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Evaluation of the Accuracy of the Incremental Queue Accumulation Delay Estimation Method

Yaye M. Keita

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Master of Science

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ABSTRACT

Evaluation of the Accuracy of the Incremental Queue
Accumulation Delay Estimation Method

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Master of Science

Knowing the performance of intersections is of utmost importance to engineers today. It affects the development, advancement, and future economic growth status of the city or place in which the intersections are located. The performance level is inferred from the levels of service of the intersections and one common way to measure the levels of service is to estimate delays for those intersections. Therefore, the estimation of delays at intersections is a very recurrent study done by traffic engineers. Different methods of calculating delays exist. Those methods are not ideal for estimating delay for all cases. The call for better methods for estimating delays for all cases is the source of much research that led to the new method that is scheduled to be included in the Highway Capacity Manual 2010, called the Incremental Queue Accumulation (IQA) method. Since it is a new method, it needs to be studied further to assess its benefits and shortcomings. The purpose of this study is to evaluate the accuracy of the IQA method.

The intersection of University Parkway and Main Street in Orem, Utah was selected as the study site. Delays were estimated for northbound and southbound approaches of that intersection using both the current methods of estimating delays in the Highway Capacity Manual 2000 (HCM 2000) and the IQA methods. For both methods, both field and model analyses were done. The data were obtained from the video recorded in the BYU Transportation Lab. The IQA analysis was done cycle by cycle for each lane, and then the weighted average was acquired to get the delay for the 15 minutes of the approach. On the other hand, the HCM 2000 analysis was performed directly for the 15 minutes of the lane group and the approach. The results were compared to determine the accuracy of the IQA method. The findings indicate that the IQA method is promising; however, the method may need to be improved for right turn movements where right turn on red is allowed. Moreover, the IQA method should be checked further to determine its sensitivity to the saturation flow rate and arrival type.

Keywords: delays, IQA, HCM

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I thank the Department of Civil and Environmental Engineering and the Fulton College of Engineering and Technology for helping me financially during my study at Brigham Young University (BYU) by providing me with a scholarship every semester since I got into the program. In addition, I would like to thank BYU for helping me financially during my undergraduate study.

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1 INTRODUCTION

Determining the level of service (LOS) of an intersection is very important to traffic engineers. With intersections experiencing high LOS, traffic engineers receive less criticism from the public. Additionally, a high LOS of an intersection in a city signifies well-flowing transportation network, which indicates and promotes the economic wellbeing and the growth of that city. To make sure that the traffic engineers are satisfying the public and promoting the economic growth of their cities, they constantly measure the LOS of the intersections. The LOS of the intersections are estimated based on the values of the intersection delays. Several methods of estimating delays exist. The purpose of this thesis is to compare the new Incremental Queue Accumulation (IQA) delay estimation methods with the Highway Capacity Manual 2000 (HCM 2000) (TRB 2000) delay estimation techniques. The IQA methods are scheduled to be included in the Highway Capacity Manual 2010 (HCM 2010) (TRB 2010).

1.1 Background

Intersection delay estimation of all kinds (e.g., control, stopped, acceleration, deceleration, geometric, etc.) has been studied by traffic engineers for many years. Different organizations have developed different methods for determining different kinds of delays. For example, the Transportation Research Board (TRB) estimates control delays in its Highway Capacity Manual (HCM) (HCM 2000). Also, the Institute of Transportation Engineers (ITE) estimates stopped delays in its Manual of Traffic Engineering Studies (ITE 1994). On the other hand, individual researchers in the traffic engineering field have been doing their investigations and research in finding better ways to estimate delay at intersections.

1.2 Problem Statement

The control delay estimation model in HCM 2000 (TRB 2000) has three terms in its delay equation namely uniform delay, incremental delay, and delay caused by an initial queue. The first term, the uniform delay term, has the potential for error. The uniform delay term has been based on the assumption that the queue accumulation diagram would always be a triangle, which means that during a signal cycle, there is only one green phase and one red phase, one constant arrival flow rate and one constant departure flow rate. Although this assumption is correct for some basic cases, there are many cases that do not follow this basic assumption. This brings up errors in delay estimation that need to be rectified. As of now, the cases that do not conform to the assumption are adjusted to fit into the assumption, which is problematic and leads to the potential for various errors. Research to develop a better method has led to the development of the IQA method.

1.3 Objective of the Study

The goal of this study is to evaluate the new IQA delay estimation method and compare it with the current HCM 2000 delay estimation method. The comparison should clarify if the new method is worth adopting. The result of the study will weigh the advantages of the new method versus the advantages of the current method. The time spent using the new method and its results are evaluated versus the time spent in using the current method and its results. If there is no big difference between the results and the new one is time consuming, the new method may not be worth adopting. The positive and negative sides of the IQA method are also investigated.

1.4 Thesis Organization

This thesis is arranged into seven chapters. The seven chapters include: 1) introduction, 2) literature review, 3) selection of study site and data collection, 4) field delay estimation and results, 5) model delay estimation and results, 6) comparison of delays from the method used in this study, and 7) conclusions and recommendations. Those chapters are followed by a references section and the appendices.

Chapter 1 introduces the objectives and reasons for conducting the study, provides background information about the study, and serves as an outline of the thesis.

Chapter 2 is the section containing the literature review. It gives detailed background information on the topic of the thesis and on related subjects. It demonstrates the old, current, and new methods of estimating delays and the changes that were made to the old ones for upgrade purposes. Also, alternative studies that were conducted in the past for estimating delays are illustrated in this chapter.

Chapter 3 describes the selection of the study site and the data collection. The chapter presents the different attempts that were made for choosing the site and for proceeding to the data collection. The problems encountered during the site selection and data collection and the solutions to those problems are mentioned. The different methods and technologies used for data collection are demonstrated. In other words, the processes of the study were highlighted.

Chapter 4 includes the field delays estimation and results. It shows the different steps and techniques used to analyze field delays.

Chapter 5 contains the determination of delays using the two models: the HCM 2000 and the IQA delay models. The techniques are explained and the results are demonstrated in this chapter.

Chapter 6 compares all the other methods used in the study to the IQA model. The results are evaluated and the accuracy and usefulness of the new method are discussed.

Chapter 7 presents the conclusions and recommendations of the thesis. It summarizes the findings of the study. Also, the chapter emphasizes the future studies that could be accomplished.

The appendices contain the data and the results of all the delay estimation methodology analysis. The ouputs from the software used in the study are also presented in the appendices.

2 LITERATURE REVIEW

Studying intersections is significant to traffic engineers. An intersection study encompasses evaluation of capacity, level of service, delay, and others. The determination of delay at an intersection as a way to measure the performance of the intersection is something that is very important and has existed for a long time. One demonstration is the availability of the delay calculation method in the HCM of the TRB published in 1985. There are different kinds of delay such as stopped delay, control delay, approach delay, total delay, vehicle interaction delay, and geometric delay. Also, diverse techniques to calculate the varieties of delay have been developed. Delays can be quantified using the model, field, and automatic methods. In this chapter, the different methods of estimating delays are presented such as model, field, and automatic methods.

2.1 Delay Models

All the delay models in HCM are based on the Webster delay model of 1958 (Strong et al. 2005). They are all composed of at least two main terms. The first term (d_1) is used to calculate uniform delay, and the second term (d_2) yields incremental delay due to randomness in arrivals from cycle to cycle. Using delay models to estimate delay at an intersection requires a lot of input data. The delay models that are discussed in this chapter are the evolution of HCM delay models including the IQA delay model that is scheduled to be included in HCM 2010. All the latter versions of delay estimation model have similar ideas, and each subsequent version is the transformation of the previous one for more details and improved accuracy. The history of HCM delay models are demonstrated in the following subsections.

2.1.1 Highway Capacity Manual 1985 (HCM 1985) Delay Model

The first version of HCM was published in the 1950s. It has a section on signalized intersection but only talks about capacity, not delay. It is primitive and is like a design manual (Bureau of Public Road 1950). The following version, which is HCM 1965, extended more the ideas of signalized intersection section in HCM 1950; but the technique was still based on volume to capacity, not delay. HCM 1985 is the version in which the method was first transformed from volume to capacity basis to a delay basis (Strong et al. 2005). Some structural changes needed to be made to the 1965 version, resulting in the 1985 one. The two delay term—the uniform delay term and the incremental delay term—are the delay terms that are present in HCM 1985. Also, it is in the 1985 version of HCM that progression factor depending on arrival type was introduced. The progression factor was applied to both delay terms in the 1985 Highway Capacity Manual (TRB 1985).

2.1.2 Highway Capacity Manual 1994 (HCM 1994) Delay Model

The 1994 HCM delay model is not significantly different from the 1985 version. It also has only the first two delay terms. In HCM 1994, the notion of level of service, which is derived from the delay estimation, is explained in more detail. Also, it was starting from this version of the HCM delay model that the progression factor was removed from incremental delay term d_2 and was only applied to the first term which is a term for uniform delay (d_1); and the supplemental adjustment factor for early and late platoon arrivals, (f_{PA}), was added to the progression factor equation (Strong and Rouphail 2005). The formula is provided in Equation 2-1(Strong and Rouphail 2005).

$$PF = \frac{(1-P)\, f_{PA}}{(1-\frac{g}{C})} \tag{2-1}$$

where: PF = progression adjustment factor
P = proportion of vehicles arriving on green
g/C = proportion of effective green time available, and
f_{PA} = supplemental adjustment factor for platoon arriving during green

2.1.3 Highway Capacity Manual 1997 (HCM 1997) Delay Model

To come up with HCM 1997 delay model, major changes were made to HCM 1994 delay model. The delay equation of the model was transformed in order to take into account signal coordination, oversaturation, variable length analysis periods, and the presence of initial queues at the beginning of an analysis period. Additionally, it is in the 1997 version of HCM that the delay equation has added one additional term d_3, which takes into account initial queue delay. Additionally, in that version of HCM the measurement of level of service has been changed from the average stopped delay to the total or control delay. Also, the permitted left turn movement model has been adjusted as well as left turn equivalency table in HCM 1997 (TRB 1997).

2.1.4 Highway Capacity Manual 2000 (HCM 2000) Delay Model

HCM 2000 delay model is the latest version of HCM delay model. It is not considerably different from the 1997 version. The HCM 2000 delay model is based on the same concepts and the same data: geometric, traffic, and signal data. It also has three terms in the delay equations which are the uniform delay term (d_1), incremental delay term (d_2), and initial queue delay term

(d_3). As with the two preceding HCMs, the progression factor is applied to only the uniform term. One new thing about this version of HCM is that for the queue model, another progression factor (*PF2*) which is different from the first progression factor (*PF*) is applied. Another detail change that is made in this version of HCM delay model is the addition of two extra factors in the calculation of saturation flow rate: pedestrian adjustment factor for left turn movements (f_{Lpb}) and the pedestrian-bicycle adjustment factor for right turn movements (f_{Rpb}) (TRB 2000). Also different equations are used in the estimation of minimum green time. As with all the three previous versions, HCM 2000 delay model has the input diagram for delay calculation (TRB 2000). The diagram is shown in Figure 2-1. The earlier versions have similar ones.

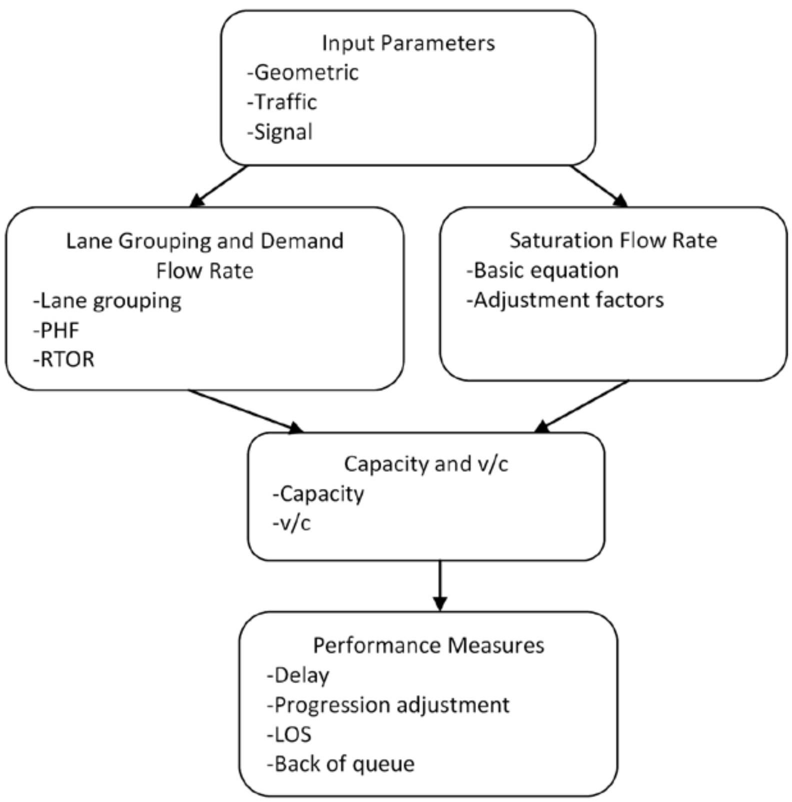


Figure 2-1: Input diagram for delay model (TRB 2000)

2.1.5 Highway Capacity Manual 2010 (HCM 2010) Delay Model: Incremental Queue Accumulation Delay Estimation Method

Although the HCM 2000 delay model represents significant improvement from the first delay model in the HCM 1985, it is still not perfect. It is widely used; however, it is not the most appropriate model for all cases. All the delay models mentioned above, including HCM 2000 delay model, are based on the assumption that the queue accumulation diagram is a triangular shape, meaning arrival and discharge rates are constant throughout the cycle. Many basic cases reflect that assumption. Nonetheless, there are some cases that do not fall into this category. In these instances, in order to use HCM 2000 delay model, the cases with the queue accumulation diagram shapes different from triangular shapes need to be modified to accommodate them. Those adjustments can be complex and lead to incorrect answers. Due to the inaccuracy of the current HCM delay model for some cases, the need for a better model has arisen. A model method called the Incremental Queue Accumulation method, also named IQA, was developed. This method is intended to be more flexible with as few limiting assumptions as possible (Strong et al. 2005).

2.1.5.1 Reason for a New Model: Drawback of the Current Model (HCM 2000)

The limitations of HCM 1985-2000 delay models are mostly related to only the first term of the model which is the uniform delay term. This is because the calculation of uniform delay involves calculating the area of the accumulation queue diagram which is assumed to be a triangle in HCM 1985-2000 delay models. That assumption indicates three things: 1) the existence of the unique triangle with only one red period and one green period, 2) the uniform arrival rate is represented by a single straight line on the leading edge of the queue accumulation diagram for the duration of the red light interval, and 3) the difference between the uniform arrival rate and uniform saturation flow rate of departure is demonstrated by a single straight line on the falling edge of the queue accumulation diagram for the green light interval (Strong et al. 2005). Consequently, sub-models must be modified to accommodate the above assumption. The queue accumulation diagram as a triangle is shown in Figure 2.2.

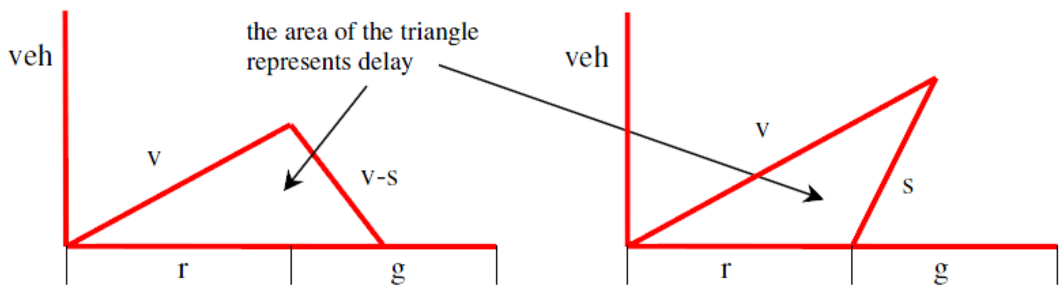


Figure 2-2: Triangle shape of the queue accumulation and discharge function (TRB 2007)

Permitted left turn models must utilize a single, weighted average saturation flow rate during the full green light interval. That does not reproduce the exact time of departures during the cycle for those cases. Some compound cases—protected-permitted and permitted-protected—have to be altered to avoid problems linked to the assumption of the queue accumulation diagram being a triangle. The current HCM delay model determines a minimum saturation flow rate for the green light interval and does not take into account sneakers which are vehicles that proceed through the intersections at the end of the amber light interval. Also, the effect of progression is not incorporated into HCM 2000 delay model until after the calculation of delay based on uniform arrivals and arrival type.

Multiple displays of green is another case that exists in the field but has no chance to be modeled with the existing HCM model due to the assumption of the queue accumulation diagram being always a triangle. One example of such cases is the right turn overlap phase splits from the main green phase. The example is demonstrated in Figure 2-3. Protected-permitted right turn models must accommodate to the assumption of the queue accumulation diagram being always a triangle by using one single, constant saturation flow rate during the green time instead of two. Additionally, by assuming that the queue accumulation diagram is always is a triangle, start up and clearance lost times are added together and subtracted at the beginning of green time to facilitate the calculation in HCM 2000. Finally, all-red sub-models presume that all-red time is similar and that it is included in the yellow time because of the simplification mentioned previously for start up and clearance lost times. That simplification creates problems for adjacent phases and multiple green light intervals (Strong et al. 2005).

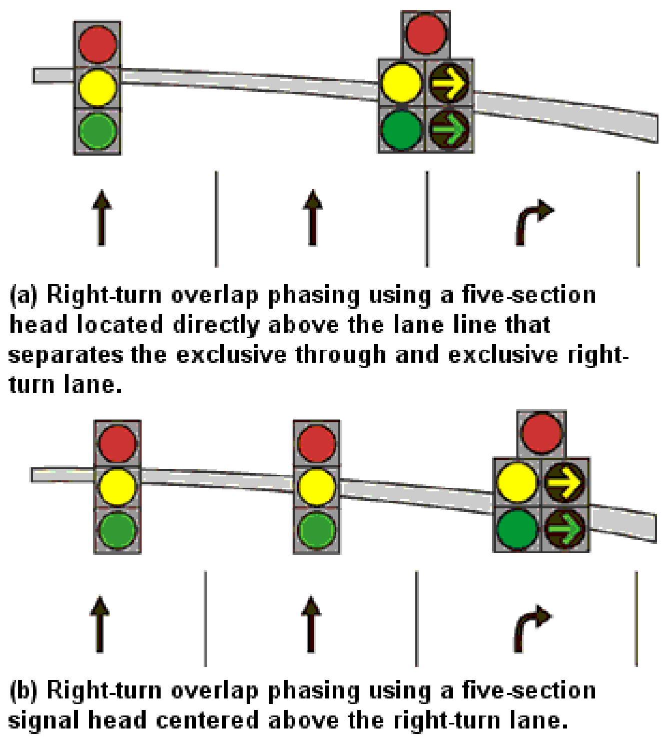


Figure 2-3: Overlap phases (USDOT 2009)

2.1.5.2 Description of the IQA Method for Fixed Interval

Instead of estimating the area of the triangle of the queue accumulation diagram and by dividing that area by the number of arrivals per cycle to calculate uniform delay as in HCM 2000 uniform delay equation, which is shown in Equation 2-2, the IQA method has a different concept. Determining the first term of the delay model consists of incrementally estimating traffic data during a fixed analysis interval. During the fixed analysis period, the numbers of arriving and departing vehicles are specified as well as the arrival and departure flow rate. Thus, the increase or decrease of the queue accumulation during the fixed analysis interval could be determined. A triangle similar to the Webster's triangle will be yielded if the same inferences such as uniform arrival and departure rates are used in the model. Otherwise, calculating the number of vehicles in the queue during each interval for the entire cycle and dividing by the number of arrival vehicles will yield d_1 for the new method. If an integer number of cars does not arrive and depart during the fixed analysis interval, then partial vehicles can be in the queue during the interval. The fixed analysis interval boundaries must coincide with the change in signal and vehicle flow, but that is not required if the time length of the interval is significantly reduced to one second. As HCM 2000 uniform delay model, the IQA method assumes during the delay calculation that the volume to capacity ratio, X, is less or equal to one ($X \leq 1$) (Strong et al. 2005). This assumption is necessary for all the other terms—d_2 and d_3— in the delay calculation equation to be valid. This is reasonable because the IQA method calculates only the uniform delay term of the delay equation.

$$d_1 = \frac{0.5C(1-\frac{g}{C})}{(1-Min(1,X)\frac{g}{C})} \quad \textbf{(2-2)}$$

where: g = effective green time
C = cycle length
X = volume to capacity ratio

2.1.5.3 IQA Method for Variable Interval

The concept of IQA is based on constant time increment; however, the IQA method does not need to have a fixed analysis interval. Variable analysis intervals can be used as long as they coincide with the change of inflow and outflow values. This is one example of where the flexibility of the new model could be accentuated. The shape of the queue accumulation can be of any shape due to the non-constant saturation flow rate and arrival rate embedded in the method. To get the variable intervals, the analyst just needs to determine intervals of constant saturation flow rate and arrival rate. Each constant saturation flow rate and arrival rate yields a trapezoid and the area of several trapezoids where inflow and outflow are constant and are added in a cycle to find the total uniform delay of the cycle. The IQA method for calculating uniform delay can be said to be comprised of the current method for estimating delay in HCM 2000. That is, the current method for estimating uniform delay can be derived from the IQA method.

2.1.5.4 Illustration and Formulas of the IQA Method

Delay diagrams of the IQA method are demonstrated in Figure 2-4 (TRB 2007). To determine the area of each trapezoid, as shown in Figure 2-4, at first the queue at the beginning of the interval must be known and in turn is used to calculate the queue at the end of the interval. The queue at the start of the interval corresponds to the queue at the end of the previous one. If there is no previous interval, the queue at the start is zero. The formula to calculate the queue at the end of the interval is presented in Equation 2-3 (TRB 2007).

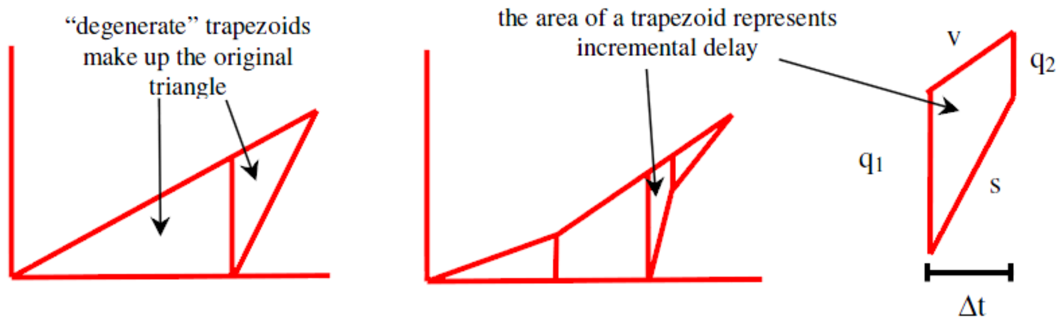


Figure 2-4: Trapezoid shape of the queue accumulation and discharge function (TRB 2007)

$$q_2 = q_1 + \frac{(v - s)}{3600 * \Delta t} \geq 0 \tag{2-3}$$

where: q_2 = queue at the end of the interval (veh)
q_1 = queue at the start of the interval (veh)
v = average arrival rate during the interval (veh/hr)
s = average saturation flow rate during the interval (veh/hr)
Δt = lengt of the interval (sec)

After finding all the information necessary to calculate q_2, the area of the trapezoid is calculated to find the uniform delay for that specific constant interval. The formula to calculate the incremental delay for an interval in a cycle is shown in Equation 2-4 (TRB 2007).

$$d_i = \Delta t * \frac{(q_1 + q_2)}{2} \tag{2-4}$$

where: d_i = incremental delay for the interval *i* (veh-sec)

2.1.5.5 Incorporating Progression in IQA

Although the new method appears sound, incorporating progression in its calculation was a source of much discussion. Taking into account the effect of different arrival types in HCM 2000, the progression factor (*PF*) shown in Equation 2-1 was used. This factor is based on some assumptions that are not always correct. One of the assumptions is constant queue dissipation time (Strong and Rouphail 2005). The problem with the stated assumption is that the flow rates during red and green intervals are not the same.

On the other hand, to include progression factor in the IQA method, a formula of PF_1 was first developed as shown in Equation 2-5. PF_1 has been proven to be more accurate than *PF* of HCM 2000. Therefore, the use of PF_1 instead of *PF* to account for progression factor in HCM 2000 will yield a more accurate result for progression and will take care of the weak assumption of constant queue dissipation time. Using PF_1 takes into account the variable flow rate during green and red intervals.

To include the effect of progression factors in the IQA method, the arrival flow rate during red light intervals (V_r) and the arrival flow rate during green light intervals (V_g) are estimated separately and used in the model. Using this technique is the same as using PF_1 in HCM 2000 delay model as long as all other assumptions are the same (Strong and Rouphail 2005). The variation of the arrival rate is established by using Equation 2-6 and Equation 2-7 if the proportion of green interval is known. This concept of different flow rate during green and red has existed for a long time in the HCM, and has been used for the estimation of both of the progression factors in the HCM 2000. However, the constant flow rate in the current HCM is the weighted average of the flow rates during red and green light intervals, and the formula is shown in Equation 2-8 (Strong and Rouphail 2005). If the proportion of green, P, is not known, it can be calculated using Equation 2-9 (TRB 2007).

$$PF_1 = \frac{(1 - R_p g/C)}{(1 - g/C)} * \frac{(1 - V/s)}{(1 - R_p V/s)} * \left[1 + \frac{V}{s} * \frac{(1 - R_p)}{(1 - g/C)}\right] \quad \textbf{(2-5)}$$

$$V_g = \frac{VP}{(\frac{g}{C})} \quad \textbf{(2-6)}$$

$$V_r = \frac{(VC - V_g g)}{r} = \frac{V(1 - P)}{(1 - \frac{g}{C})} \quad \textbf{(2-7)}$$

where:
- V = average flow rate during the cycle (veh/hr)
- P = proportion of vehicles arriving on green (0.0-1.0)
- V_g = average flow rate during effective green (veh/hr)
- V_r = average flow rate during effective red (Veh/hr)
- R_p= platoon ratio for the movement

$$V = \frac{(V_r r + V_g g)}{C} \quad \textbf{(2-8)}$$

$$P = R_p * \frac{g}{C} \quad \textbf{(2-9)}$$

2.1.5.6 IQA Delay Model for Left Turns

Left turn delays have always been the most difficult to model in HCM. Sub-models are used for their calculations. Additionally, the assumptions used in the models are not descriptive of especially the compound left turns. Using HCM 2000 delay model for such cases involves transforming the reality to match the model which leads to the potential for significant errors. For example, a protected-permitted left turn does not have a constant departure rate, but the current HCM delay model assumes a constant departure rate (Kyte et al. 2009). Figure 2-5 exemplifies the protected-permitted left turn queue accumulation diagram in HCM 2000.

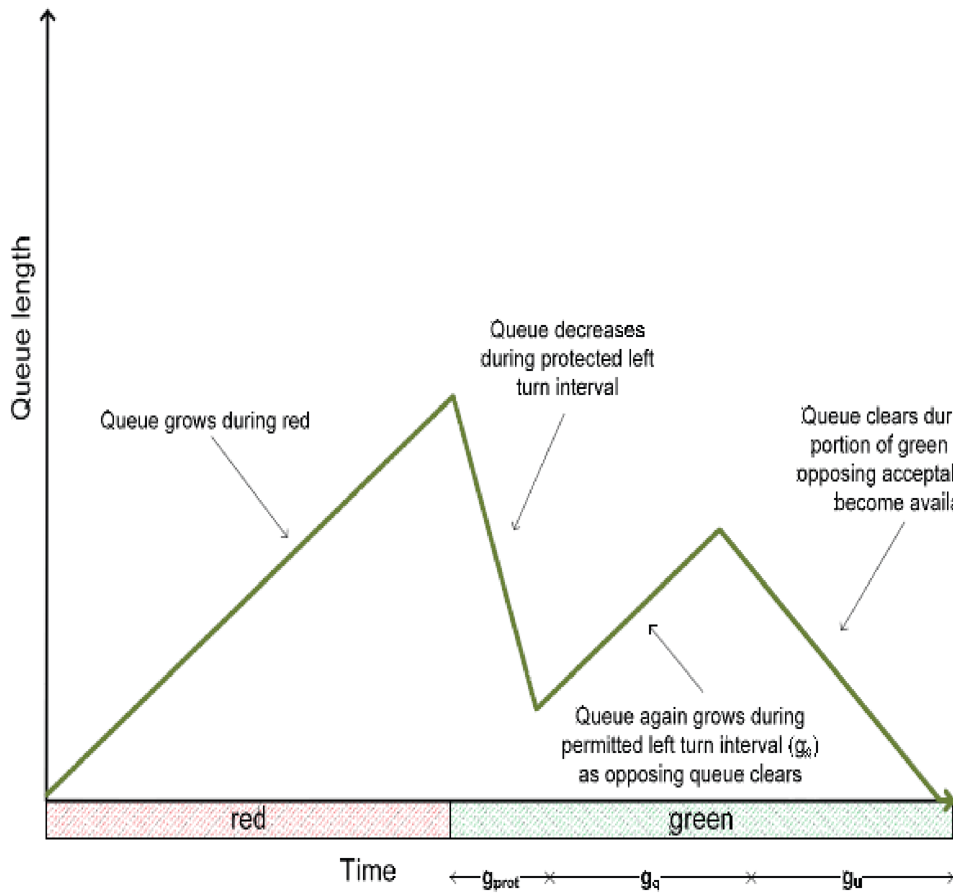


Figure 2-5: Queue accumulation diagram for protected-permitted left turn (HCM 2000)

Due to the shortcomings of HCM 2000 delay model for left turns, some attempts have been made to come up with a new model for left turns. An example of this new model was developed by Kim (2006) for protected-permitted left turns from exclusive left turn lanes. That alternate model was tested against the HCM 2000 model and the corridor simulation (CORSIM) model. The model was proven to be closer to the CORSIM than HCM 2000. The formula to determine the uniform delay model for the alternate model is shown in Equation 2-10 (Kim 2006).

$$d_1 = \min\left[\frac{Q*(r+G_q)+w*q_{LT}*G_e}{2*q_{LT}*C}, \frac{Q_{gu}}{2*q_{LT}}\right] \quad \textbf{(2-10)}$$

where: Q = estimated queue length
R = effective red time (sec)
G_q = effective green-time before the queue clearance of an exclusive permitted left lane group (sec)
G_e = effective green-time after the queue clearance of an exclusive .permitted left lane group (sec)
W = average delay time of permitted left turns on G_e (sec/veh)
q_{LT} = average arrival rate of permitted left turns (veh/hr)
Q_{gu} = maximum height of the Queue Accumulation Diagram QAP (veh)
C = cycle length (sec)

Among all of the alternate models, the IQA model seems so far to be the best way to model left turns. It does not require sub-models and represents reality better by modeling the right shape of the queue accumulation diagram. Contrary to the HCM 2000 model, the IQA model for left turns, as well as for through movements, is not based on the national average. The arrival pattern is based on the proportion of vehicles arriving on green. Also, the departure is divided into sequences of intervals that match the departure pattern of protected-permitted left turns (Kyte et al. 2009). For instance, to estimate permitted left turn delays using the IQA model, Appendix C of HCM 2000 is used to calculate the three parameters: 1) the time when the opposing queue clears (g_q) which can also be determined using the IQA method, 2) the time of the arrival of the first left turner in the shared lane (g_f), and 3) the saturation flow rate when the permitted left turn is no more blocked by opposing movements (g_u). The diagram for the IQA model for protected left turns is shown in Figure 2-6. Even though the IQA model is not a perfect representation of left turns because of its approximation of the proportion of arrival on green, it models the compound left turns better than the HCM 2000 model (Kyte et al. 2009). This new model is intended to make a difference in the estimation of left turn delays at signalized intersections—although it can involve more work for the most basic cases.

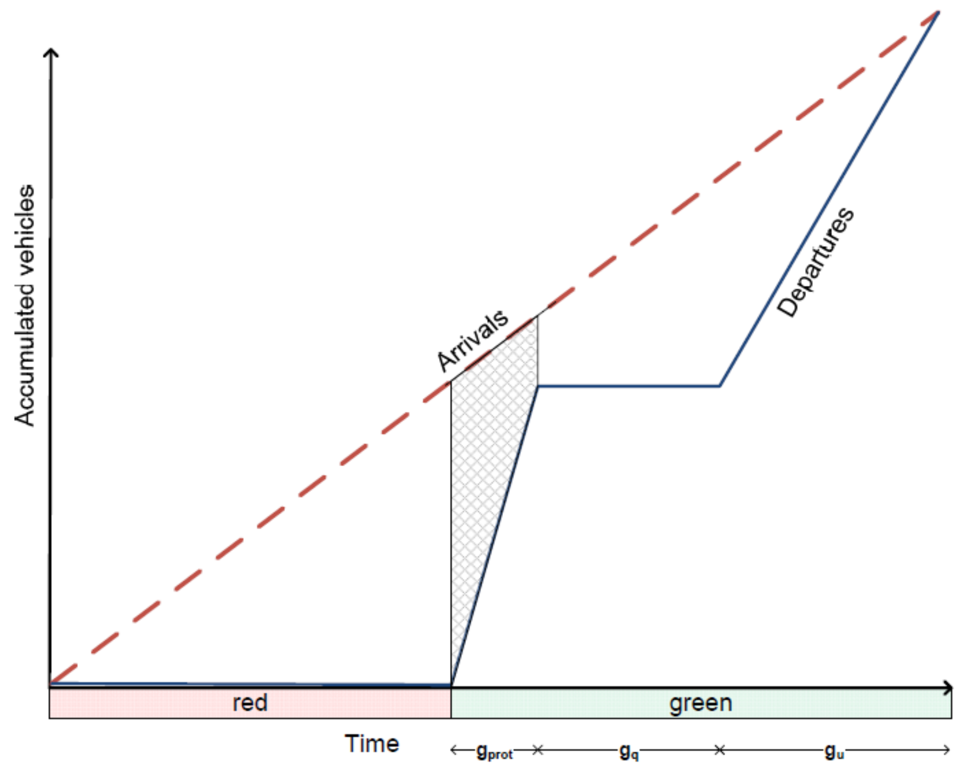


Figure 2-6: Queue accumulation polygon for protected-permitted left turn (IQA) (Kyte et al. 2009)

2.1.5.7 Summary of the IQA Model

In general, the IQA model requires identifying points in the cycle where the departure and arrival rate change. Points where the departure rates change can be at the start or end of effective green, the movement of sneakers into the intersection, the variation in saturation flow rate, the reduction of the subject queue size, the decrease of the opposing queue, etc. Points where the arrival rate change can be where the platoon arrival condition changes (TRB 2007). In other words, the IQA model involves tabulating values for the following parameters for each interval (Strong et al. 2005):

- interval number
- length of interval, Δt (sec)
- constant arrival rate during interval, v (veh/hr)

- constant saturation flow rate during interval, s (veh/hr)
- capacity of interval, c (veh/hr)
- undersaturated arrival rate during interval, v' (veh/hr)
- queue at start of interval, q_1 (veh)
- number of vehicles arriving during interval, $n_a = v'/ 3600 \times \Delta t$ (veh)
- number of vehicles departing during interval, $n_d = s/ 3600 \times \Delta t \leq q_1 + n_a$ (veh)
- queue at end of interval, q_2 (veh)
- incremental delay during the interval, d_i (veh-sec)
- maximum back of queue for the interval, Q_i *(veh)*, $Q_i = Q_{i-1} + n_a$

After performing the calculations for all the intervals, the sum of all the partial or incremental delays is obtained and divided by the number of arrivals to get the average uniform delay per vehicle.

2.2 Field Delay Measurement Methods

Determination of delay in the field is often the preferred method over using a model. It can reduce errors associated with acquiring all the inputs of the model, and it can be less work and less time consuming. The estimation of delay in the field eliminates acquiring input data for a model, which can reduce the cost of data collection. In addition, field delay measurement reflects the delay caused by prevailing conditions at the time of the data collection. Traffic flow changes over time; a delay obtained during an hour may be different from a delay experience in another hour. Fluctuation of delays is something that is real, and field delay measurement can overcome those variations. However, this method is applicable only if the system already exists.

Two common methods, among other ones, are used to estimate delay in the field: 1) the ITE stopped delay field measurement and 2) the HCM 2000 control delay field measurement. Furthermore, the IQA field delay measurement method is underway.

2.2.1 ITE Stopped Delay Field Measurement

The ITE method involves counting the number of cars at an intersection approach of interest during specific intervals. About 60 intervals are used in the field data collection with each interval lasting typically between 10 and 20 seconds. Compared with all other methods of calculating delay, obtaining delay during peak hours is more reliable for the ITE field method. The assumption behind this method is that the cars that are counted are stopped the entire time during the duration of the interval. This assumption can negatively affect the result of delays obtained using the ITE field method. The calculation of stopped delay per vehicle in the field using the ITE method is the sum of stopped cars during all the intervals multiplied by the length of the interval in seconds and all divided by total number of vehicles departing from the approach (ITE 1994).

Turning movements and classification of vehicles are included in the estimation of delay in the field. Also, characteristics that indicate stopped vehicles are important and include vehicles with locked wheels meaning vehicles that are not moving, vehicles creeping forward in a queue that is not discharging, vehicles with a gap between them, and vehicles in front of them less than three car lengths (50 feet). Calculating delay in the field using the ITE method requires acquiring traffic volume of both stopping vehicles and non-stopping vehicles. Different equipment can be used to count cars in the field such as mechanical or electronic counting boards and videos with an on-screen lock (ITE 1994).

2.2.2 HCM 2000 Control Delay Field Measurement

The HCM 2000 control delay field measurement method uses a slightly different technique than the ITE method. Two different procedures are used to calculate delay in the field for undersaturated (meaning demand is less than capacity) and oversaturated (meaning demand is greater than capacity) intersections. If the intersection is undersaturated, the count of vehicles in the queue is obtained. Vehicles in the queue are defined as a line of stopping vehicles that have not exited the intersection. It is assumed in this method that a vehicle has cleared the intersection only when the rear axle of the vehicle has crossed the stop line. And for turning vehicles, a vehicle has cleared the intersection when the opposing through-traffic or pedestrians to which it must yield have cleared the intersection and with the clearance of the vehicle itself. Vehicles that have reached a normal speed and have not exited the intersection are incorporated into the count of stopped vehicles. Other instruments can be utilized using the technique for undersaturated intersections such as multifunction digital watch with a countdown repeat timer and a volume-count board or a laptop computer capable of counting at specific intervals. Intervals between 10 and 20 seconds are commonly used. The technique requires identifying the end of the field data collection period and the last vehicle arriving at the end of the period, and that vehicle should be traced until it exits the intersection.

The HCM 2000 method involves obtaining volume counts of all cars arriving at the intersections and cars that have stopped. Cars that have stopped more than one time are considered to have stopped only once (TRB 2000). To calculate the time in queue per vehicle, Equation 2-11 is used (TRB 2000). The drawback of this method is the fact that it does not effectively take into account deceleration and acceleration delays. To make up for that, correction factors are used. To get control delay per vehicle, deceleration and acceleration correction factors are multiplied by the fraction of stopped vehicles, and that product should be added to the time-in-queue per vehicle determined using Equation 2-11.

$$\text{Time-in-queue per vehicle} = \left(I_s * \frac{\sum V_{iq}}{V_{tot}} \right) * 0.9 \tag{2-11}$$

where: Is = interval between vehicle-in-queue counts (s)
$\sum V_{iq}$ = sum of vehicle-in-queue counts (veh)
V_{tot} = total number of vehicles arriving during the survey period (veh)
0.9 = empirical adjustment factor

For oversaturated signalized intersections, techniques like input-output or zone survey can be used. The input-output technique is based on using different people counting arrivals and departures. To calculate vehicles in queue, the accumulated difference of arrivals and departures is obtained. The zone survey technique consists of dividing the area being studied into small sections that can be handled by one person. Both of these techniques used during oversaturation require a lot of people and complex settings. Other methods for estimating control delay, not specifically undersaturated or oversaturated, exist such as test-car observations, path tracing of individual vehicles, and the recording of arrival and departure volumes on a cycle by cycle basis (TRB 2000).

2.2.3 IQA Delay Field Measurement

Estimating delay in the field using the IQA field method is different from determining delay using the IQA model (Kyte et al. 2009). The IQA field delay estimate appears to be more accurate than either the IQA model or the HCM 2000 delay model. One reason for that accuracy is that the IQA field method is able to correctly demonstrate the arrival patterns of vehicles better than the two models (Kyte et al. 2009). That statement is illustrated in Figure 2-7. The uniform arrival assumption for the two models is not correct even though the IQA model better represents the progression factor (PF_1) because of its use of different average flow rates during green and red intervals. That is, the IQA model gives a better estimate of delay than the HCM 2000 delay model because of its capacity to better model the departure pattern. In any case, the IQA model accuracy seems to be closer to the IQA field method accuracy than to the HCM 2000 delay model accuracy. Even though the IQA model represents reality better than the HCM 2000 delay model by modeling the departure pattern well, comparing the IQA model, which is based on average flow rates, and the IQA field method, which demonstrates instantaneous delay—that is delay at a specific time—is difficult. That is the reason for disparity between the arrival patterns of the two methods (Kyte et al. 2009).

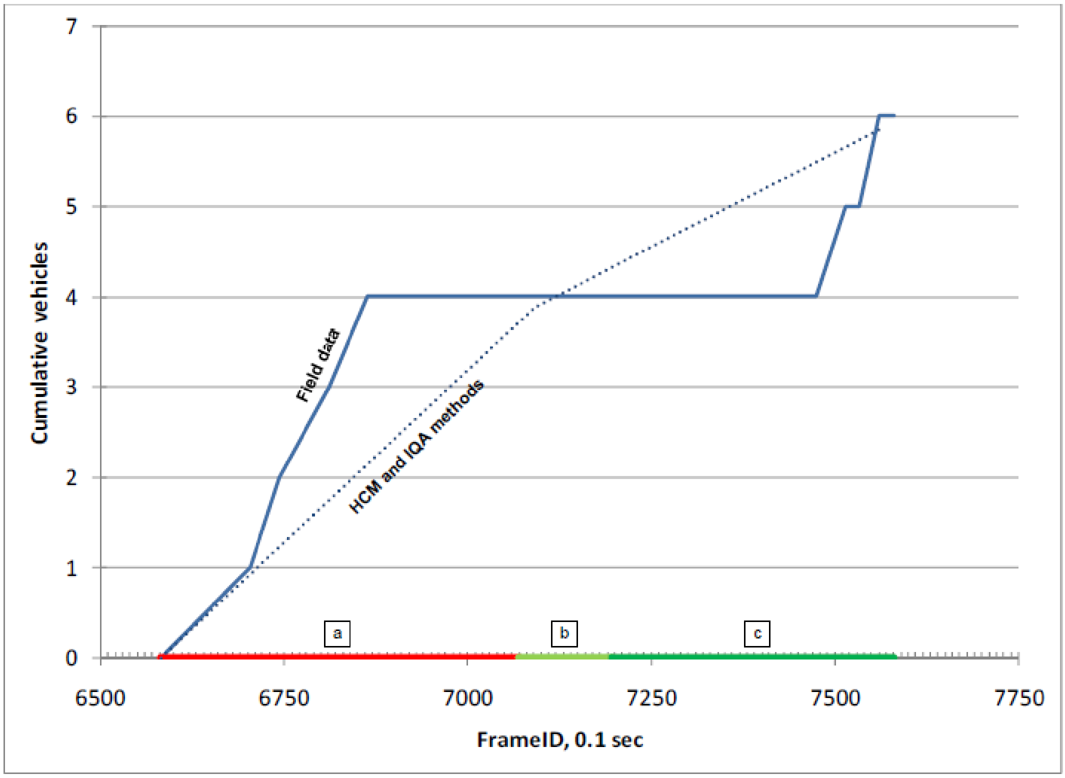


Figure 2-7: Comparing IQA field method Vs IQA and HCM 2000 models (Kyte et al. 2009)

The IQA field method is based on the kinds of calculations described in Table 2-1 (Kyte et al. 2009) as explained next. The IQA field method is based on a table composed of several columns—in this case seven columns. For the example shown in Table 2-1, the first column shows the clock time in seconds. The second indicates the arrival or departure of a car. The third illustrates the time difference between adjacent arrivals and departures. The fourth shows the number of vehicles entering the intersection. The fifth demonstrates the number of vehicles exiting the intersection. The sixth is the column of the incremental queue; and finally, the last column is the partial incremental delay, which sums up to give the total delay. Recording vehicle arrival and departure should begin as soon as a red interval starts.

Table 2-1: Example of IQA Field Computations

Clock Time, (sec) (1)	**Arrival or Departure (2)**	**Time (sec) (3)**	**# of Vehicle In (4)**	**# of Vehicle Out (5)**	**Incremental Queue (IQA) (6)**	**Incremental Delay (vehicle-seconds) (7)=(3)x(6)**
670.4	Arrival	3.9	1		1	3.9
674.3	Arrival	6.8	1		2	13.6
681.1	Arrival	5.2	1		3	15.6
686.3	Arrival	31.5	1		4	126
717.8	Departure	2.3		1	3	6.9
720.1	Departure	23.5		1	2	47
743.6	Departure	3.9		1	1	3.9
747.5	Departure	3.9		1	0	0
751.4	Arrival	1.9	1		1	1.9
753.3	Departure	2.7		1	0	0
756	Arrival	2	1		1	2
758	Departure	0.1		1	0	0
758.1					0	0
	Vehicle-seconds					220.8
	Vehicles					6
	Average delay (sec/veh)					36.8

2.2.4 Other Field Methods

Other kinds of delay can be measured in the field. For example, time in queue delay (TIQD) is a delay that can be obtained from field study and is more similar to travel time delay than stopped delay. This delay is measured by counting the number of vehicles in queue after every 10 to 20 seconds, and this count is done even if the first vehicles have started to cross the intersection. The TIQD is calculated by adding all the counts from all the intervals and then multiplying that by the length of the interval in time. TIQD yields greater delay than stopped delay. Vehicles in queue include back of queue and are not limited to the back of queue only. They should also consider vehicles that leave or join the middle of the queue. It should be noted as well that not all vehicles in queue will clear the intersection during one green interval (ITE 1994).

2.3 Automatic Method

Finally, the new method that is being studied is the automatic estimation of delay with no additional calculation. Many efforts and attempts are being made to come up with a method to automatically determine delay that requires no complex formulas or use of diagrams. This method is intended to give more accurate stopped delay and to reduce human errors. Moreover, the positive part of this method is that it does not require collecting data in the field. Everything can be done from the office. The success of this method can save time and money. Additionally, this method can yield real time delay, which means delay during a specified time period. One way to introduce this automatic method of estimating stopped delay is image analysis. Three image analysis methods called the gap method, gap-hybrid method, and motion method were developed at Brigham Young University (BYU) (Hereth et al. 2006). All of these methods are based on the concept of pixel intensity. To determine the existence of a car, two kinds of frames are used. One frame with no vehicle called the background frame and another frame with vehicles. The pixel intensity of both frames should be found, and if the difference of the pixel intensities of the two frames is higher than the user specified threshold, a car is present (Hereth et al. 2006). More details on each of the three automatic methods are provided in the following sections.

2.3.1 Gap Method

The gap method uses the concept just described in the previous section. It consists of finding the gap between cars in the real frame, not in the background frame. A vehicle is considered stopped when the gap in front of it is less than the user specified gap distance. The total stopped delay is calculated by adding the product of stopped vehicles for each frame by the specific time interval between frames. Then, the average stopped delay is acquired by dividing the total stopped delay by the total number of cars counted. One problem with the gap method is that it works better for a computer simulation than for the real world. The method can consider two or more vehicles as one single vehicle when they overlap. The splitting that results after that does not definitely assure the correct number of cars. Another weakness of the method is that it only considers one frame at a time (Hereth et al. 2006).

2.3.2 Gap-Hybrid Method

The gap-hybrid method is an extension of the gap method used to take care of the problems of the gap method which are the inaccurate vehicle counting and the vehicle overlapping. For this method, if two or more vehicles appear to be one long vehicle, the long vehicle is split into a multiple number of vehicles based on the number and length of vehicles that occupied the same area in the previous frame. This is different from the gap method, which does the splitting according to the user specified average vehicle length. Even with this improvement, this method is not still accurate (Hereth et al. 2006).

2.3.3 Motion Method

The motion method, which is the third automatic method, is different from the other two methods mentioned. This method does not refer to the gap between cars or the gap in front of cars to determine if a car is stopped; instead, it tracks down the movement of a car to find out its position and speed. To find out in the analysis if a car has moved, the front and rear of the car is examined and compared between frames. The speed of the car is set by taking the average of the speeds of the front and rear of the car. The speed of the front and rear are found by dividing the distance by which they moved by the time increment between the two frames. Knowing that information will help determine the position of the car in the future (Hereth et al. 2006).

Overlapping problems are fixed for the motion method by considering the length of the vehicles before they overlap. Subsequently, the speed of the vehicle is found by using the end that is not overlapping; and if both ends are overlapping, the average speed for the predicted front and rear is calculated. A vehicle is defined to be stopped when its speed is equal or lower than the user specified stopped speed (Hereth et al. 2006). As a car stops, the stopped delay is estimated; and it is increased by the time increment between frames for the frames with stopped cars.

Also, for the motion method, at the appearance of green, vehicles could be elongated. The solution to that problem is for the user to specify the limitation for the percentage increase in length of vehicles. When the method considers many cars as one—that is, if the car length exceeds the user-specified maximum—the long car is split into how many cars there should be; and the stopped delay of the long car will be attributed to each car that was produced from the splitting (Hereth et al. 2006).

The average stopped delay per vehicle for the motion method is computed as the other methods by dividing the total stopped delay by the number of vehicles that go into the intersection. This method is sensitive to camera angles, which can make a car look like it is speeding. Setting a limit for the maximum acceleration rate can take care of the unusual speeding of the cars into the intersection (Hereth et al. 2006). The delay of the motion method is said to be between stopped delay and control delay because the method captures vehicles that slow down as well as stopped vehicles. The motion method also has some difficulties in tracking cars and in dealing with moving shadow effects because the shadows can sometimes be considered to be a car because of their dark color. Another thing that affects the motion method is the extension of the queue beyond the entry line during the congested period. Also, incorrect counting of cars is another shortcoming of this method (Saito et al. 2008).

