5600 W 4100 S 8054 16.3 8.5 0.6 30.4 315.0 B 2 5600 W 4100 S	18.8 166.6 B 5600 W 4700 S 5674 13.4 7.0 0.5 17.5 193.0 B 3 5600 W 4700 S	11.7 156.2 B 5200 W 3500 S 5359 9.6 4.8 0.4 9.8 138.9 A 138.9 A 5200 W 3500 S	12.1 159.1 B 5 5200 W 4100 S 5003 10.0 4.0 0.5 7.6 139.4 A C 5 5200 W 4100 S	18.6 179.4 B 6 4800 W 3500 S 7662 17.0 11.2 0.5 29.1 248.2 B 6 6 4800 W 3500 S	54.2 407.4 C 7 4800 W 4100 S 9112 31.3 18.2 1.0 90.9 700.2 C 7 4800 W 4100 S	13.6 158.7 B 4800 W 4700 S 5270 12.8 4.3 0.6 14.4 199.5 B 8 4800 W 4700 S	0.0 0.0 A 9 5200 W 3745 S 1337 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 9 9 5200 W 3745 S	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 A 11 5200 W 4025 S 1813 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 10 11 5200 W 4025 S	0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W 4210 S	26.7 A 5215 W 4415 S 5180 3.3 0.2 0.1 0.1 22.0 A 13 5215 W 4415 S	3.1 172.0 A 5600 W 3800 S 5591 3.8 0.9 0.1 3.0 231.1 A 14 5600 W 3800 S	4.1 121.2 A 15 5600 W 4400 S 4858 8.9 2.5 0.4 5.1 170.1 A 170.1 A 15 5600 W 4400 S	0.0 0.0 A 16 5200 W 3800 S 2491 1.4 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S	0.0 0.0 A 17 5200 W 4700 S 1759 0.8 0.0 0.0 0.0 0.0 0.0 A 17 5200 W 4700 S	0.4 5.8 139.4 A 18 4800 W 3800 S 3758 8.9 2.1 0.4 4.7 122.5 A 18 4800 W 3800 S	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6 1.4 0.4 4.1 137.4 A 19 4800 W 4400 S
	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stop delay (s) Max Queue (ft) LOS Node number Intersection Vehicles	64.4 379.4 C 3500 W 3500 S 10318 27.6 16.3 0.8 69.9 483.9 C C 1 5600 W 3500 S 7328	0.6 26.9 245.2 B 2 5600 W 4100 S 8054 16.3 8.5 0.6 30.4 315.0 B 2 2 2 600 W 4100 S 8208	18.8 166.6 B 3 5600 W 4700 S 5674 13.4 7.0 0.5 17.5 193.0 B 3 3 5600 W 4700 S 5600 W 4700 S 9891	11.7 156.2 B 4 5200 W 3500 S 5359 9.6 4.8 0.4 9.8 138.9 A 4 5200 W 3500 S 5645	12.1 159.1 B 5 5200 W 4100 S 5003 10.0 4.0 0.5 7.6 139.4 A 5200 W 4100 S 5200 W 4100 S	18.6 179.4 B 6 4800 W 3500 S 7662 17.0 11.2 0.5 29.1 248.2 B 6 6 4800 W 3500 S 6895	54.2 407.4 C 7 4800 W 4100 S 9112 31.3 18.2 1.0 90.9 700.2 C 7 4800 W 4100 S 7688	13.6 158.7 B 4800 W 4700 S 5270 12.8 4.3 0.6 14.4 199.5 B 8 8 4800 W 4700 S 7307	0.0 0.0 A 9 5200 W 3745 S 1337 0.8 0.0 0.0 0.0 0.0 0.0 A 9 9 5200 W 3745 S 1535	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 10 4980 W 3725 S 0	0.0 A 11 5200 W 4025 S 1813 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W 4210 S 0	26.7 A 13 5215 W 4415 S 5180 3.3 0.2 0.1 0.1 0.1 0.1 22.0 A 13 5215 W 4415 S 4118	3.1 172.0 A 14 5600 W 3800 S 5591 3.8 0.9 0.1 3.8 0.9 0.1 3.0 231.1 A 14 5600 W 3800 S 3567	4.1 121.2 A 15 5600 W 4400 S 4400 S 4858 8.9 2.5 0.4 5.1 170.1 A 15 5600 W 4400 S 4400 S	0.0 0.0 A 16 5200 W 3800 S 2491 1.4 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2426	0.0 0.0 A 17 5200 W 4700 S 1759 0.8 0.0 0.0 0.0 0.0 0.0 A 17 5200 W 4700 S 5200 W 4700 S	0.4 5.8 139.4 A 800 W 3800 S 3758 8.9 2.1 0.4 4.7 122.5 A 18 4800 W 3800 S 3009	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6 1.4 0.4 4.1 137.4 A 19 4800 W 4400 S 3104
	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stop delay (s) Stop delay (s) Nag Queue (ft) LOS Node number Intersection	64.4 379.4 C 5600 W 3500 S 10318 27.6 16.3 0.8 69.9 483.9 C C 1 5600 W 3500 S	0.6 26.9 245.2 B 2 5600 W 4100 S 8054 16.3 8.5 0.6 30.4 315.0 B 2 5600 W 4100 S 8208 24.6 16.2	18.8 166.6 B 5600 W 4700 S 5674 13.4 7.0 0.5 17.5 193.0 B 3 5600 W 4700 S	11.7 156.2 B 4 5200 W 3500 S 5359 9.6 4.8 0.4 9.8 138.9 A 5200 W 3500 S 5645 14.1 6.6	12.1 159.1 B 5 5200 W 4100 S 5003 10.0 4.0 0.5 7.6 139.4 A A 5 5200 W 4100 S 6123 15.6 7.8	18.6 179.4 B 6 4800 W 3500 S 7662 17.0 11.2 0.5 29.1 248.2 B 6 4800 W 3500 S 6895 14.6 7.3	54.2 407.4 C 7 4800 W 4100 S 9112 31.3 18.2 1.0 90.9 700.2 C 7 4800 W 4100 S 7688 22.0 12.9	13.6 158.7 B 4800 W 4700 S 5270 12.8 4.3 0.6 14.4 199.5 B 8 4800 W 4700 S 7307 18.7 7.8	0.0 0.0 A 9 5200 W 3745 S 1337 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 A 11 5200 W 4025 S 1813 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W 4210 S	26.7 A 5215 W 4415 S 5180 3.3 0.2 0.1 0.1 22.0 A 13 5215 W 4415 S	3.1 172.0 A 14 5600 W 3800 S 5591 3.8 0.9 0.1 3.0 231.1 A 5600 W 3800 S 3567 3.3 0.5	4.1 121.2 A 15 5600 W 4400 S 4858 8.9 2.5 0.4 5.1 170.1 A 170.1 A 15 5600 W 4400 S	0.0 0.0 0.0 A 16 5200 W 3800 S 2491 1.4 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2426 1.5 0.0	0.0 0.0 A 17 5200 W 4700 S 1759 0.8 0.0 0.0 0.0 0.0 0.0 A 17 5200 W 4700 S	0.4 5.8 139.4 A 18 4800 W 3800 S 3758 8.9 2.1 0.4 4.7 122.5 A 18 4800 W 3800 S 3009 8.5 1.7	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6 1.4 4.1 137.4 A 4.1 137.4 A 4400 S 3104 5.7 1.1
	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Node number Intersection Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stop delay (s)	64.4 379.4 C 1 5600 W 3500 S 10318 27.6 16.3 0.8 69.9 C 483.9 C 1 5600 W 3500 S 7328 23.7 14.5 0.7	0.6 26.9 245.2 B 2 5600 W 4100 S 8054 16.3 8.5 0.6 30.4 315.0 B 2 2 600 W 4100 S 8208 24.6 16.2 8208 24.6 16.6	18.8 166.6 B 3 5600 W 4700 S 5674 13.4 7.0 0.5 17.5 193.0 B 3 5600 W 4700 S 9891 60.8 16.8 1.0	11.7 156.2 B 5200 W 3500 S 5359 9.6 4.8 0.4 9.8 138.9 A 4 5200 W 3500 S 5645 14.1 6.6 6 0.5	12.1 159.1 B 5200 W 4100 S 5003 10.0 4.0 5500 W 4100 S 5200 W 4100 S 6123 15.6 7.8 0.6	18.6 179.4 B 6 4800 W 3500 S 7662 17.0 11.2 0.5 29.1 248.2 B 6 4800 W 3500 S 6895 14.6 7.3 0.5	54.2 407.4 C 7 4800 W 4100 S 9112 31.3 18.2 1.0 90.9 700.2 C 7 4800 W 4100 S 7688 22.0 12.9 0.7	13.6 158.7 B 4800 W 4700 S 5270 12.8 4.3 0.6 14.4 199.5 B 8 4800 W 4700 S 7307 18.7 7.8 0.7	0.0 0.0 A 9 5200 W 3745 S 1337 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 A 5200 W 3745 S 1535 0.6 0.0 0.0 0.0	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 A 111 5200 W 4025 S 1813 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 A 111 5200 W 4025 S 1924 0.2 0.0 0.0 0.0	0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	26.7 A 5215 W 4415 S 5180 0.2 0.1 0.1 0.1 0.1 22.0 A 13 5215 W 4415 S 4118 6.1 0.4 0.1	3.1 172.0 A 14 5600 W 3800 S 5591 3.8 0.9 0.1 3.0 231.1 A 14 5600 W 3800 S 3806 S 38567 3.3 0.5 0.1	4.1 121.2 A 15 5600 W 4400 S 44858 8.9 2.5 0.4 5.1 170.1 A 5600 W 4400 S 4400 S 4400 S 4400 S 4400 S 4269 6.1 1.3 0.3	0.0 0.0 A 5200 W 3800 S 2491 1.4 0.0 0.0 0.0 0.0 A A 16 5200 W 3800 S 5200 W 3800 S 2426 1.5 0.0 0.0	0.0 0.0 A 5200 W 4700 S 1759 0.8 0.0 0.0 0.0 0.0 0.0 0.0 A 177 5200 W 4700 S 5478 2.1 0.0 0.0	0.4 5.8 139.4 A 4800 W 3800 S 3758 8.9 2.1 0.4 4.7 122.5 A 4800 W 3800 S 3800 S 3800 S 3009 8.5 1.7 0.4	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6 1.4 0.4 4.1 137.4 A 137.4 A 19 4800 W 4400 S 3104 5.7 1.1 0.3
	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Max Queue (ft) Max Queue (ft) Stop Bay (s) Stop Ba	64.4 379.4 C 1 5600 W 3500 S 10318 27.6 16.3 0.8 669.9 483.9 C C 1 5600 W 3500 S 7328 23.7 14.5	0.6 26.9 245.2 B 2 5600 W 4100 S 8054 16.3 8.5 0.6 30.4 315.0 B 2 5600 W 4100 S 8208 24.6 16.2	18.8 166.6 B 3 5600 W 4700 S 5674 13.4 7.0 0.5 17.5 193.0 B 3 5600 W 4700 S 9891 60.8 16.8	11.7 156.2 B 4 5200 W 3500 S 5359 9.6 4.8 0.4 9.8 138.9 A 5200 W 3500 S 5645 14.1 6.6	12.1 159.1 B 5 5200 W 4100 S 5003 10.0 4.0 0.5 7.6 139.4 A A 5 5200 W 4100 S 6123 15.6 7.8	18.6 179.4 B 6 4800 W 3500 S 7662 17.0 11.2 0.5 29.1 248.2 B 6 4800 W 3500 S 6895 14.6 7.3	54.2 407.4 C 7 4800 W 4100 S 9112 31.3 18.2 1.0 90.9 700.2 C 7 4800 W 4100 S 7688 22.0 12.9	13.6 158.7 B 4800 W 4700 S 5270 12.8 4.3 0.6 14.4 199.5 B 8 4800 W 4700 S 7307 18.7 7.8	0.0 0.0 A 9 5200 W 3745 S 1337 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 A 11 5200 W 4025 S 1813 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0	26.7 A 13 5215 W 4415 S 5180 3.3 0.2 0.1 0.1 22.0 A 1 3 5215 W 4415 S 13 5215 W 4415 S 4415 S	3.1 172.0 A 14 5600 W 3800 S 5591 3.8 0.9 0.1 3.0 231.1 A 5600 W 3800 S 3567 3.3 0.5	4.1 121.2 A 15 5600 W 4400 S 4858 8.9 2.5 0.4 45.1 170.1 A 5.1 170.1 A 15 5600 W 4400 S 4400 S 4269 6.1 1.3	0.0 0.0 0.0 A 16 5200 W 3800 S 2491 1.4 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2426 1.5 0.0	0.0 0.0 A 17 5200 W 4700 S 1759 0.8 0.0 0.0 0.0 0.0 0.0 0.0 A 17 5200 W 4700 S 5478 2.1 0.1	0.4 5.8 139.4 A 18 4800 W 3800 S 3758 8.9 2.1 0.4 4.7 122.5 A 18 4800 W 3800 S 3009 8.5 1.7	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6 1.4 4.1 137.4 A 4.1 137.4 A 4400 S 3104 5.7 1.1
	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stop delay (s)	64.4 379.4 C 1 5600 W 3500 S 10318 27.6 16.3 0.8 69.9 483.9 C C 1 5600 W 3500 S 3500 S 3500 S 3500 S 14.5 0.7 7328 23.7 14.5 0.7 37.9	0.6 26.9 245.2 B 2 5600 W 4100 S 8054 16.3 8.5 0.6 30.4 315.0 B 2 55000 W 4100 S 8208 24.00 16.2 0.6 6 16.2 0.6	18.8 166.6 B 5600 W 4700 S 5674 13.4 7.0 0.5 17.5 193.0 B 5000 W 4700 S 9891 60.8 16.8 1.0 171.2	11.7 156.2 B 5200 W 3500 S 5359 9.6 4.8 0.4 9.8 138.9 A 4 5200 W 3500 S 5645 14.1 6.6 0.5 5645	12.1 159.1 B 5200 W 4100 S 5003 10.0 4.0 0.5 7.6 139.4 A A 5 5200 W 4100 S 5 5200 W 4100 S 6123 15.6 7.8 0.6 628.6	18.6 179.4 B 6 4800 W 3500 S 7662 17.0 11.2 0.5 29.1 248.2 B 6 4800 W 3500 S 6 8 5 14.6 7.3 0.5 31.0	54.2 407.4 C 7 4800 W 4100 S 9112 31.3 18.2 1.0 90.9 700.2 C 7 4800 W 4100 S 7688 22.0 12.9 0.7 40.0	13.6 158.7 B 4800 W 4700 S 5270 12.8 4.3 0.6 14.4 199.5 B 8 4800 W 4700 S 8 7307 18.7 7.8 0.7 7.8 0.7 7.2	0.0 0.0 A 9 5200 W 3745 S 11337 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 A 11 5200 W 4025 S 1813 0.2 0.0 0.0 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 1924 0.2 0.0 0.0 0.0 0.0 0.0	0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	26.7 A 13 5215 W 4415 S 5180 3.3 0.2 0.1 22.0 A 13 5215 W 4415 S 14118 6.1 0.4 0.1 2.6	3.1 172.0 A 14 5600 W 3800 S 5591 3.8 0.9 0.1 3.0 231.1 A 4 5600 W 3800 S 3567 3.3 0.5 5.5 1.1 0.1 1.0	4.1 121.2 A 15 5600 W 4400 S 4858 8.9 2.5 0.4 5.1 170.1 A 5500 W 4400 S 4269 6.1 1.3 0.3 0.3 0.3 2.2	0.0 0.0 0.0 A 16 5200 W 3800 S 2491 1.4 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2426 1.5 0.0 0.0 0.0	0.0 0.0 0.0 A 17 5200 W 4700 S 1759 0.8 0.0 0.0 0.0 0.0 0.0 A 17 5200 W 4700 S 5478 2.1 0.1 0.0 55478	0.4 5.8 139.4 A 18 4800 W 3800 S 3758 8.9 2.1 0.4 4.7 122.5 A 122.5 A 18 4800 W 3800 S 3009 8.5 1.7 0.4 0.4 9.4.9	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6 1.4 0.4 4.1 137.4 A 19 4800 W 4400 S 3104 5.7 1.1 0.3 2.7
	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stop delay (s) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stop delay (s) Stop delay (s)	64.4 379.4 C 5600 W 3500 S 10318 27.6 16.3 0.8 69.9 C 483.9 C 1 5600 W 3500 S 7328 23.7 14.5 0.7 37.9 226.5	0.6 26.9 245.2 B 2 5500 W 4100 S 8054 16.3 8.5 0.6 30.4 315.0 B 2 5600 W 4100 S 8208 24.6 16.2 0.6 16.2 0.6	18.8 166.6 B 5600 W 4700 S 5674 13.4 7.0 0.5 17.5 193.0 B 3 5600 W 4700 S 9891 60.8 16.8 1.0 171.2 1040.1	11.7 156.2 8 5200 W 3500 S 5359 9.6 4.8 0.4 9.8 138.9 A 4 5200 W 3500 S 5645 14.1 6.6 0.5 572 17.2 237.4	12.1 159.1 B 5200 W 4100 S 5003 10.0 4.0 0.5 7.6 139.4 A A 5 5200 W 4100 S 6123 15.6 7.8 0.6 28.6 6 371.0	18.6 179.4 B 6 4800 W 3500 S 7662 17.0 11.2 0.5 29.1 248.2 B 6 4800 W 3500 S 6895 14.6 7.3 0.5 31.0 295.0	54.2 407.4 C 4800 W 4100 S 9112 31.3 18.2 1.0 90.9 700.2 C 7 4800 W 4100 S 7688 22.0 12.9 0.7 40.0 313.8	13.6 158.7 B 4800 W 4700 S 5270 12.8 4.3 0.6 14.4 199.5 B 8 4800 W 4700 S 7307 18.7 7.8 0.7 42.6 476.3	0.0 0.0 A 5200 W 3745 S 1337 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 A 5200 W 3745 S 1535 0.6 6 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 A 11 5200 W 4025 S 1813 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 1924 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	26.7 A 5215 W 4415 S 5180 3.3 0.2 0.1 0.1 22.0 A 13 5215 W 4415 S 4415 S 4415 S 4115 S 4116 A 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	3.1 172.0 3800 S 3800 S 5591 3.8 0.9 0.1 3.0 231.1 A 4 5600 W 3800 S 3567 3.3 0.5 0.1 1.0 88.9	4.1 121.2 A 5600 W 4400 S 4400 S 4858 8.9 2.5 0.4 5.1 170.1 A 7 5600 W 4400 S 4269 6.1 1.3 0.3 3.2 151.1	0.0 0.0 A 16 5200 W 3800 S 2491 1.4 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2426 1.5 0.0 0.0 0.0 0.0 0.0 3800 S	0.0 0.0 A 17 5200 W 4700 S 1759 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.4 5.8 139.4 A 18 4800 W 3800 S 3758 8.9 2.1 0.4 4.7 122.5 A 4.7 122.5 A 4800 W 3800 S 3009 8.5 1.7 0.4 4.9 212.1	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6 1.4 4.1 137.4 A 4.1 137.4 A 4400 S 3104 5.7 1.1 0.3 2.7 92.2
2040 AM	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Avg Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s)	64.4 379.4 C 5600 W 3500 S 10318 27.6 16.3 0.8 69.9 483.9 C 1 5600 W 3500 S 7328 23.7 14.5 0.7 37.9 226.5 C 1 5600 W	0.6 26.9 245.2 B 2 5600 W 4100 S 8054 16.3 8.5 0.6 30.4 315.0 B 2 5600 W 4100 S 8208 24.6 16.2 5600 W 2 5600 W	18.8 166.6 B 3 5600 W 4700 S 5674 13.4 7.0 0.5 17.5 193.0 B 3 5600 W 4700 S 9891 60.8 1.0 171.2 1040.1 E 3 5600 W	11.7 156.2 B 5200 W 3500 S 5359 9.6 4.8 0.4 9.8 138.9 A 5200 W 3500 S 5645 14.1 6.6 0.5 17.2 237.4 B 4 5200 W	12.1 159.1 5 5200 W 4100 S 5003 10.0 4.0 0.5 7.6 139.4 A 5 5200 W 4100 S 6123 15.6 7.8 6123 15.6 7.8 6123 15.6 7.8 6123 15.6 7.8 6 371.0 B 5 5 5200 W	18.6 179.4 8 4800 W 3500 S 7662 17.0 0.5 29.1 248.2 8 6 4800 W 3500 S 6895 14.6 7.3 3.0 0.5 31.0 295.0 B 6 4800 W	54.2 407.4 C 7 4800 W 4100 S 9112 31.3 18.2 1.0 90.9 700.2 C 7 4800 W 4100 S 7688 22.0 12.9 0.7 4.00 313.8 C 7 4800 W	13.6 158.7 8 4800 W 4700 S 5270 12.8 4.3 0.6 14.4 199.5 B 8 4800 W 4700 S 7307 18.7 7.8 8 0.7 42.6 476.3 B 8 4800 W	0.0 0.0 A 5200 W 3745 S 1337 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 A 11 5200 W 4025 S 1813 0.2 0.0 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 1924 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	26.7 A 13 5215 W 4415 S 5180 3.3 0.2 0.1 0.1 22.0 A 13 5215 W 4415 S 4118 6.1 0.4 415 S 4118 6.1 0.1 2.6 139.6 A 35215 W	3.1 172.0 A 5600 W 3800 S 5591 3.8 0.9 0.1 3.0 231.1 A 5600 W 3567 3.3 0.5 3567 3.3 0.5 0.1 1.0 88.9 A A 14 5600 W	4.1 121.2 5600 W 4400 S 4858 8.9 2.5 0.4 5.1 170.1 A 15 5600 W 4269 6.1 1.3 0.3 3.2 151.1 A 5500 W	0.0 0.0 0.0 A 3800 S 2491 1.4 0.0 0.0 0.0 0.0 0.0 A A 16 5200 W 3800 S 2426 1.5 0.0 0.0 0.0 0.0 3800 S 2426 1.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 A 17 5200 W 4700 S 1759 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 A 17 5200 W 4700 S 5478 2.1 0.0 0.5 5478 2.1 0.0 0.0 5478 2.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.4 5.8 139.4 A 18 4800 W 3800 S 3758 8.9 2.1 0.4 4.7 122.5 A 18 4800 W 3800 S 3009 8.5 1.7 0.4 4.9 212.1 A 18 4800 W	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6 1.4 0.4 4.1 137.4 A 19 4800 W 4400 S 3104 5.7 1.1 0.3 2.7 92.2 A 19 4800 W
