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<b>16. Abstract</b> <p>Ramp metering is one of the successful traffic control strategies in the area of active traffic and demand management. This study evaluates the effectiveness of a fixed time ramp metering control on the day to day operation of traffic over two segments of I-12, seven miles apart, in Baton Rouge, LA. Traffic data were collected and analyzed using MIST (Management Information System for Transportation) detectors at one segment, and DCMS (Data Collection and Management Service) detectors at the other segment. The assessments undertaken include a comparative speed analysis, travel time savings analysis, level of service analysis, and speed contours analysis of the conditions before and after deployment of the ramp metering. For the MIST segment, the statistical analysis showed that for the eastbound PM peak period, 47% of the time there were significant speed increases of 7 mph, but 12% of the time there were significant speed decreases of 17 mph. For the westbound AM peak period, significant speed increase of 5 mph were observed 43% of the time while significant speed decrease of 7 mph were observed 29% of the time. The speed contours analysis supported these findings with more areas of congestion observed in the westbound AM peak period than was observed in the eastbound PM peak period. The travel time analysis showed mixed results of reduced and increased travel times depending on which weekday was being analyzed. The level of service results suggests an overall deterioration of traffic conditions for both peak periods. For the DCMS segment, however, there was an average decrease in speed from 61.91 to 58.37 mph for the eastbound PM and 53.78 to 49.06 mph for the westbound AM peak periods. The speed contours showed increased areas of congestion for both peak time periods, and analysis of travel time savings showed overall increases in travel times for both peak periods. The level of service results supported the findings, showing worsened LOS distributions for both peak periods. It should be noted, however, that the analysis for the DCMS segment did not account for the effect of the on-going construction work between O'Neal Lane interchange and Walker/La. 447 interchange, which started as early as 2009. It is possible that the presence of the construction zone may have impacted the traffic conditions and obscured the benefits of ramp meters. This is because the construction work schedule overlapped with the analysis time period. For both segments, it was not possible to isolate the effect of incidents on traffic conditions when measuring the performance of ramp meters since incident logs were not available at the time the analysis was done. While the fixed time operation of the ramp metering system on I-12 was effective to some extent on one of the western segment of I-12, the study recommended further investigation to determine if other ramp metering strategies would be more effective. This includes both local and coordinated demand responsive ramp metering systems. Furthermore, due to the confounding effect of the work zone in the eastern segment of I-12 and the current fixed time ramp metering system, the study recommended further comparative analysis by turning the ramp meters on and off for a few days to determine the effect on traffic conditions. This practice was followed in other studies such as the one in Minnesota.</p>			
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# **Measuring the Effectiveness of Ramp Metering Strategies on I-12**

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## ABSTRACT

Ramp metering is one of the successful traffic control strategies in the area of active traffic and demand management. This study evaluates the effectiveness of a fixed time ramp metering control on the day-to-day operation of traffic over two segments of I-12, seven miles apart in Baton Rouge, Louisiana. Traffic data were collected and analyzed using Management Information System for Transportation (MIST) detectors at one segment, and Data Collection and Management Service (DCMS) detectors at the other segment. The assessments undertaken include a comparative speed analysis, travel time savings analysis, level of service analysis, and speed contours analysis of the conditions before and after deployment of the ramp metering.

For the MIST segment, the statistical analysis showed that for the eastbound PM peak period, 47% of the time there were significant speed increases of 7 mph, but 12% of the time there were significant speed decreases of 17 mph. For the westbound AM peak period, significant speed increases of 5 mph were observed 43% of the time, while significant speed decreases of 7 mph were observed 29% of the time. The speed contours analysis supported these findings with more areas of congestion observed in the westbound AM peak period than was observed in the eastbound PM peak period. The travel time analysis showed mixed results of reduced and increased travel times depending on which weekday was being analyzed. The level of service results suggests an overall deterioration of traffic conditions for both peak periods.

For the DCMS segment, however, there was an average decrease in speed from 61.91 to 58.37 mph for the eastbound PM and 53.78 to 49.06 mph for the westbound AM peak periods. The speed contours showed increased areas of congestion for both peak time periods, and analysis of travel time savings showed overall increases in travel times for both peak periods. The level of service results supported the findings, showing worsened level of service (LOS) distributions for both peak periods. It should be noted, however, that the analysis for the DCMS segment did not account for the effect of the on-going construction work between O’Neal Lane interchange and Walker/La. 447 interchange, which started as early as 2009. It is possible that the presence of the construction zone may have impacted the traffic conditions and obscured the benefits of ramp meters. This is because the construction work schedule overlapped with the analysis time period.

For both segments, it was not possible to isolate the effect of incidents on traffic conditions when measuring the performance of ramp meters since incident logs were not available at the

time the analysis was done. While the fixed time operation of the ramp metering system on I-12 was effective to some extent on one of the western segment of I-12, the study recommended further investigation to determine if other ramp metering strategies would be more effective. This includes both local and coordinated demand responsive ramp metering systems. Furthermore, due to the confounding effect of the work zone in the eastern segment of I-12 and the current fixed time ramp metering system, the study recommended further comparative analysis by turning the ramp meters on and off for a few days to determine the effect on traffic conditions. This practice was followed in other studies such as the one in Minnesota.

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## **IMPLEMENTATION STATEMENT**

In Louisiana, ramp metering was implemented along a section of I-12 in Baton Rouge between Essen Lane and Walker South Road/LA 447 from June to November 2010, to reduce the frequency of traffic breakdowns and improve the operational efficiency of traffic. The ramp metering is operated during the morning peak hours (6:00 to 9:00 AM) for the westbound traffic and during the evening peak hours (3:00 – 7:00 PM) for the eastbound traffic. Initial simulation studies conducted by ABMB Engineers, Inc. showed significant improvements in travel times and speed as a result of applying ramp metering strategies on I-12. This report presents findings of the evaluation of the effectiveness of the installed ramp meters, by comparing before- and after- traffic speeds of two segments of the corridor. It also presents before- and after- traffic speed contours, travel time savings, and levels of service of the section of the I-12 freeway that is controlled by ramp metering. Findings of this report provide an objective assessment of the benefits of the ramp meters on I-12 to officials of LADOTD and other interested transportation officials within Louisiana. Based on the reported findings of this study, recommendations were made to consider other types of ramp metering strategies that may have the potential to further improve the traffic conditions on I-12. This includes both local and coordinated demand responsive strategies.

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## INTRODUCTION

Urban freeways in most major cities in the U.S. are operating near or beyond capacity conditions during peak periods due to increased travel demand. Such conditions often result in traffic breakdowns that lead to congestion, which continues to escalate and spread over the surface transportation network in the U.S. The transportation community of practitioners, researchers, and public agencies now recognizes the need for better management of the existing network capacity as a viable alternative to capacity expansion projects. In recent years, more emphasis has been placed on Active Traffic Management (ATM) strategies such as speed harmonization, managed lanes, and ramp metering. It is recognized that freeway corridors may still have some unused capacity on parallel routes that can be leveraged to alleviate congestion on freeways. Ramp metering is one of the successful active traffic control strategies that controls the flow of traffic entering the freeway facility from on-ramps in order to avoid breakdowns at merging areas and preserve the maximum traffic flow on the mainline. Ramp metering optimization can help reduce the breakdown probability at merging locations, which is typically caused by a sudden influx of traffic from the on-ramp attempting a forced merge with mainline traffic.

From June 2010 to November 2010, LADOTD deployed ramp metering control along a 15-mile section of I-12 in Baton Rouge, Louisiana. The main objectives were to reduce congestion, provide a safer merge operation at freeway entrances, improve travel time reliability of the corridor, and ultimately protect the investment. It was anticipated that all these objectives would be met if the mainline traffic speeds and flow rates were not significantly impacted by on-ramp merging traffic.

The objective of this study was to determine how effective the ramp metering control strategy was in alleviating congestion on the affected section of I-12. Speeds and traffic volumes, converted into equivalent travel time savings, were used as the performance measures and were analyzed along two segments of the I-12 corridor where detectors were available. The study recognized the effect of using an appropriate assessment period as well as considering the effect of evolving traffic patterns on travel speeds within the corridor.

The methodology presented in this report provides an assessment tool for researchers and practitioners to evaluate the effectiveness of ramp meters and other traffic control strategies.

## Ramp Metering Algorithms

Advanced Traffic Management (ATM) strategies such as ramp metering aim to improve the operation and safety of traffic by regulating the demand from on-ramps to the freeway mainstream. Transportation researchers have been investigating different operational strategies that can optimize the performance of ramp meters. For fixed-time metering strategies, ramp meter timings are adjusted automatically by specified time-of-day parameters. This algorithm does not afford flexibility for changing traffic conditions. Traffic-responsive ramp metering strategies, as opposed to fixed-time strategies, are based on real-time measurements from sensors installed in the freeway network and can be classified as local or coordinated. Local control is a process of selecting ramp meter rates based solely on conditions present at an individual ramp, while coordinated control is a process of selecting metering rates based on conditions throughout the entire length of the metered corridor.

### Local Ramp Metering Strategies

Masher et al. (1975) developed a Demand-Capacity (DC) ramp metering algorithm, which is a traffic responsive algorithm that measures the downstream occupancy. If it is above the critical occupancy, congestion is assumed to exist. The metering rate is then set to the minimum rate. Otherwise, the volume is measured upstream of the merge, and the metering rate is set to the difference between the downstream capacity and the upstream volume.

The occupancy (OCC) strategy is an occupancy-based feed forward strategy, which is even more inaccurate than the DC strategy due to the linearity assumption for the fundamental diagram and the uncertainty (Jia et al. 2001). This strategy uses only upstream sensor occupancy measurements to identify and measure congestion. The critical occupancy is measured using historical data.

Papageorgiou et al. (1997) proposed a local responsive feedback ramp metering strategy, Asservissement Linéaire d'Entrée Autoroutière (ALINEA), which has had multiple successful field applications (Paris, Amsterdam, Glasgow, and Munich). This algorithm considers traffic flow as the process being controlled and the metering rate as the control variable. Based on the feedback control theory, the algorithm attempts to set the metering rate such that traffic flow will not exceed system capacity. The algorithm uses this difference in occupancy values (desired or capacity versus measured), measured at a point 12 feet downstream of the ramp gore, to calculate a metering rate. One of the most desirable features of this algorithm is the integration of the previous time interval metering rate within

the equation. This allows integrated smoothing of the metering rates to avoid wide swings between concurrent time intervals.

In another paper, Smaragdis et al. (2003) presented several modifications and extensions of ALINEA. Specifically, FL-ALINEA is a flow-based strategy; UP-ALINEA is an upstream occupancy-based version; UF-ALINEA is an upstream-flow-based strategy. X-ALINEA/Q is the combination of any of the above strategies with efficient ramp-queue control to avoid interference with surface street traffic.

A zone algorithm was reported as used in Minnesota (Thompson et al. 1997). This algorithm defines directional freeway facility “metering zones” with zones having variable lengths of three to six miles. The basic concept of the algorithm is to balance the volume of traffic entering and leaving each zone. All entering and exiting traffic volumes on both the mainline and the ramps are measured in 30-second increments, and balancing these total volumes is used to keep the density of traffic within the zone constant.

Ghods et al. (2009) proposed an adaptive genetic fuzzy control approach to reduce peak hour congestion, along with speed limit control. To calibrate the fuzzy controller, a genetic algorithm is used to tune the fuzzy sets parameters so that the total time spent in the network remains minimum. The proposed method is tested in a stretch of a freeway network using a macroscopic traffic model in an adaptive scheme.

Ozbay et al. (2003) developed an isolated feedback-based ramp-metering strategy that takes into account the ramp queue. In addition to the regulation of ramp input, the strategy calls for regulation of ramp queues by explicitly incorporating them into the model. This isolated ramp-metering strategy is tested using PARAMICS, a microscopic traffic simulation package, on a calibrated test network located in Hayward, California. The strategy was found to be effective in optimizing freeway traffic conditions (reduction in mean congestion duration on the freeway downstream link, mean downstream occupancy, and travel time).

### **Coordinated Ramp Metering Strategies**

The bottleneck metering algorithm is a system ramp control, which includes several internal adjustments of a volume reduction based on downstream bottlenecks and localized adjustments, such as queue override (Jacobsen et al., 1989). At the local level, historical data is used to determine approximate volume-occupancy relationships near capacity for each ramp location. Local metering rates are then calculated to allow ramp volumes to equal the difference between the estimated capacity and the real-time upstream volume. The coordinated bottleneck algorithm is activated when the following two criteria are met: (1) downstream bottleneck-prone section surpasses a pre-determined occupancy threshold, and

(2) the “zone” or area of influence upstream of the bottleneck is storing vehicles. The algorithm then uses centrally assigned metering rate reductions applied to meters in the zone to reduce the number of vehicles entering the mainline by the number of vehicles stored in the bottleneck area of influence.

ARMS (Advanced Real-time Metering System) consists of three operational control levels within a single algorithm: free-flow control, congestion prediction, and congestion resolution (Messer, 1993). Flow is treated as a semi-static process in which traffic flow varies slowly with time, where the control decisions are based on a free flow model. Congestion prediction works to predict (and thus pre-empt) traffic flow breakdowns caused by dynamic traffic fluctuations. Traffic flow is modeled as a rapidly changing dynamic process. Combining this control module with the free-flow control module provides for an environment in which the probability of congestion occurring is reduced. Congestion reduction is a dynamic algorithm that balances congestion resolution time and metering rates by integrating both freeway and surface street operations. This algorithm has been successfully tested in simulation models.

Wei et al. (1996) developed a coordinated metering algorithm using artificial neural networks. This algorithm is based on an Artificial Neural Network (ANN) with a “learning” capability. It is used in an offline capacity to generate an initial, preliminary metering plan, which is used within a back-propagation algorithm to “train” the neural network. The roadway system is divided into control zones, and input data for the algorithm is collected at each ramp in a zone, V/C ratios upstream and downstream of the ramp and the ramp queue length on each ramp. As the metering rate for each on-ramp is affected primarily by the mainline V/C measurements near the ramp and only partially by the traffic conditions elsewhere in the zone, a partially connected neural network is used.

The internal model tracks the actual traffic conditions, the implemented control strategies, and the results. This information is evaluated and, if necessary, additional self-adjustment training data is provided for the ANN system until the desired traffic condition is reached.

Seeking to address the interaction of the freeway system with the adjacent surface-street system, Gettman et al. (1999) presents a multi-objective integrated large-scale optimized ramp metering system for freeway traffic management. This was done by providing a method to trade-off queue growth at individual ramps in a freeway corridor. The system is composed of three primary components: area-wide metering rate coordination, predictive-cooperative real-time rate regulation, and anomaly detection/optimization scheduling. The

area-wide rate coordination algorithm is based on a multi-criteria quadratic programming problem. The predictive-cooperative real-time rate regulation algorithm is a pro-active approach to local traffic-responsive control using “scenario based” linear programming. Re-optimization intervals of the area-wide coordination and the predictive-cooperative real-time rate regulation algorithms are scheduled by a process monitoring function based on concepts in statistical process control. The performance of the method was evaluated using a simulation test case for a typical three-hour peak period on a realistic freeway in Phoenix, AZ, using freeway average speed, total travel time, queue time, and congestion recovery time.

Zhang et al. (2003) developed a new freeway ramp control objective function: minimizing total weighted (perceived) travel time. This new objective function is capable of balancing efficiency and equity of ramp meters, while the previous metering objective, minimizing total absolute travel time, was purely efficiency-oriented and hence produced a most efficient but least equitable solution. Consequently, a ramp control strategy BEEX (Balanced Efficiency and Equity) was developed. BEEX seeks to minimize the total weighted travel time, which involves weighting both the freeway mainline travel time and the ramp delays.

A ramp metering algorithm incorporating “fuzzy logic” decision support was developed at the University of Washington (Taylor et al., 1998). This algorithm was installed in early 1999 by WSDOT, controlling 15 metered ramps along I-405. The algorithm, based on fuzzy set theory, is designed to overcome some of the limitations of existing conventional ramp metering systems. In a simulation based evaluation using FREeway SIMulation (FRESIM) and a model of the Seattle I-5 corridor, the fuzzy controller demonstrated improved robustness, prevented heavy congestion, intelligently balanced conflicting needs, and tuned easily. The objective was to maximize total distance traveled, minimize total travel time and vehicle delay, and still maintain acceptable ramp queues. This algorithm functions on two levels and provides both local and downstream bottleneck metering rate selection.

A freeway traffic control system has been in place on the Hanshin Expressway near Kobe, Japan. The Hanshin algorithm is based on Linear Programming formulation (Yang et al., 1996). The linear algorithm maximizes the weighted sum of ramp flows. It also computes a real-time capacity for each road segment. The algorithm requires a very comprehensive data collection system with detectors closely spaced on the mainline and multi-point detection on all exit/entrance ramps. To solve for metering rates, the algorithm uses both real-time and pre-defined system variables as well a number of tuned parameters and weighting factors for a series of ramps. The performance of the algorithm is heavily dependent on accurate origin-destination data.

Another coordinated ramp metering strategy, METALINE, is a coordinated generalization (using lists of multiple values, or columnar vectors, in place of single values) of ALINEA (Papageorgiou et al. 1990). The metering rate of each ramp is computed based on the change in measured occupancy of each freeway segment and the deviation of occupancy from critical occupancy for each segment that has a controlled on-ramp. This algorithm incorporates a smoothing feature from the ALINEA algorithm, preventing wide swings in metering rates between concurrent time intervals by incorporating the previous metering rate into the equation for calculating the next time interval metering rate. The sensitivity of this algorithm is also quite high, as it responds to the change in occupancy between time intervals, rather than the overall occupancy of the system, allowing more responsive operation for smaller changes in traffic flow.

Chang et al. (1994) proposed a metering model for non-recurrent congestion. This algorithm uses a two-segment linear flow density model. Kalman filtering and auto-regressive moving average techniques are used for estimating link densities and ramp queue lengths from point volume and occupancy detector data and traffic system model parameters. A dynamic equation for density evolution, according to the flow conservation law, is formulated to describe the freeway traffic system and ramp traffic dynamics. The traffic evolution equations act as the essential constraints for optimizing metering rates. Other constraints are the lower and upper physical bounds on the mean link densities, the maximum and minimum allowable metering rates, and the maximum allowable ramp queue length. Traffic flow or throughput is then solved for within the objective function using linear programming mathematics.

As the successor of the ZONE metering algorithm, the Stratified Zone Ramp Metering (SZM) Strategy has been developed and deployed in the Minneapolis/Saint Paul area (Feng et al., 2005). The SZM strategy aims in maximizing freeway throughput while keeping ramp waiting times below a predetermined threshold. It focused on a better determination of the minimum release rate for each ramp and its integration with the overall SZM strategy. The SZM strategy is tested in two freeway sites under various demand scenarios through a state-of-the art microscopic simulator. The simulation results indicate that the SZM strategy is effective in delaying and decreasing the freeway congestion as well as resulting in smoother freeway traffic flow.

In a recent study, Paramichail et al. (2010) developed a traffic- response feedback control strategy, HERO (Heuristic Ramp Metering Coordination), to coordinate local ramp metering actions in freeway networks. In the framework of HERO, ALINEA ramp metering strategy

was applied to each on-ramp, the desired ramp flow was calculated, and the ramp queue was estimated. The coordination using HERO was materialized via occasional appropriate setting of minimum ramp-queue lengths that should be created and maintained at specific ramps. A pilot project of HERO has been implemented in Melbourne, Australia, as a part of the Monash-Citylink-West Gate (MCW) upgrade.

Wang et al. (2010) proposed an area-wide ramp metering system to improve the coordination of ramp meters for system-wide optimization and on-ramp overflow minimization. It uses the principles of a computer network congestion control strategy, which reduces certain types of congestion at a targeted freeway location through limiting on-ramp vehicle flows to a fraction of ramp demand and then additively increasing rates to avoid ramp queue spillover onto city streets. The effectiveness of this ramp metering approach has been evaluated by microscopic simulation experiments.

Coordinated ramp metering strategies have been suggested as more effective measures than local ramp metering when there are multiple congestion bottlenecks on the freeway, excessive ramp delays, and when the optimization of freeway and on-ramp performances requires the metering of several ramps.

### **Ramp Metering Evaluation Studies**

Several studies have been conducted to evaluate the overall benefits of ramp metering in terms of throughput, travel speeds, and travel times on the mainline. For instance, Bhouri and Kaupplia (2011) evaluated the travel time reliability benefits of ramp metering based on a study of a segment of the French motorway A6W, which comprises five on-ramps and lasts for 20 kilometers. The study applied four different ways to measure the travel time reliability: statistical range methods, buffer time methods, tardy trip measures, and probabilistic measures. The study concluded that different reliability measuring methods lead to inconsistency of results, and that in order to reach the optimal policy solutions, the benefits from improvement of average travel time and from improvement of travel time reliability need to be separated.

Washington State Department of Transportation (WSDOT) reported in a study (2012) that ramp meters reduced the risk of merging accidents on several of its major highways and freeways. Similar safety observations, attributed to ramp meters, have been made by the Georgia Department of Transportation (2010), and the California Department of Transportation (2000). Another practical case showing evidence of the merits of ramp metering is that of the Twin Cities in Minnesota, which had 430 active ramp meters turned

off during the fall of 2000 due to the public questioning its effectiveness. The results were a decline in through traffic by 14%, a doubling of travel time unpredictability, and a 26% increase in crash rate which was the equivalent of 1,041 crashes per year (2001).

Lee et al. (2005) applied a real-time crash prediction model (CPM) to investigate the safety benefits of a local traffic-responsive ramp metering control (ALINEA) on a freeway. Safety benefits were measured in terms of reduced crash potential, estimated by CPM. Traffic flow changes were captured by a microscopic traffic simulation model. The study concluded that ALINEA ramp metering control could reduce 5%-37% crash potential over the no-control case. Particularly, the crash reduction was most noticeable under the condition when congestion was caused by a high ramp traffic volume without a queue at downstream ramp.

Wu et al. (2007) investigated the impacts of ramp metering on driver behaviors in South England. The research studied the performance of drivers on ramps and on motorway carriageways with and without ramp metering. The study concluded that ramp metering didn't have significant impacts on passing traffic in terms of speeds, headway, accelerations, and decelerations. The ramp metering caused increased lane changes in pre-merge zones and thus resulted in changes of speeds and headways in pre-merge passing traffic.

In 1999, WSDOT evaluated its Renton Ramp Meters at nine locations on the I-405 (2000). Travel times and speeds were manually recorded by drivers traveling the study corridor for two weeks before and three days after the ramp meters were activated. The days chosen for evaluation were Tuesdays, Wednesdays, and Thursdays. Travel speeds, recorded at checkpoints, were averaged between checkpoints to represent segment speeds. No statistical analysis was made because of the limited number of trials. The results showed that ramp meters effectively increased speeds by 7 to 20 mph, and provided travel time savings of 3 to 16 minutes, depending on the time of day.

Zhang et al. (2006) tested the effectiveness of ramp metering for several representative freeways in the Twin Cities during the afternoon peak period. Seven performance measures were used to compare conditions with and without ramp metering, including mobility, equality, travel time variation, travel demand responses, etc. The study concluded that ramp metering was more helpful for long trips than short trips. Ramp metering reduced the travel time variations yet did not improve trip travel time due to ramp delays. Work-trips and non-work trips responded differently to the ramp metering control.

Zhang and Levinson (2010) studied the traffic flow characteristics at twenty-seven active bottlenecks in the Twin Cities for seven weeks with and seven weeks without ramp metering to determine whether ramp meters increase the capacity of active freeway bottlenecks. The authors developed a series of hypotheses concerning the relationship between ramp metering and the capacity of bottlenecks and tested the hypotheses against real traffic data. The results showed that ramp metering could increase capacity by postponing or eliminating bottleneck activation, accommodating higher flows during the pre-queue transition period than no-control, and increasing queue discharge flow rates after breakdown.

In the assessment of the Twin Cities ramp meters in 2000, the Minnesota Department of Transportation (2001) focused on three parameters: travel time, travel speed (both collected with GPS equipped vehicle), and traffic volume (collected by loop detectors). Data was collected over a five-week period when ramp metering was activated, and another five-week period when ramp metering was deactivated. Statistical tests showed there were no differences between the different weekdays as well as between the different weather conditions. As such, all valid observations were grouped and analyzed together. The results showed that travel speeds on the freeway mainline improved with ramp metering by an average of 14% or 7.4 mph.

In the studies reviewed above, the evaluation periods were relatively short, which could affect the conclusions if typical traffic patterns were not captured. One case, however, that considered a representative assessment period was jointly undertaken by the Kansas Department of Transportation and Missouri Department of Transportation on a section of the I-435 (2011). In the evaluation, the study considered a 12-month period of ‘with metering’ data and compared it to data for a two-year ‘without metering’ period. The results indicated that while the number of accidents had been significantly reduced by 64% with ramp metering, travel speeds decreased along some corridors and increased along some other corridors. Similar observation was made for travel times, but overall, the corridor experienced an improved travel time after activation of the ramp metering.

This section presented a brief review of a few ramp metering studies for performance evaluation of algorithms and for system-wide evaluation of benefits. The review indicates that the results may be impacted by the length of the time period used for evaluating the effects of ramp metering. More so, none of the studies considered the effect of growth in traffic demand over time. In considering a much longer time period (four years before and nearly one year after), this study attempts to capture the combined effects of both traffic growth over time and the ramp metering. However, such an approach was only feasible at one segment of the corridor because of the lack of data at the other segment.



## **OBJECTIVES**

The main goal of this research was to conduct an overall assessment of the effectiveness of the newly implemented ramp metering strategy on I-12 in the Baton Rouge area. This was achieved through the following:

1. Conduct a brief literature review of the most recent research findings on ramp metering applications in other states. This is to identify the successful state-of-the-practice techniques for assessment of ramp metering benefits and their relevance to this research study.
2. Identify the ramp junctions (study area) where ramp metering has already been or will be implemented during the course of study.
3. Collect traffic data at each of the identified locations over a period of at least three months, including periods when ramp metering is turned on and off.
4. Conduct thorough analysis to evaluate the effectiveness of ramp metering on I-12 using the collected traffic data.
5. Develop a statistical analysis model to illustrate the impacts on travel along the I-12 corridor and recommend other ramp metering strategies that could optimize the metering parameters and maximize performance.



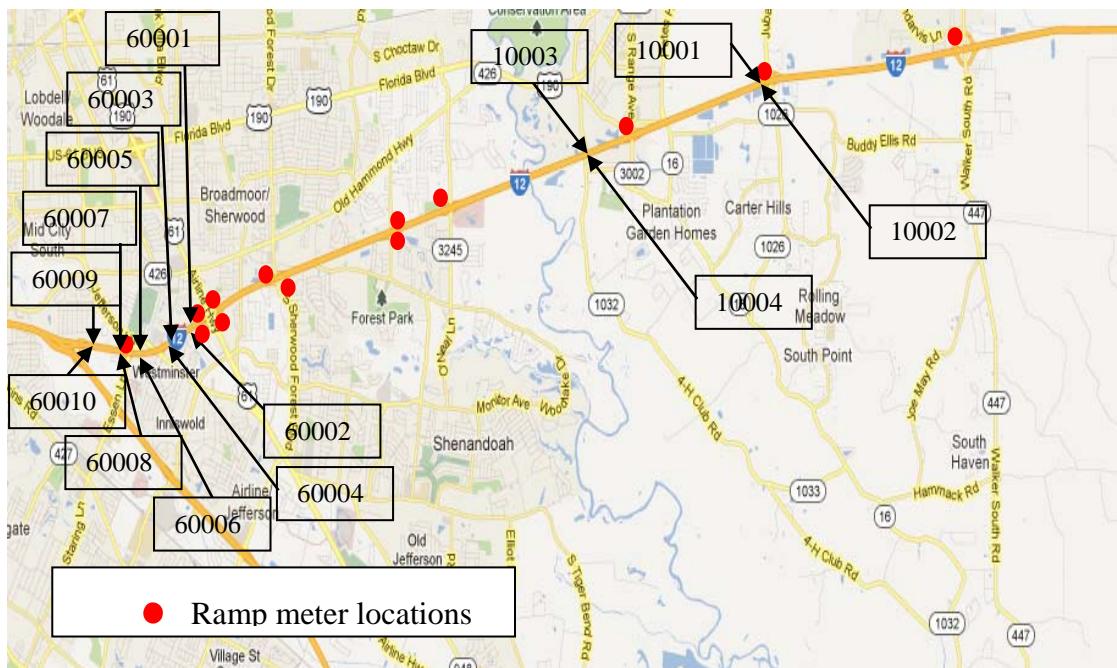
## **SCOPE**

The research was restricted to developing and recommending other ramp metering strategies for interstate highways in Louisiana. Interstate highways are defined as control-of-access facilities under the federal-aid jurisdiction.



## STUDY AREA AND DATA COLLECTION

A total of 16 ramp meters were installed in 2010 along the 15 mile corridor of I-12 in Baton Rouge, Louisiana, between Essen Lane and Walker South Road/LA 447. Since this was the first time ramp metering control was adopted in Louisiana, a simple pre-timed operation with a fixed cycle length was used. During weekdays, the meters are turned on during the AM peak period (6:00 a.m. – 9:00 a.m.) for westbound traffic, and during the PM peak period (3:00 p.m. – 7:00 p.m.) for eastbound traffic. MIST detectors as well as DCMS detectors, installed along two short segments of the corridor, collect traffic data on the freeway including speed, volume, and lane occupancy. Both speed and volume data were used as performance measures in the study. Figure 1 shows the approximate locations of ramp meters, MIST, and DCMS detectors. MIST detectors 60001, 60003, 60005, 60007, and 60009 as well as DCMS detectors 10001 and 10003 collect data for westbound traffic during the AM peak, and MIST detectors 60002, 60004, 60006, 60008, and 60010 as well as DCMS detectors 10002 and 10004 collect data for eastbound traffic during the PM peak. The study section is a 15.7 mile section, while traffic data is collected for 1.85 miles using MIST detectors (Western segment) and 3.17 miles using DCMS detectors (Eastern segment), both segments separated by approximately 7 miles.



**Figure 1**  
**Study area and locations of ramp meters along the I-12 corridor**

Traffic speeds were collected for the time period the ramp meters were active, during the AM peak period (6:00 a.m. – 9:00 a.m.) for westbound traffic, and during the PM peak period (3:00 p.m. – 7:00 p.m.) for eastbound traffic. Data for the first month of activation of each ramp meter was discarded as drivers were still in the process of getting familiar with the new traffic control, and therefore it was assumed their behavior may deviate from the norm. For the MIST detectors, a continuous measuring of traffic counts and speed at 30-second intervals was conducted per lane. The data was then aggregated into 15 minute intervals, speeds were averaged, and volumes were added for all vehicles within each 15 minute period. A screenshot for the collected data is shown in Figure 2. For DCMS detectors, traffic volume and speed were continuously measured and combined for all lanes. The data was then aggregated into 5 minute intervals for all vehicles. A screenshot of the collected data is shown Figure 3. For the westbound traffic, MIST detectors 60001, 60003, 60005, 60007, and 60009 as well as DCMS detectors 10001 and 10003 recorded data for the before- period (06/01/06 – 05/31/10) and for the after- period (07/01/10 – 05/31/11); while for the eastbound traffic, MIST detectors 60002, 60004, 60006, 60008, and 60010 as well as DCMS 10002 and 10004 recorded data for the before- period (12/01/06 – 11/30/10) and for the after- period (01/01/11 – 11/30/11). Speeds averaging 80 mph or higher were discarded as outliers since such value is highly unlikely to be sustained for 5 minutes or 15 minutes during peak periods, and therefore, denotes a detector malfunction. The data for the before- and after- periods were collected over various weather and incident conditions. Due to the lack of weather and incident data, the impact of such factors on the performance of ramp meters could not be independently measured. Also, the data was collected from devices that may not have been well-calibrated over the entire data collection period. This may have affected the quality of traffic data.

Detector_ID	DateTimeStamp	Env_ID	Volume	Occupancy	Speed	Spd_STD	Fail_Status	Summary_Period	Long_Vehicle_Volume
6000101	1/1/2009 0:00	0	116	0	64	0	ONLINE	15	12
6000102	1/1/2009 0:00	0	276	1	66	0	ONLINE	15	32
6000103	1/1/2009 0:00	0	196	1	58	0	ONLINE	15	8
6000101	1/1/2009 0:15	0	196	1	70	0	ONLINE	15	16
6000102	1/1/2009 0:15	0	328	1	65	0	ONLINE	15	24
6000103	1/1/2009 0:15	0	232	1	59	0	ONLINE	15	8
6000101	1/1/2009 0:30	0	232	0	70	0	ONLINE	15	8
6000102	1/1/2009 0:30	0	448	2	65	0	ONLINE	15	16
6000103	1/1/2009 0:30	0	412	2	56	0	ONLINE	15	12
6000101	1/1/2009 0:45	0	192	0	65	0	ONLINE	15	8
6000102	1/1/2009 0:45	0	432	1	65	0	ONLINE	15	24
6000103	1/1/2009 0:45	0	304	1	57	0	ONLINE	15	0
6000101	1/1/2009 1:00	0	168	0	59	0	ONLINE	15	4
6000102	1/1/2009 1:00	0	452	1	67	0	ONLINE	15	16
6000103	1/1/2009 1:00	0	400	1	58	0	ONLINE	15	0
6000101	1/1/2009 1:15	0	144	0	64	0	ONLINE	15	4
6000102	1/1/2009 1:15	0	336	1	65	0	ONLINE	15	28
6000103	1/1/2009 1:15	0	264	1	58	0	ONLINE	15	4
6000101	1/1/2009 1:30	0	168	0	67	0	ONLINE	15	8
6000102	1/1/2009 1:30	0	364	1	67	0	ONLINE	15	28

**Figure 2**  
**Screenshot of MIST data**

Date Of Record	12:00 AM			12:05 AM			12:10 AM			12:15 AM		
	Volume	Avg Speed	Avg Occupancy									
8/21/2009	30	79.244	1.282	36	78.791	1.890	22	75.041	0.996	42	80.265	1.672
8/22/2009	28	78.047	1.215	33	72.651	1.531	27	79.276	0.977	17	77.451	0.625
8/23/2009	26	72.313	1.461	23	76.477	0.989	18	77.514	0.836	45	74.115	1.813
8/24/2009	22	78.635	1.031	35	75.486	1.507	42	80.748	1.809	47	78.830	2.121
8/25/2009	18	78.086	0.700	18	72.506	1.164	26	77.782	1.445	15	80.349	0.613
8/26/2009	26	75.564	1.188	22	79.528	0.980	20	80.201	0.762	21	72.881	0.937
8/27/2009	30	79.666	1.653	22	79.680	0.871	35	77.320	1.590	24	81.248	0.930
8/28/2009	17	78.599	0.758	19	79.326	0.848	18	69.957	1.172	20	78.299	0.902
8/29/2009	26	76.041	1.059	37	79.322	1.641	24	71.282	1.020	25	77.742	1.121
8/30/2009	30	80.355	1.257	38	79.725	1.910	44	74.086	2.336	18	78.646	0.832
8/31/2009	24	78.660	0.961	24	77.778	1.269	26	70.694	1.289	15	76.082	0.660
9/1/2009	22	75.695	1.148	14	77.064	0.516	23	78.891	1.125	21	79.139	1.028
9/2/2009	30	79.123	1.644	33	77.279	1.458	20	76.931	0.867	24	80.000	0.929
9/3/2009	32	73.599	1.500	49	81.232	1.926	20	74.582	0.738	22	77.151	0.950
9/4/2009	36	77.752	1.343	26	77.506	1.379	40	79.727	1.942	31	77.883	1.359
9/5/2009	22	79.403	0.922	34	74.936	1.305	23	79.148	0.875	28	78.998	1.344
9/6/2009	36	80.846	1.442	18	79.506	0.891	21	79.736	0.778	23	77.145	0.918
9/7/2009	13	63.250	0.523	26	79.893	1.074	24	81.998	0.789	15	80.422	0.641
9/8/2009	22	77.770	0.735	41	79.844	1.785	46	76.967	1.886	35	75.643	1.793
9/9/2009	30	81.069	1.121	28	77.998	1.273	17	73.281	0.812	34	78.014	1.535
9/10/2009	19	79.531	0.945	28	77.885	1.113	31	76.438	1.269	36	74.922	1.539
9/11/2009	30	75.369	1.390	29	73.053	1.562	19	77.898	0.890	25	79.672	1.106
9/12/2009	57	74.982	2.895	24	73.838	1.016	39	77.877	1.785	29	79.149	1.227
9/13/2009	34	78.483	1.684	26	76.195	1.246	26	73.514	1.254	26	74.506	0.950
9/14/2009	34	78.316	1.270	29	78.026	1.184	12	79.271	0.387	25	79.625	1.098
9/15/2009	31	76.289	1.153	36	78.164	1.563	14	78.599	0.535	27	76.681	1.469
9/16/2009	21	77.438	1.055	29	76.836	1.278	36	75.254	1.734	21	77.483	0.875

**Figure 3**  
**Screenshot of DCMS data**

It should be noted that during the course of the study, the western segment of I-12 (DCMS segment) was undergoing major construction work between O'Neal Lane interchange and Walker/La. 447 interchange. This was started in early 2009 and lasted through the data collection period following the ramp meter installation. Therefore, the negative impact of the work zone may outweigh the positive impact of ramp meters along the eastern segment.



## METHODOLOGY

The mainline speeds recorded at fourteen detector locations within the study area were evaluated to establish a baseline for comparison between traffic conditions before and after the ramp metering implementation. For abbreviation, the “after” and “before” ramp metering periods will be referred to as Condition A and B, respectively. For Condition B, the data was collected for a period of four years (from 2006 to 2010) for the MIST detectors, and for a period of one year (from 2009 to 2010) for the DCMS detectors. For Condition A, the data was collected from 2010 for a period of one year, but the data for the first month were discarded from the analysis. Different types of analysis were conducted to measure the effectiveness of the ramp metering using the aforementioned collected data. The before and after analysis periods included traffic conditions for incident and incident free periods as incident logs were not available at the time the analysis was conducted.

### Trends of Traffic Speed

Given the inherent variation in traffic conditions on weekdays, the analysis was conducted for each weekday independently. The speed was averaged at each detector location over the four lanes in each direction to obtain a single speed value for each 15 minute period for each weekday in the four year period for Condition B, for MIST detectors. These were then grouped by weekday. For instance, a typical weekday would have approximately 208 speed averages (52 weeks x 4 years) for every 15 minute period. However, due to missing data and detector malfunctions, some weekdays had fewer observations. For DCMS detectors, average speed data were collected in the field; therefore, there was no need to average the collected speed data.

In order to capture the effect of growth in travel demand on traffic conditions, the trends of traffic speed for MIST detectors were constructed for each weekday and each 15 minute time interval. Linear models were fitted to the speed data to determine if a changing trend exists because of traffic growth. Low  $R^2$  values suggest that the effect of traffic growth on traffic speed was not significant over the four year period, while the converse held true.

### Comparative Analysis of Speed

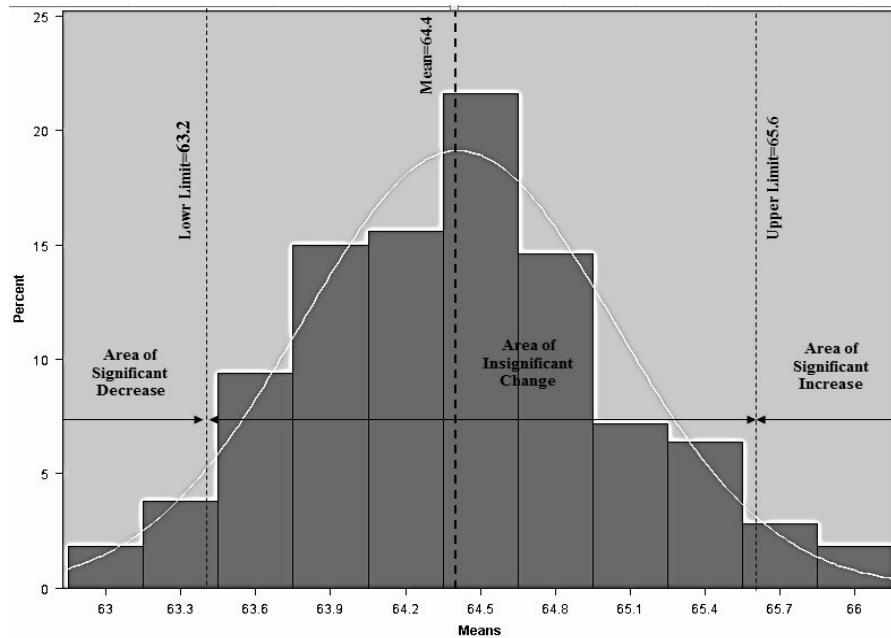
Because of the different collection periods of Condition B for the two types of detectors, different methodologies were used to analyze the two segments they control. For the MIST segment, the frequency distributions of speed for Condition B were first used to capture the

trend of traffic speeds at each location, and then to make comparison with the distributions for Condition A. The null hypothesis claims no difference in traffic speeds for Conditions A and B, while the alternative hypothesis claims a significant difference between A and B.

Statistical analyses were conducted at a 90% confidence level to determine if Conditions A and B were significantly different in terms of traffic speed within the merging area. Significant differences are detected when the observed speed for a particular 15 minute period on a weekday in Condition A falls outside the confidence limits for the speed distribution determined from Condition B. Significant differences can also be identified as significant increases or decreases in speed, depending on whether they fall above the upper limit or below the lower limit of the confidence bounds, as shown in Figure 4. It is recognized that such a procedure considers the combined effect of the ramp meters, and traffic growth in the corridor.

For the DCMS segment, the same null and alternative hypotheses were tested but in this case, two sample t-tests were performed. Statistical analyses were conducted at a 90% confidence level to determine if Conditions A and B were significantly different in terms of traffic speed within the merging area. Significant differences are detected when the p-value obtained from either pooled t-test or Satterthwaite t-test is less than the significance level of 10% divided by two. This is to test whether the mean speeds of B and A are equal or not. Significant differences can also be identified as significant increases or decreases in speed, depending on the sign of the mean differences (B-A).

However, the equality of variances test was first conducted to decide whether to use the pooled or Satterthwaite p-value. The variances for Conditions B and A are considered to have no significant difference if the P-value is greater than 5% (10%/2), in which case the pooled p-value is used.



**Figure 4**  
**Average speed distribution with the statistical significance limits (Condition B)**

### Comparative Analysis of Travel Time

Following the speed assessments, the travel time savings between Conditions A and B were compared using the traffic volumes and was averaged over each road segment length. The total travel time saving was estimated for each weekday and compared between Conditions A and B.

For MIST data, this was estimated separately for each of the three possible statistical outcomes in Table 1: (1) a significant decrease, (2) no significant difference, and (3) a significant increase in speed. For DCMS data, two cases were detected: a significant decrease in speed and no significant difference.

For the westbound AM peak period, the normalized travel time savings were estimated from detectors 60001, 60003, 60005, 60007, and 60009 for MIST and estimated from detectors 10001 and 10003 for DCMS and averaged for each weekday to represent total travel time savings in vehicle hours per mile per hour. For the eastbound PM peak period, detectors 60002, 60004, 60006, 60008, and 60010 for MIST and detectors 10002 and 10004 for DCMS were used to estimate the travel time savings. The following equation was applied to estimate the average travel time saving in vehicle hours per mile  $TTS(j, k)$  for weekday  $j$  and outcome  $k$ :

$$TTS(j, k) = \frac{1}{N(i, j, k)} \sum_{i, n}^N \left( \frac{1}{V_B(i, j)} - \frac{1}{V_A(i, j, k, n)} \right) * q_A(i, j, k, n) \quad (1)$$

where,  $V_A(i, j, k, n)$  is the average speed of the two detectors for Condition A; 15-min. or 5-min. interval  $i$  weekday  $j$  outcome  $k$  and day number  $n$ ,  $V_B(i, j)$  is the average speed of the two detectors for all days of Condition B; 15-min or 5-min interval  $i$  weekday  $j$  and  $q_A(i, j, k, n)$  is the total traffic volume observed for Condition A; time interval  $i$  weekday  $j$  outcome  $k$  day number  $n$  and  $N(i, j, k)$  is the total number of days data is available for interval  $i$  weekday  $j$  and outcome  $k$ .

### **Comparative Analysis of Level of Service (LOS)**

The level of service distribution was then computed and compared for the before- (Condition B) and after- (Condition A) periods of the ramp metering deployment using the procedures in the Highway Capacity Manual for basic freeway segment. The analysis was developed utilizing the volume data collected in this study. The level of service criteria is given in terms of the percentage volume distribution of vehicles during an analysis period of 15 minutes (MIST data) and 5 minutes (DCMS data). Six levels of service are assigned and are described as follows (Garber and Hoel, 1997);

Level of Service A – this gives the highest quality of traffic flow where drivers are free to drive at or above the posted speed limit. If there is no enforcement of a speed limit, then mean speed will typically approach 60mph, and the demand for passing will be less than the passing capacity.

Level of Service B – the mean speeds on level terrain are approximately 55 mph. For drivers to maintain desired speeds, the passing demand becomes significant and approaches the passing capacity at the lower boundary of this level of service.

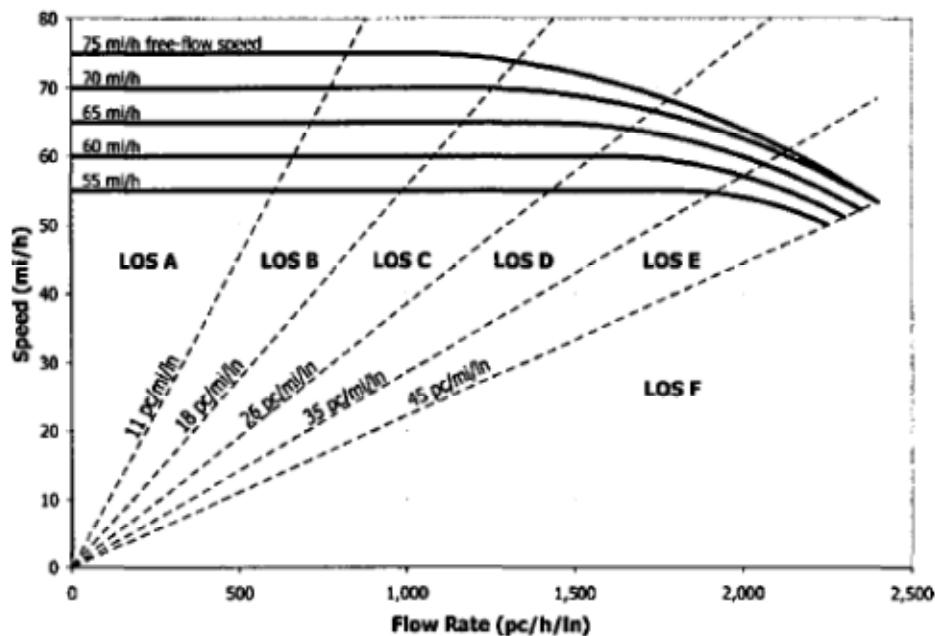
Level of Service C – the traffic flow is still considered stable under this level of service; however, turning and slow-moving traffic tends to create some congestion. Mean speeds on level terrain are generally higher than 52 mph, and also unrestricted passing demand is higher than the passing capacity.

Level of Service D – the traffic flow approaches unstable conditions at this level of service. For this level of service, the passing capacity tends to zero while the passing demand is very high and mean speeds of approximately 50 mph can be achieved.