2.3.4 Other Automatic Methods

Other techniques have also been developed to automatically estimate delays. One of these methods is the aerial video method (Angel et al. 2002). This method involves filming the intersection with a helicopter or airplane. Then, the video is used to retrieve frames at a constant rate. Afterward, the frames are studied with edge detecting techniques to determine stopped vehicles. This method consists of drawing polygons around all vehicles in the approach. The equations used to calculate the approach delay are presented in Equation 2-12 and 2-13 (Angel et al. 2002).

$$V_s = \frac{A_{pol}}{S^2 * l_w * H_s} \qquad \textbf{(2-12)}$$

where: V_s = total vehicles in queue for the approach
A_{pol} = area of the polygon (pixels^2)
l_w = average lane width (m)
S = image scale (m/pixel)
H_s = average spacing for stopped vehicles

$$\text{Avg. Stopped Delay} = \frac{Q_L * F_s}{V} \qquad \textbf{(2-13)}$$

where: Q_L = total queue length for the approach
F_s = frame sampling interval (sec)
V = Number of arrivals to the intersection

This method, although promising, may be too expensive for a small project. However, when the project is extensive, this method can be comparable in price to the other existing methods because of the data collection involved, especially in the HCM methods.

In addition, a technique to estimate the approach delay was developed previously. The method consists of placing one sensor at the stop line and another one up the road from the intersection where the cars are speeding normally. The difference between the time a car goes from the upstream sensor to the stop line sensor is obtained. To calculate the approach delay, the time required to go from one sensor to the other at the free flow speed is subtracted from the difference between the upstream sensor and the stop line(Hereth et al. 2006).

2.4 Chapter Summary

In this chapter, a literature review on different methods of estimating delays and the different type of delays was presented. Two techniques of obtaining delays are discussed: 1) estimating delay in the field and 2) using a model. Old methods of calculating delays and the improvements to those methods are discussed. The description and techniques of the new IQA method were provided.

3 SELECTION OF STUDY SITE AND DATA COLLECTION

For this study, delays were estimated using both the field methods and the model methods. In order to perform that task, an intersection was needed to be chosen as a study site. The intersection was required to be a good intersection for data collection. After finalizing the choice of the intersection, data collection started. Data were collected in the field as well as in the BYU Transportation Lab. In this chapter, the selection of the study site and the data collection are explained.

3.1 Selection of Study Site

Choosing a study site was an important part of this study. For the study to be facilitated, not all intersections could be chosen. The intersection was chosen that was clearly visible and recordable from the BYU Transportation Lab in order to eliminate the need of extensive field surveying. The following sections outline the problems and solutions encountered in selecting a study site.

3.1.1 Problems

The first intersection chosen for consideration was the intersection of University Parkway and University Avenue because of its capacity to yield reliable data and because it was believed to be a good site where the data collection trailer for filming the intersection could be placed without any problems. This choice of the intersection would involve placing the trailer in the BYU Intramural Field. To perform that task, getting permission from BYU Grounds maintenance supervisor was necessary and also signal timing information for the intersection was needed as the foundation for data collection. Getting the permission and the signal timing information was more difficult than expected. After getting the permission and the signal timing data, the camera from the trailer broke down. Moreover, that intersection was found to be unfavorable because all of its movements were not clearly visible from the transportation lab and no timing data were available on the screen in the lab.

Meanwhile, an effort was made to choose another intersection that could be entirely seen from the BYU Transportation Lab. Doing that could have eliminated the need to go outside to collect data using the trailer. After searching, it was found that some intersections on University Parkway were promising; and the positive thing about choosing one of those intersections was the availability of their signal timing data on the monitors in the lab. However, most of the time, it was difficult to see the end of queue from the lab because the Orem city cameras' views were limited. Their cameras could not show the distant approaches on University Parkway where queues extend.

The necessity to use the data collection trailer to film the intersection (in case the queues extend beyond the camera view) as the supplement to the video in the lab arose. It was decided to use both videos but by still choosing the intersections on University Parkway where timing information was available in the lab, field work was minimized. The first choice of intersection was the intersection of University Parkway and 200 East. Even though that was a good intersection for the study, there was no appropriate location to place the data collection trailer to film the intersection. The best location to place the trailer was in the Ken Garff parking lots, however they were full of cars. A trial observation was made in the field with no success. The trailer was parked at RC Willey parking lots, however the camera view was blocked by trees. The next and only place on University Parkway with timing information available from the lab and where the trailer could be placed at the site with no problem was University Parkway and Main Street. The Mitsubishi motorcycle dealer gave permission to park the data collection trailer on their parking lots. The only problem with that site was that the signal timing information of the video from the BYU Transportation Lab did not show the yellow, and therefore, the yellow time. Regardless, that intersection was the intersection that was finally chosen as the study site.

After choosing that intersection and collecting the data, coordinating the two videos, the one from the field and the one from the BYU Transportation Lab, became a challenge. Being able to see and analyze the queue up the road from University Parkway became a problem. Possible solutions to these problems were explored. Some pictures of the sites are shown in Figure 3-1 and Figure 3-2.

Figure 3-1: Main Street northbound view

Figure 3-2: University Parkway westbound view

3.1.2 Solutions

To obtain the length of the yellow intervals for the chosen intersection, Orem city traffic engineers were contacted. The problem of the yellow interval not appearing on the video was explained to them. Even though they could not solve the problem because of the high cost involved, they provided the author with a Synchro file of University Parkway intersections that contained the lengths of the yellow intervals. From that file, the yellow times were found to be 4.5 seconds for through movements and 3.5 seconds for turning movements for University Parkway approaches; and 4 seconds for through movements and 3.5 seconds for turning movements for Main Street approaches. In addition, the yellow times were checked in the field and were found to be approximately the ones found in the Synchro file. Additionally, due to the difficulty of coordinating the two videos, from the field and from the BYU Transportation Lab, and in order to be able to yield more accurate results, the approaches of University Parkway were excluded from the analysis and only the two approaches to Main Street were evaluated because no long queue was present at those approaches, and the ends of the queues present at those approaches were visible from the BYU Transportation Lab.

3.2 Data Collection

Following the selection of the site, the day of the data collection was chosen. That day was selected in a way that there were enough people available to help with the survey. The field survey was two hours long, and the hours were chosen so that they did not coincide with the peak hours. Peak hours were not chosen because of the certainty that the end of the queue would not be visible during those times from the BYU Transportation Lab. One goal of the field survey was to serve as supplement to the video that would be acquired from the lab in case the queues go beyond the camera view in the lab. Different strategies were considered to avoid periods where queues go beyond the camera view. One of those strategies was to collect the data during off-peak hours. The day and hours chosen were Tuesday, July 28, 2009 from 11:00 AM to 1:00 PM. The data were collected using four different techniques: 1) recording the video of traffic flow and information from the lab, 2) using the trailer to film traffic at the intersection, 3) using the electronic data collection method (JAMAR counter) to make turning movement counts, 4) and using the walking wheel measure to measure lane widths of the approaches.

3.2.1 Video from the BYU Transportation Lab

To collect data from the lab, the computer was set up appropriately to record the video of the intersection being analyzed (University Parkway and Main Street). Pictures of the lab monitors are shown in Figure 3-3 to Figure 3-5. The computer was already connected to the recorder. Two hours before the field survey, at exactly 9:00 AM the recording was started; and it was done on the hard drive (HDD) of the video recorder. The early recording was done because it was necessary to transport and set up the trailer before 11:00 AM which could take some time. The video was recorded for six hours from 9:00 AM to 3:00 PM, and all the approaches of the intersection were seen to a certain extent. Very long queues were not visible during those six hours.

After recording, the recorded video needed to be divided into 15 minute segments. The division was done so that the two hours from 11:00 AM to 1:00 PM were divided into eight 15 minute segments, each as a chapter. Following the division, the videos were transferred from the HDD to the DVD. The DVD files were then converted to AVI files so they could be analyzed by the software called Delay Annotator developed by Saito et al. (2008) which allows a frame by frame analysis.

Figure 3-3: BYU Transportation Lab computers and monitors

Figure 3-4: The computer that was used to set up the recording of the intersection

Figure 3-5: BYU Transportation Lab monitors

3.2.2 Video from the Data Collection Trailer in the Field

Even though the data collected with the data collection trailer was eventually not used in the analysis, it is explained here because it is one thing that was done for the completion of the thesis. In addition to recording the video in the lab, the trailer was set up in the field on the Mitsubishi motorcycle dealer's parking lots. Pictures of the trailer are shown in Figure 3-6 to Figure 3-8. The trailer has two cameras and a computer with a monitor to control the cameras. At exactly 11:00 AM, the recording from the trailer was started and was done at 1:00 PM. For accuracy, times in the lab and in the trailer were synchronized. The two cameras from the trailer were able to film the eastbound and westbound approaches to University Parkway. The video of the eastbound traffic recorded the queues from the middle to the end but did not show the beginning of the queue because that beginning was visible from the lab and it was hard to record everything from the trailer. The westbound camera saw from the beginning of the queue to the end of queue. However, from that video it was hard to distinguish which car was coming from which lane. Regardless of those challenges, those videos were good supplements to the lab videos because they both showed the end of the queues.

After recording, the videos were downloaded into four different videos. The first two consisted of the first hour for the eastbound and westbound approaches. The last two were the last hour of the eastbound and westbound approaches.

Figure 3-6: Data collection trailer and truck (view 1)

Figure 3-7: Data collection trailer and truck (view 2)

Figure 3-8: The inside of the data collection trailer

3.2.3 Field Data Collection Using Electronic Counters

The minor streets of the intersection which were northbound and southbound on Main Street were not covered by the cameras of the data collection trailer. In order to have the volume of those two approaches, two electronic counters (JAMAR) were used: one for northbound and one for southbound. Pictures showing the JAMAR electronic counters and the surveyors using them are shown in Figure 3-9 and Figure 3-10. The electronic counters were set up to start at the same time as the other equipment; and also, they were set up to generate every five minutes volumes. The counting started just as the others at 11:00 AM and was terminated at 1:00 PM.

After the counts, the information in the electronic counters was transferred to the computer. The data were copied and pasted in Excel. Afterward, they were prepared and summarized into 15-minute volumes for analysis inputs.

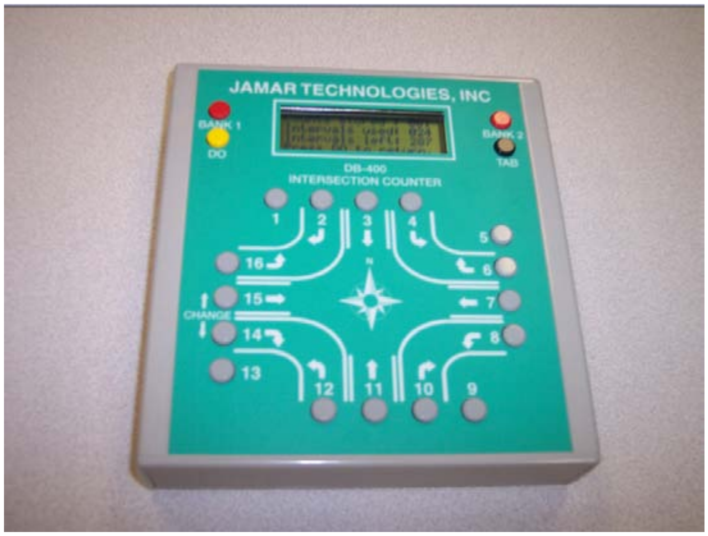


Figure 3-9: The electronic counter used

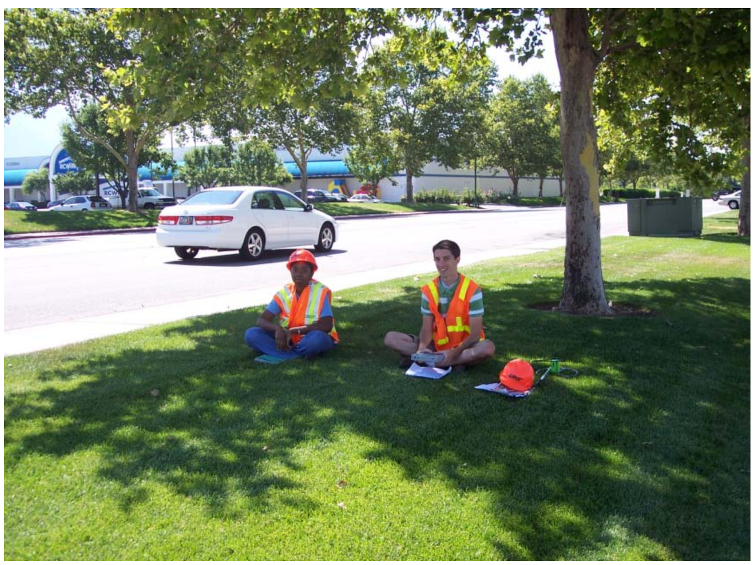


Figure 3-10: Students counting vehicles using electronic counters

3.2.4 Lane Width Data Collection Using A Walking Measuring Wheel

To collect the geometric data necessary to verify the geometric information found in the Synchro file, a walking measuring wheel was used to measure the width of each lane of the intersections. Also, the length of the right turn and left turn pockets were measured to check values in the synchro file that were entered in the HCS+ software. There were some slight differences between the two sets of geometric data. Those differences may be a result of measurement errors in the field and the fact that it was difficult to measure because of time constraint to cross the intersection. Pictures of the walking measuring wheel and of the surveyors using it are shown in Figure 3-11 and Figure 3-12.

Figure 3-11: Walking measuring wheel

Figure 3-12: Students measuring the widths of the lanes

3.3 Chapter Summary

Factors that influenced the choice of the study site and the difficulties encountered in choosing the study site were explained in this chapter. The solutions to the problems were discussed. Moreover, the chapter described the different methods used to collect data in the lab and in the field. Detailed information about the time of data collections and the location of the chosen site were also provided. In the next chapter, field delay estaimation methods and results are discussed.

4 FIELD DELAY ESTIMATION AND RESULTS

The analysis section of this study was divided into two main parts: 1) delays measured in the field and 2) delays determined using the models. This chapter covers the field delay aspect including two field delay analyses: 1) HCM field analysis and 2) IQA field analysis. Step by step details of each analysis, and the results of the analysis are illustrated and discussed. Delays determine using the models are discussed in chapter 5.

4.1 Field Delay Analysis Procedures

Two field analysis procedures used for this study are the HCM field delay analysis and the IQA field delay analysis. The two procedures, even though they both estimate delay at intersections, are different. The HCM field delay analysis method is macroscopic, and the IQA field delay analysis is microscopic. The IQA field delay analysis is more detailed. The descriptions of the two methods are given in the following sections.

4.1.1 HCM Field Delay Analysis

The HCM 2000 field delay analysis which measures control delay in the field and which is described in Appendix I of Chapter 16 and is done using a field sheet (TRB 2000). Since control delay is defined as time-in-queue delay added to the lost time due to deceleration from and acceleration to ambient speed, the HCM 2000 field delay estimation is based on counting the number of vehicles in the queue. The analysis consists of finding the number of vehicles in the queue during a certain number of fixed intervals. To do this study, the recorded videos from the BYU Transportation Lab were used. Four 15-minute videos (Video 1, Video 2, Video 3, and Video 4) were analyzed; and for each video, the northbound and southbound approaches were analyzed separately. Video 1 was from 11:00 AM to 11:15 AM, Video 2 was from 11:15 AM to 11:30 AM, Video 3 was from 11:30 AM to 11:45 AM, and Video 4 was from 12: 15 PM to 12:30 PM. Those videos were chosen because the queues were shorter for those videos. Count intervals of 20 seconds were used because that was approximately the integral divisor of the cycle length which was not fixed due to the actuated signal control at the intersection.

Two people, as needed, completed the analysis. The first person observed the end of the queues for each cycle—that is, the last vehicle that stopped in each lane due to a signal. Included in the count are vehicles that came during the green interval but the vehicles in front of them had not moved yet. Every 20 seconds, the first person recorded the number of vehicles in the queue on the field sheet. Vehicle-in-queue count was not ended until all of the vehicles that joined the queue during the survey period had exited the intersection. The second 15-minute analysis field sheet for southbound is demonstrated in Figure 4-1, the remaining data and analysis are available in Appendix A. At the same time, the second person counted the total number of vehicles that arrived and the total number of vehicles that stopped during the entire survey period. Thereafter, for each approach being studied, each column of vehicle-in-queue count was summed; and the column sums were added to get the total number of vehicle-in-queue for the study period which was 15 minutes. The average time-in-queue, T_Q was then calculated using Equation 2-11 in the literature review chapter. To adjust for acceleration and deceleration delay, two equations are used; and they are illustrated in Equation 4-1 and Equation 4-2. The number of stopped vehicles recorded by the second person and the free flow speed of the section being studied were utilized to get the correlation factor in Table 4-1 which is Table 9.6 in the Traffic Engineering book by Roess et al. (2004). The control delay is calculated using Equation 4-3.

$$V_{slc} = \frac{V_{STOP}}{N_c * N_L} \quad \textbf{(4-1)}$$

where: V_{slc} = number of vehicles stopping per lane per cycle (veh/ln/cycle)
V_{STOP} = total count of stopping vehicles, (vehs)
N_c = number of cycles included in the survey
N_L = number of lanes in the survey lane group

$$FVS = \frac{V_{STOP}}{V_T} \quad \textbf{(4-2)}$$

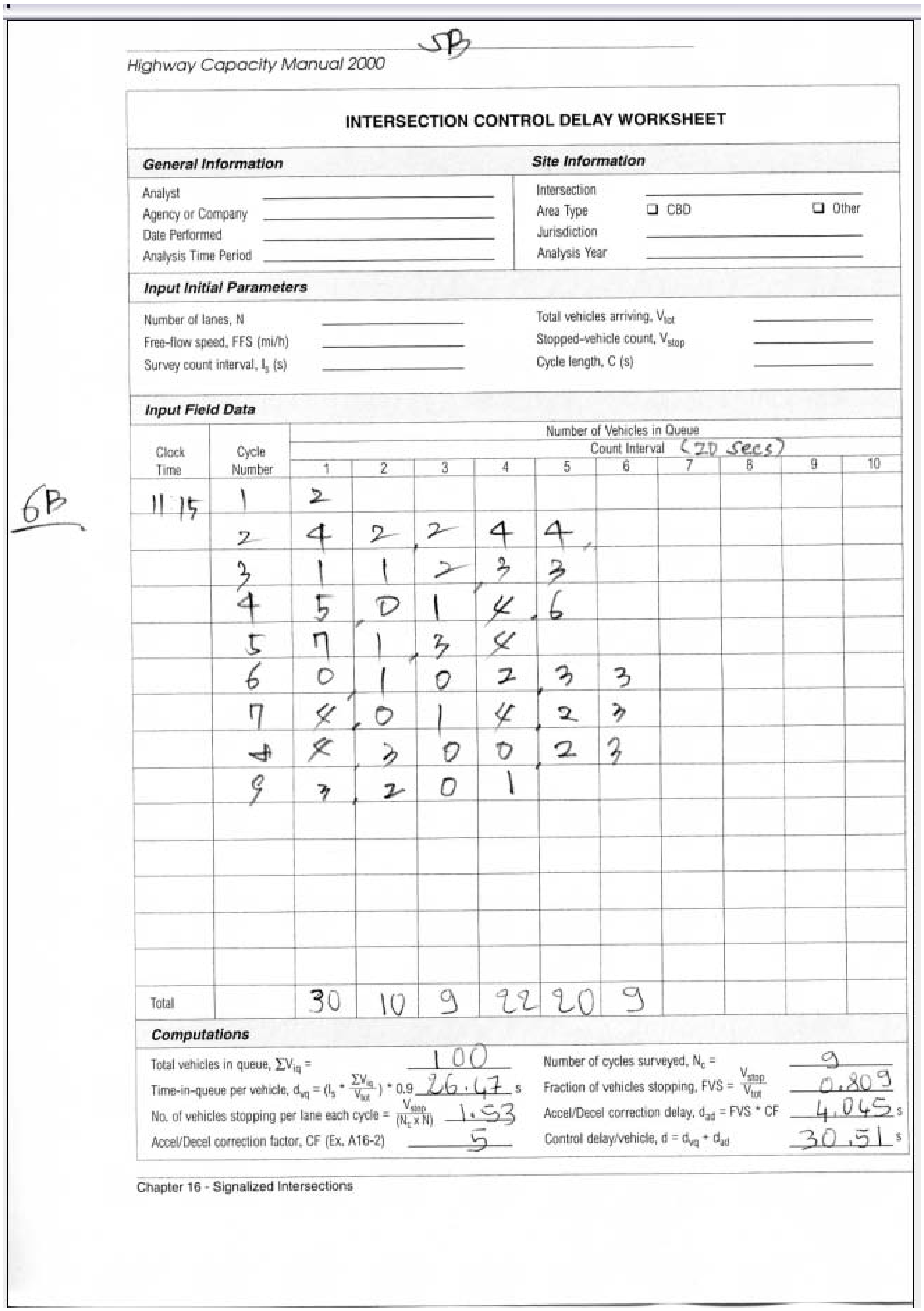
where: FVS = Fraction of vehicles stopping
V_T = total number of vehicles arriving during the survey period (veh)

$$d = T_Q + (FVS * CF) \quad \textbf{(4-3)}$$

where: d = total control delay, (sec/v)
T_Q = time-in-queue per vehicle (sec)
CF = correlation factor from Table 9.6

Table 4-1: Adjustment Factor for Acceleration/Deceleration Delay (Roess et al. 2004)

Free-Flow Speed (mi/h)	**Vehicles Stopping Per Lane, Per Cycle (V_{slc})**		
	≤7 vehs	**8-19 vehs**	**20-30 vehs**
≤37	+5	+2	-1
>37-45	+7	+4	+2
>45	+9	+7	+5



SB

6B

Highway Capacity Manual 2000

INTERSECTION CONTROL DELAY WORKSHEET

General Information

Analyst ______
Agency or Company ______
Date Performed ______
Analysis Time Period ______

Site Information

Intersection ______
Area Type ☐ CBD ☐ Other
Jurisdiction ______
Analysis Year ______

Input Initial Parameters

Number of lanes, N ______
Free-flow speed, FFS (mi/h) ______
Survey count interval, I_s (s) ______
Total vehicles arriving, V_{tot} ______
Stopped-vehicle count, V_{stop} ______
Cycle length, C (s) ______

Input Field Data

Number of Vehicles in Queue — Count Interval (20 secs)

Clock Time	Cycle Number	1	2	3	4	5	6	7	8	9	10
11 15	1	2									
	2	4	2	2	4	4					
	3	1	1	2	3	3					
	4	5	0	1	4	6					
	5	7	1	3	4						
	6	0	1	0	2	3	3				
	7	4	0	1	4	2	3				
	8	4	3	0	0	2	3				
	9	3	2	0	1						
Total		30	10	9	22	20	9				

Computations

Total vehicles in queue, ΣV_{iq} = 100

Time-in-queue per vehicle, $d_{vq} = (I_s * \frac{\Sigma V_{iq}}{V_{tot}}) * 0.9$ = 26.47 s

No. of vehicles stopping per lane each cycle = $\frac{V_{stop}}{(N_c \times N)}$ = 1.53

Accel/Decel correction factor, CF (Ex. A16-2) 5

Number of cycles surveyed, N_c = 9

Fraction of vehicles stopping, $FVS = \frac{V_{stop}}{V_{tot}}$ = 0.809

Accel/Decel correction delay, d_{ad} = FVS * CF = 4.045 s

Control delay/vehicle, $d = d_{vq} + d_{ad}$ = 30.51 s

Chapter 16 - Signalized Intersections

Figure 4-1: Field sheet

4.1.2 IQA Field Delay Analysis

Contrary to the HCM 2000 field delay analysis, the IQA field delay analysis keeps track of individual vehicles passing through the intersection. For this analysis, the movements of each vehicle traveling on the lane being studied are recorded. This part of the analysis was work intensive and time-consuming. As the HCM 2000 delay analysis, the same four 15-minute videos were studied; and the analysis of each video encompassed two approaches, northbound and southbound. Contrary to the HCM 2000 field delay analysis in which all the lanes of one approach are studied together, the IQA field analysis is done lane by lane and cycle by cycle; and to get the delay of the approach, the weighted average of all the lanes is calculated. Due to the length of this analysis, the process will be demonstrated with one example; and the rest of the data and calculations are included in Appendix B.

The third cycle of the northbound second left turn lane from the middle of the road in Video 1 is used to demonstrate the procedure. The analysis is demonstrated in Table 4-2. The same process is repeated for each cycle and each lane. To do the analysis for one cycle, the table with the same number of columns and the same column headings as shown in Table 4-2 is prepared and used. From the video, during the specific cycle, the lane being studied is observed. A lane perpendicular to the road, parallel, and down the street from the stop bar was chosen as the lane beyond which a vehicle exited the intersection. In other words, that lane was used as a reference line for exiting the intersection. The frame numbers are recorded at the time a vehicle stopped at the intersection (arrival), and then at the time the same vehicle crossed the reference line (departure). When the vehicle did not stop at the intersection, the frame numbers of when the vehicle got to the reference line and when the vehicle passed the reference line were recorded—

which basically indicated zero delay. When two or four vehicles come one after another and all stop— that is, if a vehicle joins the existing queue—the frame numbers of the time they stopped are recorded; and when they start crossing the reference line, the frame numbers of the time they crossed the reference line are recorded as demonstrated in Table 4-2.

All of the frame numbers are then converted to seconds by considering the fact that in one second there are 30 frames and the arrival and departure are specified in one column which happened to be column 3 in Table 4-2. The time differences between adjacent arrivals and departures, and just arrivals and departures are obtained and shown in column 4. Column 5 was used to note that one vehicle came in, and column 6 was used to note that one vehicle went out. Column 7 calculated the number of vehicles in queue. The last column, which was column 8, calculated the incremental delay by multiplying the time difference between adjacent events and the incremental queue. The total delay was then found by getting the sum of column 8 by adding all the incremental delays. The average delay for that cycle was acquired by dividing the total delay by the total number of vehicles that entered the intersection or approached a lane during the cycle being studied.

This long process is done for all the cycles of the video (15 minutes) for the northbound, second left turn lane. The weighted average of all the cycles is obtained to get the delay for the northbound second left turn lane. The same procedure is repeated for all the other lanes. To get the delay for the northbound approach itself, the weighted average of the delay of all the lanes constituting the approach is determined. The same method is used to get the delay for the southbound approach of video 1 and of all the other approaches of the other three videos, and all those data and calculations are found in Appendix B.

Table 4-2: IQA Field Delay Computations (Cycle 3, 2nd Left Turn of NB, Video1)

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
6497	216.6	Arrival	31.5	1		1	31.5
7442	248.1	Arrival	6.7	1		2	13.3
7642	254.7	Arrival	6.7	1		3	20
7842	261.4	Arrival	42.2	1		4	168.7
9107	303.6	Departure	6.2		1	3	18.7
9294	309.8	Departure	4.1		1	2	8.3
9418	313.9	Departure	1		1	1	1
9448	314.9	Departure			1	0	0
		Vehicle-seconds					**261.5**
		Vehicles					**4**
		Average delay (sec/veh)					**65.4**

4.2 Field Delay Analysis Results

As the two field delay estimation methods are different, the results were found to be different. For each video, the HCM 2000 field method and IQA method yielded different results for the northbound and southbound approaches. Even though the results are not the same, the differences are not large. From these results, it can be observed that IQA delays are always higher than HCM delays without exception. Since the IQA delay estimation method tracks each vehicle individually, it is representative of the ground truth delay and is therefore assumed to be more accurate than the HCM field delay method. The fact that IQA delays are higher than HCM 2000 delays means that the HCM 2000 field delay estimation method underestimates control delays at the intersection.

4.2.1 Results of the HCM Field Delay Analysis

The results of the HCM field delay analysis are presented in Table 4-3. From these results, it can be concluded that northbound vehicles experienced less delay on average than southbound vehicles in Video 1 and Video 4. However, the same northbound vehicles experience more delay on average than southbound vehicles in Video 2 and Video 3. From these results it can be deduced that delay differs from one time period to another.

Table 4-3: HCM 2000 Field Control Delay (second/vehicle)

Main Street	**Video 1**	**Video 2**	**Video 3**	**Video 4**
Northbound	33.6	33.5	36.5	30.0
Southbound	43.7	30.5	28.3	30.7

4.2.2 Results of the IQA Field Delay Analysis

The IQA field delay analysis results are illustrated in Table 4-4. Unlike the HCM field delay results, IQA field analysis results show that northbound vehicles experience less delay on average than the southbound vehicles in Video 1. As shown in Table 4-4, the opposite can be seen in Video 2, Video 3, and Video 4. Those results again accentuate the variation of delay with time.

Table 4-4: IQA Field Control Delay (second/vehicle)

Main Street	**Video 1**	**Video 2**	**Video 3**	**Video 4**
Northbound	37.1	47.1	41.9	40.1
Southbound	45.5	39.5	36.9	36.8

4.3 Chapter Summary

In this chapter, the two field analyses perfomed as part of the study are described; their results are presented and discussed. The two field analyses included the macroscopic HCM field analysis and the microscopic IQA field analysis. The results of the analyses demonstrated the variation of delays with time; and from those results, it was understood that HCM field technique underestimates delays. Additionally, the accuracy of the IQA field delay estimation method is emphasized because it tracks individual vehicles as they approach the stop bar.

5 MODEL DELAY ESTIMATION AND RESULTS

In addition to estimating delay in the field using two different methods, delays were obtained by utilizing two different types of models: 1) the HCM 2000 model and 2) the IQA model. This chapter presents the analysis procedures followed by estimating delays using the two models by giving a detailed step-by-step process of the analysis, followed by the comparison of the results from the two models. Observed trends are indicated if any exist.

5.1 Model Delays Analysis Procedures

The delay analysis procedure for the two methods are different. The HCM 2000 model analysis yields the average delay for the lane group while the IQA model analysis gives the delay for each cycle. The IQA model analysis is more time consuming and more work is involved in using it. The two analysis methods are illustrated in this section.

5.1.1 HCM 2000 Model Delay Analysis

The completion of the HCM 2000 analysis does not consist of as extensive of work as the IQA model analysis does. In order to perform the analysis, the Synchro file provided by Orem traffic engineers was used. Since the Synchro file contained most intersections on University Parkway, the intersection being studied was isolated by creating a new Synchro file with only the study intersection (University Parkway and Main Street). Before isolating the intersection, it was checked to see if the isolation would alter the inputs and even the outputs of Synchro. It was found that the inputs and results for the northbound and southbound approaches did not change after isolating the study intersection from the other intersections. Figure 5-1 and Figure 5-2 show the Synchro files with all the intersections and with the isolated intersection respectively.

The purpose of isolating the intersection was to copy and paste the Synchro information for the intersection being studied into HSC+ to get HCM 2000 output. After creating the HCS+ file for the intersection of University Parkway and Main Street by copying and pasting the data from the Synchro file into HCS+, the tasks that were left for the analysis were to change the volumes or flow rates and the arrival type to the values observed in the field. The volume counts were done in the field as well as in the lab. The volume counts for University Parkway were done in the lab using electronic data collection methods. The volume counts for Main Street were done in the field. Those volumes calculated in the lab and in the field were downloaded and converted to 15-minute volumes and then to the 15-minute flow rates. The detailed traffic volumes from the conversion are available in Appendix C. Arrival type three meaning random arrival was chosen after observing vehicle movement in the field and using the videos. For each video, the right flow rates for every approach and the arrival type of the approach was entered into the prepared HCS+ file; and the file was saved under different names to distinguish the results from different videos. All of the other inputs of HCS+ were kept the same as the inputs from the Synchro file. HCS+ results were obtained. For demonstration, the HCS+ file of Video 1 is shown in Figure 5-3 and Figure 5-4; the remaining information for all videos can be found in Appendix C. Figure 5-4 shows part of the results for Video 1.

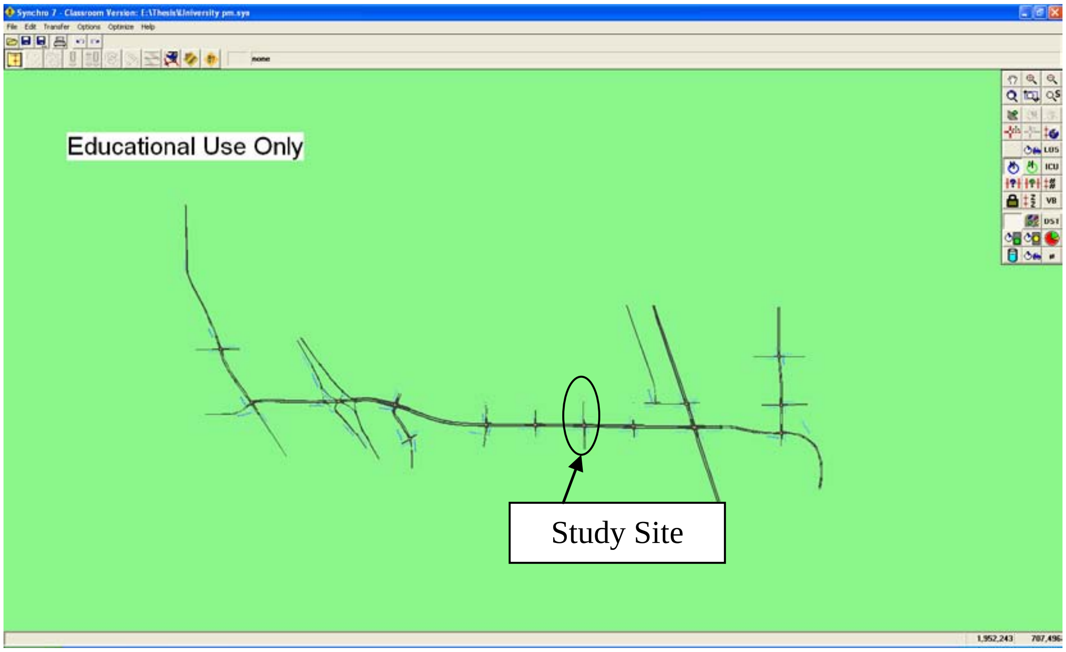


Figure 5-1: Synchro file with all the intersections on University Parkway

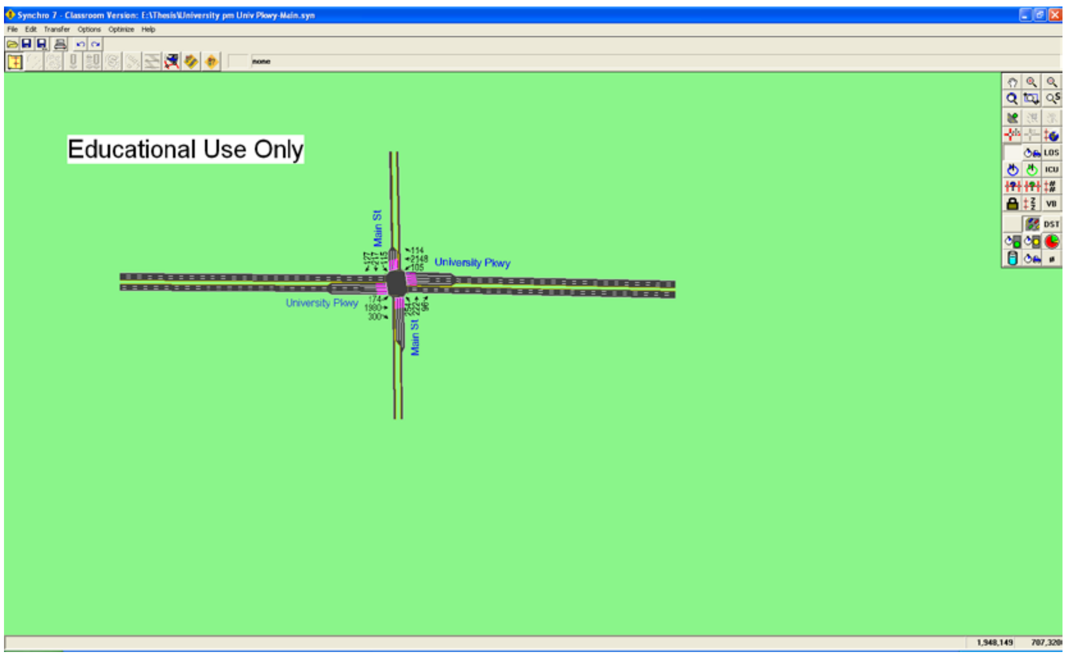


Figure 5-2: Synchro file with only University Parkway and Main Street intersection

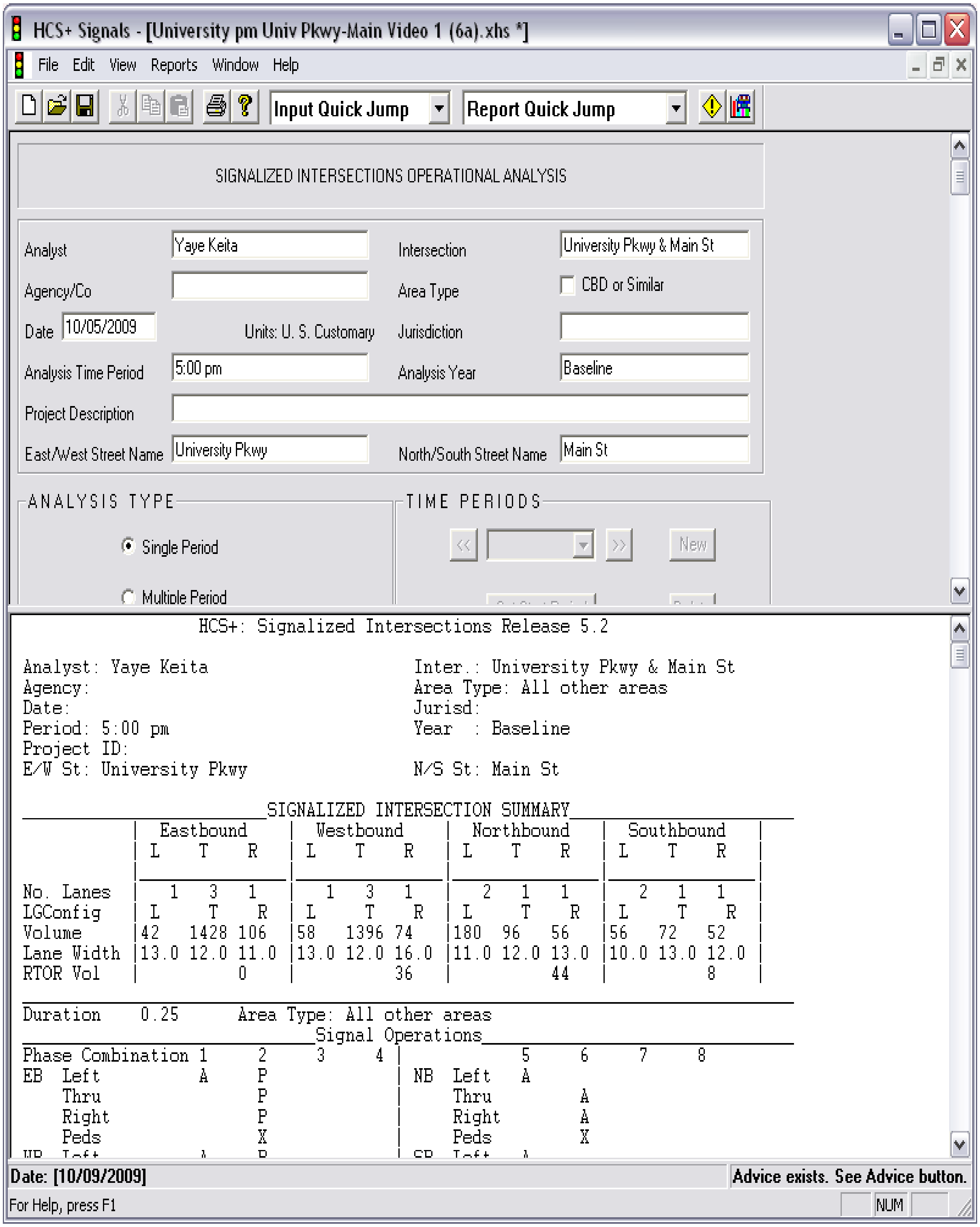


Figure 5-3: HCS+ file for Video 1 showing the input volumes

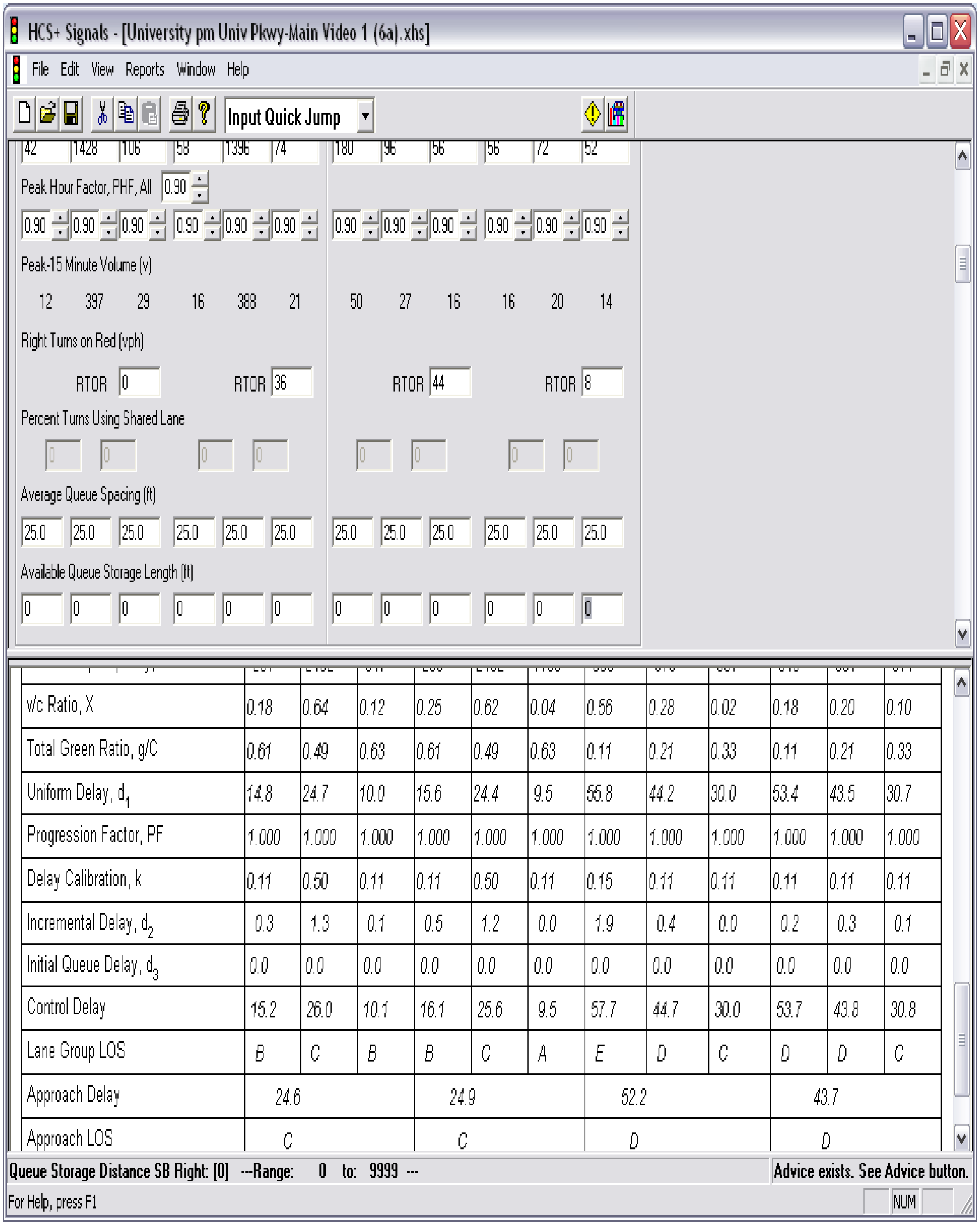


Figure 5-4: HCS+ file for Video 1 showing part of the results

5.1.2 IQA Model Delay Analysis

The IQA model analysis is also tedious but not as tedious as the IQA field analysis, which tracks each vehicle individually. This model analysis is data intensive and requires a lot of data collection if not readily available. The IQA model requires several inputs including:

- yellow time
- red time
- sum of yellow and all red
- extension of green
- start up lost time
- clearance lost time
- total lost time
- actual green
- effective green
- effective red
- number of vehicles in the cycle
- flow rate in the cycle
- saturation flow rate
- cycle length
- number of lanes in the analysis lane group
- arrival type.

For this analysis and to facilitate a more direct comparison between the results from the HCM 2000 delay model and the IQA model, several of the inputs were taken from the HCS + file including:

- yellow time
- all red time
- sum of yellow and all red
- extension of green
- start up lost time
- clearance lost time
- total lost time
- arrival type.

Also, some of the inputs were acquired from the video by observing the beginning and end of each phase and observing each cycle to get information including:

- actual green
- effective green
- effective red
- number of vehicles in the cycle
- flow rate in the cycle
- cycle length
- number of lanes in the analysis lane group

The values used for the analysis are summarized in Appendix D. Saturation flow rate was chosen as 1800 passengers car per hour per lane (pcphpl) in this study because it was difficult to measure it in the field due to shortness of the queue. Table 5-1 demonstrates the analysis for cycle 1 of Video 1 of the southbound right turn lane, and the rest of the analysis for all videos is available in Appendix D.

Table 5-1: Cycle 1 of IQA Model for southbound and Right Turn Lane of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	10.0			
Effective green time, *g* (s)	12.0			
Effective red time, *r* (s)	92.5			
Cycle1				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	34.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.5			
Effective green, *g* (sec)	12.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g*/*C*=	0.1			
Vg	34.4			
Vr	34.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	92.5	12.0		
v (vph)	34.4	34.4		
s (vph)	0	1800		
c (vph)	0	207.2	X=	0.2
v' (vph)	34.4	34.4		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Block	Unblocked	Total
$\Delta t'$ (sec)	92.5	1.8	10.2	104.5
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	40.9	0.8	0	41.7
	d_1=	41.7	sec/veh	

The same IQA model procedure was used for all the other cycles of the southbound right turn lane of Video 1. Then to get the delay for the lane, the weighted average for all the cycles is calculated. To get the delay for the southbound approach of Video 1, the weighted average of all the lanes constituting the approach was obtained. The same method is used for the northbound lanes and for all the other approaches of the other three videos. The input data were different for each cycle, each lane, each approach, and each video. As can be seen in Table 5-1, the input information is used to get the flow rate during the green and red intervals. The interval is then divided into green and red, and the duration of the green and red intervals is calculated. The saturation flow rates and the capacities during green and red intervals are determined.

The second part of the analysis consists of breaking the green interval into blocked and unblocked. The blocked interval indicates the portion of green when vehicles are clearing the intersection, the approach, and the lane. The unblocked portion is during the green interval but no vehicles are using the lane, approach, and intersection because no queue of vehicles is being formed. For each interval— red, blocked, and unblocked—the duration of the interval (Δt), the queue at the start of the interval (q_1), the number of arrivals during the interval (n_a), the number of departures during the interval (n_d), the queue at the end of the interval (q_2), and delays (d_i) are calculated. Thereafter, the delay for the cycle is estimated. The process used is exactly the same process described in the literature review section on the IQA model.

5.2 Results of the Delay Model Analysis

Since the two methods are different, they yield different results as well. The IQA model analysis covers only uniform delay. For comparison, the HCM model results for both uniform delays and total control delays were considered. By comparing the uniform delays obtained from both models (HCM 2000 and IQA), it can be concluded that the HCM 2000 model yielded higher average delays than the IQA model average delays for northbound and southbound for all four videos except the southbound lane of Video 1. For the southbound approach of Video 1, HCM 2000 model average delay was lower than IQA model average delay. Also from the results, it can be concluded that the two models yield different trends for northbound and southbound for lane by lane comparison.

5.2.1 Results of the HCM 2000 Delay Analysis

Two types of results were considered for the HCM 2000 model delay analysis. The uniform and control delays were the two types of results which are presented in Table 5-2 and Table 5-3 respectively. Those results make sense because the control delays, which are the sum of the uniform delay and the incremental delay, are higher than the uniform delays in all cases. Also from the results, it can be seen that northbound vehicles experienced more delays than southbound vehicles, which was observed for all the videos and for both uniform and control delays. Those trends can help in finding out which approach needs improvement the most.

Table 5-2: HCM 2000 Model Average Uniform Delay per Approach (sec/veh)

Main Street	**Video 1**	**Video 2**	**Video 3**	**Video 4**
Northbound	50.9	50.0	47.7	47.6
Southbound	43.4	43.1	44.4	43.2

Table 5-3: HCM 2000 Model Average Control Delay per Approach (sec/veh)

Main Street	**Video 1**	**Video 2**	**Video 3**	**Video 4**
Northbound	52.2	51.0	48.4	48.2
Southbound	43.7	43.4	44.7	43.6

5.2.2 Results of the IQA Model Delay Analysis

For the IQA model analysis only one type of result is obtained which is the uniform delays. Contrary to HCM 2000, the IQA model shows different patterns for northbound and southbound. The IQA model results demonstrate that the southbound approach experiences more delays than the northbound approach for all videos. Thus, the two methods give different results and accrediting one method above the other cannot be done at this time. Based on field observation, it cannot be stated that either northbound or southbound vehicles experience more delays. Occasionally, vehicles were queued up heading northbound rather than southbound; other times, vehicles were queued up heading southbound more than northbound.

Table 5-4: IQA Model Average Uniform Delay per Approach (sec/veh)

Main Street	**Video 1**	**Video 2**	**Video 3**	**Video 4**
Northbound	40.0	35.8	39.8	34.2
Southbound	45.6	40.4	41.2	34.4

5.3 Chapter Summary

Delay analyses done using the models were illustrated in this chapter. Two models are used: the HCM 2000 model and the IQA model. The results of the anlyses were also presented. The HCM 2000 model provides both uniform and control delays, while the IQA model gives only uniform delays. Comparison of the uniform delays shows that HCM 2000 model delays are mostly greater than IQA model delays. The next chapter summarizes all the results.

6 COMPARISON OF DELAYS FROM THE METHODS USED IN THE STUDY

This chapter discusses the results of all methods. In addition, the chapter evaluates the IQA field and model methods and determines their strengths and weaknesses. Three comparisons were done. The IQA model and the HCM 2000 model are compared first. The IQA model and the IQA field method are then compared. Those comparisons are made lane by lane. The third comparison is a comparison of total approach delays. The IQA field method and the HCM 2000 field method are not compared lane by lane because the IQA field method gives lane by lane data, and results but the HCM 2000 field data was collected for the entire approach, not lane by lane.