2040 AM	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Node number Intersection Vehicles Delay (s) Stop delay (s) Node number LOS Node number	64.4 379.4 C 1 5600 W 3500 S 10318 27.6 16.3 0.8 69.9 483.9 C C 1 5600 W 3500 S 3500 S 3500 S 7328 23.7 14.5 0.7 37.9 226.5 C C	0.6 26.9 245.2 B 25600 W 4100 S 8054 16.3 8.5 0.6 30.4 315.0 B 2 2 5600 W 4100 S 8208 24.6 16.2 0.6 46.7 297.3 C	18.8 166.6 B 3 3 5600 W 4700 S 5674 13.4 7.0 0.5 17.5 193.0 B 3 5600 W 4700 S 9891 60.8 1.0 171.2 1040.1 E 1040.1 E	11.7 156.2 B 4 5200 W 3500 S 5359 9.6 4.8 0.4 9.8 138.9 A 4 5200 W 3500 S 5645 14.1 3500 S 5645 14.1 6.6 0.5 17.2 237.4 B	12.1 159.1 B 5200 W 4100 S 5003 10.0 4.0 4.0 0.5 7.6 139.4 A A 5200 W 4100 S 6123 15.6 7.8 6123 15.6 7.8 0.6 28.6 28.6 371.0 B	18.6 179.4 B 4800 W 3500 S 7662 17.0 11.2 0.5 29.1 248.2 B 6 4800 W 3500 S 66895 14.6 7.3 3.0 0.5 3.10 0 B B	54.2 407.4 C 7 4800 W 4100 S 9112 31.3 18.2 1.0 90.9 700.2 C 7 4800 W 4100 S 7688 22.0 4100 S 7688 22.0 0.7 400 S 12.9 0.7 413.8 C 7 7	13.6 158.7 B 4800 W 4700 S 5270 12.8 4.3 0.6 14.4 199.5 B 8 8 4800 W 4700 S 7307 18.7 7.8 0.7 42.6 476.3 B	0.0 0.0 A 9 9 5200 W 3745 S 1337 0.8 0.0 0.0 0.0 0.0 0.0 A 9 9 5200 W 3745 S 1535 0.6 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4 2000 M 3745 S 2000 W 3745 S 2000 M 3745 S 2000 W 3745 S 2000 W 375 S 375 S 375 S 2000 W 375 S 2000 W	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 A 11 5200 W 4025 S 1813 0.2 0.0 0.0 0.0 0.0 A 4025 S 1924 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	26.7 A 13 5215 W 4415 S 5180 3.3 0.2 0.1 0.1 0.1 22.0 A 13 5215 W 4415 S 4118 4118 4118 4115 S 4118 4115 S 4115 S 4118 418	3.1 172.0 A 14 5600 W 3800 S 5591 3.8 0.9 0.1 3.0 231.1 A 14 5600 W 3800 S 3567 3.3 0.5 0.1 1.0 0 88.9 A 14	4.1 121.2 A 5500 W 4400 S 4858 8.9 2.5 0.4 5.1 170.1 A 5500 W 4400 S 4400 S 4400 S 4400 S 4400 S 4400 S 4400 S 15.1 1 A	0.0 0.0 0.0 A 16 5200 W 3800 S 2491 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2426 1.5 5200 W 3800 S 2426 1.5 0.0 0.0 0.0 0.0 16 5200 W 3800 S 2421 16 5200 W 3800 S 2421 16 5200 W 3800 S 5200 W 5200 W 5200W 5200 W 5200W 5200W 5200W 5200W 5200W 5200W 52	0.0 0.0 A 17 5200 W 4700 S 1759 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.4 5.8 139.4 A 18 4800 W 3800 S 3758 8.9 2.1 0.4 0.4 0.4 0.4 0.4 7122.5 A 4800 W 3800 S 3009 8.5 1.7 0.4 4.9 212.1 A 18	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6 1.4 4.1 137.4 A 4.1 137.4 4.1 137.4 4.0 4400 S 3104 5.7 1.1 0.3 2.7 92.2 A 19
2040 AM	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stop delay (s) Stop delay (s) Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Node number Intersection Vehicles Delay (s) Node number Intersection	64.4 379.4 C 5600 W 3500 S 10318 27.6 16.3 0.8 69.9 483.9 C C 1 5600 W 3500 S 7328 23.7 14.5 C 737.9 226.5 C 1 5600 W 3500 S 12503 221.1	0.6 26.9 245.2 B 2 5600 W 4100 S 8054 16.3 8.5 0.6 30.4 315.0 B 2 5600 W 4100 S 8008 24.6 16.2 0.6 46.7, 2 97.2 97.3 C 2 5600 W 4100 S	18.8 166.6 B 3 5600 W 4700 S 5674 13.4 13.4 1.3.4 1.3.7 193.0 B 3 5600 W 4700 S 10.6 1.0 171.2 1040.1 E 3 5600 W 4700 S 10.6 1.0 171.2 1040.1 E 3 5600 W 4700 S 10.6 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5	11.7 156.2 B 5200 W 3500 S 5359 9.6 4.8 0.4 9.8 138.9 A 5200 W 3500 S 5645 14.1 6.6 0.5 17.2 237.4 B 4 5200 W 3500 S 9512 27.0	12.1 159.1 B 5200 W 4100 S 5003 10.0 4.0 0.5 7.6 139.4 A 400 S 6123 15.6 7.8 6123 15.6 7.8 6123 15.6 7.8 6123 15.6 7.8 6 28.6 371.0 B 5 5200 W 4100 S	18.6 179.4 B 6 4800 W 3500 S 7662 17.0 0.5 29.1 248.2 B 6 4800 W 3500 S 6895 14.6 7.3 0.5 31.0 29.5 31.0 29.5 31.0 B 6 4800 W 3500 S 11.22 6 4800 W 3500 S 11.22 6 4800 W 3500 S 11.22 6 4800 W 3500 S 11.2 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5	54.2 407.4 C 7 4800 W 4100 S 9112 31.3 18.2 1.0 90.9 700.2 C 7 4800 W 4100 S 7688 22.0 12.9 0.7 4800 W 4100 S 7 4800 W 4100 S	13.6 158.7 8 4800 W 4700 S 5270 12.8 4.3 0.6 14.4 199.5 B 8 4800 W 4700 S 7307 18.7 7.8 0.7 42.6 476.3 B 8 4800 W 4700 S 9 229 118.4	0.0 0.0 A S200 W 3745 S 1337 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 A 11 5200 W 4025 S 1813 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	26.7 A 13 5215 W 4415 S 5180 3.3 0.2 0.1 0.1 22.0 A 13 5215 W 4415 S 44118 6.1 0.4 0.1 2.6 139.6 A 13 5215 W 4415 S 5705 A 59.3	3.1 172.0 A 5600 W 3800 S 5591 3.8 0.9 0.1 3.8 0.9 0.1 0.1 231.1 A 5600 W 3800 S 3567 3.3 0.5 3.5 0.1 1.0 88.9 A 14 5600 W 3800 S 11.6	4.1 121.2 5600 W 4400 S 4858 8.9 2.5 0.4 5.1 170.1 A 25 5600 W 4400 S 6.1 1.3 3.2 151.1 A 15 5600 W 4400 S 6224 A 8.6	0.0 0.0 0.0 A 3800 S 2491 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 A A 16 5200 W 3800 S 2426 1.5 0.0 0.0 0.0 0.23.3 A 16 5200 W 3800 S	0.0 0.0 A 17 5200 W 4700 S 17590 S 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.4 5.8 139.4 A 18 4800 W 3800 S 3758 8.9 2.1 0.4 4.7 122.5 A 4.7 122.5 A 18 4800 W 3800 S 3009 8.5 1.7 0.4 4.9 212.1 A 18 4800 W 3800 S 1.7 0.4 4.9 212.1 A	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6 1.4 0.4 4.1 137.4 A 19 4800 W 4400 S 3104 5.7 1.1 0.3 2.7 A 19 4800 W 4400 S 3104 5.7 1.1 0.3 2.7 A 19 4800 W 4400 S 3104 5.7 1.1 0.3 2.7 0.1 0.3 0.3 0.5 1.1 0.3 0.3 0.5 1.1 0.3 0.3 0.5 0.5 1.1 0.3 0.5 0.5 0.5 1.1 0.3 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
2040 AM	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stop delay (s) Stop delay (s) Node number Intersection Vehicles Delay (s) Stop delay (s) Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stop delay (s)	64.4 379.4 C 5600 W 3500 S 10318 27.6 16.3 0.8 6.9 9.9 9.9 9.9 20 500 W 3500 S 7328 23.7 14.5 0.7 37.9 226.5 C 1 37.9 226.5 C 1 3500 S	0.6 26.9 245.2 B 25600 W 4100 S 8054 16.3 8.5 0.6 30.4 315.0 B 2 2 5600 W 4100 S 8208 24.6 16.2 0.6 46.7 297.3 C 2 5500 W 4100 S	18.8 166.6 B 3 5600 W 4700 S 5674 13.4 7.0 0.5 17.5 193.0 B 3 5600 W 4700 S 9891 60.8 16.8 1.0 171.2 1040.1 E 3 3 5600 W 4700 S 105 105 105 105 105 105 105 105	11.7 1562 4 5200 W 3500 S 5359 9.6 4.8 0.4 9.8 138.9 A 4 5200 W 3500 S 5645 14.1 6.6 0.5 17.2 237.4 B 4 4 5200 W 3500 S 5645 14.1 6.6 0.5 17.2 237.4 B 4 4 6.0 5200 W 3500 S	12.1 159.1 5 5200 W 4100 S 5003 10.0 5 5003 10.0 139.4 A A 5 5200 W 4100 S 6123 15.6 7.8 6123 15.6 7.8 6123 15.6 7.8 6123 15.6 7.8 6 371.0 8 5 5200 W 4100 S	18.6 179.4 6 4800 W 3500 S 7662 17.0 0.5 29.1 248.2 B 6 4800 W 3500 S 68955 14.6 7.3 0.5 31.0 295.0 B 6 4800 W 3500 S 68955 14.6 7.5 31.0 295.0 B 6 4800 W 3500 S 6 7 6 7 6 7 6 7 6 7 6 7 6 7 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7	54.2 407.4 C 7 4800 W 4100 S 9112 31.3 18.2 1.0 90.9 700.2 C 7 4800 W 4100 S 7688 22.0 12.9 0.7 400 S 12.9 0.7 400 W 4100 S 9744	13.6 158.7 B 4800 W 4700 S 5270 12.8 4.3 0.6 14.4 199.5 B 8 4800 W 4700 S 7307 18.7 7.8 0.7 42.6 476.3 B 4800 W 4700 S	0.0 0.0 A 5200 W 3745 S 1337 0.8 0.0 0.0 0.0 0.0 0.0 A 9 5200 W 3745 S 1535 0.6 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 A 111 5200 W 4025 S 1813 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4025 S 1924 4025 S 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	26.7 A 13 5215 W 4415 S 5180 3.3 0.2 0.1 0.1 0.1 0.1 0.2 0.2 A 13 5215 W 4415 S 4415 S 6.1 0.4 0.1 0.4 0.2 6.1 3.6 13 5215 W 4415 S 5705 9.3 1.9	3.1 172.0 A 5600 W 3800 S 5591 3.8 0.9 0.1 3.0 0 231.1 A 231.1 A 3.0 5 000 W 3800 S 3567 3.3 0.5 0.1 1.0 88.9 A 14 5600 W 3800 S 5591 3.5 7 3.3 5 5591 3.5 8 5591 3.5 7 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	4.1 121.2 A 5600 W 4400 S 4858 8.9 2.5 0.4 5.1 170.1 A 5500 W 4400 S 4400 S 4400 S 4400 S 4400 S 4269 6.1 1.3 0.3 3.2 151.1 A 5500 W 4400 S 5500 W 4400 S 5500 W 4400 S 5500 W 4400 S 5500 W 4400 S 5500 W 4400 S 6224	0.0 0.0 0.0 A 16 5200 W 3800 S 2491 1.4 0.0 0.0 0.0 0.0 0.0 A A 3800 S 2426 1.5 0.0 0.0 0.0 0.0 23.3 A A 16 5200 W 3800 S 2426 1.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 A 17 5200 W 4700 S 1759 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 A 4700 S 5478 2.1 0.1 0.5 295.1 A 17 5200 W 4700 S 5478 2.2 10.5 295.1 A 5200 W 4700 S	0.4 5.8 139.4 A 18 4800 W 3800 S 3758 8.9 2.1 0.4 4.7 122.5 A 4.7 122.5 A 4800 W 3800 S 3009 8.5 1.7 0.4 4.9 212.1 A 480 400 W 3800 S	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6 1.4 4.1 137.4 A 4800 W 4400 S 3104 5.7 1.1 0.3 2.7 92.2 A 19 4800 W 4400 S 5.7 92.2 A 19 19 4800 W 4400 S 5.7 92.2 0 19 19 19 19 10 10 10 10 10 10 10 10 10 10
2040 AM	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Node number Intersection Vehicles Delay (s) Stop delay (s) Node number Intersection Vehicles Delay (s) Stop delay (s) Node number Intersection Vehicles Delay (s) Stop delay (s)	64.4 379.4 C 5600 W 3500 S 10318 27.6 63.0 869.9 483.9 C 7.6 60.9 483.9 C 1 5600 W 3500 S 7328 23.7 14.5 C 737.9 226.5 C 1 5600 W 3500 S 12503 1 5600 W 3201.1 136.9 3.3 810.1	0.6 26.9 245.2 B 2500 W 4100 S 8054 16.3 8.5 0.6 30.4 315.0 B 2 5600 W 4100 S 8208 24.6 16.2 0.6 46.7 297.3 C 2 5600 W 4100 S 10141 26.0 0 5600 W 4100 S	18.8 166.6 B 3 5600 W 4700 S 5674 13.4 13.4 13.4 13.4 13.4 13.5 193.0 B 3 5600 W 4700 S 104.0 17.5 193.0 B 5600 W 4700 S 104.0 104.0 11.5 104.0 104.0 104.0 104.0 104.0 105.0 105.0 104.0 105.0	11.7 156.2 B 5200 W 3500 S 5359 9.6 4.8 0.4 9.8 138.9 A 5200 W 3500 S 5645 14.1 6.6 0.5 17.2 2300 W 3500 S 9512 4 5200 W 3500 S 9512 27.0 16.0 0.6 6 1.1	12.1 159.1 B 5200 W 4100 S 5003 10.0 4.0 0.5 7.6 139.4 A 400 S 6123 15.6 7.8 6123 15.6 7.8 6123 15.6 7.8 6123 15.6 7.8 6 28.6 371.0 B 5 5200 W 4100 S 5 5 5200 W 4100 S 6123 15.6 7.6 7.6 6 28.6 371.0 B	18.6 179.4 8 6 4800 W 3500 S 7662 17.0 0.5 29.1 248.2 B 6 4800 W 3500 S 6895 14.6 7.3 0.5 31.0 295.0 B 6 4800 W 3500 S 11.2 6 4800 W 3500 S 11.2 6 4800 W 3500 S 11.2 6 6 4800 W 3500 S 12.2 6 6 4800 W 3500 S 12.2 6 6 4800 W 3500 S 12.2 6 6 4800 W 3500 S 12.2 1.2 1.2 1.2 1.2 1.2 1.2 1.	54.2 407.4 C 7 4800 W 4100 S 9112 318.2 1.0 90.9 700.2 C 7 4800 W 4100 S 7688 22.0 12.9 0.7 4800 W 4100 S 7 6 880 C 7 4800 W 4100 S 7 7 4800 W 4100 S	13.6 158.7 8 4800 W 4700 S 5270 12.8 4.3 0.6 14.4 199.5 B 4800 W 4700 S 7307 18.7 7.8 0.7 42.6 476.3 B 4800 W 4700 S 9118.4 53.6 3.1 518.7	0.0 0.0 A 5200 W 3745 S 1337 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 A 11 5200 W 4025 S 1813 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	26.7 A 13 5215 W 4415 S 5180 3.3 0.2 0.1 0.1 22.0 A 13 5215 W 4415 S 4415 S 4418 6.1 0.4 139.6 A 13 5215 W 4415 S 4415 S 4415 S 5705 0.1 0.1 0.1 0.1 0.2 0.1 0.1 0.2 0.1 0.2 0.2 0.1 0.2 0.1 0.2 0.2 0.1 0.2 0.2 0.1 0.2 0.1 0.2 0.2 0.1 0.2 0.2 0.1 0.2 0.2 0.2 0.2 0.1 0.1 0.2 0.2 0.2 0.1 0.1 0.2 0.2 0.2 0.1 0.1 0.1 0.2 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1	3.1 172.0 A 5600 W 3800 S 5591 3.8 0.9 0.1 3.8 0.9 0.1 3.8 231.1 A 5600 W 3800 S 3567 3.3 0.5 3567 3.3 0.1 1.0 88.9 A A 14 5600 W 3800 S 1.1 6 0.1 1.0 1.0 5 800 S 3567 1.1 1.0 5 8 1.0 1.0 1.0 1.0 1.0 5 1.0 1.0 5 5 5 1.1 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	4.1 121.2 5600 W 4400 S 4858 8.9 2.5 0.4 5.1 170.1 A 25 5600 W 4400 S 6.1 1.3 3.2 151.1 A 15 5600 W 4400 S 620 W 4400 S 622 A 0.3 3.2 15.1 15	0.0 0.0 0.0 A 3800 S 2491 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 3800 S 2426 1.5 0.0 0.0 0.0 3800 S 2426 1.5 0.0 0.0 0.2 3.3 A A 16 5200 W 3800 S 2426 1.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 A 17 5200 W 4700 S 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.4 5.8 139.4 A 18 4800 W 3800 S 3758 8.9 2.1 0.4 4.7 122.5 A 18 4800 W 3800 S 3009 8.5 1.7 0.4 4.9 212.1 A 18 4800 W 3800 S 1.7 0.4 4.9 212.1 18 4800 W 3800 S 1.7 0.4 4.9 5 1.5 1.5	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6 1.4 0.4 4.1 137.4 A 19 4800 W 4400 S 3104 5.7 1.1 0.3 2.7 A 19 4800 W 4400 S 3104 5.7 1.1 0.3 2.7 A 19 4800 W 4400 S 10 400 W 4400 S 10 10 10 10 10 10 10 10 10 10