Level of Service E – the average speeds are less than 50 mph under ideal conditions but may be reduced to 25 mph on sustained grades. Also, at this level of service, operating conditions on the highway become unstable and difficult to predict.

Level of Service F – the traffic demand is greater than the capacity, resulting in heavily congested flows at this level of service. Usually, mean speeds are less than capacity speeds and volumes are less than the capacity. Level of Service E is seldom attained but disturbances in traffic flow approaching Level E result in a rapid transition to LOS F.

For each time period the free-flow-speed (FFS) is calculated using the base free flow speed (BFFS) for freeway segments that is adjusted based on the lane and shoulder widths and the total ramps density per mile. Then the demand traffic volume is calculated using the traffic volume that is adjusted using the peak hour factor, the number of lanes, adjustment factor for heavy vehicles, and adjustment factor for unfamiliarity of drivers. Using the calculated FFS and demand volumes, the level of service is determined using the level of service curve for freeway segments, as shown in Figure 5.



**Figure 5**  
**Level of service (LOS) for basic freeway segments**

## **Spatiotemporal Speed Contours**

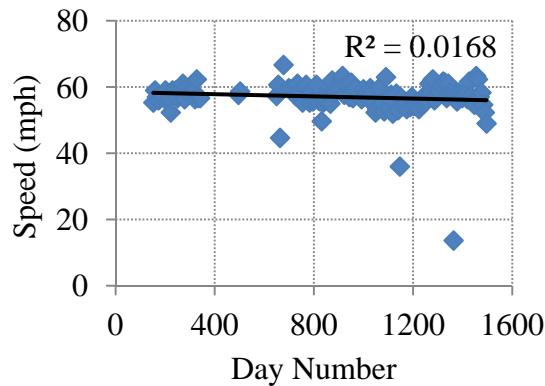
Spatiotemporal speed contour maps were generated for each weekday from time intervals before and after ramp metering using MATLAB. It was generated for both segments equipped with the MIST and DCMS detectors using recorded speed data for all time periods. MIST detectors cover 1.85 miles on the western side of I-12, whereas DCMS detectors cover 3.17 miles on the eastern side of I-12, as shown in Figure 1.

## **DISCUSSION OF RESULTS**

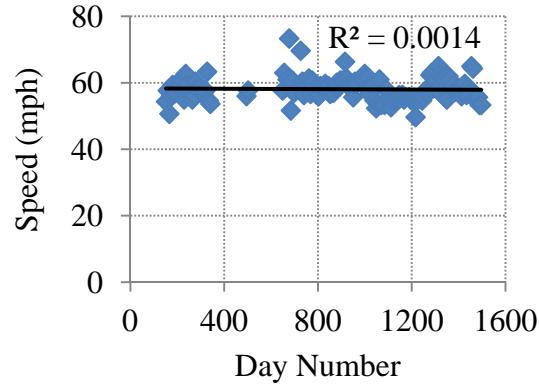
### **Trends of Traffic Speed**

Using the MIST data, Figure 6 shows the speed trend for four different 15-minute periods on Wednesdays over the four year period preceding ramp metering activation. It shows that the westbound AM peak periods predominantly exhibited free-flow conditions, while the eastbound PM peak periods exhibited mixed clusters of free-flow and congested traffic conditions. Similar distributions were obtained for all other intervals for each weekday.

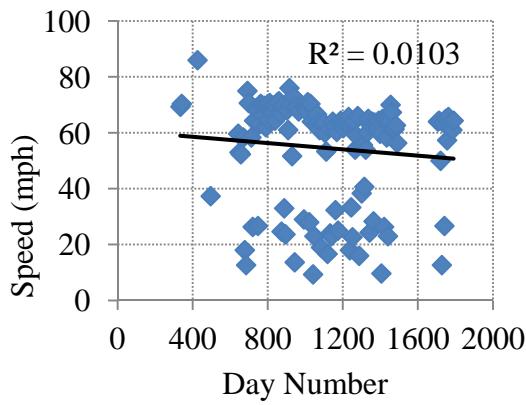
Linear models were fitted to the speed data to determine if a changing trend exists because of traffic growth. Low  $R^2$  values were obtained in most cases, which suggests that the effect of traffic growth on traffic speed was not significant over the four year period. Since no significant speed trend could be observed over time, all observations within the four year period were not considered time dependent, and therefore, the variation for each 15-minute period could be considered purely random. The statistical comparisons therefore considered all observations within the same 15 minute period during Condition B as representative of the same population. Likewise, the DCMS data was analyzed based on the same conclusion of having the same population in Conditions A and B.



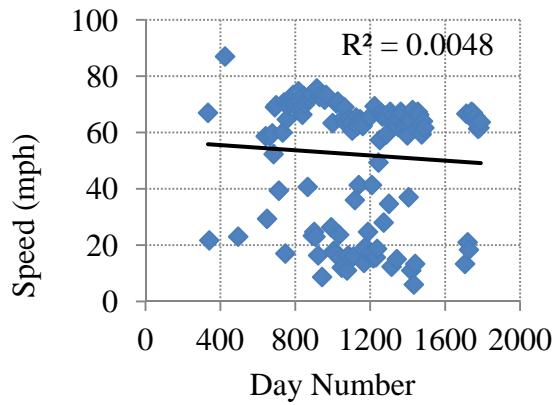
[a] 8:15-8:30 AM (westbound)



[b] 9:30-9:45 AM (westbound)



[c] 3:30-3:45 PM (eastbound)



[d] 5:45-6:00 PM (eastbound)

**Figure 6**  
Trend of speed prior to implementation of ramp metering

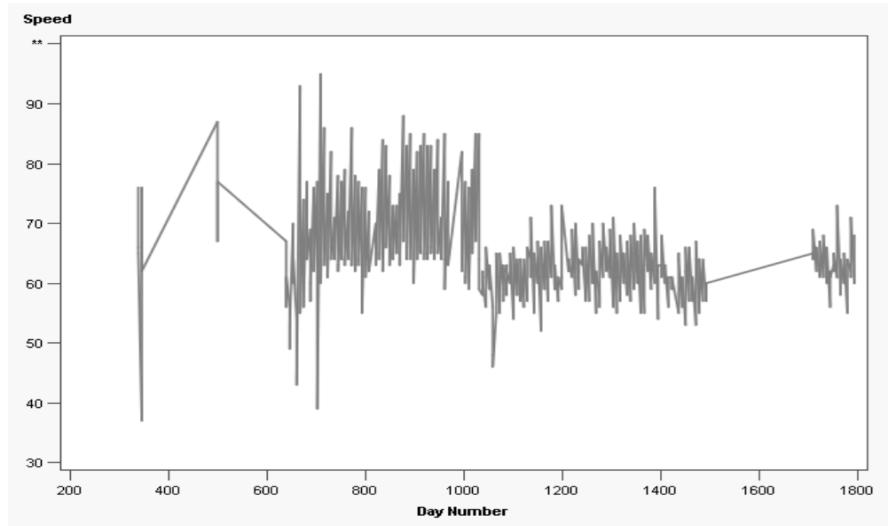
### Speed Analysis

As mentioned earlier, two different databases were used for collecting traffic data. Because of the fact that the two databases have different ways for collecting data, the analysis was conducted separately for each traffic database.

#### MIST Segment

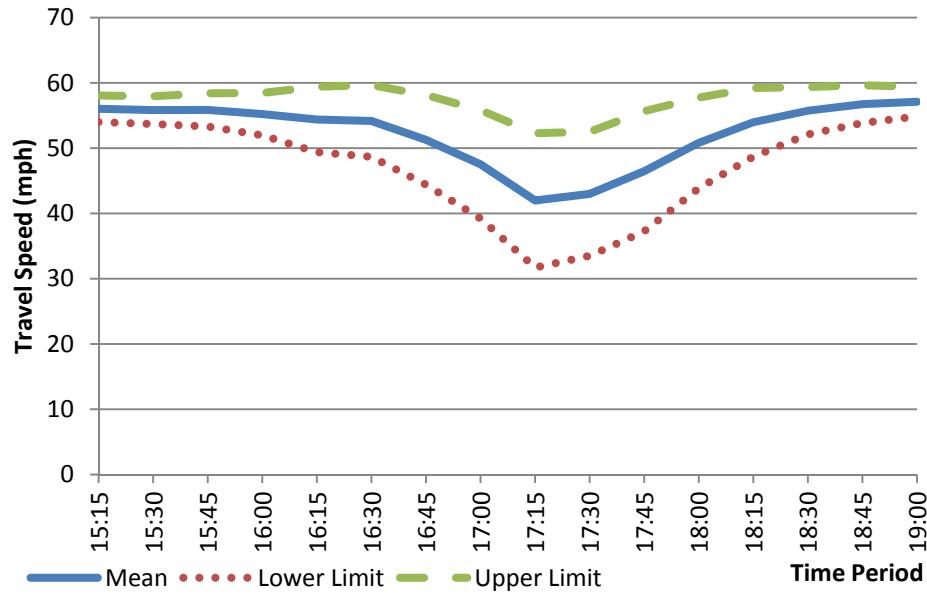
For the segment with the MIST detectors, using the observations for each weekday in the four-year period of Condition B, the 90% confidence bounds for speeds were estimated for each 15 minute interval using SAS. This procedure produced the mean, lower limit, and upper limit of speeds for each weekday and each 15 minute interval. Figure 7 shows the

average speed profile observed for all Mondays in the eastbound direction during the time interval 3:15-3:30 PM for Condition B. The x-axis marks the day number in chronological order and corresponds to one single day in the four-year period. The figure shows several missing days in the beginning and the end of the four year period. There is also a drop in speed average in the second half of the four year period. This might be due to the construction work that occurred starting from 2009.

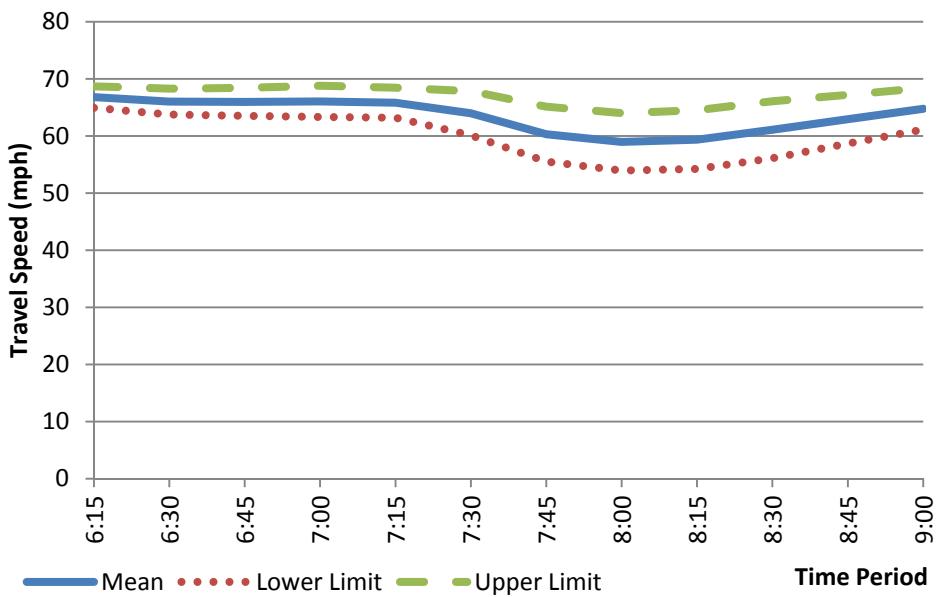


**Figure 7**  
**Average speed profile for 3:15-3:30 PM on Mondays (Condition B)**

Figure 8 shows how the means, lower, and upper limits vary for all time intervals of one weekday, Wednesday, for both the PM and AM peak period for Condition B. There is an obvious rapid drop in travel speeds at the time interval 16:30 – 18:00 for the PM period, and a more subtle drop at 7:30 – 8:30 for the AM period. This could be the periods of the most congestion during the peak periods for both directions. Travel speeds are also generally higher in the westbound AM peak period, and with lesser variation.



[a] Eastbound – PM Peak



[b] Westbound – AM Peak

**Figure 8**  
Plots of distribution for all intervals of Wednesdays (Condition B)

Since weekdays were analyzed independently, the statistical comparison was made for each 15 minute interval of the peak period (PM period for eastbound and AM period for westbound). Table 1 shows the results of the statistical tests for each time interval on Mondays (eastbound) (Results for all other weekdays and for westbound are shown in Appendix A). For each time interval, the percentage of time periods is shown for the three possible cases: (1) significant increase, (2) insignificant change, and (3) significant decrease. For instance, 13% of Mondays show a significant decrease in speed, 15% an insignificant change of speed, and 71% a significant increase in speed, during the 17:00-17:15 time interval. This implies that ramp metering was effective 71% of the time on Mondays during this particular time period.

**Table 1**  
**Statistical results for MIST-speed on Mondays (eastbound PM peak)**

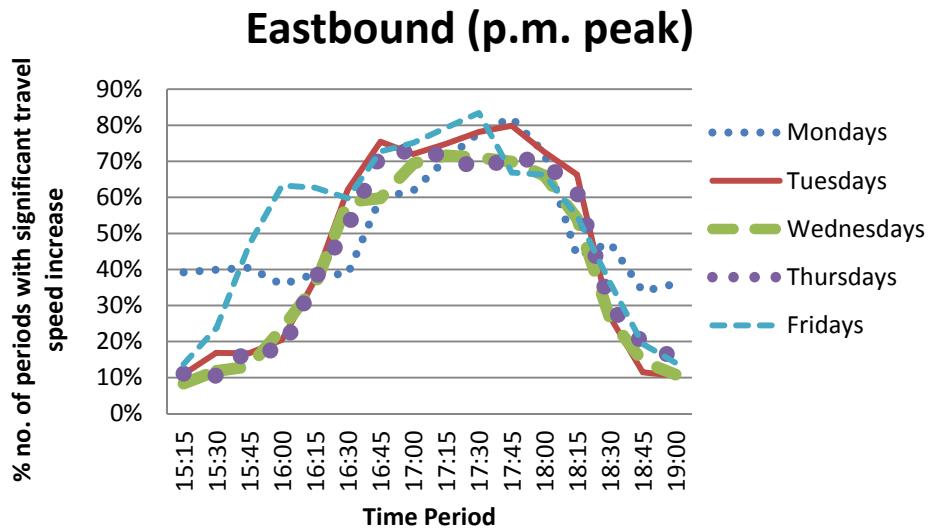
EB (PM Peak) Time Interval	% of Time Periods			Difference in Speed (mph) (% Difference)		
	Significant Decrease	Insignificant Change	Significant Increase	Significant Decrease	Insignificant Change	Significant Increase
15:00 - 15:15	29%	30%	39%	-2 (-4%)	0 (0%)	5 (8%)
15:15 - 15:30	32%	28%	40%	-2 (-4%)	0 (0%)	5 (9%)
15:30 - 15:45	24%	34%	40%	-4 (-7%)	0 (0%)	4 (7%)
15:45 - 16:00	24%	40%	36%	-4 (-6%)	0 (0%)	5 (9%)
16:00 - 16:15	12%	49%	39%	-5 (-8%)	0 (0%)	5 (8%)
16:15 - 16:30	6%	55%	39%	-12 (-20%)	1 (2%)	6 (10%)
16:30 - 16:45	6%	33%	60%	-22 (-41%)	2 (3%)	6 (12%)
16:45 - 17:00	8%	29%	62%	-26 (-50%)	2 (3%)	7 (14%)
17:00 - 17:15	13%	15%	71%	-24 (-49%)	2 (3%)	9 (18%)
17:15 - 17:30	12%	10%	78%	-26 (-54%)	3 (6%)	9 (19%)
17:30 - 17:45	7%	10%	82%	-24 (-48%)	3 (6%)	8 (16%)
17:45 - 18:00	5%	23%	72%	-19 (-37%)	3 (5%)	8 (14%)
18:00 - 18:15	2%	53%	44%	-12 (-21%)	2 (4%)	7 (13%)
18:15 - 18:30	2%	51%	47%	-4 (-7%)	1 (2%)	7 (12%)
18:30 - 18:45	4%	61%	34%	-4 (-7%)	0 (0%)	7 (12%)
18:45 - 19:00	15%	48%	36%	-2 (-4%)	0 (-1%)	6 (10%)
Total Interval	13%	36%	51%	-12 (-23%)	1 (2%)	7 (12%)

As shown in Table 1, the effectiveness of ramp metering control varies within the peak period. The table also shows the average speed difference and its percentage of the average speed for each of the three cases. For instance, for the time interval 17:00-17:15, cases with a significant decrease in speed showed an average reduction of 24 mph, while cases with a

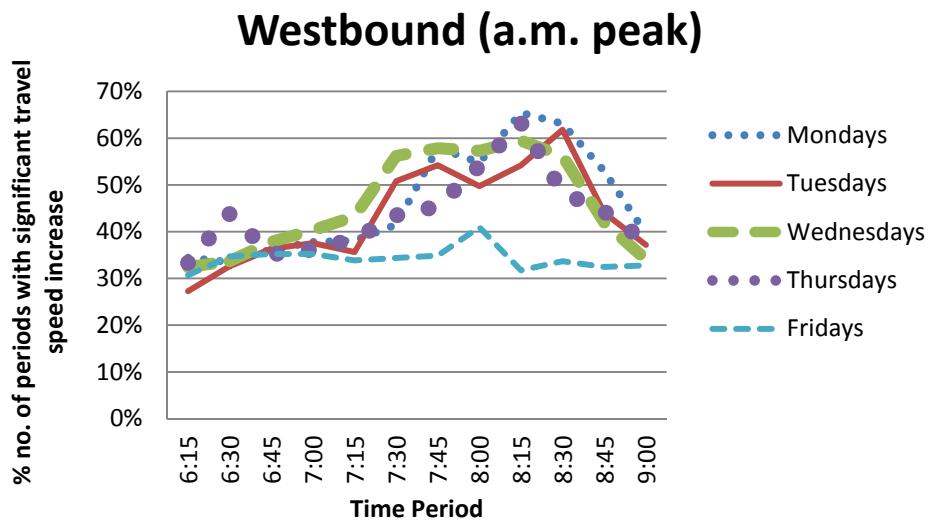
significant increase in speed showed an average increase of 9 mph. The results for all time periods combined are also shown in the table and indicate that ramp metering was effective 51% of all time periods on Mondays with an average increase of 7 mph. The remaining 49% comprise of cases with no significant change or a significant decrease in speed.

Figure 9 shows how the percentage of periods with a significant increase in speed changes during the peak period for each weekday and each direction. For the eastbound PM period, Wednesdays and Thursdays exhibit the same pattern with a percentage up to 70% between 16:30 and 18:15. This shows that ramp metering was highly effective for 70% of the days during this time interval. Tuesdays exhibited a significant increase of speed of up to 80% of the time between 16:30 and 18:00, which means that ramp meters are highly effective for 80% of the days during this time interval. On the other hand, Mondays exhibited a rather sustained pattern with percentages ranging from 40% to 80% throughout the peak period, indicating that the effectiveness of ramp metering was perceived as early as 15:00 when the meters are turned on. The pattern for Friday was somewhat similar to the mid-weekdays, except that high percentages were observed as early as 15:45. This also shows that the effectiveness of ramp metering on Fridays was perceived shortly after the meters are turned on and lasted as late as 18:15. The figure also shows the percentages for the westbound AM peak period, in which traffic is near or at free-flow conditions, except for cases when lane blocking incidents occur. The percentage of cases with a significant increase in speed does not exceed 60% and in most time intervals is consistently lower. There appears to be no distinctive pattern for the percentage profile during the AM peak period. While some improvement in speed could be observed, it is nonetheless minor since traffic is already moving near free-flow speed. It is however obvious that in both cases, the percentage of cases with a significant increase in speed dropped at the end of ramp metering operation hours: 19:00 for the eastbound PM peak period, and 9:00 for the westbound AM peak period.

The results for all time intervals combined are shown in Table 2 by weekday and direction. Overall, 47% and 43% of the time periods exhibited a significant increase in speed of 7 mph and 5 mph for the eastbound PM and westbound AM peak periods respectively. The significant increase in speed may be attributed to the ramp metering control. The results, however, show no significant changes in speed in 41% and 28% of the time periods for eastbound PM and westbound AM peak periods respectively. Also, 12% and 29% of the time periods exhibited a significant decrease in speed of 17mph and 7mph for the eastbound PM and westbound AM peak periods respectively. Such cases suggest worse traffic conditions with ramp metering control and may be attributed to unusually heavy congestion resulting from downstream incidents, which could not have been prevented with ramp metering control.



[a] Eastbound – PM peak



[b] Westbound– AM peak

**Figure 9**  
Number of periods with significant travel speed increases during Condition A

**Table 2**  
**MIST-results for all time intervals combined by weekday and direction**

		% of Time Periods			Difference in Travel Speed (mph) (% difference)		
		Significant Decrease	Insignificant Change	Significant Increase	Significant Decrease	Insignificant Change	Significant Increase
<b>Eastbound (PM peak)</b>	Mondays	13%	36%	51%	-12 (-23%)	1 (2%)	7 (12%)
	Tuesdays	12%	42%	46%	-13 (-27%)	1 (3%)	7 (15%)
	Wednesdays	17%	41%	42%	-20 (-40%)	1 (2%)	7 (15%)
	Thursdays	11%	45%	44%	-21 (-42%)	1 (3%)	7 (13%)
	Fridays	8%	40%	52%	-19 (-38%)	1 (3%)	8 (16%)
	Overall	12%	41%	47%	-17 (-34%)	1 (3%)	7 (14%)
<b>Westbound (AM peak)</b>	Mondays	26%	28%	46%	-7 (-13%)	0 (1%)	7 (12%)
	Tuesdays	30%	27%	43%	-10 (-19%)	0 (1%)	7 (13%)
	Wednesdays	24%	30%	46%	-10 (-19%)	0 (1%)	7 (13%)
	Thursdays	25%	31%	44%	-8 (-14%)	-2 (-1%)	1 (7%)
	Fridays	39%	27%	34%	-7 (-11%)	0 (0%)	6 (11%)
	Overall	29%	28%	43%	-7 (-13%)	0 (0%)	5 (9%)

### DCMS Segment

For the segment with DCMS detectors, as mentioned earlier, the data collected covered just two-years of data for Condition B and one-year of data for Condition A. Because of the lack of data for Condition B, the analysis conducted for MIST data was not applicable here.

Therefore, two samples t-test at 90% confidence bounds was conducted for DCMS data for each detector, each weekday, and each 5-minute interval using SAS. This procedure produced the differences in mean speeds between Conditions B and A, p-value for testing the equality of variances between B and A, and two p-values for the t-test, one for equal variances (Pooled t-test) and another for unequal variances (Satterthwaite t-test).

Since weekdays were analyzed independently, the statistical comparison was made for each 5 minute interval of the peak period (PM period for eastbound and AM period for westbound). Table 3 shows a sample of the results of the statistical tests for the eastbound (PM period) for each time interval on Mondays (eastbound) (Results for all other weekdays and for westbound are shown in Appendix A). As shown in the table, speed for Condition A is significantly less than the speed for Condition B for most of the time intervals, except for the time interval between 16:45 to 18:20 when the speed for condition A is more than the speed for Condition B. The statistical analysis results, however, show no significant change in speed between before and after the ramp meters installation. This implies that ramp metering was not effective at all on Mondays for the road segment at which the DCMS detectors were installed.

**Table 3**  
**Statistical results for DCMS-speed on Mondays (eastbound PM peak)**

Time	Speed before (B)	Speed After (A)	Speed Change (B-A)	Equality of Variance (P-value)	Pooled T- Test (P-Value)	Satterthwaite T- Test (P-value)
15:00 - 15:05	61.4469	60.6579	0.789	0.3463	0.4766	0.4884
15:05 - 15:10	61.0713	60.6182	0.4531	0.2856	0.6881	0.6969
15:10 - 15:15	61.5499	60.7271	0.8228	0.2617	0.4387	0.4528
15:15 - 15:20	61.1788	60.1453	1.0335	0.3282	0.3865	0.3993
15:20 - 15:25	61.6635	60.0572	1.6064	0.0078	0.1673	0.1986
15:25 - 15:30	61.4996	60.4406	1.0591	0.3032	0.3362	0.35
15:30 - 15:35	61.3126	60.2061	1.1065	0.3178	0.3451	0.3584
15:35 - 15:40	61.5074	60.2541	1.2533	0.1859	0.2942	0.3118
15:40 - 15:45	61.0628	59.7198	1.3431	0.0612	0.2693	0.2938
15:45 - 15:50	61.3615	60.4486	0.913	0.0146	0.4316	0.4614
15:50 - 15:55	61.6987	61.2373	0.4614	0.3084	0.6673	0.6759
15:55 - 16:00	61.3563	61.551	-0.1947	0.5017	0.867	0.8645
16:00 - 16:05	61.3546	61.0699	0.2847	0.8164	0.8313	0.8323
16:05 - 16:10	61.5527	61.1531	0.3996	0.0222	0.7076	0.724
16:10 - 16:15	61.8297	60.9546	0.8751	0.0056	0.4216	0.4548
16:15 - 16:20	61.3205	60.8699	0.4506	0.9406	0.6763	0.6756
16:20 - 16:25	61.5071	60.8057	0.7014	0.2552	0.5192	0.5324
16:25 - 16:30	61.6796	61.0757	0.6039	0.4694	0.5547	0.5626
16:30 - 16:35	61.6766	60.6955	0.9811	0.3501	0.3509	0.3635
16:35 - 16:40	61.3094	60.9291	0.3804	0.322	0.7392	0.732
16:40 - 16:45	61.3784	61.1739	0.2045	0.4781	0.848	0.8449
16:45 - 16:50	61.1552	61.4517	-0.2965	0.5464	0.7905	0.7869
16:50 - 16:55	61.175	61.3086	-0.1336	0.444	0.9124	0.9105
16:55 - 17:00	60.9436	61.7238	-0.7802	0.0113	0.4962	0.4648
17:00 - 17:05	60.363	61.298	-0.935	0.0162	0.4707	0.439
17:05 - 17:10	60.184	61.5777	-1.3937	0.0202	0.2737	0.2425
17:10 - 17:15	60.6156	61.3063	-0.6907	0.2524	0.5607	0.5481
17:15 - 17:20	59.8054	61.2239	-1.4185	0.0334	0.2737	0.2452
17:20 - 17:25	59.9486	61.1431	-1.1945	0.0229	0.3855	0.3547
17:25 - 17:30	59.8339	61.2289	-1.395	0.0554	0.2741	0.2483
17:30 - 17:35	60.0308	61.6817	-1.6509	0.0041	0.187	0.1527
17:35 - 17:40	59.9471	61.6761	-1.7289	0.0242	0.1631	0.1373
17:40 - 17:45	59.9755	61.6023	-1.6268	0.0288	0.1848	0.1585
17:45 - 17:50	59.3666	60.881	-1.5144	0.6569	0.2874	0.2814
17:50 - 17:55	59.0504	60.9736	-1.9232	0.071	0.164	0.1432
17:55 - 18:00	59.0537	60.8435	-1.7898	0.118	0.1712	0.1534
18:00 - 18:05	58.7667	60.3871	-1.6204	0.1025	0.2395	0.2181
18:05 - 18:10	58.454	59.4724	-1.0184	0.5454	0.4595	0.4518
18:10 - 18:15	58.2803	58.7683	-0.488	0.7821	0.7443	0.7462
18:15 - 18:20	58.7519	59.5037	-0.7518	0.6614	0.5916	0.5961
18:20 - 18:25	58.7045	59.469	-0.7644	0.3934	0.5971	0.5881
18:25 - 18:30	58.9062	59.4557	-0.5494	0.6591	0.6898	0.6934
18:30 - 18:35	59.9257	59.7443	0.1814	0.9353	0.8995	0.8997
18:35 - 18:40	60.5475	60.3185	0.2291	0.3678	0.8686	0.8652
18:40 - 18:45	60.4222	61.0563	-0.6341	0.3154	0.6451	0.6356
18:45 - 18:50	61.5993	61.7401	-0.1408	0.18	0.9111	0.9076
18:50 - 18:55	62.1807	61.8823	0.2984	0.3003	0.8041	0.7984
18:55 - 19:00	62.2267	62.1026	0.1241	0.392	0.9121	0.91
Total Interval	62.08	59.22	2.85	0.4482	0.0008	0.0008

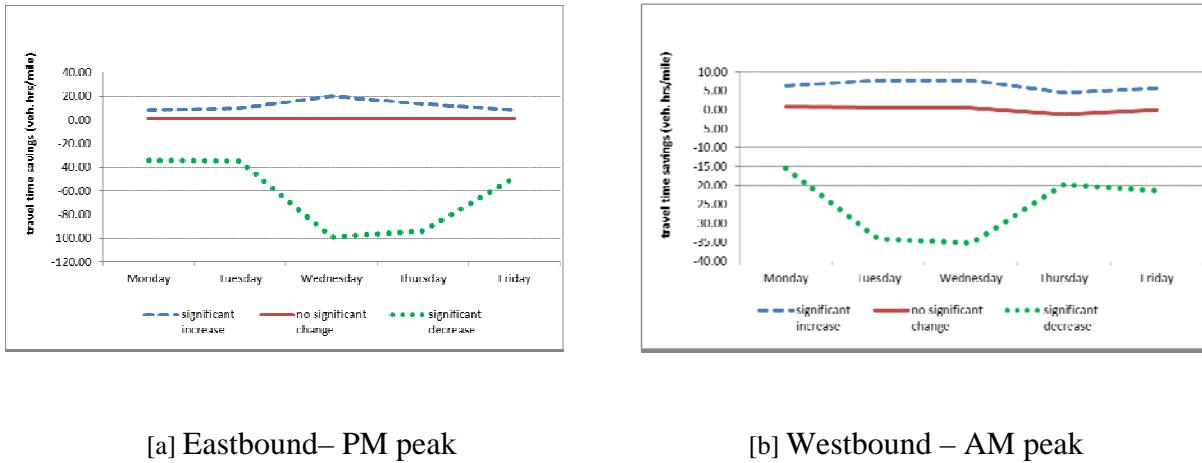
The results for all time intervals combined are shown in Table 4 by weekday and direction. For the eastbound PM, it is clear that there is always a significant decrease in speed ranging from 2.85 to 4.44 mph, whereas for the westbound there is a significant decrease in speed ranging from 3.63 to 8.78 mph, except for Thursday where there was no significant change in speed.

**Table 4**  
**DCMS-statistical speed results for all time intervals combined**  
**by weekday and direction**

		Speed Before (B)	Speed After (A)	Speed Change (B- A)	Equality of Variances (P-Value)	Pooled T-Test (P-Value)	Satterthwaite T-Test (P-Value)
Eastbound (PM peak)	Mondays	62.08	59.22	2.85	0.4482	0.0008	0.0008
	Tuesdays	61.69	57.57	4.12	0.1691	<0.0001	<0.0001
	Wednesdays	61.84	57.39	4.44	0.0753	<0.0001	<0.0001
	Thursdays	62.04	58.69	3.35	0.3786	0.0003	0.0003
	Fridays	61.88	58.99	2.88	0.8509	0.0014	0.0014
	Overall	61.91	58.37	3.54	0.0817	<0.0001	<0.0001
Westbound (AM peak)	Mondays	54.00	50.37	3.63	0.7097	0.0420	0.0420
	Tuesdays	53.11	44.33	8.78	0.2024	<0.0001	<0.0001
	Wednesdays	50.46	44.80	5.66	0.3689	0.0030	0.0030
	Thursdays	48.26	48.89	-0.62	0.2564	0.7470	0.7470
	Fridays	63.05	56.94	6.12	0.5283	0.0072	0.0072
	Overall	53.78	49.06	4.71	0.6574	<0.0001	<0.0001

### Travel Time Savings

Figure 10 shows the total travel time savings for the MIST segment per mile per hour for each weekday and each statistical outcome. For the eastbound PM peak period, the largest travel time saving for intervals with a significant increase in speed was observed on Wednesdays and amounted to about 20 vehicle hours per mile.



**Figure 10**  
**Travel time savings for MIST detectors for each weekday and statistical outcome**

For all other weekdays, the savings ranged from 8 to 13 vehicle hours per mile. On the other hand, intervals with a significant decrease in speed exhibited an overall increase in travel times from 34 to 99 vehicle hours per mile. Such intervals may reflect conditions of heavy congestion during which ramp metering was not effective. For the westbound AM peak period, much less travel time savings, around 8 vehicle hours per mile, were achieved for intervals with significant increase in speed for Tuesdays and Wednesdays and 4 – 6 vehicle hours per mile for the rest of the weekdays. This is intuitive since traffic operates near free-flow conditions during the AM peak period, and therefore, differences in travel times are expected to be minor. For both the AM and PM peak periods, intervals with no significant change exhibited positive travel time savings, around 1 vehicle hour per mile, but were considered statistically insignificant.

Table 5 shows the total travel time savings per mile per hour for the DCMS segment for each weekday and each statistical outcome. For all weekdays of the eastbound PM peak period, the travel time loss ranges from 1.81 to 3.08 vehicle hour per mile. On the other hand, the westbound AM peak period shows a saving in travel time of 0.93 vehicle hour per mile on Thursdays; however, the travel time loss ranges from 4.47 to 12.97 vehicle hour per mile for the other days of the week. This may reflect conditions of heavy congestion during which ramp metering was not effective for both the eastbound and westbound directions.

**Table 5**  
**DCMS-travel time savings results for all time intervals combined by weekday and direction**

		Speed Before (B)	Speed After (A)	Speed Change (B-A)	Traffic Volume (veh/hr)	Travel Time Saving (vehicle hour/mile)
<b>Eastbound (PM peak)</b>	Mondays	62.08	59.22	2.85	2321	-1.81
	Tuesdays	61.69	57.57	4.12	2440	-2.83
	Wednesdays	61.84	57.39	4.44	2455	-3.08
	Thursdays	62.04	58.69	3.35	2478	-2.28
	Fridays	61.88	58.99	2.88	2464	-1.95
<b>Westbound (AM peak)</b>	Mondays	54.00	50.37	3.63	3346	-4.47
	Tuesdays	53.11	44.33	8.78	3478	-12.97
	Wednesdays	50.46	44.80	5.66	3560	-8.91
	Thursdays	48.26	48.89	-0.62	3487	0.93
	Fridays	63.05	56.94	6.12	3376	-5.75

### Level of Service

Table 6 shows level of service results for the time period 08:15 to 08:30 for all weekdays on the westbound (AM peak) for the MIST segment (Results for the other direction, other periods, and other weekdays are shown in Appendix B). Generally, higher LOS distribution in the after period for LOS A and LOS B indicate an improvement, while higher LOS distribution in the after period for the remaining LOS indicate a deterioration in traffic conditions.

**Table 6**  
**Change of level of service distribution results for all weekdays (westbound AM peak)**  
**[08:15-08:30]; MIST**

Day	LOS Distribution (%)										
	Detector	60001		60003		60005		60007		60009	
	LOS	Before	After								
Monday	A	25.71	5.13	46.51	43.59	18.54	5.00	3.94	4.65	14.29	6.52
	B	16.43	20.51	44.96	56.41	29.80	10.00	70.87	88.37	51.43	71.74
	C	57.86	74.36	8.53	0.00	49.67	85.00	25.20	6.98	34.29	21.74
	D	0.00	0.00	0.00	0.00	1.99	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	19.42	0.00	29.01	28.21	15.65	0.00	0.76	2.27	7.46	4.26
	B	9.35	10.26	57.25	71.79	25.17	9.52	57.25	56.82	42.54	51.06
	C	71.22	89.74	13.74	0.00	49.66	90.48	41.98	40.91	50.00	44.68
	D	0.00	0.00	0.00	0.00	9.52	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	20.57	0.00	32.31	26.32	16.44	0.00	1.52	0.00	7.09	0.00
	B	12.77	13.16	55.38	73.68	23.97	10.00	60.61	78.57	46.46	65.22
	C	66.67	86.84	12.31	0.00	55.48	85.00	37.88	21.43	46.46	34.78
	D	0.00	0.00	0.00	0.00	4.11	5.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	25.71	5.41	34.62	27.03	20.14	0.00	6.02	4.55	13.33	2.13
	B	8.57	13.51	53.08	72.97	21.53	10.53	51.88	54.55	41.48	46.81
	C	65.00	81.08	12.31	0.00	54.17	89.47	42.11	40.91	45.19	51.06
	D	0.71	0.00	0.00	0.00	4.17	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	29.58	12.82	53.79	41.03	21.53	8.33	8.89	11.63	15.67	10.87
	B	69.72	87.18	43.94	58.97	29.17	8.33	83.70	81.40	65.67	71.74
	C	0.70	0.00	2.27	0.00	49.31	83.33	7.41	6.98	18.66	17.39
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The results for Mondays show that for detectors 60001 and 60005 before the ramp metering there was approximately 20 to 26% of the traffic component experiencing a Category A LOS which reduced to approximately 5% and 0% in the after study period. Overall both detectors had a worsened LOS with more drivers experiencing Level of Service C compared with the

before period. Similarly, for detector 60003, it is clear that there is a little deterioration in traffic conditions with increased percent of LOS C. The comparison between the before and after periods shows very little change for detector 60007. However, there is evidence of a slight improvement in Level A and Level B LOS. Finally, for detector 60009 again little evidence of a notable change that occurred between the before and after periods but there was, however, a decrease in the LOS particularly from Level A to Level B.

The results for the other weekdays indicate that there was quite a reduction in percentage of LOS A at detectors 60001, 60005, and 60007. Both detectors 60001 and 60005 had a slightly greater deterioration with more drivers experiencing LOS C compared to the before period. The recordings at detector 60007 showed a slight increase in percentage of LOS A and an improvement in LOS C, with it being less populated in the after period. Finally, detector 60009 shows a drop in the after period for LOS A and very small increase at LOS B but generally very similar and also very stable at LOS C (Detector 60003 had same values recorded both before and after, thus no recorded change). It appears, therefore, that the ramp metering has not improved traffic flow conditions at this particular time interval.

In looking at the DCMS segment, the Level of Service results for the time period, 08:15 to 08:20 am, are shown in Table 7 for the westbound (AM peak) traffic, for all weekdays (Results for the other direction, other periods, and other weekdays are shown in Appendix B). The results for Mondays show that for detector 10001, the percentage of LOS A has been improved from 68.3% to 76.6%, and percentage of LOS F has been decreased from 31.7% to 23.4%. For detector 10003, there is little improvement at the LOS A being 4.9% before and 6.5% after. However, there is a notable increase at the LOS F from around 61% to 74%. This indicates that at detector 10003, the traffic conditions for the after period is worse than the before period on Monday.

In looking at the other weekdays, the results show that there is an improvement on Thursday at detector 10001. However, for all other weekdays at detector 10001 and all weekdays at detector 10003, results show that despite there is a little increase for LOS A on some weekdays there is a significant increase in LOS F, which indicates that ramp meters were not effective at the eastern road segment and the conditions are worse for the after period.

**Table 7**  
**Change of level of service distribution results for all weekdays (westbound AM peak)  
[08:15-08:20]; DCMS**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	68.29	76.60	4.88	6.52
	B	0.00	0.00	29.27	17.39
	C	0.00	0.00	4.88	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	31.71	23.40	60.98	73.91
Tuesday	A	79.49	53.19	0.00	0.00
	B	0.00	0.00	15.38	8.51
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	20.51	46.81	84.62	91.49
Wednesday	A	62.50	61.70	0.00	0.00
	B	0.00	0.00	12.50	8.70
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	37.50	38.30	85.00	91.30
Thursday	A	57.50	66.67	5.00	2.17
	B	0.00	0.00	7.50	6.52
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	42.50	33.33	85.00	91.30
Friday	A	95.12	89.36	4.88	6.52
	B	0.00	0.00	51.22	19.57
	C	0.00	0.00	4.88	6.52
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	4.88	10.64	39.02	67.39

### Speed Contours

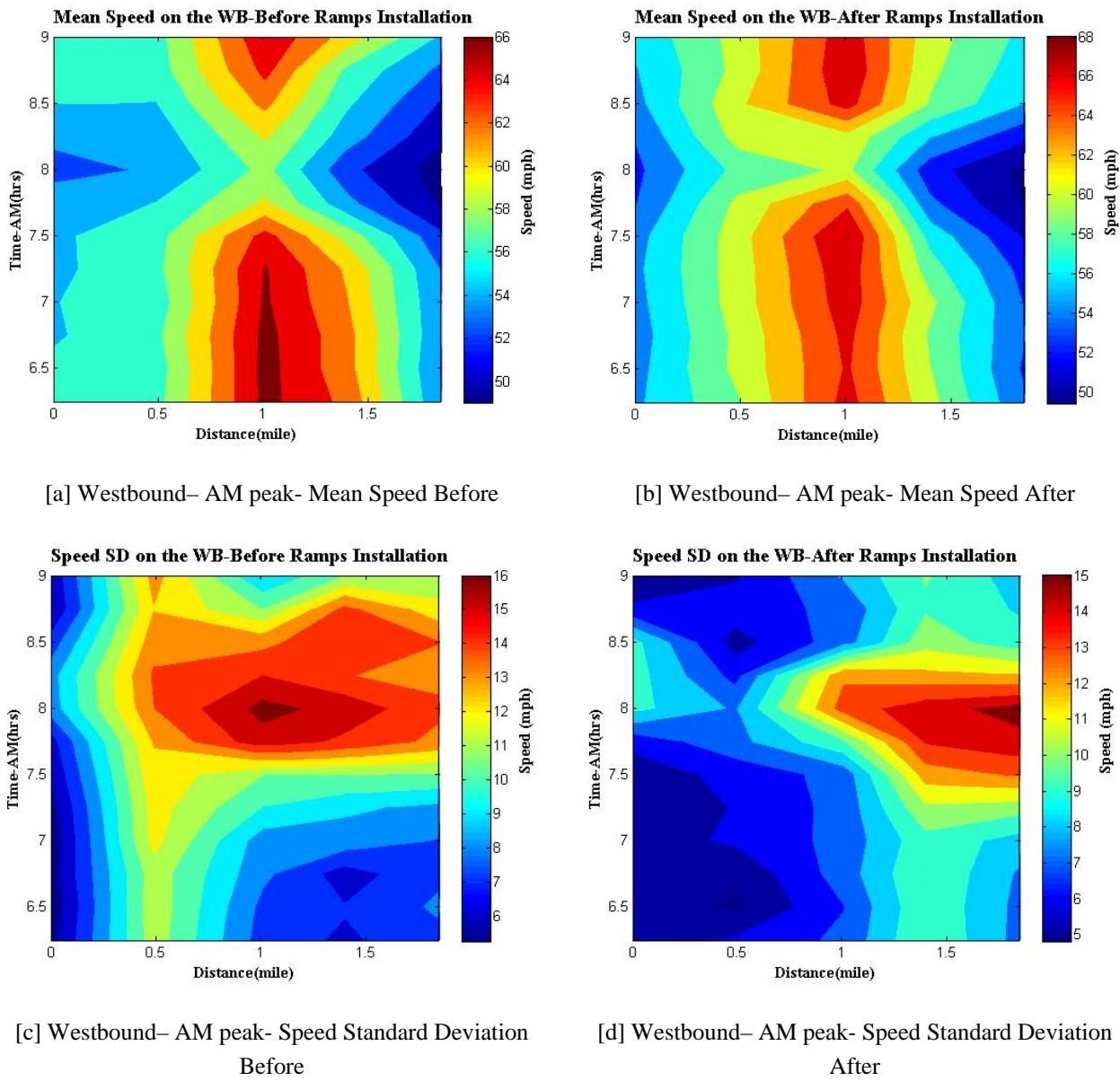
Figure 12 shows the change of speed contours between before and after ramp installation for both mean speed and standard deviation of speeds for Mondays for MIST detectors (Results of speed contours analysis for all weekdays and the all directions (Eastbound and Westbound) are shown in appendix C). It is clear that the mean speed ranges between 49 mph to 66 mph for the before period (Figure 11a), whereas it ranges between 50 to 68 mph for the after period (FIGURE 11 b). In addition, the high speed values extends over larger

time and distance for the after period than the before period. This indicates that the ramp meters are effective in improving the traffic conditions in terms of traffic speed at the freeway segment at which the MIST detectors are installed.

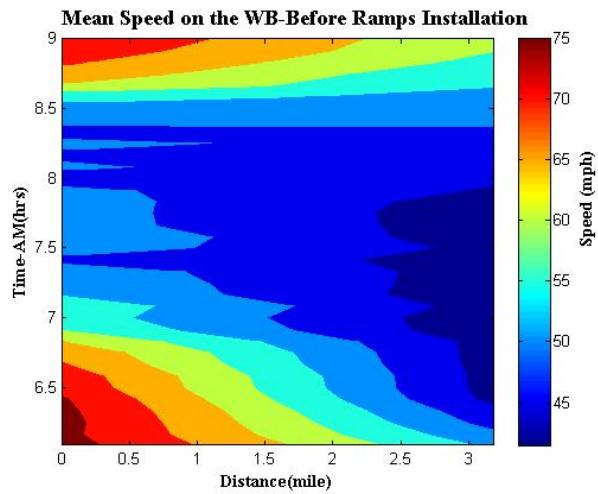
Looking at the standard deviation of the speed, it is clear that the speed variation on the freeway ranges between 6 and 16 mph with a high standard deviation value between 13-16 mph extending over a large time and distance (Figure 11c). On the other hand, the speed variation ranges between 5 and 15 mph with a low standard deviation value between 5-8 mph extending over a large time and distance (Figure 11d). This confirms the effectiveness of the ramp meters in improving the traffic conditions on the freeway as well as the reliability of the traffic speed and, in turn, the travel time.

Figure 12 shows the change of speed contours between before and after ramp installation for both mean speed and standard deviation of speeds for Mondays for DCMS detectors. It is clear that the mean speed ranges between 44-75 mph for the before period (Figure 12a), whereas it ranges between 40-70 mph for the after period (Figure 12b). In addition, the low speed values, between 40-45 mph, extend over a larger time and distance for the after period than for the before period. This indicates that the ramp meters are not effective in improving the traffic conditions in terms of traffic speed at the freeway segment at which the DCMS detectors are installed.

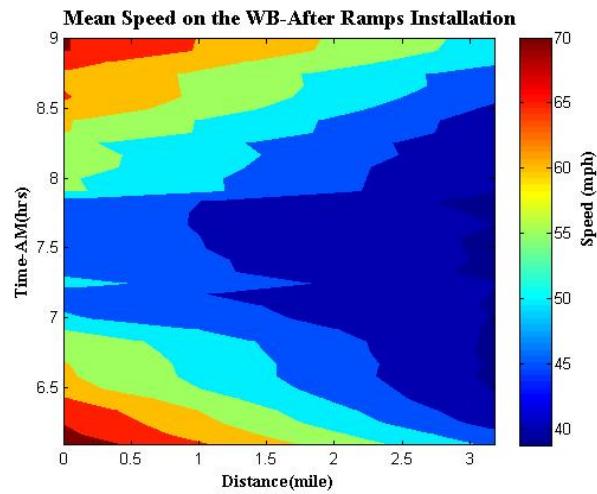
Looking at the standard deviation of the speed, it is clear that the speed variation on the freeway ranges between 5 and 30 mph for both the before and after periods (Figure 12c and d). Also, the high speed variations extend over the same time and distance for the before and after periods. This confirms that the ramp meters are not effective for this freeway segment.