6.1 Comparison of IQA Model and HCM 2000 Model

The results for the two models for all four videos are illustrated in Table 6-1 to Table 6-4. By comparing the two models lane by lane, no specific general pattern was observed. The delays by the IQA model are sometimes lower or higher than the delays by the HCM 2000 model. For all four videos, the IQA model appears to give lower uniform delays than the HCM 2000 model for most left turn movements and through movements and higher delays than the HCM 2000 model for most right turn movements. Even though the two models give different results, the results are not tremendously different. It can be stated that the results from the two models are close to each other. With the lane by lane analysis, it is hard to articulate which model is more accurate than the other one. This judgement is difficult because the two models are based on different concepts.

Table 6-1: Average Delay per Lane of Video 1 (11:00AM-11:15AM)

		Uniform Delay, d_1 (sec/veh)	
Main Street		**IQA Model**	**HCM Model**
Northbound	**LT**	45.8	55.8
Northbound	**TH**	33.3	44.2
Northbound	**RT**	34.9	30
Southbound	**LT**	51.5	53.4
Southbound	**TH**	43.3	43.5
Southbound	**RT**	42.5	30.7

Table 6-2: Average Delay per Lane of Video 2 (11:15AM-11:30AM)

		Uniform Delay, d_1 (sec/veh)	
Main Street		**IQA Model**	**HCM Model**
Northbound	**LT**	42.3	55.5
Northbound	**TH**	29.4	44
Northbound	**RT**	27.1	30.1
Southbound	**LT**	46.4	54
Southbound	**TH**	36.7	43.8
Southbound	**RT**	38.4	31.6

Table 6-3: Average Delay per Lane of Video 3 (11:30AM-11:45AM)

		Uniform Delay, d_1 (sec/veh)	
Main Street		**IQA Model**	**HCM Model**
Northbound	**LT**	41.5	55.1
Northbound	**TH**	39.7	45.4
Northbound	**RT**	37.7	30.7
Southbound	**LT**	44.7	54.2
Southbound	**TH**	38.5	43.6
Southbound	**RT**	39.5	31.3

Table 6-4: Average Delay per Lane of Video 4 (12:15 PM to 12:30 PM)

		Uniform Delay, d_1 (sec/veh)	
Main Street		**IQA Model**	**HCM Model**
Northbound	**LT**	39.4	55
Northbound	**TH**	28.9	45.2
Northbound	**RT**	32.8	30.7
Southbound	**LT**	46	53.7
Southbound	**TH**	30.2	45.2
Southbound	**RT**	31.2	31.6

6.2 Comparison of IQA Model and IQA Field

Tables 6-5 to Table 6-8 contain delays by the IQA model and by the IQA field method of the four videos. The IQA model and the IQA field methods represent two different kinds of delay. As previously mentioned, the IQA model yields only uniform delays. On the other hand, the IQA field method gives the sum of both uniform delay and incremental delay. In other words, the IQA field method yields control delays. Comparison was done between the two to find out if techniques used are reasonable and if the results acquired from the two methods are logical. By considering the four videos, it can be observed that while some of the results may be illogical, the results of the IQA field method and the IQA model are primarily logical. However, some results were not logical at all since for those results the IQA field results representing control delay (uniform delay + incremental delay) were lower than IQA model results representing just uniform delay.

Illogical results were found for all right turn movements of the four videos and for some left turn movements of the four videos. Through-movements yielded reasonable delays for the two methods, and the IQA field delays were always higher than the IQA models for the through-movements. Accordingly, there were some problems with either the IQA model method or the IQA field method for right turn and possibly for left turn movements. From field observation, right turn vehicles queued up, but not often. Those vehicles easily found gaps to turn right when the light was red. Therefore, right turn vehicles experience less delays than vehicles for the other movements. Since the IQA field method tracks individual vehicles one by one, it is assumed to be the most accurate among all the methods used in this study. However, further research is needed to improve the IQA field and model for right turns and probably for left turns. This discrepancy may be understandable in a way because right turn vehicles for the most part behave differently than vehicles of other movements. Due to time constraint and because there was no specific way to reflect the right turns on red (RTOR) in the model, RTOR were not factored into the calculation of the IQA model. However, the IQA field method by tracking individual vehicles reflects RTOR. Moreover, errors may come from the fact that a saturation flow rate of 1800 pcphpl was used for all cases. Because the number of vehicles in the queue was relatively small, it was difficult to estimate saturation flow rate from the field data. In summary, IQA techniques should be further evaluated for turning movements.

Table 6-5: Average Delay per Lane of Video 1 (11:00AM-11:15AM)

		IQA Delay, (sec/veh)	
Main Street		**IQA Model**	**IQA Field**
Northbound	**LT**	45.8	44.9
Northbound	**TH**	33.3	37.3
Northbound	**RT**	34.9	17.5
Southbound	**LT**	51.5	71.2
Southbound	**TH**	43.3	46.6
Southbound	**RT**	42.5	18.5

Table 6-6: Average Delay per Lane of Video 2 (11:15AM-11:30AM)

		IQA Delay, (sec/veh)	
Main Street		**IQA Model**	**IQA Field**
Northbound	**LT**	42.3	60.7
Northbound	**TH**	29.4	39.8
Northbound	**RT**	27.1	19.6
Southbound	**LT**	46.4	54.2
Southbound	**TH**	36.7	52.3
Southbound	**RT**	38.4	16.8

Table 6-7: Average Delay per Lane of Video 3 (11:30AM-11:45AM)

		IQA Delay, (sec/veh)	
Main Street		**IQA Model**	**IQA Field**
Northbound	**LT**	41.5	54.3
Northbound	**TH**	39.7	46
Northbound	**RT**	37.7	19
Southbound	**LT**	44.7	42.5
Southbound	**TH**	38.5	50.8
Southbound	**RT**	39.5	15

Table 6-8: Average Delay per Lane of Video 4 (12:15PM-12:30PM)

		IQA Delay, (sec/veh)	
Main Street		**IQA Model**	**IQA Field**
Northbound	**LT**	39.4	39.4
Northbound	**TH**	28.9	51.7
Northbound	**RT**	32.8	25.5
Southbound	**LT**	46	62.7
Southbound	**TH**	30.2	31.5
Southbound	**RT**	31.2	24.6

6.3 Summary of All Results and Comparisons

For more aggregate comparison, the two approaches (northbound and southbound) were compared for all methods used and using all four videos. Table 6-9 to Table 6-12 show the results of the different methods for northbound and southbound for the four videos. The percent differences between the HCM method results and the IQA method results by considering the IQA method results as the bases are also presented in Table 6-9 to Table 6-12. To compare uniform delays, the IQA model was compared with the HCM model. In general, the IQA model gave lower average delays than the HCM 2000 model. The only one exception to that trend is the southbound lane in Video 1, where the IQA model yielded higher average delays than the HCM model. By assuming that the IQA model is more correct than the HCM model and by taking the IQA model as the base, the percent differences between the HCM model results and the IQA model results are between 5 and 40 percent. Some of the percent differences are as small as 5 and some are as high as 40.

In comparing average control delays using all four videos, in general the IQA field technique gave lower delays than the HCM model method; the HCM field technique yielded even lower delays than both the IQA field and the HCM model. The one exception to the trend is the same southbound lane in Video 1 that was an exception in the uniform delay analysis. Therefore, it can be affirmed that the IQA model and the IQA field yield lower delays than the HCM model; and the HCM field gives even lower delays than the IQA field and the HCM model. By assuming that the IQA field is the most correct method for estimating control delays—due to the fact that it tracks the movement of individual vehicles—and by taking the IQA field results as the base, the percent differences between the HCM model results and the IQA field results are between 4 and 41 percent and the percent differences between the HCM field results and the IQA field results are between 4 and 30 percent. Some of the percent differences are as small as 4 and some are as high as 41.

It can be stated that the HCM model overestimated delays, and the HCM field underestimated delays. This conclusion can be valid due to the fact that the IQA field delays represent ground truth delays because the IQA field tracks individual vehicles. Overall, the IQA field and the IQA model may yield more accurate delays than the HCM model and the HCM field; however, both the IQA field and IQA model are tedious and time consuming. Researchers and practitioners can lean toward using the IQA methods if they have enough resources available to do so and if it is critical for their projects to yield microscopic results of delays. Otherwise, the HCM 2000 methods offer very good estimates of average delays. The results of both methods are not highly different. Also, due to the fluctuation of delays with time, spending that much time and that many resources to do a study that is only accurate for a specific period of time—that is the time during which the data collection was done—should be taken into consideration when using the IQA methods.

Table 6-9: Average Approach Delay of Video 1 (11:00AM-11:15AM)

	Uniform Delay, d_1 (sec/veh)			**Control Delay, d_1+d_2, (sec/veh)**				
Main Street	**IQA Model**	**HCM Model**	**% Difference Between HCM Model and IQA Model Based on IQA Model**	**IQA Field**	**HCM Model**	**HCM Field**	**% Difference Between HCM Model and IQA Field Based on IQA Field**	**% Difference Between HCM Field and IQA Field Based on IQA Field**
Northbound	40.0	50.9	27.1	37.1	52.2	33.6	40.8	9.4
Southbound	45.6	43.4	4.8	45.5	43.7	43.7	4.0	4.0

Table 6-10: Average Approach Delay of Video 2 (11:15AM-11:30AM)

	Uniform Delay, d_1 (sec/veh)			**Control Delay, d_1+d_2, (sec/veh)**				
Main Street	**IQA Model**	**HCM Model**	**% Difference Between HCM Model and IQA Model Based on IQA Model**	**IQA Field**	**HCM Model**	**HCM Field**	**% Difference Between HCM Model and IQA Field Based on IQA Field**	**% Difference Between HCM Field and IQA Field Based on IQA Field**
Northbound	35.8	50.0	39.7	47.1	51.0	33.5	8.2	28.9
Southbound	40.4	43.1	6.8	39.5	43.4	30.5	9.9	22.7

Table 6-11: Average Approach Delay of Video 3 (11:30AM-11:45AM)

	Uniform Delay, d_1 (sec/veh)			Control Delay, d_1+d_2, (sec/veh)				
Main Street	IQA Model	HCM Model	% Difference Between HCM Model and IQA Model Based on IQA Model	IQA Field	HCM Model	HCM Field	% Difference Between HCM Model and IQA Field Based on IQA Field	% Difference Between HCM Field and IQA Field Based on IQA Field
Northbound	39.8	47.7	19.7	41.9	48.4	36.5	15.6	12.8
Southbound	41.2	44.4	7.8	36.9	44.7	28.3	21.1	23.4

Table 6-12: Average Approach Delay of Video 4 (12:15PM-12:30PM)

	Uniform Delay, d_1 (sec/veh)			Control Delay, d_1+d_2, (sec/veh)				
Main Street	IQA Model	HCM Model	% Difference Between HCM Model and IQA Model Based on IQA Model	IQA Field	HCM Model	HCM Field	% Difference Between HCM Model and IQA Field Based on IQA Field	% Difference Between HCM Field and IQA Field Based on IQA Field
Northbound	34.2	47.6	39.2	40.1	48.2	30.0	20.3	25.1
Southbound	34.4	43.2	25.7	36.8	43.6	30.7	18.4	16.5

6.4 Chapter Summary

The results of the different methods are presented and compared as part of this chapter. Two kinds of comparisons were done such as lane by lane comparison and the approach comparison. The lane by lane comparison was done for the results that could be compared that way, and the approach comparison was done for all the methods. The IQA model and the HCM model, and the IQA model and the IQA field were compared lane by lane. To compare the approach delays, the uniform delays for the IQA model and the uniform delays for the HCM model were compared; and the control delays for the IQA fied, the control delays for the HCM model, and the control delays for the HCM field were compared. The percent differences between the IQA method results and the HCM method results are also presented in this chapter. Overall, the IQA methods, field and model, yielded lower delays than the delays from the HCM model method. And, the HCM field method gave lower delays than both the IQA methods, field and model, and the HCM model method's delays.

7 CONCLUSIONS AND RECOMMENDATIONS

Improving methods of estimating delays at an intersection is a source of much research done in the field of traffic engineering. The determination of more accurate delays will allow traffic engineers to improve the performance of an intersection if the need exists. Providing good flowing traffic and facilitating the movement of people and goods are the ultimate goals of traffic engineers.

The IQA methods are the new methods of estimating delays that are scheduled to be included in HCM 2010. The new methods include two parts: the model part and the field part. Both IQA model and field analysis are done cycle by cycle. However, the IQA model is different from the IQA field. The IQA model requires a lot of inputs while the IQA field simply tracks vehicles passing through the study lane or approach one by one. Previous chapters were comprised of background information in estimating delays at an intersection, the choice of the study site, the data collection for the study, the analysis, results, and discussions of results of the study. This chapter gives the conclusions of the study and presents limited recommendations based on the research.

7.1 Conclusions

The IQA methods were evaluated in this study to determine if their benefits exceed their drawbacks. To perform that task, four 15-minute videos were used to analyze the intersection of

University Parway and Main Street in Orem using the IQA field and model analysis methods and the current HCM field and model analysis methods. The IQA field and model delay analysis methods tended to yield more accurate results than the HCM 2000 model and field methods. That conclusion is due to the fact that the IQA field method calculates microscopic delay by tracking individual vehicles which can be considered as ground truth delays, and the IQA field and model methods when compared separately with the HCM field and model yielded the same conclusion. However, further research should be done to improve the IQA methods for turning movements, especially right turn movements.

The IQA methods, both field and model, can be more accurate than the HCM 2000 field and model but involve more time for data collection and more work for the analysis. The IQA methods also yield results which reflect delays during data collection time periods only, and are therefore only applicable during that period. Due to the variation of delay with time of day and because of the amount of resources and time involved in using IQA methods, it is important to evaluate the necessity of using the IQA methods prior to doing so. If it is critical for the estimation of delays for a particular analysis to be accurate for specifically only the time of analysis, and if resources are available, the IQA methods can be used to determine delays. Otherwise, the HCM 2000 delay estimation methods yield average delays that are comparable to the results of the IQA methods. For complex cases that are hard to be modeled with the HCM 2000, such as protected-permitted cases, the IQA methods can help in providing more accurate results.

7.2 Recommendations

It is recommended that the IQA methods be used only when necessary. Also, more studies need to be done to support the use of the IQA methods for special cases such as protected-permitted cases and for evaluating turning movements. For those studies, comparison between the IQA model and the IQA field should be done in order to figure out if delays estimated from these methods are logical; if not, the source of the problem needs to be identified. The IQA field method, which includes uniform and incremental delays, should yield higher delays than those determined by the IQA model method, which represents only uniform delays. Additionally, studies should be done that evaluate the impact of different saturation flow rates and arrival types on delays computed by the IQA methods. Studies should also be done to incorporate RTOR in the analysis of right turn movements to investigate if that RTOR will affect delays. Finally, analysis should be conducted to determine the impact of the inputs of the IQA model on its results, notably saturation flow rate.

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APPENDIX A. HCM Field Data and Analysis

Table A- 1: HCM Field Data for Northbound of Video 1

Northbound	**Number of Vehicles in Queue**						
		Count Interval (20 seconds)					
Clock Time	**Cycle Number**	**1**	**2**	**3**	**4**	**5**	**6**
11:00	**1**	1	2	5			
Video 1 (6a)	**2**	1	2	3	6	7	7
	3	1	4	5	6	7	7
	4	0	0	0	0	2	2
	5	0	0	0	2	3	5
	6	0	1	3	5	5	6
	7	1	2	2	2	2	5
11:15	**8**	0	2	3	4	5	6
	Interval Total	4	13	21	25	31	38
	Total	**132**					

Table A- 2: HCM Field Data for Northbound of Video 2

Northbound	Number of Vehicles in Queue						
		Count Interval (20 seconds)					
Clock Time	**Cycle Number**	**1**	**2**	**3**	**4**	**5**	**6**
11:15	**1**	1	2	4	8	7	8
Video 2 (6b)	**2**	0	0	1	3	4	4
	3	0	0	4	5	6	6
	4	0	1	2	5	8	8
	5	0	1	2	5	5	6
	6	1	2	4	5	5	7
	7	0	1	1	3	5	7
11:30	**8**	0	0	5			
	Interval Total	2	7	23	34	40	46
	Total	**152**					

Table A- 3: HCM Field Data for Northbound of Video 3

Northbound	Number of Vehicles in Queue						
		Count Interval (20 seconds)					
Clock Time	**Cycle Number**	**1**	**2**	**3**	**4**	**5**	**6**
11:30	**1**	5	5	7			
Video 3 (5b)	**2**	3	1	2	3	3	6
	3	2	0	1	2	4	4
	4	0	2	2	4	7	7
	5	6	4	6	6	9	10
	6	3	0	1	2	5	8
	7	0	0	1	4	5	8
11:45	**8**	0	0	1	3	3	4
	Interval Total	19	12	21	24	36	47
	Total	**159**					

Table A- 4: HCM Field Data for Northbound of Video 4

Northbound	Number of Vehicles in Queue						
		Count Interval (20 seconds)					
Clock Time	**Cycle Number**	**1**	**2**	**3**	**4**	**5**	**6**
12:15	**1**	0	0	2	2	3	4
Video 4 (4b)	**2**	5	1	1	1	1	2
	3	1	2	4	9	12	14
	4	0	0	0	2	3	3
	5	0	1	4	4	8	8
	6	0	1	3	6	6	8
	7	0	0	3	4	7	9
12:30	**8**	5	0	1			
	Interval Total	11	5	18	28	40	48
	Total	**150**					

Table A- 5: HCM Field Data for Southbound of Video 1

Southbound	Number of Vehicles in Queue						
		Count Interval (20 seconds)					
Clock Time	**Cycle Number**	**1**	**2**	**3**	**4**	**5**	**6**
11:00	**1**	1	1	1			
Video 1 (6a)	**2**	4	4	6	8	8	9
	3	7	0	2	3	6	7
	4	5	1	1	2	2	2
	5	0	0	0	1	1	3
	6	3	0	0	0	0	1
	7	1	1	1	2	2	3
11:15	**8**	1	0	0	1	1	1
	Interval Total	22	7	11	17	20	26
	Total	**103**					

Table A- 6: HCM Field Data for Southbound of Video 2

Southbound	**Number of Vehicles in Queue**						
		Count Interval (20 seconds)					
Clock Time	**Cycle Number**	**1**	**2**	**3**	**4**	**5**	**6**
11:15	**1**	2					
Video 2 (6b)	**2**	4	2	2	4	4	
	3	1	1	2	3	3	
	4	5	0	1	4	6	
	5	7	1	3	4		
	6	0	1	0	2	3	3
	7	4	0	1	4	2	3
11:30	**8**	4	3	0	0	2	3
	9	3	2	0	1		
	Interval Total	30	10	9	22	20	9
	Total	**100**					

Table A- 7: HCM Field Data for Southbound of Video 3

	Number of Vehicles in Queue						
		Count Interval (20 seconds)					
Clock Time	**Cycle Number**	**1**	**2**	**3**	**4**	**5**	**6**
11:30	**1**	1	2				
Video 3 (5b)	**2**	5	3	0	0	3	4
	3	0	0	2	3	3	
	4	7	3	0	0	0	6
	5	2	2	3	3	7	
	6	4	0	1	0	1	
	7	2	1	3	3	5	
11:45	**8**	2	0	0	1	4	
	Interval Total	23	11	9	10	23	10
	Total	**86**					

Table A- 8: HCM Field Data for Southbound of Video 4

	Number of Vehicles in Queue						
		Count Interval (20 seconds)					
Clock Time	**Cycle Number**	**1**	**2**	**3**	**4**	**5**	**6**
12:15	**1**	0	1	4	4	4	7
Video 4 (4b)	**2**	3	0	0	3	3	2
	3	1	0	0	1	3	4
	4	6	0	0	1	2	2
	5	3	3	3	4	4	5
	6	3	0	2	3	6	7
	7	6	2	2	3	3	4
12:30	**8**	1	2	3			
	Interval Total	23	8	14	19	25	31
	Total	**120**					

Table A- 9: Inputs of HCM Field Calculation

Approach	Video Number	Total Arriving Vehicles (VT) (vehs)	Total Stopping Vehicles (Vstop) (vehs)
Northbound	**Video 1**	80	62
Northbound	**Video 2**	93	76
Northbound	**Video 3**	89	77
Northbound	**Video 4**	102	72
Southbound	**Video 1**	47	40
Southbound	**Video 2**	68	55
Southbound	**Video 3**	65	58
Southbound	**Video 4**	81	66

Table A- 10: HCM Field Analysis for Northbound of Video 1

Parameter	Symbol	Calculated Value	Unit
Total Count of Stopping Vehicles	**Vstop**	62	vehs
Number of Cycles	N_c	8	
Number of Lanes	N_l	4	
Number of Vehicles Stopping per Lane per Cycle	V_{slc}	1.9	veh/ln/cycle
Total Number of Vehicles Arriving During the Study Period	V_T	80	vehs
Fraction of Vehicles Stopping	**FVS**	0.8	
Average Time-In-Queue	T_Q	29.7	s/veh
Correction Factor	**CF**	5	
Total Control Delay	**d**	33.6	s/veh

Table A- 11: HCM Field Analysis for Northbound of Video 2

Parameter	Symbol	Calculated Value	Unit
Total Count of Stopping Vehicles	**Vstop**	76	vehs
Number of Cycles	N_c	8	
Number of Lanes	N_l	4	
Number of Vehicles Stopping per Lane per Cycle	V_{slc}	2.4	veh/ln/cycle
Total Number of Vehicles Arriving During the Study Period	V_T	93	vehs
Fraction of Vehicles Stopping	**FVS**	0.8	
Average Time-In-Queue	T_Q	29.4	s/veh
Correction Factor	**CF**	5	
Total Control Delay	**d**	33.5	s/veh

Table A- 12: HCM Field Analysis for Northbound of Video 3

Parameter	Symbol	Calculated Value	Unit
Total Count of Stopping Vehicles	**Vstop**	77	vehs
Number of Cycles	N_c	8	
Number of Lanes	N_l	4	
Number of Vehicles Stopping per Lane per Cycle	V_{slc}	2.4	veh/ln/cycle
Total Number of Vehicles Arriving During the Study Period	V_T	89	vehs
Fraction of Vehicles Stopping	**FVS**	0.9	
Average Time-In-Queue	T_Q	32.2	s/veh
Correction Factor	**CF**	5	
Total Control Delay	**d**	36.5	s/veh

Table A- 13: HCM Field Analysis for Northbound of Video 4

Parameter	Symbol	Calculated Value	Unit
Total Count of Stopping Vehicles	**Vstop**	72	vehs
Number of Cycles	N_c	8	
Number of Lanes	N_l	4	
Number of Vehicles Stopping per Lane per Cycle	V_{slc}	2.3	veh/ln/cycle
Total Number of Vehicles Arriving During the Study Period	V_T	102	vehs
Fraction of Vehicles Stopping	**FVS**	0.7	
Average Time-In-Queue	T_Q	26.5	s/veh
Correction Factor	**CF**	5	
Total Control Delay	**d**	30.0	s/veh

Table A- 14: HCM Field Analysis for Southbound of Video 1

Parameter	Symbol	Calculated Value	Unit
Total Count of Stopping Vehicles	**Vstop**	40	vehs
Number of Cycles	N_c	8	
Number of Lanes	N_l	4	
Number of Vehicles Stopping per Lane per Cycle	V_{slc}	1.3	veh/ln/cycle
Total Number of Vehicles Arriving During the Study Period	V_T	47	vehs
Fraction of Vehicles Stopping	**FVS**	0.9	
Average Time-In-Queue	T_Q	39.4	s/veh
Correction Factor	**CF**	5	
Total Control Delay	**d**	43.7	s/veh

Table A- 15: HCM Field Analysis for Southbound of Video 2

Parameter	Symbol	Calculated Value	Unit
Total Count of Stopping Vehicles	**Vstop**	55	vehs
Number of Cycles	N_c	9	
Number of Lanes	N_l	4	
Number of Vehicles Stopping per Lane per Cycle	V_{slc}	1.5	veh/ln/cycle
Total Number of Vehicles Arriving During the Study Period	V_T	68	vehs
Fraction of Vehicles Stopping	**FVS**	0.8	
Average Time-In-Queue	T_Q	26.5	s/veh
Correction Factor	**CF**	5	
Total Control Delay	**d**	30.5	s/veh

Table A- 16: HCM Field Analysis for Southbound of Video 3

Parameter	Symbol	Calculated Value	Unit
Total Count of Stopping Vehicles	**Vstop**	58	vehs
Number of Cycles	N_c	8	
Number of Lanes	N_l	4	
Number of Vehicles Stopping per Lane per Cycle	V_{slc}	1.8	veh/ln/cycle
Total Number of Vehicles Arriving During the Study Period	V_T	65	vehs
Fraction of Vehicles Stopping	**FVS**	0.9	
Average Time-In-Queue	T_Q	23.8	s/veh
Correction Factor	**CF**	5	
Total Control Delay	**d**	28.3	s/veh

Table A- 17: HCM Field Analysis for Southbound of Video 4

Parameter	Symbol	Calculated Value	Unit
Total Count of Stopping Vehicles	**Vstop**	66	vehs
Number of Cycles	N_c	8	
Number of Lanes	N_l	4	
Number of Vehicles Stopping per Lane per Cycle	V_{slc}	2.1	veh/ln/cycle
Total Number of Vehicles Arriving During the Study Period	V_T	81	vehs
Fraction of Vehicles Stopping	**FVS**	0.8	
Average Time-In-Queue	T_Q	26.7	s/veh
Correction Factor	**CF**	5	
Total Control Delay	**d**	30.7	s/veh

APPENDIX B. IQA Field Data and Analysis

The following list is of the cycles during which no vehicle passed through the lane being studied:

Video 1: Southbound Left Turn 1: cycle 2, cycle 5, and cycle 6

Southbound Left Turn 2: cycle 6

Southbound Through: Cycle 2, and cycle 4

Video 2: Northbound Right Turn: cycle 1

Southbound Left Turn 1: cycle 1

Southbound Left Turn 2: Cycle 2

Southbound Through: cycle 3

Video 3: Northbound Left Turn 2: Cycle 2

Southbound Left Turn 1: Cycle 6

Southbound Left Turn 2: Cycle 1

Video 4: Northbound Left Turn 1: cycle 1, and cycle 2

Northbound Left Turn 2: cycle 5

Northbound Through: cycle 1

Southbound Left Turn 1: cycle 2, cycle 4, and cycle 5

Southbound Left Turn 2: cycle 1, cycle 3, and cycle 6

Southbound Through: cycle 5

Southbound Right Turn: cycle 1, and cycle 6

Table B- 1: Cycle 1 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
1395	46.5	Arrival	17.4	1		1	17.4
1917	63.9	Departure			1	0	0
		Vehicle-seconds					**17.4**
		Vehicles					**1**
		Average delay (sec/veh)					**17.4**

Table B- 2: Cycle 2 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
3877	129.2	Arrival	13.9	1		1	13.9
4294	143.1	Arrival	39.7	1		2	79.3
5484	182.8	Departure	2.2		1	1	2.2
5549	185.0	Departure			1	0	0
		Vehicle-seconds					**95.4**
		Vehicles					**2**
		Average delay (sec/veh)					**47.7**

Table B- 3: Cycle 3 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
6628	220.9	Arrival	10.0	1		1	10.0
6928	230.9	Arrival	41.3	1		2	82.5
8166	272.2	Arrival	32.7	1		3	98.0
9146	304.9	Departure	2.0		1	2	4.0
9206	306.9	Departure	2.0		1	1	2.0
9266	308.9	Departure			1	0	0
		Vehicle-seconds					**196.5**
		Vehicles					**3**
		Average delay (sec/veh)					**65.5**

Table B- 4: Cycle 4 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
11736	391.2	Arrival	33.7	1		1	33.7
12746	424.9	Departure	4.3		1	0	0
12876	429.2	Arrival	6.8	1		1	6.8
13079	436.0	Departure			1	0	0
		Vehicle-seconds					**40.4**
		Vehicles					**2**
		Average delay (sec/veh)					**20.2**

Table B- 5: Cycle 5 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
15835	527.8	Arrival	14.5	1		1	14.5
16271	542.4	Departure			1	0	0
		Vehicle-seconds					**14.5**
		Vehicles					**1**
		Average delay (sec/veh)					**14.5**

Table B- 6: Cycle 6 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
17551	585.0	Arrival	11.3	1		1	11.3
17891	596.4	Arrival	66.6	1		2	133.1
19888	662.9	Departure	2.3		1	1	2.3
19958	665.3	Departure			1	0	0
		Vehicle-seconds					**146.8**
		Vehicles					**2**
		Average delay (sec/veh)					**73.4**

Table B- 7: Cycle 7 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
20231	674.4	Arrival	85.3	1		1	85.3
22791	759.7	Arrival	15.3	1		2	30.7
23251	775.0	Arrival	7.5	1		3	22.5
23476	782.5	Departure	1.7		1	2	3.3
23526	784.2	Departure	2.6		1	1	2.6
23605	786.8	Departure			1	0	0
		Vehicle-seconds					144.5
		Vehicles					3
		Average delay (sec/veh)					48.2

Table B- 8: Summary Table of IQA Field Analysis Results of the First Left Turn Lane from the Middle of the Road for Northbound of Video 1

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	17.4	1	17.4
2	47.7	2	95.4
3	65.5	3	196.5
4	20.2	2	40.4
5	14.5	1	14.5
6	73.4	2	146.8
7	48.2	3	144.5
Total	286.9	14	655.6
	Average Delay For the 15-minutes (sec/veh)=		**46.8**

Table B- 9: Cycle 1of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
863	28.8	Arrival	28.9	1		1	28.9
1730	57.7	Arrival	8.4	1		2	16.8
1982	66.1	Arrival	1.3	1		3	4.0
2022	67.4	Departure	2.0		1	2	4.0
2082	69.4	Departure	3.7		1	1	3.7
2194	73.1	Departure			1	0	0
		Vehicle-seconds					**57.4**
		Vehicles					**3**
		Average delay (sec/veh)					**19.1**

Table B- 10: Cycle 2 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
2144	71.5	Arrival	44.6	1		1	44.6
3482	116.1	Arrival	11.7	1		2	23.3
3832	127.7	Arrival	57.7	1		3	173
5562	185.4	Departure	2.9		1	2	5.7
5648	188.3	Departure	1.7		1	1	1.7
5698	189.9	Departure	0.5		1	0	0
5713	190.4	Arrival	6.8	1		1	6.8
5917	197.2	Departure			1	0	0
		Vehicle-seconds					**255.1**
		Vehicles					**4**
		Average delay (sec/veh)					**63.8**

Table B- 11: Cycle 3 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
6497	216.6	Arrival	31.5	1		1	31.5
7442	248.1	Arrival	6.7	1		2	13.3
7642	254.7	Arrival	6.7	1		3	20.0
7842	261.4	Arrival	42.2	1		4	168.7
9107	303.6	Departure	6.2		1	3	18.7
9294	309.8	Departure	4.1		1	2	8.3
9418	313.9	Departure	1.0		1	1	1.0
9448	314.9	Departure			1	0	0
		Vehicle-seconds					**261.5**
		Vehicles					**4**
		Average delay (sec/veh)					**65.4**

Table B- 12: Cycle 4 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
11478	382.6	Arrival	34.7	1		1	34. 7
12518	417.3	Arrival	5.6	1		2	11.2
12686	422.9	Departure	5.3		1	1	5.3
12846	428.2	Departure			1	0	0
		Vehicle-seconds					51.2
		Vehicles					2
		Average delay (sec/veh)					25.6

Table B- 13: Cycle 5 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7	Incremental Delay (8)=(4)x(7)
15706	523.5	Arrival	12.8	1		1	12.8
16091	536.4	Arrival	2. 7	1		2	5.3
16171	539.0	Arrival	6.4	1		3	19.2
16363	545.4	Departure	2.0		1	2	4.0
16423	547.4	Departure	1. 7		1	1	1. 7
16473	549.1	Departure			1	0	0
		Vehicle-seconds					**43.0**
		Vehicles					**3**
		Average delay (sec/veh)					**14.3**

Table B- 14: Cycle 6 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
17208	573.6	Arrival	2. 7	1		1	2. 7
17288	576.3	Arrival	81. 7	1		2	163.3
19738	657.9	Arrival	5.5	1		3	16.5
19903	663.4	Departure	1. 7		1	2	3.3
19953	665.1	Departure	1. 7		1	1	1. 7
20003	666.8	Departure			1	0	0
		Vehicle-seconds					**187.5**
		Vehicles					**3**
		Average delay (sec/veh)					**62.5**

Table B- 15: Cycle 7 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7	Incremental Delay (8)=(4)x(7)
20138	671.3	Arrival	92.0	1		1	92.0
22898	763.3	Arrival	20.0	1		2	40.0
23498	783.3	Arrival	0.1	1		3	0.2
23500	783.3	Departure	1. 7		1	2	3.3
23550	785.0	Departure	3.0		1	1	3.0
23640	788.0	Arrival	2.7	1		2	5.5
23722	790.7	Departure	5. 7		1	1	5. 7
23892	796.4	Departure			1	0	0
		Vehicle-seconds					149. 7
		Vehicles					4
		Average delay (sec/veh)					37.4

Table B- 16: Summary Table of IQA Field Analysis Results of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 1

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	19.1	3	57.4
2	63.8	4	255.1
3	65.4	4	261.5
4	25.6	2	51.2
5	14.3	3	43.0
6	62.5	3	187.5
7	37.4	4	149.7
Total	288.2	23	1005.4
	Average Delay For the 15-minutes (sec/veh)=		**43.7**

Table B- 17: Cycle 1 of IQA Field Analysis of the Through Lane for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
1131	37.7	Arrival	7.2	1		1	7.2
1346	44.9	Arrival	15.9	1		2	31.7
1822	60.7	Arrival	2.3	1		3	6.9
1891	63.0	Departure	2.5		1	2	4.9
1965	65.5	Departure	2.7		1	1	2.7
2046	68.2	Departure			1	0	0
		Vehicle-seconds					**53.4**
		Vehicles					**3**
		Average delay (sec/veh)					**17.8**

Table B- 18: Cycle 2 of IQA Field Analysis of the Through Lane for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
2645	88.2	Arrival	26.2	1		1	26.2
3431	114.4	Arrival	84.2	1		2	168.5
5958	198.6	Departure	1.8		1	1	1.8
6011	200.4	Departure			1	0	0
		Vehicle-seconds					**196.4**
		Vehicles					**2**
		Average delay (sec/veh)					**98.2**

Table B- 19: Cycle 3 of IQA Field Analysis of the Through Lane for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
6368	212.3	Arrival	84.4	1		1	84.4
8900	296.7	Arrival	23.2	1		2	46.4
9596	319.9	Departure	1.6		1	1	1.6
9643	321.4	Departure			1	0	0
		Vehicle-seconds					132.4
		Vehicles					2
		Average delay (sec/veh)					66.2

Table B- 20: Cycle 4 of IQA Field Analysis of the Through Lane for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
12511	417.0	Arrival	19.3	1		1	19.3
13091	436.4	Departure	1.0		1	0	0
13122	437.4	Arrival	1.7	1		1	1.7
13173	439.1	Arrival	4.5	1		2	9.1
13309	443.6	Departure	2.1		1	1	2.1
13371	445.7	Departure			1	0	0
		Vehicle-seconds					**32.2**
		Vehicles					**3**
		Average delay (sec/veh)					**10.7**

Table B- 21: Cycle 5 of IQA Field Analysis of the Through Lane for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
14206	473.5	Arrival	14.8	1		1	14.8
14651	488.4	Arrival	27.1	1		2	54.3
15465	515.5	Arrival	38.3	1		3	115.0
16615	553.8	Departure	2.6		1	2	5.1
16692	556.4	Departure	2.2		1	1	2.2
16758	558.6	Departure	4.6		1	0	0
16897	563.2	Arrival	5.1	1		1	5.1
17049	568.3	Arrival	0.1	1		2	0.1
17051	568.4	Departure	6.3		1	1	6.3
17241	574.7	Departure			1	0	0
		Vehicle-seconds					**203.0**
		Vehicles					**5**
		Average delay (sec/veh)					**40.6**

Table B- 22: Cycle 6 of IQA Field Analysis of the Through Lane for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
17671	589.0	Arrival	57.0	1		1	57.0
19381	646.0	Arrival	16.2	1		2	32.5
19868	662.3	Departure	2.8		1	1	2.8
19953	665.1	Departure	1.0		1	0	0
19984	666.1	Arrival	4.9	1		1	4.9
20130	671.0	Departure			1	0	0
		Vehicle-seconds					**97.2**
		Vehicles					**3**
		Average delay (sec/veh)					**32.4**

Table B- 23: Cycle 7 of IQA Field Analysis of the Through Lane for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
23137	771.2	Arrival	27.0	1		1	27.0
23947	798.2	Departure	11.9		1	0	0
24303	810.1	Arrival	4.1	1		1	4.1
24425	814.2	Departure			1	0	0
		Vehicle-seconds					31.1
		Vehicles					2
		Average delay (sec/veh)					15.5

Table B- 24: Summary Table of IQA Field Analysis Results of the Through Lane for Northbound of Video 1

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	17.8	3	53.4
2	98.2	2	196.4
3	66.2	2	132.4
4	10.7	3	32.2
5	40.6	5	203.0
6	32.4	3	97.2
7	15.5	2	31.1
Total	281.4	20	745.6
	Average Delay For the 15-minutes (sec/veh)=		**37.3**

Table B- 25: Cycle 1 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
1192	39.7	Arrival	9.0	1		1	9.0
1462	48.7	Departure	26.3		1	0	0
2250	75.0	Arrival	7.3	1		1	7.3
2469	82.3	Departure			1	0	0
		Vehicle-seconds					**16.3**
		Vehicles					**2**
		Average delay (sec/veh)					**8.2**

Table B- 26: Cycle 2 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
2990	99.7	Arrival	15.8	1		1	15.8
3463	115.4	Departure	54.8		1	0	0
5107	170.2	Arrival	19.8	1		1	19.8
5702	190.1	Departure			1	0	0
		Vehicle-seconds					**35.6**
		Vehicles					**2**
		Average delay (sec/veh)					**17.8**

Table B- 27: Cycle 3 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
7065	235.5	Arrival	16.9	1		1	16.9
7573	252.4	Departure			1	0	0
		Vehicle-seconds					**16.9**
		Vehicles					**1**
		Average delay (sec/veh)					**16.9**

Table B- 28: Cycle 4 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
11554	385.1	Arrival	22.1	1		1	22.1
12217	407.2	Departure			1	0	0
		Vehicle-seconds					**22.1**
		Vehicles					**1**
		Average delay (sec/veh)					**22.1**

Table B- 29: Cycle 5 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
13937	464.6	Arrival	14.6	1		1	14.6
14374	479.1	Arrival	2.0	1		2	4.0
14434	481.1	Departure	22.7		1	1	22.7
15114	503.8	Departure	4.5		1	0	0
15249	508.3	Arrival	16.6	1		1	16.6
15748	524.9	Arrival	0.9	1		2	1.8
15775	525.8	Departure	11.7		1	1	11.7
16126	537.5	Departure			1	0	0
		Vehicle-seconds					**71.4**
		Vehicles					**4**
		Average delay (sec/veh)					**17.8**

Table B- 30: Cycle 6 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
19277	642.6	Arrival	16.5	1		1	16.5
19771	659.0	Departure			1	0	0
		Vehicle-seconds					**16.5**
		Vehicles					**1**
		Average delay (sec/veh)					**16.5**

Table B- 31: Cycle 7 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
20330	677.7	Arrival	8.7	1		1	8.7
20591	686.4	Departure	10.8		1	0	0
20916	697.2	Arrival	12.8	1		1	12.8
21301	710.0	Departure			1	0	0
		Vehicle-seconds					**21.5**
		Vehicles					**2**
		Average delay (sec/veh)					**10.8**

Table B- 32: Cycle 8 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
24912	830.4	Arrival	11.6	1		1	11.6
25261	842.0	Departure	2.3		1	0	0
25331	844.4	Arrival	50.4	1		1	50.4
26843	894.8	Departure			1	0	0
		Vehicle-seconds					**62.0**
		Vehicles					**2**
		Average delay (sec/veh)					**31.0**

Table B- 33: Summary Table of IQA Field Analysis Results of the Right Turn Lane for Northbound of Video 1

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	8.2	2	16.3
2	17.8	2	35.6
3	16.9	1	16.9
4	22.1	1	22.1
5	17.8	4	71.4
6	16.5	1	16.5
7	10.8	2	21.5
8	31.0	2	62.0
Total	141.1	15	262.3
	Average Delay For the 15-minutes (sec/veh)=		**17.5**

Table B- 34: Cycle 1 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
2143	71.4	Arrival	3.3	1		1	3.3
2243	74.8	Arrival	107.5	1		2	215.1
5469	182.3	Departure	2.8		1	1	2.8
5553	185.1	Departure			1	0	0
		Vehicle-seconds					**221.2**
		Vehicles					**2**
		Average delay (sec/veh)					**110.6**

Table B- 35: Cycle 3 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
7846	261.5	Arrival	2.0	1		1	2.0
7905	263.5	Arrival	40.8	1		2	81.7
9130	304.3	Departure	1.6		1	1	1.6
9178	305.9	Departure			1	0	0
		Vehicle-seconds					**85.2**
		Vehicles					**2**
		Average delay (sec/veh)					**42.6**

Table B- 36: Cycle 4 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
9400	313.3	Arrival	110.4	1		1	110.4
12712	423.7	Departure			1	0	0
		Vehicle-seconds					**110.4**
		Vehicles					**1**
		Average delay (sec/veh)					**110.4**

Table B-37: Cycle 7 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
20037	667.9	Arrival	115.1	1		1	115.1
23489	783.0	Departure			1	0	0
		Vehicle-seconds					**115.1**
		Vehicles					**1**
		Average delay (sec/veh)					**115.1**

Table B-38: Summary Table of IQA Field Analysis Results of the First Left Turn Lane from the Middle of the Road for Southbound of Video 1

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	**110.6**	2	221.2
2	0.0	0	0.0
3	42.6	2	85.2
4	110.4	1	110.4
5	0.0	0	0.0
6	0.0	0	0.0
7	115.1	1	115.1
Total	378.7	6	531.9
	Average Delay For the 15-minutes (sec/veh)=		**88.7**

Table B-39: Cycle 1 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
1791	59.7	Arrival	123.8	1		1	123.8
5505	183.5	Departure			1	0	0
		Vehicle-seconds					**123.8**
		Vehicles					**1**
		Average delay (sec/veh)					**123.8**

Table B-40: Cycle 2 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
3160	105.3	Arrival	79.7	1		1	79.7
5552	185.1	Departure			1	0	0
		Vehicle-seconds					**79.7**
		Vehicles					**1**
		Average delay (sec/veh)					**79.7**

Table B-41: Cycle 3 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
6706	223.5	Arrival	8.7	1		1	8.7
6966	232.2	Arrival	72.2	1		2	144.3
9131	304.4	Departure	1.6		1	1	1.6
9178	305.9	Departure			1	0	0
		Vehicle-seconds					**154.6**
		Vehicles					**2**
		Average delay (sec/veh)					**77.3**

Table B- 42: Cycle 4 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
11221	374.0	Arrival	51.4	1		1	51.4
12764	425.5	Departure			1	0	0
		Vehicle-seconds					**51.4**
		Vehicles					**1**
		Average delay (sec/veh)					**51.4**

Table B- 43: Cycle 5 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
15549	518.3	Arrival	24.8	1		1	24.8
16294	543.1	Departure			1	0	0
		Vehicle-seconds					**24.8**
		Vehicles					**1**
		Average delay (sec/veh)					**24.8**

Table B- 44: Cycle 7 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
22733	757.8	Arrival	22.0	1		1	22.0
23394	779.8	Arrival	2.6	1		2	5.2
23472	782.4	Departure	3.5		1	1	3.5
23577	785.9	Departure			1	0	0
		Vehicle-seconds					**30.7**
		Vehicles					**2**
		Average delay (sec/veh)					**15.4**

Table B- 45: Summary Table of IQA Field Analysis Results of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 1

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	**123.8**	1	123.8
2	79.7	1	79.7
3	77.3	2	154.6
4	51.4	1	51.4
5	24.8	1	24.8
6	0.0	0	0.0
7	15.4	2	30.7
Total	372.5	8	465.1
	Average Delay For the 15-minutes (sec/veh)=		**58.1**

Table B- 46: Cycle 1 of IQA Field Analysis of the Through Lane for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
2681	89.4	Arrival	9.8	1		1	9.8
2974	99.1	Arrival	25.9	1		2	51.9
3752	125.1	Arrival	79.2	1		3	237.5
6127	204.2	Departure	1.8		1	2	3.5
6180	206.0	Departure	2.2		1	1	2.2
6245	208.2	Departure			1	0	0
		Vehicle-seconds					**304.8**
		Vehicles					**3**
		Average delay (sec/veh)					**101.6**

Table B- 47: Cycle 3 of IQA Field Analysis of the Through Lane for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
7471	249.0	Arrival	23.4	1		1	23.4
8173	272.4	Arrival	9.9	1		2	19.8
8470	282.3	Arrival	25.0	1		3	75.0
9220	307.3	Arrival	16.8	1		4	67.1
9723	324.1	Departure	2.1		1	3	6.2
9785	326.2	Departure	4.2		1	2	8.3
9910	330.3	Departure	0.5		1	1	0.5
9925	330.8	Departure	13.8		1	0	0
10340	344.7	Arrival	4.6	1		1	4.6
10479	349.3	Arrival	0.5	1		2	1.0
10494	349.8	Departure	3.6		1	1	3.6
10602	353.4	Departure			1	0	0
		Vehicle-seconds					**209.5**
		Vehicles					**6**
		Average delay (sec/veh)					**34.9**

Table B- 48: Cycle 5 of IQA Field Analysis of the Through Lane for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
14697	489.9	Arrival	44.7	1		1	44.7
16037	534.6	Arrival	3.8	1		2	7.5
16150	538.3	Arrival	5.2	1		3	15.5
16305	543.5	Arrival	16.2	1		4	64.9
16792	559.7	Departure	2.3		1	3	6.9
16861	562.0	Departure	2.1		1	2	4.2
16924	564.1	Departure	0.0		1	1	0
16925	564.2	Arrival	2.0	1		2	4.0
16985	566.2	Departure	3.5		1	1	3.5
17089	569.6	Departure			1	0	0
		Vehicle-seconds					**151.2**
		Vehicles					**5**
		Average delay (sec/veh)					**30.2**

Table B- 49: Cycle 6 of IQA Field Analysis of the Through Lane for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
19219	640.6	Arrival	37.5	1		1	37.5
20344	678.1	Departure			1	0	0
		Vehicle-seconds					**37.5**
		Vehicles					**1**
		Average delay (sec/veh)					**37.5**

Table B- 50: Cycle 7 of IQA Field Analysis of the Through Lane for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
21604	720.1	Arrival	80.8	1		1	80.8
24029	801.0	Arrival	2.0	1		2	4.1
24090	803.0	Departure	4.3		1	1	4.3
24218	807.3	Departure			1	0	0
		Vehicle-seconds					**89.2**
		Vehicles					**2**
		Average delay (sec/veh)					**44.6**

Table B- 51: Summary Table of IQA Field Analysis Results of the Through Lane for Southbound of Video 1

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	101.6	3	304.8
2	0.0	0	0.0
3	34.9	6	209.5
4	0.0	0	0.0
5	30.2	5	151.2
6	37.5	1	37.5
7	44.6	2	89.2
Total	248.9	17	792.3
	Average Delay For the 15-minutes (sec/veh)=		**46.6**

Table B- 52: Cycle 1 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
281	9.4	Arrival	7.5	1		1	7.5
505	16.8	Departure			1	0	0
		Vehicle-seconds					**7.5**
		Vehicles					**1**
		Average delay (sec/veh)					**7.5**

Table B- 53: Cycle 2 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
3425	114.2	Arrival	11.4	1		1	11.4
3766	125.5	Departure	16.8		1	0	0
4270	142.3	Arrival	7.2	1		1	7.2
4487	149.6	Arrival	4.4	1		2	8.8
4619	154.0	Departure	11.5		1	1	11.5
4963	165.4	Arrival	26.6	1		2	53.2
5761	192.0	Arrival	9.9	1		3	29.6
6057	201.9	Departure	2.9		1	2	5.9
6145	204.8	Departure	2.4		1	1	2.4
6218	207.3	Departure			1	0	0
		Vehicle-seconds					**130.0**
		Vehicles					**5**
		Average delay (sec/veh)					**26.0**

Table B- 54: Cycle 3 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
7388	246.3	Arrival	42.4	1		1	42.4
8661	288.7	Departure	36.3		1	0	0
9751	325.0	Arrival	6.9	1		1	6.9
9959	332.0	Departure	21.5		1	0	0
10604	353.5	Arrival	13.4	1		1	13.4
11007	366.9	Departure			1	0	0
		Vehicle-seconds					**62.8**
		Vehicles					**3**
		Average delay (sec/veh)					**20.9**

Table B- 55: Cycle 4 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
11316	377.2	Arrival	8.6	1		1	8.6
11575	385.8	Departure			1	0	0
		Vehicle-seconds					**8.6**
		Vehicles					**1**
		Average delay (sec/veh)					**8.6**

Table B- 56: Cycle 5 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
15875	529.2	Arrival	23.9	1		1	23.9
16593	553.1	Departure	15.9		1	0	0
17071	569.0	Arrival	9.3	1		1	9.3
17351	578.4	Departure			1	0	0
		Vehicle-seconds					**33.3**
		Vehicles					**2**
		Average delay (sec/veh)					**16.6**

Table B- 57: Cycle 6 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
18423	614.1	Arrival	8.3	1		1	8.3
18673	622.4	Departure			1	0	0
		Vehicle-seconds					**8.3**
		Vehicles					**1**
		Average delay (sec/veh)					**8.3**

Table B- 58: Cycle 7 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 1

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
24905	830.2	Arrival	8.3	1		1	8.3
25155	838.5	Departure			1	0	0
		Vehicle-seconds					**8.3**
		Vehicles					**1**
		Average delay (sec/veh)					**8.3**

Table B- 59: Summary Table of IQA Field Analysis Results of the Right Turn Lane for Southbound of Video1