2040 AM	Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop	64.4 379.4 C 1 5500 W 3500 S 10318 27.6 16.3 0.8 669.9 483.9 C C 1 5600 W 3500 S 3500 S 7328 23.7 14.5 0.7 37.9 226.5 C C 1 5500 W 3500 S 14.5 0.7 37.9 226.5 C C 1 5500 W 3500 S 12.5 3500 S 12.5 12.5 12.5 12.5 12.5 12.5 12.5 12.5	0.6 26.9 245.2 B 25600 W 4100 S 8054 16.3 8.5 0.6 30.4 315.0 B 2 2 5600 W 4100 S 8208 24.6 16.2 0.6 46.7 297.3 C 2 5500 W 4100 S 8208 24.6 16.2 0.6 46.7 297.3 C	18.8 166.6 B 3 5600 W 4700 S 5674 13.4 7.0 0.5 17.5 193.0 B 3 5600 W 4700 S 9891 60.8 1.0 171.2 1040.1 E 3 5600 W 4700 S 11061 153.8 46.8 3.4	11.7 156.2 B 4 5200 W 3500 S 5359 9.6 4.8 0.4 9.8 9.8 9.8 9.8 138.9 A 4 5200 W 3500 S 5645 14.1 6.6 0.5 17.2 237.4 B 4 5200 W 3500 S 5512 237.0 16.0 0.6	12.1 159.1 B 5200 W 4100 S 5003 10.0 4.0 0.5 7.6 139.4 A A 5200 W 4100 S 6123 15.6 7.8 6123 15.6 7.8 0.6 28.6 371.0 B 5 5200 W 4100 S 5 5 5200 W 4100 S 5 5 5 200 W 4100 S 5 5 5 200 W 4100 S 5 5 5 5 200 W 4100 S 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	18.6 179.4 B 6 4800 W 3500 S 7662 17.0 11.2 0.5 29.1 248.2 B 6 4800 W 3500 S 6895 14.6 7.3 0.5 31.0 295.0 B 6 4800 W 3500 S 11226 13.7 6.7 0.5	54.2 407.4 C 7 4800 W 4100 S 9112 31.3 18.2 1.0 90.9 700.2 C 7 4800 W 4100 S 7688 22.0 7 7688 22.0 0.7 4000 S 12.9 0.7 4000 S 12.9 0.7 4000 W 4100 S 7688 22.0 7 4100 S 7 4800 W 4100 S 7 7 4800 W 4100 S 7 7 8 8 8 7 8 8 8 7 7 4 8 0 9 7 4 1.2 9 7 8 8 8 8 7 8 8 8 8 7 8 8 8 8 8 9 7 8 8 8 8	13.6 158.7 B 4800 W 4700 S 5270 12.8 4.3 0.6 14.4 199.5 B 4800 W 4700 S 7307 18.7 7.8 0.7 42.6 476.3 B 4800 W 4700 S 8 4800 W 4700 S 18.7 8 480 W 4700 S 5229 118.4 53.6 3.1	0.0 0.0 A 9 9 5200 W 3745 S 1337 0.8 0.0 0.0 0.0 0.0 0.0 A 9 9 5200 W 3745 S 1535 0.6 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 9 5200 W 3745 S 1535 0.6 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 A 111 5200 W 4025 S 1813 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4025 S 1924 4025 S 1924 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0.0 N/A 2400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	26.7 A 13 5215 W 4415 S 5180 3.3 0.2 0.1 0.1 0.1 22.0 A 13 5215 W 4415 S 4118 6.1 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4	3.1 172.0 A 14 5600 W 3800 S 5591 3.8 0.9 0.1 3.0 231.1 A 14 5600 W 3800 S 3567 3.3 0.5 0.1 1.0 0 88.9 A 14 5600 W 3800 S	4.1 121.2 A 5600 W 4400 S 4858 8.9 2.5 0.4 5.1 170.1 A 5600 W 4400 S 4400 S 4400 S 4400 S 4400 S 4400 S 151.1 A 15 5600 W 4400 S 2.5 6224 8.6 2.4 8.6 2.4 0.3	0.0 0.0 0.0 A 16 5200 W 3800 S 2491 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 A 17 5200 W 4700 S 1759 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.4 5.8 139.4 A 18 4800 W 3800 S 3758 8.9 2.1 0.4 0.4 7758 8.9 2.1 0.4 0.4 0.4 7758 8.9 2.1 122.5 A 4.7 122.5 A 4800 W 3800 S 3009 8.5 1.7 0.4 4.9 212.1 A 4800 W 3800 S 3009 8.5 21.7 1.7 0.4 4.8 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7	0.3 1.6 104.0 A 19 4800 W 4400 S 5051 7.6 1.4 4.1 137.4 A 4800 W 4400 S 3104 5.7 1.1 0.3 2.7 92.2 A 19 4800 W 4400 S 3104 5.7 92.2 A 19 4800 W 4400 S 3104 5.7 92.2 A 19 4800 W 4400 S 3104 5.7 92.2 A 19 4800 W 4400 S 3104 5.7 92.2 A 19 4800 W 4400 S 3104 5.7 92.2 A 19 4800 W 4400 S 3104 5.7 92.2 A 40 90 90 90 90 90 90 90 90 90 9

Connectiv						-					10		10	10		15	16	12	10	10
2009 AM	Node number	1	2	3	4	5	6	7	8	9 5200 W	10 4000 W	11	12	13	14	15	16	17	18	19
	Intersection	5600 W 3500 S	5600 W 4100 S	5600 W 4700 S	5200 W 3500 S	5200 W 4100 S	4800 W 3500 S	4800 W 4100 S	4800 W 4700 S	5200 W 3745 S	4980 W 3725 S	5200 W 4025 S	5400 W	5215 W 4415 S	5600 W 3800 S	5600 W 4400 S	5200 W 3800 S	5200 W 4700 S	4800 W 3800 S	4800 W 4400 S
	Vehicles	3500 S 8942	6942	4/00 5	3500 5	3452	5875	6523	4700 S 5020	3/45 5	0	4025 5	4210 S 0	3641	4932	3544	3800 S 1693	2689	2913	3365
							-													
	Delay (s)	33.9	16.3	16.6	11.4	10.1	13.3	31.2	14.5	0.4	0.0	0.3	0.0	2.9	4.3	7.1	1.5	1.3	6.6	5.2
	Stop delay (s)	23.1	9.7	10.9	6.4	5.1	6.5	21.0	6.8	0.0	0.0	0.0	0.0	0.1	1.3	2.8	0.0	0.0	1.5	0.8
	Stops	0.8	0.6	0.5	0.4	0.4	0.5	0.9	0.7	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.3	0.3
	Avg Queue (ft)	65.9	26.7	19.1	10.4	11.7	18.8	57.0	15.6	0.0	0.0	0.0	0.0	0.0	3.2	4.3	0.0	0.0	3.2	1.8
	Max Queue (ft)	311.1	205.5	172.4	140.3	171.0	226.1	388.7	168.3	0.0	0.0	0.0	0.0	26.6	178.0	126.1	0.0	0.0	147.2	98.3
	LOS	С	В	В	В	A	В	С	В	A	N/A	A	N/A	A	A	A	A	A	A	A
			-			-		-												
2009 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W
		3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S	3800 S	4400 S	3800 S	4700 S	3800 S	4400 S
	Vehicles	10316	8059	5683	5345	5017	7678	9123	5543	1350	0	1824	0	5190	5585	4868	2501	1783	3525	5057
	Delay (s)	27.9	15.9	13.0	9.4	9.8	17.1	30.4	12.7	0.7	0.0	0.2	0.0	3.4	3.8	8.4	1.5	0.9	7.5	7.5
	Stop delay (s)	16.6	8.2	6.7	4.7	3.8	11.3	17.6	4.5	0.0	0.0	0.0	0.0	0.2	0.9	2.3	0.0	0.0	1.4	1.3
	Stops	0.8	0.6	0.5	0.4	0.4	0.5	1.0	0.6	0.0	0.0	0.0	0.0	0.1	0.1	0.4	0.0	0.0	0.3	0.4
	Avg Queue (ft)	71.4	28.4	16.4	9.6	7.3	29.4	86.2	13.9	0.0	0.0	0.0	0.0	0.2	3.1	4.6	0.0	0.0	2.8	4.0
	Max Queue (ft)	595.2	300.1	188.7	125.9	135.9	245.7	661.9	189.8	0.0	0.0	0.0	0.0	68.1	193.5	112.8	0.0	0.0	119.4	112.2
	LOS	С	В	В	A	A	В	C	В	A	N/A	A	N/A	A	A	A	A	A	A	A
2040 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W
		3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S	3800 S	4400 S	3800 S	4700 S	3800 S	4400 S
	Vehicles	7308	8208	9911	5163	6115	6913	7682	7463	1536	0	1923	0	4104	3553	4276	2427	5486	2810	3118
	Delay (s)	24.9	24.9	59.9	10.3	15.9	15.7	22.0	26.8	0.6	0.0	0.2	0.0	6.3	3.2	6.5	1.5	2.2	7.2	6.0
	Stop delay (s)	15.4	16.4	16.7	4.6	7.6	8.0	13.1	10.4	0.0	0.0	0.0	0.0	0.4	0.5	1.5	0.0	0.1	0.9	1.1
	Stops	0.7	0.6	0.9	0.4	0.6	0.5	0.7	0.9	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.0	0.0	0.3	0.3
	Avg Queue (ft)	40.3	47.1	159.8	11.0	29.7	34.4	40.0	117.9	0.0	0.0	0.0	0.0	2.6	1.0	3.7	0.0	0.4	2.9	3.2
	Max Queue (ft)	220.9	292.6	1025.5	201.8	322.7	378.4	357.7	767.6	0.0	0.0	0.0	0.0	167.2	115.3	199.0	0.0	288.1	217.0	137.7
	LOS	С	С	E	В	В	В	С	С	Α	N/A	Α	N/A	Α	Α	Α	Α	Α	Α	Α
2040 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
		5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S	3800 S	4400 S	3800 S	4700 S	3800 S	4400 S
	Vehicles	12448	10050	11044	8975	7599	11185	9625	9350	2545	0	2709	0	5742	6023	6189	4631	6235	4101	4676
	Delay (s)	229.2	26.1	138.1	10.7	19.2	14.5	136.9	115.0	1.5	0.0	0.3	0.0	11.7	9.3	8.2	1.8	129.3	11.8	49.2
	Stop delay (s)	138.4	17.1	43.9	5.2	10.2	7.2	47.4	52.3	0.0	0.0	0.0	0.0	3.6	3.1	2.2	0.1	34.1	3.3	25.9
	Stops	3.4	0.7	3.1	0.3	0.7	0.5	2.6	3.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.0	3.1	0.5	1.3
	Avg Queue (ft)	812.3	63.1	836.8	15.1	34.1	30.1	586.1	515.9	0.0	0.0	0.0	0.0	38.1	8.0	5.6	0.0	605.4	11.8	141.6
	Max Queue (ft)	1243.0	415.3	1180.5	256.0	325.2	343.3	876.1	1509.2	0.0	0.0	0.0	0.0	864.6	193.5	188.6	12.2	769.1	236.2	1029.4
	LOS	F	С	F	В	В	В	F	F	Α	N/A	А	N/A	В	Α	Α	Α	F	В	D
Traffic Cal																				
2009 AM	Node number	1	2	3	4	5	6	7	8	9										
	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W					10	11	12	13	14	15	16	17	18	19
		3500 S	4100 S				4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W
	Vehicles	8934		4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	4980 W 3725 S	5200 W 4025 S	5400 W 4210 S	5215 W 4415 S	5600 W 3800 S	5600 W 4400 S	5200 W 3800 S	5200 W 4700 S	4800 W 3800 S	4800 W 4400 S
	Delay (s)		6943	4700 S 4689	3392	4100 S 3234	3500 S 5773	4100 S 6532	4700 S 5100		4980 W 3725 S 0	5200 W 4025 S 1045	5400 W 4210 S 0	5215 W 4415 S 3453	5600 W	5600 W 4400 S 3570	5200 W 3800 S 1578	5200 W 4700 S 2617	4800 W	4800 W 4400 S 3440
		33.5	16.2			4100 S 3234 9.5	3500 S	4100 S 6532 33.1	4700 S 5100 14.5	3745 S 1030 0.4	4980 W 3725 S	5200 W 4025 S	5400 W 4210 S 0 0.0	5215 W 4415 S	5600 W 3800 S	5600 W 4400 S	5200 W 3800 S 1578 1.4	5200 W 4700 S 2617 1.3	4800 W 3800 S	4800 W 4400 S 3440 5.2
	Stop delay (s)	22.8	16.2 9.5	4689 16.8 11.1	3392 11.8 6.7	4100 S 3234 9.5 4.8	3500 S 5773 13.1 6.4	4100 S 6532 33.1 22.3	4700 S 5100 14.5 6.9	3745 S 1030 0.4 0.0	4980 W 3725 S 0 0.0 0.0	5200 W 4025 S 1045 0.3 0.0	5400 W 4210 S 0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1	5600 W 3800 S 4935 4.1 1.3	5600 W 4400 S 3570 6.8 2.6	5200 W 3800 S 1578 1.4 0.0	5200 W 4700 S 2617 1.3 0.0	4800 W 3800 S 2929 6.6 1.6	4800 W 4400 S 3440 5.2 0.8
	Stop delay (s) Stops	22.8 0.8	16.2 9.5 0.5	4689 16.8 11.1 0.6	3392 11.8 6.7 0.4	4100 S 3234 9.5 4.8 0.4	3500 S 5773 13.1 6.4 0.5	4100 S 6532 33.1 22.3 1.0	4700 S 5100 14.5 6.9 0.7	3745 S 1030 0.4 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0	5200 W 4025 S 1045 0.3 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0	5600 W 3800 S 4935 4.1 1.3 0.1	5600 W 4400 S 3570 6.8 2.6 0.4	5200 W 3800 S 1578 1.4 0.0 0.0	5200 W 4700 S 2617 1.3 0.0 0.0	4800 W 3800 S 2929 6.6 1.6 0.3	4800 W 4400 S 3440 5.2 0.8 0.3
	Stops Avg Queue (ft)	22.8 0.8 65.3	16.2 9.5 0.5 27.0	4689 16.8 11.1 0.6 19.2	3392 11.8 6.7 0.4 10.9	4100 S 3234 9.5 4.8 0.4 9.4	3500 S 5773 13.1 6.4 0.5 18.2	4100 S 6532 33.1 22.3 1.0 64.8	4700 S 5100 14.5 6.9 0.7 16.0	3745 S 1030 0.4 0.0 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 0.3 0.0 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0 0.1	5600 W 3800 S 4935 4.1 1.3 0.1 3.1	5600 W 4400 S 3570 6.8 2.6 0.4 4.0	5200 W 3800 S 1578 1.4 0.0 0.0 0.0	5200 W 4700 S 2617 1.3 0.0 0.0 0.0	4800 W 3800 S 2929 6.6 1.6 0.3 3.2	4800 W 4400 S 3440 5.2 0.8 0.3 1.8
	Stops Avg Queue (ft) Max Queue (ft)	22.8 0.8 65.3 404.9	16.2 9.5 0.5 27.0 242.3	4689 16.8 11.1 0.6 19.2 183.5	3392 11.8 6.7 0.4 10.9 141.9	4100 S 3234 9.5 4.8 0.4 9.4 159.4	3500 S 5773 13.1 6.4 0.5 18.2 211.8	4100 S 6532 33.1 22.3 1.0 64.8 448.9	4700 S 5100 14.5 6.9 0.7 16.0 170.5	3745 S 1030 0.4 0.0 0.0 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 0.3 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9	5600 W 3800 S 4935 4.1 1.3 0.1	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0	5200 W 4700 S 2617 1.3 0.0 0.0	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8	4800 W 4400 S 3440 5.2 0.8 0.3 1.8 101.9
	Stops Avg Queue (ft)	22.8 0.8 65.3	16.2 9.5 0.5 27.0	4689 16.8 11.1 0.6 19.2	3392 11.8 6.7 0.4 10.9	4100 S 3234 9.5 4.8 0.4 9.4	3500 S 5773 13.1 6.4 0.5 18.2	4100 S 6532 33.1 22.3 1.0 64.8	4700 S 5100 14.5 6.9 0.7 16.0	3745 S 1030 0.4 0.0 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 0.3 0.0 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0 0.1	5600 W 3800 S 4935 4.1 1.3 0.1 3.1	5600 W 4400 S 3570 6.8 2.6 0.4 4.0	5200 W 3800 S 1578 1.4 0.0 0.0 0.0	5200 W 4700 S 2617 1.3 0.0 0.0 0.0	4800 W 3800 S 2929 6.6 1.6 0.3 3.2	4800 W 4400 S 3440 5.2 0.8 0.3 1.8
	Stops Avg Queue (ft) Max Queue (ft)	22.8 0.8 65.3 404.9	16.2 9.5 0.5 27.0 242.3	4689 16.8 11.1 0.6 19.2 183.5	3392 11.8 6.7 0.4 10.9 141.9	4100 S 3234 9.5 4.8 0.4 9.4 159.4	3500 S 5773 13.1 6.4 0.5 18.2 211.8	4100 S 6532 33.1 22.3 1.0 64.8 448.9	4700 S 5100 14.5 6.9 0.7 16.0 170.5	3745 S 1030 0.4 0.0 0.0 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9	5600 W 3800 S 4935 4.1 1.3 0.1 3.1 177.4	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8	4800 W 4400 S 3440 5.2 0.8 0.3 1.8 101.9
2009 PM	Stops Avg Queue (ft) Max Queue (ft)	22.8 0.8 65.3 404.9	16.2 9.5 0.5 27.0 242.3	4689 16.8 11.1 0.6 19.2 183.5	3392 11.8 6.7 0.4 10.9 141.9	4100 S 3234 9.5 4.8 0.4 9.4 159.4	3500 S 5773 13.1 6.4 0.5 18.2 211.8	4100 S 6532 33.1 22.3 1.0 64.8 448.9	4700 S 5100 14.5 6.9 0.7 16.0 170.5	3745 S 1030 0.4 0.0 0.0 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9	5600 W 3800 S 4935 4.1 1.3 0.1 3.1 177.4	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8	4800 W 4400 S 3440 5.2 0.8 0.3 1.8 101.9
2009 PM	Stops Avg Queue (ft) Max Queue (ft) LOS Node number	22.8 0.8 65.3 404.9 C 1 5600 W	16.2 9.5 0.5 27.0 242.3 B 2 5600 W	4689 16.8 11.1 0.6 19.2 183.5 B	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5 5200 W	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 4800 W	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7 4800 W	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 8 4800 W	3745 S 1030 0.4 0.0 0.0 0.0 0.0 A 9 5200 W	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 10 4980 W	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 0.0 A 11 5200 W	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9 A	5600 W 3800 S 4935 4.1 1.3 0.1 3.1 177.4 A 14 5600 W	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 15 5600 W	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 A 16 5200 W	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 A 17 5200 W	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 18 4800 W	4800 W 4400 S 3440 5.2 0.8 0.3 1.8 101.9 A 19 4800 W
2009 PM	Stops Avg Queue (ft) Max Queue (ft) LOS	22.8 0.8 65.3 404.9 C	16.2 9.5 0.5 27.0 242.3 B 2	4689 16.8 11.1 0.6 19.2 183.5 B 3	3392 11.8 6.7 0.4 10.9 141.9 B 4	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 8	3745 S 1030 0.4 0.0 0.0 0.0 0.0 A 9	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 10	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 0.0 A 11	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 12	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9 A 13	5600 W 3800 S 4935 4.1 1.3 0.1 3.1 177.4 A 14	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 15	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 A 16	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 0.0 A 17	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 18	4800 W 4400 S 3440 5.2 0.8 0.3 1.8 101.9 A 19
2009 PM	Stops Avg Queue (ft) Max Queue (ft) LOS Node number	22.8 0.8 65.3 404.9 C 1 5600 W	16.2 9.5 0.5 27.0 242.3 B 2 5600 W	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5 5200 W	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 4800 W	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7 4800 W	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 8 4800 W	3745 S 1030 0.4 0.0 0.0 0.0 0.0 A 9 5200 W	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 10 4980 W	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 0.0 A 11 5200 W	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9 A 13 5215 W	5600 W 3800 S 4935 4.1 1.3 0.1 3.1 177.4 A 14 5600 W	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 15 5600 W	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 A 16 5200 W	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 A 17 5200 W	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 18 4800 W	4800 W 4400 S 3440 5.2 0.8 0.3 1.8 101.9 A 19 4800 W