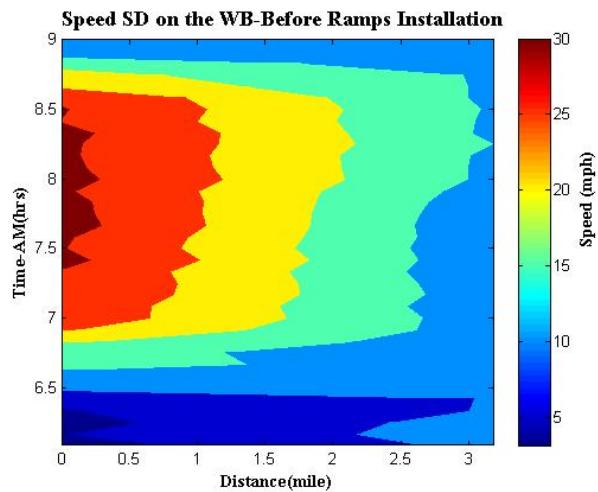
**Figure 11**  
**Mean speed and standard deviation contours for MIST detectors for Monday**



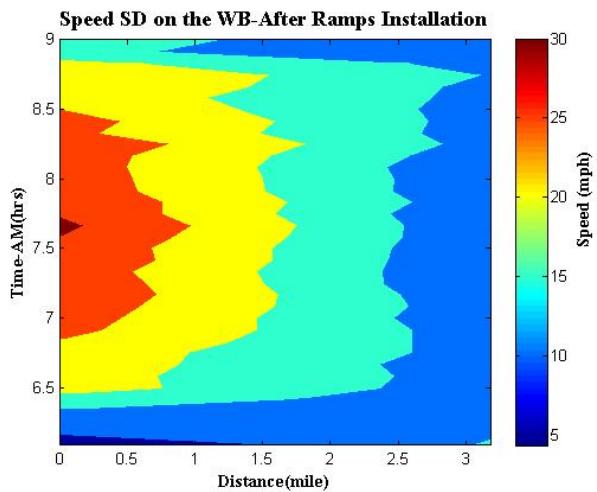
[a] Westbound– AM peak- Mean Speed Before



[b] Westbound– AM peak- Mean Speed After



[c] Westbound– AM peak- Speed Standard Deviation Before



[d] Westbound– AM peak- Speed Standard Deviation After

**Figure 12**  
**Mean speed and standard deviation contours for DCMS detectors for Monday**

## CONCLUSIONS

The assessments undertaken in this study to examine the effectiveness of the ramp metering included a comparative speed analysis, travel time savings, level of service, and speed contours of the before- (Condition B) and after- (Condition A) periods of the ramp metering deployment. A summary of the results obtained for each of the assessments is shown in Table 8 and discussed below for each segment of the corridor.

**Table 8**  
**Summary of the results for all performance measures**

Performance Measure	Study Segment			
	MIST (WB)	MIST (EB)	DCMS (WB)	DCMS (EB)
Speed Change	+5 mph (43% of time)	+7 mph (47% of time)	No Increase!	No Increase!
	-7 mph (29% of time)	-17 mph (12% of time)	53.8 to 49.1 mph	61.9 to 58.4 mph
Travel Time Change (veh.hr/mile)	-6.0 (43% of time)	-12 (47% of time)	No Saving!	No Saving!
	+25 (29% of time)	+62 (12% of time)	4.47 to 12.97	1.81 to 3.08
LOS distribution	Less frequent A, B More frequent C	More frequent B Less frequent C	Much less frequent A More frequent F	
Conclusions	Mixed	Mixed	No Improvement! (free flow condition and construction work)	

For the western segment of I-12 (MIST segment), the statistical results of the comparative speed analysis for Conditions B and A revealed that, when all weekdays were considered, for the eastbound PM peak period, 47% of the time, there were significant speed increases of 7 mph, but 12% of the time, there were significant speed decreases of 17 mph. For the westbound AM peak period, significant speed increase of 5 mph were observed 43% of the time while significant speed decrease of 7 mph were observed 29% of the time. Speed contours, developed to graphically depict the areas of congestion, supported these findings with more areas of congestion observed in the westbound AM peak period than was observed in the eastbound PM peak period.

Travel time savings, computed for the period following the implementation of ramp metering and normalized by traffic volume for each weekday, also showed that values obtained for the eastbound PM peak period were greater than those for westbound AM peak period. For intervals with significant travel speed increase, the average travel time savings for all weekdays were 12.0 and 6.0 vehicle hours per mile, for the PM and AM peak periods, respectively. On the other hand, intervals with significant decrease in speed exhibited increased average travel times of 62.0 and 25.0 vehicle hours per mile, for the PM and AM peak periods, respectively. The level of service results suggests an overall deterioration of traffic conditions for both peak periods.

Overall, the assessments show some improvements in traffic conditions after the implementation of the ramp metering for the more congested eastbound PM peak period; but slightly deteriorated conditions for the westbound AM peak period which had pre-ramp metering speeds at free-flow conditions.

For the eastern segment of I-12 (DCMS segment), the statistical results of the comparative speed analysis for this segment of the corridor revealed deterioration in traffic conditions for both the morning and evening peak periods. Considering all time intervals combined, there was an average decrease in speed from 61.91 to 58.37 mph for the eastbound PM and 53.78 to 49.06 mph for the westbound AM peak periods. Again, speed contours, developed to graphically depict the areas of congestion, showed increased areas of congestion for both peak time periods.

Analysis of travel time savings showed negative values instead for both peak periods, indicating increased travel times. For eastbound PM peak period, the travel time increase ranges from 1.81 to 3.08 vehicle hour per mile; while the travel time increase ranges from 4.47 to 12.97 vehicle hour per mile for the westbound AM peak period. The level of service results for this section of the corridor supported the earlier assessment findings in showing worsened LOS distributions for both peak periods. For the eastbound PM peak period, the LOS A has been decreased and the LOS F has been significantly increased for the different time intervals for PM and AM intervals.

Overall, the assessments show that for this section of the freeway corridor, traffic conditions have not been improved by ramp metering. Because the concentration of ramp meters is very low in this segment (2 ramp meters across 3.17 miles) compared to the MIST segment (5 ramp meters across 1.85 miles), the results suggest that the ‘diminished’ effect of the ramp meters, coupled with traffic growth over time, may account for the worsened traffic conditions observed in this segment. It should be noted, however, that the analysis for the

DCMS segment did not account for the effect of the on-going construction work between O’Neal Lane interchange and Walker/La. 447 interchange, which started as early as 2009. It is possible that the presence of the construction zone may have impacted the traffic conditions and obscured the benefits of ramp meters. This is because the construction work schedule overlapped with the analysis time period.

For both segments, the analysis did not exclude the effect of incidents on traffic conditions before and after the ramp metering implementation. Capacity reducing incidents cause non-recurring congestion and traffic breakdowns that cannot be prevented with ramp meters. To capture the performance of ramp meters, comparative analysis should be restricted to recurrent conditions (incident free conditions) before and after the implementation of ramp metering. This, however, requires knowledge of the type, location, and duration of all incidents on the study segment for the entire analysis period. During the course of this study, the incident logs were not available for the two study segments, and therefore, incident free conditions could not be separated from the data collection period.



## **RECOMMENDATIONS**

The following recommendations are made based on the findings of this study:

1. Further investigation should be made to assess the effectiveness of the current fixed time ramp meters after the construction work has been completed. This can be accomplished by turning the ramp meters on and off for a specific time period to measure the impact on traffic conditions. Bluetooth data from the BlueTOAD system can be used instead of the detector data for better data quality and direct measurements of actual travel times.
2. Collection of an accurate log of the incidents along the corridor during the before and after periods to measure the impact of ramp metering on recurrent traffic conditions. This, however, requires knowledge of the type, location, and duration of all incidents on the study segment for the entire analysis period.
3. Future analysis should include the segment between the DCMS and MIST segments. This requires the use of other sources of data, such as Bluetooth, since detector data are not available for that segment.
4. Further investigation should consider possible improvements from more advanced ramp metering algorithms, such as dynamic and coordinated ramp metering systems.



## **ACRONYMS, ABBREVIATIONS & SYMBOLS**

ATM	Advanced Traffic Management
DCMS	Data Collection and Management Service
DOTD	Department of Transportation and Development
LADOTD	Louisiana Department of Transportation and Development
WSDOT	Washington State Department of Transportation
LTRC	Louisiana Transportation Research Center
MIST	Management Information System for Transportation
PRC	Project Review Committee
ANN	Artificial Neural Networks
BEEX	Balanced Efficiency and Equity
FRESIM	FREeway SIMulation
SZM	Stratified Zone Ramp
HERO	Heuristic Ramp Metering
MCW	Monsh-Citylin-West Gate
CPM	Crash Prediction Model
LOS	Level of Service



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## **APPENDIX A (DETAILED STATISTICAL RESULTS OF BOTH MIST AND DCMS DETECTORS)**

This appendix shows detailed results of the statistical analysis conducted to compare the speed data before and after ramp meter installation. Tables A-1 through A-10 show the statistical analysis results for the freeway segment from which traffic data was collected using MIST detectors. Tables A-11 through A-20 show the statistical analysis results for the freeway segment from which traffic data was collected using DCMS detectors.

**Table A-1**  
**Statistical results for MIST-speed on Mondays (westbound AM peak)**

WB (AM Peak) Time Interval	% of Time Periods			Difference in Speed (mph) (% Difference)		
	Significant Decrease	Insignificant Change	Significant Increase	Significant Decrease	Insignificant Change	Significant Increase
06:00-06:15	40%	25%	34%	-4 (-7%)	0 (0%)	6 (11%)
06:15-06:30	45%	21%	34%	-4 (-7%)	0 (0%)	6 (12%)
06:30-06:45	41%	23%	36%	-4 (-7%)	0 (1%)	6 (10%)
06:45--07:00	29%	33%	38%	-5 (-8%)	0 (0%)	6 (11%)
07:00-07:15	27%	35%	38%	-6 (-10%)	0 (0%)	7 (12%)
07:15-07:30	21%	37%	41%	-8 (-15%)	1 (1%)	7 (13%)
07:30-07:45	23%	19%	58%	-11 (-20%)	0 (0%)	7 (14%)
07:45-08:00	26%	20%	55%	-12 (-23%)	0 (1%)	8 (16%)
08:00-08:15	16%	19%	65%	-14 (-25%)	0 (1%)	7 (14%)
08:15-08:30	10%	27%	63%	-7 (-13%)	1 (2%)	7 (13%)
08:30-08:45	14%	33%	53%	-6 (-11%)	1 (2%)	6 (12%)
08:45-09:00	22%	39%	40%	-5 (-8%)	0 (0%)	6 (11%)
Total Interval	26%	27%	46%	-7 (-13%)	0 (1%)	7 (12%)

**Table A-2**  
**Statistical results for MIST-speed on Tuesdays (westbound AM peak)**

WB (AM Peak) Time Interval	% of Time Periods			Difference in Speed (mph) (% Difference)		
	Significant Decrease	Insignificant Change	Significant Increase	Significant Decrease	Insignificant Change	Significant Increase
06:00-06:15	44%	28%	27%	-4 (-7%)	0 (1%)	6 (12%)
06:15-06:30	38%	29%	33%	-5 (-8%)	0 (0%)	6 (12%)
06:30-06:45	39%	25%	36%	-4 (-7%)	0 (1%)	6 (11%)
06:45--07:00	31%	31%	38%	-5 (-9%)	0 (1%)	6 (12%)
07:00-07:15	31%	34%	36%	-9 (-16%)	0 (1%)	7 (13%)
07:15-07:30	24%	25%	51%	-13 (-23%)	1 (1%)	6 (12%)
07:30-07:45	28%	18%	54%	-12 (-23%)	1 (1%)	8 (15%)
07:45-08:00	30%	20%	50%	-14 (-27%)	0 (1%)	9 (17%)
08:00-08:15	29%	17%	54%	-16 (-30%)	0 (0%)	8 (16%)
08:15-08:30	17%	21%	62%	-17 (-32%)	0 (0%)	7 (14%)
08:30-08:45	20%	36%	44%	-15 (-26%)	1 (1%)	7 (13%)
08:45-09:00	28%	35%	37%	-9 (-16%)	0 (0%)	6 (11%)
Total Interval	30%	27%	43%	-10 (-19%)	0 (1%)	7 (13%)

**Table A-3**  
**Statistical results for MIST-speed on Wednesdays (westbound AM peak)**

WB (AM Peak) Time Interval	% of Time Periods			Difference in Speed (mph) (% Difference)		
	Significant Decrease	Insignificant Change	Significant Increase	Significant Decrease	Insignificant Change	Significant Increase
06:00-06:15	36%	31%	32%	-4 (-6%)	0 (0%)	6 (12%)
06:15-06:30	38%	29%	34%	-5 (-8%)	0 (1%)	6 (12%)
06:30-06:45	29%	34%	38%	-5 (-8%)	0 (0%)	6 (11%)
06:45--07:00	18%	41%	40%	-5 (-8%)	0 (1%)	6 (12%)
07:00-07:15	13%	44%	43%	-9 (-15%)	0 (1%)	6 (12%)
07:15-07:30	12%	31%	56%	-13 (-24%)	1 (2%)	6 (12%)
07:30-07:45	17%	25%	58%	-15 (-28%)	1 (1%)	8 (15%)
07:45-08:00	24%	19%	57%	-14 (-28%)	0 (1%)	8 (15%)
08:00-08:15	23%	18%	59%	-16 (-31%)	0 (0%)	8 (16%)
08:15-08:30	21%	23%	56%	-15 (-28%)	1 (1%)	8 (15%)
08:30-08:45	26%	32%	42%	-12 (-22%)	1 (1%)	7 (13%)
08:45-09:00	27%	39%	34%	-10 (-17%)	0 (0%)	7 (12%)
Total Interval	24%	31%	46%	-10 (-19%)	0 (1%)	7 (13%)

**Table A-4**  
**Statistical results for MIST-speed on Thursdays (westbound AM peak)**

WB (AM Peak) Time Interval	% of Time Periods			Difference in Speed (mph) (% Difference)		
	Significant Decrease	Insignificant Change	Significant Increase	Significant Decrease	Insignificant Change	Significant Increase
06:00-06:15	46%	21%	33%	-4 (-6%)	0 (1%)	6 (11%)
06:15-06:30	30%	26%	44%	-4 (-7%)	-2 (-2%)	-6 (-11%)
06:30-06:45	35%	30%	35%	-4 (-8%)	0 (0%)	6 (11%)
06:45--07:00	32%	32%	36%	-5 (-8%)	0 (0%)	6 (10%)
07:00-07:15	28%	34%	38%	-5 (-9%)	0 (1%)	6 (11%)
07:15-07:30	20%	37%	43%	-6 (-10%)	0 (0%)	6 (11%)
07:30-07:45	21%	34%	45%	-8 (-15%)	1 (1%)	7 (13%)
07:45-08:00	22%	24%	54%	-11 (-20%)	1 (1%)	7 (13%)
08:00-08:15	13%	24%	63%	-16 (-29%)	1 (1%)	7 (14%)
08:15-08:30	15%	36%	48%	-11 (-20%)	1 (2%)	7 (14%)
08:30-08:45	12%	43%	44%	-15 (-26%)	1 (2%)	7 (13%)
08:45-09:00	26%	37%	38%	-10 (-17%)	0 (0%)	6 (11%)
Total Interval	25%	32%	44%	-8 (-14%)	-2 (-1%)	1 (7%)

**Table A-5**  
**Statistical results for MIST-speed on Fridays (westbound AM peak)**

WB (AM Peak) Time Interval	% of Time Periods			Difference in Speed (mph) (% Difference)		
	Significant Decrease	Insignificant Change	Significant Increase	Significant Decrease	Insignificant Change	Significant Increase
06:00-06:15	45%	24%	31%	-5 (-8%)	1 (1%)	6 (11%)
06:15-06:30	46%	20%	35%	-5 (-9%)	0 (0%)	6 (11%)
06:30-06:45	46%	19%	35%	-4 (-7%)	0 (0%)	6 (11%)
06:45--07:00	47%	18%	35%	-6 (-10%)	0 (1%)	6 (11%)
07:00-07:15	45%	22%	34%	-8 (-13%)	0 (0%)	5 (9%)
07:15-07:30	39%	27%	34%	-7 (-12%)	0 (0%)	6 (11%)
07:30-07:45	33%	32%	35%	-7 (-13%)	0 (0%)	6 (12%)
07:45-08:00	23%	36%	41%	-12 (-20%)	0 (1%)	6 (12%)
08:00-08:15	26%	42%	32%	-10 (-16%)	0 (0%)	7 (14%)
08:15-08:30	38%	28%	34%	-7 (-11%)	0 (0%)	6 (11%)
08:30-08:45	36%	31%	32%	-5 (-8%)	0 (1%)	6 (11%)
08:45-09:00	40%	27%	33%	-5 (-8%)	1 (1%)	6 (11%)
Total Interval	39%	27%	34%	-7 (-11%)	0 (0%)	6 (11%)

**Table A-6**  
**Statistical results for MIST-speed on Mondays (eastbound PM peak)**

EB (PM Peak) Time Interval	% of Time Periods			Difference in Speed (mph) (% Difference)		
	Significant Decrease	Insignificant Change	Significant Increase	Significant Decrease	Insignificant Change	Significant Increase
15:00 - 15:15	29%	30%	39%	-2 (-4%)	0 (0%)	5 (8%)
15:15 - 15:30	32%	28%	40%	-2 (-4%)	0 (0%)	5 (9%)
15:30 - 15:45	24%	34%	40%	-4 (-7%)	0 (0%)	4 (7%)
15:45 - 16:00	24%	40%	36%	-4 (-6%)	0 (0%)	5 (9%)
16:00 - 16:15	12%	49%	39%	-5 (-8%)	0 (0%)	5 (8%)
16:15 - 16:30	6%	55%	39%	-12 (-20%)	1 (2%)	6 (10%)
16:30 - 16:45	6%	33%	60%	-22 (-41%)	2 (3%)	6 (12%)
16:45 - 17:00	8%	29%	62%	-26 (-50%)	2 (3%)	7 (14%)
17:00 - 17:15	13%	15%	71%	-24 (-49%)	2 (3%)	9 (18%)
17:15 - 17:30	12%	10%	78%	-26 (-54%)	3 (6%)	9 (19%)
17:30 - 17:45	7%	10%	82%	-24 (-48%)	3 (6%)	8 (16%)
17:45 - 18:00	5%	23%	72%	-19 (-37%)	3 (5%)	8 (14%)
18:00 - 18:15	2%	53%	44%	-12 (-21%)	2 (4%)	7 (13%)
18:15 - 18:30	2%	51%	47%	-4 (-7%)	1 (2%)	7 (12%)
18:30 - 18:45	4%	61%	34%	-4 (-7%)	0 (0%)	7 (12%)
18:45 - 19:00	15%	48%	36%	-2 (-4%)	0 (-1%)	6 (10%)
Total Interval	13%	36%	51%	-12 (-23%)	1 (2%)	7 (12%)

**Table A-7**  
**Statistical results for MIST-speed on Tuesdays (eastbound PM peak)**

EB (PM Peak) Time Interval	% of Time Periods			Difference in Speed (mph) (% Difference)		
	Significant Decrease	Insignificant Change	Significant Increase	Significant Decrease	Insignificant Change	Significant Increase
15:00 - 15:15	41%	47%	11%	-4 (-6%)	0 (0%)	2 (3%)
15:15 - 15:30	15%	66%	17%	-5 (-8%)	0 (0%)	2 (4%)
15:30 - 15:45	13%	69%	17%	-4 (-7%)	0 (1%)	2 (4%)
15:45 - 16:00	9%	69%	20%	-8 (-13%)	1 (1%)	4 (6%)
16:00 - 16:15	8%	55%	37%	-8 (-14%)	2 (3%)	5 (9%)
16:15 - 16:30	5%	32%	62%	-12 (-21%)	1 (3%)	6 (10%)
16:30 - 16:45	6%	17%	75%	-14 (-29%)	2 (4%)	9 (19%)
16:45 - 17:00	10%	17%	72%	-18 (-41%)	3 (5%)	12 (26%)
17:00 - 17:15	13%	11%	75%	-20 (-50%)	1 (3%)	14 (34%)
17:15 - 17:30	14%	7%	78%	-22 (-56%)	2 (5%)	15 (37%)
17:30 - 17:45	11%	8%	80%	-24 (-57%)	2 (5%)	14 (32%)
17:45 - 18:00	9%	18%	73%	-26 (-53%)	2 (5%)	10 (21%)
18:00 - 18:15	6%	26%	66%	-25 (-47%)	2 (4%)	7 (14%)
18:15 - 18:30	5%	67%	27%	-11 (-18%)	1 (2%)	4 (7%)
18:30 - 18:45	6%	82%	11%	-4 (-6%)	0 (0%)	3 (5%)
18:45 - 19:00	16%	72%	10%	-3 (-5%)	0 (0%)	3 (4%)
Total Interval	12%	41%	46%	-13 (-27%)	1 (3%)	7 (15%)

**Table A-8**  
**Statistical results for MIST-speed on Wednesdays (eastbound PM peak)**

EB (PM Peak) Time Interval	% of Time Periods			Difference in Speed (mph) (% Difference)		
	Significant Decrease	Insignificant Change	Significant Increase	Significant Decrease	Insignificant Change	Significant Increase
15:00 - 15:15	26%	65%	8%	-7 (-12%)	0 (0%)	3 (4%)
15:15 - 15:30	16%	72%	12%	-17 (-29%)	0 (0%)	2 (4%)
15:30 - 15:45	14%	72%	13%	-18 (-31%)	1 (1%)	3 (4%)
15:45 - 16:00	11%	64%	24%	-21 (-35%)	1 (2%)	3 (5%)
16:00 - 16:15	11%	52%	36%	-25 (-46%)	2 (3%)	5 (8%)
16:15 - 16:30	12%	28%	59%	-24 (-45%)	1 (2%)	7 (13%)
16:30 - 16:45	14%	25%	60%	-28 (-58%)	2 (4%)	11 (24%)
16:45 - 17:00	16%	14%	69%	-30 (-68%)	0 (0%)	12 (28%)
17:00 - 17:15	22%	5%	72%	-24 (-58%)	1 (1%)	14 (37%)
17:15 - 17:30	23%	5%	71%	-26 (-64%)	2 (4%)	15 (38%)
17:30 - 17:45	22%	8%	70%	-28 (-62%)	2 (3%)	13 (29%)
17:45 - 18:00	15%	17%	66%	-28 (-56%)	2 (4%)	9 (17%)
18:00 - 18:15	9%	37%	54%	-24 (-44%)	2 (4%)	7 (12%)
18:15 - 18:30	9%	64%	26%	-11 (-19%)	1 (2%)	5 (8%)
18:30 - 18:45	17%	67%	14%	-4 (-6%)	0 (0%)	3 (5%)
18:45 - 19:00	43%	45%	11%	-3 (-5%)	0 (0%)	3 (4%)
Total Interval	17%	40%	42%	-20 (-40%)	1 (2%)	7 (15%)

**Table A-9**  
**Statistical results for MIST-speed on Thursdays (eastbound PM peak)**

EB (PM Peak) Time Interval	% of Time Periods			Difference in Speed (mph) (% Difference)		
	Significant Decrease	Insignificant Change	Significant Increase	Significant Decrease	Insignificant Change	Significant Increase
15:00 - 15:15	12%	76%	11%	-9 (-16%)	0 (0%)	3 (5%)
15:15 - 15:30	11%	76%	11%	-11 (-18%)	0 (0%)	2 (4%)
15:30 - 15:45	8%	72%	18%	-20 (-33%)	0 (0%)	2 (4%)
15:45 - 16:00	10%	71%	17%	-19 (-33%)	1 (2%)	3 (5%)
16:00 - 16:15	9%	53%	37%	-22 (-39%)	2 (3%)	5 (8%)
16:15 - 16:30	8%	38%	52%	-24 (-46%)	2 (3%)	7 (13%)
16:30 - 16:45	11%	16%	72%	-25 (-54%)	3 (6%)	10 (20%)
16:45 - 17:00	14%	12%	73%	-25 (-55%)	2 (4%)	11 (25%)
17:00 - 17:15	20%	7%	72%	-22 (-54%)	1 (1%)	13 (31%)
17:15 - 17:30	21%	10%	68%	-26 (-60%)	2 (4%)	12 (28%)
17:30 - 17:45	17%	11%	71%	-31 (-64%)	2 (4%)	11 (22%)
17:45 - 18:00	11%	17%	70%	-32 (-62%)	3 (6%)	8 (16%)
18:00 - 18:15	8%	28%	61%	-28 (-52%)	2 (4%)	6 (12%)
18:15 - 18:30	6%	61%	30%	-28 (-48%)	2 (3%)	5 (8%)
18:30 - 18:45	6%	74%	20%	-16 (-26%)	1 (1%)	5 (8%)
18:45 - 19:00	12%	71%	15%	-5 (-8%)	0 (0%)	4 (7%)
Total Interval	11%	43%	44%	-21 (-42%)	1 (3%)	7 (13%)

**Table A-10**  
**Statistical results for MIST-speed on Fridays (eastbound PM peak)**

EB (PM Peak) Time Interval	% of Time Periods			Difference in Speed (mph) (% Difference)		
	Significant Decrease	Insignificant Change	Significant Increase	Significant Decrease	Insignificant Change	Significant Increase
15:00 - 15:15	14%	72%	14%	-12 (-21%)	0 (0%)	3 (4%)
15:15 - 15:30	11%	63%	24%	-11 (-19%)	1 (2%)	4 (6%)
15:30 - 15:45	5%	47%	47%	-25 (-46%)	2 (3%)	6 (11%)
15:45 - 16:00	3%	32%	63%	-24 (-45%)	2 (3%)	7 (12%)
16:00 - 16:15	6%	30%	63%	-22 (-45%)	2 (3%)	9 (18%)
16:15 - 16:30	6%	34%	60%	-26 (-56%)	1 (2%)	12 (24%)
16:30 - 16:45	7%	19%	73%	-23 (-54%)	2 (4%)	13 (30%)
16:45 - 17:00	7%	17%	75%	-22 (-51%)	2 (4%)	13 (29%)
17:00 - 17:15	9%	10%	79%	-20 (-47%)	2 (4%)	13 (29%)
17:15 - 17:30	7%	9%	83%	-25 (-55%)	2 (5%)	11 (23%)
17:30 - 17:45	5%	27%	67%	-28 (-56%)	2 (5%)	9 (19%)
17:45 - 18:00	3%	29%	66%	-26 (-49%)	1 (2%)	8 (14%)
18:00 - 18:15	6%	38%	55%	-13 (-23%)	1 (2%)	6 (11%)
18:15 - 18:30	7%	56%	36%	-9 (-15%)	2 (3%)	5 (8%)
18:30 - 18:45	11%	69%	19%	-5 (-9%)	1 (1%)	3 (6%)
18:45 - 19:00	12%	72%	14%	-6 (-9%)	0 (0%)	3 (5%)
Total Interval	8%	39%	52%	-19 (-38%)	1 (3%)	8 (16%)

**Table A-11**  
**Statistical results for DCMS-speed on Mondays (westbound AM peak)**

Time	Speed before (B)	Speed After (A)	Speed Difference (B-A)	Equality of Variance (P- value)	Pooled T- Test (P- Value)	Satterthwaite T-Test (P- value)
06:00-06:05	65.1454	61.4241	3.7213	0.1757	0.1187	0.1138
06:05-06:10	63.4163	58.8862	4.5301	0.3314	0.0765	0.0739
06:10-06:15	62.2533	56.4861	5.7672	0.3181	0.034	0.0325
06:15-06:20	61.0482	55.0358	6.0124	0.2582	0.0311	0.0295
06:20-06:25	59.3512	52.7352	6.6159	0.34	0.0236	0.0225
06:25-06:30	59.3512	52.7352	6.6159	0.34	0.0236	0.0225
06:30-06:35	58.0542	49.9709	8.0834	0.3329	0.0084	0.0079
06:35-06:40	56.4726	49.9438	6.5288	0.6826	0.0386	0.0379
06:40-06:45	55.7146	49.4046	6.31	0.4129	0.0431	0.0417
06:45-06:50	53.4652	49.0191	4.4461	0.4037	0.1698	0.1658
06:50-06:55	50.4092	47.2227	3.1865	0.9561	0.3396	0.3393
06:55-07:00	49.421	45.2823	4.1387	0.5438	0.2207	0.2234
07:00-07:05	50.6199	44.6554	5.9645	0.6974	0.0802	0.0812
07:05-07:10	48.1605	43.7233	4.4373	0.6823	0.1995	0.2012
07:10-07:15	48.1602	45.9264	2.2338	0.6749	0.5159	0.5173
07:15-07:20	47.7065	43.9251	3.7814	0.6305	0.2619	0.2638
07:20-07:25	45.8467	43.9132	1.9335	0.6891	0.5782	0.5797
07:25-07:30	48.1652	43.5193	4.6459	0.7069	0.176	0.1774
07:30-07:35	47.9704	43.4893	4.4811	0.8045	0.2055	0.2066
07:35-07:40	46.9801	43.5002	3.48	0.9444	0.3396	0.3399
07:40-07:45	46.7173	43.4226	3.2947	0.7539	0.3531	0.3549
07:45-07:50	46.8454	43.3848	3.4607	0.9559	0.3326	0.333
07:50-07:55	47.3314	48.1468	-0.8154	0.832	0.8184	0.8178
07:55-08:00	46.4935	47.9406	-1.4471	0.9947	0.6875	0.6874
08:00-08:05	47.5853	48.5433	-0.958	0.9942	0.7897	0.7897
08:05-08:10	47.7772	49.4794	-1.7022	0.6402	0.6363	0.6329
08:10-08:15	49.1164	48.8377	0.2788	0.5928	0.9401	0.9395
08:15-08:20	48.9493	51.4062	-2.4569	0.9524	0.4939	0.4934
08:20-08:25	51.1564	51.3573	-0.2008	0.705	0.9553	0.955
08:25-08:30	52.3097	53.9378	-1.6281	1	0.6454	0.6454
08:30-08:35	54.8659	55.6079	-0.742	1	0.8284	0.8284
08:35-08:40	58.826	55.9799	2.8461	0.2833	0.3953	0.386
08:40-08:45	60.8149	55.9622	4.8527	0.1307	0.1433	0.1332
08:45-08:50	63.5091	58.7875	4.7216	0.0883	0.1029	0.0935
08:50-08:55	64.9918	61.5305	3.4613	0.0731	0.1695	0.154
08:55-09:00	66.124	61.5871	4.5368	0.0152	0.0699	0.0581
Total Interval	54.00	50.37	3.63	0.7097	0.0420	0.0420

**Table A-12**  
**Statistical results for DCMS-speed on Tuesdays (westbound AM peak)**

Time	Speed before (B)	Speed After (A)	Speed Difference (B-A)	Equality of Variance (P- value)	Pooled T- Test (P- Value)	Satterthwaite T-Test (P- value)
06:00-06:05	65.1117	61.5088	3.6029	0.9982	0.109	0.109
06:05-06:10	62.0476	58.1375	3.9101	0.4409	0.1248	0.1277
06:10-06:15	60.4354	55.3457	5.0897	0.739	0.0536	0.0544
06:15-06:20	59.9384	54.2375	5.7009	0.8731	0.0382	0.0385
06:20-06:25	58.3396	52.3289	6.0107	0.8697	0.0396	0.0399
06:25-06:30	58.3396	52.3289	6.0107	0.8697	0.0396	0.0399
06:30-06:35	55.535	48.6205	6.9146	0.8211	0.0239	0.0243
06:35-06:40	54.5305	47.9679	6.5626	0.7791	0.0313	0.0318
06:40-06:45	54.7839	47.0178	7.7661	0.4277	0.0107	0.0102
06:45-06:50	52.4903	45.2517	7.2386	0.497	0.0186	0.0178
06:50-06:55	51.3444	43.7602	7.5842	0.6495	0.0157	0.0153
06:55-07:00	49.5133	40.4122	9.1011	0.9031	0.0055	0.0054
07:00-07:05	48.4686	38.0917	10.3769	0.7906	0.0013	0.0012
07:05-07:10	46.2585	37.4197	8.8388	0.7053	0.0071	0.0069
07:10-07:15	46.9948	37.5157	9.4791	0.6898	0.003	0.0028
07:15-07:20	45.8913	36.7914	9.0998	0.6373	0.0058	0.0056
07:20-07:25	45.6423	36.2432	9.399	0.9241	0.0039	0.004
07:25-07:30	45.8251	36.1492	9.6759	0.8872	0.0036	0.0036
07:30-07:35	46.2117	35.6038	10.6079	0.8652	0.002	0.0021
07:35-07:40	45.757	36.2246	9.5324	0.974	0.0045	0.0045
07:40-07:45	45.5919	37.8971	7.6949	0.7655	0.0225	0.0219
07:45-07:50	47.0088	38.2311	8.7777	0.7467	0.0103	0.01
07:50-07:55	46.6476	37.9132	8.7345	0.5511	0.0123	0.0116
07:55-08:00	47.5999	39.9835	7.6164	0.5299	0.0265	0.0251
08:00-08:05	48.589	39.9618	8.6272	0.8862	0.0152	0.0151
08:05-08:10	48.2749	39.5108	8.7641	0.861	0.0146	0.0149
08:10-08:15	47.0406	40.8666	6.174	0.8695	0.0897	0.091
08:15-08:20	48.939	42.1755	6.7636	0.7723	0.0595	0.058
08:20-08:25	51.1216	42.6681	8.4535	0.9001	0.0208	0.0206
08:25-08:30	51.0486	43.214	7.8346	0.8895	0.0289	0.0295
08:30-08:35	54.2016	44.1039	10.0976	0.9032	0.0041	0.004
08:35-08:40	57.5001	45.0361	12.464	0.2322	0.0003	0.0002
08:40-08:45	59.4447	49.2647	10.18	0.3592	0.0027	0.0023
08:45-08:50	60.5811	51.4534	9.1277	0.2613	0.0067	0.0054
08:50-08:55	61.5296	52.603	8.9266	0.178	0.0062	0.005
08:55-09:00	62.3123	54.0872	8.2252	0.6802	0.0097	0.0093
Total Interval	53.11	44.33	8.78	0.2024	<0.0001	<0.0001

**Table A-13**  
**Statistical results for DCMS-speed on Wednesdays (westbound AM peak)**

Time	Speed before (B)	Speed After (A)	Speed Difference (B-A)	Equality of Variance (P- value)	Pooled T- Test (P- Value)	Satterthwaite T-Test (P- value)
06:00-06:05	64.8787	60.9467	3.9319	0.7086	0.0994	0.1004
06:05-06:10	63.1019	58.0981	5.0038	0.7836	0.0419	0.0424
06:10-06:15	60.9526	55.4069	5.5457	0.7028	0.0351	0.0357
06:15-06:20	59.6401	52.6399	7.0002	0.6376	0.0147	0.0143
06:20-06:25	58.4844	52.6159	5.8685	0.7179	0.0398	0.0404
06:25-06:30	58.4844	52.6159	5.8685	0.7179	0.0398	0.0404
06:30-06:35	53.203	48.2299	4.9731	0.5876	0.0971	0.0985
06:35-06:40	52.0726	47.369	4.7036	0.8687	0.1076	0.1071
06:40-06:45	52.4362	48.055	4.3812	0.5905	0.1283	0.1266
06:45-06:50	48.4103	46.1291	2.2812	0.6575	0.4442	0.4424
06:50-06:55	49.1508	43.3904	5.7603	0.9003	0.0505	0.0503
06:55-07:00	46.6364	41.7282	4.9082	0.977	0.1028	0.1029
07:00-07:05	45.8608	40.253	5.6077	0.8432	0.0604	0.06
07:05-07:10	46.6378	39.1583	7.4795	0.8489	0.0155	0.0153
07:10-07:15	43.6683	38.1413	5.5271	0.9875	0.0887	0.0888
07:15-07:20	42.1068	37.9356	4.1712	0.9666	0.1912	0.1911
07:20-07:25	41.3004	37.6659	3.6345	0.5111	0.2493	0.2465
07:25-07:30	39.3831	34.5972	4.786	0.6229	0.1221	0.1205
07:30-07:35	40.7625	35.697	5.0655	0.8093	0.113	0.1123
07:35-07:40	40.7966	36.1682	4.6285	0.959	0.1612	0.161
07:40-07:45	42.5949	36.6919	5.903	0.9207	0.0664	0.0662
07:45-07:50	42.9339	37.3981	5.5358	0.9515	0.0948	0.0951
07:50-07:55	43.4854	39.059	4.4263	0.4991	0.1882	0.185
07:55-08:00	42.7415	40.3048	2.4367	0.1823	0.4712	0.4629
08:00-08:05	43.7052	40.9092	2.796	0.3001	0.4	0.3936
08:05-08:10	44.4453	42.6331	1.8122	0.4978	0.5905	0.5868
08:10-08:15	43.7197	43.6576	0.0621	0.6667	0.9854	0.9853
08:15-08:20	44.8916	44.0263	0.8653	0.9265	0.8009	0.8006
08:20-08:25	46.806	44.3027	2.5033	0.7456	0.4634	0.4656
08:25-08:30	50.4859	42.6425	7.8435	0.7056	0.0213	0.0219
08:30-08:35	52.2484	44.8357	7.4126	0.9536	0.0345	0.0345
08:35-08:40	54.6811	47.0596	7.6215	0.6664	0.0297	0.0287
08:40-08:45	58.9937	48.5227	10.471	0.7078	0.0015	0.0014
08:45-08:50	61.7219	50.204	11.5179	0.2496	0.0003	0.0002
08:50-08:55	63.0246	52.4667	10.5579	0.1111	0.0007	0.0005
08:55-09:00	63.4177	54.5591	8.8586	0.4677	0.0045	0.0041
Total Interval	50.46	44.80	5.66	0.3689	0.0030	0.0030

**Table A-14**  
**Statistical results for DCMS-speed on Thursdays (westbound AM peak)**

Time	Speed before (B)	Speed After (A)	Speed Difference (B-A)	Equality of Variance (P- value)	Pooled T- Test (P- Value)	Satterthwaite T-Test (P- value)
06:00-06:05	65.0549	63.3858	1.6691	0.0094	0.4304	0.4395
06:05-06:10	61.4598	61.3179	0.1419	0.0129	0.9536	0.9546
06:10-06:15	60.3973	58.4954	1.9019	0.124	0.4542	0.4603
06:15-06:20	58.9719	57.1359	1.836	0.1208	0.496	0.5019
06:20-06:25	57.5196	56.282	1.2376	0.3879	0.6512	0.6537
06:25-06:30	57.5196	56.282	1.2376	0.3879	0.6512	0.6537
06:30-06:35	51.869	53.8437	-1.9747	0.1957	0.4935	0.4984
06:35-06:40	50.1307	53.3968	-3.2661	0.0424	0.2717	0.2803
06:40-06:45	49.8689	53.6424	-3.7735	0.0445	0.1932	0.2011
06:45-06:50	48.5776	52.1641	-3.5865	0.2335	0.2391	0.2437
06:50-06:55	46.4195	50.4657	-4.0462	0.2722	0.1865	0.1909
06:55-07:00	45.2015	49.2514	-4.0499	0.2627	0.1877	0.1924
07:00-07:05	43.671	46.855	-3.184	0.4294	0.3253	0.329
07:05-07:10	43.2421	45.3538	-2.1117	0.2799	0.5186	0.5229
07:10-07:15	41.514	43.4477	-1.9337	0.9908	0.5378	0.5378
07:15-07:20	40.9385	43.0284	-2.09	0.4827	0.5082	0.5111
07:20-07:25	39.46	40.584	-1.124	0.4397	0.7308	0.7326
07:25-07:30	38.2074	39.8875	-1.6801	0.7258	0.6131	0.6146
07:30-07:35	36.6591	37.5119	-0.8529	0.6118	0.7911	0.7898
07:35-07:40	39.9646	36.8693	3.0952	0.6496	0.3523	0.3498
07:40-07:45	40.9987	38.7958	2.2029	0.71	0.5191	0.5171
07:45-07:50	43.4339	41.6995	1.7344	0.9358	0.6079	0.6075
07:50-07:55	43.8334	41.7996	2.0338	0.6709	0.5365	0.5383
07:55-08:00	42.4549	42.543	-0.0881	0.8802	0.9792	0.9793
08:00-08:05	43.8031	42.8956	0.9075	0.9431	0.7846	0.7844
08:05-08:10	41.9186	44.9084	-2.9899	0.2735	0.3694	0.3618
08:10-08:15	41.2868	45.9912	-4.7044	0.4342	0.1714	0.1661
08:15-08:20	45.3344	46.6645	-1.3301	0.5942	0.6997	0.7014
08:20-08:25	45.472	46.0004	-0.5283	0.7613	0.877	0.8765
08:25-08:30	45.8056	48.2763	-2.4708	0.9623	0.4476	0.448
08:30-08:35	48.5068	51.0891	-2.5823	0.7991	0.4217	0.42
08:35-08:40	51.7979	52.8021	-1.0043	0.8206	0.7623	0.7629
08:40-08:45	52.0441	53.6513	-1.6072	0.8984	0.6303	0.6309
08:45-08:50	55.1456	55.1183	0.0274	0.638	0.9933	0.9933
08:50-08:55	59.1907	56.2607	2.93	0.3994	0.349	0.3421
08:55-09:00	59.4543	57.531	1.9233	0.6955	0.5278	0.5249
Total Interval	48.26	48.89	-0.62	0.2564	0.7470	0.7470

**Table A-15**  
**Statistical results for DCMS-speed on Fridays (westbound AM peak)**

Time	Speed before (B)	Speed After (A)	Speed Difference (B-A)	Equality of Variance (P- value)	Pooled T- Test (P- Value)	Satterthwaite T- Test (P-value)
06:00-06:05	68.3232	66.6941	1.6291	<.0001	0.3331	0.3493
06:05-06:10	66.4378	63.8479	2.5899	0.0277	0.1738	0.1829
06:10-06:15	64.7371	61.7325	3.0046	0.0812	0.1618	0.1682
06:15-06:20	64.3014	59.329	4.9724	0.6029	0.0317	0.0324
06:20-06:25	63.2858	59.2545	4.0313	0.67	0.0999	0.1012
06:25-06:30	63.2858	59.2545	4.0313	0.67	0.0999	0.1012
06:30-06:35	61.32	58.4525	2.8675	0.574	0.2846	0.2872
06:35-06:40	60.7882	58.2554	2.5328	0.3617	0.3508	0.3544
06:40-06:45	59.6247	57.4735	2.1511	0.4131	0.4407	0.4447
06:45-06:50	59.5733	56.8919	2.6814	0.5854	0.3446	0.3474
06:50-06:55	59.9959	56.3113	3.6846	0.9458	0.1941	0.1944
06:55-07:00	59.7823	56.1803	3.602	0.5899	0.2096	0.2121
07:00-07:05	58.7438	56.5799	2.1639	0.5623	0.4651	0.4675
07:05-07:10	58.3335	55.44	2.8935	0.5542	0.3265	0.3296
07:10-07:15	58.6233	54.3869	4.2364	0.9867	0.1565	0.1565
07:15-07:20	56.7526	54.1533	2.5993	0.8044	0.3999	0.3983
07:20-07:25	56.1588	54.0535	2.1053	0.7097	0.5031	0.5051
07:25-07:30	56.6935	52.254	4.4395	0.7498	0.1654	0.1638
07:30-07:35	56.0056	51.6872	4.3184	0.9267	0.1931	0.1927
07:35-07:40	55.6907	51.0428	4.6479	0.9268	0.1549	0.1553
07:40-07:45	57.4225	52.1836	5.2389	0.7502	0.1059	0.1045
07:45-07:50	57.0732	51.967	5.1062	0.5987	0.1157	0.1128
07:50-07:55	57.7923	52.5573	5.235	0.5138	0.1013	0.0979
07:55-08:00	58.662	52.4138	6.2482	0.6201	0.0528	0.0512
08:00-08:05	59.1134	53.8613	5.2521	0.3231	0.1028	0.0967
08:05-08:10	59.6295	54.186	5.4435	0.3311	0.0977	0.0917
08:10-08:15	62.0101	55.9159	6.0942	0.0945	0.0521	0.0449
08:15-08:20	63.7076	56.1029	7.6047	0.0341	0.0137	0.0108
08:20-08:25	64.44	56.5394	7.9006	0.0315	0.0088	0.0065
08:25-08:30	65.7082	56.5886	9.1195	0.0058	0.0019	0.0012
08:30-08:35	68.0123	57.5374	10.4749	0.0004	0.0001	<.0001
08:35-08:40	68.6228	59.5144	9.1084	<.0001	0.0002	<.0001
08:40-08:45	70.2436	60.6263	9.6174	<.0001	<.0001	<.0001
08:45-08:50	70.3912	61.8601	8.531	<.0001	<.0001	<.0001
08:50-08:55	70.9225	62.1525	8.77	<.0001	<.0001	<.0001
08:55-09:00	70.7398	62.8605	7.8793	<.0001	<.0001	<.0001
Total Interval	63.05	56.94	6.12	0.5283	0.0072	0.0072

**Table A-16**  
**Statistical results for DCMS-speed on Mondays (eastbound PM peak)**

Time	Speed before (B)	Speed After (A)	Speed Difference (B-A)	Equality of Variance (P- value)	Pooled T- Test (P- Value)	Satterthwaite T-Test (P- value)
15:00 - 15:05	61.4469	60.6579	0.789	0.3463	0.4766	0.4884
15:05 - 15:10	61.0713	60.6182	0.4531	0.2856	0.6881	0.6969
15:10 - 15:15	61.5499	60.7271	0.8228	0.2617	0.4387	0.4528
15:15 - 15:20	61.1788	60.1453	1.0335	0.3282	0.3865	0.3993
15:20 - 15:25	61.6635	60.0572	1.6064	0.0078	0.1673	0.1986
15:25 - 15:30	61.4996	60.4406	1.0591	0.3032	0.3362	0.35
15:30 - 15:35	61.3126	60.2061	1.1065	0.3178	0.3451	0.3584
15:35 - 15:40	61.5074	60.2541	1.2533	0.1859	0.2942	0.3118
15:40 - 15:45	61.0628	59.7198	1.3431	0.0612	0.2693	0.2938
15:45 - 15:50	61.3615	60.4486	0.913	0.0146	0.4316	0.4614
15:50 - 15:55	61.6987	61.2373	0.4614	0.3084	0.6673	0.6759
15:55 - 16:00	61.3563	61.551	-0.1947	0.5017	0.867	0.8645
16:00 - 16:05	61.3546	61.0699	0.2847	0.8164	0.8313	0.8323
16:05 - 16:10	61.5527	61.1531	0.3996	0.0222	0.7076	0.724
16:10 - 16:15	61.8297	60.9546	0.8751	0.0056	0.4216	0.4548
16:15 - 16:20	61.3205	60.8699	0.4506	0.9406	0.6763	0.6756
16:20 - 16:25	61.5071	60.8057	0.7014	0.2552	0.5192	0.5324
16:25 - 16:30	61.6796	61.0757	0.6039	0.4694	0.5547	0.5626
16:30 - 16:35	61.6766	60.6955	0.9811	0.3501	0.3509	0.3635
16:35 - 16:40	61.3094	60.9291	0.3804	0.322	0.7392	0.732
16:40 - 16:45	61.3784	61.1739	0.2045	0.4781	0.848	0.8449
16:45 - 16:50	61.1552	61.4517	-0.2965	0.5464	0.7905	0.7869
16:50 - 16:55	61.175	61.3086	-0.1336	0.444	0.9124	0.9105
16:55 - 17:00	60.9436	61.7238	-0.7802	0.0113	0.4962	0.4648
17:00 - 17:05	60.363	61.298	-0.935	0.0162	0.4707	0.439
17:05 - 17:10	60.184	61.5777	-1.3937	0.0202	0.2737	0.2425
17:10 - 17:15	60.6156	61.3063	-0.6907	0.2524	0.5607	0.5481
17:15 - 17:20	59.8054	61.2239	-1.4185	0.0334	0.2737	0.2452
17:20 - 17:25	59.9486	61.1431	-1.1945	0.0229	0.3855	0.3547
17:25 - 17:30	59.8339	61.2289	-1.395	0.0554	0.2741	0.2483
17:30 - 17:35	60.0308	61.6817	-1.6509	0.0041	0.187	0.1527
17:35 - 17:40	59.9471	61.6761	-1.7289	0.0242	0.1631	0.1373
17:40 - 17:45	59.9755	61.6023	-1.6268	0.0288	0.1848	0.1585
17:45 - 17:50	59.3666	60.881	-1.5144	0.6569	0.2874	0.2814
17:50 - 17:55	59.0504	60.9736	-1.9232	0.071	0.164	0.1432
17:55 - 18:00	59.0537	60.8435	-1.7898	0.118	0.1712	0.1534
18:00 - 18:05	58.7667	60.3871	-1.6204	0.1025	0.2395	0.2181
18:05 - 18:10	58.454	59.4724	-1.0184	0.5454	0.4595	0.4518
18:10 - 18:15	58.2803	58.7683	-0.488	0.7821	0.7443	0.7462
18:15 - 18:20	58.7519	59.5037	-0.7518	0.6614	0.5916	0.5961
18:20 - 18:25	58.7045	59.469	-0.7644	0.3934	0.5971	0.5881
18:25 - 18:30	58.9062	59.4557	-0.5494	0.6591	0.6898	0.6934
18:30 - 18:35	59.9257	59.7443	0.1814	0.9353	0.8995	0.8997
18:35 - 18:40	60.5475	60.3185	0.2291	0.3678	0.8686	0.8652
18:40 - 18:45	60.4222	61.0563	-0.6341	0.3154	0.6451	0.6356