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	**7.5**	1	7.5
2	26.0	5	130.0
3	20.9	3	62.8
4	8.6	1	8.6
5	16.6	2	33.3
6	8.3	1	8.3
7	8.3	1	8.3
Total	96.3	14	258.8
	Average Delay For the 15-minutes (sec/veh)=		**18.5**

Table B- 60: Cycle 1 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
6	0.2	Arrival	7.3	1		1	7.3
226	7.5	Departure			1	0	0
		Vehicle-seconds					**7.3**
		Vehicles					**1**
		Average delay (sec/veh)					**7.3**

Table B- 61: Cycle 2 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
1427	47.6	Arrival	6.3	1		1	6.3
1615	53.8	Arrival	68.6	1		2	137.3
3674	122.5	Departure	2.4		1	1	2.4
3746	124.9	Departure			1	0	0
		Vehicle-seconds					**145.9**
		Vehicles					**2**
		Average delay (sec/veh)					**73.0**

Table B- 62: Cycle 3 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
8181	272.7	Arrival	10.9	1		1	10.9
8509	283.6	Arrival	80.8	1		2	161.5
10932	364.4	Departure	2.0		1	1	2.0
10993	366.4	Departure			1	0	0
		Vehicle-seconds					**174.5**
		Vehicles					**2**
		Average delay (sec/veh)					**87.3**

Table B- 63: Cycle 4 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
10310	343.7	Arrival	25.3	1		1	25.3
11069	369.0	Departure			1	0	0
		Vehicle-seconds					**25.3**
		Vehicles					**1**
		Average delay (sec/veh)					**25.3**

Table B- 64: Cycle 5 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
11682	389.4	Arrival	57.6	1		1	57.5666667
13409	447.0	Arrival	37.3	1		2	74.6
14528	484.3	Departure	0.6		1	1	0.6
14547	484.9	Arrival	0.8	1		2	1.5
14570	485.7	Departure	5.2		1	1	5.2
14725	490.8	Departure			1	0	0
		Vehicle-seconds					**139.5**
		Vehicles					**3**
		Average delay (sec/veh)					**46.5**

Table B- 65: Cycle 6 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
15981	532.7	Arrival	29.2	1		1	29.2
16857	561.9	Arrival	40.2	1		2	80.5
18064	602.1	Departure	3.3		1	1	3.3
18164	605.5	Departure			1	0	0
		Vehicle-seconds					**113**
		Vehicles					**2**
		Average delay (sec/veh)					**56.5**

Table B- 66: Cycle 7 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
18810	627.0	Arrival	25.4	1		1	25.4
19571	652.4	Arrival	70.9	1		2	141.7
21697	723.2	Departure	3.5		1	1	3.5
21803	726.8	Departure			1	0	0
		Vehicle-seconds					**170.6**
		Vehicles					**2**
		Average delay (sec/veh)					**85.3**

Table B- 67: Cycle 8 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
25219	840.6	Arrival	7.0	1		1	7.0
25428	847.6	Departure			1	0	0
		Vehicle-seconds					7.0
		Vehicles					1
		Average delay (sec/veh)					7.0

Table B- 68: Summary Table of IQA Field Analysis Results of the of the First Left Turn Lane from the Middle of the Road for Northbound of Video 2

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	7.3	1	7.3
2	73.0	2	145.9
3	87.3	2	174.5
4	25.3	1	25.3
5	46.5	3	139.5
6	56.5	2	113.0
7	85.3	2	170.6
8	7.0	1	7.0
Total	388.1	14	783.2
	Average Delay For the 15-minutes (sec/veh)=		**55.9**

Table B- 69: Cycle 1 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
217	7.2	Arrival	4.3	1		1	4.3
347	11.6	Arrival	1.8	1		2	3.5
400	13.3	Departure	17.0		1	1	17.0
909	30.3	Arrival	96.3	1		2	192.7
3799	126.6	Departure	2.0		1	1	2.0
3858	128.6	Departure			1	0	0.0
		Vehicle-seconds					**219.5**
		Vehicles					**3.0**
		Average delay (sec/veh)					**73.2**

Table B- 70: Cycle 2 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
1034	34.5	Arrival	10.7	1		1	10.7
1356	45.2	Arrival	17.7	1		2	35.4
1887	62.9	Arrival	67.5	1		3	202.4
3911	130.4	Departure	3.6		1	2	7.2
4019	134.0	Departure	1.5		1	1	1.5
4063	135.4	Departure			1	0	0.0
		Vehicle-seconds					**257.2**
		Vehicles					**3**
		Average delay (sec/veh)					**85.7**

Table B- 71: Cycle 3 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
5148	171.6	Arrival	5.7	1		1	5.7
5319	177.3	Arrival	22.7	1		2	45.5
6001	200.0	Arrival	43.1	1		3	129.2
7293	243.1	Departure	2.6		1	2	5.3
7372	245.7	Departure	0.6		1	1	0.6
7390	246.3	Arrival	1.8	1		2	3.7
7445	248.2	Departure	4.2		1	1	4.2
7571	252.4	Departure			1	0	0
		Vehicle-seconds					**194.1**
		Vehicles					**4**
		Average delay (sec/veh)					**48.5**

Table B- 72: Cycle 4 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
8318	277.3	Arrival	4.3	1		1	4.3
8447	281.6	Arrival	17.9	1		2	35.9
8985	299.5	Arrival	55.8	1		3	167.5
10660	355.3	Arrival	9.7	1		4	38.8
10951	365.0	Departure	2.8		1	3	8.5
11036	367.9	Departure	2.7		1	2	5.3
11116	370.5	Departure	4.6		1	1	4.6
11253	375.1	Departure			1	0	0
		Vehicle-seconds					**264.9**
		Vehicles					**4**
		Average delay (sec/veh)					**66.2**

Table B- 73: Cycle 5 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
11945	398.2	Arrival	22.4	1		1	22.4
12616	420.5	Arrival	6.8	1		2	13.5
12819	427.3	Arrival	11.0	1		3	32.9
13148	438.3	Arrival	11.6	1		4	46.5
13497	449.9	Arrival	30.6	1		5	153.2
14416	480.5	Arrival	3.9	1		6	23.2
14532	484.4	Departure	3.6		1	5	18.0
14640	488.0	Departure	1.9		1	4	7.6
14697	489.9	Departure	0.7		1	3	2.1
14718	490.6	Arrival	1.5	1		4	5.9
14762	492.1	Departure	1.6		1	3	4.9
14811	493.7	Departure	2.1		1	2	4.3
14875	495.8	Departure	3.2		1	1	3.2
14970	499.0	Departure			1	0	0
		Vehicle-seconds					**337.6**
		Vehicles					**7**
		Average delay (sec/veh)					**48.2**

Table B- 74: Cycle 6 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
15165	505.5	Arrival	17.6	1		1	17.6
15693	523.1	Arrival	79.4	1		2	158.7
18074	602.5	Departure	2.6		1	1	2.6
18153	605.1	Departure			1	0	0
		Vehicle-seconds					**179.0**
		Vehicles					**2**
		Average delay (sec/veh)					**89.5**

Table B- 75: Cycle 7 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
18205	606.8	Arrival	31.4	1		1	31.4
19148	638.3	Arrival	75.7	1		2	151.4
21419	714.0	Arrival	4.8	1		3	14.3
21562	718.7	Arrival	6.1	1		4	24.3
21744	724.8	Departure	2.0		1	3	6.1
21805	726.8	Departure	3.8		1	2	7.5
21918	730.6	Departure	0.9		1	1	0.9
21946	731.5	Departure			1	0	0
		Vehicle-seconds					**236.0**
		Vehicles					**4**
		Average delay (sec/veh)					**59.0**

Table B- 76: Cycle 8 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
21952	731.7	Arrival	88.0	1		1	88.0
24593	819.8	Arrival	23.7	1		2	47.5
25305	843.5	Departure	2.4		1	1	2.4
25376	845.9	Departure			1	0	0
		Vehicle-seconds					**137.9**
		Vehicles					**2**
		Average delay (sec/veh)					**68.9**

Table B- 77: Summary Table of IQA Field Analysis Results of the of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 2

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	73.2	3	219.5
2	85.7	3	257.2
3	48.5	4	194.1
4	66.2	4	264.9
5	48.2	7	337.6
6	89.5	2	179.0
7	59.0	4	236.0
8	68.9	2	137.9
Total	539.3	29	1826.0
	Average Delay For the 15-minutes (sec/veh)=		**63.0**

Table B- 78: Cycle 1 of IQA Field Analysis of the Through Lane for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
116	3.9	Arrival	7.7	1		1	7.7
346	11.5	Departure			1	0	0
		Vehicle-seconds					**7.7**
		Vehicles					**1**
		Average delay (sec/veh)					**7.7**

Table B- 79: Cycle 2 of IQA Field Analysis of the Through Lane for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
2105	70.2	Arrival	64.6	1		1	64.6
4042	134.7	Arrival	3.6	1		2	7.1
4149	138.3	Departure	3.7		1	1	3.7
4261	142.0	Departure			1	0	0
		Vehicle-seconds					**75.4**
		Vehicles					**2**
		Average delay (sec/veh)					**37.7**

Table B- 80: Cycle 3 of IQA Field Analysis of the Through Lane for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
5143	171.4	Arrival	91.8	1		1	91.8
7898	263.3	Departure			1	0	0
		Vehicle-seconds					**91.8**
		Vehicles					**1**
		Average delay (sec/veh)					**91.8**

Table B- 81: Cycle 4 of IQA Field Analysis of the Through Lane for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
10690	356.3	Arrival	16.3	1		1	16.3
11180	372.7	Arrival	4.0	1		2	8.0
11300	376.7	Arrival	0.2	1		3	0.6
11306	376.9	Arrival	3.7	1		4	14.9
11418	380.6	Departure	2.7		1	3	8.1
11499	383.3	Arrival	0.4	1		4	1.5
11510	383.7	Departure	3.9		1	3	11.7
11627	387.6	Departure	2.0		1	2	3.9
11686	389.5	Departure	1.5		1	1	1.5
11732	391.1	Departure			1	0	0
		Vehicle-seconds					**66.6**
		Vehicles					**5**
		Average delay (sec/veh)					**13.3**

Table B- 82: Cycle 5 of IQA Field Analysis of the Through Lane for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
12392	413.1	Arrival	21.7	1		1	21.7
13042	434.7	Arrival	57.7	1		2	115.4
14773	492.4	Arrival	3.0	1		3	8.9
14862	495.4	Arrival	6.9	1		4	27.5
15068	502.3	Departure	1.6		1	3	4.9
15117	503.9	Departure	1.7		1	2	3.5
15169	505.6	Departure	1.9		1	1	1.9
15227	507.6	Departure			1	0	0
		Vehicle-seconds					**183.7**
		Vehicles					**4**
		Average delay (sec/veh)					**45.9**

Table B- 83: Cycle 6 of IQA Field Analysis of the Through Lane for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
16326	544.2	Arrival	66.7	1		1	66.7
18327	610.9	Arrival	4.7	1		2	9.5
18469	615.6	Departure	2.9		1	1	2.9
18555	618.5	Departure			1	0	0
		Vehicle-seconds					**79.0**
		Vehicles					**2**
		Average delay (sec/veh)					**39.5**

Table B- 84: Cycle 7 of IQA Field Analysis of the Through Lane for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
19983	666.1	Arriva	30.6	1		1	30.6
20902	696.7	Arrival	4.4	1		2	8.9
21035	701.2	Arrival	17.0	1		3	51.1
21546	718.2	Arrival	16.8	1		4	67.1
22049	735.0	Departure	1.9		1	3	5.8
22107	736.9	Departure	2.2		1	2	4.5
22174	739.1	Departure	3.5		1	1	3.5
22279	742.6	Departure			1	0	0
		Vehicle-seconds					**171.4**
		Vehicles					**4**
		Average delay (sec/veh)					**42.9**

Table B- 85: Cycle 8 of IQA Field Analysis of the Through Lane for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
23258	775.3	Arrival	3.5	1		1	3.5
23362	778.7	Arrival	19.4	1		2	38.9
23945	798.2	Arrival	34.9	1		3	104.7
24992	833.1	Arrival	19.2	1		4	76.7
25567	852.2	Departure	3.6		1	3	10.7
25674	855.8	Departure	1.6		1	2	3.2
25722	857.4	Departure	2.0		1	1	2.0
25783	859.4	Departure			1	0	0
		Vehicle-seconds					**239.6**
		Vehicles					**4**
		Average delay (sec/veh)					**59.9**

Table B- 86: Summary Table of IQA Field Analysis Results of the of the Through Lane for Northbound of Video 2

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	7.7	1	7.7
2	37.7	2	75.4
3	91.8	1	91.8
4	13.3	5	66.6
5	45.9	4	183.7
6	39.5	2	79.0
7	42.9	4	171.4
8	59.9	4	239.6
Total	338.8	23	915.4
	Average Delay For the 15-minutes (sec/veh)=		**39.8**

Table B- 87: Cycle 2 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
1529	51.0	Arrival	9.1	1		1	9.1
1803	60.1	Arrival	17.9	1		2	35.8
2340	78.0	Arrival	6.5	1		3	19.6
2536	84.5	Departure	5.9		1	2	11.9
2714	90.5	Departure	4.5		1	1	4.5
2848	94.9	Departure	8.8		1	0	0
3111	103.7	Arrival	16.0	1		1	16.0
3592	119.7	Departure	41.4		1	0	0
4835	161.2	Arrival	10.1	1		1	10.1
5139	171.3	Departure			1	0	0
		Vehicle-seconds					**107.0**
		Vehicles					**5**
		Average delay (sec/veh)					**21.4**

Table B- 88: Cycle 3 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
5774	192.5	Arrival	44.9	1		1	44.9
7120	237.3	Departure			1	0	0
		Vehicle-seconds					**44.9**
		Vehicles					**1**
		Average delay (sec/veh)					**44.9**

Table B- 89: Cycle 4 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
9660	322.0	Arrival	36.1	1		1	36.1
10742	358.1	Departure	8.8		1	0	0
11007	366.9	Arrival	10.6	1		1	10.6
11324	377.5	Departure	1.9		1	0	0
11380	379.3	Arrival	8.8	1		1	8.8
11644	388.1	Departure			1	0	0
		Vehicle-seconds					**55.4**
		Vehicles					**3**
		Average delay (sec/veh)					**18.5**

Table B- 90: Cycle 5 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
14657	488.6	Arrival	10.1	1		1	10.1
14960	498.7	Departure	0.9		1	0	0
14987	499.6	Arrival	9.9	1		1	9.9
15284	509.5	Departure			1	0	0
		Vehicle-seconds					**20.0**
		Vehicles					**2**
		Average delay (sec/veh)					**10.0**

Table B- 91: Cycle 6 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
17401	580.0	Arrival	6.8	1		1	6.8
17605	586.8	Arrival	13.7	1		2	27.3
18015	600.5	Departure	7.8		1	1	7.8
18248	608.3	Departure			1	0	0
		Vehicle-seconds					**41.9**
		Vehicles					**2**
		Average delay (sec/veh)					**21.0**

Table B- 92: Cycle 7 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
22376	745.9	Arrival	11.3	1		1	11.3
22716	757.2	Departure			1	0	0
		Vehicle-seconds					**11.3**
		Vehicles					**1**
		Average delay (sec/veh)					**11.3**

Table B- 93: Cycle 8 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
24151	805.0	Arrival	13.4	1		1	13.4
24552	818.4	Departure			1	0	0
		Vehicle-seconds					**13.4**
		Vehicles					**1**
		Average delay (sec/veh)					**13.4**

Table B- 94: Summary Table of IQA Field Analysis Results of the of the Right Turn Lane for Northbound of Video 2

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	0.0	0	0.0
2	**21.4**	5	107.0
3	44.9	1	44.9
4	18.5	3	55.4
5	10.0	2	20.0
6	21.0	2	41.9
7	11.3	1	11.3
8	13.4	1	13.4
Total	140.4	15	293.9
	Average Delay For the 15-minutes (sec/veh)=		**19.6**

Table B- 95: Cycle 2 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
2736	91.2	Arrival	18.3	1		1	18.3
3284	109.5	Arrival	13.9	1		2	27.7
3700	123.3	Departure	2.3		1	1	2.3
3769	125.6	Departure			1	0	0
		Vehicle-seconds					**48.3**
		Vehicles					**2**
		Average delay (sec/veh)					**24.2**

Table B- 96: Cycle 3 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
4525	150.8	Arrival	41.1	1		1	41.1
5757	191.9	Arrival	42.3	1		2	84.5
7025	234.2	Arrival	10.4	1		3	31.1
7336	244.5	Departure	2.2		1	2	4.5
7403	246.8	Departure	3.9		1	1	3.9
7521	250.7	Departure			1	0	0
		Vehicle-seconds					**165.1**
		Vehicles					**3**
		Average delay (sec/veh)					**55.0**

Table B- 97: Cycle 4 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
8657	288.6	Arrival	45.0	1		1	45.0
10008	333.6	Arrival	31.7	1		2	63.4
10959	365.3	Departure	2.2		1	1	2.2
11026	367.5	Departure			1	0	0
		Vehicle-seconds					**110.7**
		Vehicles					**2**
		Average delay (sec/veh)					**55.3**

Table B- 98: Cycle 5 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
11148	371.6	Arrival	36.6	1		1	36.6
12245	408.2	Arrival	70.2	1		2	140.5
14352	478.4	Arrival	3.6	1		3	10.8
14460	482.0	Departure	3.0		1	2	6.1
14551	485.0	Departure	2.9		1	1	2.9
14638	487.9	Departure			1	0	0
		Vehicle-seconds					**196.8**
		Vehicles					**3**
		Average delay (sec/veh)					**65.6**

Table B- 99: Cycle 6 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
15700	523.3	Arrival	79.4	1		1	79.4
18082	602.7	Departure			1	0	0
		Vehicle-seconds					**79.4**
		Vehicles					**1**
		Average delay (sec/veh)					**79.4**

Table B- 100: Summary Table of IQA Field Analysis Results of the First Left Turn Lane from the Middle of the Road for Southbound of Video 2

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	0.0	0	0.0
2	24.2	2	48.3
3	55.0	3	165.1
4	55.3	2	110.7
5	65.6	3	196.8
6	79.4	1	79.4
Total	279.5	11	600.3
	Average Delay For the 15-minutes (sec/veh)=		**54.6**

Table B- 101: Cycle 1 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
780	26.0	Arrival	97.1	1		1	97.1
3693	123.1	Departure			1	0	0
		Vehicle-seconds					**97.1**
		Vehicles					**1**
		Average delay (sec/veh)					**97.1**

Table B- 102: Cycle 3 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
4888	162.9	Arrival	56.7	1		1	56.7
6589	219.6	Arrival	25.7	1		2	51.5
7361	245.4	Arrival	0.4	1		3	1.1
7372	245.7	Departure	2.6		1	2	5.3
7451	248.4	Departure	4.5		1	1	4.5
7585	252.8	Departure			1	0	0
		Vehicle-seconds					**119.0**
		Vehicles					**3**
		Average delay (sec/veh)					**39.7**

Table B- 103: Cycle 4 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
8411	280.4	Arrival	84.3	1		1	84.3
10941	364.7	Departure			1	0	0.0
		Vehicle-seconds					**84.3**
		Vehicles					**1.0**
		Average delay (sec/veh)					**84.3**

Table B- 104: Cycle 5 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
12319	410.6	Arrival	24.1	1		1	24.0666667
13041	434.7	Arrival	49.1	1		2	98.1
14513	483.8	Departure	2.6		1	1	2.6
14592	486.4	Departure	2.0		1	0	0
14653	488.4	Arrival	5.5	1		1	5.5
14817	493.9	Departure			1	0	0
		Vehicle-seconds					**130.3**
		Vehicles					**3**
		Average delay (sec/veh)					**43.4**

Table B- 105: Cycle 6 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
17677	589.2	Arrival	13.5	1		1	13.5
18081	602.7	Departure			1	0	0
		Vehicle-seconds					**13.5**
		Vehicles					**1**
		Average delay (sec/veh)					**13.5**

Table B- 106: Cycle 7 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
18886	629.5	Arrival	94.6	1		1	94.6
21724	724.1	Departure			1	0	0
		Vehicle-seconds					**94.6**
		Vehicles					**1**
		Average delay (sec/veh)					**94.6**

Table B- 107: Summary Table of IQA Field Analysis Results of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 2

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	97.1	1	97.1
2	0.0	0	0.0
3	39.7	3	119.0
4	84.3	1	84.3
5	43.4	3	130.3
6	13.5	1	13.5
7	94.6	1	94.6
Total	372.6	10	538.8
	Average Delay For the 15-minutes (sec/veh)=		**53.9**

Table B- 108: Cycle 1 of IQA Field Analysis of Through Lane for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
111	3.7	Arrival	21.5	1		1	21.5
756	25.2	Departure	6.0		1	0	0
935	31.2	Arrival	111.3	1		1	111.3
4274	142.5	Departure			1	0	0
		Vehicle-seconds					**132.8**
		Vehicles					**2**
		Average delay (sec/veh)					**66.4**

Table B- 109: Cycle 2 of IQA Field Analysis of Through Lane for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
4306	143.5	Arrival	6.0	1		1	6.0
4487	149.6	Departure			1	0	0
		Vehicle-seconds					**6.0**
		Vehicles					**1**
		Average delay (sec/veh)					**6.0**

Table B- 110: Cycle 4 of IQA Field Analysis of Through Lane for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
8252	275.1	Arrival	8.8	1		1	8.8
8517	283.9	Arrival	42.6	1		2	85.1
9794	326.5	Arrival	50.9	1		3	152.6
11320	377.3	Arrival	6.6	1		4	26.4
11518	383.9	Arrival	1.8	1		5	9.0
11572	385.7	Departure	1.9		1	4	7.7
11630	387.7	Departure	5.4		1	3	16.3
11793	393.1	Departure	2.8		1	2	5.7
11878	395.9	Departure	2.0		1	1	2.0
11937	397.9	Departure			1	0	0
		Vehicle-seconds					**313.6**
		Vehicles					**5**
		Average delay (sec/veh)					**62.7**

Table B- 111: Cycle 5 of IQA Field Analysis of Through Lane for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
14426	480.9	Arrival	15.3	1		1	15.3
14886	496.2	Arrival	5.9	1		2	11.7
15062	502.1	Departure	3.4		1	1	3.4
15164	505.5	Departure			1	0	0
		Vehicle-seconds					**30.5**
		Vehicles					**2**
		Average delay (sec/veh)					**15.2**

Table B- 112: Cycle 6 of IQA Field Analysis of Through Lane for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
15889	529.6	Arrival	24.9	1		1	24.9
16635	554.5	Arrival	64.4	1		2	128.8
18567	618.9	Arrival	1.3	1		3	3.8
18605	620.2	Departure	2.1		1	2	4.2
18668	622.3	Departure	3.8		1	1	3.8
18783	626.1	Departure			1	0	0
		Vehicle-seconds					**165.5**
		Vehicles					**3**
		Average delay (sec/veh)					**55.2**

Table B- 113: Cycle 7 of IQA Field Analysis of Through Lane for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
19338	644.6	Arrival	63.7	1		1	63.7
21249	708.3	Arrival	3.7	1		2	7.4
21360	712.0	Arrival	28.5	1		3	85.6
22216	740.5	Arrival	2.1	1		4	8.3
22278	742.6	Departure	2.2		1	3	6.7
22345	744.8	Departure	1.9		1	2	3.9
22403	746.8	Departure	1.9		1	1	1.9
22459	748.6	Departure			1	0	0
		Vehicle-seconds					**177.4**
		Vehicles					**4**
		Average delay (sec/veh)					**44.4**

Table B- 114: Cycle 8 of IQA Field Analysis of Through Lane for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
23371	779.0	Arrival	5.4	1		1	5.4
23533	784.4	Arrival	20.6	1		2	41.1
24150	805.0	Arrival	55.9	1		3	167.6
25826	860.9	Departure	2.3		1	2	4.5
25894	863.1	Departure	2.4		1	1	2.4
25965	865.5	Departure			1	0	0
		Vehicle-seconds					**221.0**
		Vehicles					**3**
		Average delay (sec/veh)					**73.7**

Table B- 115: Summary Table of IQA Field Analysis Results of the Through Lane for Southbound of Video 2

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	66.4	2	132.8
2	6.0	1	6.0
3	0.0	0	0.0
4	62.7	5	313.6
5	15.2	2	30.5
6	55.2	3	165.5
7	44.4	4	177.4
8	73.7	3	221.0
Total	323.6	20	1046.9
	Average Delay For the 15-minutes (sec/veh)=		**52.3**

Table B- 116: Cycle 1 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
332	11.1	Arrival	8.9	1		1	8.9
599	20.0	Departure	5.0		1	0	0
748	24.9	Arrival	31.6	1		1	31.6
1697	56.6	Departure			1	0	0
		Vehicle-seconds					**40.5**
		Vehicles					**2**
		Average delay (sec/veh)					**20.3**

Table B- 117: Cycle 2 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
997	33.2	Arrival	29.8	1		1	29.8
1890	63.0	Departure	16.2		1	0	0
2377	79.2	Arrival	16.4	1		1	16.4
2868	95.6	Arrival	18.3	1		2	36.6
3417	113.9	Departure	4.0		1	1	4.0
3538	117.9	Departure			1	0	0
		Vehicle-seconds					**86.8**
		Vehicles					**3**
		Average delay (sec/veh)					**28.9**

Table B- 118: Cycle 3 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
6837	227.9	Arrival	14.9	1		1	14.9
7285	242.8	Departure	8.2		1	0	0
7531	251.0	Arrival	6.5	1		1	6.5
7725	257.5	Departure			1	0	0
		Vehicle-seconds					**21.4**
		Vehicles					**2**
		Average delay (sec/veh)					**10.7**

Table B- 119: Cycle 4 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
10545	351.5	Arrival	28.7	1		1	28.7
11406	380.2	Departure	9.7		1	0	0
11698	389.9	Arrival	7.5	1		1	7.5
11923	397.4	Departure	20.4		1	0	0
12535	417.8	Arrival	8.7	1		1	8.7
12795	426.5	Departure			1	0	0
		Vehicle-seconds					**44.9**
		Vehicles					**3**
		Average delay (sec/veh)					**15.0**

Table B- 120: Cycle 5 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
12751	425.0	Arrival	18.1	1		1	18.1
13294	443.1	Departure	11.5		1	0	0
13639	454.6	Arrival	11.8	1		1	11.8
13992	466.4	Arrival	4.8	1		2	9.5
14135	471.2	Departure	10.3		1	1	10.3
14444	481.5	Departure			1	0	0
		Vehicle-seconds					**49.7**
		Vehicles					**3**
		Average delay (sec/veh)					**16.6**

Table B- 121: Cycle 6 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
16886	562.9	Arrival	11.2	1		1	11.2
17221	574.0	Departure	33.6		1	0	0
18229	607.6	Arrival	9.4	1		1	9.4
18511	617.0	Departure	14.3		1	0	0
18939	631.3	Arrival	4.8	1		1	4.8
19083	636.1	Departure			1	0	0
		Vehicle-seconds					**25.4**
		Vehicles					**3**
		Average delay (sec/veh)					**8.5**

Table B- 122: Cycle 7 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
19047	634.9	Arrival	5.6	1		1	5.6
19214	640.5	Arrival	26.9	1		2	53.8
20021	667.4	Departure	3.9		1	1	3.9
20139	671.3	Departure	10.5		1	0	0
20455	681.8	Arrival	23.6	1		1	23.6
21162	705.4	Departure	8.3		1	0	0
21410	713.7	Arrival	5.9	1		1	5.9
21588	719.6	Arrival	2.0	1		2	3.9
21647	721.6	Departure	15.5		1	1	15.5
22112	737.1	Departure			1	0	0
		Vehicle-seconds					**112.2**
		Vehicles					**5**
		Average delay (sec/veh)					**22.4**

Table B- 123: Cycle 8 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 2

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
23598	786.6	Arrival	8.6	1		1	8.6
23855	795.2	Departure	24.0		1	0	0
24576	819.2	Arrival	18.0	1		1	18.0
25115	837.2	Departure	23.5		1	0	0
25821	860.7	Arrival	2.0	1		1	2.0
25882	862.7	Arrival	4.7	1		2	9.4
26023	867.4	Departure	1.5		1	1	1.5
26067	868.9	Departure			1	0	0
		Vehicle-seconds					**39.4**
		Vehicles					**4**
		Average delay (sec/veh)					**9.9**

Table B- 124: Summary Table of IQA Field Analysis Results of the Right Turn Lane for Southbound of Video 2

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	20.3	2	40.5
2	28.9	3	86.8
3	10.7	2	21.4
4	15.0	3	44.9
5	16.6	3	49.7
6	8.5	3	25.4
7	22.4	5	112.2
8	9.9	4	39.4
Total	132.2	25	420.3
	Average Delay For the 15-minutes (sec/veh)=		**16.8**

Table B- 125: Cycle 1 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
1815	60.5	Arrival	9.0	1		1	9.0
2084	69.5	Departure			1	0	0
		Vehicle-seconds					**9.0**
		Vehicles					**1**
		Average delay (sec/veh)					**9.0**

Table B- 126: Cycle 2 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
2778	92.6	Arrival	39.6	1		1	39.6
3965	132.2	Arrival	50.7	1		2	101.4
5486	182.9	Departure	2.5		1	1	2.5
5561	185.4	Departure			1	0	0
		Vehicle-seconds					**143.5**
		Vehicles					**2**
		Average delay (sec/veh)					**71.7**

Table B- 127: Cycle 3 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
7143	238.1	Arrival	65.6	1		1	65.6
9111	303.7	Departure			1	0	0
		Vehicle-seconds					**65.6**
		Vehicles					**1**
		Average delay (sec/veh)					**65.6**

Table B- 128: Cycle 4 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
9658	321.9	Arrival	8.2	1		1	8.2
9904	330.1	Arrival	94.1	1		2	188.2
12727	424.2	Departure	1.6		1	1	1.6
12775	425.8	Departure			1	0	0
		Vehicle-seconds					**198.0**
		Vehicles					**2**
		Average delay (sec/veh)					**99.0**

Table B- 129: Cycle 5 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
13270	442.3	Arrival	1.9	1		1	1.9
13328	444.3	Arrival	6.9	1		2	13.9
13536	451.2	Arrival	93.1	1		3	279.3
16329	544.3	Departure	4.7		1	2	9.4
16470	549.0	Departure	2.4		1	1	2.4
16542	551.4	Departure			1	0	0
		Vehicle-seconds					**306.9**
		Vehicles					**3**
		Average delay (sec/veh)					**102.3**

Table B- 130: Cycle 6 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
19007	633.6	Arrival	18.8	1		1	18.8
19572	652.4	Arrival	9.9	1		2	19.9
19870	662.3	Departure	4.6		1	1	4.6
20007	666.9	Departure			1	0	0
		Vehicle-seconds					**43.3**
		Vehicles					**2**
		Average delay (sec/veh)					**21.6**

Table B- 131: Cycle 7 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
21902	730.1	Arrival	26.2	1		1	26.2
22689	756.3	Arrival	13.1	1		2	26.1
23081	769.4	Arrival	14.5	1		3	43.4
23515	783.8	Departure	1.9		1	2	3.7
23571	785.7	Departure	5.2		1	1	5.2
23726	790.9	Departure			1	0	0
		Vehicle-seconds					**104.7**
		Vehicles					**3**
		Average delay (sec/veh)					**34.9**

Table B- 132: Summary Table of IQA Field Analysis Results of the First Left Turn Lane from the Middle of the Road for Northbound of Video 3

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	9.0	1	9.0
2	71.7	2	143.5
3	65.6	1	65.6
4	99.0	2	198.0
5	102.3	3	306.9
6	21.6	2	43.3
7	34.9	3	104.7
Total	404.1	14	870.9
	Average Delay For the 15-minutes (sec/veh)=		**62.2**

Table B- 133: Cycle 1 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
1188	39.6	Arrival	26.1	1		1	26.1
1970	65.7	Departure	19.6		1	0	0
2559	85.3	Arrival	98.5	1		1	98.5
5515	183.8	Departure			1	0	0
		Vehicle-seconds					**124.6**
		Vehicles					**2**
		Average delay (sec/veh)					**62.3**

Table B- 134: Cycle 3 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
7778	259.3	Arrival	42.8	1		1	42.8
9063	302.1	Arrival	2.9	1		2	5.8
9150	305.0	Departure	6.5		1	1	6.5
9344	311.5	Departure			1	0	0
		Vehicle-seconds					**55.1**
		Vehicles					**2**
		Average delay (sec/veh)					**27.6**

Table B- 135: Cycle 4 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
11606	386.9	Arrival	2.7	1		1	2.7
11688	389.6	Arrival	33.6	1		2	67.3
12697	423.2	Departure	2.6		1	1	2.6
12776	425.9	Departure			1	0	0
		Vehicle-seconds					**72.6**
		Vehicles					**2**
		Average delay (sec/veh)					**36.3**

Table B- 136: Cycle 5 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
12988	432.9	Arrival	27.9	1		1	27.9
13826	460.9	Arrival	11.6	1		2	23.2
14174	472.5	Arrival	39.7	1		3	119.1
15365	512.2	Arrival	34.0	1		4	135.9
16384	546.1	Departure	1.7		1	3	5.1
16435	547.8	Departure	1.5		1	2	2.9
16479	549.3	Departure	1.7		1	1	1.7
16531	551.0	Departure			1	0	0
		Vehicle-seconds					**315.9**
		Vehicles					**4**
		Average delay (sec/veh)					**79.0**

Table B- 137: Cycle 6 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
18762	625.4	Arrival	13.1	1		1	13.1
19155	638.5	Arrival	6.7	1		2	13.5
19357	645.2	Arrival	11.0	1		3	33.1
19688	656.3	Arrival	6.6	1		4	26.3
19885	662.8	Departure	2.2		1	3	6.7
19952	665.1	Departure	4.1		1	2	8.1
20074	669.1	Departure	3.4		1	1	3.4
20176	672.5	Departure			1	0	0
		Vehicle-seconds					**104.2**
		Vehicles					**4**
		Average delay (sec/veh)					**26.0**

Table B- 138: Cycle 7 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
20939	698.0	Arrival	42.0	1		1	42.0
22198	739.9	Arrival	38.2	1		2	76.3
23343	778.1	Arrival	5.7	1		3	17.1
23514	783.8	Departure	1.8		1	2	3.7
23569	785.6	Departure	2.1		1	1	2.1
23632	787.7	Departure			1	0	0
		Vehicle-seconds					**141.2**
		Vehicles					**3**
		Average delay (sec/veh)					**47.1**

Table B- 139: Summary Table of IQA Field Analysis Results of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 3

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	62.3	2	124.6
2	0.0	0	0
3	27.6	2	55.1
4	36.3	2	72.6
5	79.0	4	315.9
6	26.0	4	104.2
7	47.1	3	141.2
Total	278.2	17	813.5
	Average Delay For the 15-minutes (sec/veh)=		**47.9**

Table B- 140: Cycle 1 of IQA Field Analysis of the Through for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7
571	19.0	Arrival	36.2	1		1	36.2
1656	55.2	Arrival	36.6	1		2	73.2
2754	91.8	Departure	1.2		1	1	1.2
2789	93.0	Departure			1	0	0
		Vehicle-seconds					**110.5**
		Vehicles					**2**
		Average delay (sec/veh)					**55.3**

Table B- 141: Cycle 2 of IQA Field Analysis of the Through for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
4562	152.1	Arrival	5.1	1		1	5.1
4716	157.2	Arrival	20.6	1		2	41.1
5333	177.8	Arrival	1.7	1		3	5.1
5384	179.5	Arrival	22.5	1		4	89.9
6058	201.9	Departure	1.4		1	3	4.2
6100	203.3	Departure	4.0		1	2	7.9
6219	207.3	Departure	1.8		1	1	1.8
6273	209.1	Departure			1	0	0
		Vehicle-seconds					**155.2**
		Vehicles					**4**
		Average delay (sec/veh)					**38.8**

Table B- 142: Cycle 3 of IQA Field Analysis of the Through for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
7495	249.8	Arrival	27.0	1		1	27.0
8306	276.9	Arrival	39.7	1		2	79.5
9498	316.6	Arrival	2.9	1		3	8.7
9585	319.5	Departure	2.6		1	2	5.1
9662	322.1	Departure	3.9		1	1	3.9
9779	326.0	Departure			1	0	0
		Vehicle-seconds					**124.2**
		Vehicles					**3**
		Average delay (sec/veh)					**41.4**

Table B- 143: Cycle 4 of IQA Field Analysis of the Through for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
10576	352.5	Arrival	5.9	1		1	5.9
10754	358.5	Arrival	33.7	1		2	67.4
11765	392.2	Arrival	26.9	1		3	80.6
12571	419.0	Arrival	16.5	1		4	66.0
13066	435.5	Arrival	1.9	1		5	9.3
13122	437.4	Arrival	6.5	1		6	39.2
13318	443.9	Departure	1.4		1	5	7.2
13361	445.4	Arrival	1.2	1		6	7.0
13396	446.5	Departure	1.5		1	5	7.3
13440	448.0	Arrival	0.5	1		6	2.8
13454	448.5	Departure	2.6		1	5	12.8
13531	451.0	Departure	1.6		1	4	6.5
13580	452.7	Departure	2.6		1	3	7.8
13658	455.3	Departure	1.8		1	2	3.7
13713	457.1	Departure	1.4		1	1	1.4
13754	458.5	Departure			1	0	0
		Vehicle-seconds					**325.0**
		Vehicles					**8**
		Average delay (sec/veh)					**40.6**

Table B- 144: Cycle 5 of IQA Field Analysis of the Through for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
15120	504.0	Arrival	4.1	1		1	4.1
15244	508.1	Arrival	2.7	1		2	5.5
15326	510.9	Arrival	51.1	1		3	153.3
16859	562.0	Departure	2.4		1	2	4.8
16931	564.4	Departure	2.3		1	1	2.3
17000	566.7	Departure			1	0	0
		Vehicle-seconds					**170.0**
		Vehicles					**3**
		Average delay (sec/veh)					**56.7**

Table B- 145: Cycle 6 of IQA Field Analysis of the Through for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
17616	587.2	Arrival	41.1	1		1	41.1
18850	628.3	Arrival	52.1	1		2	104.2
20413	680.4	Departure	1.3		1	1	1.3
20452	681.7	Departure			1	0	0
		Vehicle-seconds					**146.6**
		Vehicles					**2**
		Average delay (sec/veh)					**73.3**

Table B- 146: Cycle 7 of IQA Field Analysis of the Through for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
21095	703.2	Arrival	42.7	1		1	42.7
22377	745.9	Arrival	15.1	1		2	30.1
22829	761.0	Arrival	10.0	1		3	29.9
23128	770.9	Arrival	10.1	1		4	40.3
23430	781.0	Arrival	16.3	1		5	81.3
23918	797.3	Departure	2.2		1	4	8.8
23984	799.5	Departure	1.7		1	3	5.1
24035	801.2	Departure	3.6		1	2	7.1
24142	804.7	Departure	0.3		1	1	0.3
24152	805.1	Arrival	2.1	1		2	4.1
24214	807.1	Departure	6.1		1	1	6.1
24396	813.2	Departure			1	0	0
		Vehicle-seconds					**255.9**
		Vehicles					**6**
		Average delay (sec/veh)					**42.7**

Table B- 147: Summary Table of IQA Field Analysis Results of the Through Lane for Northbound of Video3

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	55.3	2	110.5
2	38.8	4	155.2
3	41.4	3	124.2
4	40.6	8	325.0
5	56.7	3	170.0
6	73.3	2	146.6
7	42.7	6	255.9
Total	348.7	28	1287.5
	Average Delay For the 15-minutes (sec/veh)=		**46.0**

Table B- 148: Cycle 1 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
1958	65.3	Arrival	2.4	1		1	2.4
2029	67.6	Arrival	11.5	1		2	23.1
2375	79.2	Departure	2.0		1	1	2.0
2436	81.2	Departure	0.0		1	0	0
2437	81.2	Arrival	7.0	1		1	7.0
2648	88.3	Departure			1	0	0
		Vehicle-seconds					**34.5**
		Vehicles					**3**
		Average delay (sec/veh)					**11.5**

Table B- 149: Cycle 2 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
3834	127.8	Arrival	25.7	1		1	25.7
4605	153.5	Departure	4.9		1	0	0
4753	158.4	Arrival	13.7	1		1	13.7
5165	172.2	Departure	1.3		1	0	0
5203	173.4	Arrival	10.1	1		1	10.1
5505	183.5	Departure	45.4		1	0	0
6867	228.9	Arrival	20.0	1		1	20.0
7466	248.9	Departure			1	0	0
		Vehicle-seconds					**69.5**
		Vehicles					**4**
		Average delay (sec/veh)					**17.4**

Table B- 150: Cycle 3 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
7629	254.3	Arrival	27.9	1		1	27.9
8465	282.2	Arrival	10.1	1		2	20.3
8769	292.3	Departure	8.6		1	1	8.6
9026	300.9	Departure			1	0	0
		Vehicle-seconds					**56.7**
		Vehicles					**2**
		Average delay (sec/veh)					**28.4**

Table B- 151: Cycle 4 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
11510	383.7	Arrival	19.6	1		1	19.6
12098	403.3	Departure			1	0	0
		Vehicle-seconds					**19.6**
		Vehicles					**1**
		Average delay (sec/veh)					**19.6**

Table B- 152: Cycle 5 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
15384	512.8	Arrival	24.1	1		1	24.1
16108	536.9	Departure	1.5		1	0	0
16153	538.4	Arrival	15.4	1		1	15.4
16614	553.8	Departure	0.4		1	0	0
16626	554.2	Arrival	6.2	1		1	6.2
16811	560.4	Arrival	0.2	1		2	0.3
16816	560.5	Departure	7.9		1	1	7.9
17052	568.4	Departure			1	0	0
		Vehicle-seconds					**53.9**
		Vehicles					**4**
		Average delay (sec/veh)					**13.5**

Table B- 153: Cycle 6 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
18171	605.7	Arrival	14.5	1		1	14.5
18606	620.2	Arrival	11.1	1		2	22.2
18939	631.3	Arrival	20.0	1		3	60.1
19540	651.3	Departure	6.3		1	2	12.6
19729	657.6	Departure	3.4		1	1	3.4
19831	661.0	Departure			1	0	0
		Vehicle-seconds					**112.8**
		Vehicles					**3**
		Average delay (sec/veh)					**37.6**

Table B- 154: Cycle 7 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
21769	725.6	Arrival	23.3	1		1	23.3
22468	748.9	Departure	48.1		1	0	0
23912	797.1	Arrival	3.7	1		1	3.7
24023	800.8	Arrival	5.0	1		2	9.9
24172	805.7	Departure	5.7		1	1	5.7
24343	811.4	Departure			1	0	0
		Vehicle-seconds					**42.6**
		Vehicles					**3**
		Average delay (sec/veh)					**14.2**

Table B- 155: Cycle 8 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
24709	823.6	Arrival	15.5	1		1	15.5
25173	839.1	Departure	33.6		1	0	0
26180	872.7	Arrival	13.1	1		1	13.1
26574	885.8	Departure			1	0	0
		Vehicle-seconds					**28.6**
		Vehicles					**2**
		Average delay (sec/veh)					**14.3**

Table B- 156: Summary Table of IQA Field Analysis Results of the Right Turn Lane for Northbound of Video3

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	11.5	3	34.5
2	17.4	4	69.5
3	28.4	2	56.7
4	19.6	1	19.6
5	13.5	4	53.9
6	37.6	3	112.8
7	14.2	3	42.6
8	14.3	2	28.6
Total	156.4	22	418.2
	Average Delay For the 15-minutes (sec/veh)=		**19.0**

Table B- 157: Cycle 1 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
1246	41.5	Arrival	3.6	1		1	3.6
1353	45.1	Arrival	18.5	1		2	37.1
1909	63.6	Departure	2.5		1	1	2.5
1983	66.1	Departure			1	0	0
		Vehicle-seconds					**43.1**
		Vehicles					**2**
		Average delay (sec/veh)					**21.6**

Table B- 158: Cycle 2 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
3912	130.4	Arrival	54.6	1		1	54.6
5549	185.0	Departure			1	0	0
		Vehicle-seconds					**54.6**
		Vehicles					**1**
		Average delay (sec/veh)					**54.6**

Table B- 159: Cycle 3 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
8455	281.8	Arrival	3.2	1		1	3.2
8552	285.1	Arrival	17.8	1		2	35.5
9085	302.8	Departure	2.7		1	1	2.7
9167	305.6	Departure			1	0	0
		Vehicle-seconds					**41.5**
		Vehicles					**2**
		Average delay (sec/veh)					**20.8**

Table B- 160: Cycle 4 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
11217	373.9	Arrival	4.2	1		1	4.2
11344	378.1	Arrival	49.7	1		2	99.4
12835	427.8	Departure	1.8		1	1	1.8
12889	429.6	Departure			1	0	0
		Vehicle-seconds					**105.4**
		Vehicles					**2**
		Average delay (sec/veh)					**52.7**

Table B- 161: Cycle 5 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
15234	507.8	Arrival	34.4	1		1	34.4
16265	542.2	Departure			1	0	0
		Vehicle-seconds					**34.4**
		Vehicles					**1**
		Average delay (sec/veh)					**34.4**

Table B- 162: Cycle 7 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
20880	696.0	Arrival	75.9	1		1	75.9
23157	771.9	Arrival	11.8	1		2	23.6
23511	783.7	Departure	1.6		1	1	1.6
23560	785.3	Departure			1	0	0
		Vehicle-seconds					**101.1**
		Vehicles					**2**
		Average delay (sec/veh)					**50.6**

Table B- 163: Summary Table of IQA Field Analysis Results of the First Left Turn Lane from the Middle of the Road for Southbound of Video 3

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	21.6	2	43.1
2	54.6	1	54.6
3	20.8	2	41.5
4	52.7	2	105.4
5	34.4	1	34.4
6	0.0	0	0
7	50.6	2	101.1
Total	234.5	10	380.1
	Average Delay For the 15-minutes (sec/veh)=		**38.0**

Table B- 164: Cycle 2 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
3619	120.6	Arrival	8.1	1		1	8.1
3863	128.8	Arrival	55.3	1		2	110.7
5523	184.1	Departure	3.6		1	1	3.6
5632	187.7	Departure			1	0	0
		Vehicle-seconds					**122.4**
		Vehicles					**2**
		Average delay (sec/veh)					**61.2**

Table B- 165: Cycle 3 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
6889	229.6	Arrival	64.5	1		1	64.5
8823	294.1	Arrival	9.2	1		2	18.4
9099	303.3	Departure	2.2		1	1	2.2
9166	305.5	Departure			1	0	0
		Vehicle-seconds					**85.1**
		Vehicles					**2**
		Average delay (sec/veh)					**42.6**

Table B- 166: Cycle 4 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In 5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
11781	392.7	Arrival	33.2	1		1	33.2
12778	425.9	Departure			1	0	0
		Vehicle-seconds					**33.2**
		Vehicles					**1**
		Average delay (sec/veh)					**33.2**

Table B- 167: Cycle 5 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 3

Frame Numbers(1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
12954	431.8	Arrival	74.1	1		1	74.1
15177	505.9	Arrival	9.1	1		2	18.2
15450	515.0	Arrival	29.3	1		3	87.8
16328	544.3	Departure	2.6		1	2	5.1
16405	546.8	Departure	2.0		1	1	2.0
16466	548.9	Departure			1	0	0
		Vehicle-seconds					**187.3**
		Vehicles					**3**
		Average delay (sec/veh)					**62.4**

Table B- 168: Cycle 6 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
19595	653.2	Arrival	13.9	1		1	13.9
20011	667.0	Departure			1	0	0
		Vehicle-seconds					**13.9**
		Vehicles					**1**
		Average delay (sec/veh)					**13.9**

Table B- 169: Cycle 7 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
21362	712.1	Arrival	43.3	1		1	43.3
22660	755.3	Arrival	23.2	1		2	46.5
23357	778.6	Arrival	4.7	1		3	14.1
23498	783.3	Departure	2.9		1	2	5.7
23584	786.1	Departure	3.2		1	1	3.2
23681	789.4	Departure			1	0	0
		Vehicle-seconds					**112.8**
		Vehicles					**3**
		Average delay (sec/veh)					**37.6**

Table B- 170: Summary Table of IQA Field Analysis Results of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 3

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	0.0	0	0
2	61.2	2	122.4
3	42.6	2	85.1
4	33.2	1	33.2
5	62.4	3	187.3
6	13.9	1	13.9
7	37.6	3	112.8
Total	250.9	12	554.7
	Average Delay For the 15-minutes (sec/veh)=		46.2

Table B- 171: Cycle 1 of IQA Field Analysis of Through Lane for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
664	22.1	Arrival	15.5	1		1	15.5
1128	37.6	Arrival	49.0	1		2	98.0
2598	86.6	Departure	2.0		1	1	2.0
2657	88.6	Departure			1	0	0
		Vehicle-seconds					**115.4**
		Vehicles					**2**
		Average delay (sec/veh)					**57.7**

Table B- 172: Cycle 2 of IQA Field Analysis of Through Lane for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
4963	165.4	Arrival	30.4	1		1	30.4
5874	195.8	Departure			1	0	0
		Vehicle-seconds					**30.4**
		Vehicles					**1**
		Average delay (sec/veh)					**30.4**

Table B- 173: Cycle 3 of IQA Field Analysis of Through Lane for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
6846	228.2	Arrival	6.3	1		1	6.3
7035	234.5	Arrival	43.6	1		2	87.1
8342	278.1	Arrival	45.9	1		3	137.6
9718	323.9	Departure	3.1		1	2	6.2
9811	327.0	Departure	2.4		1	1	2.4
9883	329.4	Departure			1	0	0
		Vehicle-seconds					**239.6**
		Vehicles					**3**
		Average delay (sec/veh)					**79.9**

Table B- 174: Cycle 4 of IQA Field Analysis of Through Lane for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
11519	384.0	Arrival	29.1	1		1	29.1
12391	413.0	Arrival	1.6	1		2	3.3
12440	414.7	Arrival	12.5	1		3	37.4
12814	427.1	Arrival	11.6	1		4	46.3
13161	438.7	Departure	3.2		1	3	9.6
13257	441.9	Departure	1.1		1	2	2.2
13290	443.0	Departure	2.3		1	1	2.3
13358	445.3	Departure			1	0	0
		Vehicle-seconds					**130.1**
		Vehicles					**4**
		Average delay (sec/veh)					**32.5**