2009 PM	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection	22.8 0.8 65.3 404.9 C 1 5600 W 3500 S	16.2 9.5 0.5 27.0 242.3 B 2 5600 W 4100 S	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W 3500 S	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5 5200 W 4100 S	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 4800 W 3500 S	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7 4800 W 4100 S	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 8 4800 W 4700 S	3745 S 1030 0.4 0.0 0.0 0.0 0.0 A 9 5200 W 3745 S	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 10 4980 W 3725 S	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W 4210 S	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9 A 13 5215 W 4415 S	5600 W 3800 S 4935 4.1 1.3 0.1 3.1 177.4 A 14 5600 W 3800 S	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 15 5600 W 4400 S	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 0.0 A A 16 5200 W 3800 S	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 0.0 A 17 5200 W 4700 S	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 18 4800 W 3800 S	4800 W 4400 S 3440 5.2 0.8 0.3 1.8 101.9 A 19 4800 W 4400 S
2009 PM	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles	22.8 0.8 65.3 404.9 C 1 5600 W 3500 S 10321 27.4	16.2 9.5 0.5 27.0 242.3 B 2 5600 W 4100 S 8060	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S 5691	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W 3500 S 5295	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5 5200 W 4100 S 4739	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 4800 W 3500 S 7620	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7 4800 W 4100 S 9183	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 8 4800 W 4700 S 5618	3745 S 1030 0.4 0.0 0.0 0.0 0.0 A 9 5200 W 3745 S 1298	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 10 4980 W 3725 S 0	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 11 5200 W 4025 S 1705	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W 4210 S 0	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9 A 13 5215 W 4415 S 4989	5600 W 3800 S 4935 4.1 1.3 0.1 3.1 177.4 A 14 5600 W 3800 S 5594	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 15 5600 W 4400 S 4941	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 0.0 A A 16 5200 W 3800 S 2444	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 X 4700 S 1714	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 117.8 A 800 W 3800 S 3585	4800 W 4400 S 3440 5.2 0.8 0.3 1.8 101.9 A 19 4800 W 4400 S 5129
2009 PM	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s)	22.8 0.8 65.3 404.9 C 1 5600 W 3500 S 10321 27.4	16.2 9.5 0.5 27.0 242.3 B 2 5600 W 4100 S 8060 15.6	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S 5691 14.0	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W 3500 S 5295 9.7	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5 5 5200 W 4100 S 4739 9.4	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 6 4800 W 3500 S 7620 17.3	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7 4800 W 4100 S 9183 31.0	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 8 4800 W 4700 S 5618 13.6	3745 S 1030 0.4 0.0 0.0 0.0 0.0 A 9 5200 W 3745 S 1298 0.7	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 10 4980 W 3725 S 0 0.0	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 0.0 0.0 0.0 10 5200 W 4025 S 1705 0.2	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W 4210 S 0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9 A 13 5215 W 4415 S 4989 3.4	5600 W 3800 S 4935 4.1 1.3 0.1 3.1 177.4 A 14 5600 W 3800 S 5594 3.7	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 15 5600 W 4400 S 4941 8.8	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2444 1.4	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 0.0 0.0 X 7 5200 W 4700 S 1714 0.9	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 117.8 A 117.8 3.2 117.8 3.2 117.8 3.2 117.8 5 5 5 5 5 5 7.8	4800 W 4400 S 3440 5.2 0.8 0.3 1.8 101.9 A 19 4800 W 4400 S 5129 7.7
2009 PM	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s)	22.8 0.8 65.3 404.9 C 1 5600 W 3500 S 10321 27.4 16.4	16.2 9.5 0.5 27.0 242.3 B 2 5600 W 4100 S 8060 15.6 8.1	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S 5691 14.0 7.4	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W 3500 S 5295 9.7 4.9	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5 5 5200 W 4100 S 4739 9.4 3.6	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 6 4800 W 3500 S 7620 17.3 11.6	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7 4800 W 4100 S 9183 31.0 17.9	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 8 4800 W 4700 S 5618 13.6 5.0	3745 S 1030 0.4 0.0 0.0 0.0 0.0 A 9 5200 W 3745 S 1298 0.7 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 1705 0.2 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W 4210 S 0 0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9 A 13 5215 W 4415 S 4989 3.4 0.3	5600 W 3800 S 4935 4.1 1.3 0.1 1.77.4 A 14 5600 W 3800 S 5594 3.7 0.8	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 15 5600 W 4400 S 4941 8.8 2.5	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2444 1.4 0.0	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 0.0 0.0 A 1714 4700 S 1714 0.9 0.0	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 4800 W 3800 S 3585 7.8 1.4	4800 W 4400 S 3440 5.2 0.8 0.3 1.8 101.9 A 101.9 A 4800 W 4400 S 5129 7.7 1.5
2009 PM	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s)	22.8 0.8 65.3 404.9 C 1 5600 W 3500 S 10321 27.4 16.4 0.8	16.2 9.5 0.5 27.0 242.3 B 2 5600 W 4100 S 8060 15.6 8.1 0.6	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S 5691 14.0 7.4 0.6	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W 3500 S 5295 9.7 4.9 0.4	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5500 W 4100 S 4739 9.4 3.6 0.4	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 4800 W 3500 S 7620 17.3 11.6 0.5	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7 4800 W 4100 S 9183 31.0 17.9 1.0	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 8 4800 W 4700 S 5618 13.6 5.0 0.6	3745 S 1030 0.4 0.0 0.0 0.0 0.0 A 9 5200 W 3745 S 1298 0.7 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 1705 0.2 0.0 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9 A 13 5215 W 4415 S 4989 3.4 0.3 0.1	5600 W 3800 S 4935 4.1 1.3 0.1 3.1 177.4 A 14 5600 W 3800 S 5594 3.7 0.8 0.1	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 15 5600 W 4400 S 4941 8.8 2.5 0.4	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2444 1.4 0.0 0.0	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 A 17 5200 W 4700 S 1714 0.9 0.0 0.0	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 117.8 A 117.8 3800 W 3800 S 3585 7.8 1.4 0.3	4800 W 4400 S 3440 5.2 0.8 0.3 1.8 101.9 A 101.9 A 19 4800 W 4400 S 5129 7.7 1.5 0.4
2009 PM	Stops Avg Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft)	22.8 0.8 65.3 404.9 C 1 5600 W 3500 S 10321 27.4 16.4 0.8 66.8 509.5	16.2 9.5 0.5 27.0 242.3 B 2 5600 W 4100 S 8060 15.6 8.1 0.6 27.9 304.2	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S 5691 14.0 7.4 0.6 18.5 181.4	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4	4100 S 3234 9,5 4,8 0,4 159,4 A 5 5 5200 W 4100 S 4739 9,4 3,6 0,4 0,4 6,5 145,5	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 6 4800 W 3500 S 7620 17.3 11.6 0.5 29.6 250.0	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7 7 4800 W 4100 S 9183 31.0 17.9 1.0 91.2 713.3	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 8 4800 W 4700 S 5618 13.6 5.0 0.6 16.1 190.1	3745 S 1030 0.4 0.0 0.0 0.0 0.0 A 9 9 5200 W 3745 S 1298 0.7 0.0 0.0 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 1705 0.2 0.0 0.0 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9 A 13 5215 W 4415 S 4989 3.4 0.3 0.1 0.4 71.9	5600 W 3800 S 4935 4.1 1.3 0.1 3.1 177.4 A 14 5600 W 3800 S 5594 3.7 0.8 0.1 3.0 210.0	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 5600 W 4400 S 4904 8.8 2.5 0.4 4941 8.8 2.5 0.4 134.4	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2444 1.4 0.0 0.0 0.0 7.6	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 0.0 A 17 5200 W 4700 S 1714 0.9 0.0 0.0 0.0	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 800 W 3800 S 3585 7.8 1.4 0.3 3.0 140.3	4800 W 4400 S 3440 5.2 0.8 0.3 1.8 101.9 A 19 4800 W 4400 S 5129 7.7 1.5 0.4 4.5 134.4
2009 PM	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft)	22.8 0.8 65.3 404.9 C 1 5600 W 3500 S 10321 27.4 16.4 0.8 66.8	16.2 9.5 0.5 27.0 242.3 B 2 5600 W 4100 S 8060 U 15.6 8.1 0.6 27.9	4689 16.8 11.1 0.6 19.2 183.5 8 3 5600 W 4700 S 5691 14.0 7.4 0.6 18.5	3392 11.8 6.7 0.4 10.9 141.9 8 4 5200 W 3500 S 5295 9.7 4.9 0.4 10.0	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5 5200 W 4100 S 4739 9.4 3.6 0.4 6.5	3500 S 5773 13.1 6.4 0.5 18.2 211.8 8 6 4800 W 3500 S 7620 17.3 11.6 0.5 29.6	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7 4800 W 4100 S 9183 31.0 17.9 91.2	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 8 4800 W 4700 S 5618 13.6 5.0 0.6 16.1	3745 S 1030 0.4 0.0 0.0 0.0 0.0 0.0 A 9 5200 W 3745 S 1298 0.7 0.0 0.0 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 1705 0.2 0.0 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 V/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9 A 13 5215 W 4415 S 4989 3.4 0.3 0.1 0.4	5600 W 3800 S 4935 4.1 1.3 0.1 3.1 177.4 A 14 5600 W 3800 S 5594 3.7 0.8 0.1 3.0	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 15 5600 W 4400 S 4941 8.8 2.5 0.4 5.0	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 0.0 A 7 7 800 S 2444 1.4 0.0 0.0 0.0 0.0	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 A 4700 S 1714 0.9 0.0 0.0 0.0 0.0	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 4800 W 3800 S 3585 7.8 1.4 0.3 3.0	4800 W 4400 S 3440 5.2 0.8 0.3 1.8 101.9 A 101.9 A 4800 W 4400 S 5129 7.7 1.5 0.4 4.5
	Stops Avg Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft)	22.8 0.8 65.3 404.9 C 1 5600 W 3500 S 10321 27.4 16.4 0.8 66.8 509.5 C	16.2 9.5 0.5 27.0 242.3 B 2 5600 W 4100 S 8060 15.6 8.1 0.6 27.9 304.2 B	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S 5691 14.0 7.4 0.6 18.5 181.4 B	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4 A	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5 5200 W 4100 S 4739 9.4 3.6 0.4 6.5 145.5 A	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 4800 W 3500 S 7620 17.3 11.6 0.5 29.6 250.0 B	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7 4800 W 4100 S 9183 31.0 91.2 713.3 C 713.3 C	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 8 8 8 8 8 8 8 8 8 8 8 8 8	3745 S 1030 0.4 0.0 0.0 0.0 0.0 A 9 5200 W 3745 S 1298 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 N/A 10 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 A 11 5200 W 4025 S 1705 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 N/A 212 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9 A 13 5215 W 4415 S 4989 3.4 0.3 0.1 0.4 71.9 A	5600 W 3800 S 4935 4.1 1.3 0.1 3.1 177.4 A 14 5600 W 3800 S 5594 3.7 0.8 0.1 3.0 210.0 A	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 15 5600 W 4400 S 4941 8.8 2.5 0.4 5.0 134.4 A	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 A 16 5200 W 3800 S 2444 1.4 0.0 0.0 0.0 A 2444 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 A 17 5200 W 4700 S 1714 0.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 18 4800 W 3800 S 3585 7.8 1.4 0.3 3.0 140.3 A	4800 W 4400 S 3440 5.2 0.8 0.3 1.8 101.9 A 19 4800 W 4400 S 5129 7.7 1.5 0.4 4.5 134.4 A
2009 PM	Stops Avg Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft)	22.8 0.8 65.3 404.9 C 1 5600 W 3500 S 10321 27.4 16.4 0.8 66.8 509.5 C 1	16.2 9.5 0.5 27.0 242.3 B 2 5600 W 4100 S 8060 15.6 8.1 0.6 27.9 304.2 B 2	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S 5691 14.0 7.4 0.6 18.5 181.4 B 3	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4 A 4	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5 5200 W 4100 S 4739 9.4 3.6 0.4 6.5 145.5 A 5 5	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 4800 W 3500 S 7620 17.3 11.6 0.5 29.6 250.0 B 6	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7 4800 W 4100 S 9183 31.0 17.9 1.0 91.2 713.3 C	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 4800 W 4700 S 5618 13.6 5.0 0.6 16.1 190.1 B 8	3745 S 1030 0.4 0.0 0.0 0.0 0.0 A 9 9 5200 W 3745 S 1298 0.7 0.0 0.0 0.0 0.0 0.0 0.0 9 9	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 1705 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 11 11	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9 A 13 5215 W 4415 S 4989 3.4 0.3 0.1 0.4 71.9 A 13	5600 W 3800 S 4935 4.1 1.3 0.1 3.1 177.4 A 5600 W 3800 S 5594 3.7 0.8 0.1 3.0 210.0 A 14	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 15 5600 W 4400 S 4941 8.8 2.5 0.4 4941 8.8 2.5 0.4 134.4 A	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2444 1.4 0.0 0.0 0.0 7.6 A 16	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 4700 S 177 5200 W 4700 S 1714 0.9 0.0 0.0 0.0 0.0 0.0 1714 0.9 0.0 0.0 0.0 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 4800 W 3800 S 3585 7.8 7.8 7.8 1.4 0.3 3.0 140.3 A 18	4800 W 4400 S 3440 5.2 0.8 0.3 1.8 101.9 A 19 4800 W 4400 S 5129 7.7 1.5 0.4 4.5 134.4 A 9