Time	Speed before (B)	Speed After (A)	Speed Difference (B-A)	Equality of Variance (P- value)	Pooled T- Test (P- Value)	Satterthwaite T-Test (P- value)
18:45 - 18:50	61.5993	61.7401	-0.1408	0.18	0.9111	0.9076
18:50 - 18:55	62.1807	61.8823	0.2984	0.3003	0.8041	0.7984
18:55 - 19:00	62.2267	62.1026	0.1241	0.392	0.9121	0.91
Total Interval	62.08	59.22	2.85	0.4482	0.0008	0.0008

**Table A-17**  
**Statistical results for DCMS-speed on Tuesdays (eastbound PM peak)**

Time	Speed before (B)	Speed After (A)	Speed Difference (B-A)	Equality of Variance (P- value)	Pooled T- Test (P- Value)	Satterthwaite T-Test (P- value)
15:00 - 15:05	61.2839	59.2441	2.0397	0.0002	0.1186	0.1576
15:05 - 15:10	61.413	59.1456	2.2674	0.0004	0.0859	0.1176
15:10 - 15:15	61.1506	59.1055	2.045	<.0001	0.1361	0.179
15:15 - 15:20	60.4682	58.7907	1.6775	0.0014	0.2558	0.2963
15:20 - 15:25	60.8004	58.9913	1.8091	0.0004	0.2194	0.263
15:25 - 15:30	61.1684	59.0277	2.1407	<.0001	0.0999	0.1394
15:30 - 15:35	61.1866	59.1586	2.028	<.0001	0.1397	0.1856
15:35 - 15:40	60.3805	59.6883	0.6922	0.2825	0.6233	0.6128
15:40 - 15:45	60.4262	59.0373	1.3889	0.5606	0.3549	0.3627
15:45 - 15:50	60.7264	59.4541	1.2723	0.9678	0.3541	0.3537
15:50 - 15:55	60.7959	59.9212	0.8747	0.5173	0.5091	0.501
15:55 - 16:00	60.2097	60.2785	-0.0689	0.0199	0.9583	0.9554
16:00 - 16:05	60.4737	59.9823	0.4915	0.1145	0.7072	0.6942
16:05 - 16:10	60.7244	59.5461	1.1784	0.4481	0.3438	0.354
16:10 - 16:15	60.8763	59.1589	1.7174	0.029	0.2425	0.2707
16:15 - 16:20	60.9825	58.2142	2.7683	0.0078	0.0654	0.0866
16:20 - 16:25	60.7874	59.7795	1.0079	0.2154	0.4419	0.4261
16:25 - 16:30	60.8307	59.1983	1.6324	0.9917	0.215	0.215
16:30 - 16:35	60.8346	59.557	1.2776	0.604	0.3355	0.3286
16:35 - 16:40	60.6661	60.0676	0.5985	0.3838	0.6457	0.6376
16:40 - 16:45	60.2723	60.2899	-0.0177	0.9726	0.9897	0.9897
16:45 - 16:50	59.9487	59.9525	-0.00383	0.0353	0.9979	0.9978
16:50 - 16:55	60.0279	60.1091	-0.0812	0.1533	0.9539	0.952
16:55 - 17:00	60.4681	59.4061	1.062	0.5149	0.4549	0.463
17:00 - 17:05	60.1419	60.3966	-0.2547	0.3469	0.8531	0.8491
17:05 - 17:10	60.0099	60.7301	-0.7202	0.0052	0.5966	0.5673
17:10 - 17:15	59.7595	60.1266	-0.3671	0.0497	0.8009	0.79
17:15 - 17:20	59.8948	59.9345	-0.0397	0.2566	0.9793	0.9799
17:20 - 17:25	60.3092	60.5219	-0.2127	0.6525	0.8774	0.8759
17:25 - 17:30	60.5107	60.9035	-0.3928	0.0832	0.7667	0.7555
17:30 - 17:35	59.7009	60.9182	-1.2172	0.061	0.3592	0.3341
17:35 - 17:40	59.759	60.5415	-0.7824	0.1271	0.5673	0.5506
17:40 - 17:45	60.0994	59.8127	0.2868	0.4182	0.8307	0.8343
17:45 - 17:50	59.6969	59.5991	0.0978	0.6117	0.9458	0.945
17:50 - 17:55	59.666	59.6161	0.0499	0.6005	0.9731	0.9727
17:55 - 18:00	59.2066	59.3722	-0.1656	0.3395	0.9092	0.9067
18:00 - 18:05	59.1817	59.809	-0.6273	0.2626	0.6235	0.6121
18:05 - 18:10	58.8149	59.5479	-0.733	0.164	0.5743	0.5587
18:10 - 18:15	58.6936	59.098	-0.4044	0.1018	0.7707	0.7599
18:15 - 18:20	58.5568	58.8562	-0.2994	0.2037	0.8328	0.8266
18:20 - 18:25	58.5154	58.4181	0.0972	0.6895	0.9426	0.9432
18:25 - 18:30	58.627	58.9693	-0.3422	0.9011	0.7923	0.7916
18:30 - 18:35	58.6233	58.8572	-0.234	0.9516	0.8649	0.8647
18:35 - 18:40	59.1994	58.855	0.3444	0.8666	0.7948	0.7957
18:40 - 18:45	59.6719	59.0851	0.5869	0.9393	0.6479	0.6486

Time	Speed before (B)	Speed After (A)	Speed Difference (B-A)	Equality of Variance (P- value)	Pooled T- Test (P- Value)	Satterthwaite T-Test (P- value)
18:45 - 18:50	60.3409	59.7454	0.5956	0.9852	0.6467	0.6465
18:50 - 18:55	60.7373	60.6064	0.1309	0.9747	0.9203	0.9203
18:55 - 19:00	61.6142	60.1639	1.4504	0.785	0.2158	0.2197
Total Interval	61.69	57.57	4.12	0.1691	<0.0001	<0.0001

**Table A-18**  
**Statistical results for DCMS-speed on Wednesdays (eastbound PM peak)**

Time	Speed before (B)	Speed After (A)	Speed Difference (B-A)	Equality of Variance (P- value)	Pooled T- Test (P- Value)	Satterthwaite T-Test (P- value)
15:00 - 15:05	61.546	59.7232	1.8228	0.0017	0.1279	0.1622
15:05 - 15:10	61.7886	60.3973	1.3913	0.0046	0.2213	0.2588
15:10 - 15:15	61.5467	61.047	0.4996	0.7116	0.6285	0.6248
15:15 - 15:20	60.9467	60.2695	0.6772	0.509	0.5937	0.6005
15:20 - 15:25	61.5791	60.654	0.9251	0.5191	0.4355	0.4441
15:25 - 15:30	60.867	59.8409	1.0261	0.3306	0.4271	0.4397
15:30 - 15:35	60.93	58.6462	2.2838	0.0004	0.1205	0.1583
15:35 - 15:40	60.8187	58.5452	2.2735	<.0001	0.1013	0.1437
15:40 - 15:45	61.3408	58.919	2.4217	<.0001	0.0704	0.1047
15:45 - 15:50	60.8229	59.2381	1.5848	0.0028	0.2481	0.2862
15:50 - 15:55	60.521	59.6898	0.8312	0.0283	0.5316	0.5554
15:55 - 16:00	61.212	58.5555	2.6566	<.0001	0.05	0.0825
16:00 - 16:05	61.3388	58.9255	2.4133	<.0001	0.076	0.118
16:05 - 16:10	61.08	59.2619	1.8182	0.0004	0.1406	0.1805
16:10 - 16:15	61.0751	58.7647	2.3103	0.0021	0.0851	0.1135
16:15 - 16:20	60.9947	59.0557	1.939	0.0001	0.139	0.1817
16:20 - 16:25	61.4257	59.6879	1.7378	0.0079	0.1375	0.1675
16:25 - 16:30	60.8415	59.32	1.5216	0.0018	0.2451	0.2853
16:30 - 16:35	60.7589	59.078	1.6809	<.0001	0.24	0.2943
16:35 - 16:40	60.9143	59.736	1.1783	0.0038	0.3676	0.4047
16:40 - 16:45	60.2665	59.9638	0.3026	0.4994	0.818	0.8214
16:45 - 16:50	60.5431	60.0643	0.4788	0.1803	0.7099	0.7201
16:50 - 16:55	60.5122	59.908	0.6043	0.0091	0.6656	0.6872
16:55 - 17:00	61.3958	60.0848	1.311	0.0014	0.2764	0.3179
17:00 - 17:05	60.7728	60.2075	0.5654	0.0548	0.651	0.6678
17:05 - 17:10	60.4348	60.8253	-0.3905	0.8149	0.7542	0.7557
17:10 - 17:15	60.6303	61.2299	-0.5996	0.9064	0.6097	0.6085
17:15 - 17:20	60.034	60.7707	-0.7367	0.8887	0.5502	0.5518
17:20 - 17:25	60.3871	61.0953	-0.7082	0.6753	0.5644	0.5597
17:25 - 17:30	60.5565	61.3383	-0.7818	0.4394	0.4906	0.481
17:30 - 17:35	60.1124	60.9494	-0.837	0.9167	0.4911	0.4924
17:35 - 17:40	60.3752	61.3462	-0.971	0.2974	0.3984	0.3845
17:40 - 17:45	59.6697	60.8966	-1.2269	0.2768	0.3249	0.31
17:45 - 17:50	59.7545	59.8758	-0.1213	0.9468	0.9248	0.925
17:50 - 17:55	60.1376	60.4715	-0.3339	0.8117	0.784	0.7826
17:55 - 18:00	60.1463	59.4857	0.6606	0.3236	0.5999	0.6098
18:00 - 18:05	59.7358	59.1556	0.5802	0.2833	0.664	0.6733
18:05 - 18:10	59.1572	59.0886	0.0686	0.8854	0.9594	0.9595
18:10 - 18:15	58.9692	58.1185	0.8507	0.4727	0.5463	0.5543
18:15 - 18:20	58.4089	58.4309	-0.0219	0.5204	0.9879	0.9876
18:20 - 18:25	57.1766	57.5069	-0.3303	0.9311	0.8332	0.8336
18:25 - 18:30	57.1589	58.0749	-0.916	0.5038	0.5612	0.5537
18:30 - 18:35	58.2745	57.2452	1.0293	0.3101	0.483	0.4958
18:35 - 18:40	58.8288	57.8906	0.9382	0.5747	0.5204	0.5272
18:40 - 18:45	59.3386	58.2907	1.048	0.3812	0.4846	0.4956

Time	Speed before (B)	Speed After (A)	Speed Difference (B-A)	Equality of Variance (P- value)	Pooled T- Test (P- Value)	Satterthwaite T-Test (P- value)
18:45 - 18:50	59.8144	59.8963	-0.0819	0.1638	0.9526	0.9507
18:50 - 18:55	60.7678	60.6476	0.1202	0.253	0.9269	0.9245
18:55 - 19:00	61.3156	60.5041	0.8115	0.2679	0.5664	0.554
Total Interval	61.84	57.39	4.44	0.0753	<0.0001	<0.0001

**Table A-19**  
**Statistical results for DCMS-speed on Thursdays (eastbound PM peak)**

Time	Speed before (B)	Speed After (A)	Speed Difference (B-A)	Equality of Variance (P- value)	Pooled T- Test (P- Value)	Satterthwaite T-Test (P- value)
15:00 - 15:05	61.5556	61.5912	-0.0356	0.6898	0.9722	0.9725
15:05 - 15:10	61.4392	60.389	1.0502	0.0237	0.3775	0.4059
15:10 - 15:15	61.5574	60.6269	0.9305	0.006	0.4246	0.4574
15:15 - 15:20	61.5626	60.0322	1.5304	0.0006	0.2011	0.241
15:20 - 15:25	61.6727	59.8661	1.8066	<.0001	0.1568	0.2062
15:25 - 15:30	61.3175	60.9133	0.4042	0.0867	0.7293	0.7409
15:30 - 15:35	61.3775	60.383	0.9945	0.0039	0.413	0.4466
15:35 - 15:40	61.1524	60.6585	0.4939	0.0174	0.6688	0.6871
15:40 - 15:45	61.4782	59.7028	1.7754	<.0001	0.1682	0.2145
15:45 - 15:50	61.4817	60.0442	1.4375	<.0001	0.2669	0.3267
15:50 - 15:55	60.9993	61.1909	-0.1916	0.2319	0.8713	0.8753
15:55 - 16:00	60.7687	61.0071	-0.2384	0.5681	0.833	0.8354
16:00 - 16:05	60.5599	60.7827	-0.2228	0.7923	0.8556	0.8545
16:05 - 16:10	60.8679	60.7133	0.1546	0.0442	0.9006	0.9055
16:10 - 16:15	60.8014	59.8522	0.9492	0.0001	0.4913	0.5314
16:15 - 16:20	60.6778	60.0702	0.6076	0.0002	0.6495	0.6785
16:20 - 16:25	60.8619	60.7525	0.1094	0.9681	0.9265	0.9266
16:25 - 16:30	60.6379	60.4995	0.1384	0.7106	0.9118	0.9109
16:30 - 16:35	61.2801	60.2764	1.0038	0.2573	0.389	0.4035
16:35 - 16:40	61.1753	61.3974	-0.2222	0.5073	0.8411	0.8438
16:40 - 16:45	60.9601	60.9373	0.0228	0.4911	0.9843	0.9846
16:45 - 16:50	60.7826	60.8034	-0.0208	0.5705	0.9858	0.986
16:50 - 16:55	60.9119	60.7082	0.2037	0.2055	0.869	0.8731
16:55 - 17:00	61.2092	60.3376	0.8716	0.019	0.4714	0.4971
17:00 - 17:05	61.4106	60.9431	0.4676	0.2368	0.6983	0.7073
17:05 - 17:10	61.4629	61.0503	0.4126	0.2567	0.7243	0.732
17:10 - 17:15	61.0625	61.7674	-0.7049	0.6554	0.5421	0.5468
17:15 - 17:20	61.1717	61.3605	-0.1888	0.4351	0.8677	0.8703
17:20 - 17:25	60.647	61.445	-0.798	0.4238	0.5093	0.5003
17:25 - 17:30	60.2941	61.2807	-0.9867	0.3514	0.4656	0.4548
17:30 - 17:35	60.2999	61.2055	-0.9056	0.3189	0.4585	0.4468
17:35 - 17:40	60.5696	61.0297	-0.4601	0.8523	0.7002	0.6988
17:40 - 17:45	60.2325	60.6713	-0.4388	0.82	0.7244	0.726
17:45 - 17:50	60.0497	60.8589	-0.8091	0.4761	0.5082	0.5002
17:50 - 17:55	59.9031	60.8728	-0.9697	0.4607	0.4355	0.4265
17:55 - 18:00	59.5333	60.7832	-1.2499	0.164	0.3143	0.2966
18:00 - 18:05	59.7186	60.378	-0.6595	0.2854	0.6014	0.5909
18:05 - 18:10	59.1797	59.8868	-0.7071	0.2257	0.5981	0.5862
18:10 - 18:15	58.8712	59.9739	-1.1027	0.1296	0.4066	0.3876
18:15 - 18:20	58.8001	60.0289	-1.2288	0.0733	0.3297	0.3068
18:20 - 18:25	59.0567	59.4957	-0.4389	0.1556	0.7375	0.7278
18:25 - 18:30	58.7924	59.7111	-0.9188	0.0709	0.4756	0.4542
18:30 - 18:35	58.9728	59.6652	-0.6923	0.0751	0.6038	0.5864
18:35 - 18:40	59.0985	59.9163	-0.8178	0.2931	0.5362	0.5247
18:40 - 18:45	59.7917	59.5208	0.2709	0.9542	0.8416	0.8418

Time	Speed before (B)	Speed After (A)	Speed Difference (B-A)	Equality of Variance (P- value)	Pooled T- Test (P- Value)	Satterthwaite T-Test (P- value)
18:45 - 18:50	60.2272	60.3015	-0.0743	0.7035	0.9564	0.956
18:50 - 18:55	60.631	61.7523	-1.1213	0.0191	0.3392	0.3082
18:55 - 19:00	61.2687	62.239	-0.9703	0.0656	0.3851	0.3611
Total Interval	62.04	58.69	3.35	0.3786	0.0003	0.0003

**Table A-20**  
**Statistical results for DCMS-speed on Fridays (eastbound PM peak)**

Time	Speed before (B)	Speed After (A)	Speed Difference (B-A)	Equality of Variance (P- value)	Pooled T- Test (P- Value)	Satterthwaite T-Test (P- value)
15:00 - 15:05	60.9912	60.3427	0.6485	0.2537	0.5971	0.6084
15:05 - 15:10	61.0444	60.0962	0.9482	0.9021	0.4478	0.4463
15:10 - 15:15	61.2047	60.8086	0.3961	0.5957	0.7468	0.743
15:15 - 15:20	61.1858	60.7938	0.392	1	0.7603	0.7603
15:20 - 15:25	61.5234	61.117	0.4064	0.2108	0.7354	0.7443
15:25 - 15:30	61.4559	60.523	0.933	0.1122	0.4582	0.4791
15:30 - 15:35	61.7001	60.4083	1.2918	0.0076	0.3052	0.3415
15:35 - 15:40	61.4005	61.1163	0.2842	0.8254	0.8001	0.8013
15:40 - 15:45	61.6115	60.2516	1.3599	0.0147	0.2747	0.3069
15:45 - 15:50	61.1535	60.607	0.5465	0.7846	0.6499	0.6524
15:50 - 15:55	60.9872	60.7266	0.2606	0.8689	0.8255	0.8263
15:55 - 16:00	61.0957	60.7004	0.3953	0.0373	0.7522	0.7653
16:00 - 16:05	61.6806	60.7921	0.8885	0.294	0.4453	0.459
16:05 - 16:10	61.4859	61.0131	0.4727	0.5118	0.6777	0.6834
16:10 - 16:15	61.2634	61.7656	-0.5022	0.3412	0.645	0.6356
16:15 - 16:20	61.8084	60.8983	0.91	0.193	0.4108	0.4277
16:20 - 16:25	61.5057	60.7736	0.7321	0.3086	0.5251	0.5368
16:25 - 16:30	61.2913	61.1516	0.1398	0.3539	0.9078	0.9102
16:30 - 16:35	61.6409	60.7584	0.8825	0.0531	0.4827	0.5064
16:35 - 16:40	61.5602	61.6702	-0.11	0.6547	0.9251	0.9261
16:40 - 16:45	60.8051	61.2338	-0.4287	0.5423	0.7404	0.7447
16:45 - 16:50	60.2949	62.0187	-1.7238	0.0014	0.1544	0.1184
16:50 - 16:55	61.0069	62.0442	-1.0373	0.1288	0.3723	0.351
16:55 - 17:00	61.1392	61.7112	-0.572	0.5589	0.6345	0.6287
17:00 - 17:05	61.4895	61.4659	0.0236	0.4944	0.9844	0.9847
17:05 - 17:10	60.3997	62.194	-1.7942	0.0219	0.1481	0.1213
17:10 - 17:15	59.8882	62.0347	-2.1465	0.0019	0.1293	0.097
17:15 - 17:20	59.9481	62.3031	-2.355	0.0001	0.0879	0.0566
17:20 - 17:25	59.7808	62.3268	-2.546	0.0013	0.0651	0.0431
17:25 - 17:30	59.925	61.6057	-1.6807	0.0092	0.2162	0.1833
17:30 - 17:35	59.9003	60.7829	-0.8826	0.2297	0.5208	0.5064
17:35 - 17:40	59.7047	60.9199	-1.2152	0.0661	0.38	0.3543
17:40 - 17:45	59.9829	60.6069	-0.624	0.054	0.6501	0.6318
17:45 - 17:50	59.6663	60.6731	-1.0069	0.0366	0.4532	0.4262
17:50 - 17:55	59.5964	60.3392	-0.7428	0.0525	0.5872	0.5663
17:55 - 18:00	59.2632	60.6737	-1.4105	0.0063	0.3169	0.2798
18:00 - 18:05	59.2028	60.4538	-1.251	0.2632	0.3825	0.3674
18:05 - 18:10	58.9824	59.745	-0.7626	0.1482	0.5869	0.5716
18:10 - 18:15	58.8033	59.617	-0.8136	0.0774	0.5567	0.5359
18:15 - 18:20	58.4493	58.6727	-0.2234	0.4013	0.8821	0.8792
18:20 - 18:25	58.664	59.2164	-0.5523	0.225	0.6902	0.6799
18:25 - 18:30	58.8047	60.1099	-1.3053	0.0357	0.3669	0.3383
18:30 - 18:35	58.5054	60.2682	-1.7628	0.0242	0.2601	0.2301
18:35 - 18:40	59.0249	60.4331	-1.4082	0.2602	0.3535	0.3376
18:40 - 18:45	59.6166	60.085	-0.4684	0.9282	0.7578	0.7572

Time	Speed before (B)	Speed After (A)	Speed Difference (B-A)	Equality of Variance (P- value)	Pooled T- Test (P- Value)	Satterthwaite T-Test (P- value)
18:45 - 18:50	59.2902	60.1025	-0.8124	0.602	0.5804	0.5746
18:50 - 18:55	59.769	59.8527	-0.0837	0.565	0.9548	0.9555
18:55 - 19:00	60.0516	60.4396	-0.388	0.6486	0.7762	0.7734
Total Interval	61.88	58.99	2.88	0.8509	0.0014	0.0014

## **APPENDIX B (DETAILED STATISTICAL RESULTS OF BOTH MIST AND DCMS DETECTORS)**

This appendix shows detailed results of the comparisons between the level of service (LOS) distributions of the before and after ramp meters installation periods. Tables B-1 through B-28 show the LOS distribution comparisons for the freeway segment from which traffic data was collected using MIST detectors. Whereas, Tables B-29 through B-112 show the LOS distribution comparisons for the freeway segment from which traffic data was collected using DCMS detectors.

**Table B-1**  
**Change of LOS distribution for all weekdays [06:00-06:15] for westbound (AM peak);**  
**MIST detectors**

Day	LOS Distribution (%)										
	Detector	60001		60003		60005		60007		60009	
		LOS	Before	After	Before	After	Before	After	Before	After	Before
Monday	A	25.87	5.26	30.23	63.16	21.77	5.26	4.00	9.52	15.11	11.11
	B	9.09	31.58	49.61	36.84	17.69	10.53	86.40	85.71	61.87	86.67
	C	64.34	63.16	20.16	0.00	55.78	84.21	9.60	4.76	23.02	2.22
	D	0.70	0.00	0.00	0.00	4.76	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	25.00	0.00	34.48	40.54	15.97	0.00	0.79	2.27	9.77	2.13
	B	6.25	27.03	42.76	59.46	18.75	19.05	78.57	95.45	50.38	87.23
	C	68.75	72.97	22.76	0.00	57.64	80.95	20.63	2.27	39.85	10.64
	D	0.00	0.00	0.00	0.00	7.64	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	23.24	0.00	22.73	31.58	18.18	0.00	0.78	0.00	8.06	0.00
	B	7.04	15.79	52.27	68.42	20.28	0.00	75.19	95.24	50.81	76.09
	C	69.72	84.21	25.00	0.00	53.15	90.00	24.03	4.76	41.13	23.91
	D	0.00	0.00	0.00	0.00	8.39	10.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	25.90	2.70	25.19	40.54	20.83	0.00	6.06	4.44	12.69	2.13
	B	4.32	13.51	49.62	59.46	19.44	0.00	72.73	95.56	46.27	82.98
	C	69.06	83.78	25.19	0.00	54.17	100.00	21.21	0.00	41.04	14.89
	D	0.72	0.00	0.00	0.00	5.56	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	32.37	13.16	39.84	89.47	30.34	8.00	12.88	10.00	16.91	13.04
	B	67.63	86.84	52.34	10.53	20.00	4.00	84.09	90.00	77.21	86.96
	C	0.00	0.00	7.81	0.00	48.28	88.00	3.03	0.00	5.88	0.00
	D	0.00	0.00	0.00	0.00	1.38	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-2**  
**Change of LOS distribution for all weekdays [06:15-06:30] for westbound (AM peak);**  
**MIST detectors**

Day	Detector	LOS Distribution (%)									
		60001		60003		60005		60007		60009	
		LOS	Before	After	Before	After	Before	After	Before	After	Before
Monday	A	25.00	5.13	24.80	28.21	16.22	5.00	3.17	6.98	14.39	6.52
	B	3.57	10.26	45.60	71.79	19.59	5.00	45.24	67.44	25.18	54.35
	C	59.29	84.62	29.60	0.00	39.86	90.00	51.59	25.58	60.43	39.13
	D	12.14	0.00	0.00	0.00	24.32	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	20.86	0.00	22.66	13.51	14.08	0.00	0.78	0.00	9.09	2.13
	B	5.04	10.81	48.44	86.49	19.72	4.76	32.03	61.36	17.42	31.91
	C	52.52	89.19	27.34	0.00	34.51	85.71	67.19	38.64	71.97	65.96
	D	21.58	0.00	1.56	0.00	31.69	9.52	0.00	0.00	1.52	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	20.42	0.00	18.60	10.81	14.48	0.00	0.00	0.00	7.26	0.00
	B	3.52	8.11	48.84	89.19	21.38	0.00	37.69	63.41	20.97	40.00
	C	61.27	91.89	32.56	0.00	34.48	94.74	62.31	36.59	71.77	60.00
	D	14.79	0.00	0.00	0.00	29.66	5.26	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	24.64	2.70	23.26	13.51	17.48	0.00	5.26	2.27	13.33	2.13
	B	2.90	5.41	43.41	86.49	20.28	0.00	30.83	70.45	17.04	31.91
	C	57.25	91.89	33.33	0.00	30.07	100.00	63.91	27.27	69.63	65.96
	D	15.22	0.00	0.00	0.00	32.17	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	31.21	12.82	27.20	25.64	21.23	8.00	9.02	11.63	16.18	10.87
	B	64.54	87.18	46.40	74.36	22.60	0.00	42.86	76.74	28.68	50.00
	C	4.26	0.00	26.40	0.00	43.84	92.00	48.12	11.63	55.15	39.13
	D	0.00	0.00	0.00	0.00	12.33	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-3**  
**Change of LOS distribution for all weekdays [06:30-06:45] for westbound (AM peak);**  
**MIST detectors**

Day	Detector	LOS Distribution (%)									
		60001		60003		60005		60007		60009	
		LOS	Before	After	Before	After	Before	After	Before	After	Before
Monday	A	25.00	5.13	21.54	15.38	16.30	5.56	3.15	4.65	12.32	6.52
	B	4.29	7.69	46.92	84.62	21.48	0.00	13.39	25.58	12.32	10.87
	C	31.43	38.46	31.54	0.00	20.74	33.33	83.46	69.77	69.57	82.61
	D	39.29	48.72	0.00	0.00	41.48	61.11	0.00	0.00	5.80	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	21.64	0.00	16.92	8.11	13.60	0.00	0.00	0.00	6.06	0.00
	B	2.99	5.41	54.62	91.89	23.20	5.26	5.47	15.91	7.58	10.64
	C	27.61	29.73	24.62	0.00	15.20	26.32	92.19	84.09	72.73	82.98
	D	47.76	64.86	3.85	0.00	48.00	68.42	2.34	0.00	13.64	6.38
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	21.28	0.00	18.75	2.63	15.57	0.00	0.00	0.00	4.84	0.00
	B	5.67	2.63	50.00	97.37	27.05	0.00	10.85	9.52	12.10	4.35
	C	25.53	23.68	28.13	0.00	8.20	33.33	86.82	90.48	70.16	93.48
	D	47.52	73.68	3.13	0.00	49.18	66.67	2.33	0.00	12.90	2.17
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	27.21	2.70	20.93	13.51	19.05	0.00	5.34	2.27	10.53	2.13
	B	2.21	8.11	45.74	86.49	25.40	0.00	4.58	13.64	6.77	10.64
	C	21.32	21.62	31.78	0.00	9.52	15.79	89.31	84.09	69.92	85.11
	D	49.26	67.57	1.55	0.00	46.03	84.21	0.76	0.00	12.78	2.13
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	30.43	12.82	25.20	17.95	20.86	8.00	8.27	11.63	14.93	10.87
	B	28.26	46.15	43.90	82.05	21.58	0.00	14.29	13.95	9.70	10.87
	C	41.30	41.03	30.08	0.00	17.99	28.00	77.44	72.09	73.13	78.26
	D	0.00	0.00	0.81	0.00	39.57	64.00	0.00	2.33	2.24	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-4**  
**Change of LOS distribution for all weekdays [06:45-07:00] for westbound (AM peak);**  
**MIST detectors**

Day	LOS Distribution (%)										
	Detector	60001		60003		60005		60007		60009	
	LOS	Before	After								
Monday	A	25.90	5.13	24.81	17.95	15.17	5.00	3.97	9.30	11.68	8.70
	B	4.32	5.13	44.96	82.05	22.76	0.00	20.63	25.58	19.71	19.57
	C	41.73	48.72	30.23	0.00	26.90	35.00	75.40	65.12	66.42	71.74
	D	28.06	41.03	0.00	0.00	35.17	60.00	0.00	0.00	2.19	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	21.17	0.00	23.26	7.89	13.99	0.00	1.56	0.00	7.58	0.00
	B	2.92	5.26	48.06	92.11	20.28	4.76	15.63	29.55	10.61	14.89
	C	35.04	50.00	27.13	0.00	20.98	42.86	82.81	70.45	78.79	85.11
	D	40.88	44.74	1.55	0.00	44.76	52.38	0.00	0.00	3.03	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	20.14	0.00	21.21	8.11	14.18	0.00	0.00	0.00	6.40	0.00
	B	4.32	2.70	47.73	91.89	21.28	0.00	18.60	21.95	12.00	20.00
	C	33.09	51.35	28.79	0.00	25.53	50.00	79.84	78.05	80.80	77.78
	D	42.45	45.95	2.27	0.00	39.01	50.00	1.55	0.00	0.80	2.22
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	25.71	2.70	23.48	13.51	16.90	0.00	5.22	4.55	11.85	2.13
	B	2.14	8.11	43.18	86.49	21.83	0.00	12.69	18.18	10.37	21.28
	C	32.14	40.54	33.33	0.00	19.01	50.00	82.09	77.27	74.81	76.60
	D	40.00	48.65	0.00	0.00	42.25	50.00	0.00	0.00	2.96	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	30.50	12.82	27.91	17.95	19.86	8.33	9.02	11.63	14.81	10.87
	B	43.97	76.92	44.96	82.05	21.23	0.00	21.80	16.28	15.56	19.57
	C	25.53	10.26	27.13	0.00	34.93	70.83	69.17	72.09	69.63	69.57
	D	0.00	0.00	0.00	0.00	23.97	20.83	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-5**  
**Change of LOS distribution for all weekdays [07:00-07:15] for westbound (AM peak);**  
**MIST detectors**

Day	LOS Distribution (%)										
	Detector	60001		60003		60005		60007		60009	
	LOS	Before	After								
Monday	A	26.09	5.13	20.93	12.82	16.22	4.76	3.15	6.98	12.41	8.70
	B	2.17	5.13	49.61	87.18	19.59	0.00	12.60	18.60	13.14	8.70
	C	39.13	38.46	29.46	0.00	25.68	38.10	84.25	74.42	74.45	80.43
	D	32.61	51.28	0.00	0.00	38.51	57.14	0.00	0.00	0.00	2.17
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	20.59	0.00	19.08	5.26	13.57	0.00	0.78	0.00	7.52	0.00
	B	2.21	5.26	48.85	94.74	20.71	5.00	10.94	20.45	6.77	17.02
	C	27.94	36.84	29.77	0.00	21.43	45.00	87.50	79.55	81.20	80.85
	D	49.26	57.89	2.29	0.00	44.29	50.00	0.78	0.00	4.51	2.13
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	20.71	0.00	20.00	5.26	14.08	0.00	0.00	0.00	3.17	0.00
	B	2.86	0.00	46.92	94.74	19.72	0.00	13.74	21.95	12.70	8.70
	C	28.57	42.11	32.31	0.00	21.83	40.00	85.50	78.05	82.54	89.13
	D	47.86	57.89	0.77	0.00	44.37	60.00	0.76	0.00	1.59	2.17
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	25.00	2.70	22.31	10.81	17.27	0.00	6.02	2.27	10.45	2.13
	B	2.14	8.11	44.62	89.19	21.58	0.00	5.26	18.18	5.97	10.64
	C	22.14	32.43	33.08	0.00	13.67	22.22	87.97	79.55	80.60	87.23
	D	50.71	56.76	0.00	0.00	47.48	77.78	0.75	0.00	2.99	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	30.71	12.82	24.60	12.82	20.69	8.00	8.96	11.63	14.93	10.87
	B	33.57	43.59	46.83	87.18	20.00	4.00	13.43	11.63	10.45	6.52
	C	35.71	43.59	28.57	0.00	28.28	48.00	77.61	76.74	73.13	82.61
	D	0.00	0.00	0.00	0.00	31.03	40.00	0.00	0.00	1.49	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-6**

**Change of LOS distribution for all weekdays [07:15-07:30] for westbound (AM peak); MIST detectors**

Day	LOS Distribution (%)										
	Detector	60001		60003		60005		60007		60009	
	LOS	Before	After								

Monday	A	26.09	5.13	23.26	17.95	15.33	5.00	3.15	4.65	12.50	6.52
	B	2.17	5.13	47.29	82.05	20.67	0.00	18.90	11.63	16.18	15.22
	C	39.13	46.15	28.68	0.00	32.00	40.00	77.95	83.72	71.32	78.26
	D	32.61	43.59	0.78	0.00	32.00	55.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	21.17	0.00	21.21	5.26	12.33	0.00	0.78	0.00	8.21	0.00
	B	1.46	2.63	49.24	94.74	19.86	0.00	19.38	15.91	10.45	14.89
	C	23.36	42.11	28.79	0.00	24.66	66.67	79.84	84.09	80.60	85.11
	D	54.01	55.26	0.76	0.00	43.15	33.33	0.00	0.00	0.75	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	20.57	0.00	17.83	5.26	13.79	0.00	0.00	0.00	6.35	0.00
	B	0.71	0.00	51.16	94.74	17.93	0.00	12.40	7.14	10.32	13.04
	C	31.21	44.74	31.01	0.00	31.72	60.00	87.60	92.86	83.33	86.96
	D	47.52	55.26	0.00	0.00	36.55	40.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	25.90	2.70	20.74	13.51	17.36	0.00	5.30	2.27	11.94	2.13
	B	2.88	2.70	45.19	86.49	20.14	0.00	9.09	6.82	7.46	12.77
	C	24.46	27.03	33.33	0.00	22.92	36.84	85.61	90.91	80.60	85.11
	D	46.76	67.57	0.00	0.00	39.58	63.16	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	29.50	12.82	23.20	12.82	18.62	8.33	7.46	11.63	14.18	10.87
	B	23.74	30.77	45.60	87.18	22.07	0.00	19.40	6.98	12.69	10.87
	C	46.76	56.41	31.20	0.00	31.03	66.67	73.13	81.40	73.13	78.26
	D	0.00	0.00	0.00	0.00	28.28	25.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-7**  
**Change of LOS distribution for all weekdays [07:30-07:45] for westbound (AM peak);**  
**MIST detectors**

Day	LOS Distribution (%)										
	Detector	60001		60003		60005		60007		60009	
	LOS	Before	After								

Monday	A	24.29	5.13	24.03	15.38	15.89	5.00	3.17	4.65	12.95	6.52
	B	2.14	5.13	48.84	84.62	19.21	0.00	19.84	11.63	10.07	6.52
	C	42.14	30.77	27.13	0.00	34.44	35.00	76.98	83.72	75.54	86.96
	D	31.43	58.97	0.00	0.00	30.46	60.00	0.00	0.00	1.44	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	19.12	0.00	19.23	5.13	13.01	0.00	0.77	0.00	6.72	0.00
	B	2.21	2.63	52.31	94.87	19.86	0.00	16.15	15.91	11.19	8.51
	C	39.71	36.84	28.46	0.00	31.51	35.00	83.08	84.09	82.09	91.49
	D	38.97	60.53	0.00	0.00	35.62	65.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	21.90	0.00	20.47	2.63	14.38	0.00	0.76	0.00	4.80	0.00
	B	0.73	0.00	49.61	97.37	17.12	0.00	13.74	7.14	13.60	6.52
	C	33.58	31.58	29.92	0.00	31.51	40.00	85.50	92.86	80.80	91.30
	D	43.80	68.42	0.00	0.00	36.99	60.00	0.00	0.00	0.80	2.17
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	26.09	2.70	20.74	8.11	18.18	0.00	5.30	2.27	11.94	2.13
	B	2.90	0.00	45.19	91.89	19.58	0.00	12.12	6.82	10.45	6.38
	C	35.51	29.73	33.33	0.00	25.87	15.79	82.58	90.91	77.61	91.49
	D	35.51	67.57	0.74	0.00	36.36	84.21	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	29.50	12.82	24.60	12.82	18.62	8.33	8.21	11.63	14.29	10.87
	B	30.22	17.95	42.86	87.18	22.07	0.00	17.16	6.98	12.78	6.52
	C	40.29	69.23	31.75	0.00	31.72	29.17	74.63	81.40	72.93	82.61
	D	0.00	0.00	0.79	0.00	27.59	62.50	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-8**

**Change of LOS distribution for all weekdays [07:45-08:00] for westbound (AM peak);  
MIST detectors**

Day	LOS Distribution (%)										
	Detector	60001		60003		60005		60007		60009	
		LOS	Before	After	Before	After	Before	After	Before	After	
Monday	A	26.62	5.13	30.47	25.64	16.56	5.00	4.72	9.30	12.23	10.87
	B	5.76	10.26	41.41	74.36	19.87	0.00	39.37	25.58	23.74	23.91
	C	54.68	53.85	28.13	0.00	49.67	60.00	55.91	65.12	64.03	65.22

	D	12.95	30.77	0.00	0.00	13.91	35.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	20.86	0.00	25.19	10.26	13.10	0.00	2.33	2.27	8.21	2.13
	B	4.32	10.26	48.85	89.74	20.69	4.76	31.78	36.36	17.16	34.04
	C	64.03	66.67	25.19	0.00	51.72	71.43	65.89	61.36	74.63	63.83
	D	10.79	23.08	0.76	0.00	14.48	23.81	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	19.42	0.00	22.73	10.53	15.75	0.00	0.00	0.00	7.94	0.00
	B	2.88	2.63	47.73	89.47	16.44	0.00	24.24	30.95	12.70	17.39
	C	56.12	55.26	29.55	0.00	46.58	75.00	75.76	69.05	79.37	82.61
	D	21.58	42.11	0.00	0.00	21.23	25.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	26.81	2.70	24.43	16.22	20.14	0.00	6.11	2.27	13.33	2.13
	B	2.90	5.41	45.04	83.78	17.36	0.00	28.24	20.45	12.59	21.28
	C	57.25	78.38	30.53	0.00	46.53	63.16	65.65	77.27	74.07	76.60
	D	13.04	13.51	0.00	0.00	15.97	36.84	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	30.94	12.82	29.03	15.38	20.55	8.33	8.89	11.63	14.29	10.87
	B	57.55	64.10	46.77	84.62	23.29	0.00	40.74	27.91	28.57	19.57
	C	11.51	23.08	24.19	0.00	45.89	75.00	50.37	60.47	57.14	69.57
	D	0.00	0.00	0.00	0.00	10.27	16.67	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-9**  
**Change of LOS distribution for all weekdays [08:00-08:15] for westbound (AM peak);**  
**MIST detectors**

Day	LOS Distribution (%)										
	Detector	60001		60003		60005		60007		60009	
		LOS	Before	After	Before	After	Before	After	Before	After	
Monday	A	26.24	5.13	38.58	28.21	15.33	5.00	3.94	9.30	12.86	8.70
	B	9.22	12.82	44.09	71.79	24.67	0.00	46.46	34.88	29.29	30.43
	C	63.83	79.49	17.32	0.00	52.00	90.00	49.61	55.81	57.86	60.87

	D	0.71	2.56	0.00	0.00	8.00	5.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	20.59	0.00	25.38	23.08	15.17	0.00	2.33	2.27	7.63	4.17
	B	4.41	7.69	49.23	76.92	20.00	9.52	37.98	38.64	28.24	29.17
	C	70.59	92.31	25.38	0.00	47.59	71.43	59.69	59.09	63.36	64.58
	D	4.41	0.00	0.00	0.00	17.24	19.05	0.00	0.00	0.76	2.08
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	20.57	0.00	21.97	7.89	15.07	0.00	0.00	0.00	7.14	0.00
	B	5.67	2.63	51.52	92.11	18.49	5.00	32.06	42.86	23.02	30.43
	C	63.83	81.58	26.52	0.00	47.95	80.00	67.94	57.14	69.84	69.57
	D	9.93	15.79	0.00	0.00	18.49	15.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	28.17	2.70	24.03	29.73	19.44	0.00	5.30	2.27	13.33	4.26
	B	2.11	10.81	51.16	70.27	20.83	5.26	35.61	38.64	24.44	23.40
	C	68.31	81.08	24.81	0.00	45.83	89.47	59.09	59.09	62.22	72.34
	D	1.41	5.41	0.00	0.00	13.89	5.26	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	30.71	13.16	32.80	23.68	21.13	8.33	8.33	11.90	16.67	11.11
	B	67.86	84.21	54.40	76.32	25.35	4.17	49.24	45.24	39.39	24.44
	C	1.43	2.63	12.80	0.00	45.77	79.17	42.42	42.86	43.94	64.44
	D	0.00	0.00	0.00	0.00	7.75	8.33	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-10**

**Change of LOS distribution for all weekdays [08:15-08:30] for westbound (AM peak); MIST detectors**

Day	LOS Distribution (%)										
	Detector	60001		60003		60005		60007		60009	
		LOS	Before	After	Before	After	Before	After	Before	After	
Monday	A	25.71	5.13	46.51	43.59	18.54	5.00	3.94	4.65	14.29	6.52
	B	16.43	20.51	44.96	56.41	29.80	10.00	70.87	88.37	51.43	71.74
	C	57.86	74.36	8.53	0.00	49.67	85.00	25.20	6.98	34.29	21.74
	D	0.00	0.00	0.00	0.00	1.99	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Tuesday	A	19.42	0.00	29.01	28.21	15.65	0.00	0.76	2.27	7.46	4.26
	B	9.35	10.26	57.25	71.79	25.17	9.52	57.25	56.82	42.54	51.06
	C	71.22	89.74	13.74	0.00	49.66	90.48	41.98	40.91	50.00	44.68
	D	0.00	0.00	0.00	0.00	9.52	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	20.57	0.00	32.31	26.32	16.44	0.00	1.52	0.00	7.09	0.00
	B	12.77	13.16	55.38	73.68	23.97	10.00	60.61	78.57	46.46	65.22
	C	66.67	86.84	12.31	0.00	55.48	85.00	37.88	21.43	46.46	34.78
	D	0.00	0.00	0.00	0.00	4.11	5.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	25.71	5.41	34.62	27.03	20.14	0.00	6.02	4.55	13.33	2.13
	B	8.57	13.51	53.08	72.97	21.53	10.53	51.88	54.55	41.48	46.81
	C	65.00	81.08	12.31	0.00	54.17	89.47	42.11	40.91	45.19	51.06
	D	0.71	0.00	0.00	0.00	4.17	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	29.58	12.82	53.79	41.03	21.53	8.33	8.89	11.63	15.67	10.87
	B	69.72	87.18	43.94	58.97	29.17	8.33	83.70	81.40	65.67	71.74
	C	0.70	0.00	2.27	0.00	49.31	83.33	7.41	6.98	18.66	17.39
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-11**  
**Change of LOS distribution for all weekdays [08:30-08:45] for westbound (AM peak);**  
**MIST detectors**

Day	LOS Distribution (%)										
	Detector	60001		60003		60005		60007		60009	
		LOS	Before	After	Before	After	Before	After	Before	After	
Monday	A	25.53	5.26	56.00	66.67	21.33	5.00	4.76	4.65	12.86	6.52
	B	45.39	44.74	40.80	33.33	31.33	25.00	88.10	90.70	63.57	91.30
	C	29.08	50.00	3.20	0.00	47.33	65.00	7.14	4.65	23.57	2.17
	D	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Tuesday	A	19.86	0.00	36.15	41.03	17.12	0.00	1.54	0.00	8.82	4.26
	B	26.24	17.95	57.69	58.97	23.97	19.05	74.62	84.09	52.21	74.47
	C	53.90	82.05	6.15	0.00	55.48	80.95	23.85	15.91	38.97	21.28
	D	0.00	0.00	0.00	0.00	3.42	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	20.00	0.00	32.33	34.21	19.31	0.00	0.00	0.00	5.47	0.00
	B	22.14	13.16	63.91	65.79	24.83	0.00	82.58	85.71	57.03	80.43
	C	57.86	86.84	3.76	0.00	53.79	100.00	17.42	14.29	37.50	19.57
	D	0.00	0.00	0.00	0.00	2.07	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	23.91	2.70	33.86	37.84	22.22	0.00	6.02	2.27	11.85	2.13
	B	21.74	18.92	64.57	62.16	25.00	10.53	67.67	79.55	53.33	61.70
	C	54.35	78.38	1.57	0.00	50.69	89.47	26.32	18.18	34.81	36.17
	D	0.00	0.00	0.00	0.00	2.08	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	31.03	12.82	57.69	79.49	25.52	8.33	7.41	7.14	13.53	8.70
	B	68.97	87.18	42.31	20.51	30.34	20.83	88.89	90.48	83.46	82.61
	C	0.00	0.00	0.00	0.00	44.14	70.83	3.70	2.38	3.01	8.70
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-12**