Table B- 175: Cycle 5 of IQA Field Analysis of Through Lane for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
15321	510.7	Arrival	13.1	1		1	13.1
15713	523.8	Arrival	17.9	1		2	35.8
16250	541.7	Arrival	5.2	1		3	15.6
16406	546.9	Arrival	17.2	1		4	68.9
16923	564.1	Departure	3.1		1	3	9.2
17015	567.2	Departure	2.8		1	2	5.6
17099	570.0	Departure	2.5		1	1	2.5
17173	572.4	Departure			1	0	0
		Vehicle-seconds					**150.7**
		Vehicles					**4**
		Average delay (sec/veh)					**37.7**

Table B- 176: Cycle 6 of IQA Field Analysis of Through Lane for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
18390	613.0	Arrival	51.5	1		1	51.5
19934	664.5	Arrival	20.6	1		2	41.2
20552	685.1	Departure	1.1		1	1	1.1
20585	686.2	Departure			1	0	0
		Vehicle-seconds					**93.8**
		Vehicles					**2**
		Average delay (sec/veh)					**46.9**

Table B- 177: Cycle 7 of IQA Field Analysis of Through Lane for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
21268	708.9	Arrival	34.5	1		1	34.5
22304	743.5	Arrival	59.1	1		2	118.1
24076	802.5	Departure	2.4		1	1	2.4
24147	804.9	Departure			1	0	0
		Vehicle-seconds					**155.0**
		Vehicles					**2**
		Average delay (sec/veh)					**77.5**

Table B- 178: Summary Table of IQA Field Analysis Results of Through Lane for Southbound of Video 3

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	57.7	2	115.4
2	30.4	1	30.4
3	79.9	3	239.6
4	32.5	4	130.1
5	37.7	4	150.7
6	46.9	2	93.8
7	77.5	2	155.0
Total	362.5	18	915.0
	Average Delay For the 15-minutes (sec/veh)=		**50.8**

Table B- 179: Cycle 1 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
1580	52.7	Arrival	9.7	1		1	9.7
1871	62.4	Departure			1	0	0
		Vehicle-seconds					**9.7**
		Vehicles					**1**
		Average delay (sec/veh)					**9.7**

Table B- 180: Cycle 2 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
3106	103.5	Arrival	16.3	1		1	16.3
3594	119.8	Departure			1	0	0
		Vehicle-seconds					**16.3**
		Vehicles					**1**
		Average delay (sec/veh)					**16.3**

Table B- 181: Cycle 3 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
8757	291.9	Arrival	10.1	1		1	10.1
9061	302.0	Departure			1	0	0
		Vehicle-seconds					**10.1**
		Vehicles					**1**
		Average delay (sec/veh)					**10.1**

Table B- 182: Cycle 4 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
10039	334.6	Arrival	22.2	1		1	22.2
10705	356.8	Departure	64.2		1	0	0
12632	421.1	Arrival	8.8	1		1	8.8
12897	429.9	Departure	18.8		1	0	0
13460	448.7	Arrival	6.6	1		1	6.6
13659	455.3	Departure	5.7		1	0	0
13831	461.0	Arrival	27.3	1		1	27.3
14650	488.3	Departure			1	0	0
		Vehicle-seconds					**65.0**
		Vehicles					**4**
		Average delay (sec/veh)					**16.2**

Table B- 183: Cycle 5 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
14868	495.6	Arrival	40.6	1		1	40.6
16085	536.2	Departure	13.1		1	0	0
16479	549.3	Arrival	5.6	1		1	5.6
16646	554.9	Arrival	3.4	1		2	6.9
16749	558.3	Departure	6.3		1	1	6.3
16937	564.6	Departure	1.7		1	0	0
16988	566.3	Arrival	5.7	1		1	5.7
17160	572.0	Departure			1	0	0
		Vehicle-seconds					**65.0**
		Vehicles					**4**
		Average delay (sec/veh)					**16.3**

Table B- 184: Cycle 6 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
17778	592.6	Arrival	8.4	1		1	8.4
18029	601.0	Departure	55.7		1	0	0
19700	656.7	Arrival	2.7	1		1	2.7
19780	659.3	Arrival	16.8	1		2	33.7
20285	676.2	Departure	3.5		1	1	3.5
20391	679.7	Departure			1	0	0
		Vehicle-seconds					**48.2**
		Vehicles					**3**
		Average delay (sec/veh)					**16.1**

Table B- 185: Cycle 7 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 3

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
22414	747.1	Arrival	24.9	1		1	24.9
23162	772.1	Departure	29.0		1	0	0
24033	801.1	Arrival	0.8	1		1	0.8
24056	801.9	Arrival	6.4	1		2	12.7
24247	808.2	Departure	1.6		1	1	1.6
24295	809.8	Departure			1	0	0
		Vehicle-seconds					**40.0**
		Vehicles					**3**
		Average delay (sec/veh)					**13.3**

Table B- 186: Summary Table of IQA Field Analysis Results of the Right Turn Lane for Southbound of Video 3

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	9.7	1	9.7
2	16.3	1	16.3
3	10.1	1	10.1
4	16.2	4	65.0
5	16.3	4	65.0
6	16.1	3	48.2
7	13.3	3	40.0
Total	98.0	17	254.3
	Average Delay For the 15-minutes (sec/veh)=		**15.0**

Table B- 187: Cycle 3 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
3881	129.4	Arrival	113.9	1		1	113.9
7299	243.3	Arrival	2.3	1		2	4.5
7367	245.6	Departure	5.2		1	1	5.2
7523	250.8	Departure			1	0	0
		Vehicle-seconds					**123.7**
		Vehicles					**2**
		Average delay (sec/veh)					**61.8**

Table B- 188: Cycle 4 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
9254	308.5	Arrival	48.1	1		1	48.1
10698	356.6	Arrival	9.1	1		2	18.1
10970	365.7	Departure	1.9		1	1	1.9
11028	367.6	Arrival	1.2	1		2	2.5
11065	368.8	Departure	9.3		1	1	9.3
11344	378.1	Departure			1	0	0
		Vehicle-seconds					**80.0**
		Vehicles					**3**
		Average delay (sec/veh)					**26.7**

Table B- 189: Cycle 5 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
13096	436.5	Arrival	47.9	1		1	47.9
14532	484.4	Departure			1	0	0
		Vehicle-seconds					**47.9**
		Vehicles					**1**
		Average delay (sec/veh)					**47.9**

Table B- 190: Cycle 6 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
15680	522.7	Arrival	54.2	1		1	54.2
17307	576.9	Arrival	23.4	1		2	46.9
18010	600.3	Arrival	3.1	1		3	9.3
18103	603.4	Departure	0.0		1	2	0.1
18104	603.5	Arrival	2.0	1		3	5.9
18163	605.4	Departure	3.4		1	2	6.8
18265	608.8	Arrival	1.2	1		3	3.7
18302	610.1	Departure	3.5		1	2	7.1
18408	613.6	Departure	1.3		1	1	1.3
18447	614.9	Departure			1	0	0
		Vehicle-seconds					**135.2**
		Vehicles					**5**
		Average delay (sec/veh)					**27.0**

Table B- 191: Cycle 7 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
21231	707.7	Arrival	4.0	1		1	4.0
21352	711.7	Arrival	11.5	1		2	22.9
21696	723.2	Arrival	1.9	1		3	5.8
21754	725.1	Departure	3.0		1	2	6.0
21844	728.1	Departure	3.0		1	1	3.0
21935	731.2	Departure			1	0	0
		Vehicle-seconds					**41.8**
		Vehicles					**3**
		Average delay (sec/veh)					**13.9**

Table B- 192: Cycle 8 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
23699	790.0	Arrival	44.0	1		1	44.0
25020	834.0	Arrival	10.2	1		2	20.3
25325	844.2	Departure	1.6		1	1	1.6
25374	845.8	Departure			1	0	0
		Vehicle-seconds					**66.0**
		Vehicles					**2**
		Average delay (sec/veh)					**33.0**

Table B- 193: Summary Table of IQA Field Analysis Results of the First Left Turn Lane from the Middle of the Road for Northbound of Video 4

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	0.0	0	0
2	0.0	0	0
3	61.8	2	123.7
4	26.7	3	80.0
5	47.9	1	47.9
6	27.0	5	135.2
7	13.9	3	41.8
8	33.0	2	66.0
Total	210.3	16	494.5
	Average Delay For the 15-minutes (sec/veh)=		**30.9**

Table B- 194: Cycle 1 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
1	0.0	Arrival	8.8	1		1	8.8
264	8.8	Arrival	6.0	1		2	12.1
445	14.8	Departure	1.9		1	1	1.9
502	16.7	Departure			1	0	0
		Vehicle-seconds					**22.7**
		Vehicles					**2**
		Average delay (sec/veh)					**11.4**

Table B- 195: Cycle 2 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
3501	116.7	Arrival	10.4	1		1	10.4
3812	127.1	Departure			1	0	0
		Vehicle-seconds					**10.4**
		Vehicles					**1**
		Average delay (sec/veh)					**10.4**

Table B- 196: Cycle 3 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
6792	226.4	Arrival	12.5	1		1	12.5
7166	238.9	Arrival	9.2	1		2	18.5
7443	248.1	Departure	1.4		1	1	1.4
7485	249.5	Departure			1	0	0
		Vehicle-seconds					**32.3**
		Vehicles					**2**
		Average delay (sec/veh)					**16.2**

Table B- 197: Cycle 4 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
7547	251.6	Arrival	15.0	1		1	15.0
7996	266.5	Arrival	22.7	1		2	45.5
8678	289.3	Arrival	42.4	1		3	127.1
9949	331.6	Arrival	6.3	1		4	25.1
10137	337.9	Arrival	25.0	1		5	125.2
10888	362.9	Arrival	4.6	1		6	27.8
11027	367.6	Departure	1.5		1	5	7.7
11073	369.1	Departure	2.4		1	4	9.7
11146	371.5	Departure	2.4		1	3	7.2
11218	373.9	Departure	2.2		1	2	4.3
11283	376.1	Departure	1.4		1	1	1.4
11326	377.5	Departure			1	0	0
		Vehicle-seconds					**395.9**
		Vehicles					**6**
		Average delay (sec/veh)					**66.0**

Table B- 198: Cycle 6 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
15417	513.9	Arrival	35.4	1		1	35.4
16479	549.3	Arrival	5.1	1		2	10.3
16633	554.4	Arrival	18.6	1		3	55.9
17192	573.1	Arrival	23.4	1		4	93.5
17893	596.4	Arrival	7.2	1		5	36.2
18110	603.7	Departure	1.3		1	4	5.1
18148	604.9	Departure	4.0		1	3	11.9
18267	608.9	Departure	2.0		1	2	3.9
18326	610.9	Departure	3.3		1	1	3.3
18424	614.1	Departure			1	0	0
		Vehicle-seconds					**255.4**
		Vehicles					**5**
		Average delay (sec/veh)					**51.1**

Table B- 199: Cycle 7 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
18703	623.4	Arrival	34.2	1		1	34.2
19729	657.6	Arrival	68.5	1		2	137.1
21785	726.2	Departure	3.0		1	1	3.0
21874	729.1	Departure			1	0	0
		Vehicle-seconds					**174.2**
		Vehicles					**2.00**
		Average delay (sec/veh)					**87.1**

Table B- 200: Cycle 8 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
23451	781.7	Arrival	60.3	1		1	60.3
25260	842.0	Arrival	0.1	1		2	0.1
25262	842.1	Departure	3.9		1	1	3.9
25379	846.0	Arrival	2.6	1		2	5.2
25457	848.6	Departure	3.6		1	1	3.6
25564	852.1	Departure			1	0	0
		Vehicle-seconds					**73.1**
		Vehicles					**3**
		Average delay (sec/veh)					**24.4**

Table B- 201: Summary Table of IQA Field Analysis Results of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 4

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	11.4	2	22.7
2	10.4	1	10.4
3	16.2	2	32.3
4	66.0	6	395.9
5	0.0	0	0
6	51.1	5	255.4
7	87.1	2	174.2
8	24.4	3	73.1
Total	266.4	21	964.1
	Average Delay For the 15-minutes (sec/veh)=		**45.9**

Table B- 202: Cycle 2 of IQA Field Analysis of the Through Lane for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
1266	42.2	Arrival	9.6	1		1	9.6
1554	51.8	Arrival	23.7	1		2	47.4
2265	75.5	Arrival	42.2	1		3	126.5
3530	117.7	Arrival	7.6	1		4	30.5
3759	125.3	Arrival	18.7	1		5	93.5
4320	144.0	Departure	3.0		1	4	11.9
4409	147.0	Departure	1.8		1	3	5.5
4464	148.8	Departure	1.8		1	2	3.7
4519	150.6	Departure	2.7		1	1	2.7
4601	153.4	Departure	15.2		1	0	0
5056	168.5	Arrival	4.8	1		1	4.8
5201	173.4	Departure			1	0	0
		Vehicle-seconds					**336.1**
		Vehicles					**6**
		Average delay (sec/veh)					**56.0**

Table B- 203: Cycle 3 of IQA Field Analysis of the Through Lane for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
7631	254.4	Arrival	6.5	1		1	6.5
7827	260.9	Departure			1	0	0
		Vehicle-seconds					**6.5**
		Vehicles					**1**
		Average delay (sec/veh)					**6.5**

Table B- 204: Cycle 4 of IQA Field Analysis of the Through Lane for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
8543	284.8	Arrival	10.2	1		1	10.2
8848	294.9	Arrival	3.6	1		2	7.3
8957	298.6	Arrival	5.9	1		3	17.8
9135	304.5	Arrival	8.4	1		4	33.5
9386	312.9	Arrival	38.1	1		5	190.3
10528	350.9	Arrival	2.4	1		6	14.2
10599	353.3	Arrival	25.2	1		7	176.4
11355	378.5	Departure	1.6		1	6	9.6
11403	380.1	Departure	2.6		1	5	13.0
11481	382.7	Departure	2.4		1	4	9.7
11554	385.1	Departure	1.4		1	3	4.3
11597	386.6	Departure	3.7		1	2	7.5
11709	390.3	Departure	2.2		1	1	2.2
11776	392.5	Departure	5.5		1	0	0
11942	398.1	Arrival	5.8	1		1	5.8
12115	403.8	Departure			1	0	0
		Vehicle-seconds					**501.7**
		Vehicles					**8**
		Average delay (sec/veh)					**62.7**

Table B- 205: Cycle 5 of IQA Field Analysis of the Through Lane for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
12798	426.6	Arrival	5.73333333	1		1	5.7
12970	432.3	Arrival	50.4333333	1		2	100.9
14483	482.8	Departure	2.9		1	1	2.9
14570	485.7	Departure	0.13333333		1	0	0
14574	485.8	Arrival	7.16666667	1		1	7.2
14789	493.0	Departure			1	0	0
		Vehicle-seconds					**116.7**
		Vehicles					**3**
		Average delay (sec/veh)					**38.9**

Table B- 206: Cycle 6 of IQA Field Analysis of the Through Lane for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
16743	558.1	Arrival	28.1	1		1	28.1
17587	586.2	Arrival	28.2	1		2	56.5
18434	614.5	Departure	2.1		1	1	2.1
18498	616.6	Departure			1	0	0
		Vehicle-seconds					**86.7**
		Vehicles					**2**
		Average delay (sec/veh)					**43.4**

Table B- 207: Cycle 7 of IQA Field Analysis of the Through Lane for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
19549	651.6	Arrival	11.8	1		1	11.8
19902	663.4	Arrival	59.1	1		2	118.1
21674	722.5	Arrival	13.9	1		3	41.6
22090	736.3	Departure	2.1		1	2	4.2
22153	738.4	Departure	1.9		1	1	1.9
22211	740.4	Departure			1	0	0
		Vehicle-seconds					**177.6**
		Vehicles					**3**
		Average delay (sec/veh)					**59.2**

Table B- 208: Cycle 8 of IQA Field Analysis of the Through Lane for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
23023	767.4	Arrival	3.9	1		1	3.9
23139	771.3	Arrival	32.2	1		2	64.4
24105	803.5	Arrival	4.8	1		3	14.5
24250	808.3	Arrival	21.8	1		4	87.1
24903	830.1	Arrival	15.2	1		5	75.8
25358	845.3	Arrival	4.9	1		6	29.6
25506	850.2	Arrival	7.2	1		7	50.2
25721	857.4	Departure	1.9		1	6	11.6
25779	859.3	Arrival	0.1	1		7	0.7
25782	859.4	Departure	2.1		1	6	12.6
25845	861.5	Departure	1.9		1	5	9.7
25903	863.4	Departure	1.2		1	4	4.7
25938	864.6	Departure	2.2		1	3	6.6
26004	866.8	Departure	1.6		1	2	3.1
26051	868.4	Departure	2.1		1	1	2.1
26115	870.5	Departure			1	0	0
		Vehicle-seconds					**376.5**
		Vehicles					**8**
		Average delay (sec/veh)					**47.1**

Table B- 209: Summary Table of IQA Field Analysis Results of the Through Lane for Northbound of Video 4

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	0.0	0	0
2	56.0	6	336.1
3	6.5	1	6.5
4	62.7	8	501.7
5	38.9	3	116.7
6	43.4	2	86.7
7	59.2	3	177.6
8	47.1	8	376.5
Total	313.8	31	1602.0
	Average Delay For the 15-minutes (sec/veh)=		**51.7**

Table B- 210: Cycle 1 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
129	4.3	Arrival	13.6	1		1	13.6
538	17.9	Departure			1	0	0
		Vehicle-seconds					**13.6**
		Vehicles					**1**
		Average delay (sec/veh)					**13.6**

Table B- 211: Cycle 2 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
3237	107.9	Arrival	14.3	1		1	14.3
3666	122.2	Departure	44.4		1	0	0
4999	166.6	Arrival	8.2	1		1	8.2
5244	174.8	Departure			1	0	0
		Vehicle-seconds					**22.5**
		Vehicles					**2**
		Average delay (sec/veh)					**11.2**

Table B- 212: Cycle 3 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
7108	236.9	Arrival	13.8	1		1	13.8
7523	250.8	Departure	4.7		1	0	0
7663	255.4	Arrival	7.8	1		1	7.8
7897	263.2	Departure			1	0	0
		Vehicle-seconds					**21.6**
		Vehicles					**2**
		Average delay (sec/veh)					**10.8**

Table B- 213: Cycle 4 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
9025	300.8	Arrival	57.1	1		1	57.1
10738	357.9	Departure	15.5		1	0	0
11204	373.5	Arrival	8.4	1		1	8.4
11455	381.8	Departure			1	0	0
		Vehicle-seconds					**65.5**
		Vehicles					**2**
		Average delay (sec/veh)					**32.7**

Table B- 214: Cycle 5 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
13612	453.7	Arrival	28.0	1		1	28.0
14451	481.7	Departure	14.8		1	0	0
14894	496.5	Arrival	4.1	1		1	4.1
15018	500.6	Arrival	5.3	1		2	10.6
15177	505.9	Departure	2.5		1	1	2.5
15252	508.4	Arrival	6.2	1		2	12.4
15438	514.6	Departure	30.6		1	1	30.6
16357	545.2	Departure			1	0	0
		Vehicle-seconds					**88.2**
		Vehicles					**4**
		Average delay (sec/veh)					**22.1**

Table B- 215: Cycle 6 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
15815	527.2	Arrival	22.6	1		1	22.6
16493	549.8	Arrival	14.7	1		2	29.4
16934	564.5	Arrival	23.5	1		3	70.4
17638	587.9	Departure	6.5		1	2	13.0
17833	594.4	Departure	5.2		1	1	5.2
17988	599.6	Departure	6.2		1	0	0
18174	605.8	Arrival	2.9	1		1	2.9
18262	608.7	Arrival	5.4	1		2	10.9
18425	614.2	Departure	3.0		1	1	3.0
18516	617.2	Departure			1	0	0
		Vehicle-seconds					**157.4**
		Vehicles					**5**
		Average delay (sec/veh)					**31.5**

Table B- 216: Cycle 7 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
19367	645.6	Arrival	26.3	1		1	26.3
20155	671.8	Arrival	49.7	1		2	99.5
21647	721.6	Departure	2.1		1	1	2.1
21709	723.6	Arrival	1.6	1		2	3.3
21758	725.3	Departure	6.3		1	1	6.3
21948	731.6	Departure	14.7		1	0	0
22388	746.3	Arrival	4.3	1		1	4.3
22516	750.5	Arrival	2.9	1		2	5.9
22604	753.5	Departure	9.0		1	1	9.0
22873	762.4	Departure			1	0	0
		Vehicle-seconds					**156.5**
		Vehicles					**5**
		Average delay (sec/veh)					**31.3**

Table B- 217: Cycle 8 of IQA Field Analysis of the Right Turn Lane for Northbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
24375	812.5	Arrival	41.3	1		1	41.3
25615	853.8	Arrival	8.8	1		2	17.7
25880	862.7	Departure	2.2		1	1	2.2
25947	864.9	Departure			1	0	0
		Vehicle-seconds					**61.2**
		Vehicles					**2**
		Average delay (sec/veh)					**30.6**

Table B- 218: Summary Table of IQA Field Analysis Results of the Right Turn Lane for Northbound of Video 4

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	13.6	1	13.6
2	11.2	2	22.5
3	10.8	2	21.6
4	32.7	2	65.5
5	22.1	4	88.2
6	31.5	5	157.4
7	31.3	5	156.5
8	30.6	2	61.2
Total	183.9	23	586.6
	Average Delay For the 15-minutes (sec/veh)=		**25.5**

Table B- 219: Cycle 1 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
669	22.3	Arrival	28.3	1		1	28.3
1518	50.6	Arrival	74.2	1		2	148.5
3745	124.8	Departure	1.5		1	1	1.5
3791	126.4	Departure			1	0	0
		Vehicle-seconds					**178.3**
		Vehicles					**2**
		Average delay (sec/veh)					**89.2**

Table B- 220: Cycle 3 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
5286	176.2	Arrival	69.3	1		1	69.3
7365	245.5	Departure			1	0	0
		Vehicle-seconds					**69.3**
		Vehicles					**1**
		Average delay (sec/veh)					**69.3**

Table B- 221: Cycle 6 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
14239	474.6	Arrival	128.1	1		1	128.1
18083	602.8	Departure			1	0	0
		Vehicle-seconds					**128.1**
		Vehicles					**1**
		Average delay (sec/veh)					**128.1**

Table B- 222: Cycle 7 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
19937	664.6	Arrival	59.3	1		1	59.3
21715	723.8	Departure			1	0	0
		Vehicle-seconds					**59.3**
		Vehicles					**1**
		Average delay (sec/veh)					**59.3**

Table B- 223: Cycle 8 of IQA Field Analysis of the First Left Turn Lane from the Middle of the Road for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
23648	788.3	Arrival	53.9	1		1	53.9
25266	842.2	Departure			1	0	0
		Vehicle-seconds					**53.9**
		Vehicles					**1**
		Average delay (sec/veh)					**53.9**

Table B- 224: Summary Table of IQA Field Analysis Results of the First Left Turn Lane from the Middle of the Road for Southbound of Video 4

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	89.2	2	178.3
2	0.0	0	0
3	69.3	1	69.3
4	0.0	0	0
5	0.0	0	0
6	128.1	1	128.1
7	59.3	1	59.3
8	53.9	1	53.9
Total	399.8	6	488.9
	Average Delay For the 15-minutes (sec/veh)=		**81.5**

Table B- 225: Cycle 1 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
2958	98.6	Arrival	3.3	1		1	3.3
3057	101.9	Arrival	8.4	1		2	16.9
3310	110.3	Arrival	10.2	1		3	30.6
3616	120.5	Arrival	3.7	1		4	14.7
3726	124.2	Departure	2.6		1	3	7.8
3804	126.8	Departure	2.0		1	2	4.1
3865	128.8	Departure	2.8		1	1	2.8
3950	131.7	Departure			1	0	0
		Vehicle-seconds					**80.1**
		Vehicles					**4**
		Average delay (sec/veh)					**20.0**

Table B- 226: Cycle 4 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
10077	335.9	Arrival	32.4	1		1	32.4
11049	368.3	Departure			1	0	0
		Vehicle-seconds					**32.4**
		Vehicles					**1**
		Average delay (sec/veh)					**32.4**

Table B- 227: Cycle 5 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
14327	477.6	Arrival	16.3	1		1	16.3
14815	493.8	Arrival	109.1	1		2	218.1
18087	602.9	Departure	2.3		1	1	2.3
18156	605.2	Departure			1	0	0
		Vehicle-seconds					**236.7**
		Vehicles					**2**
		Average delay (sec/veh)					**118.4**

Table B- 228: Cycle 7 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
20885	696.2	Arrival	28.3	1		1	28.3
21734	724.5	Departure			1	0	0
		Vehicle-seconds					**28.3**
		Vehicles					**1**
		Average delay (sec/veh)					**28.3**

Table B- 229: Cycle 8 of IQA Field Analysis of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
22443	748.1	Arrival	3.8	1		1	3.8
22556	751.9	Arrival	83.9	1		2	167.7
25072	835.7	Arrival	7.4	1		3	22.1
25293	843.1	Departure	1.8		1	2	3.6
25347	844.9	Departure	2.1		1	1	2.1
25410	847.0	Departure			1	0	0
		Vehicle-seconds					**199.3**
		Vehicles					**3**
		Average delay (sec/veh)					**66.4**

Table B- 230: Summary Table of IQA Field Analysis Results of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 4

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	0.0	0	0
2	20.0	4	80.1
3	0.0	0	0
4	32.4	1	32.4
5	118.4	2	236.7
6	0.0	0	0
7	28.3	1	28.3
8	66.4	3	199.3
Total	265.5	11	576.8
	Average Delay For the 15-minutes (sec/veh)=		**52.4**

Table B- 231: Cycle 1 of IQA Field Analysis of the Through Lane for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
915	30.5	Arrival	4.4	1		1	4.4
1046	34.9	Arrival	0.3	1		2	0.5
1054	35.1	Departure	3.5		1	1	3.5
1158	38.6	Departure			1	0	0
		Vehicle-seconds					**8.4**
		Vehicles					**2**
		Average delay (sec/veh)					**4.2**

Table B- 232: Cycle 2 of IQA Field Analysis of the Through Lane for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
1335	44.5	Arrival	2.5	1		1	2.5
1411	47.0	Arrival	85.8	1		2	171.5
3984	132.8	Arrival	5.0	1		3	15.1
4135	137.8	Arrival	2.6	1		4	10.3
4212	140.4	Departure	2.6		1	3	7.8
4290	143.0	Departure	1.4		1	2	2.9
4333	144.4	Departure	2.6		1	1	2.6
4412	147.1	Departure	19.8		1	0	0
5007	166.9	Arrival	5.7	1		1	5.7
5178	172.6	Departure			1	0	0
		Vehicle-seconds					**218.4**
		Vehicles					**5**
		Average delay (sec/veh)					**43.7**

Table B- 233: Cycle 3 of IQA Field Analysis of the Through Lane for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
7541	251.4	Arrival	11.6	1		1	11.6
7889	263.0	Departure	0.4		1	0	0
7902	263.4	Arrival	4.2	1		1	4.2
8029	267.6	Departure	0.4		1	0	0
8042	268.1	Arrival	4.4	1		1	4.4
8173	272.4	Departure	3.2		1	0	0
8270	275.7	Arrival	4.2	1		1	4.2
8396	279.9	Departure			1	0	0
		Vehicle-seconds					**24.4**
		Vehicles					**4**
		Average delay (sec/veh)					**6.1**

Table B- 234: Cycle 4 of IQA Field Analysis of the Through Lane for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
8942	298.1	Arrival	73.9	1		1	73.9
11158	371.9	Arrival	2.2	1		2	4.5
11225	374.2	Arrival	3.6	1		3	10.9
11334	377.8	Arrival	4.5	1		4	18.0
11469	382.3	Arrival	5.2	1		5	26.2
11626	387.5	Departure	2.6		1	4	10.4
11704	390.1	Departure	1.3		1	3	3.9
11743	391.4	Departure	3.0		1	2	5.9
11832	394.4	Departure	2.8		1	1	2.8
11916	397.2	Departure	28.9		1	0	0.0
12783	426.1	Arrival	69.2	1		1	69.2
14858	495.3	Departure			1	0	0
		Vehicle-seconds					**225.6**
		Vehicles					**6**
		Average delay (sec/veh)					**37.6**

Table B- 235: Cycle 6 of IQA Field Analysis of the Through Lane for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
16163	538.8	Arrival	42.7	1		1	42.7
17444	581.5	Arrival	32.1	1		2	64.1
18406	613.5	Arrival	8.7	1		3	26.1
18667	622.2	Departure	1.1		1	2	2.3
18701	623.4	Arrival	1.3	1		3	3.8
18739	624.6	Departure	6.1		1	2	12.3
18923	630.8	Departure	1.5		1	1	1.5
18967	632.2	Departure			1	0	0
		Vehicle-seconds					**152.7**
		Vehicles					**4**
		Average delay (sec/veh)					**38.2**

Table B- 236: Cycle 7 of IQA Field Analysis of the Through Lane for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
19292	643.1	Arrival	29.3	1		1	29.3
20170	672.3	Arrival	26.5	1		2	53.0
20965	698.8	Arrival	24.3	1		3	72.9
21694	723.1	Arrival	3.9	1		4	15.6
21811	727.0	Arrival	3.5	1		5	17.7
21917	730.6	Arrival	11.2	1		6	67.0
22252	741.7	Departure	2.7		1	5	13.5
22333	744.4	Departure	1.4		1	4	5.5
22374	745.8	Departure	0.3		1	3	0.8
22382	746.1	Arrival	1.9	1		4	7.5
22438	747.9	Departure	2.0		1	3	5.9
22497	749.9	Departure	1.8		1	2	3.6
22551	751.7	Departure	2.2		1	1	2.2
22618	753.9	Arrival	0.1	1		2	0.3
22622	754.1	Departure	4.5		1	1	4.5
22756	758.5	Departure			1	0	0
		Vehicle-seconds					**299.1**
		Vehicles					**8**
		Average delay (sec/veh)					**37.4**

Table B- 237: Cycle 8 of IQA Field Analysis of the Through Lane for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
25361	845.4	Arrival	16.7	1		1	16.7
25862	862.1	Departure			1	0	0
		Vehicle-seconds					**16.7**
		Vehicles					**1**
		Average delay (sec/veh)					**16.7**

Table B- 238: Summary Table of IQA Field Analysis Results of the Through Lane for Southbound of Video 4

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	4.2	2	8.4
2	43.7	5	218.4
3	6.1	4	24.4
4	37.6	6	225.6
5	0.0	0	0.0
6	38.2	4	152.7
7	37.4	8	299.1
8	16.7	1	16.7
Total	183.8	30	945.4
	Average Delay For the 15-minutes (sec/veh)=		**31.5**

Table B- 239: Cycle 2 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
2392	79.7	Arrival	12.9	1		1	12.9
2779	92.6	Departure	35.9		1	0	0
3856	128.5	Arrival	8.4	1		1	8.4
4109	137.0	Departure	7.0		1	0	0
4318	143.9	Arrival	2.5	1		1	2.5
4392	146.4	Arrival	7.1	1		2	14.2
4605	153.5	Departure	2.1		1	1	2.1
4668	155.6	Departure			1	0	0
		Vehicle-seconds					**40.1**
		Vehicles					**4**
		Average delay (sec/veh)					**10.0**

Table B- 240: Cycle 3 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
5694	189.8	Arrival	2.4	1		1	2.4
5767	192.2	Arrival	8.1	1		2	16.2
6010	200.3	Arrival	15.2	1		3	45.5
6465	215.5	Departure	4.3		1	2	8.5
6593	219.8	Arrival	0.9	1		3	2.7
6620	220.7	Departure	1.0		1	2	1.9
6649	221.6	Departure	20.8		1	1	20.8
7273	242.4	Departure			1	0	0
		Vehicle-seconds					**98.1**
		Vehicles					**4**
		Average delay (sec/veh)					**24.5**

Table B- 241: Cycle 4 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
8832	294.4	Arrival	16.5	1		1	16.5
9328	310.9	Departure	17.0		1	0	0
9837	327.9	Arrival	4.2	1		1	4.2
9962	332.1	Arrival	23.3	1		2	46.6
10661	355.4	Arrival	5.8	1		3	17.4
10835	361.2	Arrival	0.1	1		4	0.5
10839	361.3	Departure	5.0		1	3	15.1
10990	366.3	Departure	17.2		1	2	34.3
11505	383.5	Departure	2.8		1	1	2.8
11588	386.3	Departure			1	0	0
		Vehicle-seconds					**137.4**
		Vehicles					**5**
		Average delay (sec/veh)					**27.5**

Table B- 242: Cycle 5 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
13127	437.6	Arrival	41.8	1		1	41.8
14382	479.4	Departure			1	0	0
		Vehicle-seconds					**41.8**
		Vehicles					**1**
		Average delay (sec/veh)					**41.8**

Table B- 243: Cycle 7 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
19397	646.6	Arrival	14.9	1		1	14.9
19843	661.4	Arrival	11.1	1		2	22.2
20176	672.5	Departure	4.0		1	1	4.0
20295	676.5	Departure	2.6		1	0	0
20372	679.1	Arrival	1.5	1		1	1.5
20418	680.6	Arrival	8.7	1		2	17.5
20680	689.3	Arrival	31.7	1		3	95.1
21631	721.0	Departure	2.3		1	2	4.7
21701	723.4	Departure	14.0		1	1	14.0
22122	737.4	Departure	10.2		1	0	0
22427	747.6	Arrival	5.9	1		1	5.9
22604	753.5	Departure			1	0	0
		Vehicle-seconds					**179.7**
		Vehicles					**6**
		Average delay (sec/veh)					**30.0**

Table B- 244: Cycle 8 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
24409	813.6	Arrival	37.8	1		1	37.8
25544	851.5	Arrival	5.5	1		2	11.0
25709	857.0	Departure	3.4		1	1	3.4
25811	860.4	Departure			1	0	0
		Vehicle-seconds					**52.2**
		Vehicles					**2**
		Average delay (sec/veh)					**26.1**

Table B- 245: Cycle 9 of IQA Field Analysis of the Right Turn Lane for Southbound of Video 4

Frame Numbers (1)	Clock Time, (sec) (2)	Arrival or Departure (3)	Time (Sec) (4)	# of Vehicle In (5)	# of Vehicle Out (6)	Incremental Queue (IQA) (7)	Incremental Delay (8)=(4)x(7)
26431	881.0	Arrival	16.4	1		1	16.4
26923	897.4	Departure			1	0	0
		Vehicle-seconds					**16.4**
		Vehicles					**1**
		Average delay (sec/veh)					**16.4**

Table B- 246: Summary Table of IQA Field Analysis Results of the Right Turn Lane for Southbound of Video 4

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	0.0	0	0
2	10.0	4	40.1
3	24.5	4	98.1
4	27.5	5	137.4
5	41.8	1	41.8
6	0.0	0	0
7	30.0	6	179.7
8	26.1	2	52.2
9	16.4	1	16.4
Total	176.3	23	565.8
	Average Delay For the 15-minutes (sec/veh)=		**24.6**

Table B- 247: Northbound of Video 1 IQA Field Summary

Type	Delay	Unit
Left Turns	44.9	sec/veh
Through	37.3	sec/veh
Right Turn	17.5	sec/veh
Approach	37.1	sec/veh
Total Volume	72	veh

Table B- 248: Southbound of Video 1 IQA Field Summary

Type	Delay	Unit
Left Turns	71.2	sec/veh
Through	46.6	sec/veh
Right Turn	18.5	sec/veh
Approach	45.5	sec/veh
Total Volume	45	veh

Table B- 249: Northbound of Video 2 IQA Field Summary

Type	Delay	Unit
Left Turns	60.7	sec/veh
Through	39.8	sec/veh
Right Turn	19.6	sec/veh
Approach	47.1	sec/veh
Total Volume	81	veh

Table B- 250: Southbound of Video 2 IQA Field Summary

Type	Delay	Unit
Left Turn	54.2	sec/veh
Through	52.3	sec/veh
Right Turn	16.8	sec/veh
Approach	39.5	sec/veh
Total Volume	66	veh

Table B- 251: Northbound of Video 3 IQA Field Summary

Type	Delay	Unit
Left Turn	54.3	sec/veh
Through	46.0	sec/veh
Right Turn	19.0	sec/veh
Approach	41.9	sec/veh
Total Volume	81	veh

Table B- 252: Southbound of Video 3 IQA Field Summary

Type	Delay	Unit
Left Turn	42.5	sec/veh
Through	50.8	sec/veh
Right Turn	15.0	sec/veh
Approach	36.9	sec/veh
Total Volume	57	veh

Table B- 253: Northbound of Video 4 IQA Field Summary

Type	Delay	Unit
Left Turn	39.4	sec/veh
Through	51.7	sec/veh
Right Turn	25.5	sec/veh
Approach	40.1	sec/veh
Total Volume	91	veh

Table B- 254: Southbound of Video 4 IQA Field Summary

Type	Delay	Unit
Left Turn	62.7	sec/veh
Through	31.5	sec/veh
Right Turn	24.6	sec/veh
Approach	36.8	sec/veh
Total Volume	70	Veh

APPENDIX C. HCM Model Data and Analysis

Table C- 1: Eastbound Volumes of University Parkway

Video Number	Left	Thru	Right	Peds
Video 1	11	357	27	0
Video 2	11	326	27	0
Video 3	16	395	28	0
Video 4	17	461	34	0

Table C- 2: Eastbound Flow Rates of University Parkway

Video Number	Left	Thru	Right	Peds
Video 1	42	1428	106	0
Video 2	44	1302	106	0
Video 3	64	1580	112	0
Video 4	68	1842	134	0

Table C- 3: Westbound Volumes of University Parkway

Video Number	Left	Thru	Right	Peds
Video 1	15	349	19	0
Video 2	24	340	16	0
Video 3	22	323	0	0
Video 4	27	433	31	1

Table C- 4: Westbound Flow Rates of University Parkway

Video Number	Left	Thru	Right	Peds
Video 1	58	1396	74	0
Video 2	94	1358	64	0
Video 3	86	1292	0	0
Video 4	106	1732	122	4

Table C- 5: Northbound Volumes of Main Street

Video Number	Left	Through	Right	Peds
Video1	45	24	14	0
Video2	42	22	16	0
Video3	36	34	22	0
Video4	35	32	22	0

Table C- 6: Northbound Flow Rates of Main Street

Video Number	Left	Through	Right	Peds
Video1	180	96	56	0
Video2	168	88	64	0
Video3	144	136	88	0
Video4	140	128	88	0

Table C- 7: Southbound Volumes of Main Street

Video Number	Left	Through	Right	Peds
Video1	14	18	13	0
Video2	21	21	23	1
Video3	24	19	19	1
Video4	17	33	23	0

Table C- 8: Southbound Flow Rates of Main Street

Video Number	Left	Through	Right	Peds
Video1	56	72	52	0
Video2	84	84	92	4
Video3	96	76	76	4
Video4	68	132	92	0

Table C- 9: Approach Uniform Delay Estimation of Video 1

Movement	Uniform Delay, d_1 (sec/veh)	Number of Vehicles	d_1* Number of Vehicles
Northbound LT	55.8	200	11160.0
Northbound TH	44.2	107	4729.4
Northbound RT	30	13	390.0
	Sum	320	16279.4
Northbound Approach Uniform Delay, d_1 (sec/veh)=			50.9
Southbound LT	53.4	62	3310.8
Southbound TH	43.5	80	3480.0
Southbound RT	30.7	49	1504.3
	Sum	191	8295.1
Southbound Approach Uniform Delay, d_1 (sec/veh)=			43.4

Table C- 10: Approach Uniform Delay Estimation of Video 2

Movement	Uniform Delay, d_1 (sec/veh)	Number of Vehicles	d_1* Number of Vehicles
Northbound LT	55.5	187	10378.5
Northbound TH	44.0	98	4312.0
Northbound RT	30.1	22	662.2
	Sum	307	15352.7
Northbound Approach Uniform Delay, d_1 (sec/veh)=			50.0
Southbound LT	54.0	93	5022.0
Southbound TH	43.8	93	4073.4
Southbound RT	31.6	93	2938.8
	Sum	279	12034.2
Southbound Approach Uniform Delay, d1 (sec/veh)=			43.1

Table C- 11: Approach Uniform Delay Estimation of Video 3

Movement	Uniform Delay, d_1 (sec/veh)	Number of Vehicles	d_1* Number of Vehicles
Northbound LT	55.1	160	8816.0
Northbound TH	45.4	151	6855.4
Northbound RT	30.7	49	1504.3
	Sum	360	17175.7
Northbound Approach Uniform Delay, d_1 (sec/veh)=			47.7
Southbound LT	54.2	107	5799.4
Southbound TH	43.6	84	3662.4
Southbound RT	31.3	76	2378.8
	Sum	267	11840.6
Southbound Approach Uniform Delay, d1 (sec/veh)=			44.3

Table C- 12: Approach Delay Estimation of Video 4

Movement	Uniform Delay, d_1 (sec/veh)	Number of Vehicles	d_1* Number of Vehicles
Northbound LT	55.0	156	8580.0
Northbound TH	45.2	142	6418.4
Northbound RT	30.7	49	1504.3
	Sum	347	16502.7
Northbound Approach Uniform Delay, d_1 (sec/veh)=			47.6
Southbound LT	53.7	76	4081.2
Southbound TH	45.2	147	6644.4
Southbound RT	31.6	93	2938.8
	Sum	316	13664.4
Southbound Approach Uniform Delay, d1 (sec/veh)=			43.2

SHORT REPORT

General Information		Site Information	
Analyst	*Yaye Keita*	Intersection	*University Pkwy & Main St*
Agency or Co.		Area Type	*All other areas*
Date Performed	*10/05/2009*	Jurisdiction	
Time Period		Analysis Year	

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	1	3	1	1	3	1	2	1	1	2	1	1
Lane Group	L	T	R	L	T	R	L	T	R	L	T	R
Volume (vph)	42	1428	106	58	1396	74	180	96	56	56	72	52
% Heavy Vehicles	3	3	3	3	3	3	3	3	3	3	3	3
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed/Actuated (P/A)	A	P	P	A	P	P	A	A	A	A	A	A
Startup Lost Time	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green	4.0	5.5	4.0	4.0	5.5	4.0	4.0	5.0	4.0	4.0	5.0	4.0
Arrival Type	3	3	3	3	3	3	3	3	3	3	3	3
Unit Extension	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Ped/Bike/RTOR Volume	2	0	0	2	0	36	2	0	44	2	0	8
Lane Width	13.0	12.0	11.0	13.0	12.0	16.0	11.0	12.0	13.0	10.0	13.0	12.0
Parking/Grade/Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking/Hour												
Bus Stops/Hour	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Pedestrian Time		3.2			3.2			3.2			3.2	

Phasing	Excl. Left	EW Perm	03	04	Excl. Left	Thru & RT	07	08
Timing	G = 11.3	G = 61.7	G =	G =	G = 12.4	G = 24.1	G =	G =
	Y = 5	Y = 6.5	Y =	Y =	Y = 5	Y = 6	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 132.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB	
Adjusted Flow Rate	47	1587	118	64	1551	42	200	107	13	62	80
Lane Group Capacity	261	2482	947	256	2482	1109	359	379	531	346	391
v/c Ratio	0.18	0.64	0.12	0.25	0.62	0.04	0.56	0.28	0.02	0.18	0.20
Green Ratio	0.61	0.49	0.63	0.61	0.49	0.63	0.11	0.21	0.33	0.11	0.21
Uniform Delay d_1	14.8	24.7	10.0	15.6	24.4	9.5	55.8	44.2	30.0	53.4	43.5
Delay Factor k	0.11	0.50	0.11	0.11	0.50	0.11	0.15	0.11	0.11	0.11	0.11
Incremental Delay d_2	0.3	1.3	0.1	0.5	1.2	0.0	1.9	0.4	0.0	0.2	0.3
PF Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Control Delay	15.2	26.0	10.1	16.1	25.6	9.5	57.7	44.7	30.0	53.7	43.8
Lane Group LOS	B	C	B	B	C	A	E	D	C	D	D
Approach Delay		24.6			24.9			52.2			43.7

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Figure C- 1: HCM short output report for Video 1

Approach LOS	C	C	D	D
Intersection Delay	27.9	Intersection LOS		C

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Figure C-1: HCM short output report for Video 1 (Cont.)

SHORT REPORT

General Information		Site Information	
Analyst	Yaye Keita	Intersection	University Pkwy & Main St
Agency or Co.		Area Type	All other areas
Date Performed	10/05/2009	Jurisdiction	
Time Period		Analysis Year	

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	1	3	1	1	3	1	2	1	1	2	1	1
Lane Group	L	T	R	L	T	R	L	T	R	L	T	R
Volume (vph)	44	1302	106	94	1358	64	168	88	64	84	84	92
% Heavy Vehicles	3	3	3	3	3	3	3	3	3	3	3	3
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed/Actuated (P/A)	A	P	P	A	P	P	A	A	A	A	A	A
Startup Lost Time	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green	4.0	5.5	4.0	4.0	5.5	4.0	4.0	5.0	4.0	4.0	5.0	4.0
Arrival Type	3	3	3	3	3	3	3	3	3	3	3	3
Unit Extension	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Ped/Bike/RTOR Volume	2	0	0	2	0	36	2	0	44	2	0	8
Lane Width	13.0	12.0	11.0	13.0	12.0	16.0	11.0	12.0	13.0	10.0	13.0	12.0
Parking/Grade/Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking/Hour												
Bus Stops/Hour	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Pedestrian Time		3.2			3.2			3.2			3.2	

Phasing	Excl. Left	EW Perm	03	04	Excl. Left	Thru & RT	07	08
Timing	G = 11.3 Y = 5	G = 61.7 Y = 6.5	G = Y =	G = Y =	G = 12.4 Y = 5	G = 24.1 Y = 6	G = Y =	G = Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 132.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB	
Adjusted Flow Rate	49	1447	118	104	1509	31	187	98	22	93	93
Lane Group Capacity	267	2482	947	278	2482	1109	359	379	531	346	391
v/c Ratio	0.18	0.58	0.12	0.37	0.61	0.03	0.52	0.26	0.04	0.27	0.24
Green Ratio	0.61	0.49	0.63	0.61	0.49	0.63	0.11	0.21	0.33	0.11	0.21
Uniform Delay d_1	14.5	23.7	10.0	15.2	24.2	9.4	55.5	44.0	30.1	54.0	43.8
Delay Factor k	0.11	0.50	0.11	0.11	0.50	0.11	0.13	0.11	0.11	0.11	0.11
Incremental Delay d_2	0.3	1.0	0.1	0.8	1.1	0.0	1.4	0.4	0.0	0.4	0.3
PF Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Control Delay	14.8	24.7	10.1	16.1	25.3	9.4	56.9	44.4	30.2	54.4	44.1
Lane Group LOS	B	C	B	B	C	A	E	D	C	D	D
Approach Delay	23.4			24.4			51.0			43.4	

Figure C-2: HCM short output report for Video 2

Approach LOS	*C*	*C*	*D*	*D*
Intersection Delay	*27.5*	Intersection LOS		*C*

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Figure C-2: HCM short output report for Video 2 (Cont.)

SHORT REPORT

General Information		Site Information	
Analyst	Yaye Keita	Intersection	University Pkwy & Main St
Agency or Co.		Area Type	All other areas
Date Performed	10/05/2009	Jurisdiction	
Time Period		Analysis Year	

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	1	3	1	1	3	1	2	1	1	2	1	1
Lane Group	L	T	R	L	T	R	L	T	R	L	T	R
Volume (vph)	64	1580	112	86	1292	0	144	136	88	96	76	76
% Heavy Vehicles	3	3	3	3	3	3	3	3	3	3	3	3
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed/Actuated (P/A)	A	P	P	A	P	P	A	A	A	A	A	A
Startup Lost Time	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green	4.0	5.5	4.0	4.0	5.5	4.0	4.0	5.0	4.0	4.0	5.0	4.0
Arrival Type	3	3	3	3	3	3	3	3	3	3	3	3
Unit Extension	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Ped/Bike/RTOR Volume	2	0	108	2	0	36	2	0	44	2	0	8
Lane Width	13.0	12.0	11.0	13.0	12.0	16.0	11.0	12.0	13.0	10.0	13.0	12.0
Parking/Grade/Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking/Hour												
Bus Stops/Hour	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Pedestrian Time		3.2			3.2			3.2			3.2	

Phasing	Excl. Left	EW Perm	03	04	Excl. Left	Thru & RT	07	08
Timing	G = 11.3	G = 61.7	G =	G =	G = 12.4	G = 24.1	G =	G =
	Y = 5	Y = 6.5	Y =	Y =	Y = 5	Y = 6	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 132.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB	
Adjusted Flow Rate	71	1756	4	96	1436	0	160	151	49	107	84
Lane Group Capacity	280	2482	947	240	2482	1109	359	379	531	346	391
v/c Ratio	0.25	0.71	0.00	0.40	0.58	0.00	0.45	0.40	0.09	0.31	0.21
Green Ratio	0.61	0.49	0.63	0.61	0.49	0.63	0.11	0.21	0.33	0.11	0.21
Uniform Delay d_1	14.4	26.0	9.3	19.2	23.7	9.2	55.1	45.4	30.7	54.2	43.6
Delay Factor k	0.11	0.50	0.11	0.11	0.50	0.11	0.11	0.11	0.11	0.11	0.11
Incremental Delay d_2	0.5	1.7	0.0	1.1	1.0	0.0	0.9	0.7	0.1	0.5	0.3
PF Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Control Delay	14.8	27.7	9.3	20.3	24.7	9.2	55.9	46.1	30.7	54.7	43.9
Lane Group LOS	B	C	A	C	C	A	E	D	C	D	D
Approach Delay		27.2			24.4			48.4			44.7

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Figure C- 3: HCM short output report for Video 3

Approach LOS	C	C	D	D
Intersection Delay	29.2	Intersection LOS		C

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Figure C- 3: HCM short output report continue for Video 3 (Cont.)