	Stops Avg Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft)	22.8 0.8 65.3 404.9 C 1 5600 W 3500 S 10321 27.4 16.4 0.8 66.8 509.5 C 1 5600 W	16.2 9.5 0.5 27.0 242.3 B 2 5600 W 4100 S 8060 15.6 8.1 0.6 27.9 304.2 B 2 5600 W	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S 5691 14.0 7.4 0.6 5691 14.0 7.4 0.6 5691 14.0 7.4 0.6 5691 8.5 181.4 B	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4 A 4 5200 W	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5 5 5 200 W 4100 S 4739 9.4 3.6 0.4 4739 9.4 3.6 0.4 6.5 145.5 A 5 5 200 W	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 4800 W 3500 S 7620 17.3 11.6 0.5 29.6 250.0 B 6 4800 W	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7 7 4800 W 4100 S 9183 31.0 7 7 4800 W 7 7 4800 W	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 8 4800 W 4700 S 5618 13.6 5.0 0.6 16.1 190.1 B 8 4800 W	3745 S 1030 0.4 0.0 0.0 0.0 0.0 0.0 A 9 9 5200 W 3745 S 1298 0.7 0.0 0.0 0.0 0.0 0.0 0.0 A 9 5200 W	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 1705 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9 A 13 5215 W 4415 S 4989 3.4 0.3 0.1 0.4 0.3 0.1 0.4 71.9 A 13 5215 W	5600 W 3800 S 4935 4.1 1.3 0.1 3.1 177.4 A 14 5600 W 3800 S 5594 3.7 0.8 0.1 3.7 0.8 0.1 3.0 A 14 5600 W 3800 S 4.1 14 5600 W 3800 S 5594 3.7 14 5600 W 3.7 14 5600 W	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 15 5600 W 4400 S 4941 8.8 2.5 0.4 5.0 0.4 5.0 0.4 5.5 0.4 5.5 0.4 5.5 0.4 5.5 0.4 5.5 0.4 5.5 0.4 4.0 5 5.5 0.4 5.5 5.5 5.5 0.5 5.5 5.5 5.5 5.5 5.5 5.5	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 0.0 A 16 5200 W 5200 W	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 A 1717 5200 W 4700 S 1714 0.9 0.0 0.0 0.0 0.0 0.0 A 17 5200 W	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 4800 W 3800 S 3585 7.8 1.4 0.3 3.0 140.3 A 140.3 A 18 4800 W	4800 W 4400 S 3440 5.2 0.8 0.3 1.8 101.9 4800 W 4400 S 5129 7.7 1.5 0.4 4400 S 5129 7.7 1.5 0.4 440 S 5129 7.7
	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection	22.8 0.8 65.3 404.9 C 1 5600 W 3500 S 10321 27.4 16.4 0.8 66.8 509.5 C 1 5600 W 3500 S	16.2 9.5 0.5 27.0 242.3 B 2 5600 W 4100 S 8060 15.6 8.1 0.6 27.9 304.2 B 2 5600 W 4100 S	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S 5691 14.0 7.4 0.6 18.5 181.4 B 3 3 5600 W 4700 S	3392 11.8 6.7 0.4 10.9 141.9 8 8 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4 A 4 5200 W 3500 S	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5 5200 W 4100 S 4739 9.4 4739 9.4 4739 9.4 6.5 145.5 A 5 5200 W 4100 S	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 6 4800 W 3500 S 7620 17.3 11.6 0.5 29.6 250.0 B 6 4800 W 3500 S	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7 7 4800 W 4100 S 9183 31.0 91.2 713.3 C 7 4800 W 4800 W 4100 S	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 8 4800 W 4700 S 5618 13.6 5.0 0.6 16.1 190.1 B 8 4800 W 4700 S	3745 S 1030 0.4 0.0 0.0 0.0 0.0 0.0 A 3745 S 1298 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 1705 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W 4210 S 5400 W 4210 S	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9 A 13 5215 W 4415 S 13 0.1 0.4 71.9 A 989 3.4 0.3 0.1 0.4 71.9 A 13 5215 W 4415 S	5600 W 3800 S 4935 4.1 1.3 0.1 177.4 A 14 5600 W 3800 S 5594 3.7 0.8 3.0 210.0 A 14 5600 W 3800 S	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 15 5600 W 4400 S 15 5600 W 4400 S	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2444 1.4 0.0 0.0 0.0 7.6 A 16 5200 W 3800 S	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 0.0 4700 S 1714 0.9 0.0 0.0 0.0 0.0 0.0 0.0 1714 0.9 0.0 0.0 0.0 0.0 1.7 5200 W 4700 S 1.7 5200 W 4700 S 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 18 4800 W 3800 S 3585 7.8 1.4 0.3 3.0 140.3 A 18 4800 W 3800 S 3.585 7.8 1.4 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5	4800 W 4400 S 3440 S 0.8 0.3 1.8 1.8 101.9 4800 W 4400 S 5129 7.7 1.5 0.4 4.5 134.4 A 9 19 4800 W 4400 S
	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stop delay (s) Avg Queue (ft) LOS Node number Intersection Vehicles	22.8 0.8 65.3 404.9 C 1 5600 W 3500 S 10321 27.4 16.4 0.8 66.8 509.5 C 1 1 5600 W 3500 S 12236	16.2 9.5 0.5 27.0 242.3 B 2 5600 W 4100 S 8060 15.6 8.1 0 27.9 304.2 B 2 5600 W 4100 S	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S 5691 14.0 7.4 0.6 18.5 181.4 B 3 5600 W 4700 S 183.5 181.4 183.5 183.5 14.0 183.5 183.5 14.0 183.5 183.5 183.5 19.2 19	3392 11.8 6.7 0.4 10.9 141.9 B 4 4 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4 A 4 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4 A 5200 W	4100 S 3234 9.5 4.8 0.4 159.4 A 5 5200 W 4100 S 4739 9.4 3.6 0.4 4739 9.4 3.6 0.4 4739 9.4 3.6 0.4 4739 9.4 3.6 0.5 145.5 A 8 200 W 4100 S	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 4800 W 3500 S 7620 17.3 11.6 0.5 29.6 250.0 B 6 4800 W 3500 S 10606	4100 S 6532 33.1 1.0 64.8 448.9 C 7 4800 W 4100 S 9183 31.0 17.9 1.0 91.2 713.3 C 7 4800 W 4100 S 91.2 713.3 C	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 4800 W 4700 S 5618 13.6 5.0 0.6 16.1 190.1 B 4800 W 4700 S 5518 13.6 5.9 0.7 16.9 13.6 5.9 13.6 5.9 13.6 5.9 13.6 5.9 13.6 5.9 13.6 5.9 13.6 5.9 13.6 5.9 13.6 5.9 13.6 5.9 13.6 5.9 13.6 5.9 13.6 5.9 13.6 5.9 13.6 5.9 14.5 13.6 5.9 14.5 15.6 15.0 16.1 190.1 16.7 170.5 170.5 170.5 170.5 170.5 170.5 170.5 15.6 15.6 15.6 15.1 190.1 18.6 15.7 190.1 190.1 19.7	3745 S 1030 0.4 0.0 0.0 0.0 0.0 A 9 5200 W 3745 S 1298 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 S 0.3 0.0 0.0 0.0 0.0 0.0 0.0 4 2200 W 4025 S 1705 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9 A 4015 S 4989 3.4 0.3 0.1 0.4 71.9 A 13 5215 W 4415 S 13 5215 S 4385 4385 3.4 0.3 0.1 0.4 71.9 A 3.4 0.3 0.1 0.4 71.9 5215 S 4385 3766	5600 W 3800 S 4935 4.1 1.3 0.1 3.1 177.4 14 5600 W 3800 S 5594 3.7 0.8 0.1 3.0 210.0 A 14 5600 W 3800 S 5533	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 5600 W 4400 S 4941 8.8 2.5 0.4 5.00 134.4 A 500 U 134.4 A 5500 W 4400 S 5291	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2444 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 0.0 0.0 4 700 S 1714 0.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 4800 W 3800 S 3585 7.8 1.4 0.3 3.0 140.3 A 140.3 A 140.3 3.0 140.3 3.30 140.3 A 5585 3390	4800 W 4400 S 3440 S 5.2 0.8 0.3 1.8 0.3 1.8 101.9 A 4800 W 4400 S 5129 7.7 7.5 0.4 4.5 134.4 A 9 19 4800 W 4400 S 5129 7.7 7.5 0.4 4.5 3471
	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stop delay (s) Stop delay (s) Node number Intersection Vehicles Delay (s)	22.8 0.8 65.3 404.9 C 1 5600 W 3500 S 10321 27.4 16.4 0.8 66.8 509.5 C 1 5600 W 3500 S 12236 315.7	16.2 9.5 0.5 27.0 242.3 B 2 5600 W 4100 S 8060 15.6 8.1 0.6 8.1 0.6 8.1 0.6 8.1 0.4 27.9 304.2 B 2 5600 W 4100 S	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S 5691 14.0 5600 W 4700 S 3 5600 W 4700 S 9697 228.2	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4 A 5200 W 3500 S 7958 154.0	4100 S 3234 9.5 4.8 0.4 159.4 A 5 5 200 W 4100 S 4739 9.4 3.6 0.4 6.5 145.5 A 5 5 200 W 4105 S 145.5 A 25 5 5 200 W 4108 S 289.5	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 4800 W 3500 S 7620 17.3 11.6 0.5 29.6 250.0 B 6 4800 W 3500 S 10606 6 4800 W 3500 S	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7 4800 W 4100 S 9183 31.0 17.9 91.2 711.3 C 7 4800 W 4100 S 6704 287.3	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 4800 W 4700 S 5618 13.6 5.0 6.5 0.6 16.1 190.1 B 8 4800 W 4700 S 7857 230.8	3745 S 1030 0.4 0.0 0.0 0.0 0.0 A 9 5200 W 3745 S 1298 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 S 0.3 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 1705 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0 1 27.9 A 13 5215 W 4415 S 4989 3.4 0.3 0.1 0.4 4989 3.4 0.3 0.1 0.4 415 S 4989 3.4 0.3 0.1 0.4 5215 W 4415 S 3766 326.6	5600 W 3800 S 4935 4.1 1.3 0.1 177.4 A 14 5600 W 3800 S 5594 3.7 0.8 0.1 3.0 A 14 5600 W 3800 S 5594 3.7 0.8 0.1 3.0 A 14 5600 W 3800 S 5594 3.7 0.8 0.1 3.0 14 5600 W 3800 S 5594 3.7 0.8 0.1 3.0 12 10 10 10 10 10 10 10 10 10 10	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 15 5600 W 4400 S 5291 5291 5293	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2444 1.4 0.0 0.0 0.0 0.0 A 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 A 177 5200 W 4700 S 5400 S 5400 S 5400 S 5400 S	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 18 4800 W 3800 S 3585 7.8 1.4 0.3 3.0 140.3 A 140.3 158.5 A 158.5 A 158.5 A 140.3 158.5 A 140.3 158.5 A 158.5 A 158.5 A 158.5 A 158.5 A 158.5 A 158.5 A 158.5 A 159.5 159.5	4800 W 4400 S 5.2 0.8 0.3 1.8 101.9 A 4800 W 4400 S 5129 7.7 1.5 0.4 4.5 134.4 A 4.5 134.4 A 9 9 9 19 9 9 9 19 9 9 9 19 9 9 9 19 9 9 9 10 9 9 9 10 9 9 9 10 9 9 10 9 9 10 9 10 10 10 10 10 10 10 10 10 10 10 10 10
	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s)	22.8 0.8 65.3 404.9 C 1 5600 W 3500 S 10321 27.4 16.4 0.8 66.8 509.5 C C 1 5600 W 3500 S 12236 315.7 175.8	16.2 9.5 0.5 27.0 242.3 B 2 5600 W 4100 S 8060 15.6 8.1 0.6 27.9 304.2 B 2 5600 W 4100 S 8882 308.1 152.9	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S 5600 W 4700 S 5601 H4.0 7.4 0.6 18.5 181.4 B 3 5600 W 4700 S 560 W 570	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4 A A 4 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4 A 7 200 W 3500 S 5205 (200 H) 131.4 A 7 200 (200 H) 131.4 7 200 (200 H) 140	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5 5200 W 4100 S 5 4739 9.4 3.6 0.4 0.4 6.5 145.5 A 5200 W 4100 S 5200 W 4100 S 5200 W 4100 S 5200 W 4100 S	3500 S 5773 13.1 6.4 0.5 18.2 8 6 4800 W 3500 S 7620 17.3 11.6 0.5 29.6 250.0 B 6 4800 W 3500 S 7620 17.3 11.5 29.6 25.0 8 7620 17.3 11.6 0.5 29.6 25.0 8 7620 7720 77700 77700 77700 7770 7770 7770 77700 7770 7770 77700 7770	4100 S 6532 33.1 22.3 1.0 64.8 9 448.9 C 7 4800 W 4100 S 7 7 4800 W 4100 S 7 7 4800 W 4100 S 6704 287.3 187.3	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 4800 W 4700 S 5618 13.6 5.0 6.5 10.1 190.1 B 8 4800 W 4700 S 7857 230.8 130.9	3745 S 1030 0.4 0.0 0.0 0.0 A 9 5200 W 3745 S 1298 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 S 0.3 0.0 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 1705 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0 0.1 27.9 A 4415 S 4989 3.4 0.3 0.1 0.4 71.9 A 13 25215 W 4415 S 5215 W 4415 S 3766 326.6 226.8	5600 W 3800 S 4935 4.1 1.3 0.1 177.4 A 14 5600 W 3800 S 5594 3.7 0.8 0.1 3.0 210.0 A 14 5600 W 3800 S 5594 3.7 0.8 0.1 3.0 210.0 A 1500 S 1600 S	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 5600 W 4400 S 4941 8.8 2.5 0.4 4941 8.8 2.5 0.4 4941 8.8 2.5 0.4 134.4 A 15 5600 W 4400 S 134.4 A 500 S 134.4 A 15 5600 W 4400 S 134.6 10 5600 W 4400 S 145.8 145.8	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2444 1.4 0.0 0.0 0.0 A 3800 S 2444 1.4 0.0 0.0 0.0 A 3800 S 1.578 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 0.0 0.0 A 17 5200 W 4700 S 1714 0.0 0.0 0.0 0.0 0.0 0.0 A 17 5200 W 4700 S 17 5200 W 4700 S 5200 W 5200 W	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 4800 W 3800 S 3585 7.8 1.4 0.3 3.0 140.3 A 18 4800 W 3800 S 3390 154.4 106.8	4800 W 4400 S 5.2 0.8 0.3 1.8 101.9 A 109 4800 W 4400 S 5129 7.7 1.5 0.4 4.5 5129 7.7 1.5 134.4 A 4 9 19 4800 W 4400 S 3471 299.1 299.1
	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stop delay (s)	22.8 0.8 65.3 404.9 C 1 5600 W 3500 S 10321 27.4 16.4 0.8 509.5 C C 1 5600 W 3500 S 12236 315.7 175.8 5.4	16.2 9.5 0.5 27.0 242.3 B 2 5600 W 4100 S 8060 15.6 8.1 0.6 8.1 0.6 8.1 0.6 8.1 0.6 27.9 304.2 B 2 5000 W 4100 S 8082 308.1 152.9 6.7	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S 5691 14.0 7.4 0.6 18.5 181.4 B 3 5600 W 4700 S 5691 14.0 7.4 0.5 181.4 B 5600 W 4700 S 5691 14.0 7.4 0.5 181.5 18.5 18.5 19.2	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4 A 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4 A 5200 W 3500 S 5295 9.7 4.9 0.4 10.9 11.8 520 8 7 9.7 4.9 0.4 10.9 11.8 10.9 14.19 10.9 14.19 10.9 14.19 10.9 14.19 10.9 14.19 10.9 14.19 10.9 14.19 10.9 14.19 10.9 14.19 10.9 14.19 10.9 14.19 10.9 14.19 10.9 14.19 10.9 14.19 10.9 14.19 10.9 14.19 10.9 14.19 10.0 14.19 10.9 14.19 10.9 14.19 10.0 14.19 10.0 14.19 10.0 14.19 10.9 14.19 10.0 14.19 10 10.19 10.19 1	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5 5 5 00 W 4100 S 4739 9.4 3.6 0.4 6.5 A 145.5 A 5 5200 W 4100 S 5 5200 W 4100 S 5 5 5200 W 4100 S 38883 289.5 213.3 3.4	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 4800 W 3500 S 7620 17.3 11.6 0.5 29.6 250.0 B 6 4800 W 3500 S 10606 8.7 27.9 1.9	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7 4800 W 4100 S 9183 31.0 17.9 1.0 91.2 711.3 C 713.3 C 7 4800 W 4100 S 5 704 287.3 8 6704 287.3 187.3	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 4800 W 4700 S 5618 13.6 5.0 0.6 16.1 190.1 B 8 4800 W 4700 S 7857 230.8 130.9 4.9	3745 S 1030 0.4 0.0 0.0 0.0 0.0 0.0 0.0 745 S 1298 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 S 0.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5400 W 4210 S 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5215 W 4415 S 3453 3.0 0.1 0.1 0.1 27.9 A 215 W 4415 S 4989 3.4 0.3 0.1 0.4 71.9 A 5215 W 4415 S 5215 W 4415 S 5215 W 4415 S 5215 W 4415 S 5215 W 6.2 6.2	5600 W 3800 S 4935 4.1 1.3 0.1 1.7 7.4 3.1 177.4 3.0 107.4 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 5600 W 4400 S 4941 8.8 2.5 0.4 5.0 134.4 A 500 U 134.4 A 5000 W 4400 S 2.5 0.4 5.5 9 134.4 A 5 500 W 134.4 A 5 500 W	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 0.0 A 4700 S 1714 0.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 A 4700 S 17 5200 W 4700 S 5427 106.7 31.5 2.4	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 4800 W 3800 S 3585 7.8 1.4 0.3 3.0 140.3 A 155.5 A 140.3 A 140.3 A 140.3 A 140.3 A 140.3 A 140.3 A 150.5 A 140.3 A 140.3 A 140.3 A 150.5 A 140.3 A 150.5 A 140.3 A 140.3 A 150.5 A 140.3 A 150.5 A 140.3 A 150.5 A 140.3 A 150.5	4800 W 4400 S 5.2 0.8 0.3 1.8 101.9 A 4800 W 4400 S 5129 7.7 1.5 5129 7.7 1.5 134.4 A 4.5 134.4 A 9 9 9 134.4 3471 299.1 209.1 212.9 9 4.6