**Change of LOS distribution for all weekdays [08:45-09:00] for westbound (AM peak); MIST detectors**

Day	LOS Distribution (%)										
	Detector	60001		60003		60005		60007		60009	
		LOS	Before	After	Before	After	Before	After	Before	After	
Monday	A	25.53	5.26	65.65	92.31	27.81	4.76	7.81	4.65	13.48	8.70
	B	69.50	76.32	34.35	7.69	50.99	57.14	90.63	90.70	80.14	89.13
	C	4.96	15.79	0.00	0.00	21.19	38.10	1.56	4.65	6.38	2.17
	D	0.00	2.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	20.14	0.00	62.41	82.05	26.21	0.00	0.78	4.55	8.89	4.26
	B	67.63	66.67	35.34	17.95	44.14	71.43	96.88	93.18	85.93	89.36
	C	12.23	33.33	2.26	0.00	29.66	28.57	2.34	2.27	5.19	6.38

	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	20.44	0.00	54.26	81.58	24.66	0.00	0.76	0.00	7.75	0.00
	B	57.66	76.32	44.96	18.42	40.41	35.00	93.94	97.62	80.62	95.65
	C	21.90	23.68	0.78	0.00	34.93	65.00	5.30	2.38	11.63	4.35
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	25.00	2.70	48.84	83.78	30.28	0.00	6.87	4.55	14.93	2.13
	B	59.29	72.97	50.39	16.22	33.10	47.37	88.55	93.18	76.12	93.62
	C	15.71	24.32	0.78	0.00	36.62	52.63	4.58	2.27	8.96	4.26
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	33.33	12.82	65.89	97.44	27.59	8.33	11.11	9.30	15.04	10.87
	B	66.67	87.18	34.11	2.56	53.10	62.50	88.15	90.70	84.21	89.13
	C	0.00	0.00	0.00	0.00	19.31	29.17	0.74	0.00	0.75	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-13**  
**Change of LOS distribution for all weekdays [15:00-15:15] for eastbound (PM peak);**  
**MIST detectors**

Day	LOS Distribution (%)										
	Detector	60002		60004		60006		60008		60010	
		LOS	Before	After	Before	After	Before	After	Before	After	
Monday	A	4.58	0.00	2.42	3.57	4.00	8.33	4.73	15.00	3.85	7.14
	B	16.03	18.52	31.45	42.86	80.57	91.67	95.27	85.00	95.51	92.86
	C	79.39	81.48	66.13	53.57	15.43	0.00	0.00	0.00	0.64	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	4.48	0.00	4.58	0.00	1.72	0.00	5.29	7.50	2.60	3.57
	B	11.94	10.34	21.37	32.14	75.29	100.00	94.12	92.50	95.45	96.43
	C	82.84	89.66	73.28	67.86	22.99	0.00	0.59	0.00	1.95	0.00

	D	0.75	0.00	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	3.03	0.00	2.46	0.00	1.17	0.00	3.57	2.50	2.01	0.00
	B	6.82	3.57	23.77	30.77	80.12	90.00	96.43	97.50	97.32	100.00
	C	90.15	96.43	72.95	69.23	18.71	10.00	0.00	0.00	0.67	0.00
	D	0.00	0.00	0.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	5.38	0.00	6.67	0.00	4.71	0.00	7.78	7.89	5.81	0.00
	B	15.38	7.14	25.00	32.14	75.88	100.00	92.22	92.11	93.55	100.00
	C	79.23	92.86	67.50	67.86	19.41	0.00	0.00	0.00	0.65	0.00
	D	0.00	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	10.08	0.00	3.97	0.00	4.57	0.00	8.19	17.50	5.70	0.00
	B	89.15	21.43	42.86	46.43	83.43	100.00	91.81	82.50	94.30	100.00
	C	0.78	78.57	53.17	53.57	12.00	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-14**  
**Change of LOS distribution for all weekdays [15:15-15:30] for eastbound (PM peak);**  
**MIST detectors**

Day	Detector	LOS Distribution (%)									
		60002		60004		60006		60008		60010	
		LOS	Before	After	Before	After	Before	After	Before	After	Before
Monday	A	3.05	0.00	2.38	3.45	4.60	8.33	5.33	17.50	5.06	7.14
	B	12.21	35.71	19.84	51.72	71.26	91.67	94.67	82.50	94.30	92.86
	C	84.73	64.29	77.78	44.83	24.14	0.00	0.00	0.00	0.63	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	3.01	0.00	4.76	0.00	2.30	0.00	5.33	12.50	5.19	7.14
	B	7.52	14.29	15.08	53.57	59.77	100.00	94.67	87.50	93.51	92.86
	C	89.47	85.71	80.16	46.43	37.93	0.00	0.00	0.00	1.30	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	3.05	0.00	4.92	0.00	1.16	0.00	5.85	5.00	3.33	0.00
	B	10.69	17.86	13.93	48.00	62.21	100.00	94.15	95.00	96.67	100.00
	C	86.26	82.14	81.15	52.00	36.63	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	6.06	0.00	5.08	0.00	4.71	0.00	9.58	7.89	7.74	7.69
	B	11.36	14.29	21.19	25.93	61.18	100.00	90.42	92.11	91.61	92.31
	C	81.82	85.71	73.73	74.07	34.12	0.00	0.00	0.00	0.65	0.00
	D	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	10.85	0.00	4.00	3.57	5.14	0.00	10.40	17.50	6.96	11.11
	B	89.15	28.57	48.80	53.57	76.57	100.00	89.60	82.50	93.04	88.89
	C	0.00	71.43	47.20	42.86	18.29	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-15**  
**Change of LOS distribution for all weekdays [15:30-15:45] for eastbound (PM peak);**  
**MIST detectors**

Day	Detector	LOS Distribution (%)									
		60002		60004		60006		60008		60010	
		LOS	Before	After	Before	After	Before	After	Before	After	Before
Monday	A	3.73	3.57	3.10	3.45	3.45	8.33	4.71	7.50	5.70	7.14
	B	12.69	17.86	19.38	27.59	67.24	91.67	95.29	92.50	93.04	92.86
	C	83.58	78.57	76.74	68.97	29.31	0.00	0.00	0.00	1.27	0.00
	D	0.00	0.00	0.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	2.26	0.00	4.62	0.00	1.15	0.00	2.37	7.50	1.30	3.57
	B	6.77	13.79	16.92	32.14	60.34	90.91	97.63	92.50	98.05	96.43
	C	89.47	86.21	78.46	67.86	37.93	9.09	0.00	0.00	0.65	0.00
	D	1.50	0.00	0.00	0.00	0.57	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	3.03	0.00	4.88	0.00	0.58	0.00	4.71	5.00	2.00	0.00
	B	7.58	3.57	13.82	25.00	61.63	90.91	95.29	95.00	98.00	100.00
	C	88.64	96.43	81.30	75.00	37.79	9.09	0.00	0.00	0.00	0.00
	D	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	6.82	0.00	8.33	0.00	4.12	0.00	7.78	5.13	6.45	7.41
	B	17.42	10.71	20.83	21.43	64.12	83.33	92.22	94.87	92.90	92.59
	C	75.76	89.29	70.83	78.57	31.76	16.67	0.00	0.00	0.65	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	10.77	0.00	4.84	0.00	4.02	0.00	11.18	17.50	5.70	11.11
	B	89.23	53.57	51.61	78.57	86.21	100.00	88.82	82.50	93.04	88.89
	C	0.00	46.43	43.55	21.43	9.77	0.00	0.00	0.00	1.27	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-16**  
**Change of LOS distribution for all weekdays [15:45-16:00] for eastbound (PM peak);**  
**MIST detectors**

Day	LOS Distribution (%)										
	Detector	60002		60004		60006		60008		60010	
	LOS	Before	After	Before	After	Before	After	Before	After	Before	After
Monday	A	2.31	0.00	2.40	3.45	5.14	7.69	7.65	15.00	4.46	7.14
	B	11.54	25.00	23.20	44.83	61.71	92.31	92.35	85.00	95.54	92.86
	C	85.38	75.00	73.60	51.72	32.57	0.00	0.00	0.00	0.00	0.00
	D	0.77	0.00	0.80	0.00	0.57	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	2.26	0.00	3.25	0.00	1.73	0.00	5.33	10.26	3.27	7.41
	B	6.77	17.86	21.95	35.71	51.45	100.00	94.67	89.74	96.08	92.59
	C	90.98	82.14	74.80	64.29	46.82	0.00	0.00	0.00	0.65	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	3.85	0.00	4.88	0.00	0.59	0.00	7.74	5.00	2.03	0.00
	B	13.08	3.57	21.14	44.00	58.82	90.91	92.26	95.00	97.97	100.00
	C	83.08	96.43	73.98	56.00	40.59	9.09	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	6.87	0.00	7.56	0.00	3.55	0.00	8.43	12.50	7.69	7.69
	B	9.92	17.86	26.89	29.63	60.95	91.67	91.57	87.50	91.67	92.31
	C	83.21	82.14	65.55	70.37	35.50	8.33	0.00	0.00	0.64	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	11.72	0.00	4.07	0.00	4.60	0.00	20.71	30.00	10.13	14.81
	B	88.28	64.29	63.41	75.00	82.76	100.00	79.29	70.00	89.87	85.19
	C	0.00	35.71	32.52	25.00	12.64	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-17**  
**Change of LOS distribution for all weekdays [16:00-16:15] for eastbound (PM peak);**  
**MIST detectors**

Day	LOS Distribution (%)										
	Detector	60002		60004		60006		60008		60010	
	LOS	Before	After	Before	After	Before	After	Before	After	Before	After
Monday	A	3.05	0.00	1.65	3.45	3.43	8.33	7.02	10.00	4.43	7.14
	B	11.45	10.71	23.14	17.24	55.43	75.00	92.98	90.00	94.94	92.86
	C	85.50	89.29	74.38	79.31	41.14	16.67	0.00	0.00	0.63	0.00
	D	0.00	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	2.24	0.00	4.69	0.00	1.14	0.00	2.92	2.56	2.60	0.00
	B	11.19	7.14	22.66	17.86	58.29	72.73	97.08	97.44	96.10	96.30
	C	86.57	92.86	72.66	82.14	40.57	27.27	0.00	0.00	1.30	3.70
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	4.62	0.00	4.92	0.00	0.59	0.00	6.55	5.00	3.36	0.00
	B	13.85	3.57	22.95	20.00	61.18	90.91	93.45	95.00	95.30	100.00
	C	81.54	96.43	72.13	80.00	38.24	9.09	0.00	0.00	1.34	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	6.15	0.00	4.92	0.00	4.65	0.00	10.65	5.00	6.41	3.85
	B	15.38	10.71	32.79	25.93	66.28	91.67	89.35	95.00	93.59	96.15
	C	77.69	89.29	62.30	74.07	29.07	8.33	0.00	0.00	0.00	0.00
	D	0.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	12.40	0.00	3.28	0.00	4.55	0.00	21.76	25.00	8.86	14.81
	B	86.82	35.71	77.05	71.43	86.36	100.00	78.24	75.00	91.14	85.19
	C	0.78	64.29	19.67	28.57	9.09	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-18**

**Change of LOS distribution for all weekdays [16:15-16:30] for eastbound (PM peak);  
MIST detectors**

Day	LOS Distribution (%)										
	Detector	60002		60004		60006		60008		60010	
	LOS	Before	After								

Monday	A	4.51	3.57	3.97	3.45	4.00	8.33	8.19	17.50	6.33	7.14
	B	9.77	14.29	36.51	37.93	61.14	83.33	91.81	82.50	93.67	92.86
	C	85.71	82.14	59.52	58.62	34.86	8.33	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	2.22	0.00	4.76	0.00	1.14	0.00	10.00	10.00	2.60	0.00
	B	10.37	14.29	34.13	48.28	63.43	100.00	90.00	90.00	96.10	100.00
	C	87.41	85.71	60.32	51.72	35.43	0.00	0.00	0.00	1.30	0.00
	D	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	3.85	0.00	3.33	0.00	0.58	0.00	10.59	7.50	5.96	3.57
	B	15.38	14.29	45.00	50.00	61.63	81.82	89.41	92.50	94.04	96.43
	C	80.77	85.71	51.67	50.00	37.79	18.18	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	4.58	0.00	7.32	0.00	4.05	0.00	13.95	7.50	6.96	3.85
	B	22.14	17.86	43.09	42.31	68.21	83.33	86.05	92.50	93.04	96.15
	C	73.28	82.14	49.59	57.69	27.75	16.67	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	14.29	0.00	6.25	3.70	5.68	0.00	37.06	42.50	14.56	14.81
	B	85.71	77.78	80.47	92.59	90.91	100.00	62.94	57.50	85.44	85.19
	C	0.00	22.22	13.28	3.70	3.41	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-19**  
**Change of LOS distribution for all weekdays [16:30-16:45] for eastbound (PM peak);**  
**MIST detectors**

Day	LOS Distribution (%)									
	Detector	60002		60004		60006		60008		60010
	LOS	Before	After	Before	After	Before	After	Before	After	Before

Monday	A	4.62	3.57	3.94	3.45	4.57	8.33	18.24	20.00	5.70	7.14
	B	18.46	3.57	46.46	24.14	64.00	58.33	81.76	80.00	94.30	92.86
	C	76.92	92.86	48.82	72.41	31.43	33.33	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	2.96	3.45	5.47	0.00	0.57	0.00	17.86	12.50	1.96	0.00
	B	11.85	13.79	57.03	24.14	66.67	83.33	82.14	87.50	97.39	100.00
	C	85.19	82.76	37.50	75.86	32.76	16.67	0.00	0.00	0.65	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	2.33	0.00	4.76	0.00	1.74	0.00	24.26	15.00	5.30	0.00
	B	24.81	14.29	57.14	33.33	66.86	75.00	75.74	85.00	94.70	100.00
	C	72.87	85.71	38.10	66.67	31.40	25.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	6.15	0.00	8.20	0.00	4.60	0.00	27.22	20.51	6.33	3.85
	B	25.38	17.86	58.20	51.85	71.26	75.00	72.78	79.49	93.67	96.15
	C	66.92	82.14	33.61	48.15	24.14	25.00	0.00	0.00	0.00	0.00
	D	1.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	12.21	0.00	6.50	10.71	7.95	0.00	56.80	62.50	16.46	14.81
	B	87.79	67.86	83.74	89.29	91.48	100.00	42.60	37.50	83.54	85.19
	C	0.00	32.14	9.76	0.00	0.57	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.59	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-20**

**Change of LOS distribution for all weekdays [16:45-17:00] for eastbound (PM peak);  
MIST detectors**

Day	LOS Distribution (%)										
	Detector	60002		60004		60006		60008		60010	
		LOS	Before	After	Before	After	Before	After	Before	After	
Monday	A	3.17	3.57	4.10	3.45	4.05	8.33	18.24	20.00	7.01	7.14
	B	19.84	17.86	68.03	51.72	79.77	58.33	81.76	80.00	92.99	92.86
	C	76.98	78.57	27.87	44.83	16.18	33.33	0.00	0.00	0.00	0.00

	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	3.79	0.00	4.24	3.45	0.58	0.00	17.86	12.50	3.29	7.14
	B	15.15	17.24	63.56	51.72	80.35	100.00	82.14	87.50	95.39	92.86
	C	81.06	82.76	31.36	44.83	19.08	0.00	0.00	0.00	1.32	0.00
	D	0.00	0.00	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	4.65	0.00	5.69	4.00	1.16	18.18	24.26	15.00	7.28	0.00
	B	20.93	17.86	70.73	64.00	81.40	72.73	75.74	85.00	92.72	100.00
	C	74.42	82.14	23.58	32.00	17.44	9.09	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	6.82	0.00	7.56	3.85	5.23	0.00	27.22	20.51	10.13	3.85
	B	28.03	21.43	71.43	65.38	79.07	91.67	72.78	79.49	89.87	96.15
	C	64.39	78.57	21.01	30.77	15.70	8.33	0.00	0.00	0.00	0.00
	D	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	16.15	0.00	9.02	14.29	9.14	0.00	56.80	62.50	23.42	22.22
	B	83.85	78.57	87.70	85.71	89.71	100.00	42.60	37.50	76.58	77.78
	C	0.00	21.43	3.28	0.00	1.14	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.59	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-21**  
**Change of LOS distribution for all weekdays [17:00-17:15] for eastbound (PM peak);**  
**MIST detectors**

Day	LOS Distribution (%)										
	Detector	60002		60004		60006		60008		60010	
		LOS	Before	After	Before	After	Before	After	Before	After	
Monday	A	2.38	3.57	3.94	3.45	3.45	8.33	30.59	12.50	11.39	7.14
	B	44.44	17.86	78.74	51.72	90.80	91.67	69.41	87.50	88.61	92.86
	C	53.17	78.57	17.32	44.83	5.75	0.00	0.00	0.00	0.00	0.00

	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	4.51	0.00	4.07	3.45	1.72	0.00	30.18	20.00	4.58	3.57
	B	36.09	24.14	85.37	68.97	91.95	100.00	69.82	80.00	94.77	96.43
	C	59.40	75.86	10.57	27.59	6.32	0.00	0.00	0.00	0.65	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	2.99	0.00	5.69	4.00	2.91	18.18	34.91	27.50	7.28	3.57
	B	33.58	21.43	83.74	72.00	91.86	72.73	65.09	72.50	92.72	96.43
	C	62.69	78.57	10.57	24.00	5.23	9.09	0.00	0.00	0.00	0.00
	D	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	6.35	0.00	5.00	15.38	5.78	0.00	39.18	30.77	12.03	0.00
	B	46.83	42.86	86.67	73.08	87.86	84.62	60.82	69.23	87.97	100.00
	C	46.03	57.14	8.33	11.54	6.36	15.38	0.00	0.00	0.00	0.00
	D	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	17.42	0.00	8.94	3.70	10.29	0.00	61.18	62.50	27.85	22.22
	B	82.58	85.19	90.24	96.30	87.43	100.00	38.82	37.50	72.15	77.78
	C	0.00	14.81	0.81	0.00	2.29	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-22**

**Change of LOS distribution for all weekdays [17:15-17:30] for eastbound (PM peak); MIST detectors**

Day	LOS Distribution (%)										
	Detector	60002		60004		60006		60008		60010	
		LOS	Before	After	Before	After	Before	After	Before	After	
Monday	A	4.65	3.57	5.74	10.34	8.14	8.33	56.47	50.00	14.10	10.71
	B	73.64	75.00	86.89	82.76	88.37	91.67	43.53	50.00	85.90	89.29
	C	21.71	21.43	7.38	6.90	3.49	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Tuesday	A	2.22	0.00	5.65	6.90	2.33	0.00	47.90	45.00	12.50	7.14
	B	61.48	65.52	88.71	93.10	95.35	100.00	52.10	55.00	86.84	92.86
	C	36.30	34.48	5.65	0.00	2.33	0.00	0.00	0.00	0.66	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	3.82	0.00	9.76	16.00	3.49	9.09	52.35	60.00	10.60	3.57
	B	57.25	75.00	86.99	84.00	94.77	90.91	47.65	40.00	89.40	96.43
	C	38.93	25.00	3.25	0.00	1.74	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	5.56	0.00	8.33	11.11	6.40	0.00	58.24	51.28	17.20	11.54
	B	69.84	75.00	88.33	88.89	90.70	100.00	41.76	48.72	82.80	88.46
	C	24.60	25.00	3.33	0.00	2.91	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	40.30	3.70	16.67	7.41	21.02	13.33	74.27	82.50	44.30	33.33
	B	59.70	92.59	80.16	92.59	78.41	86.67	25.73	17.50	55.70	66.67
	C	0.00	3.70	3.17	0.00	0.57	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-23**  
**Change of LOS distribution for all weekdays [17:30-17:45] for eastbound (PM peak);**  
**MIST detectors**

Day	Detector	LOS Distribution (%)									
		60002		60004		60006		60008		60010	
		LOS	Before	After	Before	After	Before	After	Before	After	Before
Monday	A	4.65	3.57	4.20	3.45	12.72	8.33	61.90	77.50	25.00	25.00
	B	82.17	92.86	95.80	96.55	85.55	91.67	38.10	22.50	75.00	75.00
	C	13.18	3.57	0.00	0.00	1.73	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	4.51	0.00	6.35	6.90	4.62	9.09	52.41	75.00	15.03	32.14
	B	68.42	86.21	88.10	93.10	92.49	90.91	47.59	25.00	84.97	67.86
	C	27.07	13.79	5.56	0.00	2.89	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	3.03	0.00	8.94	12.50	5.81	20.00	52.05	65.00	17.22	17.86
	B	71.97	82.14	86.99	87.50	91.86	80.00	47.95	35.00	82.78	82.14
	C	25.00	17.86	4.07	0.00	2.33	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	8.66	0.00	12.40	15.38	10.47	0.00	59.65	69.23	24.84	19.23
	B	73.23	82.14	85.95	84.62	86.63	100.00	40.35	30.77	75.16	80.77
	C	18.11	17.86	1.65	0.00	2.91	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	47.33	7.41	12.80	11.11	30.11	13.33	76.33	90.00	48.73	59.26
	B	52.67	92.59	87.20	88.89	69.32	86.67	23.67	10.00	51.27	40.74
	C	0.00	0.00	0.00	0.00	0.57	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-24**  
**Change of LOS distribution for all weekdays [17:45-18:00] for eastbound (PM peak);**  
**MIST detectors**

Day	Detector	LOS Distribution (%)									
		60002		60004		60006		60008		60010	
		LOS	Before	After	Before	After	Before	After	Before	After	Before
Monday	A	5.38	7.14	9.68	10.34	17.24	33.33	75.74	97.50	51.59	67.86
	B	83.08	92.86	89.52	89.66	82.76	66.67	24.26	2.50	48.41	32.14
	C	11.54	0.00	0.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	6.77	3.45	7.26	3.45	11.56	9.09	63.31	75.00	33.33	57.14
	B	72.18	89.66	87.90	96.55	87.86	90.91	36.69	25.00	66.01	42.86
	C	21.05	6.90	4.84	0.00	0.58	0.00	0.00	0.00	0.65	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	3.85	0.00	12.10	8.33	10.47	9.09	62.72	82.50	34.44	46.43
	B	76.15	89.29	85.48	91.67	88.37	90.91	37.28	17.50	65.56	53.57
	C	20.00	10.71	2.42	0.00	1.16	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	4.69	0.00	8.55	7.69	12.79	0.00	52.05	82.05	28.03	34.62
	B	78.91	92.86	89.74	92.31	84.30	100.00	47.95	17.95	71.97	65.38
	C	16.41	7.14	1.71	0.00	2.91	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	50.00	7.41	16.80	11.11	34.66	40.00	82.35	97.50	63.29	77.78
	B	50.00	92.59	82.40	88.89	65.34	60.00	17.65	2.50	36.71	22.22
	C	0.00	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



**Table B-25**  
**Change of LOS distribution for all weekdays [18:00-18:15] for eastbound (PM peak);**  
**MIST detectors**

Day	Detector	LOS Distribution (%)									
		60002		60004		60006		60008		60010	
		LOS	Before	After	Before	After	Before	After	Before	After	Before
Monday	A	5.38	3.70	11.20	10.71	26.29	16.67	84.02	97.56	66.46	85.71
	B	89.23	96.30	88.00	89.29	73.14	83.33	15.98	0.00	33.54	14.29
	C	5.38	0.00	0.80	0.00	0.57	0.00	0.00	2.44	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	5.38	0.00	7.38	0.00	12.79	9.09	70.24	87.50	50.00	57.14
	B	80.77	100.00	90.16	100.00	87.21	90.91	29.76	12.50	50.00	42.86
	C	13.85	0.00	2.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	3.13	0.00	8.66	11.54	11.05	9.09	68.82	92.50	49.34	82.14
	B	86.72	100.00	88.98	88.46	88.95	90.91	31.18	7.50	50.66	17.86
	C	10.16	0.00	2.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	8.46	0.00	9.84	7.69	13.95	0.00	65.29	71.79	39.49	57.69
	B	77.69	96.43	89.34	92.31	84.30	100.00	34.12	28.21	60.51	42.31
	C	13.85	3.57	0.82	0.00	1.74	0.00	0.59	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	57.89	3.70	15.20	7.41	36.36	40.00	85.38	100.00	68.35	96.30
	B	41.35	92.59	84.80	92.59	63.07	60.00	14.62	0.00	31.65	3.70
	C	0.75	3.70	0.00	0.00	0.57	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-26**  
**Change of LOS distribution for all weekdays [18:15-18:30] for eastbound (PM peak);**  
**MIST detectors**

Day	Detector	LOS Distribution (%)									
		60002		60004		60006		60008		60010	
		LOS	Before	After	Before	After	Before	After	Before	After	Before
Monday	A	8.33	0.00	19.20	10.71	46.29	69.23	97.65	100.00	86.71	89.66
	B	89.39	100.00	80.80	89.29	53.14	23.08	2.35	0.00	13.29	10.34
	C	2.27	0.00	0.00	0.00	0.57	7.69	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	5.22	0.00	9.68	3.45	26.59	36.36	86.31	97.50	74.51	71.43
	B	89.55	100.00	89.52	96.55	73.41	63.64	13.69	2.50	25.49	28.57
	C	5.22	0.00	0.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	3.82	0.00	10.40	4.00	25.73	9.09	83.53	100.00	70.39	85.71
	B	89.31	96.43	89.60	96.00	74.27	90.91	16.47	0.00	29.61	14.29
	C	6.87	3.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	9.45	3.57	11.67	11.11	25.00	7.69	76.79	92.31	60.51	84.62
	B	86.61	92.86	88.33	88.89	73.84	92.31	23.21	7.69	39.49	15.38
	C	3.94	3.57	0.00	0.00	1.16	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	63.16	7.14	15.32	10.71	39.77	60.00	90.06	97.50	73.42	92.59
	B	36.84	92.86	84.68	89.29	60.23	40.00	9.94	2.50	26.58	7.41
	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-27**  
**Change of LOS distribution for all weekdays [18:30-18:45] for eastbound (PM peak);**  
**MIST detectors**

Day	LOS Distribution (%)										
	Detector	60002		60004		60006		60008		60010	
		LOS	Before	After	Before	After	Before	After	Before	After	
Monday	A	10.85	7.41	20.97	10.71	48.57	91.67	97.04	100.00	93.67	100.00
	B	87.60	92.59	78.23	89.29	51.43	8.33	2.96	0.00	6.33	0.00
	C	1.55	0.00	0.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	6.11	0.00	8.13	3.45	36.05	45.45	94.12	92.31	82.35	92.86
	B	90.08	100.00	90.24	96.55	63.95	54.55	5.88	7.69	17.65	7.14
	C	3.82	0.00	1.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	3.05	0.00	8.87	4.35	29.65	36.36	92.94	95.00	79.61	92.86
	B	95.42	100.00	91.13	95.65	70.35	63.64	7.06	5.00	20.39	7.14
	C	1.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	11.02	3.57	10.83	10.71	31.98	23.08	82.25	97.44	69.43	80.77
	B	84.25	92.86	88.33	89.29	67.44	76.92	17.75	2.56	30.57	19.23
	C	4.72	3.57	0.83	0.00	0.58	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	66.15	3.57	9.68	3.57	45.45	42.86	89.47	97.50	75.32	81.48
	B	33.85	96.43	88.71	96.43	54.55	57.14	10.53	2.50	24.68	18.52
	C	0.00	0.00	1.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-28**  
**Change of LOS distribution for all weekdays [18:45-19:00] for eastbound (PM peak);**  
**MIST detectors**

Day	Detector	LOS Distribution (%)									
		60002		60004		60006		60008		60010	
		LOS	Before	After	Before	After	Before	After	Before	After	
Monday	A	13.28	7.41	28.69	50.00	66.09	100.00	99.40	100.00	98.10	100.00
	B	86.72	92.59	71.31	50.00	33.91	0.00	0.60	0.00	1.90	0.00
	C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tuesday	A	9.02	0.00	14.17	17.24	51.74	100.00	95.83	100.00	90.20	100.00
	B	90.23	100.00	85.04	82.76	48.26	0.00	4.17	0.00	9.80	0.00
	C	0.75	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wednesday	A	3.82	0.00	10.85	17.39	45.93	81.82	94.71	100.00	90.13	100.00
	B	95.42	100.00	89.15	82.61	54.07	18.18	5.29	0.00	9.87	0.00
	C	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thursday	A	11.90	3.57	10.40	10.71	42.44	84.62	91.12	94.87	82.17	92.31
	B	86.51	96.43	88.80	89.29	57.56	15.38	8.88	5.13	17.83	7.69
	C	1.59	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Friday	A	68.94	3.57	13.01	10.71	44.89	66.67	91.23	100.00	83.54	92.59
	B	31.06	96.43	86.18	89.29	54.55	33.33	8.77	0.00	16.46	7.41
	C	0.00	0.00	0.00	0.00	0.57	0.00	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	F	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table B-29**  
**Change of LOS distribution for all weekdays [06:00-06:05] for westbound (AM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	31.71	20.83	4.88	6.38
	B	68.29	77.08	0.00	6.38
	C	0.00	0.00	43.90	31.91
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.08	51.22	55.32
Tuesday	A	37.50	22.92	0.00	2.13
	B	62.50	75.00	2.50	4.26
	C	0.00	0.00	45.00	36.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.08	52.50	57.45
Wednesday	A	30.00	19.15	0.00	0.00
	B	70.00	78.72	0.00	8.70
	C	0.00	0.00	40.00	34.78
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.13	60.00	56.52
Thursday	A	25.00	10.64	5.00	2.17
	B	75.00	89.36	2.50	19.57
	C	0.00	0.00	45.00	28.26
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	47.50	50.00
Friday	A	68.29	58.33	10.00	4.26
	B	29.27	41.67	27.50	44.68
	C	0.00	0.00	40.00	25.53
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	0.00	22.50	25.53

**Table B-30**  
**Change of LOS distribution for all weekdays [06:05-06:10] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	12.20	14.58	4.88	6.38
	B	85.37	83.33	0.00	2.13
	C	0.00	0.00	39.02	23.40
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	2.08	56.10	68.09
Tuesday	A	7.50	8.33	0.00	0.00
	B	92.50	89.58	5.00	2.17
	C	0.00	0.00	15.00	13.04
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.08	80.00	84.78
Wednesday	A	12.50	6.38	0.00	0.00
	B	87.50	87.23	0.00	6.52
	C	0.00	0.00	27.50	8.70
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	6.38	72.50	84.78
Thursday	A	10.00	16.67	5.00	2.17
	B	90.00	83.33	2.50	4.35
	C	0.00	0.00	15.00	23.91
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	77.50	69.57
Friday	A	31.71	33.33	10.00	4.26
	B	65.85	64.58	7.50	23.40
	C	0.00	0.00	45.00	27.66
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	2.08	37.50	44.68

**Table B-31**  
**Change of LOS distribution for all weekdays [06:10-06:15] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	14.63	14.58	4.88	6.38
	B	85.37	81.25	2.44	4.26
	C	0.00	0.00	26.83	10.64
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	4.17	65.85	78.72
Tuesday	A	10.00	6.25	0.00	0.00
	B	90.00	91.67	5.00	2.17
	C	0.00	0.00	10.00	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.08	85.00	95.65
Wednesday	A	5.00	6.38	0.00	0.00
	B	95.00	91.49	0.00	2.17
	C	0.00	0.00	15.00	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.13	85.00	95.65
Thursday	A	7.50	10.42	5.00	2.17
	B	92.50	89.58	2.50	2.17
	C	0.00	0.00	5.00	8.70
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	87.50	86.96
Friday	A	24.39	20.83	7.32	4.26
	B	73.17	79.17	7.32	4.26
	C	0.00	0.00	36.59	21.28
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	0.00	48.78	70.21

**Table B-32**  
**Change of LOS distribution for all weekdays [06:15-06:20] for westbound (AM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	17.07	16.67	4.88	6.38
	B	80.49	77.08	0.00	4.26
	C	0.00	0.00	7.32	6.38
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	6.25	87.80	82.98
Tuesday	A	10.00	8.33	0.00	0.00
	B	90.00	85.42	2.50	0.00
	C	0.00	0.00	5.00	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	6.25	92.50	97.83
Wednesday	A	7.50	8.51	0.00	0.00
	B	92.50	82.98	2.50	2.17
	C	0.00	0.00	5.00	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	8.51	92.50	95.65
Thursday	A	12.50	16.67	5.00	2.17
	B	85.00	81.25	2.50	0.00
	C	0.00	0.00	0.00	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	2.08	92.50	93.48
Friday	A	34.15	43.75	7.32	4.26
	B	63.41	56.25	7.32	0.00
	C	0.00	0.00	31.71	10.64
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	0.00	53.66	85.11

**Table B-33**  
**Change of LOS distribution for all weekdays [06:20-06:25] for westbound (AM peak);  
 DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	14.63	18.75	4.88	6.38
	B	82.93	68.75	2.44	4.26
	C	0.00	0.00	2.44	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	12.50	90.24	89.36
Tuesday	A	12.50	14.58	0.00	0.00
	B	87.50	72.92	2.50	2.17
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	12.50	95.00	97.83
Wednesday	A	7.50	14.89	0.00	0.00
	B	90.00	74.47	0.00	0.00
	C	0.00	0.00	7.50	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	10.64	92.50	97.83
Thursday	A	10.00	25.00	5.00	2.17
	B	85.00	70.83	2.50	4.35
	C	0.00	0.00	0.00	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	5.00	4.17	92.50	91.30
Friday	A	41.46	43.75	7.32	6.38
	B	56.10	56.25	7.32	4.26
	C	0.00	0.00	29.27	8.51
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	0.00	56.10	80.85

**Table B-34**  
**Change of LOS distribution for all weekdays [06:25-06:30] for westbound (AM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	14.63	31.25	4.88	6.38
	B	80.49	50.00	4.88	4.26
	C	0.00	0.00	2.44	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	4.88	18.75	87.80	89.36
Tuesday	A	27.50	19.15	0.00	2.13
	B	70.00	61.70	5.00	4.26
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	19.15	95.00	93.62
Wednesday	A	22.50	23.40	0.00	0.00
	B	67.50	57.45	2.50	0.00
	C	0.00	0.00	5.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	10.00	19.15	92.50	100.00
Thursday	A	15.00	33.33	5.00	2.17
	B	65.00	62.50	2.50	4.35
	C	0.00	0.00	0.00	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	20.00	4.17	92.50	91.30
Friday	A	41.46	58.33	4.88	6.38
	B	56.10	41.67	9.76	2.13
	C	0.00	0.00	19.51	8.51
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	0.00	65.85	82.98

**Table B-35**  
**Change of LOS distribution for all weekdays [06:30-06:35] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	31.71	41.67	4.88	6.38
	B	63.41	37.50	7.32	4.26
	C	0.00	0.00	0.00	2.13
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	4.88	20.83	87.80	87.23
Tuesday	A	30.00	43.75	0.00	0.00
	B	62.50	33.33	5.00	2.13
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	7.50	22.92	95.00	97.87
Wednesday	A	25.00	43.48	0.00	0.00
	B	55.00	28.26	5.00	2.17
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	20.00	28.26	92.50	97.83
Thursday	A	30.00	43.75	5.00	2.17
	B	42.50	43.75	2.50	2.17
	C	0.00	0.00	0.00	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	27.50	12.50	92.50	91.30
Friday	A	60.98	64.58	9.76	4.26
	B	36.59	35.42	7.32	2.13
	C	0.00	0.00	12.20	12.77
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	0.00	70.73	80.85

**Table B-36**  
**Change of LOS distribution for all weekdays [06:35-06:40] for westbound (AM peak);**  
**DCMS detectors**

Day	Detector	LOS Distribution (%)			
		10001		10003	
		LOS	Before	After	Before
Monday	A	65.85	68.75	4.88	6.38
	B	24.39	12.50	7.32	2.13
	C	0.00	0.00	0.00	2.13
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	9.76	18.75	87.80	89.36
Tuesday	A	60.00	64.58	0.00	0.00
	B	27.50	10.42	5.00	4.26
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	12.50	25.00	95.00	95.74
Wednesday	A	45.00	55.32	0.00	0.00
	B	27.50	12.77	2.50	2.17
	C	0.00	0.00	5.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	27.50	31.91	92.50	97.83
Thursday	A	37.50	64.58	5.00	2.17
	B	32.50	20.83	2.50	2.17
	C	0.00	0.00	0.00	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	30.00	14.58	92.50	93.48
Friday	A	87.80	95.83	9.76	4.26
	B	9.76	4.17	7.32	2.13
	C	0.00	0.00	7.32	4.26
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	0.00	75.61	89.36

**Table B-37**  
**Change of LOS distribution for all weekdays [06:40-06:45] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	58.54	72.92	4.88	6.38
	B	26.83	2.08	4.88	6.38
	C	0.00	0.00	2.44	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	14.63	25.00	87.80	87.23
Tuesday	A	75.00	68.75	0.00	0.00
	B	7.50	4.17	5.00	2.17
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	17.50	27.08	95.00	97.83
Wednesday	A	60.00	68.09	0.00	0.00
	B	20.00	4.26	2.50	2.17
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	20.00	27.66	95.00	97.83
Thursday	A	50.00	79.17	5.00	2.17
	B	12.50	8.33	2.50	4.35
	C	0.00	0.00	0.00	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	37.50	12.50	92.50	91.30
Friday	A	92.68	91.67	9.76	6.38
	B	4.88	8.33	9.76	2.13
	C	0.00	0.00	4.88	4.26
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	0.00	75.61	87.23

**Table B-38**  
**Change of LOS distribution for all weekdays [06:45-06:50] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	70.73	68.75	4.88	6.38
	B	7.32	6.25	9.76	6.38
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	21.95	25.00	85.37	87.23
Tuesday	A	77.50	66.67	0.00	0.00
	B	5.00	0.00	5.00	2.17
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	17.50	33.33	95.00	97.83
Wednesday	A	62.50	65.96	0.00	0.00
	B	0.00	2.13	2.50	2.17
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	37.50	31.91	95.00	97.83
Thursday	A	60.00	79.17	5.00	2.22
	B	5.00	4.17	2.50	6.67
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	35.00	16.67	92.50	91.11
Friday	A	95.12	97.92	7.50	6.38
	B	2.44	2.08	7.50	6.38
	C	0.00	0.00	7.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	0.00	77.50	87.23

**Table B-39**  
**Change of LOS distribution for all weekdays [06:50-06:55] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	58.54	68.75	4.88	6.38
	B	12.20	2.08	7.32	6.38
	C	0.00	0.00	2.44	2.13
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	29.27	29.17	85.37	85.11
Tuesday	A	67.50	65.96	0.00	2.13
	B	10.00	0.00	5.00	2.13
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	22.50	34.04	95.00	95.74
Wednesday	A	57.50	55.32	0.00	0.00
	B	5.00	2.13	2.50	2.17
	C	0.00	0.00	5.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	37.50	42.55	92.50	97.83
Thursday	A	57.50	75.00	5.00	2.22
	B	0.00	0.00	2.50	4.44
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	42.50	25.00	92.50	93.33
Friday	A	90.24	95.83	9.76	6.38
	B	7.32	4.17	4.88	4.26
	C	0.00	0.00	7.32	4.26
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	0.00	78.05	85.11

**Table B-40**  
**Change of LOS distribution for all weekdays [06:55-07:00] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	63.41	52.08	4.88	6.38
	B	2.44	2.08	4.88	8.51
	C	0.00	0.00	4.88	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	34.15	45.83	85.37	85.11
Tuesday	A	70.00	52.08	0.00	0.00
	B	0.00	2.08	5.00	4.26
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	30.00	45.83	95.00	95.74
Wednesday	A	55.00	48.94	0.00	0.00
	B	5.00	0.00	2.50	0.00
	C	0.00	0.00	2.50	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	40.00	51.06	95.00	97.83
Thursday	A	52.50	68.75	5.00	2.17
	B	5.00	2.08	2.50	10.87
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	42.50	29.17	92.50	86.96
Friday	A	95.00	100.00	9.76	4.26
	B	2.50	0.00	4.88	2.13
	C	0.00	0.00	7.32	4.26
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	78.05	89.36

**Table B-41**  
**Change of LOS distribution for all weekdays [07:00-07:05] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	65.85	60.42	4.88	6.38
	B	2.44	0.00	4.88	6.38
	C	0.00	0.00	4.88	2.13
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	31.71	39.58	85.37	85.11
Tuesday	A	57.50	43.75	0.00	0.00
	B	5.00	0.00	5.00	2.13
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	37.50	56.25	95.00	97.87
Wednesday	A	52.50	46.81	0.00	0.00
	B	2.50	0.00	2.50	2.17
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	45.00	53.19	95.00	97.83
Thursday	A	47.50	64.58	5.00	2.17
	B	5.00	0.00	2.50	8.70
	C	0.00	0.00	0.00	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	47.50	35.42	92.50	86.96
Friday	A	97.56	97.92	7.32	4.26
	B	0.00	0.00	4.88	8.51
	C	0.00	0.00	7.32	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	2.08	80.49	87.23

**Table B-42**  
**Change of LOS distribution for all weekdays [07:05-07:10] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	63.41	54.17	4.88	6.38
	B	2.44	0.00	7.32	6.38
	C	0.00	0.00	2.44	2.13
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	34.15	45.83	85.37	85.11
Tuesday	A	57.50	43.75	0.00	0.00
	B	2.50	0.00	5.00	2.13
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	40.00	56.25	95.00	97.87
Wednesday	A	60.00	44.68	0.00	0.00
	B	2.50	2.13	0.00	0.00
	C	0.00	0.00	2.50	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	37.50	53.19	97.50	97.83
Thursday	A	52.50	56.25	5.00	2.17
	B	2.50	0.00	2.50	6.52
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	45.00	43.75	92.50	91.30
Friday	A	90.24	93.75	4.88	4.26
	B	7.32	2.08	7.32	4.26
	C	0.00	0.00	2.44	4.26
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	4.17	85.37	87.23

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**Table B-43**  
**Change of LOS distribution for all weekdays [07:10-07:15] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	65.85	62.50	4.88	6.38
	B	0.00	0.00	7.32	4.26
	C	0.00	0.00	2.44	2.13
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	34.15	37.50	85.37	87.23
Tuesday	A	57.50	41.67	0.00	0.00
	B	0.00	0.00	2.50	2.13
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	42.50	58.33	95.00	97.87
Wednesday	A	52.50	42.55	0.00	0.00
	B	5.00	0.00	0.00	2.17
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	42.50	57.45	97.50	97.83
Thursday	A	45.00	47.92	5.00	2.17
	B	0.00	2.08	2.50	8.70
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	55.00	50.00	92.50	89.13
Friday	A	95.12	89.58	7.32	6.38
	B	2.44	0.00	9.76	0.00
	C	0.00	0.00	2.44	4.26
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	10.42	80.49	89.36

**Table B-44**  
**Change of LOS distribution for all weekdays [07:15-07:20] for westbound (AM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	60.98	60.42	4.88	6.38
	B	0.00	0.00	9.76	6.38
	C	0.00	0.00	2.44	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	39.02	39.58	82.93	87.23
Tuesday	A	60.00	43.75	0.00	0.00
	B	0.00	0.00	2.50	2.13
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	40.00	56.25	95.00	97.87
Wednesday	A	50.00	46.81	0.00	0.00
	B	0.00	0.00	0.00	0.00
	C	0.00	0.00	2.50	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	50.00	53.19	97.50	97.83
Thursday	A	40.00	45.83	2.50	2.17
	B	2.50	2.08	5.00	4.35
	C	0.00	0.00	0.00	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	57.50	52.08	92.50	91.30
Friday	A	85.37	91.67	7.32	4.26
	B	7.32	0.00	7.32	4.26
	C	0.00	0.00	2.44	2.13
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	7.32	8.33	82.93	89.36

**Table B-45**  
**Change of LOS distribution for all weekdays [07:20-07:25] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	58.54	62.50	4.88	6.38
	B	0.00	0.00	9.76	6.38
	C	0.00	0.00	2.44	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	41.46	37.50	82.93	87.23
Tuesday	A	65.00	39.58	0.00	0.00
	B	0.00	0.00	5.00	0.00
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	35.00	60.42	95.00	100.00
Wednesday	A	40.00	44.68	0.00	0.00
	B	2.50	0.00	2.50	0.00
	C	0.00	0.00	0.00	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	57.50	55.32	97.50	97.83
Thursday	A	42.50	43.75	2.50	2.17
	B	0.00	0.00	5.00	2.17
	C	0.00	0.00	2.50	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	57.50	56.25	90.00	93.48
Friday	A	92.68	91.67	4.88	4.26
	B	0.00	0.00	9.76	2.13
	C	0.00	0.00	0.00	4.26
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	7.32	8.33	85.37	89.36

**Table B-46**  
**Change of LOS distribution for all weekdays [07:25-07:30] for westbound (AM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	63.41	56.25	4.88	6.38
	B	0.00	0.00	12.20	6.38
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	36.59	43.75	82.93	87.23
Tuesday	A	60.00	45.83	0.00	0.00
	B	0.00	0.00	5.00	2.13
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	40.00	54.17	95.00	97.87
Wednesday	A	37.50	40.43	0.00	0.00
	B	2.50	0.00	0.00	2.17
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	60.00	59.57	97.50	97.83
Thursday	A	41.03	41.67	5.13	2.17
	B	0.00	0.00	2.56	6.52
	C	0.00	0.00	2.56	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	58.97	58.33	89.74	91.30
Friday	A	92.68	89.36	4.88	4.26
	B	0.00	0.00	12.20	2.13
	C	0.00	0.00	2.44	2.13
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	7.32	10.64	80.49	91.49

**Table B-47**  
**Change of LOS distribution for all weekdays [07:30-07:35] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	65.85	58.33	4.88	6.38
	B	0.00	0.00	9.76	6.38
	C	0.00	0.00	0.00	2.13
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	34.15	41.67	85.37	85.11
Tuesday	A	70.00	39.58	0.00	0.00
	B	0.00	0.00	5.00	0.00
	C	0.00	0.00	0.00	2.13
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	30.00	60.42	95.00	97.87
Wednesday	A	47.50	38.30	0.00	0.00
	B	0.00	0.00	0.00	0.00
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	52.50	61.70	97.50	100.00
Thursday	A	37.50	37.50	5.00	2.17
	B	0.00	0.00	2.50	2.17
	C	0.00	0.00	2.50	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	62.50	62.50	90.00	93.48
Friday	A	92.68	85.42	7.32	4.35
	B	0.00	0.00	12.20	4.35
	C	0.00	0.00	0.00	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	7.32	14.58	80.49	89.13

**Table B-48**  
**Change of LOS distribution for all weekdays [07:35-07:40] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	65.00	55.32	4.88	6.52
	B	0.00	2.13	9.76	8.70
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	35.00	42.55	85.37	84.78
Tuesday	A	62.50	35.42	0.00	0.00
	B	2.50	0.00	5.00	2.13
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	35.00	64.58	95.00	97.87
Wednesday	A	50.00	40.43	0.00	0.00
	B	0.00	0.00	2.50	0.00
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	50.00	59.57	97.50	100.00
Thursday	A	45.00	38.30	2.50	2.17
	B	0.00	2.13	5.00	2.17
	C	0.00	0.00	2.50	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	55.00	59.57	90.00	93.48
Friday	A	90.24	81.25	4.88	4.35
	B	0.00	0.00	14.63	2.17
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	9.76	18.75	80.49	93.48