Short Report Page 1 of 2

SHORT REPORT

General Information		Site Information	
Analyst	*Yaye Keita*	Intersection	*University Pkwy & Main St*
Agency or Co.		Area Type	*All other areas*
Date Performed	*10/05/2009*	Jurisdiction	
Time Period		Analysis Year	

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes	1	3	1	1	3	1	2	1	1	2	1	1
Lane Group	L	T	R	L	T	R	L	T	R	L	T	R
Volume (vph)	68	1842	134	106	1732	122	140	128	88	68	132	92
% Heavy Vehicles	3	3	3	3	3	3	3	3	3	3	3	3
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed/Actuated (P/A)	A	P	P	A	P	P	A	A	A	A	A	A
Startup Lost Time	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green	4.0	5.5	4.0	4.0	5.5	4.0	4.0	5.0	4.0	4.0	5.0	4.0
Arrival Type	3	3	3	3	3	3	3	3	3	3	3	3
Unit Extension	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Ped/Bike/RTOR Volume	2	0	108	2	0	36	2	0	44	2	0	8
Lane Width	13.0	12.0	11.0	13.0	12.0	16.0	11.0	12.0	13.0	10.0	13.0	12.0
Parking/Grade/Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking/Hour												
Bus Stops/Hour	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Pedestrian Time		3.2			3.2			3.2			3.2	

Phasing	Excl. Left	EW Perm	03	04	Excl. Left	Thru & RT	07	08
Timing	G = 11.3	G = 61.7	G =	G =	G = 12.4	G = 24.1	G =	G =
	Y = 5	Y = 6.5	Y =	Y =	Y = 5	Y = 6	Y =	Y =
Duration of Analysis (hrs) = 0.25						Cycle Length C = 132.0		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB	
Adjusted Flow Rate	76	2047	29	118	1924	96	156	142	49	76	147
Lane Group Capacity	240	2482	947	240	2482	1109	359	379	531	346	391
v/c Ratio	0.32	0.82	0.03	0.49	0.78	0.09	0.43	0.37	0.09	0.22	0.38
Green Ratio	0.61	0.49	0.63	0.61	0.49	0.63	0.11	0.21	0.33	0.11	0.21
Uniform Delay d_1	19.9	28.5	9.4	24.2	27.4	9.8	55.0	45.2	30.7	53.7	45.2
Delay Factor k	0.11	0.50	0.11	0.11	0.50	0.11	0.11	0.11	0.11	0.11	0.11
Incremental Delay d_2	0.8	3.3	0.0	1.6	2.4	0.0	0.8	0.6	0.1	0.3	0.6
PF Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Control Delay	20.7	31.8	9.4	25.8	29.8	9.8	55.8	45.8	30.7	54.0	45.8
Lane Group LOS	C	C	A	C	C	A	E	D	C	D	D
Approach Delay		31.1			28.7			48.2			43.6

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Figure C-4: HCM short output report of Video 4

Short Report Page 2 of 2

Approach LOS	*C*	*C*	*D*	*D*
Intersection Delay	*32.1*	Intersection LOS		*C*

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Figure C- 4: HCM short output report for video 4 (Cont.)

APPENDIX D. IQA Model Data and Analysis

Table D- 1: Cycle Length

Cycle Number	Video 1	Video 2	Video 3	Video 4
1	104.5	155.7	114.2	127.8
2	111.0	99.5	118.1	107.7
3	153.0	142.4	121.0	132.1
4	99.9	104.1	128.8	85.6
5	114.3	117.2	97.0	140.9
6	102.4	120.1	115.7	112.7
7	146.0	103.0	126.5	110.0
Average	118.7	120.3	117.3	116.7

Table D- 2: Green Time for Northbound Left Turns of Video 1

Frame Number	Green or Red	Duration of Green (sec)
0	Red	
1732	Start Green	17.9
2270	Start Red	
5331	Start Green	
5881	Start Red	18.3
8931	Start Green	
9472	Start Red	18.0
12528	Start Green	
13060	Start Red	17.7
16119	Start Green	
16594	Start Red	15.8
19713	Start Green	
20139	Start Red	14.2
23308	Start Green	
23876	Start Red	18.9
26911	Start Green	
26984	Green	
	Average	17.3

Table D- 3: Green Time for Northbound Through and Right Turn of Video 1

Frame Number	Green or Red	Duration of Green (sec)
0	Red	
1735	Start Green	
2618	Start Red	29.4
5771	Start Green	
6401	Start Red	21.0
9369	Start Green	
10553	Start Red	39.5
12922	Start Green	
13551	Start Red	21.0
16490	Start Green	
17423	Start Red	31.1
19716	Start Green	
20494	Start Red	25.9
23773	Start Green	
24436	Start Red	22.1
26925	Start Green	
26984	Green	
	Average	27.1

Table D- 4: Green Time for Southbound Left Turns of Video 1

Frame Number	Green or Red	Duration of Green (sec)
0	Red	
5331 5730	Start Green Start Red	13.3
8931 9323	Start Green Start Red	13.1
12528 12874	Start Green Start Red	11.5
16119 16442	Start Green Start Red	10.8
23309 23728	Start Green Start Red	14.0
26984	Red	
	Average	12.5

Table D- 5: Green Time for Southbound Through and Right Turn of Video 1

Frame Number	Green or Red	Duration of Green (sec)
0	Red	
2319	Start Green	
2620	Start Red	10.0
5929	Start Green	
6402	Start Red	15.8
9520	Start Green	
10555	Start Red	34.5
13108	Start Green	
13552	Start Red	14.8
16641	Start Green	
17423	Start Red	26.1
20187	Start Green	
20494	Start Red	10.2
23924	Start Green	
24437	Start Red	17.1
26984	Red	
	Average	18.4

Table D- 6: Green Time for Northbound Left Turns of Video 2

Frame Number	Green or Red	Duration of Green (sec)
0	Green	
475	Start Red	15.8
3535	Start Green	
4090	Start Red	18.5
7129	Start Green	
8123	Start Red	33.1
10733	Start Green	
11364	Start Red	21.0
14323	Start Green	
14867	Start Red	18.1
17923	Start Green	
18392	Start Red	15.6
21524	Start Green	
22064	Start Red	18.0
25127	Start Green	
25607	Start Red	16.0
26984	Red	
	Average	19.5

Table D- 7: Green Time for Northbound Through and Right Turn of Video 2

Frame Number	Green or Red	Duration of Green (sec)
0 875	Green Start Red	29.2
3989 5159	Start Green Start Red	39.0
7710 8138	Start Green Start Red	14.3
11258 12428	Start Green Start Red	39.0
14914 15932	Start Green Start Red	33.9
18289 19012	Start Green Start Red	24.1
21839 22613	Start Green Start Red	25.8
25427 26145	Start Green Start Red	23.9
26984	Red	
	Average	28.7

Table D- 8: Green Time for Southbound Left Turns of Video 2

Frame Number	Green or Red	Duration of Green (sec)
0	Red	
3536 3940	Start Green Start Red	13.5
7130 7664	Start Green Start Red	17.8
10733 11213	Start Green Start Red	16.0
14323 14866	Start Green Start Red	18.1
17926 18241	Start Green Start Red	10.5
21524 21786	Start Green Start Red	8.7
25126 25380	Start Green Start Red	8.5
26984	Red	
	Average	13.3

Table D- 9: Green Time for southbound Through and Right Turn of Video 2

Frame Number	Green or Red	Duration of Green (sec)
0	Red	
524	Start Green	
876	Start Red	11.7
4138	Start Green	
5160	Start Red	34.1
11413	Start Green	
12429	Start Red	33.9
14914	Start Green	
15932	Start Red	33.9
18439	Start Green	
19011	Start Red	19.1
22110	Start Green	
22612	Start Red	16.7
25653	Start Green	
26146	Start Red	16.4
26984	Red	
	Average	23.7

Table D- 10: Green Time for Northbound Left Turns of Video 3

Frame Number	Green or Red	Duration of Green (sec)
0	Red	
1747	Start Green	
2310	Start Red	18.8
5342	Start Green	
5677	Start Red	11.2
8943	Start Green	
9511	Start Red	18.9
12553	Start Green	
12942	Start Red	13.0
16129	Start Green	
16738	Start Red	20.3
19731	Start Green	
20341	Start Red	20.3
23338	Start Green	
23894	Start Red	18.5
26840	Red	
	Average	17.3

Table D- 11: Green Time for Northbound Through and Right Turn of Video 3

Frame Number	Green or Red	Duration of Green (sec)
0	Red	
2205	Start Green	
3023	Start Red	27.3
5880	Start Green	
6460	Start Red	19.3
9407	Start Green	
10064	Start Red	21.9
13153	Start Green	
13958	Start Red	26.8
16628	Start Green	
17308	Start Red	22.7
20233	Start Green	
20774	Start Red	18.0
23794	Start Green	
24575	Start Red	26.0
26840	Red	
	Average	23.2

Table D- 12: Green Time for Southbound Left Turns of Video 3

Frame Number	Green or Red	Duration of Green (sec)
0	Red	
1748	Start Green	
2154	Start Red	13.5
5341	Start Green	
5833	Start Red	16.4
8943	Start Green	
9363	Start Red	14.0
12553	Start Green	
13106	Start Red	18.4
16133	Start Green	
16578	Start Red	14.8
19735	Start Green	
20187	Start Red	15.1
23338	Start Green	
23744	Start Red	13.5
26840	Red	
	Average	15.1

Table D- 13: Green Time for Southbound Through and Right Turn of video 3

Frame Number	Green or Red	Duration of Green (sec)
0	Red	
2358	Start Green	
3024	Start Red	22.2
5725	Start Green	
6460	Start Red	24.5
9560	Start Green	
10064	Start Red	16.8
12989	Start Green	
13958	Start Red	32.3
16788	Start Green	
17309	Start Red	17.4
20389	Start Green	
20775	Start Red	12.9
23942	Start Green	
24575	Start Red	21.1
26840	Red	
	Average	21.0

Table D- 14: Green Time for Northbound Left Turns of Video 4

Frame Number	Green or Red	Duration of Green (sec)
0 468	Green Start Red	15.6
3535 3974	Start Green Start Red	14.6
7126 7673	Start Green Start Red	18.2
10725 11310	Start Green Start Red	19.5
14321 14664	Start Green Start Red	11.4
17920 18451	Start Green Start Red	17.7
21515 22049	Start Green Start Red	17.8
25113 25664	Start Green Start Red	18.4
26984	Red	
	Average	16.7

Table D- 15: Green Time for Northbound Through and Right Turn of Video 4

Frame Number	Green or Red	Duration of Green (sec)
0	Red	
276	Start Green	
1379	Start Red	36.8
4174	Start Green	
5193	Start Red	34.0
7568	Start Green	
8407	Start Red	28.0
11196	Start Green	
12372	Start Red	39.2
14325	Start Green	
15022	Start Red	23.2
18280	Start Green	
19152	Start Red	29.1
21943	Start Green	
22982	Start Red	34.6
25508	Start Green	
26274	Start Red	25.5
26984	Red	
	Average	31.3

Table D- 16: Green Time for Southbound Left Turns of video 4

Frame Number	Green or Red	Duration of Green (sec)
0	Green	
232	Start Red	7.7
3535	Start Green	
4130	Start Red	19.8
7126	Start Green	
7520	Start Red	13.1
10722	Start Green	
11148	Start Red	14.2
17921	Start Green	
18238	Start Red	10.6
21515	Start Green	
21896	Start Red	12.7
25114	Start Green	
25461	Start Red	11.6
26984	Red	
	Average	12.8

Table D- 17: Green Time for Southbound Through and Right Turn of Video 4

Frame Number	Green or Red	Duration of Green (sec)
0	Red	
515	Start Green	
1378	Start Red	28.8
4026	Start Green	
5194	Start Red	38.9
7721	Start Green	
8407	Start Red	22.9
11355	Start Green	
12372	Start Red	33.9
14698	Start Green	
15023	Start Red	10.8
18499	Start Green	
19152	Start Red	21.8
22095	Start Green	
22982	Start Red	29.6
25692	Start Green	
26273	Start Red	19.4
26984	Red	
	Average	25.8

Table D- 18: Input Values in the Model

	Northbound			Southbound		
	Left Turn	**Through**	**Right Turn**	**Left Turn**	**Through**	**Right Turn**
Yellow (sec)	3.5	4	3.5	3.5	4	3.5
All Red (sec)	1.5	2	1.5	1.5	2	1.5
Start up Lost Time (sec)	2	2	2	2	2	2
Extension of Green (sec)	4	5	4	4	5	4

The following list is the list of the cycles during which no vehicle passed through the lane being studied and they were omitted:

Video 1: Southbound Left Turn 1: cycle 2, cycle 5, and cycle 6

Southbound Left Turn 2: cycle 6

Southbound Through: Cycle 2, and cycle 4

Video 2: Northbound Right Turn: cycle 1

Southbound Left Turn 1: cycle 1

Southbound Left Turn 2: Cycle 2

Southbound Through: cycle 3

Video 3: Northbound Left Turn 2: Cycle 2

Southbound Left Turn 1: Cycle 6

Southbound Left Turn 2: Cycle 1

Video 4: Northbound Left Turn 1: cycle 1, and cycle 2

Northbound Left Turn 2: cycle 5

Northbound Through: cycle 1

Southbound Left Turn 1: cycle 2, cycle 4, and cycle 5

Southbound Left Turn 2: cycle 1, cycle 3, and cycle 6

Southbound Through: cycle 5

Southbound Right Turn: cycle 1, and cycle 6

Table D- 19: Cycle 1 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	17.9			
Effective green time, *g* (s)	19.9			
Effective red time, *r* (s)	84.6			
Cycle1				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	34.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.5			
Effective green, *g* (sec)	19.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	34.4			
Vr	34.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	84.6	19.9		
v (vph)	34.4	34.4		
s (vph)	0	1800		
c (vph)	0	343.3	X=	0.1
v′ (vph)	34.4	34.4		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t′* (sec)	84.6	1.7	18.3	104.5
q_1 (veh)	0	0.8	0	
n_a (veh)	0.81	0.02	0.17	1
n_d (veh)	0	0.8	0.2	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	34.2	0.7	0	34.9
	d_1=	34.9	Sec/veh	

Table D- 20: Cycle 2 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.3			
Effective green time, *g* (s)	20.3			
Effective red time, *r* (s)	90.7			
Cycle2				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	64.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	111			
Effective green, *g* (sec)	20			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	64.9			
Vr	64.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	90.7	20.3		
v (vph)	64.9	64.9		
s (vph)	0	1800		
c (vph)	0	329.7	X=	0.2
v' (vph)	64.9	64.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	90.7	3.4	16.9	111
q_1 (veh)	0	1.6	0	
n_a (veh)	1.6	0.1	0.31	2
n_d (veh)	0	1.7	0.31	2
q_2 (veh)	1.6	0	0	
d_i (veh-sec)	74.1	2.8	0	76.8
	d_1=	38.4	sec/veh	

Table D- 21: Cycle 3 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.0			
Effective green time, *g* (s)	20.0			
Effective red time, *r* (s)	133.0			
Cycle3				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	70.6			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	153.0			
Effective green, *g* (sec)	20.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	70.6			
Vr	70.6			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	133.0	20.0		
v (vph)	70.6	70.6		
s (vph)	0	1800		
c (vph)	0	235.6	X=	0.3
v' (vph)	70.6	70.6		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	5.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	133.0	5.4	14.6	153
q_1 (veh)	0	2.6	0	
n_a (veh)	2.6	0.1	0.3	3
n_d (veh)	0	2.7	0.3	3
q_2 (veh)	2.6	0	0	
d_i (veh-sec)	173.3	7.1	0	180.4
	d_1=	60.1	sec/veh	

Table D- 22: Cycle 4 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	17.7			
Effective green time, *g* (s)	19.7			
Effective red time, *r* (s)	80.2			
Cycle4				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	72.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	99.9			
Effective green, *g* (sec)	19.7			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	72.1			
Vr	72.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	80.2	19.7		
v (vph)	72.1	72.1		
s (vph)	0	1800		
c (vph)	0	355.4	X=	0.2
v' (vph)	72.1	72.1		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	80.2	3.3	16.4	99.9
q_1 (veh)	0	1.6	0	
n_a (veh)	1.6	0.1	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.6	0	0	
d_i (veh-sec)	64.4	2.7	0	67.0
	d_1=	33.5	sec/veh	

Table D- 23: Cycle 5 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	15.8			
Effective green time, *g* (s)	17.8			
Effective red time, *r* (s)	96.5			
Cycle5				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	31.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	114.3			
Effective green, *g* (sec)	17.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	31.5			
Vr	31.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	96.5	17.8		
v (vph)	31.5	31.5		
s (vph)	0	1800		
c (vph)	0	280.7	X=	0.1
v' (vph)	31.5	31.5		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	96.5	1.7	16.1	114.3
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0.02	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	40.7	0.7	0	41.5
	d_1=	41.5	sec/veh	

Table D- 24: Cycle 6 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	14.2			
Effective green time, *g* (s)	16.2			
Effective red time, *r* (s)	86.2			
Cycle6				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	70.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	102.4			
Effective green, *g* (sec)	16.2			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	70.3			
Vr	70.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	86.2	16.2		
v (vph)	70.3	70.3		
s (vph)	0	1800		
c (vph)	0	284.8	X=	0.2
v' (vph)	70.3	70.3		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	86.2	3.5	12.7	102.4
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.2	2
n_d (veh)	0	1.8	0.2	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	72.6	2.9	0	75.5
	d_1=	37.8	se/veh	

Table D- 25: Cycle 7 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, y (s)	3.5			
All red interval for movement , ar (s)	1.5			
Extension of effective green, e (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, Y, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, G (s)	18.9			
Effective green time, g (s)	20.9			
Effective red time, r (s)	125.1			
Cycle7				
# of Vehicles in the cycle	3			
Volume, V (vph)	74.0			
Saturation flow rate, S (vph)	1800			
Cycle, C (sec)	146			
Effective green, g (sec)	20.9			
# of lanes, n	1			
Arrival Type, AT	3			
Rp=	1			
$P= Rpxg/C$=	0.1			
Vg	74.0			
Vr	74.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	125.1	20.9		
v (vph)	74.0	74.0		
s (vph)	0	1800		
c (vph)	0	258.0	X=	0.3
v' (vph)	74.0	74.0		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	5.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	125.1	5.4	15.6	146.0
q_1 (veh)	0	2.6	0	
n_a (veh)	2.6	0.1	0.3	3
n_d (veh)	0	2.7	0.3	3
q_2 (veh)	2.6	0	0	
d_i (veh-sec)	160.7	6.9	0	167.6
	d_1=	55.9	sec/veh	

Table D- 26: Summary Table of IQA Model Analysis Results of the First Left Turn Lane from the Middle of the Road for Northbound of Video 1

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	34.9	1	34.9
2	38.4	2	76.8
3	60.1	3	180.4
4	33.5	2	67.0
5	41.5	1	41.5
6	37.8	2	75.5
7	55.9	3	167.6
Total	**302.0**	14	643.7
	Average Delay For the 15-minutes (sec/veh)=		**46.0**

Table D- 27: Cycle 1 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	17.9			
Effective green time, *g* (s)	19.9			
Effective red time, *r* (s)	84.6			
Cycle1				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	103.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.5			
Effective green, *g* (sec)	19.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	103.3			
Vr	103.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	84.6	19.9		
v (vph)	103.3	103.3		
s (vph)	0	1800		
c (vph)	0	343.3	X=	0.3
v' (vph)	103.3	103.3		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	5.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	84.6	5.2	14.8	104.5
q_1 (veh)	0	2.4	0	
n_a (veh)	2.4	0.1	0.4	3
n_d (veh)	0	2.6	0.4	3
q_2 (veh)	2.4	0	0	
d_i (veh-sec)	102.7	6.3	0	108.9
	d_1=	36.3	sec/veh	

Table D- 28: Cycle 2 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.3			
Effective green time, *g* (s)	20.3			
Effective red time, *r* (s)	90.7			
Cycle2				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	129.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	111			
Effective green, *g* (sec)	20.3			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	129.7			
Vr	129.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	90.7	20.3		
v (vph)	129.7	129.7		
s (vph)	0	1800		
c (vph)	0	329.7	X=	0.4
v' (vph)	129.7	129.7		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	7.0			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	90.7	7.0	13.3	111.0
q_1 (veh)	0	3.3	0	
n_a (veh)	3.3	0.3	0.5	4
n_d (veh)	0	3.5	0.5	4
q_2 (veh)	3.3	0	0	
d_i (veh-sec)	148.1	11.5	0	159.6
	d_1=	39.9	sec/veh	

Table D- 29: Cycle 3 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.0			
Effective green time, *g* (s)	20.0			
Effective red time, *r* (s)	133.0			
Cycle3				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	94.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	153			
Effective green, *g* (sec)	20.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	94.1			
Vr	94.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	133.0	20.0		
v (vph)	94.1	94.1		
s (vph)	0	1800		
c (vph)	0	235.6	X=	0.4
v' (vph)	94.1	94.1		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	7.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	133.0	7.3	12.7	153.0
q_1 (veh)	0	3.5	0	
n_a (veh)	3.5	0.2	0.3	4
n_d (veh)	0	3.7	0.3	4
q_2 (veh)	3.5	0	0	
d_i (veh-sec)	231.1	12.8	0	243.9
	d_1=	61.0	sec/veh	

Table D- 30: Cycle 4 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	17.7			
Effective green time, *g* (s)	19.7			
Effective red time, *r* (s)	80.2			
Cycle4				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	72.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	99.9			
Effective green, *g* (sec)	19.7			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	72.1			
Vr	72.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	80.2	19.7		
v (vph)	72.1	72.1		
s (vph)	0	1800		
c (vph)	0	355.4	X=	0.2
v′ (vph)	72.1	72.1		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	80.2	3.3	16.4	99.9
q_1 (veh)	0	1.6	0	
n_a (veh)	1.6	0.1	0.3	2.0
n_d (veh)	0	1.7	0.3	2.0
q_2 (veh)	1.6	0	0	
d_i (veh-sec)	64.4	2.7	0	67.0
	d_1=	33.5	sec/veh	

Table D- 31: Cycle 5 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	15.8			
Effective green time, *g* (s)	17.8			
Effective red time, *r* (s)	96.5			
Cycle5				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	94.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	114.3			
Effective green, *g* (sec)	17.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	94.5			
Vr	94.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	96.5	17.8		
v (vph)	94.5	94.5		
s (vph)	0	1800		
c (vph)	0	280.7	X=	0.3
v' (vph)	94.5	94.5		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	5.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	96.5	5.3	12.5	114.3
q_1 (veh)	0	2.5	0	
n_a (veh)	2.5	0.1	0.3	3
n_d (veh)	0	2.7	0.3	3
q_2 (veh)	2.5	0	0	
d_i (veh-sec)	122.2	6.8	0	128.9
	d_1=	43.0	sec/veh	

Table D- 32 : Cycle 6 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	14.2			
Effective green time, *g* (s)	16.2			
Effective red time, *r* (s)	86.2			
Cycle6				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	105.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	102.4			
Effective green, *g* (sec)	16.2			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	105.5			
Vr	105.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	86.2	16.2		
v (vph)	105.5	105.5		
s (vph)	0	1800		
c (vph)	0	284.8	X=	0.4
v' (vph)	105.5	105.5		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	5.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	86.2	5.4	10.8	102.4
q_1 (veh)	0	2.5	0	
n_a (veh)	2.5	0.2	0.3	3
n_d (veh)	0	2.7	0.3	3
q_2 (veh)	2.5	0	0	
d_i (veh-sec)	108.8	6.8	0	115.6
	d_1=	38.5	sec/veh	

Table D- 33: Cycle 7 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.9			
Effective green time, *g* (s)	20.9			
Effective red time, *r* (s)	125.1			
Cycle7				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	98.6			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	146			
Effective green, *g* (sec)	20.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	98.6			
Vr	98.6			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	125.1	20.9		
v (vph)	98.6	98.6		
s (vph)	0	1800		
c (vph)	0	258.0	X=	0.4
v' (vph)	98.6	98.6		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	7.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	125.1	7.3	13.7	146
q_1 (veh)	0	3.4	0	
n_a (veh)	3.4	0.2	0.4	4
n_d (veh)	0	3.6	0.4	4
q_2 (veh)	3.4	0	0	
d_i (veh-sec)	214.3	12.4	0	226.7
	d_1=	56.7	sec/veh	

Table D- 34: Summary Table of IQA Model Analysis Results of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 1

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	36.3	3	108.9
2	39.9	4	159.6
3	61.0	4	243.9
4	33.5	2	67.0
5	43.0	3	128.9
6	38.5	3	115.6
7	56.7	4	226.7
Total	308.9	23	1050.7
	Average Delay For the 15-minutes (sec/veh)=		**45.7**

Table D- 35: Cycle 1 of IQA Model for Northbound and Through Lane of Video 1

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	29.4			
Effective green time, *g* (s)	32.4			
Effective red time, *r* (s)	72.1			
Cycle1				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	103.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.5			
Effective green, *g* (sec)	32.43			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	103.3			
Vr	103.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	72.1	32.4		
v (vph)	103.3	103.3		
s (vph)	0	1800		
c (vph)	0	558.6	X=	0.2
v' (vph)	103.3	103.3		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	4.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	72.1	4.4	28.0	104.5
q_1 (veh)	0	2.1	0	
n_a (veh)	2.1	0.1	0.8	3
n_d (veh)	0	2.2	0.8	3
q_2 (veh)	2.1	0	0	
d_i (veh-sec)	74.6	4.5	0	79.1
	d_1=	26.4	sec/veh	

Table D- 36: Cycle 2 of IQA Model for Northbound and Through Lane of Video 1

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	21			
Effective green time, *g* (s)	24			
Effective red time, *r* (s)	87			
Cycle2				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	64.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	111			
Effective green, *g* (sec)	24			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rpxg/C*=	0.2			
Vg	64.9			
Vr	64.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	87	24		
v (vph)	64.9	64.9		
s (vph)	0	1800		
c (vph)	0	389.2	X=	0.2
v' (vph)	64.9	64.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	87.0	3.3	20.7	111
q_1 (veh)	0	1.6	0	
n_a (veh)	1.6	0.1	0.4	2
n_d (veh)	0	1.6	0.4	2
q_2 (veh)	1.6	0	0	
d_i (veh-sec)	68.2	2.5	0	70.7
	d_1=	35.4	sec/veh	

Table D- 37: Cycle 3 of IQA Model for Northbound and Through Lane of Video 1

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	39.5			
Effective green time, *g* (s)	42.5			
Effective red time, *r* (s)	110.5			
Cycle3				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	47.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	153			
Effective green, *g* (sec)	42.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	47.1			
Vr	47.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	110.5	42.5		
v (vph)	47.1	47.1		
s (vph)	0	1800		
c (vph)	0	499.6	X=	0.1
v' (vph)	47.1	47.1		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	3.0			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	110.5	3.0	39.5	153
q_1 (veh)	0	1.4	0	
n_a (veh)	1.4	0.0	0.5	2
n_d (veh)	0	1.5	0.5	2
q_2 (veh)	1.4	0	0	
d_i (veh-sec)	79.8	2.1	0	82.0
	d_1=	41.0	sec/veh	

Table D- 38: Cycle 4 of IQA Model for Northbound and Through Lane of Video 1

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	21.0			
Effective green time, *g* (s)	24.0			
Effective red time, *r* (s)	76.0			
Cycle4				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	108.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	99.9			
Effective green, *g* (sec)	24.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	108.1			
Vr	108.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	76.0	24.0		
v (vph)	108.1	108.1		
s (vph)	0	1800		
c (vph)	0	431.8	X=	0.3
v' (vph)	108.1	108.1		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	4.9			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	76.0	4.9	19.1	99.93
q_1 (veh)	0	2.3	0	
n_a (veh)	2.3	0.1	0.6	3
n_d (veh)	0	2.4	0.6	3
q_2 (veh)	2.3	0	0	
d_i (veh-sec)	86.6	5.5	0	92.1
	d_1=	30.7	sec/veh	

Table D- 39: Cycle 5 of IQA Model for Northbound and Through Lane of Video 1

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	31.1			
Effective green time, *g* (s)	34.1			
Effective red time, *r* (s)	80.2			
Cycle5				
# of Vehicles in the cycle	5			
Volume, *V* (vph)	157.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	114.3			
Effective green, *g* (sec)	34.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	157.4			
Vr	157.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	80.2	34.1		
v (vph)	157.4	157.4		
s (vph)	0	1800		
c (vph)	0	536.9	X=	0.3
v' (vph)	157.4	157.4		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	7.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	80.2	7.7	26.4	114.3
q_1 (veh)	0	3.5	0	
n_a (veh)	3.5	0.3	1.2	5
n_d (veh)	0	3.8	1.2	5
q_2 (veh)	3.5	0	0	
d_i (veh-sec)	140.8	13.5	0	154.2
	d_1=	30.8	sec/veh	

Table D- 40: Cycle 6 of IQA Model for Northbound and Through Lane of Video 1

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	25.9			
Effective green time, *g* (s)	28.9			
Effective red time, *r* (s)	73.5			
Cycle6				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	105.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	102.4			
Effective green, *g* (sec)	28.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g*/*C*=	0.3			
Vg	105.5			
Vr	105.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	73.5	28.9		
v (vph)	105.5	105.5		
s (vph)	0	1800		
c (vph)	0	508.5	X=	0.2
v' (vph)	105.5	105.5		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	4.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	73.5	4.6	24.4	102.4
q_1 (veh)	0	2.2	0	
n_a (veh)	2.2	0.1	0.7	3
n_d (veh)	0	2.3	0.7	3
q_2 (veh)	2.2	0	0	
d_i (veh-sec)	79.1	4.9	0	84.0
	d_1=	28.0	sec/veh	

Table D- 41: Cycle 7 of IQA Model for Northbound and Through Lane of Video 1

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	22.1			
Effective green time, *g* (s)	25.1			
Effective red time, *r* (s)	120.9			
Cycle7				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	49.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	146			
Effective green, *g* (sec)	25.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.2			
Vg	49.3			
Vr	49.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	120.9	25.1		
v (vph)	49.3	49.3		
s (vph)	0	1800		
c (vph)	0	309.5	X=	0.2
v' (vph)	49.3	49.3		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	3.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	120.9	3.4	21.7	146
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	100.1	2.8	0	102.9
	d_1=	51.5	sec/veh	

Table D- 42: Summary Table of IQA Model Analysis Results of the Through Lane for Northbound of Video 1

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	26.4	3	79.1
2	35.4	2	70.7
3	41.0	2	82.0
4	30.7	3	92.1
5	30.8	5	154.2
6	28.0	3	84.0
7	51.5	2	102.9
Total	243.8	20	665.1
	Average Delay For the 15-minutes (sec/veh)=		**33.3**

Table D- 43: Cycle 1 of IQA Model for Northbound and Right Turn Lane of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	29.4			
Effective green time, *g* (s)	31.4			
Effective red time, *r* (s)	73.1			
Cycle1				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	68.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.5			
Effective green, *g* (sec)	31.4			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	68.9			
Vr	68.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	73.1	31.4		
v (vph)	68.9	68.9		
s (vph)	0	1800		
c (vph)	0	541.4	X=	0.1
v' (vph)	68.9	68.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	2.9			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	73.1	2.9	28.5	104.5
q_1 (veh)	0	1.4	0	
n_a (veh)	1.4	0.1	0.5	2
n_d (veh)	0	1.5	0.5	2
q_2 (veh)	1.4	0	0	
d_i (veh-sec)	51.1	2.0	0	53.1
	d_1=	26.6	sec/veh	

Table D- 44: Cycle 2 of IQA Model for Northbound and Right Turn Lane of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	21			
Effective green time, *g* (s)	23			
Effective red time, *r* (s)	88			
Cycle2				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	64.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	111			
Effective green, *g* (sec)	23			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	64.9			
Vr	64.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	88.0	23.0		
v (vph)	64.9	64.9		
s (vph)	0	1800		
c (vph)	0	373.0	X=	0.2
v′ (vph)	64.9	64.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t′* (sec)	88.0	3.3	19.7	111
q_1 (veh)	0.0	1.6	0.0	
n_a (veh)	1.6	0.1	0.4	2
n_d (veh)	0.0	1.6	0.4	2
q_2 (veh)	1.6	0.0	0.0	
d_i (veh-sec)	69.8	2.6	0.0	72.4
	d_1=	36.2	sec/veh	

Table D- 45: Cycle 3 of IQA Model for Northbound and Right Turn Lane of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	39.5			
Effective green time, *g* (s)	41.5			
Effective red time, *r* (s)	111.5			
Cycle3				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	23.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	153			
Effective green, *g* (sec)	41.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	23.5			
Vr	23.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	111.5	41.5		
v (vph)	23.5	23.5		
s (vph)	0	1800		
c (vph)	0	487.9	X=	0.05
v' (vph)	23.5	23.5		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	111.5	1.5	40.0	153
q_1 (veh)	0	0.7	0	
n_a (veh)	0.7	0	0.3	1
n_d (veh)	0	0.7	0.3	1
q_2 (veh)	0.7	0	0	
d_i (veh-sec)	40.7	0.5	0	41.2
	d_1=	41.2	sec/veh	

Table D- 46: Cycle 4 of IQA Model for Northbound and Right Turn Lane of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	21.0			
Effective green time, *g* (s)	23.0			
Effective red time, *r* (s)	77.0			
Cycle4				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	36.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	99.9			
Effective green, *g* (sec)	23.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	36.0			
Vr	36.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	77.0	23.0		
v (vph)	36.0	36.0		
s (vph)	0	1800		
c (vph)	0	413.7	X=	0.09
v' (vph)	36.0	36.0		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	77.0	1.6	21.4	99.9
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.2	1
n_d (veh)	0	0.8	0.2	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	29.6	0.6	0	30.2
	d_1=	30.2	sec/veh	

Table D- 47: Cycle 5 of IQA Model for Northbound and Right Turn Lane of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	31.1			
Effective green time, *g* (s)	33.1			
Effective red time, *r* (s)	81.2			
Cycle5				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	126.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	114.3			
Effective green, *g* (sec)	33.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	126.0			
Vr	126.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	81.2	33.1		
v (vph)	126.0	126.0		
s (vph)	0	1800		
c (vph)	0	521.1	X=	0.2
v' (vph)	126.0	126.0		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	6.1			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	81.2	6.1	27.0	114.3
q_1 (veh)	0	2.8	0	
n_a (veh)	2.8	0.2	0.9	4
n_d (veh)	0	3.1	0.9	4
q_2 (veh)	2.8	0	0	
d_i (veh-sec)	115.4	8.7	0	124.1
	d_1=	31.0	sec/veh	

Table D- 48: Cycle 6 of IQA Model for Northbound and Right Turn Lane of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	25.9			
Effective green time, *g* (s)	27.9			
Effective red time, *r* (s)	74.5			
Cycle6				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	35.2			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	102.4			
Effective green, *g* (sec)	27.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	35.2			
Vr	35.2			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	74.5	27.9		
v (vph)	35.2	35.2		
s (vph)	0	1800		
c (vph)	0	491.0	X=	0.1
v′ (vph)	35.2	35.2		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	74.5	1.5	26.4	102.4
q_1 (veh)	0	0.7	0	
n_a (veh)	0.7	0	0.3	1
n_d (veh)	0	0.7	0.3	1
q_2 (veh)	0.7	0	0	
d_i (veh-sec)	27.1	0.5	0	27.6
	d_1=	27.6	sec/veh	

Table D- 49: Cycle 7 of IQA Model for Northbound and Right Turn Lane of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	22.1			
Effective green time, *g* (s)	24.1			
Effective red time, *r* (s)	121.9			
Cycle7				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	49.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	146			
Effective green, *g* (sec)	24.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	49.3			
Vr	49.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	121.9	24.1		
v (vph)	49.3	49.3		
s (vph)	0	1800		
c (vph)	0	297.1	X=	0.2
v' (vph)	49.3	49.3		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	3.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	121.9	3.4	20.7	146
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	101.8	2.9	0	104.6
	d_1=	52.3	sec/veh	

Table D- 50: Cycle 8 of IQA Model for Northbound and Right Turn Lane of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	27.1			
Effective green time, *g* (s)	29.1			
Effective red time, *r* (s)	89.6			
Cycle8				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	60.6			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	118.7			
Effective green, *g* (sec)	29.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	60.6			
Vr	60.6			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	89.6	29.1		
v (vph)	60.6	60.6		
s (vph)	0	1800		
c (vph)	0	441.7	X=	0.1
v' (vph)	60.6	60.6		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.1			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	89.6	3.1	26.0	118.7
q_1 (veh)	0	1.5	0	
n_a (veh)	1.5	0.1	0.4	2
n_d (veh)	0	1.6	0.4	2
q_2 (veh)	1.5	0	0	
d_i (veh-sec)	67.6	2.4	0	70.0
	d_1=	35.0	sec/veh	

Table D- 51: Summary Table of IQA Model Analysis Results of the Right Turn Lane for Northbound of Video 1

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	26.6	2	53.1
2	36.2	2	72.4
3	41.2	1	41.2
4	30.2	1	30.2
5	31.0	4	124.1
6	27.6	1	27.6
7	52.3	2	104.6
8	35.0	2	70.0
Total	280.1	15	523.3
Average Delay For the 15-minutes (sec/veh)=	**Average Delay For the 15-minutes (sec/veh)=**		**34.9**

Table D- 52: Cycle 1 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	12.5			
Effective green time, *g* (s)	14.5			
Effective red time, *r* (s)	90			
Cycle1				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	68.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.5			
Effective green, *g* (sec)	14.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.14			
Vg	68.9			
Vr	68.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	90	14.5		
v (vph)	68.9	68.9		
s (vph)	0	1800		
c (vph)	0	249.8	X=	0.3
v' (vph)	68.9	68.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	90.0	3.6	10.9	104.5
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.2	2
n_d (veh)	0	1.8	0.2	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	77.5	3.1	0	80.6
	d_1=	40.3	sec/veh	

Table D- 53: Cycle 3 Cycle 1 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	13.1			
Effective green time, *g* (s)	15.1			
Effective red time, *r* (s)	137.9			
Cycle3				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	47.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	153			
Effective green, *g* (sec)	15.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g*/*C*=	0.1			
Vg	47.1			
Vr	47.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	137.9	15.1		
v (vph)	47.1	47.1		
s (vph)	0	1800		
c (vph)	0	177.3	X=	0.3
v' (vph)	47.1	47.1		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	3.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	137.9	3.7	11.4	153
q_1 (veh)	0	1.8	0	
n_a (veh)	1.8	0	0.1	2
n_d (veh)	0	1.9	0.1	2
q_2 (veh)	1.8	0	0	
d_i (veh-sec)	124.3	3.3	0	127.7
	d_1=	63.8	sec/veh	

Table D- 54: Cycle 4 Cycle 1 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	11.5			
Effective green time, *g* (s)	13.5			
Effective red time, *r* (s)	86.4			
Cycle4				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	36.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	99.9			
Effective green, *g* (sec)	13.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	36.0			
Vr	36.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	86.4	13.5		
v (vph)	36.0	36.0		
s (vph)	0	1800		
c (vph)	0	243.7	X=	0.1
v' (vph)	36.0	36.0		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	86.4	1.8	11.8	99.9
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	37.4	0.8	0	38.1
	d_1=	38.1	sec/veh	

Table D- 55: Cycle 7 Cycle 1 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	12.5			
Effective green time, *g* (s)	14.5			
Effective red time, *r* (s)	131.5			
Cycle7				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	24.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	146			
Effective green, *g* (sec)	14.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	24.7			
Vr	24.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	131.5	14.5		
v (vph)	24.7	24.7		
s (vph)	0	1800		
c (vph)	0	178.8	X=	0.1
v' (vph)	24.7	24.7		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	131.5	1.8	12.7	146
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	59.2	0.8	0	60.0
	d_1=	60.0	sec/veh	

Table D- 56: Summary Table of IQA Model Analysis Results of the First Left Turn Lane from the Middle of the Road for Southbound of Video 1

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	40.3	2	80.6
2	0.0	0	0.0
3	63.8	2	127.7
4	38.1	1	38.1
5	0.0	0	0.0
6	0.0	0	0.0
7	60.0	1	60.0
Total	226.2	6	306.4
	Average Delay For the 15-minutes (sec/veh)=		**51.1**

Table D- 57: Cycle 1 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	12.5			
Effective green time, *g* (s)	14.5			
Effective red time, *r* (s)	90			
Cycle1				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	34.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.5			
Effective green, *g* (sec)	14.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.14			
Vg	34.4			
Vr	34.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	90.0	14.5		
v (vph)	34.4	34.4		
s (vph)	0	1800		
c (vph)	0	249.8	X=	0.1
v' (vph)	34.4	34.4		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	90.0	1.8	12.7	104.5
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1.0
n_d (veh)	0	0.9	0.1	1.0
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	38.8	0.8	0	39.5
	d_1=	39.5	sec/veh	

Table D- 58: Cycle 2 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	13.3			
Effective green time, *g* (s)	15.3			
Effective red time, *r* (s)	95.7			
Cycle2				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	32.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	111			
Effective green, *g* (sec)	15.3			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	32.4			
Vr	32.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	95.7	15.3		
v (vph)	32.4	32.4		
s (vph)	0	1800		
c (vph)	0	248.1	X=	0.1
v' (vph)	32.4	32.4		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	95.7	1.8	13.5	111
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	41.3	0.8	0	42.0
	d_1=	42.0	sec/veh	

Table D- 59: Cycle 3 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	13.07			
Effective green time, *g* (s)	15.07			
Effective red time, *r* (s)	137.9			
Cycle3				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	47.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	153			
Effective green, *g* (sec)	15.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rpxg/C*=	0.1			
Vg	47.1			
Vr	47.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	137.9	15.1		
v (vph)	47.1	47.1		
s (vph)	0	1800		
c (vph)	0	177.3	X=	0.3
v′ (vph)	47.1	47.1		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	3.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	137.9	3.7	11.4	153
q_1 (veh)	0	1.8	0	
n_a (veh)	1.8	0	0.1	2
n_d (veh)	0	1.9	0.1	2
q_2 (veh)	1.8	0	0	
d_i (veh-sec)	124.3	3.3	0	127.7
	d_1=	63.8	sec/veh	

Table D- 60: Cycle 4 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	11.5			
Effective green time, *g* (s)	13.5			
Effective red time, *r* (s)	86.4			
Cycle4				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	36.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	99.9			
Effective green, *g* (sec)	13.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	36.0			
Vr	36.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	86.4	13.5		
v (vph)	36.0	36.0		
s (vph)	0	1800		
c (vph)	0	243.7	X=	0.1
v' (vph)	36.0	36.0		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	86.4	1.8	11.8	99.9
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	37.4	0.8	0	38.1
	d_1=	38.1	sec/veh	

Table D- 61: Cycle 5 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	10.8			
Effective green time, *g* (s)	12.8			
Effective red time, *r* (s)	101.6			
Cycle5				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	31.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	114.3			
Effective green, *g* (sec)	12.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	31.5			
Vr	31.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	101.6	12.8		
v (vph)	31.5	31.5		
s (vph)	0	1800		
c (vph)	0	201.0	X=	0.2
v' (vph)	31.5	31.5		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	101.6	1.8	11.0	114.3
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	45.1	0.8	0	45.9
	d_1=	45.9	sec/veh	

Table D- 62: Cycle 7 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	12.5			
Effective green time, *g* (s)	14.5			
Effective red time, *r* (s)	131.5			
Cycle7				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	49.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	146			
Effective green, *g* (sec)	14.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	49.3			
Vr	49.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	131.5	14.5		
v (vph)	49.3	49.3		
s (vph)	0	1800		
c (vph)	0	178.8	X=	0.3
v′ (vph)	49.3	49.3		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	3.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	131.5	3.7	10.8	146
q_1 (veh)	0	1.8	0	
n_a (veh)	1.8	0.1	0.1	2
n_d (veh)	0	1.9	0.1	2
q_2 (veh)	1.8	0	0	
d_i (veh-sec)	118.4	3.3	0	121.8
	d_1=	60.9	sec/veh	

Table D- 63: Summary Table of IQA Model Analysis Results of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 1

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	39.5	1	39.5
2	42.0	1	42.0
3	63.8	2	127.7
4	38.1	1	38.1
5	45.9	1	45.9
6	0.0	0	0.0
7	60.9	2	121.8
Total	314.1	8	415.0
	Average Delay For the 15-minutes (sec/veh)=		**51.9**

Table D- 64: Cycle 1 of IQA Model for Southbound and Through Lane of Video 1

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	10.0			
Effective green time, *g* (s)	13.0			
Effective red time, *r* (s)	91.5			
Cycle1				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	103.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.5			
Effective green, *g* (sec)	13.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	103.3			
Vr	103.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	91.5	13.0		
v (vph)	103.3	103.3		
s (vph)	0	1800		
c (vph)	0	224.4	X=	0.5
v' (vph)	103.3	103.3		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	5.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	91.5	5.6	7.5	104.5
q_1 (veh)	0	2.6	0	
n_a (veh)	2.6	0.2	0.2	3
n_d (veh)	0	2.8	0.2	3
q_2 (veh)	2.6	0	0	
d_i (veh-sec)	120.1	7.3	0	127.4
	d_1=	42.5	sec/veh	

Table D- 65: Cycle 3 of IQA Model for Southbound and Through Lane of Video 1

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	34.5			
Effective green time, *g* (s)	37.5			
Effective red time, *r* (s)	115.5			
Cycle3				
# of Vehicles in the cycle	6			
Volume, *V* (vph)	141.2			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	153			
Effective green, *g* (sec)	37.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.2			
Vg	141.2			
Vr	141.2			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	115.5	37.5		
v (vph)	141.2	141.2		
s (vph)	0	1800		
c (vph)	0	441.2	X=	0.3
v′ (vph)	141.2	141.2		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	9.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t′* (sec)	115.5	9.8	27.7	153
q_1 (veh)	0	4.5	0	
n_a (veh)	4.5	0.4	1.1	6
n_d (veh)	0	4.9	1.1	6
q_2 (veh)	4.5	0	0	
d_i (veh-sec)	261.6	22.3	0	283.8
	d_1=	47.3	sec/veh	

Table D- 66: Cycle 5 of IQA Model for Southbound and Through Lane of Video 1

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	26.1			
Effective green time, *g* (s)	29.1			
Effective red time, *r* (s)	85.3			
Cycle5				
# of Vehicles in the cycle	5			
Volume, *V* (vph)	157.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	114.3			
Effective green, *g* (sec)	29.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	157.4			
Vr	157.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	85.3	29.1		
v (vph)	157.4	157.4		
s (vph)	0	1800		
c (vph)	0	457.7	X=	0.3
v' (vph)	157.4	157.4		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	8.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	85.3	8.2	20.9	114.3
q_1 (veh)	0	3.7	0	
n_a (veh)	3.7	0.4	0.9	5
n_d (veh)	0	4.1	0.9	5
q_2 (veh)	3.7	0	0	
d_i (veh-sec)	159.0	15.2	0	174.2
	d_1=	34.8	sec/veh	

Table D- 67: Cycle 6 of IQA Model for Southbound and Through Lane of Video 1

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	10.2			
Effective green time, *g* (s)	13.2			
Effective red time, *r* (s)	89.2			
Cycle6				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	35.2			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	102.4			
Effective green, *g* (sec)	13.2			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	35.2			
Vr	35.2			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	89.2	13.2		
v (vph)	35.2	35.2		
s (vph)	0	1800		
c (vph)	0	232.6	X=	0.2
v' (vph)	35.2	35.2		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	89.2	1.8	11.5	102.4
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	38.8	0.8	0	39.6
	d_1=	39.6	sec/veh	

Table D- 68: Cycle 7 of IQA Model for Southbound and Through Lane of Video 1

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	17.1			
Effective green time, *g* (s)	20.1			
Effective red time, *r* (s)	125.9			
Cycle7				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	49.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	146			
Effective green, *g* (sec)	20.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.1			
Vg	49.3			
Vr	49.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	125.9	20.1		
v (vph)	49.3	49.3		
s (vph)	0	1800		
c (vph)	0	247.8	X=	0.2
v' (vph)	49.3	49.3		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	3.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	125.9	3.5	16.6	146
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0	0.2	2
n_d (veh)	0	1.8	0.2	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	108.6	3.1	0	111.6
	d_1=	55.8	sec/veh	

Table D- 69: Summary Table of IQA Model Analysis Results of the Through Lane for Southbound of Video 1

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	42.5	3	127.4
2	0.0	0	0.0
3	47.3	6	283.8
4	0.0	0	0.0
5	34.8	5	174.2
6	39.6	1	39.6
7	55.8	2	111.6
Total	220.0	17	736.7
	Average Delay For the 15-minutes (sec/veh)=		**43.3**

Table D- 70: Cycle 1 of IQA Model for Southbound and Right Turn Lane of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	10.0			
Effective green time, *g* (s)	12.0			
Effective red time, *r* (s)	92.5			
Cycle1				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	34.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.5			
Effective green, *g* (sec)	12.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.1			
Vg	34.4			
Vr	34.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	92.5	12.0		
v (vph)	34.4	34.4		
s (vph)	0	1800		
c (vph)	0	207.2	X=	0.2
v' (vph)	34.4	34.4		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	92.5	1.8	10.2	104.5
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	40.9	0.8	0	41.7
	d_1=	41.7	sec/veh	

Table D- 71: Cycle 2 of IQA Model for Southbound and Right Turn Lane of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	15.8			
Effective green time, *g* (s)	17.8			
Effective red time, *r* (s)	93.2			
Cycle2				
# of Vehicles in the cycle	5			
Volume, *V* (vph)	162.2			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	111			
Effective green, *g* (sec)	17.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g*/*C*=	0.2			
Vg	162.2			
Vr	162.2			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	93.2	17.8		
v (vph)	162.2	162.2		
s (vph)	0	1800		
c (vph)	0	288.2	X=	0.6
v' (vph)	162.2	162.2		
v (vpsec)	0.05			
s(vpsec)	0.5			
t_c	9.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	93.2	9.2	8.5	111
q_1 (veh)	0	4.2	0	
n_a (veh)	4.2	0.4	0.4	5
n_d (veh)	0	4.6	0.4	5
q_2 (veh)	4.2	0	0	
d_i (veh-sec)	195.8	19.4	0	215.1
	d_1=	43.0	sec/veh	

Table D- 72: Cycle 3 of IQA Model for Southbound and Right Turn Lane of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	34.5			
Effective green time, *g* (s)	36.5			
Effective red time, *r* (s)	116.5			
Cycle3				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	70.6			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	153			
Effective green, *g* (sec)	36.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	70.6			
Vr	70.6			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	116.5	36.5		
v (vph)	70.6	70.6		
s (vph)	0	1800		
c (vph)	0	429.4	X=	0.2
v′ (vph)	70.6	70.6		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	4.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	116.5	4.8	31.7	153
q_1 (veh)	0	2.3	0	
n_a (veh)	2.3	0.1	0.6	3
n_d (veh)	0	2.4	0.6	3
q_2 (veh)	2.3	0	0	
d_i (veh-sec)	133.1	5.4	0	138.5
	d_1=	46.2	sec/veh	