	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stop delay (s) Stop delay (s)	22.8 0.8 65.3 404.9 C 1 5600 W 3500 S 10321 27.4 16.4 0.8 509.5 C 1 5600 W 3500 S 12236 315.7 175.8 5.4 1205.9	16.2 9.5 0.5 27.0 242.3 B 25600 W 4100 S 8060 15.6 8.1 0.6 27.9 304.2 B 2 5600 W 4100 S 8080 15.6 8.1 304.2 B 2 5600 W 4100 S	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S 5691 14.0 7.4 18.5 181.4 B 3 5600 W 4700 S 5691 14.0 7.4 8.5 181.4 B 3 5600 W 4700 S 5691 14.0 7.4 8.5 181.4 B 3 5600 W 4700 S 5691 14.0 7.4 8.5 181.4 18.5 18.5 18.5 18.5 19.5	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4 A 5200 W 3500 S 7958 154.0 72.6 2.3 674.9	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5 5200 W 4100 S 4739 9.4 3.6 0.4 6.5 145.5 A 0.4 6.5 145.5 A 5 5200 W 4100 S 3883 3889.5 5 213.3 3.4 631.4	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 4800 W 3500 S 7620 17.3 11.6 0.5 29.6 250.0 B 6 4800 W 3500 S 10.6 4800 W 3500 S 29.6 250.6 250.6 8 277.9 1.9 391.2	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7 4800 W 4100 S 9183 31.0 17.9 91.2 7113.3 C 7 4800 W 4100 S 6704 287.3 187.3 4.6 560.4	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 4800 W 4700 S 5618 13.6 5.0 16.1 190.1 B 8 4800 W 4700 S 7857 230.8 130.9 4.9 783.0	3745 S 1030 0.4 0.0 0.0 0.0 0.0 0.0 3745 S 1298 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 S 0.3 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 1705 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5400 W 4210 S 0 0 0 0 0 0 0 0 0 0 0 0 0	5215 W 4415 S 3453 3.0 0.1 0.0 127.9 A 13 5215 W 4415 S 4989 3.4 0.1 0.4 4415 S 4989 3.4 0.1 0.1 0.4 71.9 A 13 5215 W 4415 S 3766 226.6 226.8 6.2 20.5	5600 W 3800 S 4935 4.1 1.3 0.1 177.4 A 14 5600 W 3800 S 5594 3.7 0.8 0.1 3.0 210.0 A 14 5600 W 3800 S 5594 3.7 0.1 3.0 210.0 A 14 5600 W 3800 S 5594 3.7 0.1 3.0 210.0 A 14 5600 W 3800 S 5594 3.7 0.1 3.0 210.0 A 14 5600 W 3800 S 5594 3.7 0.1 3.0 210.0 A 14 5600 W 3800 S 3.7 0.1 3.0 210.0 14 5600 W 3800 S 5594 3.7 0.8 0.1 3.0 14 5600 W 3800 S 3800 S 3805 S 3800 S 3805 S 3800 S 3805 S 3800 S 3805 S	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 15 5600 W 4400 S 4941 8.8 2.5 0.4 5.0 4941 8.8 2.5 0.4 5.0 134.4 A 15 5600 W 4400 S 229.3 145.8 5.4 229.3	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2444 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2444 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 A 177 5200 W 4700 S 1714 0.9 0.0 0.0 0.0 0.0 0.0 1714 0.9 0.0 0.0 0.0 0.0 1.7 1.7 5200 W 4700 S 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 18 4800 W 3800 S 3585 7.8 1.4 0.3 3.0 140.3 A 140.3 A 140.3 A 140.3 A 140.3 A 140.3 A 140.5 A 154.4 10.6 83390 154.4 106.8 2.8 835.6 154.4 106.8 2.8 107.4	4800 W 4400 S 5.2 0.8 3440 5.2 0.8 3.3 101.9 A 4800 W 4400 S 5129 7.7 1.5 0.4 4400 S 5129 7.7 1.5 0.4 4.5 3440 4400 S 5129 7.7 1.5 0.4 4.5 2 9.1 1.5 0.4 4.5 2 0.4 4.5 2 0.5 2 1.5 2 0.5 2 1.5 2 0.5 2 1.5 2 0.5 2 1.5 2 0.5 2 1.5 2 0.5 2 1.5 2 0.5 2 1.5 2 0.5 2 1.5 2 0.5 2 1.5 2 0.5 2 1.5 2 0.5 2 1.5 2 0.5 2 1.5 1.5 1.5 1.5 2 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5
	Stops Avg Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s)	22.8 0.8 65.3 404.9 C 1 5500 W 3500 S 10321 27.4 16.4 0.8 66.8 509.5 C 1 5600 W 3500 S 12236 315.7 175.8 5.4 1205.9 1438.4	16.2 9.5 0.5 27.0 242.3 B 2 5600 W 4100 S 8060 15.6 8.1 0.6 8.1 0.6 8.1 0.4 27.9 304.2 B 2 5600 W 4100 S 8082 308.1 152.9 6.7 8682.2	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S 5601 W 4700 S 5601 W 4700 S 5601 H4.0 7.4 0.6 18.5 181.4 B 3 3 5600 W 4700 S 560 W 560 W 5	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4 A 4 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4 A 5200 W 3500 S 5295 134.0 5200 W 3500 S 5295 134.0 10.7 131.4 A 5200 W 3500 S 5295 134.0 131.4 5200 W 3500 S 5295 134.0 131.4 5200 W 3500 S 5295 134.0 131.4 135.2 135	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5 5200 W 4100 S 5 7 4739 9.4 3.6 0.4 6.5 145.5 A 5200 W 4100 S 5200 W 4100 S 38893 289.5 5213.3 3.4 631.4 1008.4	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 4800 W 3500 S 7620 17.3 11.6 0.5 29.6 250.0 B 6 4800 W 3500 S 7620 17.3 11.6 0.5 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 27.9 1.9 27.9 1.9 21.9 21.9 21.9 21.9 21.9 21.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 27.9 1.9 27.9 1.9 21	4100 S 6532 33.1 22.3 1.0 64.8 9 448.9 C 7 4800 W 4100 S 9183 31.0 17.9 91.2 713.3 7 4800 W 4100 S 6704 287.3 187.3 4.6 560.4 1182.3	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 4800 W 4700 S 5618 13.6 5.0 6.5 0.6 16.1 190.1 B 8 4800 W 4700 S 7857 230.8 13.9 4.9 783.0 1656.0	3745 S 1030 0.4 0.0 0.0 0.0 A 3745 S 1298 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 1705 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.1 27.9 A 13 5215 W 4415 S 4989 3.4 0.3 0.1 0.4 71.9 A A 13 5215 W 4415 S 5215 W 4415 S 5215 W 4415 S 5215 S 4525 5215 S 4525 5215 S 5215 S 52	5600 W 3800 S 4935 4.1 1.3 1.1 3.1 177.4 A 14 5600 W 3800 S 5594 3.7 0.8 0.1 3.0 210.0 A 14 5600 W 3800 S 5533 210.0 A 14 5533 210.0 A 14 5533 228.0 116.2 4.6 236.2 681.8 8	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 5600 W 4400 S 4941 8.8 2.5 0.4 5.00 134.4 A 15 5600 W 4400 S 134.4 A 5.0 134.4 A 5.5 15 5600 W 145.8 5.2 9 134.4 A 5.5 15 5600 W 134.4 A 5.5 15 5600 W 134.4 A 5.5 15 15 15 15 15 15 15 15 15 15 15 15 15	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 0.0 0.0 A 17 5200 W 4700 S 1714 0.0 0.0 0.0 0.0 0.0 0.0 A 17 5200 W 4700 S 1714 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 18 4800 W 3800 S 3585 7.8 1.4 0.3 3.0 140.3 A 18 4800 W 3800 S 3390 154.4 106.8 2.8 335.6 970	4800 W 4400 S 5.2 0.8 1.8 101.9 A 4800 W 4400 S 5129 7.7 1.5 0.4 4.5 134.4 A 9 19 4800 W 4400 S 3471 121.9 9 3471 212.9 4.6 5 3471 121.2 9 4.6 5 3471 121.2 9 4.6 5 3471 1.5 121.2 9 121.2 9 3471 1.5 121.2 9 3471 1.5 121.2 9 3471 1.5 121.2 12
	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Stop delay (s) Stop delay (s)	22.8 0.8 65.3 404.9 C 1 5600 W 3500 S 10321 27.4 16.4 0.8 509.5 C 1 5600 W 3500 S 12236 315.7 175.8 5.4 1205.9	16.2 9.5 0.5 27.0 242.3 B 25600 W 4100 S 8060 15.6 8.1 0.6 27.9 304.2 B 2 5600 W 4100 S 8080 15.6 8.1 304.2 B 2 5600 W 4100 S	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S 5691 14.0 7.4 5691 14.0 7.4 18.5 181.4 B 3 5600 W 4700 S 9697 228.2 92.7 5.3 760.9	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4 A 5200 W 3500 S 7958 154.0 72.6 2.3 674.9	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5 5200 W 4100 S 4739 9.4 3.6 0.4 6.5 145.5 A 0.4 6.5 145.5 A 5 5200 W 4100 S 3883 3889.5 5 213.3 3.4 631.4	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 	4100 S 6532 33.1 22.3 1.0 64.8 448.9 C 7 4800 W 4100 S 9183 31.0 17.9 91.2 7113.3 C 7 4800 W 4100 S 6704 287.3 187.3 4.6 560.4	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 4800 W 4700 S 5618 13.6 5.0 16.1 190.1 B 8 4800 W 4700 S 7857 230.8 130.9 4.9 783.0	3745 S 1030 0.4 0.0 0.0 0.0 0.0 0.0 3745 S 1298 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 S 0.3 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 1705 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 N/A 12 5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.0 127.9 A 13 5215 W 4415 S 4989 3.4 0.1 0.4 4415 S 4989 3.4 0.1 0.1 0.4 71.9 A 13 5215 W 4415 S 3766 226.6 226.8 6.2 26.8 6.2 701.5	5600 W 3800 S 4935 4.1 1.3 0.1 177.4 A 14 5600 W 3800 S 5594 3.7 0.8 0.1 3.0 210.0 A 14 5600 W 3800 S 5594 3.7 0.1 3.0 210.0 A 14 5600 W 3800 S 5594 3.7 0.1 3.0 210.0 A 14 5600 W 3800 S 5594 3.7 0.1 3.0 210.0 A 14 5600 W 3800 S 5594 3.7 0.1 3.0 210.0 A 14 5600 W 3800 S 3.7 0.1 3.0 210.0 14 5600 W 3800 S 5594 3.7 0.8 0.1 3.0 14 5600 W 3800 S 3800 S 3805 S 3800 S 3805 S 3800 S 3805 S 3800 S 3805 S	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 15 5600 W 4400 S 4941 8.8 2.5 0.4 5.0 4941 8.8 2.5 0.4 5.0 134.4 A 15 5600 W 4400 S 229.3 145.8 5.4 229.3	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2444 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 A 16 5200 W 3800 S 2444 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 A 177 5200 W 4700 S 1714 0.9 0.0 0.0 0.0 0.0 0.0 1714 0.9 0.0 0.0 0.0 0.0 1.7 1.7 5200 W 4700 S 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 18 4800 W 3800 S 3585 7.8 1.4 0.3 3.0 140.3 A 140.3 A 140.3 A 140.3 A 140.3 A 140.3 A 140.5 A 154.4 10.6 83390 154.4 106.8 2.8 835.6 154.4 106.8 2.8 107.4	4800 W 4400 S 3440 5.2 0.8 31.8 101.9 A 4800 W 4400 S 5129 7.7 7.5 0.4 4.5 5129 7.7 1.5 0.4 4.5 4.400 S 5129 7.7 1.5 0.4 4.5 4.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2
	Stops Avg Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s)	22.8 0.8 65.3 404.9 C 1 5500 W 3500 S 10321 27.4 16.4 0.8 66.8 509.5 C 1 5600 W 3500 S 12236 315.7 175.8 5.4 1205.9 1438.4	16.2 9.5 0.5 27.0 242.3 B 2 5600 W 4100 S 8060 15.6 8.1 0.6 8.1 0.6 8.1 0.4 27.9 304.2 B 2 5600 W 4100 S 8082 308.1 152.9 6.7 8682.2	4689 16.8 11.1 0.6 19.2 183.5 B 3 5600 W 4700 S 5601 W 4700 S 5601 W 4700 S 5601 H4.0 7.4 0.6 18.5 181.4 B 3 3 5600 W 4700 S 560 W 560 W 5	3392 11.8 6.7 0.4 10.9 141.9 B 4 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4 A 4 5200 W 3500 S 5295 9.7 4.9 0.4 10.0 131.4 A 5200 W 3500 S 5295 134.0 5200 W 3500 S 5295 134.0 10.7 131.4 A 5200 W 3500 S 5295 134.0 131.4 5200 W 3500 S 5295 134.0 131.4 5200 W 3500 S 5295 134.0 131.4 135.2 15.2 15.2 15.2 15.2 1	4100 S 3234 9.5 4.8 0.4 9.4 159.4 A 5 5200 W 4100 S 5 7 4739 9.4 3.6 0.4 6.5 145.5 A 5200 W 4100 S 5200 W 4100 S 3883 289.5 5213.3 3.4 631.4 1008.4	3500 S 5773 13.1 6.4 0.5 18.2 211.8 B 6 4800 W 3500 S 7620 17.3 11.6 0.5 29.6 250.0 B 6 4800 W 3500 S 7620 17.3 11.6 0.5 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 29.6 25.0 8 7 27.9 1.9 27.9 1.9 21.9 21.9 21.9 21.9 21.9 21.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 27.9 1.9 27.9 1.9 21	4100 S 6532 33.1 22.3 1.0 64.8 9 448.9 C 7 4800 W 4100 S 9183 31.0 17.9 91.2 713.3 7 4800 W 4100 S 6704 287.3 187.3 4.6 560.4 1182.3	4700 S 5100 14.5 6.9 0.7 16.0 170.5 B 4800 W 4700 S 5618 13.6 5.0 6.5 0.6 16.1 190.1 B 8 4800 W 4700 S 7857 230.8 13.9 4.9 783.0 1656.0	3745 S 1030 0.4 0.0 0.0 0.0 A 3745 S 1298 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	4980 W 3725 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5200 W 4025 S 1045 0.3 0.0 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 1705 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5400 W 4210 S 0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	5215 W 4415 S 3453 3.0 0.1 0.1 27.9 A 13 5215 W 4415 S 4989 3.4 0.3 0.1 0.4 71.9 A A 13 5215 W 4415 S 5215 W 4415 S 5215 W 4415 S 5215 S 4525 8 20.6 6 226.8 6.2 705.6 50 105.0	5600 W 3800 S 4935 4.1 1.3 1.1 3.1 177.4 A 14 5600 W 3800 S 5594 3.7 0.8 0.1 3.0 210.0 A 14 5600 W 3800 S 5533 210.0 A 14 5533 210.0 A 14 5533 228.0 116.2 4.6 236.2 681.8 8	5600 W 4400 S 3570 6.8 2.6 0.4 4.0 121.7 A 5600 W 4400 S 4941 8.8 2.5 0.4 5.00 134.4 A 15 5600 W 4400 S 134.4 A 5.0 134.4 A 5.5 15 5600 W 145.8 5.2 9 134.4 A 5.5 15 5600 W 134.4 A 5.5 15 5600 W 134.4 A 5.5 15 15 15 15 15 15 15 15 15 15 15 15 15	5200 W 3800 S 1578 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	5200 W 4700 S 2617 1.3 0.0 0.0 0.0 0.0 0.0 0.0 A 17 5200 W 4700 S 1714 0.0 0.0 0.0 0.0 0.0 0.0 A 17 5200 W 4700 S 1714 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	4800 W 3800 S 2929 6.6 1.6 0.3 3.2 117.8 A 18 4800 W 3800 S 3585 7.8 1.4 0.3 3.0 140.3 A 18 4800 W 3800 S 3390 154.4 106.8 2.8 335.6 970	4800 W 4400 S 4400 S 5.2 0.8 1.8 101.9 A 4800 W 4400 S 5129 7.7 1.5 134.4 A 4800 W 4400 S 134.4 A 9 9 9 3471 122.9 3471 212.9 3471 121.2 9 4.6 650.3 1658.2

2040 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	Terroretter	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S	3800 S	4400 S	3800 S	4700 S	3800 S	4400 S
	Vehicles	11890	10019	10996	8491	6857	10723	9745	9389	2475	0	2507	0	5597	5895	6630	4565	6158	4221	4697
	Delay (s)	339.2	36.3	145.9	126.1	13.8	85.0	136.3	121.8	1.5	0.0	0.2	0.0	5.0	48.1	8.8	3.3	132.5	11.5	40.6
	Stop delay (s)	185.3	23.7	46.7	22.8	6.5	21.7	47.8	55.7	0.0	0.0	0.0	0.0	0.3	29.1	2.3	0.7	33.8	3.3	17.8
	Stops	5.1	0.9	3.3	2.5	0.5	2.1	2.6	3.1	0.0	0.0	0.0	0.0	0.1	1.1	0.4	0.1	3.1	0.4	1.2
	Avg Queue (ft)	1214.6	114.1	848.1	612.0	21.2	419.8	583.7	532.0	0.0	0.0	0.0	0.0	1.2	96.6	6.4	2.5	605.2	11.5	135.8
	Max Queue (ft)	1435.0	553.3	1161.1	996.4	284.9	1163.7	898.2	1388.8	0.0	0.0	0.0	0.0	154.9	671.0	176.8	239.1	811.8	169.3	1023.6
	LOS	F	D	F	F	В	F	F	F	A	N/A	Α	N/A	A	D	A	A	F	В	D

Michigan I	U Turn															
2009 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
200571111		5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W	MUT	MUT
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S	North	South
	Vehicles	10260	7434	5572	2390	3055	5330	6859	0	294	508	524	262	710	3700	4296
	Delay (s)	14.5	27.6	22.1	12.6	2.2	24.1	42.6	0.0	0.5	2.5	0.7	1.6	1.1	4.2	1.1
	Stop delay (s)	8.4	20.0	15.1	10.8	0.5	14.5	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
	Stops	0.4	0.7	0.6	0.1	0.1	0.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	28.0	48.6	30.3	20.9	0.4	47.8	119.0	0.0	9.5	0.0	0.0	0.0	0.0	0.2	0.1
	Max Queue (ft)	319.1	284.1	232.8	138.3	57.3	307.8	525.0	0.0	205.3	0.0	0.0	0.0	0.0	86.5	36.8
	LOS	В	С	С	В	А	С	D	N/A	А	А	А	А	А	А	А
2009 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W	MUT	MUT
		3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S	North	South
	Vehicles	9217	8714	7068	3424	4668	6803	9888	0	648	425	986	423	1033	3988	4641