**Table B-49**  
**Change of LOS distribution for all weekdays [07:40-07:45] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	63.41	54.17	4.88	6.52
	B	2.44	0.00	9.76	6.52
	C	0.00	0.00	0.00	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	34.15	45.83	85.37	84.78
Tuesday	A	65.00	43.75	0.00	0.00
	B	0.00	0.00	5.00	2.13
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	35.00	56.25	95.00	97.87
Wednesday	A	55.00	42.55	0.00	0.00
	B	0.00	0.00	2.50	0.00
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	45.00	57.45	97.50	100.00
Thursday	A	57.50	43.75	5.00	2.17
	B	0.00	0.00	2.50	4.35
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	42.50	56.25	90.00	93.48
Friday	A	95.12	85.11	7.32	6.52
	B	0.00	0.00	12.20	2.17
	C	0.00	0.00	4.88	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	4.88	14.89	75.61	89.13

**Table B-50**  
**Change of LOS distribution for all weekdays [07:45-07:50] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	70.73	52.08	4.88	6.52
	B	0.00	0.00	12.20	8.70
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	29.27	47.92	82.93	84.78
Tuesday	A	70.00	43.75	0.00	0.00
	B	2.50	0.00	7.50	4.26
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	27.50	56.25	92.50	95.74
Wednesday	A	55.00	42.55	0.00	0.00
	B	2.50	0.00	5.00	0.00
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	42.50	57.45	95.00	100.00
Thursday	A	52.50	47.92	5.00	2.17
	B	0.00	2.08	2.50	6.52
	C	0.00	0.00	5.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	47.50	50.00	87.50	91.30
Friday	A	95.12	83.33	9.76	6.52
	B	0.00	2.08	17.07	4.35
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	4.88	14.58	73.17	89.13

**Table B-51**  
**Change of LOS distribution for all weekdays [07:50-07:55] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	68.29	70.83	4.88	6.52
	B	2.44	0.00	17.07	8.70
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	29.27	29.17	78.05	84.78
Tuesday	A	70.00	45.83	0.00	0.00
	B	0.00	0.00	10.00	4.26
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	30.00	54.17	90.00	95.74
Wednesday	A	57.50	44.68	0.00	0.00
	B	0.00	2.13	10.00	2.17
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	42.50	53.19	90.00	97.83
Thursday	A	52.50	47.92	5.00	2.17
	B	0.00	2.08	5.00	6.52
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	47.50	50.00	87.50	91.30
Friday	A	92.68	83.33	4.88	6.52
	B	0.00	0.00	24.39	8.70
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	7.32	16.67	70.73	84.78

**Table B-52**  
**Change of LOS distribution for all weekdays [07:55-08:00] for westbound (AM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	68.29	72.92	4.88	8.70
	B	2.44	0.00	19.51	6.52
	C	0.00	0.00	2.44	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	29.27	27.08	73.17	84.78
Tuesday	A	72.50	50.00	2.50	0.00
	B	0.00	0.00	7.50	4.26
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	27.50	50.00	90.00	95.74
Wednesday	A	60.00	51.06	0.00	0.00
	B	0.00	0.00	10.00	6.52
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	40.00	48.94	90.00	93.48
Thursday	A	50.00	50.00	5.00	2.17
	B	0.00	2.08	7.50	6.52
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	50.00	47.92	87.50	91.30
Friday	A	95.12	83.33	7.32	6.52
	B	0.00	0.00	26.83	6.52
	C	0.00	0.00	0.00	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	4.88	16.67	65.85	82.61

**Table B-53**  
**Change of LOS distribution for all weekdays [08:00-08:05] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	70.73	72.34	4.88	6.52
	B	0.00	0.00	19.51	10.87
	C	0.00	0.00	2.44	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	29.27	27.66	73.17	82.61
Tuesday	A	75.00	52.08	0.00	0.00
	B	0.00	0.00	10.26	4.26
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	25.00	47.92	89.74	95.74
Wednesday	A	60.00	53.19	0.00	0.00
	B	0.00	0.00	10.00	6.52
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	40.00	46.81	90.00	93.48
Thursday	A	55.00	53.19	5.00	2.17
	B	0.00	0.00	7.50	6.52
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	45.00	46.81	87.50	91.30
Friday	A	95.12	87.50	4.88	8.70
	B	0.00	0.00	36.59	13.04
	C	0.00	0.00	2.44	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	4.88	12.50	56.10	78.26

**Table B-54**  
**Change of LOS distribution for all weekdays [08:05-08:10] for westbound (AM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	73.17	68.75	4.88	6.52
	B	0.00	0.00	21.95	13.04
	C	0.00	0.00	2.44	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	26.83	31.25	70.73	80.43
Tuesday	A	77.50	47.92	0.00	0.00
	B	0.00	0.00	10.26	6.38
	C	0.00	0.00	2.56	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	22.50	52.08	87.18	93.62
Wednesday	A	65.00	53.19	0.00	0.00
	B	0.00	0.00	10.00	6.52
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	35.00	46.81	87.50	93.48
Thursday	A	52.50	60.42	5.00	2.17
	B	0.00	0.00	7.50	6.52
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	47.50	39.58	85.00	91.30
Friday	A	95.12	87.23	7.32	8.70
	B	0.00	0.00	41.46	13.04
	C	0.00	0.00	2.44	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	4.88	12.77	48.78	78.26

**Table B-55**  
**Change of LOS distribution for all weekdays [08:10-08:15] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	75.61	68.75	4.88	6.52
	B	0.00	0.00	26.83	19.57
	C	0.00	0.00	4.88	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	24.39	31.25	63.41	73.91
Tuesday	A	80.00	50.00	0.00	2.13
	B	0.00	0.00	10.26	6.38
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	20.00	50.00	89.74	91.49
Wednesday	A	62.50	57.45	0.00	0.00
	B	0.00	0.00	10.00	6.52
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	37.50	42.55	87.50	93.48
Thursday	A	57.50	66.67	2.50	2.17
	B	0.00	0.00	7.50	6.52
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	42.50	33.33	87.50	91.30
Friday	A	97.56	87.50	4.88	6.52
	B	0.00	0.00	46.34	23.91
	C	0.00	0.00	2.44	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	12.50	46.34	69.57

**Table B-56**  
**Change of LOS distribution for all weekdays [08:15-08:20] for westbound (AM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	68.29	76.60	4.88	6.52
	B	0.00	0.00	29.27	17.39
	C	0.00	0.00	4.88	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	31.71	23.40	60.98	73.91
Tuesday	A	79.49	53.19	0.00	0.00
	B	0.00	0.00	15.38	8.51
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	20.51	46.81	84.62	91.49
Wednesday	A	62.50	61.70	0.00	0.00
	B	0.00	0.00	12.50	8.70
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	37.50	38.30	85.00	91.30
Thursday	A	57.50	66.67	5.00	2.17
	B	0.00	0.00	7.50	6.52
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	42.50	33.33	85.00	91.30
Friday	A	95.12	89.36	4.88	6.52
	B	0.00	0.00	51.22	19.57
	C	0.00	0.00	4.88	6.52
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	4.88	10.64	39.02	67.39

**Table B-57**  
**Change of LOS distribution for all weekdays [08:20-08:25] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	70.73	77.08	4.88	6.52
	B	0.00	0.00	34.15	19.57
	C	0.00	0.00	4.88	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	29.27	22.92	56.10	73.91
Tuesday	A	79.49	56.25	0.00	0.00
	B	0.00	0.00	25.64	8.51
	C	0.00	0.00	2.56	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	20.51	43.75	71.79	91.49
Wednesday	A	70.00	53.19	0.00	0.00
	B	0.00	0.00	17.50	10.87
	C	0.00	0.00	2.50	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	30.00	46.81	80.00	86.96
Thursday	A	60.00	66.67	5.00	2.17
	B	0.00	0.00	7.50	8.70
	C	0.00	0.00	5.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	40.00	33.33	82.50	89.13
Friday	A	97.56	87.50	4.88	6.52
	B	0.00	0.00	56.10	26.09
	C	0.00	0.00	7.32	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	12.50	31.71	67.39

**Table B-58**  
**Change of LOS distribution for all weekdays [08:25-08:30] for westbound (AM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	70.73	81.25	2.44	6.52
	B	0.00	0.00	36.59	21.74
	C	0.00	0.00	4.88	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	29.27	18.75	56.10	67.39
Tuesday	A	75.00	56.25	0.00	0.00
	B	2.50	0.00	35.00	10.64
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	22.50	43.75	62.50	89.36
Wednesday	A	67.50	53.19	0.00	0.00
	B	5.00	2.13	20.00	15.22
	C	0.00	0.00	7.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	27.50	44.68	72.50	84.78
Thursday	A	60.00	65.96	2.50	4.35
	B	0.00	0.00	20.00	8.70
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	40.00	34.04	77.50	86.96
Friday	A	92.68	87.23	4.88	4.35
	B	2.44	0.00	68.29	32.61
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	4.88	12.77	26.83	63.04

**Table B-59**  
**Change of LOS distribution for all weekdays [08:30-08:35] for westbound (AM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	75.61	83.33	4.88	6.52
	B	0.00	0.00	43.90	30.43
	C	0.00	0.00	0.00	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	24.39	16.67	51.22	60.87
Tuesday	A	77.50	54.17	0.00	0.00
	B	2.50	0.00	42.50	14.89
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	20.00	45.83	57.50	85.11
Wednesday	A	75.00	59.57	0.00	0.00
	B	0.00	0.00	30.00	13.04
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	25.00	40.43	70.00	86.96
Thursday	A	52.50	75.00	2.50	2.17
	B	2.50	0.00	25.00	13.04
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	45.00	25.00	72.50	84.78
Friday	A	95.12	89.58	7.32	2.17
	B	2.44	0.00	70.73	36.96
	C	0.00	0.00	4.88	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	10.42	17.07	60.87

**Table B-60**  
**Change of LOS distribution for all weekdays [08:35-08:40] for westbound (AM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	82.93	83.33	4.88	6.52
	B	0.00	0.00	53.66	36.96
	C	0.00	0.00	2.44	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	17.07	16.67	39.02	56.52
Tuesday	A	85.00	60.42	0.00	0.00
	B	0.00	0.00	52.50	14.89
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	15.00	39.58	47.50	85.11
Wednesday	A	77.50	61.70	0.00	0.00
	B	0.00	0.00	40.00	15.56
	C	0.00	0.00	0.00	2.22
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	22.50	38.30	60.00	82.22
Thursday	A	65.00	83.33	2.50	2.17
	B	2.50	0.00	27.50	17.39
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	32.50	16.67	70.00	80.43
Friday	A	95.12	91.67	4.88	6.52
	B	2.44	0.00	85.37	43.48
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	8.33	9.76	50.00

**Table B-61**  
**Change of LOS distribution for all weekdays [08:40-08:45] for westbound (AM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	87.80	83.33	4.88	6.52
	B	0.00	0.00	56.10	39.13
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	12.20	16.67	39.02	54.35
Tuesday	A	85.00	68.75	0.00	0.00
	B	0.00	0.00	60.00	21.28
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	15.00	31.25	40.00	78.72
Wednesday	A	85.00	65.96	0.00	0.00
	B	2.50	0.00	50.00	19.57
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	12.50	34.04	50.00	80.43
Thursday	A	65.00	85.11	5.00	2.17
	B	2.50	0.00	35.00	19.57
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	32.50	14.89	60.00	78.26
Friday	A	95.12	93.62	7.32	8.70
	B	2.44	0.00	87.80	52.17
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	6.38	4.88	39.13

**Table B-62**  
**Change of LOS distribution for all weekdays [08:45-08:50] for westbound (AM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	85.37	83.33	4.88	6.52
	B	2.44	0.00	58.54	45.65
	C	0.00	0.00	0.00	2.17
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	12.20	16.67	36.59	45.65
Tuesday	A	87.18	79.17	2.56	4.26
	B	0.00	0.00	66.67	25.53
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	12.82	20.83	30.77	70.21
Wednesday	A	85.00	72.34	0.00	0.00
	B	5.00	0.00	57.50	19.57
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	10.00	27.66	42.50	80.43
Thursday	A	70.00	91.67	7.50	2.17
	B	2.50	0.00	40.00	21.74
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	27.50	8.33	52.50	76.09
Friday	A	95.12	95.65	4.88	4.35
	B	2.44	0.00	90.24	52.17
	C	0.00	0.00	2.44	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	4.35	2.44	43.48

**Table B-63**  
**Change of LOS distribution for all weekdays [08:50-08:55] for westbound (AM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	90.24	87.50	4.88	6.52
	B	2.44	0.00	70.73	52.17
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	7.32	12.50	24.39	41.30
Tuesday	A	82.50	78.72	0.00	0.00
	B	5.00	0.00	67.50	29.79
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	12.50	21.28	32.50	70.21
Wednesday	A	92.50	78.72	0.00	0.00
	B	0.00	0.00	65.00	26.09
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	7.50	21.28	35.00	73.91
Thursday	A	75.00	91.67	2.50	4.35
	B	12.50	0.00	50.00	26.09
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	12.50	8.33	45.00	69.57
Friday	A	95.12	95.74	4.88	4.35
	B	2.44	0.00	92.68	58.70
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	4.26	2.44	36.96

**Table B-64**  
**Change of LOS distribution for all weekdays [08:55-09:00] for westbound (AM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10001		10003	
		LOS	Before	After	Before
Monday	A	95.12	93.75	4.88	6.52
	B	0.00	0.00	68.29	63.04
	C	0.00	0.00	2.44	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	4.88	6.25	24.39	30.43
Tuesday	A	90.00	82.98	0.00	2.13
	B	0.00	0.00	72.50	38.30
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	10.00	17.02	27.50	59.57
Wednesday	A	90.00	80.00	2.50	2.17
	B	0.00	0.00	75.00	28.26
	C	0.00	0.00	0.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	10.00	20.00	22.50	69.57
Thursday	A	82.50	91.67	5.00	2.17
	B	2.50	0.00	50.00	32.61
	C	0.00	0.00	2.50	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	15.00	8.33	42.50	65.22
Friday	A	95.12	95.83	4.88	10.87
	B	2.44	0.00	90.24	54.35
	C	0.00	0.00	2.44	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	4.17	2.44	34.78

**Table B-65**  
**Change of LOS distribution for all weekdays [15:00-15:05] for eastbound (PM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	62.50	80.95	0.00	13.64
	B	37.50	19.05	26.87	31.82
	C	0.00	0.00	50.75	9.09
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	22.39	45.45
Tuesday	A	52.50	54.76	1.49	4.35
	B	47.50	42.86	14.93	34.78
	C	0.00	0.00	53.73	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	29.85	60.87
Wednesday	A	37.50	57.14	1.52	13.64
	B	62.50	40.48	21.21	22.73
	C	0.00	0.00	57.58	9.09
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	19.70	54.55
Thursday	A	30.00	51.16	3.03	13.04
	B	70.00	48.84	22.73	26.09
	C	0.00	0.00	53.03	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	21.21	56.52
Friday	A	24.39	23.81	0.00	8.70
	B	75.61	76.19	18.18	17.39
	C	0.00	0.00	45.45	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	36.36	69.57

**Table B-66**  
**Change of LOS distribution for all weekdays [15:05-15:10] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	60.00	54.76	0.00	22.73
	B	40.00	42.86	16.42	27.27
	C	0.00	0.00	52.24	9.09
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	31.34	40.91
Tuesday	A	27.50	50.00	4.48	0.00
	B	70.00	47.62	11.94	39.13
	C	0.00	0.00	65.67	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	2.38	17.91	56.52
Wednesday	A	27.50	45.24	1.52	4.76
	B	72.50	54.76	21.21	19.05
	C	0.00	0.00	57.58	4.76
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	19.70	71.43
Thursday	A	25.00	23.81	0.00	4.35
	B	75.00	76.19	19.70	34.78
	C	0.00	0.00	60.61	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	19.70	56.52
Friday	A	14.63	28.57	1.49	4.35
	B	85.37	71.43	13.43	17.39
	C	0.00	0.00	55.22	8.70
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	29.85	69.57

**Table B-67**  
**Change of LOS distribution for all weekdays [15:10-15:15] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	42.50	57.14	1.49	8.70
	B	57.50	42.86	16.42	30.43
	C	0.00	0.00	59.70	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	22.39	60.87
Tuesday	A	30.00	52.38	1.49	8.70
	B	67.50	47.62	11.94	21.74
	C	0.00	0.00	62.69	8.70
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	23.88	60.87
Wednesday	A	32.50	40.48	0.00	4.55
	B	67.50	59.52	21.21	27.27
	C	0.00	0.00	56.06	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	22.73	63.64
Thursday	A	17.50	42.86	1.52	13.04
	B	82.50	57.14	13.64	21.74
	C	0.00	0.00	57.58	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	27.27	60.87
Friday	A	19.51	21.43	1.49	13.64
	B	80.49	78.57	14.93	31.82
	C	0.00	0.00	52.24	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	31.34	54.55

**Table B-68**  
**Change of LOS distribution for all weekdays [15:15-15:20] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	32.50	42.86	1.49	8.70
	B	67.50	57.14	10.45	34.78
	C	0.00	0.00	61.19	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	26.87	52.17
Tuesday	A	27.50	42.86	1.49	0.00
	B	70.00	57.14	10.45	21.74
	C	0.00	0.00	56.72	8.70
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	31.34	69.57
Wednesday	A	17.50	38.10	0.00	4.55
	B	82.50	61.90	19.70	18.18
	C	0.00	0.00	50.00	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	30.30	72.73
Thursday	A	12.50	23.26	0.00	0.00
	B	87.50	76.74	15.15	21.74
	C	0.00	0.00	54.55	4.35
	D	0.00	0.00	1.52	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	28.79	73.91
Friday	A	24.39	30.95	1.49	4.76
	B	75.61	69.05	16.42	33.33
	C	0.00	0.00	53.73	4.76
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	28.36	57.14

**Table B-69**  
**Change of LOS distribution for all weekdays [15:20-15:25] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	42.50	57.14	0.00	8.70
	B	57.50	42.86	20.90	39.13
	C	0.00	0.00	56.72	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	22.39	52.17
Tuesday	A	27.50	28.57	1.49	0.00
	B	72.50	71.43	7.46	26.09
	C	0.00	0.00	62.69	8.70
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	28.36	65.22
Wednesday	A	37.50	30.95	1.52	0.00
	B	62.50	69.05	15.15	23.81
	C	0.00	0.00	57.58	9.52
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	25.76	66.67
Thursday	A	35.00	33.33	0.00	4.55
	B	65.00	66.67	19.70	31.82
	C	0.00	0.00	54.55	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	25.76	63.64
Friday	A	14.63	23.81	1.49	4.55
	B	85.37	76.19	11.94	22.73
	C	0.00	0.00	59.70	9.09
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	26.87	63.64

**Table B-70**  
**Change of LOS distribution for all weekdays [15:25-15:30] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	32.50	42.86	0.00	8.70
	B	67.50	52.38	20.90	30.43
	C	0.00	0.00	58.21	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	4.76	20.90	60.87
Tuesday	A	27.50	30.95	1.49	0.00
	B	70.00	66.67	16.42	26.09
	C	0.00	0.00	62.69	8.70
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	2.38	19.40	65.22
Wednesday	A	25.00	33.33	1.52	0.00
	B	75.00	66.67	16.67	9.09
	C	0.00	0.00	57.58	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	24.24	86.36
Thursday	A	17.50	35.71	0.00	8.70
	B	82.50	64.29	15.15	34.78
	C	0.00	0.00	56.06	8.70
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	28.79	47.83
Friday	A	12.20	21.95	0.00	4.55
	B	87.80	78.05	14.93	27.27
	C	0.00	0.00	58.21	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	26.87	63.64

**Table B-71**  
**Change of LOS distribution for all weekdays [15:30-15:35] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	45.00	59.52	1.49	13.04
	B	55.00	38.10	14.93	21.74
	C	0.00	0.00	58.21	8.70
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	25.37	56.52
Tuesday	A	32.50	38.10	0.00	0.00
	B	67.50	61.90	14.93	13.04
	C	0.00	0.00	58.21	8.70
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	26.87	78.26
Wednesday	A	40.00	38.10	0.00	0.00
	B	60.00	61.90	10.61	22.73
	C	0.00	0.00	62.12	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	27.27	72.73
Thursday	A	22.50	25.58	0.00	4.35
	B	77.50	74.42	13.64	17.39
	C	0.00	0.00	62.12	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	24.24	73.91
Friday	A	17.07	16.67	0.00	4.55
	B	82.93	83.33	22.39	27.27
	C	0.00	0.00	53.73	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	23.88	68.18

**Table B-72**  
**Change of LOS distribution for all weekdays [15:35-15:40] for eastbound (PM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	15.00	47.62	1.49	13.04
	B	85.00	47.62	17.91	30.43
	C	0.00	0.00	58.21	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	4.76	22.39	56.52
Tuesday	A	30.00	40.48	2.99	0.00
	B	67.50	59.52	11.94	26.09
	C	0.00	0.00	58.21	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	26.87	69.57
Wednesday	A	17.50	30.95	0.00	0.00
	B	80.00	69.05	10.61	22.73
	C	0.00	0.00	60.61	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	28.79	77.27
Thursday	A	10.00	25.58	0.00	4.35
	B	90.00	74.42	9.09	30.43
	C	0.00	0.00	60.61	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	30.30	65.22
Friday	A	14.63	19.05	1.49	4.55
	B	85.37	80.95	17.91	36.36
	C	0.00	0.00	52.24	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	28.36	59.09

**Table B-73**  
**Change of LOS distribution for all weekdays [15:40-15:45] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	30.00	59.52	1.49	13.04
	B	70.00	40.48	13.43	26.09
	C	0.00	0.00	58.21	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	26.87	60.87
Tuesday	A	42.50	45.24	0.00	0.00
	B	55.00	54.76	7.46	17.39
	C	0.00	0.00	62.69	8.70
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	29.85	73.91
Wednesday	A	17.95	40.48	0.00	0.00
	B	79.49	57.14	13.85	22.73
	C	0.00	0.00	58.46	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.56	2.38	27.69	72.73
Thursday	A	37.50	37.21	3.03	0.00
	B	62.50	62.79	12.12	17.39
	C	0.00	0.00	57.58	4.35
	D	0.00	0.00	1.52	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	25.76	78.26
Friday	A	17.07	23.81	2.99	4.35
	B	82.93	76.19	13.43	30.43
	C	0.00	0.00	65.67	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	17.91	60.87

**Table B-74**  
**Change of LOS distribution for all weekdays [15:45-15:50] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	37.50	54.76	2.99	8.70
	B	62.50	45.24	11.94	34.78
	C	0.00	0.00	62.69	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	22.39	56.52
Tuesday	A	20.00	33.33	1.49	0.00
	B	77.50	66.67	11.94	17.39
	C	0.00	0.00	59.70	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	26.87	78.26
Wednesday	A	10.26	40.48	0.00	0.00
	B	89.74	57.14	18.18	27.27
	C	0.00	0.00	56.06	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	25.76	68.18
Thursday	A	12.50	35.71	3.03	0.00
	B	87.50	64.29	10.61	43.48
	C	0.00	0.00	59.09	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	27.27	52.17
Friday	A	17.07	21.43	0.00	4.35
	B	82.93	78.57	17.91	26.09
	C	0.00	0.00	53.73	4.35
	D	0.00	0.00	1.49	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	26.87	65.22

**Table B-75**  
**Change of LOS distribution for all weekdays [15:50-15:55] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	37.50	57.14	1.49	17.39
	B	62.50	42.86	19.40	34.78
	C	0.00	0.00	59.70	8.70
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	19.40	39.13
Tuesday	A	23.08	34.15	2.99	4.55
	B	74.36	65.85	5.97	22.73
	C	0.00	0.00	65.67	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.56	0.00	25.37	72.73
Wednesday	A	23.08	33.33	0.00	0.00
	B	74.36	61.90	13.64	27.27
	C	0.00	0.00	53.03	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.56	4.76	33.33	68.18
Thursday	A	23.08	30.23	3.03	0.00
	B	76.92	69.77	16.67	36.36
	C	0.00	0.00	53.03	9.09
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	27.27	54.55
Friday	A	20.00	9.52	0.00	8.70
	B	80.00	90.48	13.43	26.09
	C	0.00	0.00	53.73	8.70
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	32.84	56.52

**Table B-76**  
**Change of LOS distribution for all weekdays [15:55-16:00] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	25.00	40.48	1.49	13.04
	B	75.00	59.52	17.91	34.78
	C	0.00	0.00	61.19	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	19.40	47.83
Tuesday	A	17.50	28.57	2.99	9.09
	B	80.00	71.43	4.48	22.73
	C	0.00	0.00	58.21	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	34.33	63.64
Wednesday	A	10.00	33.33	0.00	0.00
	B	90.00	64.29	13.64	27.27
	C	0.00	0.00	62.12	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	24.24	68.18
Thursday	A	15.00	20.93	1.52	0.00
	B	85.00	79.07	12.12	34.78
	C	0.00	0.00	50.00	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	36.36	60.87
Friday	A	12.50	11.90	0.00	13.04
	B	87.50	88.10	14.93	26.09
	C	0.00	0.00	50.75	4.35
	D	0.00	0.00	1.49	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	32.84	56.52

**Table B-77**  
**Change of LOS distribution for all weekdays [16:00-16:05] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	22.50	52.38	1.49	13.04
	B	77.50	47.62	20.90	26.09
	C	0.00	0.00	61.19	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	16.42	56.52
Tuesday	A	17.50	29.27	1.49	0.00
	B	80.00	70.73	10.45	26.09
	C	0.00	0.00	65.67	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	22.39	69.57
Wednesday	A	25.64	40.48	0.00	0.00
	B	74.36	57.14	16.67	31.82
	C	0.00	0.00	63.64	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	19.70	63.64
Thursday	A	20.00	23.81	1.52	8.70
	B	80.00	76.19	9.09	26.09
	C	0.00	0.00	60.61	8.70
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	28.79	56.52
Friday	A	17.07	23.81	1.49	4.55
	B	82.93	76.19	11.94	31.82
	C	0.00	0.00	64.18	9.09
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	22.39	54.55

**Table B-78**  
**Change of LOS distribution for all weekdays [16:05-16:10] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	32.50	23.81	0.00	8.70
	B	67.50	76.19	19.70	39.13
	C	0.00	0.00	59.09	4.35
	D	0.00	0.00	1.52	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	19.70	47.83
Tuesday	A	15.00	16.67	2.99	0.00
	B	82.50	80.95	7.46	4.35
	C	0.00	0.00	62.69	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	2.38	26.87	91.30
Wednesday	A	5.00	26.19	0.00	0.00
	B	95.00	71.43	13.64	22.73
	C	0.00	0.00	54.55	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	31.82	77.27
Thursday	A	10.00	13.95	1.52	0.00
	B	90.00	86.05	13.64	43.48
	C	0.00	0.00	57.58	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	27.27	56.52
Friday	A	14.63	14.29	1.49	4.55
	B	85.37	85.71	11.94	31.82
	C	0.00	0.00	59.70	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	26.87	63.64

**Table B-79**  
**Change of LOS distribution for all weekdays [16:10-16:15] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	27.50	40.48	0.00	13.04
	B	72.50	59.52	15.15	39.13
	C	0.00	0.00	68.18	8.70
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	16.67	39.13
Tuesday	A	10.00	23.81	4.48	4.35
	B	90.00	73.81	13.43	17.39
	C	0.00	0.00	56.72	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	25.37	73.91
Wednesday	A	10.00	30.95	0.00	0.00
	B	90.00	69.05	13.64	18.18
	C	0.00	0.00	63.64	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	22.73	77.27
Thursday	A	27.50	23.26	1.52	0.00
	B	70.00	76.74	12.12	21.74
	C	0.00	0.00	57.58	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	28.79	73.91
Friday	A	14.63	19.05	1.49	0.00
	B	85.37	80.95	17.91	45.45
	C	0.00	0.00	56.72	13.64
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	23.88	40.91

**Table B-80**  
**Change of LOS distribution for all weekdays [16:15-16:20] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	14.63	30.95	1.52	8.70
	B	85.37	69.05	18.18	39.13
	C	0.00	0.00	60.61	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	19.70	47.83
Tuesday	A	15.00	19.05	4.48	0.00
	B	82.50	78.57	7.46	8.70
	C	2.50	0.00	59.70	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	28.36	91.30
Wednesday	A	0.00	19.05	0.00	4.55
	B	100.00	80.95	12.12	22.73
	C	0.00	0.00	60.61	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	27.27	72.73
Thursday	A	17.50	13.95	3.03	8.70
	B	82.50	86.05	16.67	26.09
	C	0.00	0.00	51.52	8.70
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	28.79	56.52
Friday	A	17.07	21.43	0.00	4.35
	B	82.93	78.57	19.40	39.13
	C	0.00	0.00	62.69	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	17.91	56.52

**Table B-81**  
**Change of LOS distribution for all weekdays [16:20-16:25] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	24.39	33.33	1.49	8.70
	B	75.61	66.67	10.45	39.13
	C	0.00	0.00	65.67	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	22.39	47.83
Tuesday	A	20.00	19.05	2.99	0.00
	B	80.00	78.57	8.96	13.04
	C	0.00	0.00	58.21	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	29.85	86.96
Wednesday	A	10.00	14.29	0.00	0.00
	B	90.00	85.71	12.12	18.18
	C	0.00	0.00	69.70	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	18.18	81.82
Thursday	A	15.00	23.81	1.52	4.35
	B	85.00	76.19	12.12	34.78
	C	0.00	0.00	56.06	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	30.30	56.52
Friday	A	14.63	23.81	1.49	0.00
	B	82.93	73.81	23.88	30.43
	C	0.00	0.00	55.22	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	2.38	19.40	69.57

**Table B-82**  
**Change of LOS distribution for all weekdays [16:25-16:30] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	7.32	23.81	0.00	8.70
	B	92.68	76.19	10.45	30.43
	C	0.00	0.00	70.15	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	19.40	56.52
Tuesday	A	15.00	11.90	1.49	0.00
	B	85.00	85.71	7.46	8.70
	C	0.00	0.00	59.70	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	31.34	91.30
Wednesday	A	0.00	14.29	0.00	0.00
	B	100.00	85.71	13.64	22.73
	C	0.00	0.00	62.12	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	24.24	77.27
Thursday	A	17.50	18.60	1.52	0.00
	B	82.50	79.07	9.09	30.43
	C	0.00	0.00	50.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.33	39.39	69.57
Friday	A	19.51	16.67	1.49	4.55
	B	78.05	83.33	17.91	31.82
	C	0.00	0.00	56.72	9.09
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	0.00	23.88	54.55

**Table B-83**  
**Change of LOS distribution for all weekdays [16:30-16:35] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	17.07	42.86	2.99	8.70
	B	82.93	57.14	14.93	39.13
	C	0.00	0.00	64.18	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	17.91	47.83
Tuesday	A	27.50	16.67	1.49	0.00
	B	72.50	83.33	7.46	30.43
	C	0.00	0.00	65.67	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	25.37	69.57
Wednesday	A	7.50	19.05	0.00	0.00
	B	92.50	80.95	10.61	22.73
	C	0.00	0.00	57.58	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	31.82	77.27
Thursday	A	15.00	23.81	1.52	4.35
	B	85.00	73.81	10.61	26.09
	C	0.00	0.00	63.64	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	24.24	65.22
Friday	A	14.63	16.67	2.99	4.55
	B	85.37	83.33	11.94	27.27
	C	0.00	0.00	59.70	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	25.37	63.64

**Table B-84**  
**Change of LOS distribution for all weekdays [16:35-16:40] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	12.20	28.57	1.49	4.35
	B	87.80	71.43	16.42	43.48
	C	0.00	0.00	65.67	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	16.42	52.17
Tuesday	A	12.50	21.43	1.49	0.00
	B	87.50	78.57	11.94	17.39
	C	0.00	0.00	55.22	8.70
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	31.34	73.91
Wednesday	A	12.50	26.19	0.00	0.00
	B	87.50	73.81	9.09	22.73
	C	0.00	0.00	65.15	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	25.76	77.27
Thursday	A	7.50	25.58	1.52	4.35
	B	92.50	74.42	10.61	30.43
	C	0.00	0.00	62.12	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	25.76	60.87
Friday	A	17.07	19.05	1.49	0.00
	B	82.93	80.95	14.93	22.73
	C	0.00	0.00	62.69	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	20.90	72.73

**Table B-85**  
**Change of LOS distribution for all weekdays [16:40-16:45] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	9.76	35.71	2.99	4.35
	B	90.24	64.29	13.43	43.48
	C	0.00	0.00	62.69	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	20.90	47.83
Tuesday	A	12.50	16.67	1.49	8.70
	B	87.50	83.33	10.45	8.70
	C	0.00	0.00	56.72	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	31.34	78.26
Wednesday	A	10.00	21.43	0.00	0.00
	B	90.00	78.57	9.09	27.27
	C	0.00	0.00	56.06	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	34.85	72.73
Thursday	A	15.00	25.58	3.03	0.00
	B	85.00	74.42	7.58	30.43
	C	0.00	0.00	59.09	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	30.30	69.57
Friday	A	21.95	28.57	1.49	0.00
	B	78.05	71.43	16.42	36.36
	C	0.00	0.00	50.75	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	31.34	59.09

**Table B-86**  
**Change of LOS distribution for all weekdays [16:45-16:50] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	14.63	33.33	0.00	8.70
	B	85.37	66.67	14.93	39.13
	C	0.00	0.00	61.19	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	23.88	52.17
Tuesday	A	17.50	26.19	1.49	0.00
	B	82.50	73.81	8.96	13.04
	C	0.00	0.00	56.72	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	32.84	82.61
Wednesday	A	5.00	21.43	0.00	0.00
	B	95.00	78.57	6.06	27.27
	C	0.00	0.00	62.12	9.09
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	31.82	63.64
Thursday	A	10.00	11.63	3.03	0.00
	B	90.00	88.37	6.06	39.13
	C	0.00	0.00	53.03	0.00
	D	0.00	0.00	1.52	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	36.36	60.87
Friday	A	14.63	23.81	1.49	0.00
	B	82.93	76.19	17.91	45.45
	C	0.00	0.00	47.76	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	0.00	32.84	50.00

**Table B-87**  
**Change of LOS distribution for all weekdays [16:50-16:55] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	29.27	40.48	2.99	0.00
	B	70.73	59.52	10.45	56.52
	C	0.00	0.00	61.19	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	25.37	43.48
Tuesday	A	25.00	28.57	1.49	0.00
	B	75.00	71.43	11.94	26.09
	C	0.00	0.00	50.75	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	35.82	73.91
Wednesday	A	12.50	26.19	0.00	0.00
	B	87.50	73.81	6.06	27.27
	C	0.00	0.00	59.09	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	34.85	72.73
Thursday	A	20.51	27.91	1.52	0.00
	B	76.92	72.09	7.58	30.43
	C	0.00	0.00	60.61	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.56	0.00	30.30	69.57
Friday	A	21.95	19.05	2.99	0.00
	B	78.05	80.95	13.43	40.91
	C	0.00	0.00	52.24	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	31.34	54.55

**Table B-88**  
**Change of LOS distribution for all weekdays [16:55-17:00] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	19.51	45.24	4.48	8.70
	B	80.49	54.76	8.96	34.78
	C	0.00	0.00	61.19	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	25.37	52.17
Tuesday	A	15.00	16.67	1.49	0.00
	B	85.00	83.33	10.45	26.09
	C	0.00	0.00	50.75	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	37.31	69.57
Wednesday	A	5.00	19.05	0.00	0.00
	B	95.00	80.95	10.61	31.82
	C	0.00	0.00	62.12	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	27.27	68.18
Thursday	A	15.38	13.95	1.52	0.00
	B	84.62	83.72	10.61	34.78
	C	0.00	0.00	60.61	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.33	27.27	65.22
Friday	A	9.76	16.67	2.99	0.00
	B	90.24	83.33	7.46	36.36
	C	0.00	0.00	58.21	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	31.34	59.09

**Table B-89**  
**Change of LOS distribution for all weekdays [17:00-17:05] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	21.95	43.90	2.99	8.70
	B	78.05	56.10	7.46	39.13
	C	0.00	0.00	61.19	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	28.36	47.83
Tuesday	A	22.50	29.27	0.00	0.00
	B	77.50	70.73	13.43	30.43
	C	0.00	0.00	55.22	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	31.34	69.57
Wednesday	A	10.00	19.05	0.00	0.00
	B	90.00	80.95	6.06	31.82
	C	0.00	0.00	60.61	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	33.33	63.64
Thursday	A	25.00	33.33	3.03	0.00
	B	75.00	64.29	13.64	34.78
	C	0.00	0.00	54.55	13.04
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	28.79	52.17
Friday	A	19.51	25.00	4.48	0.00
	B	80.49	75.00	13.43	36.36
	C	0.00	0.00	58.21	0.00
	D	0.00	0.00	1.49	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	22.39	63.64

**Table B-90**  
**Change of LOS distribution for all weekdays [17:05-17:10] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	9.76	28.57	0.00	4.35
	B	87.80	69.05	8.96	43.48
	C	0.00	0.00	53.73	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	2.38	37.31	47.83
Tuesday	A	15.00	21.43	0.00	0.00
	B	82.50	78.57	11.94	26.09
	C	0.00	0.00	53.73	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	34.33	73.91
Wednesday	A	12.50	14.29	0.00	0.00
	B	87.50	85.71	9.09	31.82
	C	0.00	0.00	51.52	9.09
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	39.39	59.09
Thursday	A	10.00	16.28	3.03	4.35
	B	90.00	83.72	10.61	47.83
	C	0.00	0.00	54.55	0.00
	D	0.00	0.00	1.52	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	30.30	47.83
Friday	A	12.20	31.71	2.99	0.00
	B	87.80	68.29	7.46	45.45
	C	0.00	0.00	56.72	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	32.84	54.55

**Table B-91**  
**Change of LOS distribution for all weekdays [17:10-17:15] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	30.00	38.10	1.49	0.00
	B	70.00	61.90	8.96	47.83
	C	0.00	0.00	56.72	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	32.84	52.17
Tuesday	A	27.50	16.67	0.00	0.00
	B	70.00	83.33	8.96	30.43
	C	0.00	0.00	55.22	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	35.82	69.57
Wednesday	A	7.50	28.57	0.00	0.00
	B	92.50	71.43	9.09	27.27
	C	0.00	0.00	59.09	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	31.82	72.73
Thursday	A	25.00	20.93	3.03	0.00
	B	75.00	79.07	12.12	52.17
	C	0.00	0.00	50.00	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	34.85	43.48
Friday	A	19.51	21.43	2.99	4.55
	B	80.49	78.57	7.46	36.36
	C	0.00	0.00	52.24	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	37.31	54.55

**Table B-92**  
**Change of LOS distribution for all weekdays [17:15-17:20] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	17.07	28.57	1.49	8.70
	B	82.93	66.67	5.97	34.78
	C	0.00	0.00	55.22	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	4.76	37.31	52.17
Tuesday	A	17.50	26.19	1.49	4.35
	B	80.00	73.81	11.94	21.74
	C	0.00	0.00	44.78	0.00
	D	0.00	0.00	2.99	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	38.81	73.91
Wednesday	A	10.00	19.05	0.00	0.00
	B	87.50	80.95	6.06	31.82
	C	0.00	0.00	53.03	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	40.91	63.64
Thursday	A	17.50	13.95	3.03	0.00
	B	82.50	86.05	9.09	30.43
	C	0.00	0.00	57.58	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	30.30	69.57
Friday	A	19.51	14.29	1.49	4.55
	B	80.49	85.71	19.40	54.55
	C	0.00	0.00	43.28	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	35.82	40.91

**Table B-93**  
**Change of LOS distribution for all weekdays [17:20-17:25] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	29.27	35.71	1.49	4.35
	B	68.29	59.52	5.97	43.48
	C	0.00	0.00	56.72	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	4.76	35.82	52.17
Tuesday	A	27.50	11.90	1.49	0.00
	B	70.00	88.10	11.94	34.78
	C	0.00	0.00	56.72	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	29.85	65.22
Wednesday	A	35.00	26.19	0.00	0.00
	B	62.50	73.81	6.06	31.82
	C	0.00	0.00	57.58	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	36.36	63.64
Thursday	A	32.50	25.58	4.55	4.35
	B	65.00	74.42	7.58	39.13
	C	0.00	0.00	50.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	37.88	56.52
Friday	A	31.71	16.67	1.49	4.55
	B	65.85	83.33	19.40	50.00
	C	0.00	0.00	41.79	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	0.00	37.31	45.45

**Table B-94**  
**Change of LOS distribution for all weekdays [17:25-17:30] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	34.15	38.10	1.49	8.70
	B	65.85	61.90	8.96	43.48
	C	0.00	0.00	46.27	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	43.28	47.83
Tuesday	A	32.50	21.43	1.49	0.00
	B	65.00	78.57	13.43	39.13
	C	0.00	0.00	53.73	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	31.34	60.87
Wednesday	A	25.00	35.71	0.00	4.55
	B	75.00	64.29	15.15	40.91
	C	0.00	0.00	54.55	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	30.30	54.55
Thursday	A	28.21	23.26	4.55	0.00
	B	69.23	76.74	12.12	39.13
	C	0.00	0.00	45.45	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.56	0.00	37.88	60.87
Friday	A	31.71	26.19	1.49	4.35
	B	68.29	73.81	19.40	43.48
	C	0.00	0.00	41.79	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	37.31	47.83

**Table B-95**  
**Change of LOS distribution for all weekdays [17:30-17:35] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	46.34	52.38	1.49	4.35
	B	53.66	45.24	11.94	60.87
	C	0.00	0.00	49.25	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	37.31	34.78
Tuesday	A	47.50	33.33	0.00	0.00
	B	50.00	66.67	10.45	39.13
	C	0.00	0.00	50.75	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	38.81	60.87
Wednesday	A	40.00	47.62	0.00	4.55
	B	60.00	52.38	12.12	45.45
	C	0.00	0.00	50.00	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	37.88	50.00
Thursday	A	35.90	32.56	4.55	0.00
	B	61.54	67.44	13.64	39.13
	C	0.00	0.00	48.48	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.56	0.00	33.33	60.87
Friday	A	34.15	35.71	4.48	4.35
	B	65.85	61.90	11.94	26.09
	C	0.00	0.00	47.76	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	35.82	69.57

**Table B-96**  
**Change of LOS distribution for all weekdays [17:35-17:40] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	48.78	54.76	1.49	13.04
	B	51.22	40.48	10.45	47.83
	C	0.00	0.00	49.25	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	4.76	38.81	39.13
Tuesday	A	45.00	50.00	1.49	4.35
	B	52.50	50.00	14.93	39.13
	C	0.00	0.00	52.24	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	31.34	56.52
Wednesday	A	27.50	57.14	1.52	4.55
	B	72.50	42.86	13.64	45.45
	C	0.00	0.00	53.03	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	31.82	45.45
Thursday	A	35.00	32.56	3.03	0.00
	B	65.00	65.12	15.15	34.78
	C	0.00	0.00	48.48	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.33	33.33	65.22
Friday	A	39.02	28.57	5.97	9.09
	B	60.98	69.05	13.43	31.82
	C	0.00	0.00	43.28	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	37.31	59.09

**Table B-97**  
**Change of LOS distribution for all weekdays [17:40-17:45] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	48.78	54.76	1.49	8.70
	B	51.22	42.86	14.93	34.78
	C	0.00	0.00	44.78	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	38.81	56.52
Tuesday	A	52.50	59.52	1.49	4.35
	B	47.50	40.48	20.90	26.09
	C	0.00	0.00	49.25	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	28.36	69.57
Wednesday	A	40.00	59.52	1.52	0.00
	B	60.00	40.48	10.61	36.36
	C	0.00	0.00	46.97	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	40.91	63.64
Thursday	A	45.00	51.16	3.03	4.35
	B	55.00	48.84	18.18	43.48
	C	0.00	0.00	46.97	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	31.82	52.17
Friday	A	36.59	35.71	5.97	8.70
	B	60.98	61.90	22.39	21.74
	C	0.00	0.00	40.30	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	2.38	31.34	69.57

**Table B-98**  
**Change of LOS distribution for all weekdays [17:45-17:50] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	53.66	61.90	0.00	8.70
	B	46.34	35.71	10.45	34.78
	C	0.00	0.00	41.79	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	47.76	56.52
Tuesday	A	47.50	57.14	1.49	0.00
	B	52.50	42.86	11.94	26.09
	C	0.00	0.00	49.25	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	37.31	73.91
Wednesday	A	40.00	57.14	3.03	4.55
	B	60.00	42.86	15.15	22.73
	C	0.00	0.00	43.94	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	37.88	72.73
Thursday	A	37.50	46.51	6.06	0.00
	B	62.50	53.49	12.12	60.87
	C	0.00	0.00	43.94	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	37.88	39.13
Friday	A	31.71	33.33	2.99	8.70
	B	65.85	64.29	17.91	34.78
	C	0.00	0.00	41.79	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	2.38	37.31	56.52

**Table B-99**  
**Change of LOS distribution for all weekdays [17:50-17:55] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	63.41	57.14	1.49	8.70
	B	36.59	42.86	11.94	39.13
	C	0.00	0.00	43.28	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	43.28	52.17
Tuesday	A	58.97	61.90	1.49	0.00
	B	41.03	38.10	10.45	30.43
	C	0.00	0.00	50.75	4.35
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	37.31	65.22
Wednesday	A	42.50	50.00	3.03	0.00
	B	57.50	50.00	13.64	27.27
	C	0.00	0.00	42.42	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	40.91	72.73
Thursday	A	47.50	60.47	4.55	4.35
	B	52.50	39.53	13.64	43.48
	C	0.00	0.00	39.39	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	42.42	52.17
Friday	A	41.46	35.71	5.97	4.35
	B	58.54	59.52	28.36	39.13
	C	0.00	0.00	34.33	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	4.76	31.34	56.52

**Table B-100**  
**Change of LOS distribution for all weekdays [17:55-18:00] for eastbound (PM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	43.59	57.14	0.00	8.70
	B	56.41	38.10	17.91	34.78
	C	0.00	0.00	38.81	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	4.76	43.28	56.52
Tuesday	A	58.97	50.00	1.49	0.00
	B	41.03	50.00	16.42	22.73
	C	0.00	0.00	38.81	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	43.28	77.27
Wednesday	A	45.00	64.29	3.03	0.00
	B	55.00	35.71	18.18	9.09
	C	0.00	0.00	40.91	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	37.88	90.91
Thursday	A	45.00	51.16	4.55	4.35
	B	55.00	48.84	19.70	34.78
	C	0.00	0.00	39.39	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	36.36	60.87
Friday	A	41.46	40.48	7.46	13.04
	B	56.10	57.14	17.91	21.74
	C	0.00	0.00	35.82	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	2.38	38.81	65.22

**Table B-101**  
**Change of LOS distribution for all weekdays [18:00-18:05] for eastbound (PM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	51.22	64.29	0.00	8.70
	B	48.78	30.95	16.42	39.13
	C	0.00	0.00	37.31	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	4.76	46.27	52.17
Tuesday	A	55.00	59.52	2.99	4.55
	B	45.00	38.10	17.91	31.82
	C	0.00	0.00	32.84	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	46.27	63.64
Wednesday	A	55.00	64.29	1.52	0.00
	B	45.00	35.71	18.18	9.09
	C	0.00	0.00	39.39	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	40.91	86.36
Thursday	A	52.50	65.12	7.58	8.70
	B	47.50	34.88	12.12	30.43
	C	0.00	0.00	37.88	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	42.42	60.87
Friday	A	51.22	47.62	7.46	17.39
	B	48.78	50.00	25.37	30.43
	C	0.00	0.00	32.84	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	34.33	52.17