Table D- 73: Cycle 4 of IQA Model for Southbound and Right Turn Lane of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	14.8			
Effective green time, *g* (s)	16.8			
Effective red time, *r* (s)	83.1			
Cycle4				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	36.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	99.9			
Effective green, *g* (sec)	16.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g*/*C*=	0.2			
Vg	36.0			
Vr	36.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	83.1	16.8		
v (vph)	36.0	36.0		
s (vph)	0	1800		
c (vph)	0	302.6	X=	0.1
v' (vph)	36.0	36.0		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	83.1	1.7	15.1	99.9
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0.0	0.2	1
n_d (veh)	0	0.8	0.2	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	34.6	0.7	0	35.3
	d_1=	35.3	sec/veh	

Table D- 74: Cycle 5 of IQA Model for Southbound and Right Turn Lane of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	26.1			
Effective green time, *g* (s)	28.1			
Effective red time, *r* (s)	86.3			
Cycle5				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	63.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	114.3			
Effective green, *g* (sec)	28.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g*/*C*=	0.2			
Vg	63.0			
Vr	63.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	86.3	28.1		
v (vph)	63.0	63.0		
s (vph)	0	1800		
c (vph)	0	441.9	X=	0.1
v' (vph)	63.0	63.0		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.1			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	86.3	3.1	24.9	114.3
q_1 (veh)	0	1.5	0	
n_a (veh)	1.5	0.1	0.4	2
n_d (veh)	0	1.6	0.4	2
q_2 (veh)	1.5	0	0	
d_i (veh-sec)	65.1	2.4	0	67.4
	d_1=	33.7	sec/veh	

Table D- 75: Cycle 6 of IQA Model for Southbound and Right Turn Lane of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	10.2			
Effective green time, *g* (s)	12.2			
Effective red time, *r* (s)	90.2			
Cycle6				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	35.2			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	102.4			
Effective green, *g* (sec)	12.2			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.1			
Vg	35.2			
Vr	35.2			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	90.2	12.2		
v (vph)	35.2	35.2		
s (vph)	0	1800		
c (vph)	0	215.0	X=	0.2
v′ (vph)	35.2	35.2		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t′* (sec)	90.2	1.8	10.4	102.4
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	39.7	0.8	0	40.5
	d_1=	40.5	sec/veh	

Table D- 76: Cycle 7 of IQA Model for Southbound and Right Turn Lane of Video 1

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	17.1			
Effective green time, *g* (s)	19.1			
Effective red time, *r* (s)	126.9			
Cycle7				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	24.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	146			
Effective green, *g* (sec)	19.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	24.7			
Vr	24.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	126.9	19.1		
v (vph)	24.7	24.7		
s (vph)	0	1800		
c (vph)	0	235.5	X=	0.1
v′ (vph)	24.7	24.7		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	126.9	1.8	17.3	146
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	55.1	0.8	0	55.9
	d_1=	55.9	sec/veh	

Table D- 77: Summary Table of IQA Model Analysis Results of the Right Turn Lane for Southbound of Video 1

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	41.7	1	41.7
2	43.0	5	215.1
3	46.2	3	138.5
4	35.3	1	35.3
5	33.7	2	67.4
6	40.5	1	40.5
7	55.9	1	55.9
Total	296.3	14	594.5
	Average Delay For the 15-minutes (sec/veh)=		**42.5**

Table D- 78: Cycle 1 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	15.8			
Effective green time, *g* (s)	17.8			
Effective red time, *r* (s)	137.8			
Cycle1				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	23.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	155.7			
Effective green, *g* (sec)	17.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g*/*C*=	0.1			
Vg	23.1			
Vr	23.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	137.8	17.8		
v (vph)	23.1	23.1		
s (vph)	0	1800		
c (vph)	0	206.2	X=	0.1
v' (vph)	23.1	23.1		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	137.8	1.8	16.0	155.7
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	61.0	0.8	0	61.8
	d_1=	61.8	sec/veh	

Table D- 79: Cycle 2 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.5			
Effective green time, *g* (s)	20.5			
Effective red time, *r* (s)	79.0			
Cycle2				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	72.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	99.5			
Effective green, *g* (sec)	20.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	72.3			
Vr	72.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	79.0	20.5		
v (vph)	72.3	72.3		
s (vph)	0	1800		
c (vph)	0	370.7	X=	0.2
v′ (vph)	72.3	72.3		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	79.0	3.3	17.2	99.5
q_1 (veh)	0	1.6	0	
n_a (veh)	1.6	0.1	0.3	2.0
n_d (veh)	0	1.7	0.3	2.0
q_2 (veh)	1.6	0	0	
d_i (veh-sec)	62.8	2.6	0	65.4
	d_1=	32.7	sec/veh	

Table D- 80: Cycle 3 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	33.1			
Effective green time, *g* (s)	35.1			
Effective red time, *r* (s)	107.3			
Cycle3				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	50.6			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	142.4			
Effective green, *g* (sec)	35.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	50.6			
Vr	50.6			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	107.3	35.1		
v (vph)	50.6	50.6		
s (vph)	0	1800		
c (vph)	0	444.0	X=	0.1
v' (vph)	50.6	50.6		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	3.1			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	107.3	3.1	32.0	142.4
q_1 (veh)	0.0	1.5	0.0	
n_a (veh)	1.5	0.0	0.4	2
n_d (veh)	0.0	1.6	0.4	2
q_2 (veh)	1.5	0.0	0.0	
d_i (veh-sec)	80.8	2.3	0.0	83.2
	d_1=	41.6	sec/veh	

Table D- 81: Cycle 4 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	21.0			
Effective green time, *g* (s)	23.0			
Effective red time, *r* (s)	81.1			
Cycle4				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	34.6			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.1			
Effective green, *g* (sec)	23.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	34.6			
Vr	34.6			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	81.1	23.0		
v (vph)	34.6	34.6		
s (vph)	0	1800		
c (vph)	0	398.1	X=	0.1
v' (vph)	34.6	34.6		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	81.1	1.6	21.4	104.1
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.2	1
n_d (veh)	0	0.8	0.2	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	31.6	0.6	0	32.2
	d_1=	32.2	sec/veh	

Table D- 82: Cycle 5 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.1			
Effective green time, *g* (s)	20.1			
Effective red time, *r* (s)	97.1			
Cycle5				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	92.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	117.2			
Effective green, *g* (sec)	20.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	92.1			
Vr	92.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	97.1	20.1		
v (vph)	92.1	92.1		
s (vph)	0	1800		
c (vph)	0	309.1	X=	0.3
v′ (vph)	92.1	92.1		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	5.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t′* (sec)	97.1	5.2	14.9	117.2
q_1 (veh)	0.0	2.5	0.0	
n_a (veh)	2.5	0.1	0.4	3
n_d (veh)	0.0	2.6	0.4	3
q_2 (veh)	2.5	0.0	0.0	
d_i (veh-sec)	120.6	6.5	0.0	127.1
	d_1=	42.4	sec/veh	

Table D- 83: Cycle 6 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	15.6			
Effective green time, *g* (s)	17.6			
Effective red time, *r* (s)	102.5			
Cycle6				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	60.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	120.1			
Effective green, *g* (sec)	17.6			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	60.0			
Vr	60.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	102.5	17.6		
v (vph)	60.0	60.0		
s (vph)	0	1800		
c (vph)	0	264.2	X=	0.2
v' (vph)	60.0	60.0		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	102.5	3.5	14.1	120.1
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.2	2
n_d (veh)	0	1.8	0.2	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	87.4	3.0	0	90.4
	d_1=	45.2	sec/veh	

Table D- 84: Cycle 7 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18			
Effective green time, *g* (s)	20			
Effective red time, *r* (s)	83			
Cycle7				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	69.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	103			
Effective green, *g* (sec)	20			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	69.9			
Vr	69.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	83.0	20.0		
v (vph)	69.9	69.9		
s (vph)	0	1800		
c (vph)	0	349.5	X=	0.2
v' (vph)	69.9	69.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	83.0	3.4	16.6	103
q_1 (veh)	0	1.6	0	
n_a (veh)	1.6	0.1	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.6	0	0	
d_i (veh-sec)	66.9	2.7	0	69.6
	d_1=	34.8	sec/veh	

Table D- 85: Cycle 8 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	16			
Effective green time, *g* (s)	18			
Effective red time, *r* (s)	102.3			
Cycle8				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	29.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	120.3			
Effective green, *g* (sec)	18			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	29.9			
Vr	29.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	102.3	18.0		
v (vph)	29.9	29.9		
s (vph)	0	1800		
c (vph)	0	269.3	X=	0.1
v' (vph)	29.9	29.9		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	102.3	1.7	16.3	120.3
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	43.5	0.7	0	44.2
	d_1=	44.2	sec/veh	

Table D- 86: Summary Table of IQA Model Analysis Results of the First Left Turn Lane from the Middle of the Road for Northbound of Video 2

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	61.8	1	61.8
2	32.7	2	65.4
3	41.6	2	83.2
4	32.2	1	32.2
5	42.4	3	127.1
6	45.2	2	90.4
7	34.8	2	69.6
8	44.2	1	44.2
Total	334.9	14	574.0
	Average Delay For the 15-minutes (sec/veh)=		**41.0**

Table D- 87: Cycle 1 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	15.8			
Effective green time, *g* (s)	17.8			
Effective red time, *r* (s)	137.8			
Cycle1				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	69.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	155.7			
Effective green, *g* (sec)	17.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.1			
Vg	69.4			
Vr	69.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	137.8	17.8		
v (vph)	69.4	69.4		
s (vph)	0	1800		
c (vph)	0	206.2	X=	0.3
v' (vph)	69.4	69.4		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	5.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	137.8	5.5	12.3	155.7
q_1 (veh)	0	2.7	0	
n_a (veh)	2.7	0.1	0.2	3
n_d (veh)	0	2.8	0.2	3
q_2 (veh)	2.7	0	0	
d_i (veh-sec)	183.1	7.3	0	190.4
	d_1=	63.5	sec/veh	

Table D- 88: Cycle 2 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.5			
Effective green time, *g* (s)	20.5			
Effective red time, *r* (s)	79.0			
Cycle2				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	108.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	99.5			
Effective green, *g* (sec)	20.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	108.5			
Vr	108.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	79.0	20.5		
v (vph)	108.5	108.5		
s (vph)	0	1800		
c (vph)	0	370.7	X=	0.3
v' (vph)	108.5	108.5		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	5.1			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	79.0	5.1	15.4	99.5
q_1 (veh)	0	2.4	0	
n_a (veh)	2.4	0.2	0.5	3
n_d (veh)	0	2.5	0.5	3
q_2 (veh)	2.4	0	0	
d_i (veh-sec)	94.1	6.0	0	100.2
	d_1=	33.4	sec/veh	

Table D- 89: Cycle 3 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	33.1			
Effective green time, *g* (s)	35.1			
Effective red time, *r* (s)	107.3			
Cycle3				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	101.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	142.4			
Effective green, *g* (sec)	35.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	101.1			
Vr	101.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	107.3	35.1		
v (vph)	101.1	101.1		
s (vph)	0	1800		
c (vph)	0	444.0	X=	0.2
v' (vph)	101.1	101.1		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	6.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	107.3	6.4	28.7	142.4
q_1 (veh)	0	3.0	0	
n_a (veh)	3.0	0.2	0.8	4
n_d (veh)	0	3.2	0.8	4
q_2 (veh)	3.0	0	0	
d_i (veh-sec)	161.7	9.6	0	171.3
	d_1=	42.8	sec/veh	

Table D- 90: Cycle 4 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	21.0			
Effective green time, *g* (s)	23.0			
Effective red time, *r* (s)	81.1			
Cycle4				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	138.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.1			
Effective green, *g* (sec)	23.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	138.3			
Vr	138.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	81.1	23.0		
v (vph)	138.3	138.3		
s (vph)	0	1800		
c (vph)	0	398.1	X=	0.3
v' (vph)	138.3	138.3		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	6.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	81.1	6.7	16.3	104.1
q_1 (veh)	0	3.1	0	
n_a (veh)	3.1	0.3	0.6	4
n_d (veh)	0	3.4	0.6	4
q_2 (veh)	3.1	0	0	
d_i (veh-sec)	126.3	10.5	0	136.8
	d_1=	34.2	sec/veh	

Table D- 91: Cycle 5 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.1			
Effective green time, *g* (s)	20.1			
Effective red time, *r* (s)	97.1			
Cycle5				
# of Vehicles in the cycle	7			
Volume, *V* (vph)	215.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	117.2			
Effective green, *g* (sec)	20.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	215.0			
Vr	215.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	97.1	20.1		
v (vph)	215.0	215.0		
s (vph)	0	1800		
c (vph)	0	309.1	X=	0.7
v' (vph)	215.0	215.0		
v (vpsec)	0.1			
s(vpsec)	0.5			
t_c	13.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	97.1	13.2	7.0	117.2
q_1 (veh)	0	5.8	0	
n_a (veh)	5.8	0.8	0.4	7
n_d (veh)	0	6.6	0.4	7
q_2 (veh)	5.8	0	0	
d_i (veh-sec)	281.5	38.2	0	319.7
	d_1=	45.7	sec/veh	

Table D- 92: Cycle 6 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	15.6			
Effective green time, *g* (s)	17.6			
Effective red time, *r* (s)	102.5			
Cycle6				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	60.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	120.1			
Effective green, *g* (sec)	17.63			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	60.0			
Vr	60.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	102.5	17.6		
v (vph)	60.0	60.0		
s (vph)	0	1800		
c (vph)	0	264.2	X=	0.2
v' (vph)	60.0	60.0		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	102.5	3.5	14.1	120.1
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.2	2
n_d (veh)	0	1.8	0.2	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	87.4	3.0	0	90.4
	d_1=	45.2	sec/veh	

Table D- 93: Cycle 7 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18			
Effective green time, *g* (s)	20			
Effective red time, *r* (s)	83			
Cycle7				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	139.8			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	103			
Effective green, *g* (sec)	20			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	139.8			
Vr	139.8			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	83.0	20.0		
v (vph)	139.8	139.8		
s (vph)	0	1800		
c (vph)	0	349.5	X=	0.4
v' (vph)	139.8	139.8		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	7.0			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	83.0	7.0	13.0	103
q_1 (veh)	0	3.2	0	
n_a (veh)	3.2	0.3	0.5	4
n_d (veh)	0	3.5	0.5	4
q_2 (veh)	3.2	0	0	
d_i (veh-sec)	133.8	11.3	0	145.0
	d_1=	36.3	sec/veh	

Table D- 94: Cycle 8 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	16			
Effective green time, *g* (s)	18			
Effective red time, *r* (s)	102.3			
Cycle8				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	59.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	120.3			
Effective green, *g* (sec)	18			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	59.9			
Vr	59.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	102.3	18.0		
v (vph)	59.9	59.9		
s (vph)	0	1800		
c (vph)	0	269.3	X=	0.2
v' (vph)	59.9	59.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	102.3	3.5	14.5	120.3
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.2	2
n_d (veh)	0	1.8	0.2	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	87.0	3.0	0	90.0
	d_1=	45.0	sec/veh	

Table D- 95: Summary Table of IQA Model Analysis Results of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 2

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	63.5	3	190.4
2	33.4	3	100.2
3	42.8	4	171.3
4	34.2	4	136.8
5	45.7	7	319.7
6	45.2	2	90.4
7	36.3	4	145.0
8	45.0	2	90.0
Total	346.0	29	1243.8
	Average Delay For the 15-minutes (sec/veh)=		**42.9**

Table D- 96: Cycle 1 of IQA Model for Northbound and Through Lane of Video 2

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	29.2			
Effective green time, *g* (s)	32.2			
Effective red time, *r* (s)	123.5			
Cycle1				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	23.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	155.7			
Effective green, *g* (sec)	32.2			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	23.1			
Vr	23.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	123.5	32.2		
v (vph)	23.1	23.1		
s (vph)	0	1800		
c (vph)	0	372.0	X=	0.1
v' (vph)	23.1	23.1		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	123.5	1.6	30.6	155.7
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.2	1.0
n_d (veh)	0	0.8	0.2	1.0
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	49.0	0.6	0	49.6
	d_1=	49.6	sec/veh	

Table D- 97: Cycle 2 of IQA Model for Northbound and Through Lane of Video 2

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	39			
Effective green time, *g* (s)	42			
Effective red time, *r* (s)	57.5			
Cycle2				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	72.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	99.5			
Effective green, *g* (sec)	42			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g/C*=	0.4			
Vg	72.3			
Vr	72.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	57.5	42.0		
v (vph)	72.3	72.3		
s (vph)	0	1800		
c (vph)	0	759.6	X=	0.1
v' (vph)	72.3	72.3		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	2.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	57.5	2.4	39.6	99.5
q_1 (veh)	0	1.2	0	
n_a (veh)	1.2	0	0.8	2
n_d (veh)	0	1.2	0.8	2
q_2 (veh)	1.2	0	0	
d_i (veh-sec)	33.3	1.4	0	34.6
	d_1=	17.3	sec/veh	

Table D- 98: Cycle 3 of IQA Model for Northbound and Through Lane of Video 2

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	14.3			
Effective green time, *g* (s)	17.3			
Effective red time, *r* (s)	125.2			
Cycle3				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	25.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	142.4			
Effective green, *g* (sec)	17.3			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.1			
Vg	25.3			
Vr	25.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	125.2	17.3		
v (vph)	25.3	25.3		
s (vph)	0	1800		
c (vph)	0	218.3	X=	0.1
v' (vph)	25.3	25.3		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	125.2	1.8	15.5	142.4
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	55.0	0.8	0	55.8
	d_1=	55.8	sec/veh	

Table D- 99: Cycle 4 of IQA Model for Northbound and Through Lane of Video 2

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	39			
Effective green time, *g* (s)	42			
Effective red time, *r* (s)	62.1			
Cycle4				
# of Vehicles in the cycle	5			
Volume, *V* (vph)	172.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.1			
Effective green, *g* (sec)	42			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.4			
Vg	172.9			
Vr	172.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	62.1	42.0		
v (vph)	172.9	172.9		
s (vph)	0	1800		
c (vph)	0	726.0	X=	0.2
v' (vph)	172.9	172.9		
v (vpsec)	0.05			
s(vpsec)	0.5			
t_c	6.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	62.1	6.6	35.4	104.1
q_1 (veh)	0	3.0	0	
n_a (veh)	3.0	0.3	1.7	5
n_d (veh)	0	3.3	1.7	5
q_2 (veh)	3.0	0	0	
d_i (veh-sec)	92.7	9.8	0	102.5
	d_1=	20.5	sec/veh	

Table D- 100: Cycle 5 of IQA Model for Northbound and Through Lane of Video 2

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	33.9			
Effective green time, *g* (s)	36.9			
Effective red time, *r* (s)	80.3			
Cycle5				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	122.8			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	117.2			
Effective green, *g* (sec)	36.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	122.8			
Vr	122.8			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	80.3	36.9		
v (vph)	122.8	122.8		
s (vph)	0	1800		
c (vph)	0	567.0	X=	0.2
v' (vph)	122.8	122.8		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	5.9			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	80.3	5.9	31.0	117.2
q_1 (veh)	0	2.7	0	
n_a (veh)	2.7	0.2	1.1	4
n_d (veh)	0	2.9	1.1	4
q_2 (veh)	2.7	0	0	
d_i (veh-sec)	110.0	8.1	0	118.1
	d_1=	29.5	sec/veh	

Table D- 101: Cycle 6 of IQA Model for Northbound and Through Lane of Video 2

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	24.1			
Effective green time, *g* (s)	27.1			
Effective red time, *r* (s)	93			
Cycle6				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	60.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	120.1			
Effective green, *g* (sec)	27.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.2			
Vg	60.0			
Vr	60.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	93.0	27.1		
v (vph)	60.0	60.0		
s (vph)	0	1800		
c (vph)	0	406.2	X=	0.1
v' (vph)	60.0	60.0		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	93.0	3.2	23.9	120.1
q_1 (veh)	0	1.5	0	
n_a (veh)	1.5	0.1	0.4	2
n_d (veh)	0	1.6	0.4	2
q_2 (veh)	1.5	0	0	
d_i (veh-sec)	72.0	2.5	0	74.5
	d_1=	37.2	sec/veh	

Table D- 102: Cycle 7 of IQA Model for Northbound and Through Lane of Video 2

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	25.8			
Effective green time, *g* (s)	28.8			
Effective red time, *r* (s)	74.2			
Cycle7				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	139.8			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	103			
Effective green, *g* (sec)	28.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.3			
Vg	139.8			
Vr	139.8			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	74.2	28.8		
v (vph)	139.8	139.8		
s (vph)	0	1800		
c (vph)	0	503.3	X=	0.3
v' (vph)	139.8	139.8		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	6.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	74.2	6.2	22.6	103
q_1 (veh)	0	2.9	0	
n_a (veh)	2.9	0.2	0.9	4
n_d (veh)	0	3.1	0.9	4
q_2 (veh)	2.9	0	0	
d_i (veh-sec)	106.9	9.0	0	115.9
	d_1=	29.0	sec/veh	

Table D- 103: Cycle 8 of IQA Model for Northbound and Through Lane of Video 2

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	23.9			
Effective green time, *g* (s)	26.9			
Effective red time, *r* (s)	77.6			
Cycle8				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	137.8			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.5			
Effective green, *g* (sec)	26.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.3			
Vg	137.8			
Vr	137.8			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	77.6	26.9		
v (vph)	137.8	137.8		
s (vph)	0	1800		
c (vph)	0	463.9	X=	0.3
v' (vph)	137.8	137.8		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	6.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	77.6	6.4	20.5	104.5
q_1 (veh)	0	3.0	0	
n_a (veh)	3.0	0.2	0.8	4
n_d (veh)	0	3.2	0.8	4
q_2 (veh)	3.0	0	0	
d_i (veh-sec)	115.2	9.5	0	124.7
	d_1=	31.2	sec/veh	

Table D- 104: Summary Table of IQA Model Analysis Results of the Through Lane for Northbound of Video 2

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	49.6	1	49.6
2	17.3	2	34.6
3	55.8	1	55.8
4	20.5	5	102.5
5	29.5	4	118.1
6	37.2	2	74.5
7	29.0	4	115.9
8	31.2	4	124.7
Total	270.1	23	675.7
	Average Delay For the 15-minutes (sec/veh)=		**29.4**

Table D- 105: Cycle 2 of IQA Model for Northbound and Right Turn Lane of Video 2

Yellow interval for movement, y (s)	3.5			
All red interval for movement , ar (s)	1.5			
Extension of effective green, e (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, Y, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, G (s)	39			
Effective green time, g (s)	41			
Effective red time, r (s)	58.5			
Cycle2				
# of Vehicles in the cycle	5			
Volume, V (vph)	180.8			
Saturation flow rate, S (vph)	1800			
Cycle, C (sec)	99.5			
Effective green, g (sec)	41			
# of lanes, n	1			
Arrival Type, AT	3			
Rp=	1			
$P= Rpxg/C=$	0.4			
Vg	180.8			
Vr	180.8			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	58.5	41.0		
v (vph)	180.8	180.8		
s (vph)	0	1800		
c (vph)	0	741.5	X=	0.2
v' (vph)	180.8	180.8		
v (vpsec)	0.1			
s(vpsec)	0.5			
t_c	6.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	58.5	6.5	34.5	99.5
q_1 (veh)	0	2.9	0	
n_a (veh)	2.9	0.3	1.7	5
n_d (veh)	0	3.3	1.7	5
q_2 (veh)	2.9	0	0	
d_i (veh-sec)	86.0	9.6	0	95.7
	d_1=	19.1	sec/veh	

Table D- 106: Cycle 3 of IQA Model for Northbound and Right Turn Lane of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	14.3			
Effective green time, *g* (s)	16.3			
Effective red time, *r* (s)	126.2			
Cycle3				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	25.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	142.4			
Effective green, *g* (sec)	16.3			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	25.3			
Vr	25.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	126.2	16.3		
v (vph)	25.3	25.3		
s (vph)	0	1800		
c (vph)	0	205.6	X=	0.1
v' (vph)	25.3	25.3		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	126.2	1.8	14.5	142.4
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	55.9	0.8	0	56.7
	d_1=	56.7	sec/veh	

Table D- 107: Cycle 4 of IQA Model for Northbound and Right Turn Lane of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	39			
Effective green time, *g* (s)	41			
Effective red time, *r* (s)	63.1			
Cycle4				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	103.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.1			
Effective green, *g* (sec)	41			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.4			
Vg	103.7			
Vr	103.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	63.1	41.0		
v (vph)	103.7	103.7		
s (vph)	0	1800		
c (vph)	0	708.7	X=	0.1
v' (vph)	103.7	103.7		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	3.9			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	63.1	3.9	37.1	104.1
q_1 (veh)	0	1.8	0	
n_a (veh)	1.8	0.1	1.1	3
n_d (veh)	0	1.9	1.1	3
q_2 (veh)	1.8	0	0	
d_i (veh-sec)	57.4	3.5	0	60.9
	d_1=	20.3	sec/veh	

Table D- 108: Cycle 5 of IQA Model for Northbound and Right Turn Lane of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	33.9			
Effective green time, *g* (s)	35.9			
Effective red time, *r* (s)	81.3			
Cycle5				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	61.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	117.2			
Effective green, *g* (sec)	35.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g*/*C*=	0.3			
Vg	61.4			
Vr	61.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	81.3	35.9		
v (vph)	61.4	61.4		
s (vph)	0	1800		
c (vph)	0	551.7	X=	0.1
v′ (vph)	61.4	61.4		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	2.9			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t′* (sec)	81.3	2.9	33.1	117.2
q_1 (veh)	0	1.4	0	
n_a (veh)	1.4	0	0.6	2
n_d (veh)	0	1.4	0.6	2
q_2 (veh)	1.4	0	0	
d_i (veh-sec)	56.4	2.0	0	58.4
	d_1=	29.2	sec/veh	

Table D- 109: Cycle 6 of IQA Model for Northbound and Right Turn Lane of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	24.1			
Effective green time, *g* (s)	26.1			
Effective red time, *r* (s)	94			
Cycle6				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	60.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	120.1			
Effective green, *g* (sec)	26.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g*/*C*=	0.2			
Vg	60.0			
Vr	60.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	94.0	26.1		
v (vph)	60.0	60.0		
s (vph)	0	1800		
c (vph)	0	391.2	X=	0.2
v' (vph)	60.0	60.0		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	94.0	3.2	22.9	120.1
q_1 (veh)	0	1.6	0	
n_a (veh)	1.6	0.1	0.4	2
n_d (veh)	0	1.6	0.4	2
q_2 (veh)	1.6	0	0	
d_i (veh-sec)	73.6	2.5	0	76.1
	d_1=	38.1	sec/veh	

Table D- 110: Cycle 7 of IQA Model for Northbound and Right Turn Lane of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	25.8			
Effective green time, *g* (s)	27.8			
Effective red time, *r* (s)	75.2			
Cycle7				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	35.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	103			
Effective green, *g* (sec)	27.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	35.0			
Vr	35.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	75.2	27.8		
v (vph)	35.0	35.0		
s (vph)	0	1800		
c (vph)	0	485.8	X=	0.1
v' (vph)	35.0	35.0		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	75.2	1.5	26.3	103
q_1 (veh)	0	0.7	0	
n_a (veh)	0.7	0	0.3	1
n_d (veh)	0	0.7	0.3	1
q_2 (veh)	0.7	0	0	
d_i (veh-sec)	27.5	0.5	0	28.0
	d_1=	28.0	sec/veh	

Table D- 111: Cycle 8 of IQA Model for Northbound and Right Turn Lane of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	23.9			
Effective green time, *g* (s)	25.9			
Effective red time, *r* (s)	78.6			
Cycle8				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	34.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.5			
Effective green, *g* (sec)	25.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.2			
Vg	34.4			
Vr	34.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	78.6	25.9		
v (vph)	34.4	34.4		
s (vph)	0	1800		
c (vph)	0	446.6	X=	0.1
v' (vph)	34.4	34.4		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	78.6	1.5	24.4	104.5
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.2	1
n_d (veh)	0	0.8	0.2	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	29.5	0.6	0	30.1
	d_1=	30.1	sec/veh	

Table D- 112: Summary Table of IQA Model Analysis Results of the Right Turn Lane for Northbound of Video 2

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	0.0	0	0.0
2	19.1	5	95.7
3	56.7	1	56.7
4	20.3	3	60.9
5	29.2	2	58.4
6	38.1	2	76.1
7	28.0	1	28.0
8	30.1	1	30.1
Total	221.5	15	405.8
	Average Delay For the 15-minutes (sec/veh)=		**27.1**

Table D- 113: Cycle 2 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	13.5			
Effective green time, *g* (s)	15.5			
Effective red time, *r* (s)	84.1			
Cycle2				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	72.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	99.5			
Effective green, *g* (sec)	15.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	72.3			
Vr	72.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	84.1	15.5		
v (vph)	72.3	72.3		
s (vph)	0	1800		
c (vph)	0	279.8	X=	0.3
v' (vph)	72.3	72.3		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	84.1	3.5	12.0	99.5
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.2	2
n_d (veh)	0	1.8	0.2	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	71.0	3.0	0	74.0
	d_1=	37.0	sec/veh	

Table D- 114: Cycle 3 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	17.8			
Effective green time, *g* (s)	19.8			
Effective red time, *r* (s)	122.6			
Cycle3				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	75.8			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	142.4			
Effective green, *g* (sec)	19.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	75.8			
Vr	75.8			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	122.6	19.8		
v (vph)	75.8	75.8		
s (vph)	0	1800		
c (vph)	0	250.2	X=	0.3
v' (vph)	75.8	75.8		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	5.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	122.6	5.4	14.4	142.4
q_1 (veh)	0	2.6	0	
n_a (veh)	2.6	0.1	0.3	3
n_d (veh)	0	2.7	0.3	3
q_2 (veh)	2.6	0	0	
d_i (veh-sec)	158.4	7.0	0	165.3
	d_1=	55.1	sec/veh	

Table D- 115: Cycle 4 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	16			
Effective green time, *g* (s)	18			
Effective red time, *r* (s)	86.1			
Cycle4				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	69.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.1			
Effective green, *g* (sec)	18			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	69.1			
Vr	69.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	86.1	18.0		
v (vph)	69.1	69.1		
s (vph)	0	1800		
c (vph)	0	311.1	X=	0.2
v' (vph)	69.1	69.1		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	86.1	3.4	14.6	104.1
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	71.2	2.8	0	74.1
	d_1=	37.0	sec/veh	

Table D- 116: Cycle 5 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.1			
Effective green time, *g* (s)	20.1			
Effective red time, *r* (s)	97.1			
Cycle5				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	92.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	117.2			
Effective green, *g* (sec)	20.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	92.1			
Vr	92.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	97.1	20.1		
v (vph)	92.1	92.1		
s (vph)	0	1800		
c (vph)	0	308.6	X=	0.3
v' (vph)	92.1	92.1		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	5.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	97.1	5.2	14.9	117.2
q_1 (veh)	0	2.5	0	
n_a (veh)	2.5	0.1	0.4	3
n_d (veh)	0	2.6	0.4	3
q_2 (veh)	2.5	0	0	
d_i (veh-sec)	120.7	6.5	0	127.2
	d_1=	42.4	sec/veh	

Table D- 117: Cycle 6 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	10.5			
Effective green time, *g* (s)	12.5			
Effective red time, *r* (s)	107.6			
Cycle6				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	30.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	120.1			
Effective green, *g* (sec)	12.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	30.0			
Vr	30.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	107.6	12.5		
v (vph)	30.0	30.0		
s (vph)	0	1800		
c (vph)	0	187.3	X=	0.2
v' (vph)	30.0	30.0		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	107.6	1.8	10.7	120.1
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	48.2	0.8	0	49.0
	d_1=	49.0	sec/veh	

Table D- 118: Summary Table of IQA Model Analysis Results of the First Left Turn Lane from the Middle of the Road for Southbound of Video 2

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	0.0	0	0.0
2	37.0	2	74.0
3	55.1	3	165.3
4	37.0	2	74.1
5	42.4	3	127.2
6	49.0	1	49.0
Total	220.6	11	489.6
	Average Delay For the 15-minutes (sec/veh)=		**44.5**

Table D- 119: Cycle 1 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	13.3			
Effective green time, *g* (s)	15.3			
Effective red time, *r* (s)	140.4			
Cycle1				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	23.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	155.7			
Effective green, *g* (sec)	15.3			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.10			
Vg	23.1			
Vr	23.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	140.4	15.3		
v (vph)	23.1	23.1		
s (vph)	0	1800		
c (vph)	0	176.9	X=	0.1
v' (vph)	23.1	23.1		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	140.4	1.8	13.5	155.7
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	63.3	0.8	0	64.1
	d_1=	64.1	sec/veh	

Table D- 120: Cycle 3 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	17.8			
Effective green time, *g* (s)	19.8			
Effective red time, *r* (s)	122.6			
Cycle3				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	75.8			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	142.4			
Effective green, *g* (sec)	19.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	75.8			
Vr	75.8			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	122.6	19.8		
v (vph)	75.8	75.8		
s (vph)	0	1800		
c (vph)	0	250.2	X=	0.3
v' (vph)	75.8	75.8		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	5.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	122.6	5.4	14.4	142.4
q_1 (veh)	0	2.6	0	
n_a (veh)	2.6	0.1	0.3	3
n_d (veh)	0	2.7	0.3	3
q_2 (veh)	2.6	0	0	
d_i (veh-sec)	158.4	7.0	0	165.3
	d_1=	55.1	sec/veh	

Table D- 121: Cycle 4 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	16			
Effective green time, *g* (s)	18			
Effective red time, *r* (s)	86.1			
Cycle4				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	34.6			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.1			
Effective green, *g* (sec)	18			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	34.6			
Vr	34.6			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	86.1	18.0		
v (vph)	34.6	34.6		
s (vph)	0	1800		
c (vph)	0	311.1	X=	0.1
v′ (vph)	34.6	34.6		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	86.1	1.7	16.3	104.1
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.2	1
n_d (veh)	0	0.8	0.2	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	35.6	0.7	0.0	36.3
	d_1=	36.3	sec/veh	

Table D- 122: Cycle 5 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.1			
Effective green time, *g* (s)	20.1			
Effective red time, *r* (s)	97.1			
Cycle5				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	92.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	117.2			
Effective green, *g* (sec)	20.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	92.1			
Vr	92.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	97.1	20.1		
v (vph)	92.1	92.1		
s (vph)	0	1800		
c (vph)	0	308.6	X=	0.3
v′ (vph)	92.1	92.1		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	5.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	97.1	5.2	14.9	117.2
q_1 (veh)	0	2.5	0	
n_a (veh)	2.5	0.1	0.4	3
n_d (veh)	0	2.6	0.4	3
q_2 (veh)	2.5	0	0	
d_i (veh-sec)	120.7	6.5	0	127.2
	d_1=	42.4	sec/veh	

Table D- 123: Cycle 6 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	10.5			
Effective green time, *g* (s)	12.5			
Effective red time, *r* (s)	107.6			
Cycle6				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	30.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	120.1			
Effective green, *g* (sec)	12.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	30.0			
Vr	30.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	107.6	12.5		
v (vph)	30.0	30.0		
s (vph)	0	1800		
c (vph)	0	187.3	X=	0.2
v' (vph)	30.0	30.0		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	107.6	1.8	10.7	120.1
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0.0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	48.2	0.8	0	49.0
	d_1=	49.0	sec/veh	

Table D- 124: Cycle 7 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	8.7			
Effective green time, *g* (s)	10.7			
Effective red time, *r* (s)	92.3			
Cycle7				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	35.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	103			
Effective green, *g* (sec)	10.7			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	35.0			
Vr	35.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	92.3	10.7		
v (vph)	35.0	35.0		
s (vph)	0	1800		
c (vph)	0	187.5	X=	0.2
v' (vph)	35.0	35.0		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	92.3	1.8	8.9	103
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	41.3	0.8	0	42.1
	d_1=	42.1	sec/veh	

Table D- 125: Summary Table of IQA Model Analysis Results of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 2

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	64.1	1	64.1
2	0.0	0	0.0
3	55.1	3	165.3
4	36.3	1	36.3
5	42.4	3	127.2
6	49.0	1	49.0
7	42.1	1	42.1
Total	301.8	10	484.1
	Average Delay For the 15-minutes (sec/veh)=		**48.4**

Table D- 126: Cycle 1 of IQA Model for Southbound and Through Lane of Video 2

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	11.7			
Effective green time, *g* (s)	14.7			
Effective red time, *r* (s)	140.9			
Cycle1				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	46.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	155.7			
Effective green, *g* (sec)	14.7			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	46.3			
Vr	46.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	140.9	14.7		
v (vph)	46.3	46.3		
s (vph)	0	1800		
c (vph)	0	170.3	X=	0.3
v' (vph)	46.3	46.3		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	3.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	140.9	3.7	11.0	155.7
q_1 (veh)	0	1.8	0	
n_a (veh)	1.8	0	0.1	2
n_d (veh)	0	1.9	0.1	2
q_2 (veh)	1.8	0	0	
d_i (veh-sec)	127.6	3.4	0	131.0
	d_1=	65.5	sec/veh	

Table D- 127: Cycle 2 of IQA Model for Southbound and Through Lane of Video 2

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	34.1			
Effective green time, *g* (s)	37.1			
Effective red time, *r* (s)	62.5			
Cycle2				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	36.2			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	99.5			
Effective green, *g* (sec)	37.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.4			
Vg	36.2			
Vr	36.2			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	62.5	37.1		
v (vph)	36.2	36.2		
s (vph)	0	1800		
c (vph)	0	670.4	X=	0.1
v′ (vph)	36.2	36.2		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	62.5	1.3	35.8	99.5
q_1 (veh)	0	0.6	0	
n_a (veh)	0.6	0	0.4	1
n_d (veh)	0	0.6	0.4	1
q_2 (veh)	0.6	0	0	
d_i (veh-sec)	19.6	0.4	0	20.0
	d_1=	20.0	sec/veh	

Table D- 128: Cycle 4 of IQA Model for Southbound and Through Lane of Video 2

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	33.9			
Effective green time, *g* (s)	36.9			
Effective red time, *r* (s)	67.3			
Cycle4				
# of Vehicles in the cycle	5			
Volume, *V* (vph)	172.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.1			
Effective green, *g* (sec)	36.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g/C*=	0.4			
Vg	172.9			
Vr	172.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	67.3	36.9		
v (vph)	172.9	172.9		
s (vph)	0	1800		
c (vph)	0	637.3	X=	0.3
v' (vph)	172.9	172.9		
v (vpsec)	0.05			
s(vpsec)	0.5			
t_c	7.1			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	67.3	7.1	29.7	104.1
q_1 (veh)	0	3.2	0	
n_a (veh)	3.2	0.3	1.4	5
n_d (veh)	0	3.6	1.4	5
q_2 (veh)	3.2	0	0	
d_i (veh-sec)	108.6	11.5	0	120.2
	d_1=	24.0	sec/veh	

Table D- 129: Cycle 5 of IQA Model for Southbound and Through Lane of Video 2

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	33.9			
Effective green time, *g* (s)	36.9			
Effective red time, *r* (s)	80.3			
Cycle5				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	61.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	117.2			
Effective green, *g* (sec)	36.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	61.4			
Vr	61.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	80.3	36.9		
v (vph)	61.4	61.4		
s (vph)	0	1800		
c (vph)	0	567.0	X=	0.1
v' (vph)	61.4	61.4		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	2.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	80.3	2.8	34.1	117.2
q_1 (veh)	0	1.4	0	
n_a (veh)	1.4	0	0.6	2
n_d (veh)	0	1.4	0.6	2
q_2 (veh)	1.4	0	0	
d_i (veh-sec)	55.0	1.9	0	56.9
	d_1=	28.5	sec/veh	

Table D- 130: Cycle 6 of IQA Model for Southbound and Through Lane of Video 2

Yellow interval for movement, y (s)	4			
All red interval for movement , ar (s)	2			
Extension of effective green, e (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, Y, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, G (s)	19.1			
Effective green time, g (s)	22.1			
Effective red time, r (s)	98.0			
Cycle6				
# of Vehicles in the cycle	3			
Volume, V (vph)	89.9			
Saturation flow rate, S (vph)	1800			
Cycle, C (sec)	120.1			
Effective green, g (sec)	22.07			
# of lanes, n	1			
Arrival Type, AT	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	89.9			
Vr	89.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	98.0	22.1		
v (vph)	89.9	89.9		
s (vph)	0	1800		
c (vph)	0	330.8	X=	0.3
v' (vph)	89.9	89.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	5.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	98.0	5.2	16.9	120.1
q_1 (veh)	0	2.4	0	
n_a (veh)	2.4	0.1	0.4	3
n_d (veh)	0	2.6	0.4	3
q_2 (veh)	2.4	0	0	
d_i (veh-sec)	120.0	6.3	0	126.3
	d_1=	42.1	sec/veh	

Table D- 131: Cycle 7 of IQA Model for Southbound and Through Lane of Video 2

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	16.7			
Effective green time, *g* (s)	19.7			
Effective red time, *r* (s)	83.3			
Cycle7				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	139.8			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	103			
Effective green, *g* (sec)	19.7			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	139.8			
Vr	139.8			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	83.3	19.7		
v (vph)	139.8	139.8		
s (vph)	0	1800		
c (vph)	0	344.8	X=	0.4
v' (vph)	139.8	139.8		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	7.0			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	83.3	7.0	12.7	103
q_1 (veh)	0	3.2	0	
n_a (veh)	3.2	0.3	0.5	4
n_d (veh)	0	3.5	0.5	4
q_2 (veh)	3.2	0	0	
d_i (veh-sec)	134.6	11.3	0	146.0
	d_1=	36.5	sec/veh	

Table D- 132: Cycle 8 of IQA Model for Southbound and Through Lane of Video 2

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	16.4			
Effective green time, *g* (s)	19.4			
Effective red time, *r* (s)	100.9			
Cycle8				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	89.8			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	120.3			
Effective green, *g* (sec)	19.4			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.2			
Vg	89.8			
Vr	89.8			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	100.9	19.4		
v (vph)	89.8	89.8		
s (vph)	0	1800		
c (vph)	0	290.7	X=	0.3
v' (vph)	89.8	89.8		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	5.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	100.9	5.3	14.1	120.3
q_1 (veh)	0	2.5	0	
n_a (veh)	2.5	0.1	0.4	3
n_d (veh)	0	2.6	0.4	3
q_2 (veh)	2.5	0	0	
d_i (veh-sec)	126.9	6.7	0	133.5
	d_1=	44.5	sec/veh	

Table D- 133: Summary Table of IQA Model Analysis Results of the Through Lane for Southbound of Video 2

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	65.5	2	131.0
2	20.0	1	20.0
3	0.0	0	0.0
4	24.0	5	120.2
5	28.5	2	56.9
6	42.1	3	126.3
7	36.5	4	146.0
8	44.5	3	133.5
Total	261.1	20	733.9
	Average Delay For the 15-minutes (sec/veh)=		**36.7**

Table D- 134: Cycle 1 of IQA Model for Southbound and Right Turn Lane of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	11.7			
Effective green time, *g* (s)	13.7			
Effective red time, *r* (s)	141.9			
Cycle1				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	46.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	155.7			
Effective green, *g* (sec)	13.7			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.1			
Vg	46.3			
Vr	46.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	141.9	13.7		
v (vph)	46.3	46.3		
s (vph)	0	1800		
c (vph)	0	158.8	X=	0.3
v' (vph)	46.3	46.3		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	3.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	141.9	3.7	10.0	155.7
q_1 (veh)	0	1.8	0	
n_a (veh)	1.8	0	0.1	2
n_d (veh)	0	1.9	0.1	2
q_2 (veh)	1.8	0	0	
d_i (veh-sec)	129.4	3.4	0	132.8
	d_1=	66.4	sec/veh	

Table D- 135: Cycle 2 of IQA Model for Southbound and Right Turn Lane of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	34.1			
Effective green time, *g* (s)	36.1			
Effective red time, *r* (s)	63.5			
Cycle2				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	108.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	99.5			
Effective green, *g* (sec)	36.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.4			
Vg	108.5			
Vr	108.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	63.5	36.1		
v (vph)	108.5	108.5		
s (vph)	0	1800		
c (vph)	0	652.3	X=	0.2
v' (vph)	108.5	108.5		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	4.1			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	63.5	4.1	32.0	99.5
q_1 (veh)	0	1.9	0	
n_a (veh)	1.9	0.1	1.0	3
n_d (veh)	0	2.0	1.0	3
q_2 (veh)	1.9	0	0	
d_i (veh-sec)	60.7	3.9	0	64.6
	d_1=	21.5	sec/veh	

Table D- 136: Cycle 3 of IQA Model for Southbound and Right Turn Lane of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	23.7			
Effective green time, *g* (s)	25.7			
Effective red time, *r* (s)	116.7			
Cycle3				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	50.6			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	142.4			
Effective green, *g* (sec)	25.7			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g/C*=	0.2			
Vg	50.6			
Vr	50.6			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	116.7	25.7		
v (vph)	50.6	50.6		
s (vph)	0	1800		
c (vph)	0	324.8	X=	0.2
v' (vph)	50.6	50.6		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	3.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	116.7	3.4	22.3	142.4
q_1 (veh)	0	1.6	0	
n_a (veh)	1.6	0	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.6	0	0	
d_i (veh-sec)	95.7	2.8	0	98.4
	d_1=	49.2	sec/veh	

Table D- 137: Cycle 4 of IQA Model for Southbound and Right Turn Lane of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	33.9			
Effective green time, *g* (s)	35.9			
Effective red time, *r* (s)	68.3			
Cycle4				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	103.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	104.1			
Effective green, *g* (sec)	35.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g/C*=	0.3			
Vg	103.7			
Vr	103.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	68.3	35.9		
v (vph)	103.7	103.7		
s (vph)	0	1800		
c (vph)	0	620.1	X=	0.2
v' (vph)	103.7	103.7		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	4.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	68.3	4.2	31.7	104.1
q_1 (veh)	0	2.0	0	
n_a (veh)	2.0	0.1	0.9	3
n_d (veh)	0	2.1	0.9	3
q_2 (veh)	2.0	0	0	
d_i (veh-sec)	67.1	4.1	0	71.2
	d_1=	23.7	sec/veh	

Table D- 138: Cycle 5 of IQA Model for Southbound and Right Turn Lane of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	33.9			
Effective green time, *g* (s)	35.9			
Effective red time, *r* (s)	81.3			
Cycle5				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	92.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	117.2			
Effective green, *g* (sec)	35.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	92.1			
Vr	92.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	81.3	35.9		
v (vph)	92.1	92.1		
s (vph)	0	1800		
c (vph)	0	551.7	X=	0.2
v' (vph)	92.1	92.1		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	4.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	81.3	4.4	31.5	117.2
q_1 (veh)	0	2.1	0	
n_a (veh)	2.1	0.1	0.8	3
n_d (veh)	0	2.2	0.8	3
q_2 (veh)	2.1	0	0	
d_i (veh-sec)	84.6	4.6	0	89.1
	d_1=	29.7	sec/veh	

Table D- 139: Cycle 6 of IQA Model for Southbound and Right Turn Lane of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	19.1			
Effective green time, *g* (s)	21.1			
Effective red time, *r* (s)	99.0			
Cycle6				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	89.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	120.1			
Effective green, *g* (sec)	21.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	89.9			
Vr	89.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	99.0	21.1		
v (vph)	89.9	89.9		
s (vph)	0	1800		
c (vph)	0	315.8	X=	0.3
v' (vph)	89.9	89.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	5.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	99.0	5.2	15.9	120.1
q_1 (veh)	0	2.5	0	
n_a (veh)	2.5	0.1	0.4	3
n_d (veh)	0	2.6	0.4	3
q_2 (veh)	2.5	0	0	
d_i (veh-sec)	122.5	6.4	0	128.9
	d_1=	43.0	sec/veh	

Table D- 140: Cycle 7 of IQA Model for Southbound and Right Turn Lane of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	16.7			
Effective green time, *g* (s)	18.7			
Effective red time, *r* (s)	84.3			
Cycle7				
# of Vehicles in the cycle	5			
Volume, *V* (vph)	174.8			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	103			
Effective green, *g* (sec)	18.7			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.2			
Vg	174.8			
Vr	174.8			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	84.3	18.7		
v (vph)	174.8	174.8		
s (vph)	0	1800		
c (vph)	0	327.3	X=	0.5
v' (vph)	174.8	174.8		
v (vpsec)	0.05			
s(vpsec)	0.5			
t_c	9.1			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	84.3	9.1	9.7	103
q_1 (veh)	0	4.1	0	
n_a (veh)	4.1	0.4	0.5	5
n_d (veh)	0	4.5	0.5	5
q_2 (veh)	4.1	0	0	
d_i (veh-sec)	172.4	18.5	0	190.9
	d_1=	38.2	sec/veh	

Table D- 141: Cycle 8 of IQA Model for Southbound and Right Turn Lane of Video 2

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	16.4			
Effective green time, *g* (s)	18.4			
Effective red time, *r* (s)	101.9			
Cycle8				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	119.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	120.3			
Effective green, *g* (sec)	18.4			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C*=	0.2			
Vg	119.7			
Vr	119.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	101.9	18.4		
v (vph)	119.7	119.7		
s (vph)	0	1800		
c (vph)	0	275.8	X=	0.4
v' (vph)	119.7	119.7		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	7.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	101.9	7.3	11.2	120.3
q_1 (veh)	0	3.4	0	
n_a (veh)	3.4	0.2	0.4	4.0
n_d (veh)	0	3.6	0.4	4.0
q_2 (veh)	3.4	0	0	
d_i (veh-sec)	172.5	12.3	0	184.8
	d_1=	46.2	sec/veh	

Table D- 142: Summary Table of IQA Model Analysis Results of the Right Turn Lane Southbound of Video 2

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	66.4	2	132.8
2	21.5	3	64.6
3	49.2	2	98.4
4	23.7	3	71.2
5	29.7	3	89.1
6	43.0	3	128.9
7	38.2	5	190.9
8	46.2	4	184.8
Total	340.0	25	960.8
	Average Delay For the 15-minutes (sec/veh)=		**38.4**

Table D- 143: Cycle 1 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.8			
Effective green time, *g* (s)	20.8			
Effective red time, *r* (s)	93.4			
Cycle1				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	31.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	114.2			
Effective green, *g* (sec)	20.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	31.5			
Vr	31.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	93.4	20.8		
v (vph)	31.5	31.5		
s (vph)	0	1800		
c (vph)	0	327.4	X=	0.1
v' (vph)	31.5	31.5		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	93.4	1.7	19.1	114.2
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.2	1
n_d (veh)	0	0.8	0.2	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	38.2	0.7	0	38.90002
	d_1=	38.9	sec/veh	