	Delay (s)	20.8	49.8	19.1	4.9	5.6	15.5	29.5	0.0	1.3	2.0	0.8	2.1	1.7	1.3	0.6
	Stop delay (s)	14.2	36.0	12.1	2.5	2.8	9.5	18.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Stops	0.5	1.0	0.6	0.2	0.2	0.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	35.7	168.9	28.5	2.4	3.4	23.5	75.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
	Max Queue (ft)	295.5	569.8	256.9	94.7	83.3	197.2	517.4	0.0	0.0	0.0	0.0	0.0	0.0	64.1	29.9
	LOS	С	D	В	Α	Α	В	С	N/A	Α	Α	А	Α	Α	Α	Α
						_		_								
2040 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W	MUT	MUT
		3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S	North	South
	Vehicles	6898	8062	9927	3731	5181	6263	8088	0	650	362	1006	417	888	1995	2515
	Delay (s)	22.1	27.6	96.1	2.0	265	265	22.0	0.0	1.1	1.0	0.5	2.4	1.4	2.6	0.0
	Chan dalar (a)	22.1	37.6	86.1	3.0	26.5	26.5	23.0	0.0	1.1	1.8	0.5	2.4	1.4	3.6	0.8
	Stop delay (s)	15.5	27.9	28.5	1.0	15.8	15.5	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
	Stops	15.5 0.5	27.9 0.7	28.5 1.6	1.0 0.0	15.8 0.5	15.5 0.7	12.5 0.8	0.0	0.0 0.0	0.0 0.0	0.0	0.0 0.0	0.0 0.0	0.1 0.0	0.0 0.0
	Stops Avg Queue (ft)	15.5 0.5 35.4	27.9 0.7 75.0	28.5 1.6 380.4	1.0 0.0 3.2	15.8 0.5 134.8	15.5 0.7 74.8	12.5 0.8 46.8	0.0 0.0 0.0	0.0 0.0 156.3	0.0 0.0 0.0	0.0 0.0 53.6	0.0 0.0 0.0	0.0 0.0 0.0	0.1 0.0 0.2	0.0 0.0 0.0
	Stops Avg Queue (ft) Max Queue (ft)	15.5 0.5 35.4 324.7	27.9 0.7 75.0 444.1	28.5 1.6 380.4 1040.9	1.0 0.0 3.2 149.7	15.8 0.5 134.8 1252.3	15.5 0.7 74.8 590.3	12.5 0.8 46.8 477.0	0.0 0.0 0.0 0.0	0.0 0.0 156.3 402.4	0.0 0.0 0.0 0.0	0.0 0.0 53.6 256.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.1 0.0 0.2 104.6	0.0 0.0 0.0 0.0
	Stops Avg Queue (ft)	15.5 0.5 35.4	27.9 0.7 75.0	28.5 1.6 380.4	1.0 0.0 3.2	15.8 0.5 134.8	15.5 0.7 74.8	12.5 0.8 46.8	0.0 0.0 0.0	0.0 0.0 156.3	0.0 0.0 0.0	0.0 0.0 53.6	0.0 0.0 0.0	0.0 0.0 0.0	0.1 0.0 0.2	0.0 0.0 0.0
2040 PM	Stops Avg Queue (ft) Max Queue (ft)	15.5 0.5 35.4 324.7	27.9 0.7 75.0 444.1	28.5 1.6 380.4 1040.9	1.0 0.0 3.2 149.7	15.8 0.5 134.8 1252.3	15.5 0.7 74.8 590.3	12.5 0.8 46.8 477.0	0.0 0.0 0.0 0.0	0.0 0.0 156.3 402.4	0.0 0.0 0.0 0.0	0.0 0.0 53.6 256.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.1 0.0 0.2 104.6	0.0 0.0 0.0 0.0
2040 PM	Stops Avg Queue (ft) Max Queue (ft) LOS Node number	15.5 0.5 35.4 324.7 C	27.9 0.7 75.0 444.1 D	28.5 1.6 380.4 1040.9 F	1.0 0.0 3.2 149.7 A	15.8 0.5 134.8 1252.3 C	15.5 0.7 74.8 590.3 C	12.5 0.8 46.8 477.0 C	0.0 0.0 0.0 0.0 N/A	0.0 0.0 156.3 402.4 A	0.0 0.0 0.0 0.0 A	0.0 0.0 53.6 256.0 A	0.0 0.0 0.0 0.0 A	0.0 0.0 0.0 0.0 A	0.1 0.0 0.2 104.6 A	0.0 0.0 0.0 0.0 A
2040 PM	Stops Avg Queue (ft) Max Queue (ft) LOS	15.5 0.5 35.4 324.7 C	27.9 0.7 75.0 444.1 D	28.5 1.6 380.4 1040.9 F 3	1.0 0.0 3.2 149.7 A 4	15.8 0.5 134.8 1252.3 C	15.5 0.7 74.8 590.3 C	12.5 0.8 46.8 477.0 C	0.0 0.0 0.0 0.0 N/A 8	0.0 0.0 156.3 402.4 A 9	0.0 0.0 0.0 0.0 A 10	0.0 0.0 53.6 256.0 A 11	0.0 0.0 0.0 A 12	0.0 0.0 0.0 0.0 A 13	0.1 0.0 0.2 104.6 A 14	0.0 0.0 0.0 A 15
2040 PM	Stops Avg Queue (ft) Max Queue (ft) LOS Node number	15.5 0.5 35.4 324.7 C 1 5600 W	27.9 0.7 75.0 444.1 D 2 5600 W	28.5 1.6 380.4 1040.9 F 3 5600 W	1.0 0.0 3.2 149.7 A 4 5200 W	15.8 0.5 134.8 1252.3 C 5 5200 W	15.5 0.7 74.8 590.3 C 6 4800 W	12.5 0.8 46.8 477.0 C 7 4800 W	0.0 0.0 0.0 0.0 N/A 8 4800 W	0.0 0.0 156.3 402.4 A 9 5200 W	0.0 0.0 0.0 0.0 A 10 4980 W	0.0 0.0 53.6 256.0 A 11 5200 W	0.0 0.0 0.0 A 12 5400 W	0.0 0.0 0.0 A 13 5215 W	0.1 0.0 0.2 104.6 A 14 MUT	0.0 0.0 0.0 A 15 MUT
2040 PM	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection	15.5 0.5 35.4 324.7 C 1 5600 W 3500 S	27.9 0.7 75.0 444.1 D 2 5600 W 4100 S	28.5 1.6 380.4 1040.9 F 3 5600 W 4700 S	1.0 0.0 3.2 149.7 A 5200 W 3500 S	15.8 0.5 134.8 1252.3 C 5 5200 W 4100 S	15.5 0.7 74.8 590.3 C 6 4800 W 3500 S	12.5 0.8 46.8 477.0 C 7 4800 W 4100 S	0.0 0.0 0.0 0.0 N/A 8 4800 W 4700 S	0.0 0.0 156.3 402.4 A 9 5200 W 3745 S	0.0 0.0 0.0 A 10 4980 W 3725 S	0.0 0.0 53.6 256.0 A 11 5200 W 4025 S	0.0 0.0 0.0 A 12 5400 W 4210 S	0.0 0.0 0.0 A 13 5215 W 4415 S	0.1 0.0 0.2 104.6 A 14 MUT North	0.0 0.0 0.0 A 15 MUT South
2040 PM	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles	15.5 0.5 35.4 324.7 C 1 5600 W 3500 S 11899	27.9 0.7 75.0 444.1 D 2 5600 W 4100 S 11285	28.5 1.6 380.4 1040.9 F 3 5600 W 4700 S 11564	1.0 0.0 3.2 149.7 A 5200 W 3500 S 7121	15.8 0.5 134.8 1252.3 C 5 5200 W 4100 S 8177	15.5 0.7 74.8 590.3 C 6 4800 W 3500 S 10165	12.5 0.8 46.8 477.0 C 7 4800 W 4100 S 11185	0.0 0.0 0.0 N/A 8 4800 W 4700 S 0	0.0 0.0 156.3 402.4 A 9 5200 W 3745 S 1828	0.0 0.0 0.0 A 10 4980 W 3725 S 215	0.0 0.0 53.6 256.0 A 11 5200 W 4025 S 2046	0.0 0.0 0.0 A 12 5400 W 4210 S 577	0.0 0.0 0.0 A 13 5215 W 4415 S 955	0.1 0.0 0.2 104.6 A 14 MUT North 4680	0.0 0.0 0.0 A 15 MUT South 4066
2040 PM	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s)	15.5 0.5 35.4 324.7 C 1 5600 W 3500 S 11899 31.9	27.9 0.7 75.0 444.1 D 2 5600 W 4100 S 11285 85.5	28.5 1.6 380.4 1040.9 F 3 5600 W 4700 S 11564 229.5	1.0 0.0 3.2 149.7 A 5200 W 3500 S 7121 8.8	15.8 0.5 134.8 1252.3 C 5 5200 W 4100 S 8177 10.0	15.5 0.7 74.8 590.3 C 6 4800 W 3500 S 10165 15.1	12.5 0.8 46.8 477.0 C 7 4800 W 4100 S 11185 37.7	0.0 0.0 0.0 N/A 8 4800 W 4700 S 0 0.0	0.0 0.0 156.3 402.4 A 9 5200 W 3745 S 1828 2.0	0.0 0.0 0.0 A 10 4980 W 3725 S 215 1.6	0.0 0.0 53.6 256.0 A 11 5200 W 4025 S 2046 0.7	0.0 0.0 0.0 A 12 5400 W 4210 S 577 23.9	0.0 0.0 0.0 A 13 5215 W 4415 S 955 1.4	0.1 0.0 0.2 104.6 A 14 MUT North 4680 2.7	0.0 0.0 0.0 A 15 MUT South 4066 1.4
2040 PM	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s)	15.5 0.5 35.4 324.7 C 1 5600 W 3500 S 11899 31.9 20.4	27.9 0.7 75.0 444.1 D 2 5600 W 4100 S 11285 85.5 50.7	28.5 1.6 380.4 1040.9 F 3 5600 W 4700 S 11564 229.5 101.0	1.0 0.0 3.2 149.7 A 5200 W 3500 S 7121 8.8 3.6	15.8 0.5 134.8 1252.3 C 5 5200 W 4100 S 8177 10.0 3.3	15.5 0.7 74.8 590.3 C 6 4800 W 3500 S 10165 15.1 7.9	12.5 0.8 46.8 477.0 C 7 4800 W 4100 S 11185 37.7 25.2	0.0 0.0 0.0 N/A 8 4800 W 4700 S 0 0.0	0.0 0.0 156.3 402.4 A 9 5200 W 3745 S 1828 2.0 0.0	0.0 0.0 0.0 A 10 4980 W 3725 S 215 1.6 0.0	0.0 0.0 53.6 256.0 A 11 5200 W 4025 S 2046 0.7 0.0	0.0 0.0 0.0 A 12 5400 W 4210 S 577 23.9 7.3	0.0 0.0 0.0 A 13 5215 W 4415 S 955 1.4 0.0	0.1 0.0 0.2 104.6 A 14 MUT North 4680 2.7 0.0	0.0 0.0 0.0 A 15 MUT South 4066 1.4 0.1
2040 PM	Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stops	15.5 0.5 35.4 324.7 C 1 5600 W 3500 S 11899 31.9 20.4 0.7	27.9 0.7 75.0 444.1 D 2 5600 W 4100 S 11285 85.5 50.7 1.7	28.5 1.6 380.4 1040.9 F 3 5600 W 4700 S 11564 229.5 101.0 5.4	1.0 0.0 3.2 149.7 A 5200 W 3500 S 7121 8.8 3.6 0.2	15.8 0.5 134.8 1252.3 C 5 5200 W 4100 S 8177 10.0 3.3 0.4	15.5 0.7 74.8 590.3 C 6 4800 W 3500 S 10165 15.1 7.9 0.5	12.5 0.8 46.8 477.0 C 7 4800 W 4100 S 11185 37.7 25.2 0.9	0.0 0.0 0.0 N/A 8 4800 W 4700 S 0 0.0 0.0 0.0	0.0 0.0 156.3 402.4 A 9 5200 W 3745 S 1828 2.0 0.0 0.0	0.0 0.0 0.0 A 10 4980 W 3725 S 215 1.6 0.0 0.0	0.0 0.0 53.6 256.0 A 11 5200 W 4025 S 2046 0.7 0.0 0.0	0.0 0.0 0.0 A 12 5400 W 4210 S 577 23.9 7.3 0.5	0.0 0.0 0.0 A 13 5215 W 4415 S 955 1.4 0.0 0.0	0.1 0.0 0.2 104.6 A 14 MUT North 4680 2.7 0.0 0.0	0.0 0.0 0.0 A 15 MUT South 4066 1.4 0.1 0.0

Bowtie In	tersection															
2009 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W		_
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S	BT East	BT West
	Vehicles	11183	7437	5590	2960	3049	5741	6850	4753	331	508	528	262	713	4661	5375
	Delay (s)	21.0	27.8	22.5	4.9	2.1	27.2	37.4	13.1	0.4	2.4	0.6	1.7	1.0	4.3	1.7
	Stop delay (s)	12.0	20.4	15.3	2.6	0.4	15.7	26.2	6.3	0.0	0.0	0.0	0.0	0.0	0.4	0.1
	Stops	0.6	0.6	0.6	0.2	0.1	0.8	0.9	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Avg Queue (ft)	52.8	50.0	30.0	1.8	0.4	57.3	93.2	11.7	0.0	0.0	0.0	0.0	0.0	4.7	0.7
	Max Queue (ft)	407.1	263.6	243.4	161.1	35.7	388.7	593.4	148.9	0.0	0.0	0.0	0.0	0.0	393.4	166.0
	LOS	С	С	С	Α	Α	С	D	В	А	А	Α	Α	Α	Α	Α
2009 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Intersection	5600 W	5600 W	5600 W	5200 W	5200 W	$4800 \mathrm{W}$	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W		
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S	BT East	BT West
	Vehicles	11701	8720	7088	4641	4679	7699	9907	5432	655	425	991	423	1029	4654	5532
	Delay (s)	27.0	65.5	38.1	4.7	6.0	15.4	27.6	13.8	1.2	2.4	0.7	2.4	1.0	1.5	11.8
	Stop delay (s)	17.2	47.4	27.9	2.0	3.0	9.3	17.7	6.5	0.0	0.0	0.0	0.1	0.0	0.1	2.1
	Stops	0.6	1.2	0.7	0.1	0.2	0.5	0.8	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.3
	Avg Queue (ft)	28.5	65.0	27.0	0.9	1.2	7.3	22.0	4.0	0.0	0.0	0.0	0.0	0.0	0.1	10.5
	Max Queue (ft)	134.5	189.6	109.7	47.2	23.0	74.3	155.2	50.7	0.0	0.0	0.0	0.0	0.0	31.0	133.1
	1.00	0		D			D	0	n		А		А	Α	А	В
	LOS	С	E	D	Α	Α	В	С	В	A	A	Α	A	A	A	D
								-								
2040 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	A 14	15
2040 AM	Node number	1 5600 W	2 5600 W	3 5600 W	4 5200 W	5 5200 W	6 4800 W	7 4800 W	8 4800 W	9 5200 W	10 4980 W	11 5200 W	12 5400 W	13 5215 W	14	15
2040 AM	Node number Intersection	1 5600 W 3500 S	2 5600 W 4100 S	3 5600 W 4700 S	4 5200 W 3500 S	5 5200 W 4100 S	6 4800 W 3500 S	7 4800 W 4100 S	8 4800 W 4700 S	9 5200 W 3745 S	10 4980 W 3725 S	11 5200 W 4025 S	12 5400 W 4210 S	13 5215 W 4415 S	14 BT East	15 BT West
2040 AM	Node number Intersection Vehicles	1 5600 W 3500 S 7919	2 5600 W 4100 S 8124	3 5600 W 4700 S 9931	4 5200 W 3500 S 4426	5 5200 W 4100 S 5430	6 4800 W 3500 S 6724	7 4800 W 4100 S 8152	8 4800 W 4700 S 7312	9 5200 W 3745 S 866	10 4980 W 3725 S 362	11 5200 W 4025 S 1153	12 5400 W 4210 S 417	13 5215 W 4415 S 889	14 BT East 4269	15 BT West 4388
2040 AM	Node number Intersection Vehicles Delay (s)	1 5600 W 3500 S 7919 25.5	2 5600 W 4100 S 8124 35.6	3 5600 W 4700 S 9931 86.8	4 5200 W 3500 S 4426 5.7	5 5200 W 4100 S 5430 6.3	6 4800 W 3500 S 6724 27.9	7 4800 W 4100 S 8152 19.2	8 4800 W 4700 S 7312 13.5	9 5200 W 3745 S 866 1.0	10 4980 W 3725 S 362 1.8	11 5200 W 4025 S 1153 0.4	12 5400 W 4210 S 417 2.4	13 5215 W 4415 S 889 1.4	14 BT East 4269 1.8	15 BT West 4388 2.1
2040 AM	Node number Intersection Vehicles Delay (s) Stop delay (s)	1 5600 W 3500 S 7919 25.5 17.3	2 5600 W 4100 S 8124 35.6 26.7	3 5600 W 4700 S 9931 86.8 30.8	4 5200 W 3500 S 4426 5.7 2.3	5 5200 W 4100 S 5430 6.3 1.8	6 4800 W 3500 S 6724 27.9 16.5	7 4800 W 4100 S 8152 19.2 10.2	8 4800 W 4700 S 7312 13.5 4.9	9 5200 W 3745 S 866 1.0 0.0	10 4980 W 3725 S 362 1.8 0.0	11 5200 W 4025 S 1153 0.4 0.0	12 5400 W 4210 S 417 2.4 0.0	13 5215 W 4415 S 889 1.4 0.0	14 BT East 4269 1.8 0.1	15 BT West 4388 2.1 0.1
2040 AM	Node number Intersection Vehicles Delay (s) Stop delay (s) Stops	1 5600 W 3500 S 7919 25.5 17.3 0.6	2 5600 W 4100 S 8124 35.6 26.7 0.7	3 5600 W 4700 S 9931 86.8 30.8 1.6	4 5200 W 3500 S 4426 5.7 2.3 0.2	5 5200 W 4100 S 5430 6.3 1.8 0.3	6 4800 W 3500 S 6724 27.9 16.5 0.7	7 4800 W 4100 S 8152 19.2 10.2 0.7	8 4800 W 4700 S 7312 13.5 4.9 0.5	9 5200 W 3745 S 866 1.0 0.0 0.0	10 4980 W 3725 S 362 1.8 0.0 0.0	11 5200 W 4025 S 1153 0.4 0.0 0.0	12 5400 W 4210 S 417 2.4 0.0 0.0	13 5215 W 4415 S 889 1.4 0.0 0.0	14 BT East 4269 1.8 0.1 0.0	15 BT West 4388 2.1 0.1 0.0
2040 AM	Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft)	1 5600 W 3500 S 7919 25.5 17.3 0.6 17.3	2 5600 W 4100 S 8124 35.6 26.7 0.7 22.0	3 5600 W 4700 S 9931 86.8 30.8 1.6 125.2	4 5200 W 3500 S 4426 5.7 2.3 0.2 1.3	5 5200 W 4100 S 5430 6.3 1.8 0.3 2.0	6 4800 W 3500 S 6724 27.9 16.5 0.7 25.7	7 4800 W 4100 S 8152 19.2 10.2 0.7 10.9	8 4800 W 4700 S 7312 13.5 4.9 0.5 5.8	9 5200 W 3745 S 866 1.0 0.0 0.0 0.0	10 4980 W 3725 S 362 1.8 0.0 0.0 0.0	11 5200 W 4025 S 1153 0.4 0.0 0.0 0.0	12 5400 W 4210 S 417 2.4 0.0 0.0 0.0	13 5215 W 4415 S 889 1.4 0.0 0.0 0.0	14 BT East 4269 1.8 0.1 0.0 0.2	15 BT West 4388 2.1 0.1 0.0 0.3
2040 AM	Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft)	1 5600 W 3500 S 7919 25.5 17.3 0.6 17.3 133.3	2 5600 W 4100 S 8124 35.6 26.7 0.7 22.0 115.7	3 5600 W 4700 S 9931 86.8 30.8 1.6 125.2 317.1	4 5200 W 3500 S 4426 5.7 2.3 0.2 1.3 68.7	5 5200 W 4100 S 5430 6.3 1.8 0.3 2.0 92.7	6 4800 W 3500 S 6724 27.9 16.5 0.7 25.7 220.4	7 4800 W 4100 S 8152 19.2 10.2 0.7 10.9 93.8	8 4800 W 4700 S 7312 13.5 4.9 0.5 5.8 102.5	9 5200 W 3745 S 866 1.0 0.0 0.0 0.0 0.0 0.0	10 4980 W 3725 S 362 1.8 0.0 0.0 0.0 0.0 0.0	11 5200 W 4025 S 1153 0.4 0.0 0.0 0.0 0.0 0.0	12 5400 W 4210 S 417 2.4 0.0 0.0 0.0 0.0 0.0	13 5215 W 4415 S 889 1.4 0.0 0.0 0.0 0.0 0.0	14 BT East 4269 1.8 0.1 0.0 0.2 40.5	15 BT West 4388 2.1 0.1 0.0 0.3 40.7
2040 AM	Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft)	1 5600 W 3500 S 7919 25.5 17.3 0.6 17.3	2 5600 W 4100 S 8124 35.6 26.7 0.7 22.0	3 5600 W 4700 S 9931 86.8 30.8 1.6 125.2	4 5200 W 3500 S 4426 5.7 2.3 0.2 1.3	5 5200 W 4100 S 5430 6.3 1.8 0.3 2.0	6 4800 W 3500 S 6724 27.9 16.5 0.7 25.7	7 4800 W 4100 S 8152 19.2 10.2 0.7 10.9	8 4800 W 4700 S 7312 13.5 4.9 0.5 5.8	9 5200 W 3745 S 866 1.0 0.0 0.0 0.0	10 4980 W 3725 S 362 1.8 0.0 0.0 0.0	11 5200 W 4025 S 1153 0.4 0.0 0.0 0.0	12 5400 W 4210 S 417 2.4 0.0 0.0 0.0	13 5215 W 4415 S 889 1.4 0.0 0.0 0.0	14 BT East 4269 1.8 0.1 0.0 0.2	15 BT West 4388 2.1 0.1 0.0 0.3
	Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft) LOS	1 5600 W 3500 S 7919 25.5 17.3 0.6 17.3 133.3 C	2 5600 W 4100 S 8124 35.6 26.7 0.7 22.0 115.7 D	3 5600 W 4700 S 9931 86.8 30.8 1.6 125.2 317.1 F	4 5200 W 3500 S 4426 5.7 2.3 0.2 1.3 68.7 A	5 5200 W 4100 S 5430 6.3 1.8 0.3 2.0 92.7 A	6 4800 W 3500 S 6724 27.9 16.5 0.7 25.7 220.4 C	7 4800 W 4100 S 8152 19.2 10.2 0.7 10.9 93.8 B	8 4800 W 4700 S 7312 13.5 4.9 0.5 5.8 102.5 B	9 5200 W 3745 S 866 1.0 0.0 0.0 0.0 0.0 0.0 A	10 4980 W 3725 S 362 1.8 0.0 0.0 0.0 0.0 0.0 A	11 5200 W 4025 S 1153 0.4 0.0 0.0 0.0 0.0 0.0 A	12 5400 W 4210 S 417 2.4 0.0 0.0 0.0 0.0 A	13 5215 W 4415 S 889 1.4 0.0 0.0 0.0 0.0 0.0 A	14 BT East 4269 1.8 0.1 0.0 0.2 40.5 A	15 BT West 4388 2.1 0.1 0.0 0.3 40.7 A