**Table B-102**  
**Change of LOS distribution for all weekdays [18:05-18:10] for eastbound (PM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	53.66	50.00	1.49	8.70
	B	46.34	40.48	13.43	26.09
	C	0.00	0.00	32.84	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	9.52	52.24	65.22
Tuesday	A	50.00	50.00	1.49	9.09
	B	50.00	47.62	11.94	18.18
	C	0.00	0.00	38.81	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	47.76	72.73
Wednesday	A	50.00	57.14	1.52	0.00
	B	50.00	38.10	18.18	18.18
	C	0.00	0.00	37.88	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	4.76	42.42	81.82
Thursday	A	47.50	51.16	4.55	4.35
	B	52.50	48.84	21.21	21.74
	C	0.00	0.00	37.88	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	36.36	73.91
Friday	A	45.00	40.48	8.96	13.04
	B	52.50	54.76	25.37	30.43
	C	0.00	0.00	28.36	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	4.76	37.31	56.52

**Table B-103**  
**Change of LOS distribution for all weekdays [18:10-18:15] for eastbound (PM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	63.41	52.38	1.49	8.70
	B	36.59	40.48	23.88	39.13
	C	0.00	0.00	26.87	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	7.14	47.76	52.17
Tuesday	A	50.00	61.90	1.49	4.55
	B	50.00	38.10	13.43	27.27
	C	0.00	0.00	37.31	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	47.76	68.18
Wednesday	A	60.00	61.90	1.52	4.55
	B	37.50	33.33	19.70	22.73
	C	0.00	0.00	34.85	4.55
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	4.76	43.94	68.18
Thursday	A	45.00	67.44	7.58	13.04
	B	55.00	32.56	15.15	30.43
	C	0.00	0.00	37.88	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	39.39	56.52
Friday	A	46.34	47.62	8.96	18.18
	B	51.22	50.00	28.36	27.27
	C	0.00	0.00	28.36	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	2.38	34.33	54.55

**Table B-104**  
**Change of LOS distribution for all weekdays [18:15-18:20] for eastbound (PM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	70.73	64.29	4.48	8.70
	B	29.27	30.95	23.88	30.43
	C	0.00	0.00	26.87	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	4.76	44.78	60.87
Tuesday	A	57.50	61.90	4.48	4.55
	B	42.50	38.10	14.93	22.73
	C	0.00	0.00	32.84	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	47.76	72.73
Wednesday	A	67.50	57.14	3.03	4.55
	B	32.50	40.48	21.21	18.18
	C	0.00	0.00	31.82	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	43.94	77.27
Thursday	A	47.50	62.79	7.58	17.39
	B	52.50	37.21	16.67	30.43
	C	0.00	0.00	36.36	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	39.39	52.17
Friday	A	48.78	50.00	7.46	13.64
	B	48.78	45.24	28.36	31.82
	C	0.00	0.00	25.37	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	4.76	38.81	54.55

**Table B-105**  
**Change of LOS distribution for all weekdays [18:20-18:25] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	78.05	66.67	2.99	17.39
	B	21.95	23.81	20.90	26.09
	C	0.00	0.00	28.36	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	9.52	47.76	56.52
Tuesday	A	67.50	69.05	4.48	4.55
	B	30.00	28.57	23.88	18.18
	C	0.00	0.00	26.87	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	2.38	44.78	77.27
Wednesday	A	70.00	64.29	1.52	4.55
	B	30.00	33.33	24.24	27.27
	C	0.00	0.00	25.76	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	48.48	68.18
Thursday	A	57.50	67.44	4.55	8.70
	B	42.50	32.56	24.24	26.09
	C	0.00	0.00	25.76	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	45.45	65.22
Friday	A	58.54	57.14	7.46	21.74
	B	36.59	40.48	31.34	21.74
	C	0.00	0.00	22.39	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	4.88	2.38	38.81	56.52

**Table B-106**  
**Change of LOS distribution for all weekdays [18:25-18:30] for eastbound (PM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	75.61	69.05	7.46	26.09
	B	24.39	23.81	28.36	21.74
	C	0.00	0.00	20.90	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	7.14	43.28	52.17
Tuesday	A	67.50	71.43	1.49	13.64
	B	30.00	28.57	20.90	27.27
	C	0.00	0.00	31.34	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	46.27	59.09
Wednesday	A	72.50	57.14	1.52	9.09
	B	27.50	40.48	22.73	27.27
	C	0.00	0.00	19.70	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	56.06	63.64
Thursday	A	62.50	62.79	10.61	8.70
	B	37.50	37.21	18.18	43.48
	C	0.00	0.00	28.79	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	42.42	47.83
Friday	A	56.10	57.14	7.46	39.13
	B	41.46	40.48	31.34	26.09
	C	0.00	0.00	29.85	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	2.38	31.34	34.78

**Table B-107**  
**Change of LOS distribution for all weekdays [18:30-18:35] for eastbound (PM peak);  
DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	82.93	85.71	8.96	43.48
	B	17.07	7.14	35.82	17.39
	C	0.00	0.00	17.91	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	7.14	37.31	39.13
Tuesday	A	70.00	78.57	7.46	22.73
	B	27.50	19.05	23.88	13.64
	C	0.00	0.00	22.39	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	2.38	46.27	63.64
Wednesday	A	72.50	71.43	1.52	4.76
	B	27.50	21.43	25.76	19.05
	C	0.00	0.00	27.27	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	7.14	45.45	76.19
Thursday	A	70.00	69.77	7.58	17.39
	B	27.50	30.23	25.76	21.74
	C	0.00	0.00	28.79	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	37.88	60.87
Friday	A	60.98	61.90	8.96	34.78
	B	36.59	35.71	29.85	26.09
	C	0.00	0.00	23.88	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	2.38	37.31	39.13

**Table B-108**  
**Change of LOS distribution for all weekdays [18:35-18:40] for eastbound (PM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	92.68	76.19	17.91	52.17
	B	7.32	16.67	35.82	8.70
	C	0.00	0.00	13.43	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	7.14	32.84	39.13
Tuesday	A	75.00	73.81	7.46	22.73
	B	25.00	23.81	26.87	22.73
	C	0.00	0.00	20.90	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	44.78	54.55
Wednesday	A	75.00	73.81	9.09	4.76
	B	25.00	23.81	28.79	28.57
	C	0.00	0.00	24.24	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	37.88	66.67
Thursday	A	70.00	74.42	12.12	21.74
	B	27.50	25.58	27.27	26.09
	C	0.00	0.00	19.70	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	40.91	52.17
Friday	A	56.10	61.90	10.45	40.91
	B	39.02	35.71	25.37	22.73
	C	0.00	0.00	20.90	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	4.88	2.38	43.28	36.36

**Table B-109**  
**Change of LOS distribution for all weekdays [18:40-18:45] for eastbound (PM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	92.68	90.48	16.42	73.91
	B	7.32	4.76	43.28	4.35
	C	0.00	0.00	11.94	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	4.76	28.36	21.74
Tuesday	A	92.50	80.95	17.91	31.82
	B	7.50	16.67	31.34	9.09
	C	0.00	0.00	17.91	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	32.84	59.09
Wednesday	A	82.50	80.95	7.58	19.05
	B	17.50	16.67	37.88	19.05
	C	0.00	0.00	19.70	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	34.85	61.90
Thursday	A	70.00	79.07	12.12	34.78
	B	27.50	20.93	31.82	13.04
	C	0.00	0.00	18.18	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	37.88	52.17
Friday	A	65.85	71.43	13.43	43.48
	B	29.27	26.19	29.85	21.74
	C	0.00	0.00	19.40	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	4.88	2.38	37.31	34.78

**Table B-110**  
**Change of LOS distribution for all weekdays [18:45-18:50] for eastbound (PM peak);**  
**DCMS detectors**

Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	95.12	85.71	32.84	78.26
	B	4.88	9.52	38.81	4.35
	C	0.00	0.00	5.97	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	4.76	22.39	17.39
Tuesday	A	90.00	80.95	17.91	45.45
	B	10.00	16.67	32.84	18.18
	C	0.00	0.00	16.42	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	32.84	36.36
Wednesday	A	85.00	88.10	10.61	36.36
	B	15.00	9.52	34.85	13.64
	C	0.00	0.00	16.67	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	37.88	50.00
Thursday	A	67.50	81.40	18.18	43.48
	B	30.00	18.60	28.79	17.39
	C	0.00	0.00	21.21	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.50	0.00	31.82	39.13
Friday	A	73.17	73.81	14.93	45.45
	B	24.39	23.81	28.36	18.18
	C	0.00	0.00	14.93	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	2.38	41.79	36.36

**Table B-111**  
**Change of LOS distribution for all weekdays [18:50-18:55] for eastbound (PM peak);  
DCMS detectors**

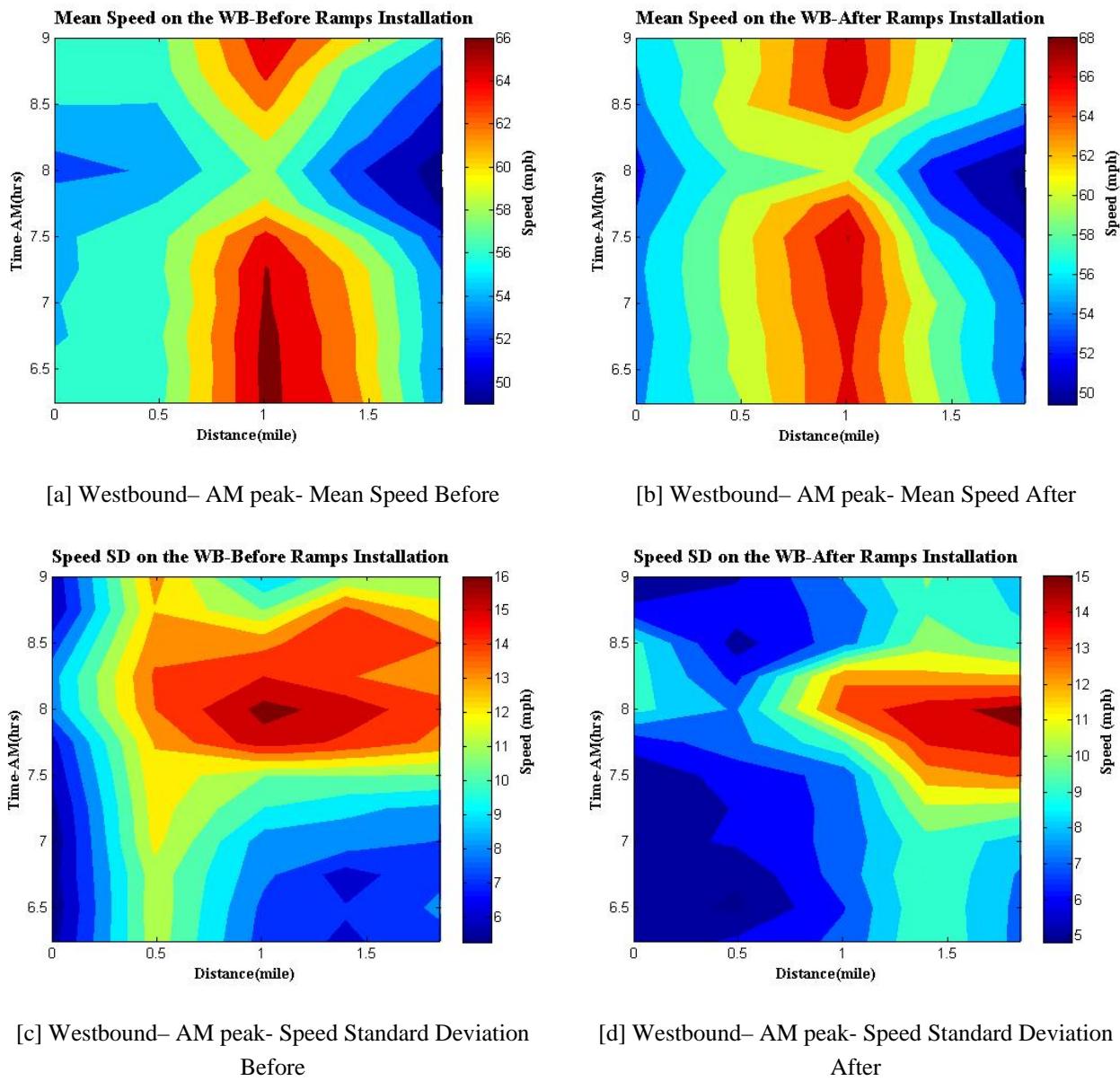
Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	100.00	90.48	38.81	86.96
	B	0.00	7.14	38.81	0.00
	C	0.00	0.00	4.48	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	17.91	13.04
Tuesday	A	90.00	80.95	28.36	63.64
	B	10.00	14.29	38.81	4.55
	C	0.00	0.00	8.96	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	4.76	23.88	31.82
Wednesday	A	87.50	88.10	22.73	59.09
	B	12.50	9.52	37.88	4.55
	C	0.00	0.00	10.61	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	2.38	28.79	36.36
Thursday	A	82.50	97.67	18.18	54.55
	B	17.50	2.33	37.88	18.18
	C	0.00	0.00	16.67	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	27.27	27.27
Friday	A	78.05	76.19	14.93	40.91
	B	19.51	19.05	37.31	27.27
	C	0.00	0.00	11.94	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	4.76	35.82	31.82

**Table B-112**  
**Change of LOS distribution for all weekdays [18:55-19:00] for eastbound (PM peak);**  
**DCMS detectors**

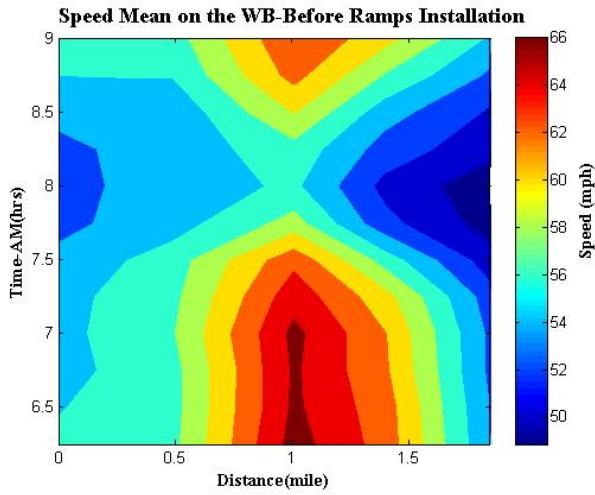
Day	LOS Distribution (%)				
	Detector	10002		10004	
		LOS	Before	After	Before
Monday	A	100.00	92.86	37.31	82.61
	B	0.00	2.38	43.28	0.00
	C	0.00	0.00	1.49	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	4.76	17.91	17.39
Tuesday	A	95.00	85.71	23.88	63.64
	B	5.00	9.52	50.75	4.55
	C	0.00	0.00	2.99	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	4.76	22.39	31.82
Wednesday	A	92.50	92.86	25.76	63.64
	B	7.50	0.00	43.94	4.55
	C	0.00	0.00	7.58	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	7.14	22.73	31.82
Thursday	A	85.00	88.37	22.73	72.73
	B	15.00	11.63	30.30	4.55
	C	0.00	0.00	22.73	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	0.00	0.00	24.24	22.73
Friday	A	80.49	78.57	19.40	47.83
	B	17.07	19.05	34.33	13.04
	C	0.00	0.00	11.94	0.00
	D	0.00	0.00	0.00	0.00
	E	0.00	0.00	0.00	0.00
	F	2.44	2.38	34.33	39.13

## **APPENDIX C (SPEED MEANS AND STANDARD DEVIATION CONTOURS OF BOTH MIST AND DCMS DETECTORS)**

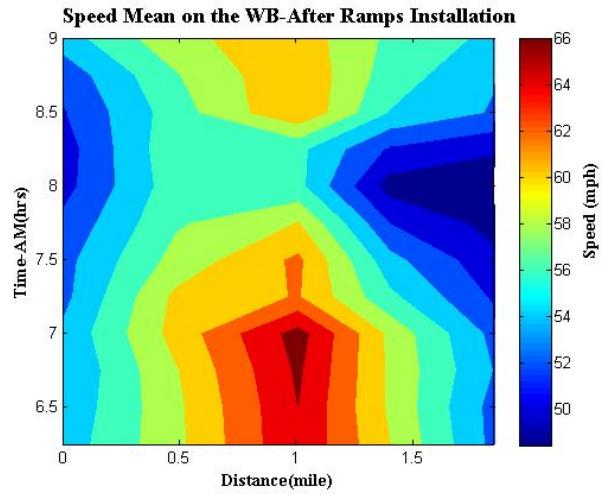
This appendix shows comparisons between speed means and standard deviations contours for before and after ramp meters installation. Figures C-1 through C-10 show the speed contours comparisons for the freeway segment from which traffic data was collected using MIST detectors. Whereas, Figures C-11 through C-20 show the speed contours comparisons for the freeway segment from which traffic data was collected using DCMS detectors.



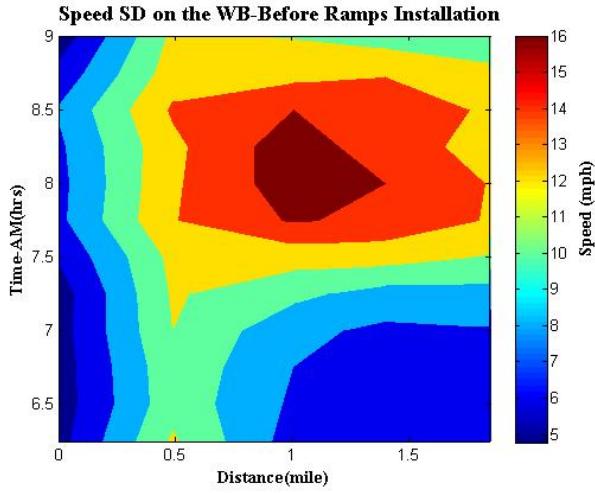
**Figure C-1**  
**Mean speed and standard deviation contours for MIST detectors for Mondays**



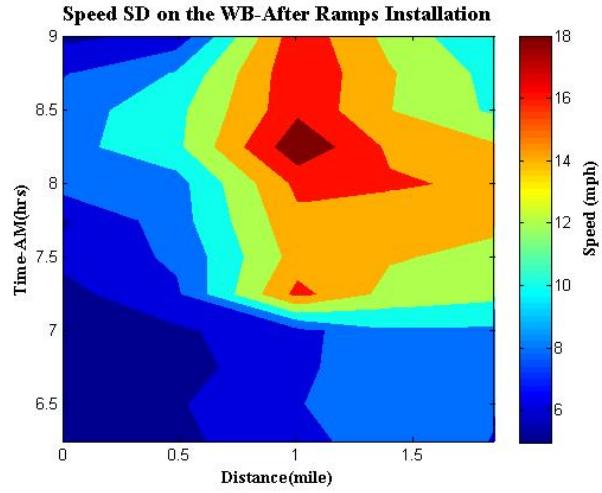
[a] Westbound– AM peak- Mean Speed Before



[b] Westbound– AM peak- Mean Speed After

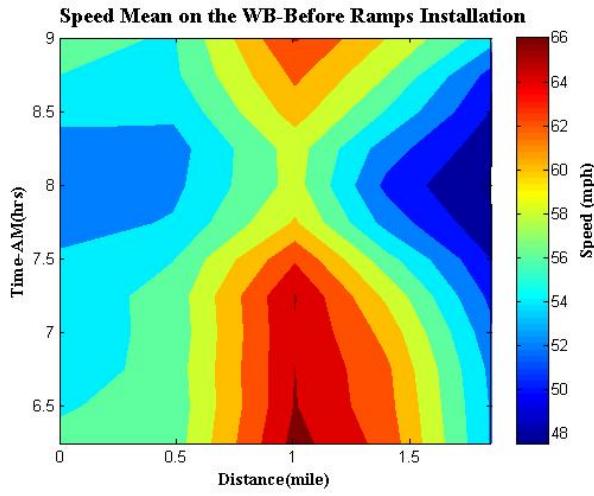


[c] Westbound– AM peak- Speed Standard Deviation Before

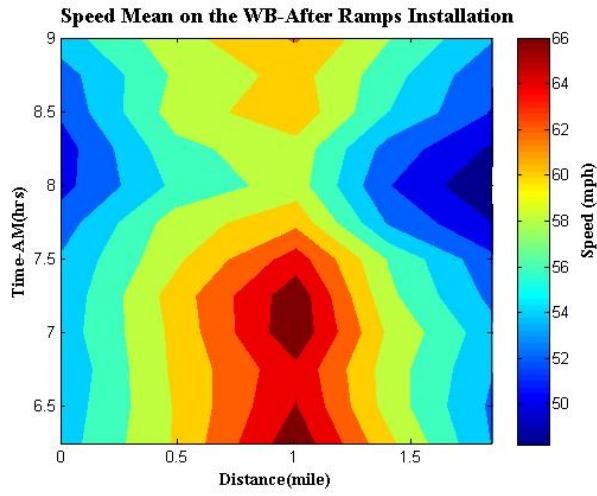


[d] Westbound– AM peak- Speed Standard Deviation After

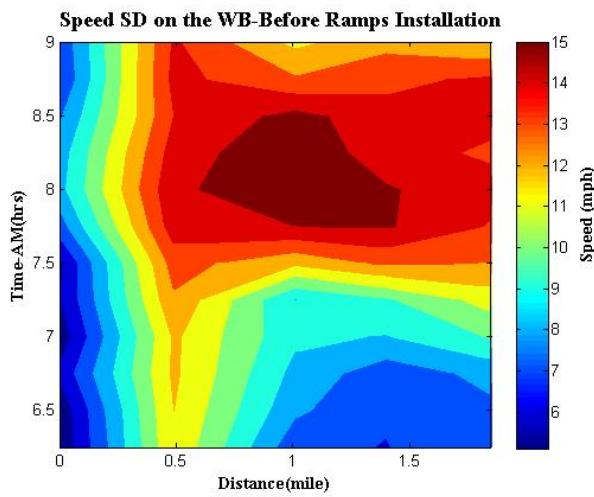
**Figure C-2**  
**Mean speed and standard deviation contours for MIST detectors on Westbound for Tuesdays**



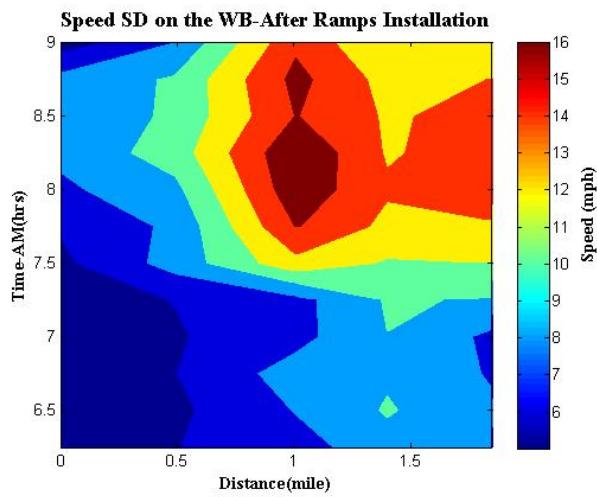
[a] Westbound– AM peak- Mean Speed Before



[b] Westbound– AM peak- Mean Speed After

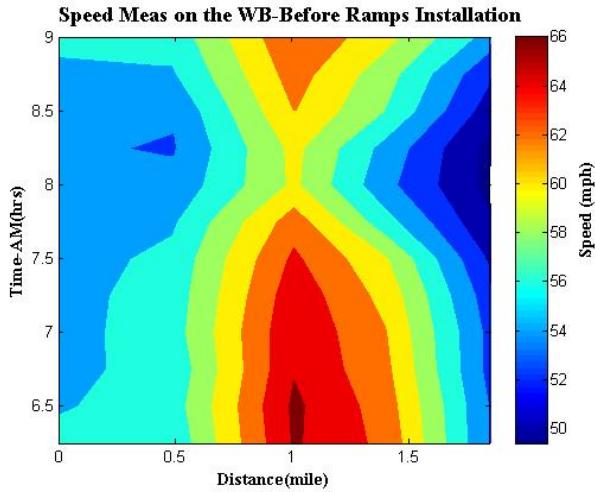


[c] Westbound– AM peak- Speed Standard Deviation Before

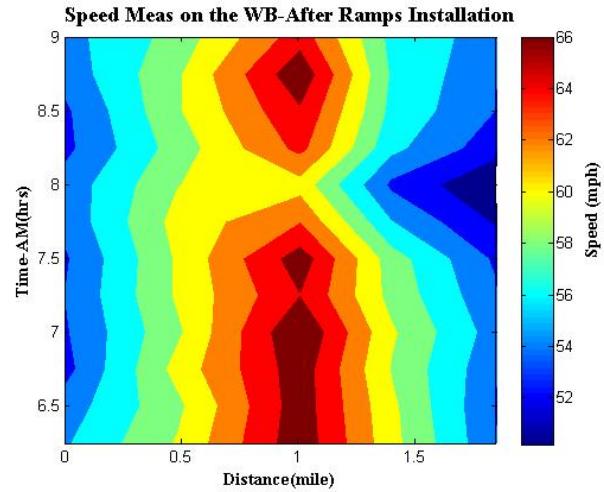


[d] Westbound– AM peak- Speed Standard Deviation After

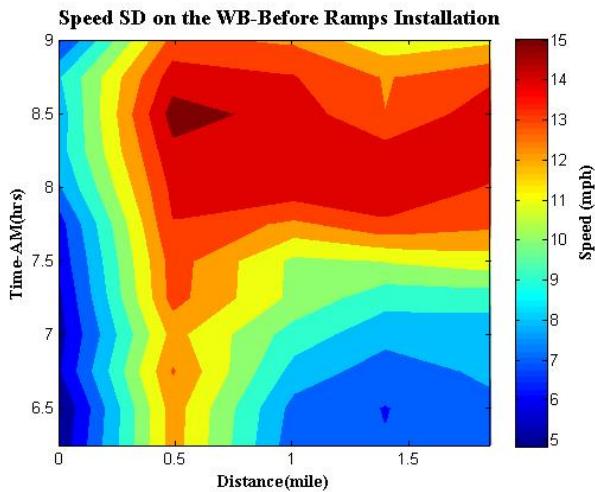
**Figure C-3**  
**Mean speed and standard deviation contours for MIST detectors on westbound for Wednesdays**



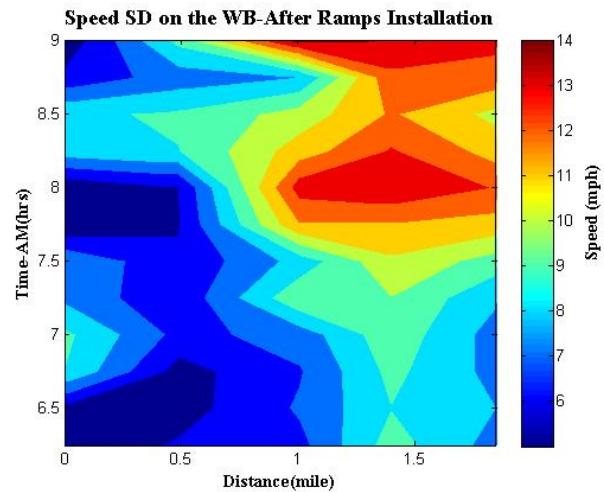
[a] Westbound– AM peak- Mean Speed Before



[b] Westbound– AM peak- Mean Speed After

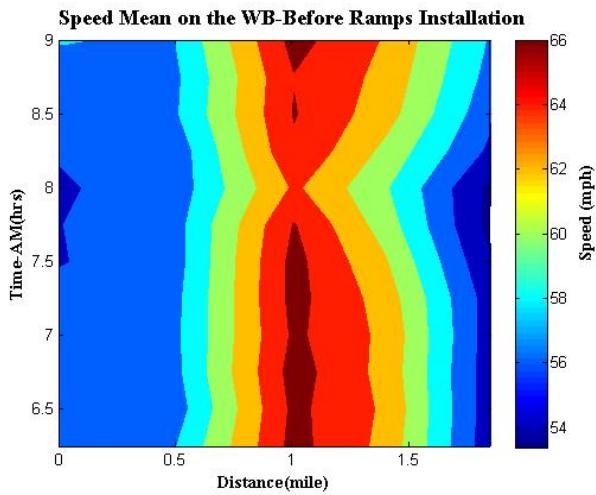


[c] Westbound– AM peak- Speed Standard Deviation Before

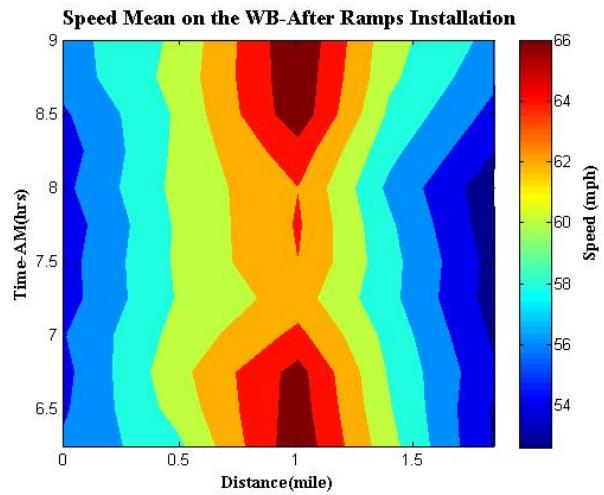


[d] Westbound– AM peak- Speed Standard Deviation After

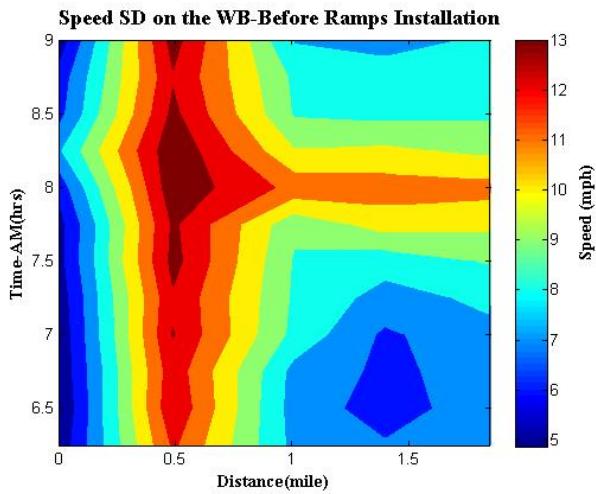
**Figure C-4**  
**Mean speed and standard deviation contours for MIST detectors on westbound for Thursdays**



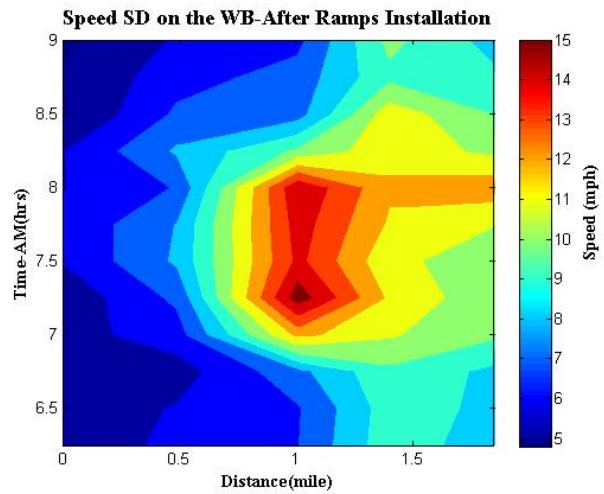
[a] Westbound– AM peak- Mean Speed Before



[b] Westbound– AM peak- Mean Speed After

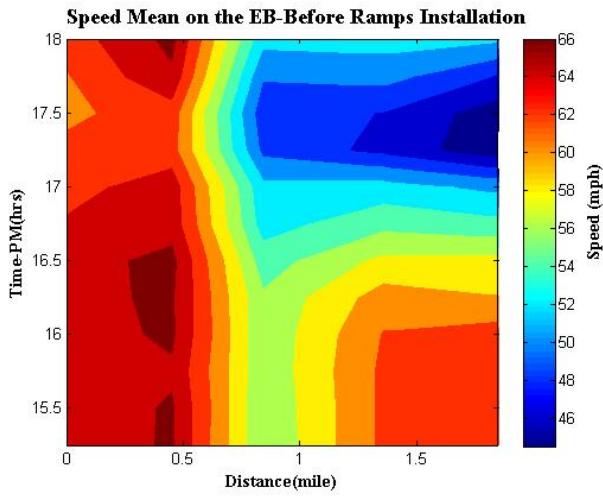


[c] Westbound– AM peak- Speed Standard Deviation Before

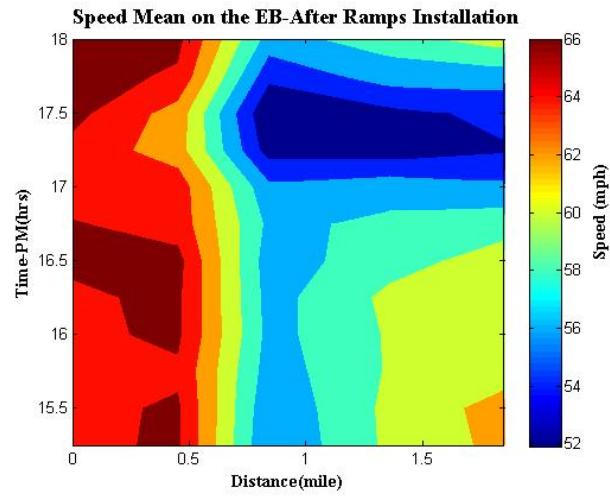


[d] Westbound– AM peak- Speed Standard Deviation After

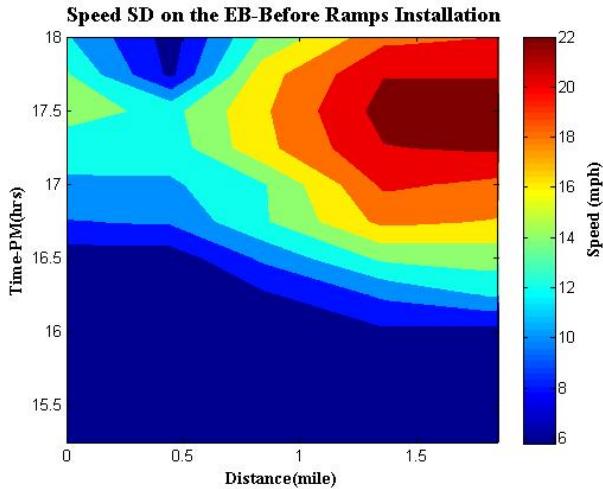
**Figure C-5**  
**Mean speed and standard deviation contours for MIST detectors on westbound for Fridays**



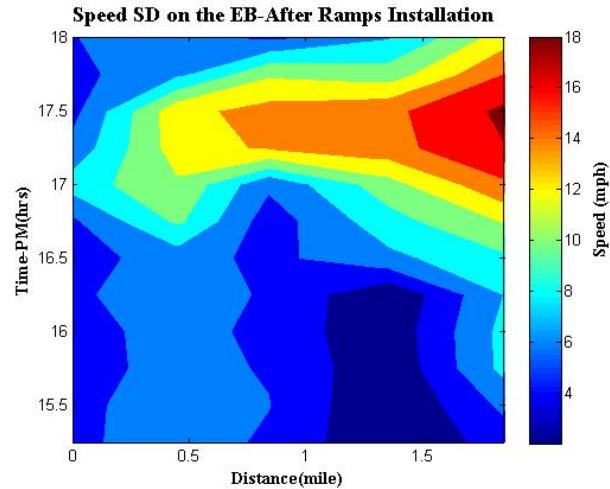
[a] Eastbound– PM peak- Mean Speed Before



[b] Eastbound– PM peak- Mean Speed After

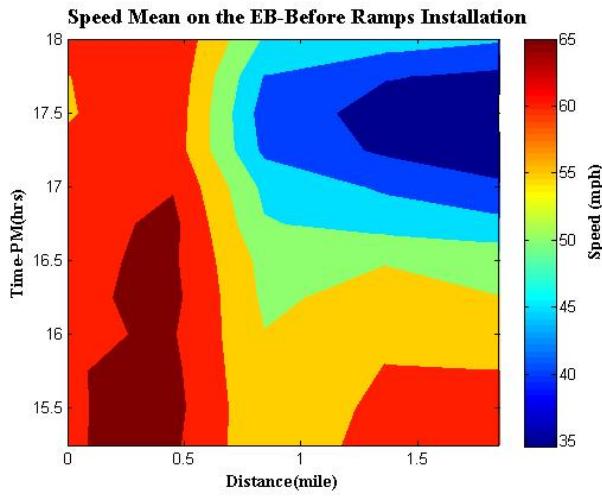


[c] Eastbound– PM Peak - Speed Standard Deviation Before

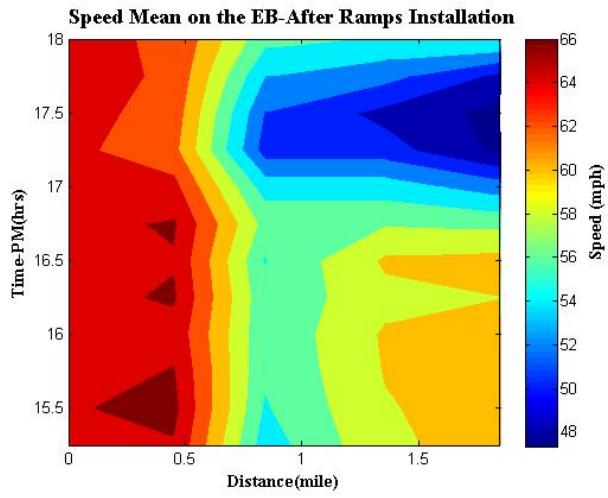


[d] Eastbound– PM Peak - Speed Standard Deviation After

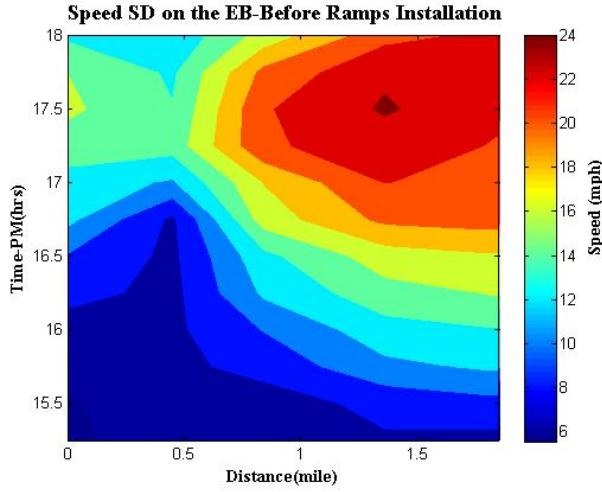
**Figure C-6**  
**Mean speed and standard deviation contours for MIST detectors on eastbound for Mondays**



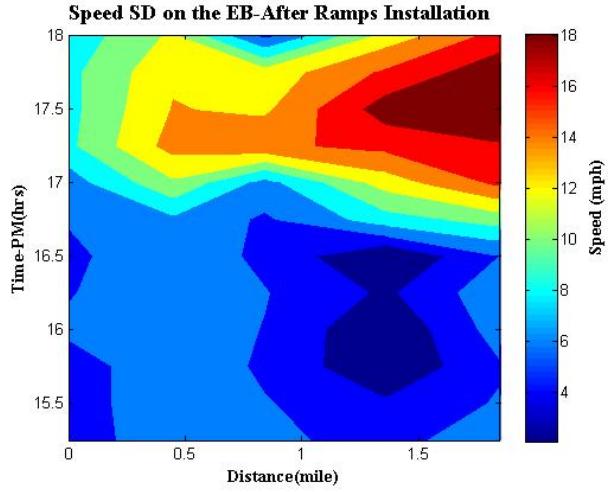
[a] Eastbound– PM Peak - Mean Speed Before



[b] Eastbound– PM Peak - Mean Speed After

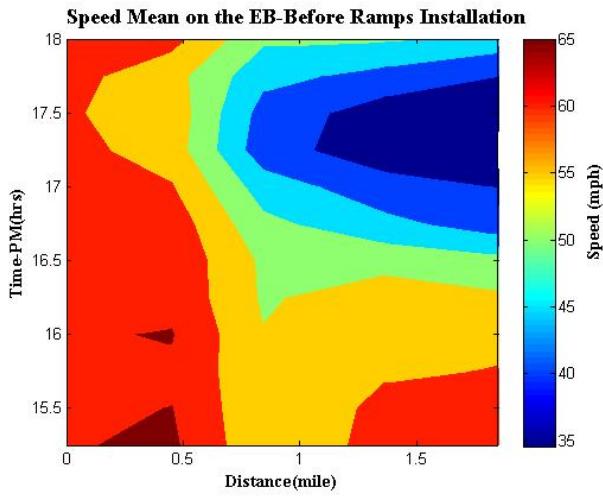


[c] Eastbound– PM Peak - Speed Standard Deviation Before

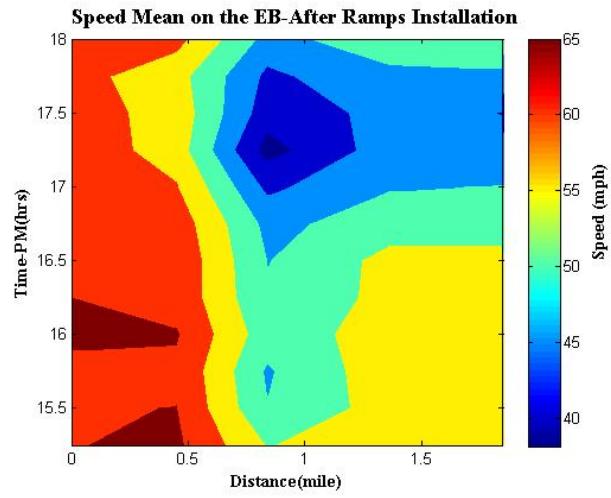


[d] Eastbound– PM Peak - Speed Standard Deviation After

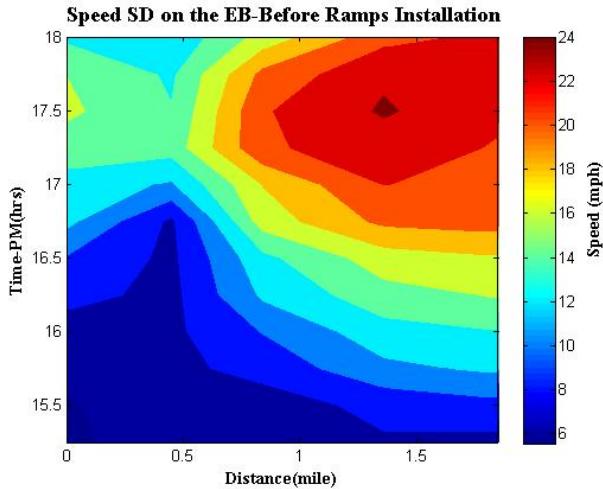
**Figure C-7**  
**Mean speed and standard deviation contours for MIST detectors on eastbound for Tuesdays**



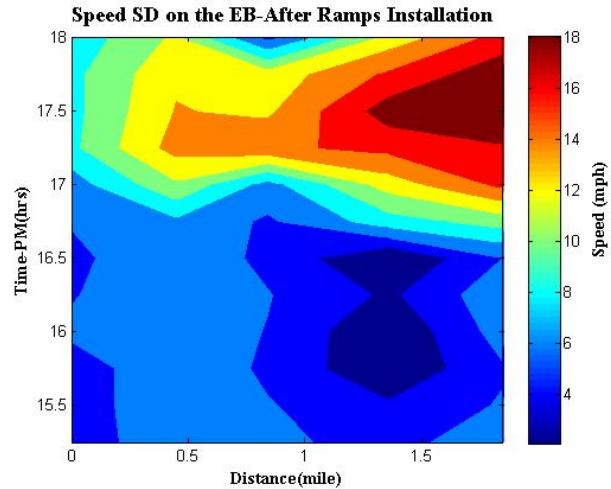
[a] Eastbound– PM Peak - Mean Speed Before



[b] Eastbound– PM Peak - Mean Speed After

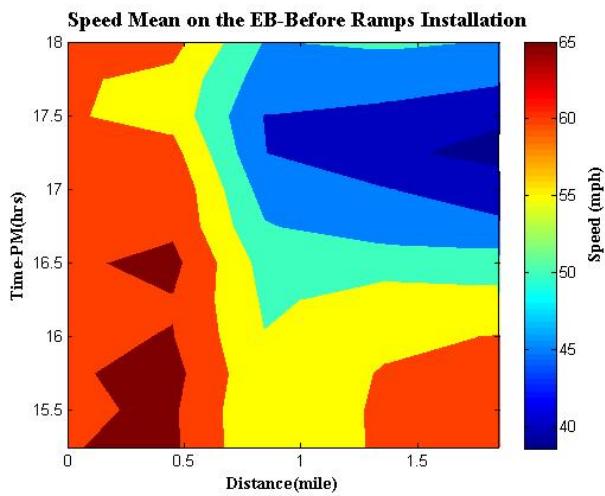


[c] Eastbound– PM Peak - Speed Standard Deviation Before

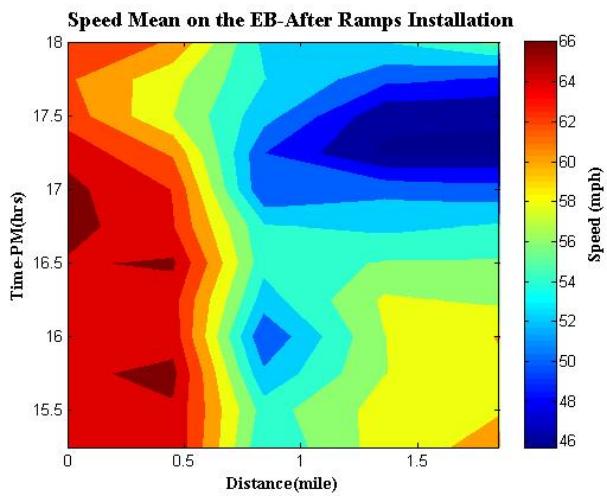


[d] Eastbound– PM Peak - Speed Standard Deviation After

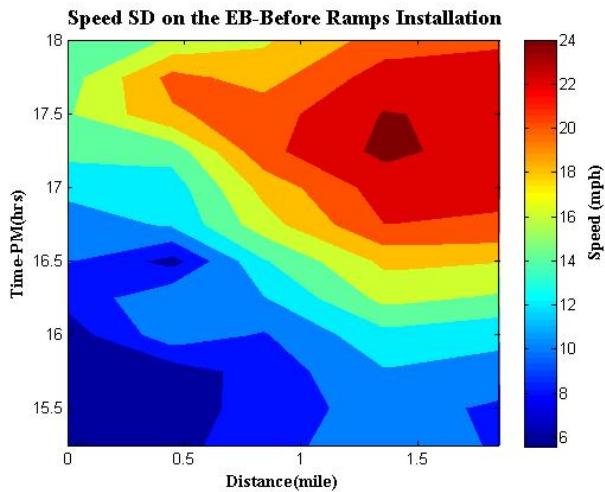
**Figure C-8**  
**Mean speed and standard deviation contours for MIST detectors on eastbound for Wednesdays**