2040 AM	Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft)	1 5600 W 3500 S 7919 25.5 17.3 0.6 17.3 133.3 C	2 5600 W 4100 S 8124 35.6 26.7 0.7 22.0 115.7 D 2	3 5600 W 4700 S 9931 86.8 30.8 1.6 125.2 317.1 F 3	4 5200 W 3500 S 4426 5.7 2.3 0.2 1.3 68.7 A 4	5 5200 W 4100 S 5430 6.3 1.8 0.3 2.0 92.7 A 5	6 4800 W 3500 S 6724 27.9 16.5 0.7 25.7 220.4 C 6	7 4800 W 4100 S 8152 19.2 10.2 0.7 10.9 93.8 B B 7	8 4800 W 4700 S 7312 13.5 4.9 0.5 5.8 102.5 B B 8	9 5200 W 3745 S 866 1.0 0.0 0.0 0.0 0.0 A 4 9	10 4980 W 3725 S 362 1.8 0.0 0.0 0.0 0.0 0.0 A 10	11 5200 W 4025 S 1153 0.4 0.0 0.0 0.0 0.0 A 11	12 5400 W 4210 S 417 2.4 0.0 0.0 0.0 0.0 0.0 A 12	13 5215 W 4415 S 889 1.4 0.0 0.0 0.0 0.0 0.0 A 13	14 BT East 4269 1.8 0.1 0.0 0.2 40.5	15 BT West 4388 2.1 0.1 0.0 0.3 40.7
	Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft) LOS	1 5600 W 3500 S 7919 25.5 17.3 0.6 17.3 133.3 C C 1 5600 W	2 5600 W 4100 S 8124 35.6 26.7 0.7 22.0 115.7 D 2 2 5600 W	3 5600 W 4700 S 9931 86.8 30.8 1.6 125.2 317.1 F S 3 5600 W	4 5200 W 3500 S 4426 5.7 2.3 0.2 1.3 68.7 A 4 5200 W	5 5200 W 4100 S 5430 6.3 1.8 0.3 2.0 92.7 A 2.7 5 5 5200 W	6 4800 W 3500 S 6724 27.9 16.5 0.7 25.7 220.4 C C 6 4800 W	7 4800 W 4100 S 8152 19.2 10.2 0.7 10.9 93.8 B 7 7 4800 W	8 4800 W 4700 S 7312 13.5 4.9 0.5 5.8 102.5 8 8 4800 W	9 5200 W 3745 S 866 1.0 0.0 0.0 0.0 0.0 0.0 A 9 5200 W	10 4980 W 3725 S 362 1.8 0.0 0.0 0.0 0.0 0.0 A 4980 W	11 5200 W 4025 S 1153 0.4 0.0 0.0 0.0 0.0 0.0 A 11 5200 W	12 5400 W 4210 S 417 2.4 0.0 0.0 0.0 0.0 0.0 A 12 5400 W	13 5215 W 4415 S 889 1.4 0.0 0.0 0.0 0.0 0.0 A 13 5215 W	14 BT East 4269 1.8 0.1 0.0 0.2 40.5 A 14	15 BT West 4388 2.1 0.1 0.0 0.3 40.7 A 15
	Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection	1 5600 W 3500 S 7919 25.5 17.3 0.6 17.3 133.3 C C 1 5600 W 3500 S	2 5600 W 4100 S 8124 35.6 26.7 0.7 22.0 115.7 D 2 2 5600 W 4100 S	3 5600 W 4700 S 9931 86.8 30.8 1.6 125.2 317.1 F 3 5600 W 4700 S	4 5200 W 3500 S 4426 5.7 2.3 0.2 1.3 68.7 A 4 5200 W 3500 S	5 5200 W 4100 S 5430 6.3 1.8 0.3 2.0 92.7 92.7 8 4 0 5 5200 W 4100 S	6 4800 W 3500 S 6724 27.9 16.5 0.7 25.7 220.4 C C 6 4800 W 3500 S	7 4800 W 4100 S 8152 19.2 10.2 0.7 10.9 93.8 B 7 7 4800 W 4100 S	8 4800 W 4700 S 7312 13.5 4.9 0.5 5.8 102.5 8 8 4800 W 4700 S	9 5200 W 3745 S 866 1.0 0.0 0.0 0.0 0.0 A 9 5200 W 3745 S	10 4980 W 3725 S 362 1.8 0.0 0.0 0.0 0.0 0.0 A 10 4980 W 3725 S	11 5200 W 4025 S 1153 0.4 0.0 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S	12 5400 W 4210 S 417 2.4 0.0 0.0 0.0 0.0 0.0 A 12 5400 W 4210 S	13 5215 W 4415 S 889 1.4 0.0 0.0 0.0 0.0 0.0 A 13 5215 W 4415 S	14 BT East 4269 1.8 0.1 0.0 0.2 40.5 A 14 BT East	15 BT West 4388 2.1 0.1 0.0 0.3 40.7 A 15 BT West
	Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles	1 5600 W 3500 S 7919 25.5 17.3 0.6 17.3 133.3 C 1 5600 W 3500 S 13511	2 5600 W 4100 S 8124 35.6 26.7 0.7 22.0 115.7 D 2 5600 W 4100 S 10782	3 5600 W 4700 S 9931 86.8 30.8 1.6 125.2 317.1 F 3 5600 W 4700 S 11061	4 5200 W 3500 S 4426 5.7 2.3 0.2 1.3 68.7 A 4 5200 W 3500 S 8311	5 5200 W 4100 S 5430 6.3 1.8 0.3 2.0 92.7 A 92.7 A 5 5 5200 W 4100 S 8139	6 4800 W 3500 S 6724 27.9 16.5 0.7 25.7 220.4 C C 6 6 4800 W 3500 S 11200	7 4800 W 4100 S 8152 19.2 10.2 0.7 10.9 93.8 B 7 4800 W 4100 S 11090	8 4800 W 4700 S 7312 13.5 4.9 0.5 5.8 102.5 B 8 4800 W 4700 S 8686	9 5200 W 3745 S 866 1.0 0.0 0.0 0.0 0.0 0.0 0.0 A 9 5200 W 3745 S 1829	10 4980 W 3725 S 362 1.8 0.0 0.0 0.0 0.0 0.0 0.0 A 10 4980 W 3725 S 215	11 5200 W 4025 S 1153 0.4 0.0 0.0 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 2049	12 5400 W 4210 S 417 2.4 0.0 0.0 0.0 0.0 0.0 0.0 A 12 5400 W 4210 S 577	13 5215 W 4415 S 889 1.4 0.0 0.0 0.0 0.0 0.0 0.0 A 13 5215 W 4415 S 956	14 BT East 4269 1.8 0.1 0.0 0.2 40.5 A 14 BT East 7438	15 BT West 4388 2.1 0.1 0.0 0.3 40.7 A 15 BT West 7683
	Node number Intersection Vehicles Delay (s) Stop delay (s) Stops Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s)	1 5600 W 3500 S 7919 25.5 17.3 0.6 17.3 133.3 C 1 33.3 C 1 5600 W 3500 S 13511 149.6	2 5600 W 4100 S 8124 33.6 26.7 0.7 22.0 115.7 D 2 5600 W 4100 S 10782 82.8	3 5600 W 4700 S 9931 86.8 30.8 1.6 125.2 317.1 F 3 5600 W 4700 S 11061 253.9	4 5200 W 3500 S 4426 5.7 2.3 0.2 1.3 68.7 A 4 5200 W 3500 S 8311 8.7	5 5200 W 4100 S 5430 6.3 1.8 0.3 2.0 92.7 A 92.7 A 5 5200 W 4100 S 8139 16.8	6 4800 W 3500 S 6724 27.9 16.5 0.7 25.7 220.4 C 4800 W 3500 S 11200 14.3	7 4800 W 4100 S 8152 19.2 10.2 0.7 10.9 93.8 B 7 7 4800 W 4100 S 11090 32.5	8 4800 W 4700 S 7312 13.5 4.9 0.5 5.8 102.5 B 4800 W 4700 S 8686 157.3	9 5200 W 3745 S 866 1.0 0.0 0.0 0.0 0.0 0.0 A 9 9 5200 W 3745 S 1829 1.5	10 4980 W 3725 S 362 1.8 0.0 0.0 0.0 0.0 0.0 A 4980 W 3725 S 215 1.7	11 5200 W 4025 S 1153 0.4 0.0 0.0 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 2049 19.1	12 5400 W 4210 S 417 2.4 0.0 0.0 0.0 0.0 0.0 0.0 A 12 5400 W 4210 S 577 13.5	13 5215 W 4415 S 889 1.4 0.0 0.0 0.0 0.0 0.0 0.0 A 13 5215 W 4415 S 956 1.3	14 BT East 4269 1.8 0.1 0.0 0.2 40.5 A 14 BT East 7438 78.8	15 BT West 4388 2.1 0.1 0.0 0.3 40.7 A 15 BT West 7683 29.3
	Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Avg Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s)	1 5600 W 3500 S 7919 25.5 17.3 0.6 17.3 133.3 C 1 5600 W 3500 S 13511 149.6 61.1	2 5600 W 4100 S 8124 35.6 26.7 0.7 22.0 115.7 D 2 5600 W 4100 S 10782 82.8 50.4	3 5600 W 4700 S 9931 86.8 30.8 1.6 125.2 317.1 F 3 5600 W 4700 S 11061 253.9 123.8	4 5200 W 3500 S 4426 5.7 2.3 0.2 1.3 68.7 A 5200 W 3500 S 8311 8.7 2.4	5 5200 W 4100 S 54300 6.3 1.8 0.3 2.0 92.7 92.7 5 5200 W 4100 S 8139 16.8 6.2	6 4800 W 3500 S 6724 27.9 16.5 0.7 25.7 220.4 C C 6 4800 W 3500 S 11200 14.3 7.4	7 4800 W 4100 S 8152 19.2 10.2 0.7 10.9 93.8 B 7 7 4800 W 4100 S 11090 32.5 22.0	8 4800 W 4700 S 7312 13.5 5.8 102.5 8 102.5 8 4800 W 4700 S 86866 157.3 76.7	9 5200 W 3745 S 866 1.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	10 4980 W 3725 S 362 1.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	11 5200 W 4025 S 1153 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	12 5400 W 4210 S 417 2.4 0.0 0.0 0.0 0.0 0.0 0.0 A 12 5400 W 4210 S 5777 13.5 3.1	13 5215 W 4415 S 889 1.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 A 13 5215 W 4415 S 956 1.3 0.0	14 BT East 4269 1.8 0.1 0.0 0.2 40.5 A 14 BT East 7438 78.8 24.4	15 BT West 4388 2.1 0.1 0.0 0.3 40.7 A 15 BT West 7683 29.3 3.9
	Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s)	1 5600 W 3500 S 7919 25.5 17.3 0.6 17.3 133.3 C 1 5600 W 3500 S 13511 149.6 6.1.1 3.0	2 5600 W 4100 S 8124 35.6 26.7 0.7 22.0 115.7 D 2 5600 W 4100 S 10782 82.8 50.4 1.7	3 5600 W 4700 S 9931 86.8 30.8 1.6 125.2 317.1 F 3 5600 W 4700 S 11061 253.9 123.8 5.9	4 5200 W 3500 S 4426 5.7 2.3 0.2 1.3 68.7 A 5200 W 3500 S 8311 8.7 2.4 0.2	5 5200 W 4100 S 5430 6.3 1.8 0.3 2.0 92.7 A 5 5200 W 4100 S 8139 16.8 6.2 0.5	6 4800 W 3500 S 6724 27.9 16.5 0.7 25.7 220.4 C 6 4800 W 3500 S 11200 14.3 7.4 0.5	7 4800 W 4100 S 8152 19.2 0.7 10.9 93.8 B 7 4800 W 4100 S 11090 32.5 22.0 0.8	8 8 4800 W 4700 S 7312 13.5 5.8 102.5 B 4.9 0.5 5.8 102.5 B 4800 W 4700 S 8686 157.3 76.7 4.9	9 5200 W 3745 S 866 1.0 0.0 0.0 0.0 0.0 0.0 4 9 5200 W 3745 S 1829 1.5 0.0 0.0 0.0	10 4980 W 3725 S 362 1.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4980 W 3725 S 215 1.7 0.0 0.0 0.0	11 5200 W 4025 S 1153 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4025 S 2049 19.1 11.3 0.1	12 5400 W 4210 S 417 2.4 0.0 0.0 0.0 0.0 0.0 0.0 A 12 5400 W 4210 S 577 13.5 3.1 0.2	13 5215 W 4415 S 889 1.4 0.0 0.0 0.0 0.0 0.0 A 13 5215 W 4415 S 956 1.3 0.0 0.0	14 BT East 4269 1.8 0.1 0.0 0.2 40.5 A 14 BT East 7438 78.8 24.4 1.3	15 BT West 4388 2.1 0.1 0.0 0.3 40.7 A 15 BT West 7683 29.3 3.9 0.5
	Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Avg Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s) Stop stops	1 5600 W 3500 S 7919 25.5 17.3 0.6 17.3 133.3 C 1 5600 W 3500 S 13511 149.6 61.1 149.6 61.3.0 208.9	2 5600 W 4100 S 8124 35.6 26.7 0.7 22.0 115.7 D 2 5600 W 4100 S 10782 82.8 50.4 1.7 100.5	3 5600 W 4700 S 9931 86.8 30.8 1.6 125.2 317.1 F 3 5600 W 4700 S 11061 253.9 123.8 5.9 232.6	4 5200 W 3500 S 4426 5.7 2.3 0.2 1.3 68.7 A 5200 W 3500 S 8311 8.7 2.4 0.2 2.7	5 5200 W 4100 S 5430 6.3 1.8 0.3 2.0 92.7 A 5 5200 W 4100 S 8139 16.8 6.2 0.5 12.2	6 4800 W 3500 S 6724 27.9 16.5 0.7 25.7 220.4 C C 6 4800 W 3500 S 11200 14.3 7.4 0.5 9.3	7 4800 W 4100 S 8152 10.2 0.7 10.9 93.8 B 7 4800 W 4100 S 11090 32.5 22.0 0.8 29.0	8 8 4800 W 4700 S 7312 13.5 5.8 102.5 B 4800 W 4700 S 8686 157.3 76.7 4.9 134.8	9 5200 W 3745 S 866 1.0 0.0 0.0 0.0 0.0 0.0 A 9 5200 W 3745 S 1829 1.5 0.0 0.0 0.0	10 4980 W 3725 S 362 1.8 0.0 0.0 0.0 0.0 0.0 A 4980 W 3725 S 215 1.7 0.0 0.0 0.0 0.0	11 5200 W 4025 S 1153 0.4 0.0 0.0 0.0 0.0 0.0 0.0 A 11 5200 W 4025 S 2049 19.1 11.3 0.1 11.2.8	12 5400 W 4210 S 417 2.4 0.0 0.0 0.0 0.0 0.0 A 12 5400 W 4210 S 577 13.5 3.1 0.2 0.0	13 5215 W 4415 S 889 1.4 0.0 0.0 0.0 0.0 A 13 5215 W 4415 S 956 1.3 0.0 0.0 0.0 0.0	14 BT East 4269 1.8 0.1 0.0 0.2 40.5 A 14 BT East 7438 78.8 24.4 1.3 120.4	15 BT West 4388 2.1 0.1 0.0 0.3 40.7 A 15 BT West 7683 29.3 3.9 0.5 61.9
	Node number Intersection Vehicles Delay (s) Stop delay (s) Stop delay (s) Avg Queue (ft) Max Queue (ft) LOS Node number Intersection Vehicles Delay (s) Stop delay (s)	1 5600 W 3500 S 7919 25.5 17.3 0.6 17.3 133.3 C 1 5600 W 3500 S 13511 149.6 6.1.1 3.0	2 5600 W 4100 S 8124 35.6 26.7 0.7 22.0 115.7 D 2 5600 W 4100 S 10782 82.8 50.4 1.7	3 5600 W 4700 S 9931 86.8 30.8 1.6 125.2 317.1 F 3 5600 W 4700 S 11061 253.9 123.8 5.9	4 5200 W 3500 S 4426 5.7 2.3 0.2 1.3 68.7 A 5200 W 3500 S 8311 8.7 2.4 0.2	5 5200 W 4100 S 5430 6.3 1.8 0.3 2.0 92.7 A 5 5200 W 4100 S 8139 16.8 6.2 0.5	6 4800 W 3500 S 6724 27.9 16.5 0.7 25.7 220.4 C 6 4800 W 3500 S 11200 14.3 7.4 0.5	7 4800 W 4100 S 8152 19.2 0.7 10.9 93.8 B 7 4800 W 4100 S 11090 32.5 22.0 0.8	8 8 4800 W 4700 S 7312 13.5 5.8 102.5 B 4.9 0.5 5.8 102.5 B 4800 W 4700 S 8686 157.3 76.7 4.9	9 5200 W 3745 S 866 1.0 0.0 0.0 0.0 0.0 0.0 4 9 5200 W 3745 S 1829 1.5 0.0 0.0 0.0	10 4980 W 3725 S 362 1.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4980 W 3725 S 215 1.7 0.0 0.0 0.0	11 5200 W 4025 S 1153 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 4025 S 2049 19.1 11.3 0.1	12 5400 W 4210 S 417 2.4 0.0 0.0 0.0 0.0 0.0 0.0 A 12 5400 W 4210 S 577 13.5 3.1 0.2	13 5215 W 4415 S 889 1.4 0.0 0.0 0.0 0.0 0.0 A 13 5215 W 4415 S 956 1.3 0.0 0.0	14 BT East 4269 1.8 0.1 0.0 0.2 40.5 A 14 BT East 7438 78.8 24.4 1.3	15 BT West 4388 2.1 0.1 0.0 0.3 40.7 A 15 BT West 7683 29.3 3.9 0.5

Quadrant	Intersection														
2009 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
		5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W	5600 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S	Quadrant
	Vehicles	6308	7449	5577	2203	2955	5078	6847	4760	238	508	434	262	712	5214
	Delay (s)	16.0	27.2	23.0	2.8	1.9	31.2	36.5	13.6	0.4	2.4	0.7	1.7	1.0	23.0
	Stop delay (s)	11.0	19.3	15.3	1.1	0.4	17.5	26.0	6.6	0.0	0.0	0.0	0.0	0.0	12.8
	Stops	0.4	0.7	0.6	0.2	0.1	0.8	0.9	0.6	0.0	0.0	0.0	0.0	0.0	0.6
	Avg Queue (ft)	19.0	46.7	30.3	0.7	0.4	71.3	86.6	12.1	0.0	0.0	0.0	0.0	0.0	30.4
	Max Queue (ft)	239.0	284.4	222.3	84.8	55.5	487.5	638.0	155.0	0.0	0.0	0.0	0.0	0.0	442.3
	LOS	В	C	C	A	A	C	D	B	A	A	A	A	A	C
			-	-			-								
2009 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
20051111		5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W	5600 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S	Quadrant
	Vehicles	7902	8714	7062	3299	4569	6674	9896	5432	558	425	896	423	1033	5040
	Delay (s)	22.6	28.2	19.2	3.8	5.6	16.1	29.6	13.7	1.2	2.1	0.7	2.2	1.1	11.8
	Stop delay (s)	14.9	19.5	11.9	1.3	2.9	9.7	19.1	6.3	0.0	0.0	0.0	0.0	0.0	6.9
	Stops	0.6	0.7	0.5	0.2	0.2	0.5	0.8	0.6	0.0	0.0	0.0	0.0	0.0	0.3
	Avg Queue (ft)	34.9	59.6	28.5	2.3	3.5	23.2	77.1	12.8	0.0	0.0	0.0	0.0	0.0	13.9
	Max Queue (ft)	296.7	334.1	263.6	97.0	82.1	211.7	456.5	140.6	0.0	0.0	0.0	0.0	0.0	266.7
	LOS	С	С	В	Α	Α	В	С	В	Α	Α	А	Α	Α	В
2040 AM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
		5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W	5600 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S	Quadrant
	Vehicles	4643	8058	9764	3584	5308	5884	8150	7210	739	362	1026	417	886	2749
	Delay (s)	28.2	33.6	79.3	3.1	6.5	69.5	21.0	13.4	1.0	1.8	0.3	2.5	1.4	14.4
	Stop delay (s)	20.3	25.3	22.9	1.0	2.0	39.2	11.6	4.9	0.0	0.0	0.0	0.0	0.0	8.2
	Stops	0.6	0.7	1.2	0.1	0.3	1.3	0.7	0.5	0.0	0.0	0.0	0.0	0.0	0.4
	Avg Queue (ft)	47.5	65.6	306.7	1.3	8.1	371.4	42.2	16.7	0.0	0.0	0.0	0.0	0.0	6.5
	Max Queue (ft)	465.5	395.2	987.5	109.9	333.1	707.0	318.5	256.7	0.0	0.0	0.0	0.0	0.0	211.1
	LOS	С	С	Е	А	А	Е	С	В	А	А	А	А	Α	В
2040 PM	Node number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	T	5600 W	5600 W	5600 W	5200 W	5200 W	4800 W	4800 W	4800 W	5200 W	4980 W	5200 W	5400 W	5215 W	5600 W
	Intersection	3500 S	4100 S	4700 S	3500 S	4100 S	3500 S	4100 S	4700 S	3745 S	3725 S	4025 S	4210 S	4415 S	Quadrant
	Vehicles	9698	11271	11537	6770	7827	9817	11135	8817	1491	215	1711	577	953	4589
	Delay (s)	30.8	31.4	228.6	6.4	10.6	14.8	35.3	157.9	1.7	1.6	0.5	2.4	1.3	11.2
	Stop delay (s)	19.8	21.1	98.3	1.6	3.7	7.7	23.9	76.9	0.0	0.0	0.0	0.0	0.0	6.6
	C tame	0.6	0.8	5.4	0.2	0.4	0.5	0.8	4.8	0.0	0.0	0.0	0.0	0.0	0.3
	Stops	0.0	0.0	5.1											
	Avg Queue (ft)	90.0	83.2	738.2	7.9	19.5	26.2	102.5	443.5	0.0	0.0	0.0	0.0	0.0	12.0
	-						26.2 276.6	102.5 560.2	443.5 965.9	0.0 0.0	0.0 0.0	0.0	0.0	0.0 0.0	12.0 245.4