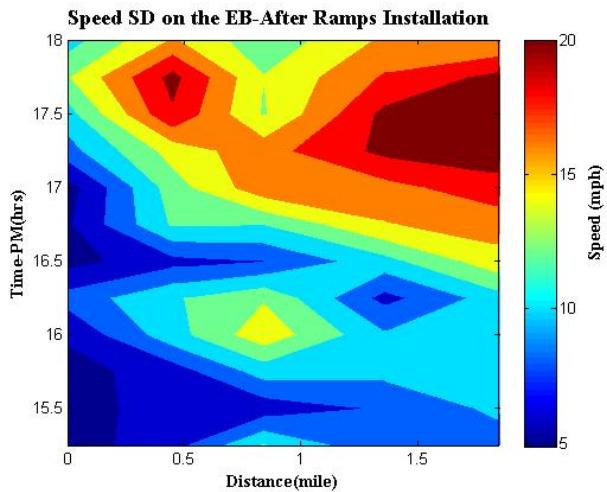
[a] Eastbound– PM Peak - Mean Speed Before



[b] Eastbound– PM Peak - Mean Speed After

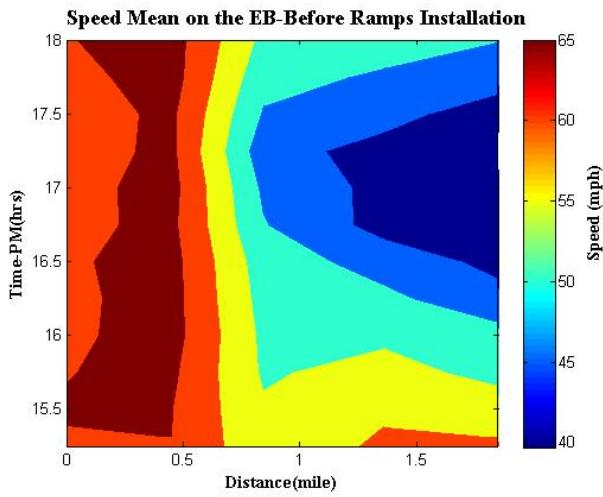


[c] Eastbound– PM Peak - Speed Standard Deviation Before

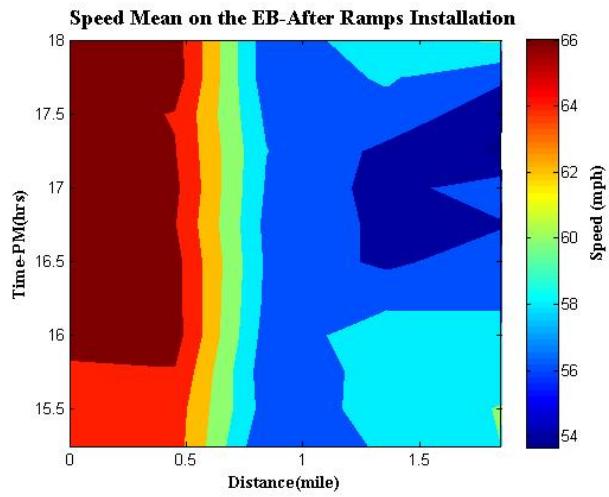


[d] Eastbound– PM Peak - Speed Standard Deviation After

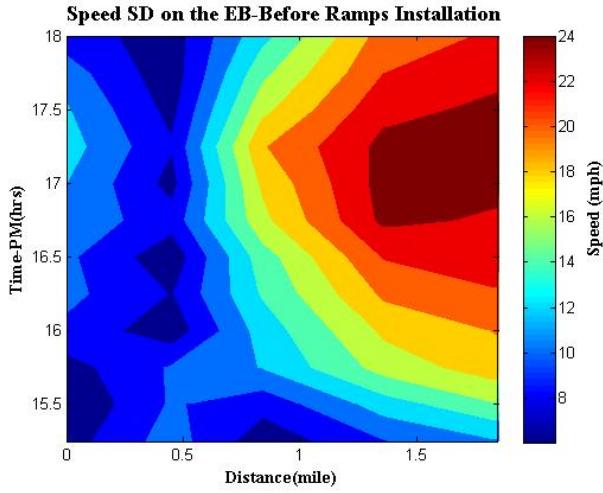
**Figure C-9**  
**Mean speed and standard deviation contours for MIST detectors on eastbound for**  
**Thursdays**



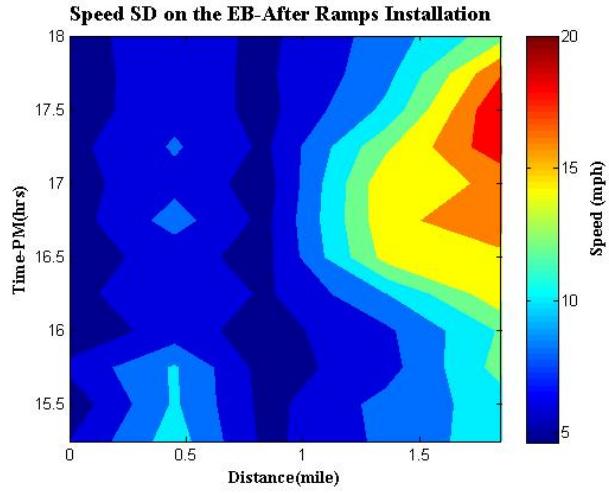
[a] Eastbound– PM Peak - Mean Speed Before



[b] Eastbound– PM Peak - Mean Speed After

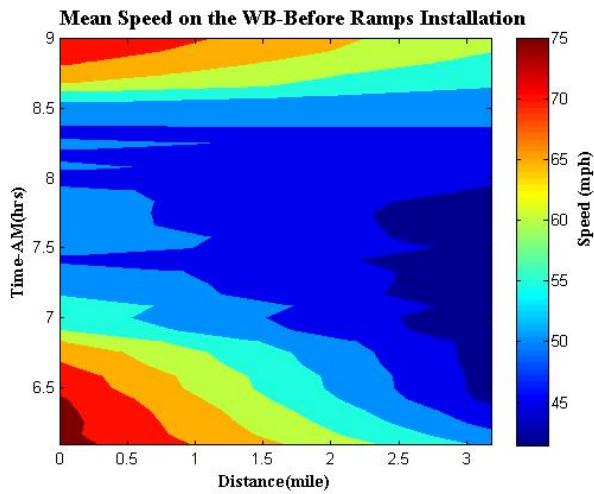


[c] Eastbound– PM Peak - Speed Standard Deviation Before

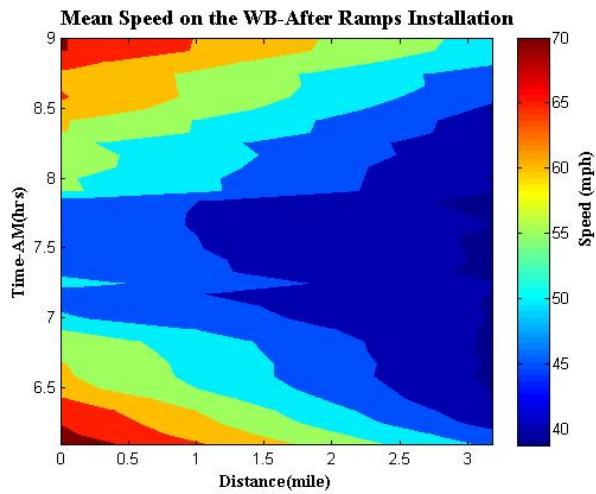


[d] Eastbound– PM Peak - Speed Standard Deviation After

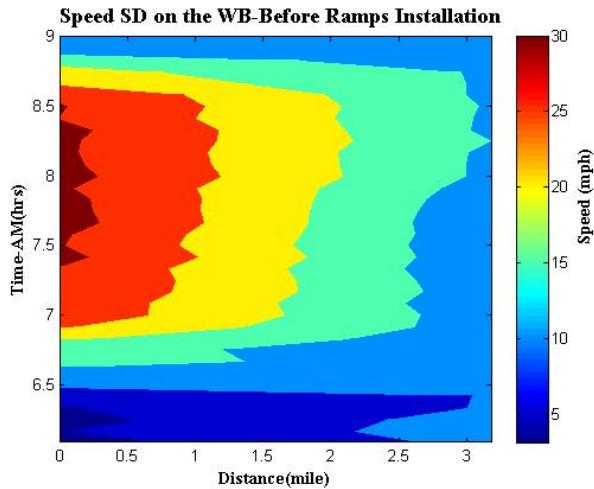
**Figure C-10**  
**Mean speed and standard deviation contours for MIST detectors on eastbound for Fridays**



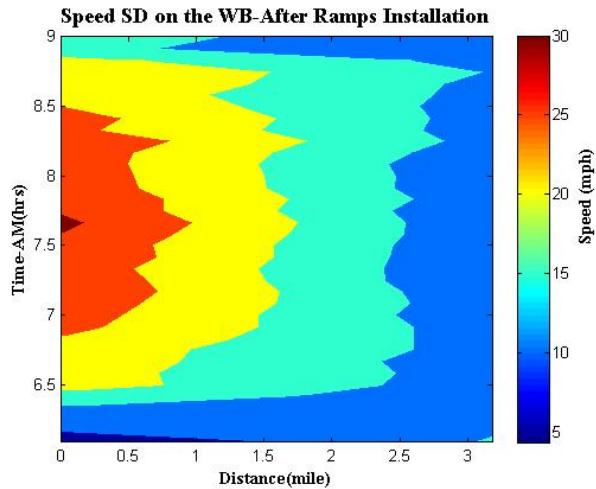
[a] Westbound– AM Peak - Mean Speed Before



[b] Westbound– AM Peak - Mean Speed After

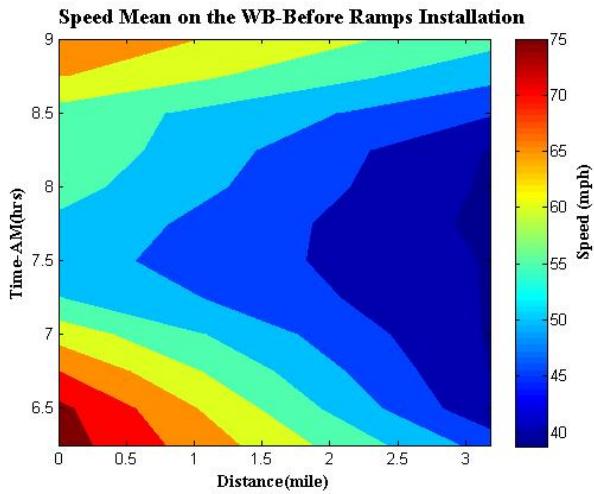


[c] Westbound– AM Peak - Speed Standard Deviation Before

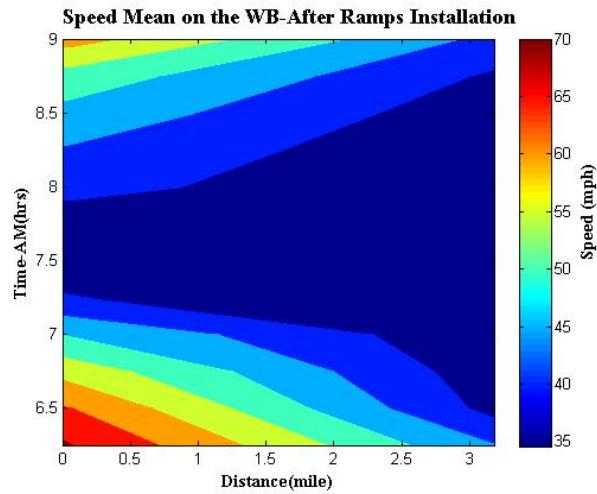


[d] Westbound– AM Peak - Speed Standard Deviation After

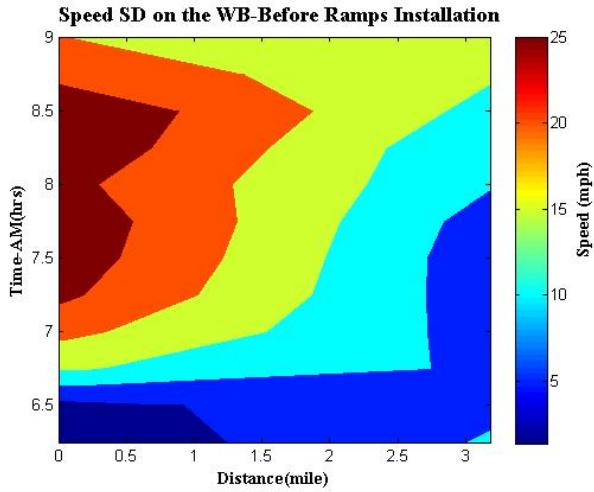
**Figure C-11**  
**Mean speed and standard deviation contours for DCMS detectors on westbound for Mondays**



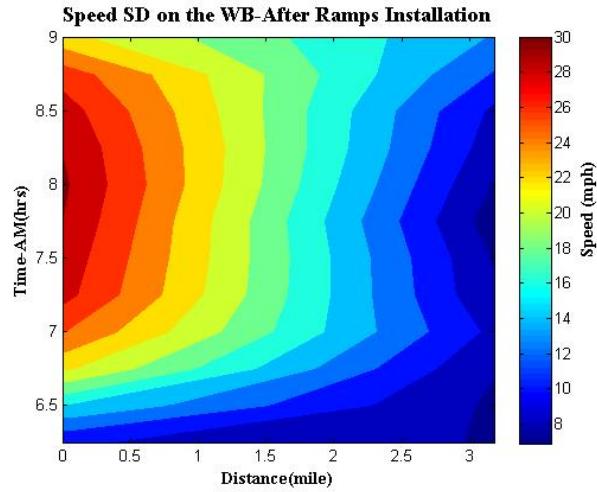
[a] Westbound– AM Peak - Mean Speed Before



[b] Westbound– AM Peak - Mean Speed After

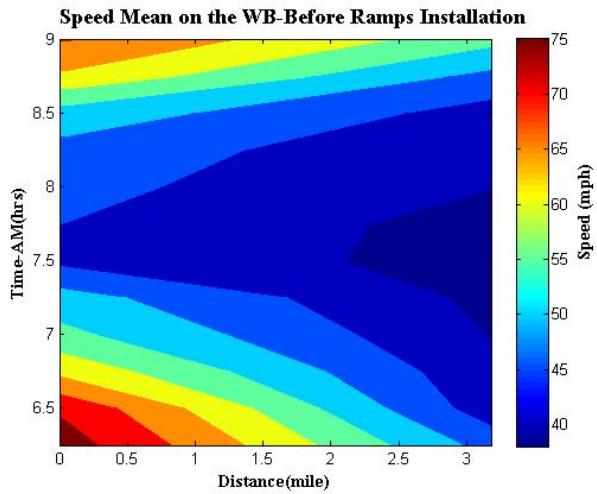


[c] Westbound– AM Peak - Speed Standard Deviation Before

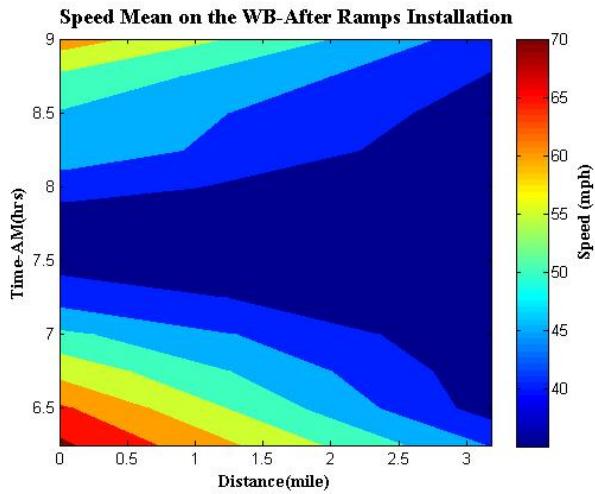


[d] Westbound– AM Peak - Speed Standard Deviation After

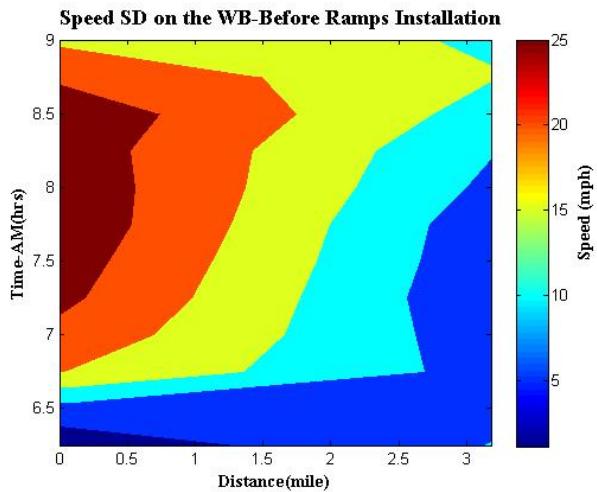
**Figure C-12**  
**Mean speed and standard deviation contours for DCMS detectors on westbound for Tuesdays**



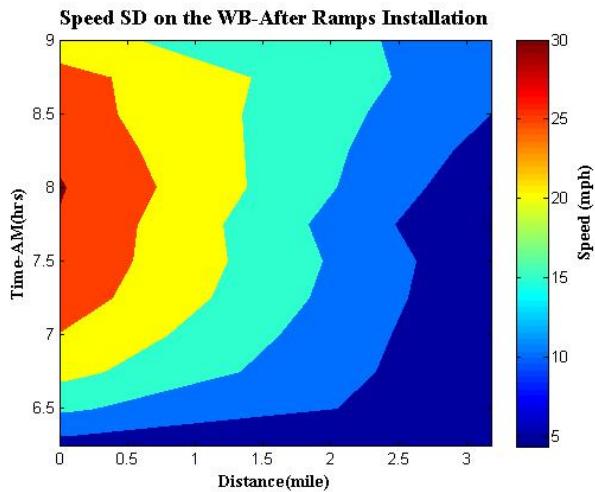
[a] Westbound– AM Peak - Mean Speed Before



[b] Westbound– AM Peak - Mean Speed After

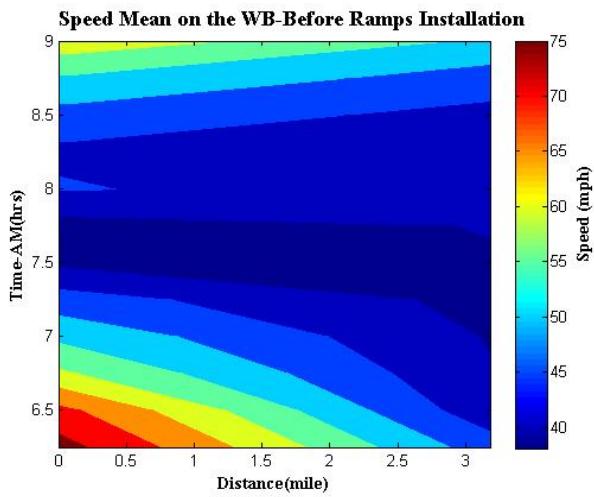


[c] Westbound– AM Peak - Speed Standard Deviation Before

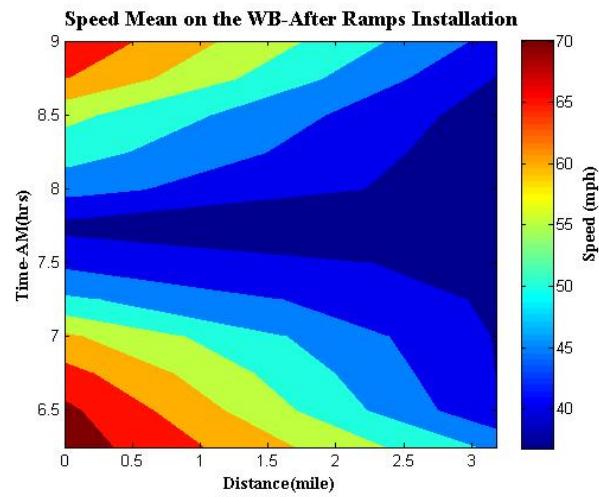


[d] Westbound– AM Peak - Speed Standard Deviation After

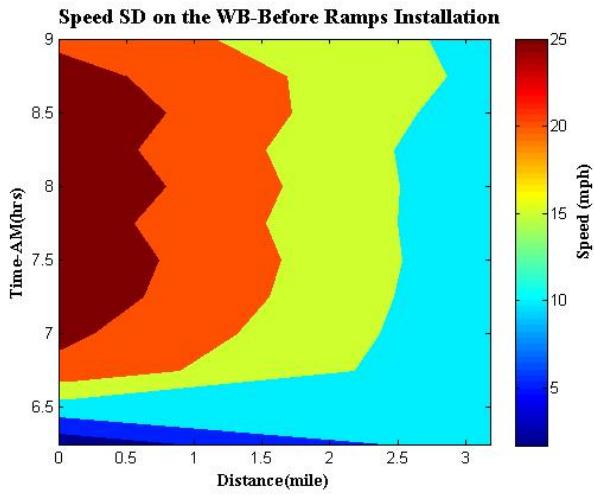
**Figure C-13**  
**Mean speed and standard deviation contours for DCMS detectors on westbound for Wednesdays**



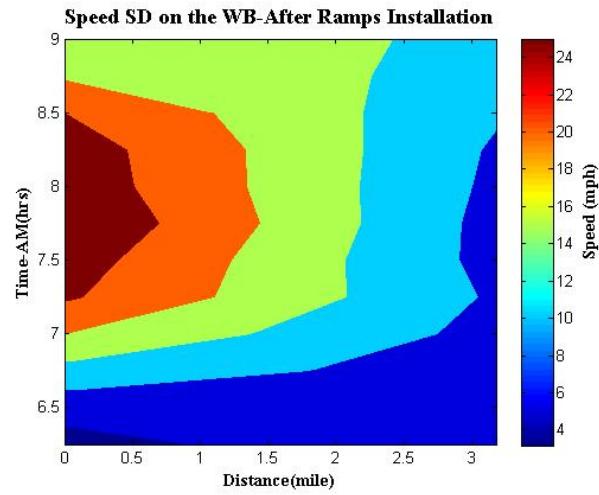
[a] Westbound– AM Peak - Mean Speed Before



[b] Westbound– AM Peak - Mean Speed After

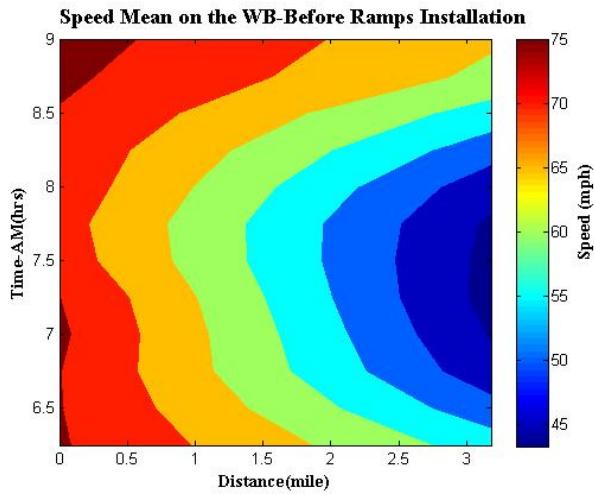


[c] Westbound– AM Peak - Speed Standard Deviation Before

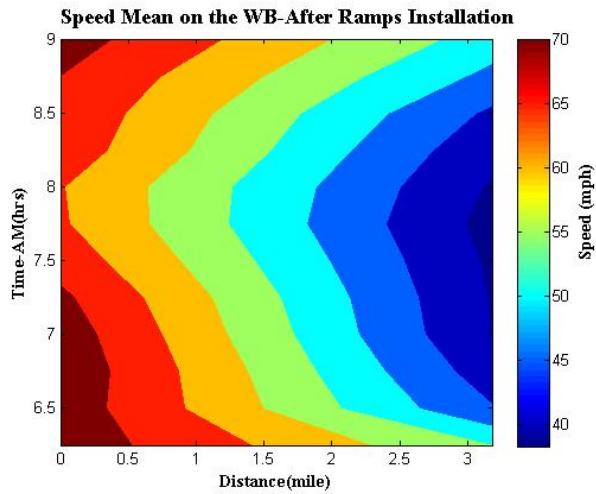


[d] Westbound– AM Peak - Speed Standard Deviation After

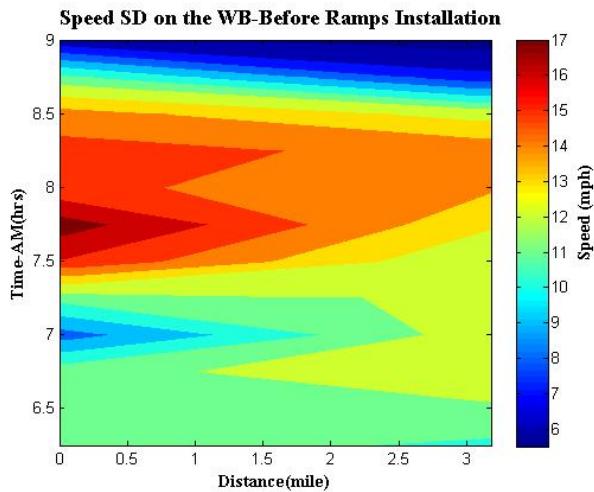
**Figure C-14**  
**Mean speed and standard deviation contours for DCMS detectors on westbound for Thursdays**



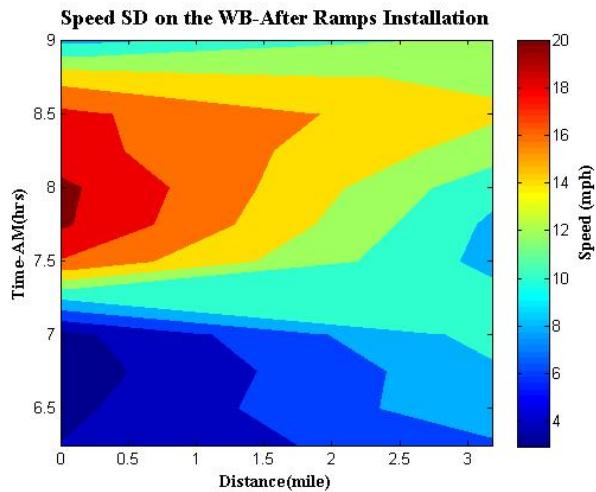
[a] Westbound– AM Peak - Mean Speed Before



[b] Westbound– AM Peak - Mean Speed After

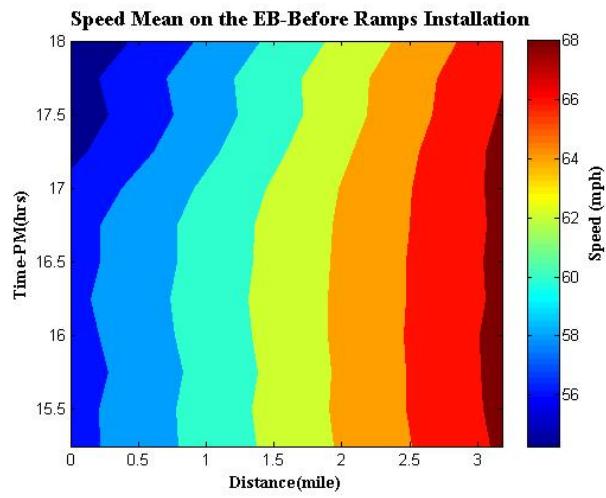


[c] Westbound– AM Peak - Speed Standard Deviation Before

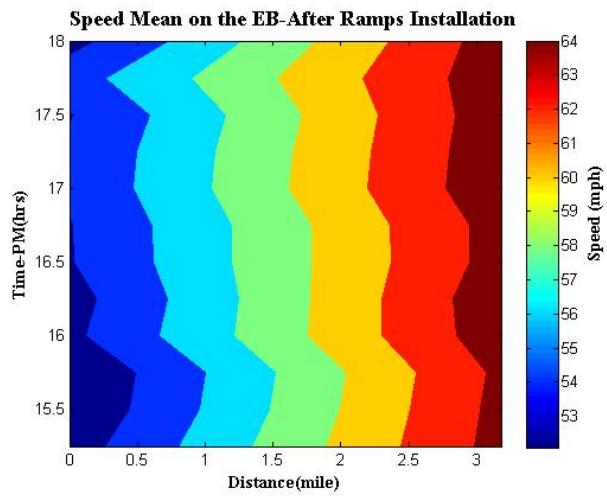


[d] Westbound– AM Peak - Speed Standard Deviation After

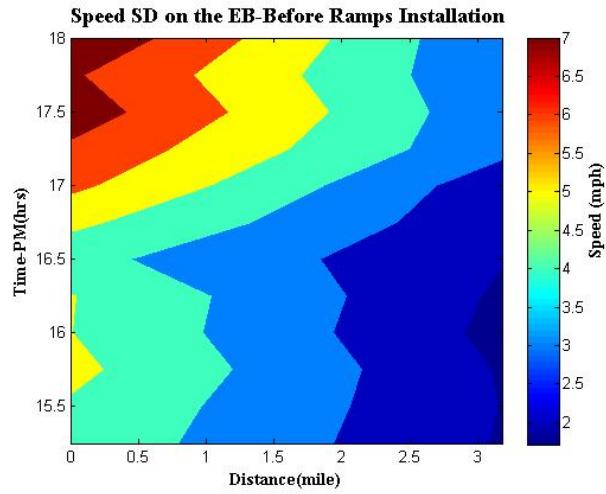
**Figure C-15**  
**Mean speed and standard deviation contours for DCMS detectors on westbound for Fridays**



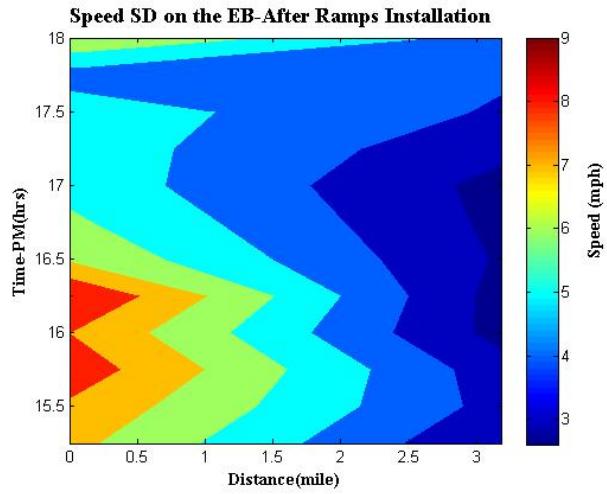
[a] Eastbound– PM Peak - Mean Speed Before



[b] Eastbound– PM Peak - Mean Speed After

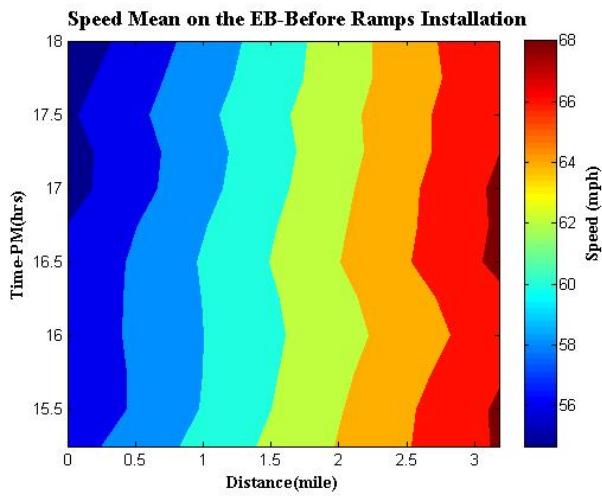


[c] Eastbound– PM Peak - Speed Standard Deviation Before

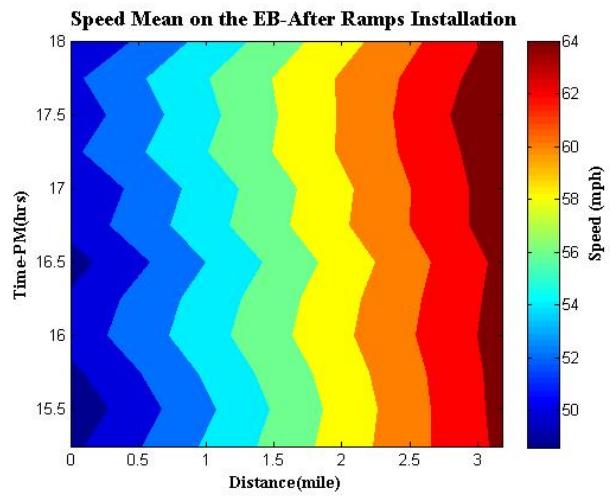


[d] Eastbound– PM Peak - Speed Standard Deviation After

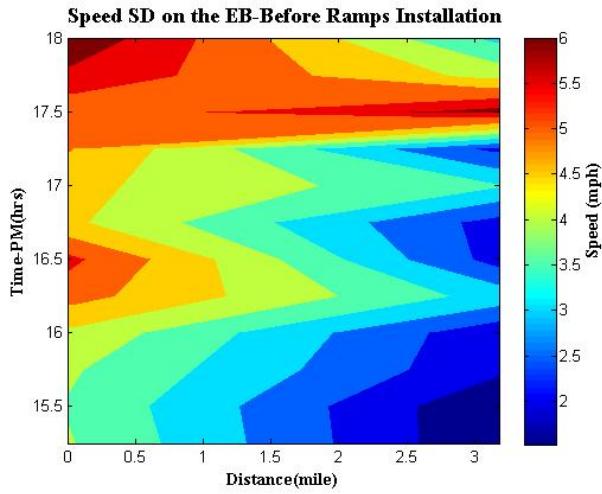
**Figure C-16**  
**Mean speed and standard deviation contours for DCMS detectors on eastbound for Mondays**



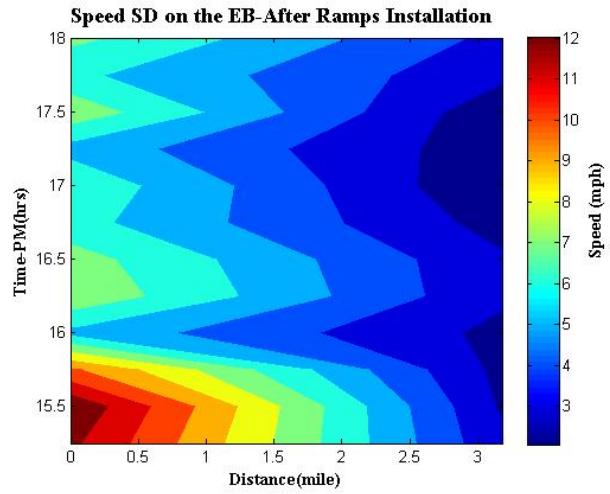
[a] Eastbound– PM Peak - Mean Speed Before



[b] Eastbound– PM Peak - Mean Speed After

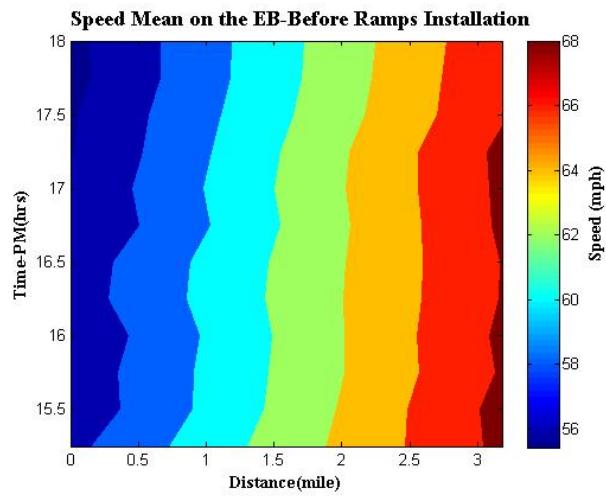


[c] Eastbound– PM Peak - Speed Standard Deviation Before

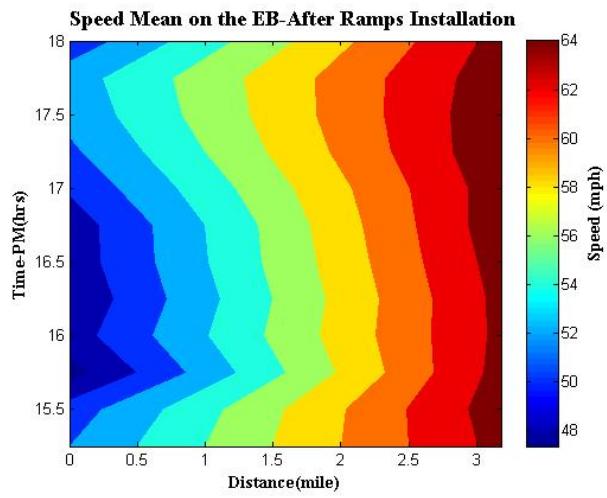


[d] Eastbound– PM Peak - Speed Standard Deviation After

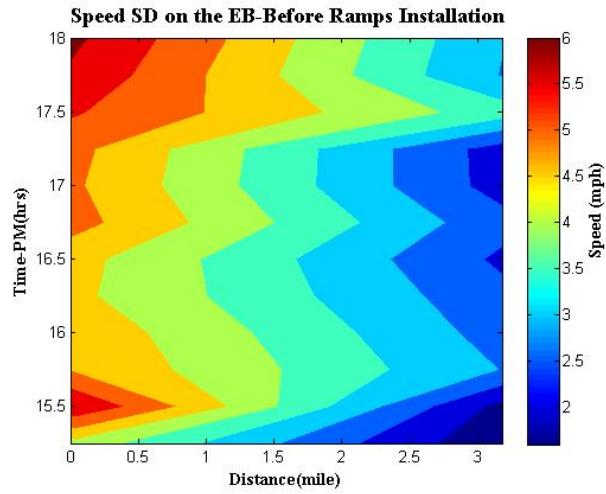
**Figure C-17**  
**Mean speed and standard deviation contours for DCMS detectors on eastbound for Tuesdays**



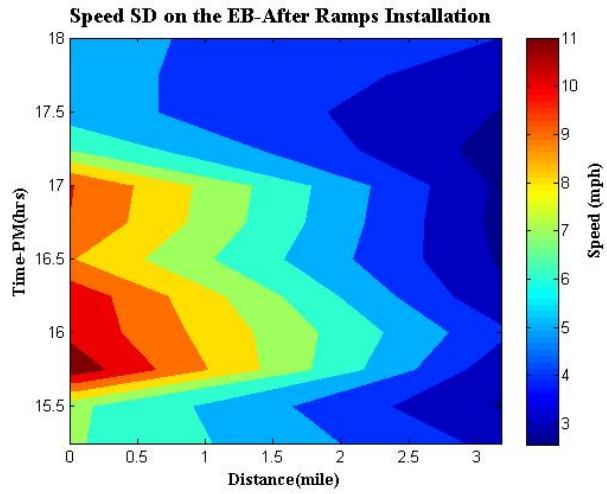
[a] Eastbound– PM Peak - Mean Speed Before



[b] Eastbound– PM Peak - Mean Speed After

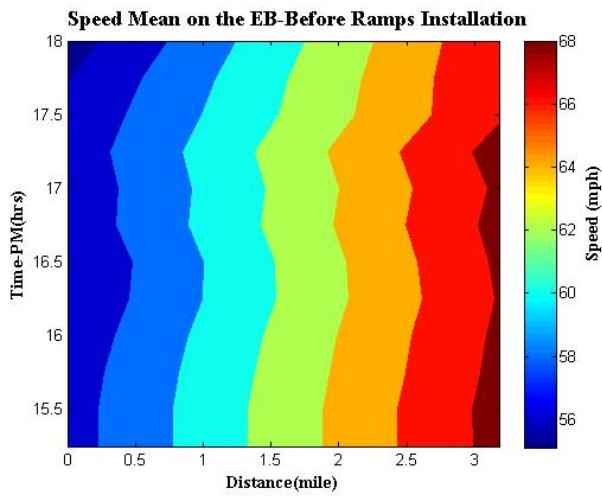


[c] Eastbound– PM Peak - Speed Standard Deviation Before

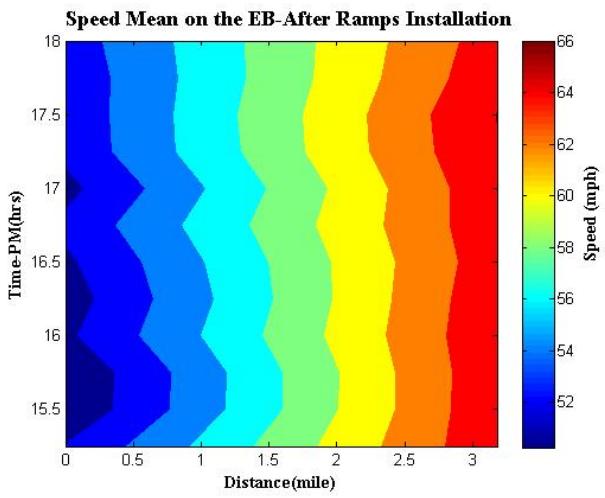


[d] Eastbound– PM Peak - Speed Standard Deviation After

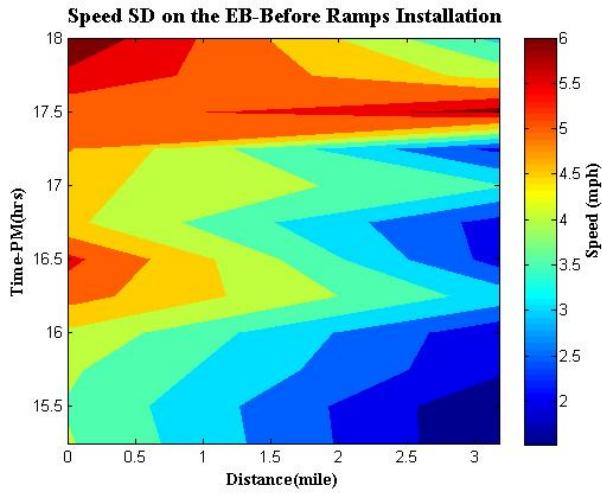
**Figure C-18**  
**Mean speed and standard deviation contours for DCMS detectors on eastbound for Wednesdays**



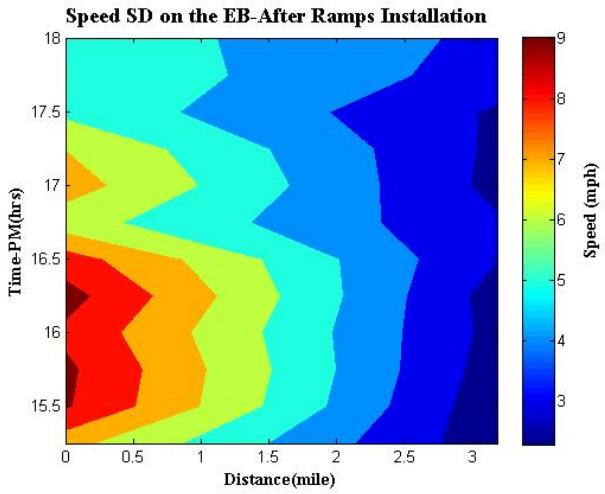
[a] Eastbound– PM Peak - Mean Speed Before



[b] Eastbound– PM Peak - Mean Speed After

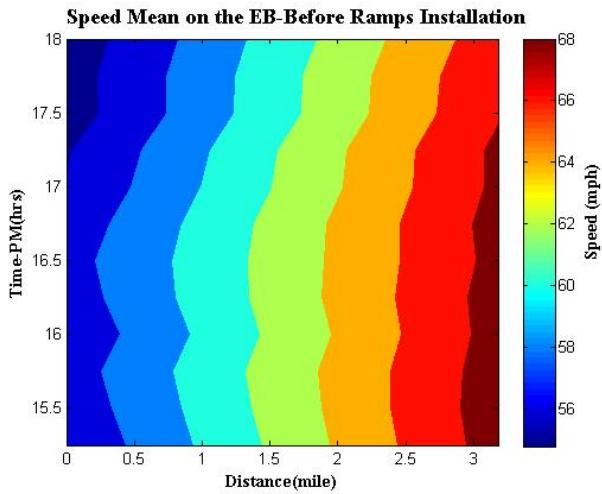


[c] Eastbound– PM Peak - Speed Standard Deviation Before

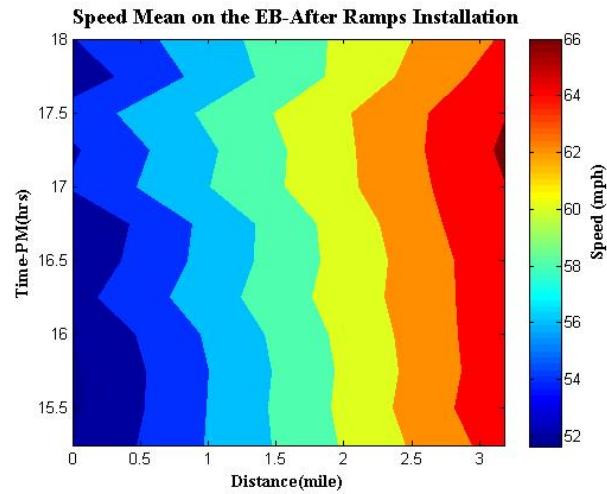


[d] Eastbound– PM Peak - Speed Standard Deviation After

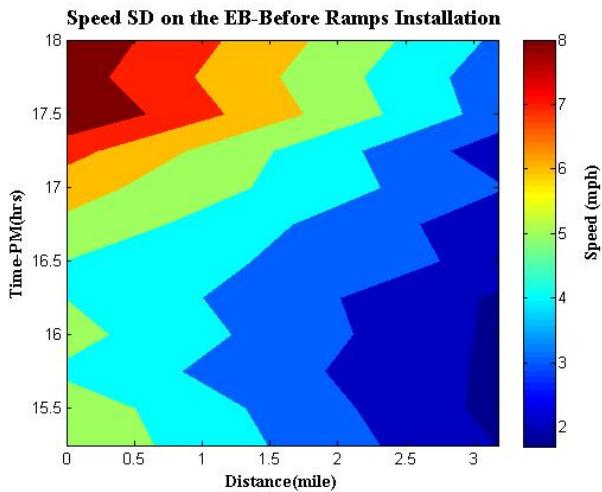
**Figure C-19**  
**Mean speed and standard deviation contours for DCMS detectors on eastbound for Thursdays**



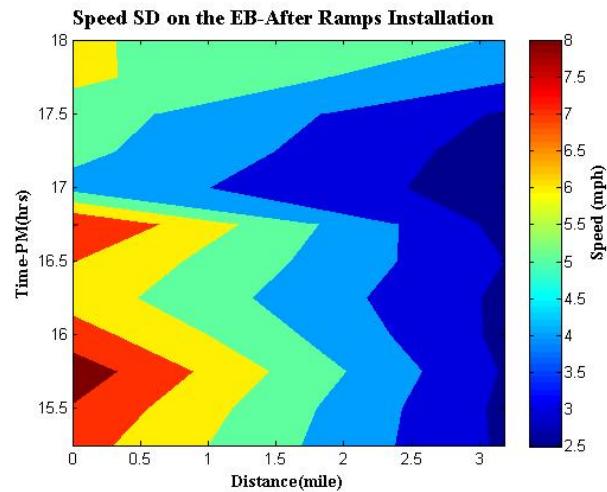
[a] Eastbound– PM Peak - Mean Speed Before



[b] Eastbound– PM Peak - Mean Speed After



[c] Eastbound– PM Peak - Speed Standard Deviation Before



[d] Eastbound– PM Peak - Speed Standard Deviation After

**Figure C-20**  
**Mean speed and standard deviation contours for DCMS detectors on eastbound for Fridays**