Table D- 144: Cycle 2 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	11.2			
Effective green time, *g* (s)	13.2			
Effective red time, *r* (s)	105.0			
Cycle2				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	60.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	118.1			
Effective green, *g* (sec)	13.2			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	60.9			
Vr	60.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	105.0	13.2		
v (vph)	60.9	60.9		
s (vph)	0	1800		
c (vph)	0	200.7	X=	0.3
v' (vph)	60.9	60.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	105.0	3.7	9.5	118.1
q_1 (veh)	0	1.8	0	
n_a (veh)	1.8	0.1	0.2	2
n_d (veh)	0	1.8	0.2	2
q_2 (veh)	1.8	0	0	
d_i (veh-sec)	93.3	3.3	0	96.5
	d_1=	48.3	sec/veh	

Table D- 145: Cycle 3 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.9			
Effective green time, *g* (s)	20.9			
Effective red time, *r* (s)	100.1			
Cycle3				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	29.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	121.0			
Effective green, *g* (sec)	20.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	29.7			
Vr	29.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	100.1	20.9		
v (vph)	29.7	29.7		
s (vph)	0	1800		
c (vph)	0	311.3	X=	0.1
v' (vph)	29.7	29.7		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	100.1	1.7	19.2	121.0
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.2	1
n_d (veh)	0	0.8	0.2	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	41.4	0.7	0	42.1
	d_1=	42.1	sec/veh	

Table D- 146: Cycle 4 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	13.0			
Effective green time, *g* (s)	15.0			
Effective red time, *r* (s)	113.9			
Cycle4				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	55.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	128.8			
Effective green, *g* (sec)	15.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	55.9			
Vr	55.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	113.9	15.0		
v (vph)	55.9	55.9		
s (vph)	0	1800		
c (vph)	0	209.2	X=	0.3
v' (vph)	55.9	55.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	113.9	3.6	11.3	128.8
q_1 (veh)	0	1.8	0	
n_a (veh)	1.8	0.1	0.2	2
n_d (veh)	0	1.8	0.2	2
q_2 (veh)	1.8	0	0	
d_i (veh-sec)	100.6	3.2	0	103.9
	d_1=	51.9	sec/veh	

Table D- 147: Cycle 5 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	20.3			
Effective green time, *g* (s)	22.3			
Effective red time, *r* (s)	74.7			
Cycle5				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	111.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	97.0			
Effective green, *g* (sec)	22.3			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	111.3			
Vr	111.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	74.7	22.3		
v (vph)	111.3	111.3		
s (vph)	0	1800		
c (vph)	0	413.7	X=	0.3
v' (vph)	111.3	111.3		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	4.9			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	74.7	4.9	17.4	97.0
q_1 (veh)	0	2.3	0	
n_a (veh)	2.3	0.2	0.5	3
n_d (veh)	0	2.5	0.5	3
q_2 (veh)	2.3	0	0	
d_i (veh-sec)	86.3	5.7	0	92.0
	d_1=	30.7	sec/veh	

Table D- 148: Cycle 6 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	20.3			
Effective green time, *g* (s)	22.3			
Effective red time, *r* (s)	93.3			
Cycle6				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	62.2			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	115.7			
Effective green, *g* (sec)	22.3			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g*/*C*=	0.2			
Vg	62.2			
Vr	62.2			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	93.3	22.3		
v (vph)	62.2	62.2		
s (vph)	0	1800		
c (vph)	0	347.5	X=	0.2
v' (vph)	62.2	62.2		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	93.3	3.3	19.0	115.7
q_1 (veh)	0	1.6	0	
n_a (veh)	1.6	0.1	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.6	0	0	
d_i (veh-sec)	75.3	2.7	0	78.0
	d_1=	39.0	sec/veh	

Table D- 149: Cycle 7 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.5			
Effective green time, *g* (s)	20.5			
Effective red time, *r* (s)	106			
Cycle7				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	85.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	126.5			
Effective green, *g* (sec)	20.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	85.4			
Vr	85.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	106.0	20.5		
v (vph)	85.4	85.4		
s (vph)	0	1800		
c (vph)	0	292.1	X=	0.3
v' (vph)	85.4	85.4		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	5.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	106.0	5.3	15.3	126.5
q_1 (veh)	0	2.5	0	
n_a (veh)	2.5	0.1	0.4	3
n_d (veh)	0	2.6	0.4	3
q_2 (veh)	2.5	0	0	
d_i (veh-sec)	133.2	6.6	0	139.8
	d_1=	46.6	sec/veh	

Table D- 150: Summary Table of IQA Model Analysis Results of the First Left Turn Lane from the Middle of the Road for Northbound of Video 3

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	38.9	1	38.9
2	48.3	2	96.5
3	42.1	1	42.1
4	51.9	2	103.9
5	30.7	3	92.0
6	39.0	2	78.0
7	46.6	3	139.8
Total	297.5	14	591.2
	Average Delay For the 15-minutes (sec/veh)=		**42.2**

Table D- 151: Cycle 1 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.8			
Effective green time, *g* (s)	20.8			
Effective red time, *r* (s)	93.4			
Cycle1				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	63.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	114.2			
Effective green, *g* (sec)	20.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	63.0			
Vr	63.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	93.4	20.8		
v (vph)	63.0	63.0		
s (vph)	0	1800		
c (vph)	0	327.4	X=	0.2
v′ (vph)	63.0	63.0		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	93.4	3.4	17.4	114.2
q_1 (veh)	0	1.6	0	
n_a (veh)	1.6	0.1	0.3	2.0
n_d (veh)	0	1.7	0.3	2.0
q_2 (veh)	1.6	0	0	
d_i (veh-sec)	76.4	2.8	0	79.2
	d_1=	39.6	sec/veh	

Table D- 152: Cycle 3 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.9			
Effective green time, *g* (s)	20.9			
Effective red time, *r* (s)	100.1			
Cycle3				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	59.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	121.0			
Effective green, *g* (sec)	20.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	59.5			
Vr	59.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	100.1	20.9		
v (vph)	59.5	59.5		
s (vph)	0	1800		
c (vph)	0	311.3	X=	0.2
v' (vph)	59.5	59.5		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	100.1	3.4	17.5	121.0
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	82.8	2.8	0	85.6
	d_1=	42.8	sec/veh	

Table D- 153: Cycle 4 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	13.0			
Effective green time, *g* (s)	15.0			
Effective red time, *r* (s)	113.9			
Cycle4				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	55.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	128.8			
Effective green, *g* (sec)	15.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	55.9			
Vr	55.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	113.9	15.0		
v (vph)	55.9	55.9		
s (vph)	0	1800		
c (vph)	0	209.2	X=	0.3
v' (vph)	55.9	55.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	113.9	3.6	11.3	128.8
q_1 (veh)	0	1.8	0	
n_a (veh)	1.8	0.1	0.2	2
n_d (veh)	0	1.8	0.2	2
q_2 (veh)	1.8	0	0	
d_i (veh-sec)	100.6	3.2	0	103.9
	d_1=	51.9	sec/veh	

Table D- 154: Cycle 5 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	20.3			
Effective green time, *g* (s)	22.3			
Effective red time, *r* (s)	74.7			
Cycle5				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	148.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	97.0			
Effective green, *g* (sec)	22.3			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	148.4			
Vr	148.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	74.7	22.3		
v (vph)	148.4	148.4		
s (vph)	0	1800		
c (vph)	0	413.7	X=	0.4
v′ (vph)	148.4	148.4		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	6.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t′* (sec)	74.7	6.7	15.6	97.0
q_1 (veh)	0.0	3.1	0	
n_a (veh)	3.1	0.3	0.6	4
n_d (veh)	0	3.4	0.6	4
q_2 (veh)	3.1	0	0	
d_i (veh-sec)	115.1	10.3	0	125.5
	d_1=	31.4	sec/veh	

Table D- 155: Cycle 6 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	20.3			
Effective green time, *g* (s)	22.3			
Effective red time, *r* (s)	93.3			
Cycle6				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	124.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	115.7			
Effective green, *g* (sec)	22.3			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	124.5			
Vr	124.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	93.3	22.3		
v (vph)	124.5	124.5		
s (vph)	0	1800		
c (vph)	0	347.5	X=	0.4
v' (vph)	124.5	124.5		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	6.9			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	93.3	6.9	15.4	115.7
q_1 (veh)	0	3.2	0	
n_a (veh)	3.2	0.2	0.5	4
n_d (veh)	0	3.5	0.5	4
q_2 (veh)	3.2	0	0	
d_i (veh-sec)	150.6	11.2	0	161.8
	d_1=	40.5	sec/veh	

Table D- 156: Cycle 7 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.5			
Effective green time, *g* (s)	20.5			
Effective red time, *r* (s)	106			
Cycle7				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	85.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	126.5			
Effective green, *g* (sec)	20.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	85.4			
Vr	85.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	106.0	20.5		
v (vph)	85.4	85.4		
s (vph)	0	1800		
c (vph)	0	292.1	X=	0.3
v' (vph)	85.4	85.4		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	5.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	106.0	5.3	15.3	126.5
q_1 (veh)	0	2.5	0	
n_a (veh)	2.5	0.1	0.4	3
n_d (veh)	0	2.6	0.4	3
q_2 (veh)	2.5	0	0	
d_i (veh-sec)	133.2	6.6	0	139.8
	d_1=	46.6	sec/veh	

Table D- 157: Summary Table of IQA Model Analysis Results of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 3

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	39.6	2	79.2
2	0.0	0	0.0
3	42.8	2	85.6
4	51.9	2	103.9
5	31.4	4	125.5
6	40.5	4	161.8
7	46.6	3	139.8
Total	252.8	17	695.8
	Average Delay For the 15-minutes (sec/veh)=		**40.9**

Table D- 158: Cycle 1 of IQA Model for Northbound and Through Lane of Video 3

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	27.3			
Effective green time, *g* (s)	30.3			
Effective red time, *r* (s)	83.9			
Cycle1				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	63.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	114.2			
Effective green, *g* (sec)	30.3			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.3			
Vg	63.0			
Vr	63.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	83.9	30.3		
v (vph)	63.0	63.0		
s (vph)	0	1800		
c (vph)	0	477.1	X=	0.1
v' (vph)	63.0	63.0		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.0			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	83.9	3.0	27.2	114.2
q_1 (veh)	0	1.5	0	
n_a (veh)	1.5	0.1	0.5	2
n_d (veh)	0	1.5	0.5	2
q_2 (veh)	1.5	0	0	
d_i (veh-sec)	61.7	2.2	0	63.9
	d_1=	32.0	sec/veh	

Table D- 159: Cycle 2 of IQA Model for Northbound and Through Lane of Video 3

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	19.3			
Effective green time, *g* (s)	22.3			
Effective red time, *r* (s)	95.8			
Cycle2				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	121.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	118.1			
Effective green, *g* (sec)	22.3			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	121.9			
Vr	121.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	95.8	22.3		
v (vph)	121.9	121.9		
s (vph)	0	1800		
c (vph)	0	340.3	X=	0.4
v' (vph)	121.9	121.9		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	7.0			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	95.8	7.0	15.4	118.1
q_1 (veh)	0	3.2	0	
n_a (veh)	3.2	0.2	0.5	4
n_d (veh)	0	3.5	0.5	4
q_2 (veh)	3.2	0	0	
d_i (veh-sec)	155.4	11.3	0	166.7
	d_1=	41.7	sec/veh	

Table D- 160: Cycle 3 of IQA Model for Northbound and Through Lane of Video 3

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	21.9			
Effective green time, *g* (s)	24.9			
Effective red time, *r* (s)	96.1			
Cycle3				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	89.2			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	121.0			
Effective green, *g* (sec)	24.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.2			
Vg	89.2			
Vr	89.2			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	96.1	24.9		
v (vph)	89.2	89.2		
s (vph)	0	1800		
c (vph)	0	370.3	X=	0.2
v' (vph)	89.2	89.2		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	5.0			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	96.1	5.0	19.9	121.0
q_1 (veh)	0	2.4	0	
n_a (veh)	2.4	0.1	0.5	3
n_d (veh)	0	2.5	0.5	3
q_2 (veh)	2.4	0	0	
d_i (veh-sec)	114.5	6.0	0	120.5
	d_1=	40.2	sec/veh	

Table D- 161: Cycle 4 of IQA Model for Northbound and Through Lane of Video 3

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	26.8			
Effective green time, *g* (s)	29.8			
Effective red time, *r* (s)	99			
Cycle4				
# of Vehicles in the cycle	8			
Volume, *V* (vph)	223.6			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	128.8			
Effective green, *g* (sec)	29.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g*/*C*=	0.2			
Vg	223.6			
Vr	223.6			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	99.0	29.8		
v (vph)	223.6	223.6		
s (vph)	0	1800		
c (vph)	0	416.8	X=	0.5
v′ (vph)	223.6	223.6		
v (vpsec)	0.1			
s(vpsec)	0.5			
t_c	14.0			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	99.0	14.0	15.8	128.8
q_1 (veh)	0	6.1	0	
n_a (veh)	6.1	0.9	1.0	8
n_d (veh)	0	7.0	1.0	8
q_2 (veh)	6.1	0	0	
d_i (veh-sec)	304.3	43.2	0	347.5
	d_1=	43.4	sec/veh	

Table D- 162: Cycle 5 of IQA Model for Northbound and Through Lane of Video 3

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	22.7			
Effective green time, *g* (s)	25.7			
Effective red time, *r* (s)	71.4			
Cycle5				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	111.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	97.0			
Effective green, *g* (sec)	25.7			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	111.3			
Vr	111.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	71.4	25.7		
v (vph)	111.3	111.3		
s (vph)	0	1800		
c (vph)	0	476.2	X=	0.2
v' (vph)	111.3	111.3		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	4.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	71.4	4.7	21.0	97.0
q_1 (veh)	0	2.2	0	
n_a (veh)	2.2	0.1	0.6	3
n_d (veh)	0	2.4	0.6	3
q_2 (veh)	2.2	0	0	
d_i (veh-sec)	78.7	5.2	0	83.9
	d_1=	28.0	sec/veh	

Table D- 163: Cycle 6 of IQA Model for Northbound and Through Lane of Video 3

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.0			
Effective green time, *g* (s)	21.0			
Effective red time, *r* (s)	94.6			
Cycle6				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	62.2			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	115.7			
Effective green, *g* (sec)	21.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	62.2			
Vr	62.2			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	94.6	21.0		
v (vph)	62.2	62.2		
s (vph)	0	1800		
c (vph)	0	327.3	X=	0.2
v' (vph)	62.2	62.2		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	94.6	3.4	17.6	115.7
q_1 (veh)	0	1.6	0.0	
n_a (veh)	1.6	0.1	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.6	0	0	
d_i (veh-sec)	77.4	2.8	0	80.2
	d_1=	40.1	sec/veh	

Table D- 164: Cycle 7 of IQA Model for Northbound and Through Lane of Video 3

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	26.0			
Effective green time, *g* (s)	29.0			
Effective red time, *r* (s)	97.5			
Cycle7				
# of Vehicles in the cycle	6			
Volume, *V* (vph)	170.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	126.5			
Effective green, *g* (sec)	29.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	170.7			
Vr	170.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	97.5	29.0		
v (vph)	170.7	170.7		
s (vph)	0	1800		
c (vph)	0	413.0	X=	0.4
v' (vph)	170.7	170.7		
v (vpsec)	0.05			
s(vpsec)	0.5			
t_c	10.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	97.5	10.2	18.8	126.5
q_1 (veh)	0	4.6	0	
n_a (veh)	4.6	0.5	0.9	6
n_d (veh)	0	5.1	0.9	6
q_2 (veh)	4.6	0	0	
d_i (veh-sec)	225.4	23.6	0	249.0
	d_1=	41.5	sec/veh	

Table D- 165: Summary Table of IQA Model Analysis Results of the Through Lane for Northbound of Video 3

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	32.0	2	63.9
2	41.7	4	166.7
3	40.2	3	120.5
4	43.4	8	347.5
5	28.0	3	83.9
6	40.1	2	80.2
7	41.5	6	249.0
Total	266.8	28	1111.7
	Average Delay For the 15-minutes (sec/veh)=		**39.7**

Table D- 166: Cycle 1 of IQA Model for Northbound and Right Turn Lane of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	27.3			
Effective green time, *g* (s)	29.3			
Effective red time, *r* (s)	84.9			
Cycle1				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	94.6			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	114.2			
Effective green, *g* (sec)	29.3			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.3			
Vg	94.6			
Vr	94.6			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	84.9	29.3		
v (vph)	94.6	94.6		
s (vph)	0	1800		
c (vph)	0	461.3	X=	0.2
v' (vph)	94.6	94.6		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	4.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	84.9	4.7	24.6	114.2
q_1 (veh)	0	2.2	0	
n_a (veh)	2.2	0.1	0.6	3
n_d (veh)	0	2.4	0.6	3
q_2 (veh)	2.2	0	0	
d_i (veh-sec)	94.7	5.3	0	100.0
	d_1=	33.3	sec/veh	

Table D- 167: Cycle 2 of IQA Model for Northbound and Right Turn Lane of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	19.3			
Effective green time, *g* (s)	21.3			
Effective red time, *r* (s)	96.8			
Cycle2				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	121.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	118.1			
Effective green, *g* (sec)	21.3			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.2			
Vg	121.9			
Vr	121.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	96.8	21.3		
v (vph)	121.9	121.9		
s (vph)	0	1800		
c (vph)	0	325.0	X=	0.4
v' (vph)	121.9	121.9		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	7.0			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	96.8	7.0	14.3	118.1
q_1 (veh)	0	3.3	0	
n_a (veh)	3.3	0.2	0.5	4
n_d (veh)	0	3.5	0.5	4
q_2 (veh)	3.3	0	0	
d_i (veh-sec)	158.6	11.5	0	170.2
	d_1=	42.5	sec/veh	

Table D- 168: Cycle 3 of IQA Model for Northbound and Right Turn Lane of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	21.9			
Effective green time, *g* (s)	23.9			
Effective red time, *r* (s)	97.1			
Cycle3				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	59.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	121.0			
Effective green, *g* (sec)	23.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g*/*C*=	0.2			
Vg	59.5			
Vr	59.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	97.1	23.9		
v (vph)	59.5	59.5		
s (vph)	0	1800		
c (vph)	0	355.4	X=	0.2
v' (vph)	59.5	59.5		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	97.1	3.3	20.6	121.0
q_1 (veh)	0	1.6	0	
n_a (veh)	1.6	0.1	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.6	0	0	
d_i (veh-sec)	77.9	2.7	0	80.6
	d_1=	40.3	sec/veh	

Table D- 169: Cycle 4 of IQA Model for Northbound and Right Turn Lane of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	26.8			
Effective green time, *g* (s)	28.8			
Effective red time, *r* (s)	100			
Cycle4				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	27.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	128.8			
Effective green, *g* (sec)	28.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.2			
Vg	27.9			
Vr	27.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	100.0	28.8		
v (vph)	27.9	27.9		
s (vph)	0	1800		
c (vph)	0	402.8	X=	0.1
v' (vph)	27.9	27.9		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	100.0	1.6	27.3	128.8
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.2	1
n_d (veh)	0	0.8	0.2	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	38.8	0.6	0	39.4
	d_1=	39.4	sec/veh	

Table D- 170: Cycle 5 of IQA Model for Northbound and Right Turn Lane of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	22.7			
Effective green time, *g* (s)	24.7			
Effective red time, *r* (s)	72.4			
Cycle5				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	148.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	97.0			
Effective green, *g* (sec)	24.7			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	148.4			
Vr	148.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	72.4	24.7		
v (vph)	148.4	148.4		
s (vph)	0	1800		
c (vph)	0	457.7	X=	0.3
v' (vph)	148.4	148.4		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	6.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	72.4	6.5	18.2	97.0
q_1 (veh)	0	3.0	0	
n_a (veh)	3.0	0.3	0.7	4
n_d (veh)	0	3.3	0.7	4
q_2 (veh)	3.0	0	0	
d_i (veh-sec)	107.9	9.7	0	117.6
	d_1=	29.4	sec/veh	

Table D- 171: Cycle 6 of IQA Model for Northbound and Right Turn Lane of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.0			
Effective green time, *g* (s)	20.0			
Effective red time, *r* (s)	95.6			
Cycle6				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	93.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	115.7			
Effective green, *g* (sec)	20.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g/C*=	0.2			
Vg	93.4			
Vr	93.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	95.6	20.0		
v (vph)	93.4	93.4		
s (vph)	0	1800		
c (vph)	0	311.7	X=	0.3
v' (vph)	93.4	93.4		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	5.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	95.6	5.2	14.8	115.7
q_1 (veh)	0	2.5	0	
n_a (veh)	2.5	0.1	0.4	3
n_d (veh)	0	2.6	0.4	3
q_2 (veh)	2.5	0	0	
d_i (veh-sec)	118.6	6.5	0	125.1
	d_1=	41.7	sec/veh	

Table D- 172: Cycle 7 of IQA Model for Northbound and Right Turn Lane of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	26.0			
Effective green time, *g* (s)	28.0			
Effective red time, *r* (s)	98.5			
Cycle7				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	85.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	126.5			
Effective green, *g* (sec)	28.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.2			
Vg	85.4			
Vr	85.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	98.5	28.0		
v (vph)	85.4	85.4		
s (vph)	0	1800		
c (vph)	0	398.8	X=	0.2
v' (vph)	85.4	85.4		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	4.9			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	98.5	4.9	23.1	126.5
q_1 (veh)	0	2.3	0	
n_a (veh)	2.3	0.1	0.5	3
n_d (veh)	0	2.5	0.5	3
q_2 (veh)	2.3	0	0	
d_i (veh-sec)	115.0	5.7	0	120.7
	d_1=	40.2	sec/veh	

Table D- 173: Cycle 8 of IQA Model for Northbound and Right Turn Lane of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	23.2			
Effective green time, *g* (s)	25.2			
Effective red time, *r* (s)	92.2			
Cycle8				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	61.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	117.4			
Effective green, *g* (sec)	25.2			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.2			
Vg	61.4			
Vr	61.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	92.2	25.2		
v (vph)	61.4	61.4		
s (vph)	0	1800		
c (vph)	0	385.8	X=	0.2
v' (vph)	61.4	61.4		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	92.2	3.3	21.9	117.4
q_1 (veh)	0	1.6	0	
n_a (veh)	1.6	0.1	0.4	2
n_d (veh)	0	1.6	0.4	2
q_2 (veh)	1.6	0	0	
d_i (veh-sec)	72.4	2.6	0	75.0
	d_1=	37.5	sec/veh	

Table D- 174: Summary Table of IQA Model Analysis Results of Right Turn Lane for Northbound of Video 3

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	33.3	3	100.0
2	42.5	4	170.2
3	40.3	2	80.6
4	39.4	1	39.4
5	29.4	4	117.6
6	41.7	3	125.1
7	40.2	3	120.7
8	37.5	2	75.0
Total	304.5	22	828.7
	Average Delay For the 15-minutes (sec/veh)=		**37.7**

Table D- 175: Cycle 1 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	13.5			
Effective green time, *g* (s)	15.5			
Effective red time, *r* (s)	98.7			
Cycle1				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	63.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	114.2			
Effective green, *g* (sec)	15.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	63.0			
Vr	63.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	98.7	15.5		
v (vph)	63.0	63.0		
s (vph)	0	1800		
c (vph)	0	244.8	X=	0.3
v' (vph)	63.0	63.0		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	98.7	3.6	11.9	114.2
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.2	2
n_d (veh)	0	1.8	0.2	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	85.3	3.1	0	88.3
	d_1=	44.2	sec/veh	

Table D- 176: Cycle 2 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	16.4			
Effective green time, *g* (s)	18.4			
Effective red time, *r* (s)	99.7			
Cycle2				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	30.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	118.1			
Effective green, *g* (sec)	18.4			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	30.5			
Vr	30.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	99.7	18.4		
v (vph)	30.5	30.5		
s (vph)	0	1800		
c (vph)	0	280.4	X=	0.1
v' (vph)	30.5	30.5		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	99.7	1.7	16.7	118.1
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	42.1	0.7	0	42.8
	d_1=	42.8230126	sec/veh	

Table D- 177: Cycle 3 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	14			
Effective green time, *g* (s)	16			
Effective red time, *r* (s)	105.0			
Cycle3				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	59.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	121.0			
Effective green, *g* (sec)	16			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	59.5			
Vr	59.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	105.0	16.0		
v (vph)	59.5	59.5		
s (vph)	0	1800		
c (vph)	0	238.0	X=	0.3
v′ (vph)	59.5	59.5		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	105.0	3.6	12.4	121.0
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.2	2
n_d (veh)	0	1.8	0.2	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	91.1	3.1	0	94.3
	d_1=	47.1	sec/veh	

Table D- 178: Cycle 4 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.4			
Effective green time, *g* (s)	20.4			
Effective red time, *r* (s)	108.4			
Cycle4				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	55.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	128.8			
Effective green, *g* (sec)	20.4			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	55.9			
Vr	55.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	108.4	20.4		
v (vph)	55.9	55.9		
s (vph)	0	1800		
c (vph)	0	285.4	X=	0.2
v' (vph)	55.9	55.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	108.4	3.5	17.0	128.8
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	91.2	2.9	0	94.1
	d_1=	47.1	sec/veh	

Table D- 179: Cycle 5 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	14.8			
Effective green time, *g* (s)	16.8			
Effective red time, *r* (s)	80.2			
Cycle5				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	37.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	97.0			
Effective green, *g* (sec)	16.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	37.1			
Vr	37.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	80.2	16.8		
v (vph)	37.1	37.1		
s (vph)	0	1800		
c (vph)	0	312.2	X=	0.1
v' (vph)	37.1	37.1		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	80.2	1.7	15.1	97.0
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.2	1
n_d (veh)	0	0.8	0.2	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	33.1	0.7	0	33.8
	d_1=	33.8	sec/veh	

Table D- 180: Cycle 7 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	13.5			
Effective green time, *g* (s)	15.5			
Effective red time, *r* (s)	111			
Cycle7				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	56.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	126.5			
Effective green, *g* (sec)	15.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	56.9			
Vr	56.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	111.0	15.5		
v (vph)	56.9	56.9		
s (vph)	0	1800		
c (vph)	0	220.9	X=	0.3
v' (vph)	56.9	56.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	111.0	3.6	11.9	126.5
q_1 (veh)	0	1.8	0	
n_a (veh)	1.8	0.1	0.2	2
n_d (veh)	0	1.8	0.2	2
q_2 (veh)	1.8	0	0	
d_i (veh-sec)	97.4	3.2	0	100.6
	d_1=	50.3	sec/veh	

Table D- 181: Summary Table of IQA Model Analysis Results of the First Left Turn Lane from the Middle of the Road for Southbound of Video 3

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	44.2	2	88.3
2	42.8	1	42.8
3	47.1	2	94.3
4	47.1	2	94.1
5	33.8	1	33.8
6	0.0	0	0.0
7	50.3	2	100.6
Total	265.3	10	454.0
	Average Delay For the 15-minutes (sec/veh)=		**45.4**

Table D- 182: Cycle 2 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	16.4			
Effective green time, *g* (s)	18.4			
Effective red time, *r* (s)	99.7			
Cycle2				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	60.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	118.1			
Effective green, *g* (sec)	18.4			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	60.9			
Vr	60.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	99.7	18.4		
v (vph)	60.9	60.9		
s (vph)	0	1800		
c (vph)	0	280.4	X=	0.2
v' (vph)	60.9	60.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	99.7	3.5	14.9	118.1
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	84.2	3.0	0	87.1
	d_1=	43.6	sec/veh	

Table D- 183: Cycle 3 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	14			
Effective green time, *g* (s)	16			
Effective red time, *r* (s)	105.0			
Cycle3				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	59.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	121.0			
Effective green, *g* (sec)	16			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	59.5			
Vr	59.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	105.0	16.0		
v (vph)	59.5	59.5		
s (vph)	0	1800		
c (vph)	0	238.0	X=	0.3
v′ (vph)	59.5	59.5		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	105.0	3.6	12.4	121.0
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.2	2
n_d (veh)	0	1.8	0.2	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	91.1	3.1	0	94.3
	d_1=	47.1	sec/veh	

Table D- 184: Cycle 4 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.4			
Effective green time, *g* (s)	20.4			
Effective red time, *r* (s)	108.4			
Cycle4				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	27.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	128.8			
Effective green, *g* (sec)	20.4			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	27.9			
Vr	27.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	108.4	20.4		
v (vph)	27.9	27.9		
s (vph)	0	1800		
c (vph)	0	285.4	X=	0.1
v' (vph)	27.9	27.9		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	108.4	1.7	18.7	128.8
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	45.6	0.7	0	46.3
	d_1=	46.3	sec/veh	

Table D- 185: Cycle 5 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	14.8			
Effective green time, *g* (s)	16.8			
Effective red time, *r* (s)	80.2			
Cycle5				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	111.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	97.0			
Effective green, *g* (sec)	16.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	111.3			
Vr	111.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	80.2	16.8		
v (vph)	111.3	111.3		
s (vph)	0	1800		
c (vph)	0	312.2	X=	0.4
v' (vph)	111.3	111.3		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	5.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	80.2	5.3	11.5	97.0
q_1 (veh)	0	2.5	0	
n_a (veh)	2.5	0.2	0.4	3
n_d (veh)	0	2.6	0.4	3
q_2 (veh)	2.5	0	0	
d_i (veh-sec)	99.4	6.6	0	106.0
	d_1=	35.3	sec/veh	

Table D- 186: Cycle 6 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	15.1			
Effective green time, *g* (s)	17.1			
Effective red time, *r* (s)	98.6			
Cycle6				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	31.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	115.7			
Effective green, *g* (sec)	17.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	31.1			
Vr	31.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	98.6	17.1		
v (vph)	31.1	31.1		
s (vph)	0	1800		
c (vph)	0	265.6	X=	0.1
v' (vph)	31.1	31.1		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	98.6	1.7	15.3	115.7
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	42.0	0.7	0	42.8
	d_1=	42.8	sec/veh	

Table D- 187: Cycle 7 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	13.5			
Effective green time, *g* (s)	15.5			
Effective red time, *r* (s)	111			
Cycle7				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	85.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	126.5			
Effective green, *g* (sec)	15.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	85.4			
Vr	85.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	111.0	15.5		
v (vph)	85.4	85.4		
s (vph)	0	1800		
c (vph)	0	220.9	X=	0.4
v' (vph)	85.4	85.4		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	5.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	111.0	5.5	10.0	126.5
q_1 (veh)	0	2.6	0	
n_a (veh)	2.6	0.1	0.2	3
n_d (veh)	0	2.8	0.2	3
q_2 (veh)	2.6	0	0	
d_i (veh-sec)	146.1	7.3	0	153.3
	d_1=	51.1	sec/veh	

Table D- 188: Summary Table of IQA Model Analysis Results of the Second Left Turn Lane from the Middle of the Road for Southbound of Video 3

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	0.0	0	0.0
2	43.6	2	87.1
3	47.1	2	94.3
4	46.3	1	46.3
5	35.3	3	106.0
6	42.8	1	42.8
7	51.1	3	153.3
Total	266.2	12	529.8
	Average Delay For the 15-minutes (sec/veh)=		44.2

Table D- 189: Cycle 1 of IQA Model for Southbound and Through Lane of Video 3

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	22.2			
Effective green time, *g* (s)	25.2			
Effective red time, *r* (s)	89			
Cycle1				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	63.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	114.2			
Effective green, *g* (sec)	25.2			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	63.0			
Vr	63.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	89.0	25.2		
v (vph)	63.0	63.0		
s (vph)	0	1800		
c (vph)	0	397.2	X=	0.2
v' (vph)	63.0	63.0		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	89.0	3.2	22.0	114.2
q_1 (veh)	0	1.6	0	
n_a (veh)	1.6	0.1	0.4	2
n_d (veh)	0	1.6	0.4	2
q_2 (veh)	1.6	0	0	
d_i (veh-sec)	69.4	2.5	0	71.9
	d_1=	35.9	sec/veh	

Table D- 190: Cycle 2 of IQA Model for Southbound and Through Lane of Video 3

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	24.5			
Effective green time, *g* (s)	27.5			
Effective red time, *r* (s)	90.6			
Cycle2				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	30.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	118.1			
Effective green, *g* (sec)	27.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g*/*C*=	0.2			
Vg	30.5			
Vr	30.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	90.6	27.5		
v (vph)	30.5	30.5		
s (vph)	0	1800		
c (vph)	0	419.0	X=	0.1
v' (vph)	30.5	30.5		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	90.6	1.6	25.9	118.1
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.2	1
n_d (veh)	0	0.8	0.2	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	34.8	0.6	0	35.4
	d_1=	35.4	sec/veh	

Table D- 191: Cycle 3 of IQA Model for Southbound and Through Lane of Video 3

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	16.8			
Effective green time, *g* (s)	19.8			
Effective red time, *r* (s)	101.2			
Cycle3				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	89.2			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	121.0			
Effective green, *g* (sec)	19.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	89.2			
Vr	89.2			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	101.2	19.8		
v (vph)	89.2	89.2		
s (vph)	0	1800		
c (vph)	0	294.5	X=	0.3
v' (vph)	89.2	89.2		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	5.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	101.2	5.3	14.5	121.0
q_1 (veh)	0	2.5	0	
n_a (veh)	2.5	0.1	0.4	3
n_d (veh)	0	2.6	0.4	3
q_2 (veh)	2.5	0	0	
d_i (veh-sec)	127.0	6.6	0	133.6
	d_1=	44.5	sec/veh	

Table D- 192: Cycle 4 of IQA Model for Southbound and Through Lane of Video 3

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	32.3			
Effective green time, *g* (s)	35.3			
Effective red time, *r* (s)	93.5			
Cycle4				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	111.8			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	128.8			
Effective green, *g* (sec)	35.3			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	111.8			
Vr	111.8			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	93.5	35.3		
v (vph)	111.8	111.8		
s (vph)	0	1800		
c (vph)	0	493.2	X=	0.2
v' (vph)	111.8	111.8		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	6.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	93.5	6.2	29.1	128.8
q_1 (veh)	0	2.9	0	
n_a (veh)	2.9	0.2	0.9	4
n_d (veh)	0	3.1	0.9	4
q_2 (veh)	2.9	0	0	
d_i (veh-sec)	135.8	9.0	0	144.8
	d_1=	36.2	sec/veh	

Table D- 193: Cycle 5 of IQA Model for Southbound and Through Lane of Video 3

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	17.4			
Effective green time, *g* (s)	20.4			
Effective red time, *r* (s)	76.7			
Cycle5				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	148.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	97.0			
Effective green, *g* (sec)	20.4			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g*/*C*=	0.2			
Vg	148.4			
Vr	148.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	76.7	20.4		
v (vph)	148.4	148.4		
s (vph)	0	1800		
c (vph)	0	377.9	X=	0.4
v' (vph)	148.4	148.4		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	6.9			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	76.7	6.9	13.5	97.0
q_1 (veh)	0	3.2	0	
n_a (veh)	3.2	0.3	0.6	4
n_d (veh)	0	3.4	0.6	4
q_2 (veh)	3.2	0	0	
d_i (veh-sec)	121.1	10.9	0	132.0
	d_1=	33.0	sec/veh	

Table D- 194: Cycle 6 of IQA Model for Southbound and Through Lane of Video 3

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	12.9			
Effective green time, *g* (s)	15.9			
Effective red time, *r* (s)	99.8			
Cycle6				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	62.2			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	115.7			
Effective green, *g* (sec)	15.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	62.2			
Vr	62.2			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	99.8	15.9		
v (vph)	62.2	62.2		
s (vph)	0	1800		
c (vph)	0	247.0	X=	0.3
v' (vph)	62.2	62.2		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	99.8	3.6	12.3	115.7
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.2	2
n_d (veh)	0	1.8	0.2	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	86.1	3.1	0	89.2
	d_1=	44.6	sec/veh	

Table D- 195: Cycle 7 of IQA Model for Southbound and Through Lane of Video 3

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	21.1			
Effective green time, *g* (s)	24.1			
Effective red time, *r* (s)	102.4			
Cycle7				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	56.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	126.5			
Effective green, *g* (sec)	24.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	56.9			
Vr	56.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	102.4	24.1		
v (vph)	56.9	56.9		
s (vph)	0	1800		
c (vph)	0	342.8	X=	0.2
v' (vph)	56.9	56.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	102.4	3.3	20.8	126.5
q_1 (veh)	0	1.6	0	
n_a (veh)	1.6	0.1	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.6	0	0	
d_i (veh-sec)	82.9	2.7	0	85.6
	d_1=	42.8	sec/veh	

Table D- 196: Summary Table of IQA Model Analysis Results of the Through Lane for Southbound of Video 3

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	35.9	2	71.9
2	35.4	1	35.4
3	44.5	3	133.6
4	36.2	4	144.8
5	33.0	4	132.0
6	44.6	2	89.2
7	42.8	2	85.6
Total	272.5	18	692.5
	Average Delay For the 15-minutes (sec/veh)=		**38.5**

Table D- 197: Cycle 1 of IQA Model for Southbound and Right Turn Lane of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	22.2			
Effective green time, *g* (s)	24.2			
Effective red time, *r* (s)	90			
Cycle1				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	31.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	114.2			
Effective green, *g* (sec)	24.2			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	31.5			
Vr	31.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	90.0	24.2		
v (vph)	31.5	31.5		
s (vph)	0	1800		
c (vph)	0	381.4	X=	0.1
v' (vph)	31.5	31.5		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	90.0	1.6	22.6	114.2
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.2	1
n_d (veh)	0	0.8	0.2	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	35.5	0.6	0	36.1
	d_1=	36.1	sec/veh	

Table D- 198: Cycle 2 of IQA Model for Southbound and Right Turn Lane of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	24.5			
Effective green time, *g* (s)	26.5			
Effective red time, *r* (s)	91.6			
Cycle2				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	30.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	118.1			
Effective green, *g* (sec)	26.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	30.5			
Vr	30.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	91.6	26.5		
v (vph)	30.5	30.5		
s (vph)	0	1800		
c (vph)	0	403.8	X=	0.1
v' (vph)	30.5	30.5		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	91.6	1.6	24.9	118.1
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.2	1
n_d (veh)	0	0.8	0.2	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	35.5	0.6	0	36.1
	d_1=	36.1	sec/veh	

Table D- 199: Cycle 3 of IQA Model for Southbound and Right Turn Lane of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	16.8			
Effective green time, *g* (s)	18.8			
Effective red time, *r* (s)	102.2			
Cycle3				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	29.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	121.0			
Effective green, *g* (sec)	18.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.2			
Vg	29.7			
Vr	29.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	102.2	18.8		
v (vph)	29.7	29.7		
s (vph)	0	1800		
c (vph)	0	279.6	X=	0.1
v' (vph)	29.7	29.7		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	102.2	1.7	17.1	121.0
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	43.2	0.7	0	43.9
	d_1=	43.9	sec/veh	

Table D- 200: Cycle 4 of IQA Model for Southbound and Right Turn Lane of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	32.3			
Effective green time, *g* (s)	34.3			
Effective red time, *r* (s)	94.5			
Cycle4				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	111.8			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	128.8			
Effective green, *g* (sec)	34.3			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C*=	0.3			
Vg	111.8			
Vr	111.8			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	94.5	34.3		
v (vph)	111.8	111.8		
s (vph)	0	1800		
c (vph)	0	479.2	X=	0.2
v' (vph)	111.8	111.8		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	6.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	94.5	6.3	28.0	128.8
q_1 (veh)	0	2.9	0	
n_a (veh)	2.9	0.2	0.9	4
n_d (veh)	0	3.1	0.9	4
q_2 (veh)	2.9	0	0	
d_i (veh-sec)	138.7	9.2	0	147.9
	d_1=	37.0	sec/veh	

Table D- 201: Cycle 5 of IQA Model for Southbound and Right Turn Lane of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	17.4			
Effective green time, *g* (s)	19.4			
Effective red time, *r* (s)	77.7			
Cycle5				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	148.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	97.0			
Effective green, *g* (sec)	19.4			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rpxg/C*=	0.2			
Vg	148.4			
Vr	148.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	77.7	19.4		
v (vph)	148.4	148.4		
s (vph)	0	1800		
c (vph)	0	359.3	X=	0.4
v' (vph)	148.4	148.4		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	7.0			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	77.7	7.0	12.4	97.0
q_1 (veh)	0	3.2	0	
n_a (veh)	3.2	0.3	0.5	4
n_d (veh)	0	3.5	0.5	4
q_2 (veh)	3.2	0	0	
d_i (veh-sec)	124.3	11.2	0	135.5
	d_1=	33.9	sec/veh	

Table D- 202: Cycle 6 of IQA Model for Southbound and Right Turn Lane of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	12.9			
Effective green time, *g* (s)	14.9			
Effective red time, *r* (s)	100.8			
Cycle6				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	93.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	115.7			
Effective green, *g* (sec)	14.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	93.4			
Vr	93.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	100.8	14.9		
v (vph)	93.4	93.4		
s (vph)	0	1800		
c (vph)	0	231.4	X=	0.4
v' (vph)	93.4	93.4		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	5.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	100.8	5.5	9.4	115.7
q_1 (veh)	0	2.6	0	
n_a (veh)	2.6	0.1	0.2	3
n_d (veh)	0	2.8	0.2	3
q_2 (veh)	2.6	0	0	
d_i (veh-sec)	131.8	7.2	0	139.0
	d_1=	46.3	sec/veh	

Table D- 203: Cycle 7 of IQA Model for Southbound and Right Turn Lane of Video 3

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	21.1			
Effective green time, *g* (s)	23.1			
Effective red time, *r* (s)	103.4			
Cycle7				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	85.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	126.5			
Effective green, *g* (sec)	23.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g*/*C*=	0.2			
Vg	85.4			
Vr	85.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	103.4	23.1		
v (vph)	85.4	85.4		
s (vph)	0	1800		
c (vph)	0	328.6	X=	0.3
v' (vph)	85.4	85.4		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	5.1			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	103.4	5.1	18.0	126.5
q_1 (veh)	0	2.5	0	
n_a (veh)	2.5	0.1	0.4	3
n_d (veh)	0	2.6	0.4	3
q_2 (veh)	2.5	0	0	
d_i (veh-sec)	126.8	6.3	0	133.1
	d_1=	44.4	sec/veh	

Table D- 204: Summary Table of IQA Model Analysis Results of the Right Turn Lane for Southbound of Video 3

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	36.1	1	36.1
2	36.1	1	36.1
3	43.9	1	43.9
4	37.0	4	147.9
5	33.9	4	135.5
6	46.3	3	139.0
7	44.4	3	133.1
Total	277.7	17	671.6
	Average Delay For the 15-minutes (sec/veh)=		**39.5**

Table D- 205: Cycle 3 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.2			
Effective green time, *g* (s)	20.2			
Effective red time, *r* (s)	111.8			
Cycle3				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	54.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	132.1			
Effective green, *g* (sec)	20.2			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	54.5			
Vr	54.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	111.8	20.2		
v (vph)	54.5	54.5		
s (vph)	0	1800		
c (vph)	0	275.7	X=	0.2
v' (vph)	54.5	54.5		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	111.8	3.5	16.7	132.1
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	94.7	3.0	0	97.7
	d_1=	48.8	sec/veh	

Table D- 206: Cycle 4 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	19.5			
Effective green time, *g* (s)	21.5			
Effective red time, *r* (s)	64.1			
Cycle4				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	126.2			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	85.6			
Effective green, *g* (sec)	21.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rpxg/C*=	0.3			
Vg	126.2			
Vr	126.2			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	64.1	21.5		
v (vph)	126.2	126.2		
s (vph)	0	1800		
c (vph)	0	452.3	X=	0.3
v' (vph)	126.2	126.2		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	4.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	64.1	4.8	16.7	85.6
q_1 (veh)	0	2.2	0	
n_a (veh)	2.2	0.2	0.6	3
n_d (veh)	0	2.4	0.6	3
q_2 (veh)	2.2	0	0	
d_i (veh-sec)	72.0	5.4	0	77.4
	d_1=	25.8	sec/veh	

Table D- 207: Cycle 5 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	11.4			
Effective green time, *g* (s)	13.4			
Effective red time, *r* (s)	127.4			
Cycle5				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	25.6			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	140.9			
Effective green, *g* (sec)	13.4			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	25.6			
Vr	25.6			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	127.4	13.4		
v (vph)	25.6	25.6		
s (vph)	0	1800		
c (vph)	0	171.6	X=	0.1
v' (vph)	25.6	25.6		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	127.4	1.8	11.6	140.9
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	57.6	0.8	0	58.5
	d_1=	58.5	sec/veh	

Table D- 208: Cycle 6 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	17.7			
Effective green time, *g* (s)	19.7			
Effective red time, *r* (s)	93.0			
Cycle6				
# of Vehicles in the cycle	5			
Volume, *V* (vph)	159.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	112.7			
Effective green, *g* (sec)	19.7			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	159.7			
Vr	159.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	93.0	19.7		
v (vph)	159.7	159.7		
s (vph)	0	1800		
c (vph)	0	314.6	X=	0.5
v' (vph)	159.7	159.7		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	9.1			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	93.0	9.1	10.6	112.7
q_1 (veh)	0	4.1	0	
n_a (veh)	4.1	0.4	0.5	5
n_d (veh)	0	4.5	0.5	5
q_2 (veh)	4.1	0	0	
d_i (veh-sec)	191.9	18.7	0	210.6
	d_1=	42.1	sec/veh	

Table D- 209: Cycle 7 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	17.8			
Effective green time, *g* (s)	19.8			
Effective red time, *r* (s)	90.2			
Cycle7				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	98.2			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	110.0			
Effective green, *g* (sec)	19.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	98.2			
Vr	98.2			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	90.2	19.8		
v (vph)	98.2	98.2		
s (vph)	0	1800		
c (vph)	0	323.9	X=	0.3
v' (vph)	98.2	98.2		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	5.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	90.2	5.2	14.6	110.0
q_1 (veh)	0	2.5	0	
n_a (veh)	2.5	0.1	0.4	3
n_d (veh)	0	2.6	0.4	3
q_2 (veh)	2.5	0	0	
d_i (veh-sec)	111.0	6.4	0	117.4
	d_1=	39.1	sec/veh	

Table D- 210: Cycle 8 of IQA Model for Northbound and First Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.4			
Effective green time, *g* (s)	20.4			
Effective red time, *r* (s)	96.3			
Cycle8				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	61.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	116.7			
Effective green, *g* (sec)	20.4			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	61.7			
Vr	61.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	96.3	20.4		
v (vph)	61.7	61.7		
s (vph)	0	1800		
c (vph)	0	314.3	X=	0.2
v' (vph)	61.7	61.7		
v (vpsec)	0.0			
s(vpsec)	0.5			
t_c	3.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	96.3	3.4	17.0	116.7
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	79.5	2.8	0	82.3
	d_1=	41.2	sec/veh	

Table D- 211: Summary Table of IQA Model Analysis Results of the First Left Turn Lane from the Middle of the Road for Northbound of Video 4

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	0.0	0	0.0
2	0.0	0	0.0
3	48.8	2	97.7
4	25.8	3	77.4
5	58.5	1	58.5
6	42.1	5	210.6
7	39.1	3	117.4
8	41.2	2	82.3
Total	255.5	16	643.8
	Average Delay For the 15-minutes (sec/veh)=		**40.2**

Table D- 212: Cycle 1 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	15.6			
Effective green time, *g* (s)	17.6			
Effective red time, *r* (s)	110.2			
Cycle1				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	56.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	127.8			
Effective green, *g* (sec)	17.6			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.1			
Vg	56.4			
Vr	56.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	110.2	17.6		
v (vph)	56.4	56.4		
s (vph)	0	1800		
c (vph)	0	247.9	X=	0.2
v' (vph)	56.4	56.4		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	110.2	3.6	14.0	127.8
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.2	2
n_d (veh)	0	1.8	0.2	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	95.0	3.1	0	98.1
	d_1=	49.0	sec/veh	

Table D- 213: Cycle 2 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	14.6			
Effective green time, *g* (s)	16.6			
Effective red time, *r* (s)	91.0			
Cycle2				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	33.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	107.7			
Effective green, *g* (sec)	16.6			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	33.4			
Vr	33.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	91.0	16.6		
v (vph)	33.4	33.4		
s (vph)	0	1800		
c (vph)	0	278.0	X=	0.1
v′ (vph)	33.4	33.4		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t′* (sec)	91.0	1.7	14.9	107.7
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	38.5	0.7	0	39.2
	d_1=	39.2	sec/veh	

Table D- 214: Cycle 3 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.2			
Effective green time, *g* (s)	20.2			
Effective red time, *r* (s)	111.8			
Cycle3				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	54.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	132.1			
Effective green, *g* (sec)	20.2			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	54.5			
Vr	54.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	111.8	20.2		
v (vph)	54.5	54.5		
s (vph)	0	1800		
c (vph)	0	275.7	X=	0.2
v′ (vph)	54.5	54.5		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	111.8	3.5	16.7	132.1
q_1 (veh)	0	1.7	0	
n_a (veh)	1.7	0.1	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.7	0	0	
d_i (veh-sec)	94.7	3.0	0	97.7
	d_1=	48.8	sec/veh	

Table D- 215: Cycle 4 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	19.5			
Effective green time, *g* (s)	21.5			
Effective red time, *r* (s)	64.1			
Cycle4				
# of Vehicles in the cycle	6			
Volume, *V* (vph)	252.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	85.6			
Effective green, *g* (sec)	21.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	252.4			
Vr	252.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	64.1	21.5		
v (vph)	252.4	252.4		
s (vph)	0	1800		
c (vph)	0	452.3	X=	0.6
v' (vph)	252.4	252.4		
v (vpsec)	0.1			
s(vpsec)	0.5			
t_c	10.5			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	64.1	10.5	11.0	85.6
q_1 (veh)	0	4.5	0	
n_a (veh)	4.5	0.7	0.8	6
n_d (veh)	0	5.2	0.8	6
q_2 (veh)	4.5	0	0	
d_i (veh-sec)	143.9	23.5	0	167.4
	d_1=	27.9	sec/veh	

Table D- 216: Cycle 6 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	17.7			
Effective green time, *g* (s)	19.7			
Effective red time, *r* (s)	93.0			
Cycle6				
# of Vehicles in the cycle	5			
Volume, *V* (vph)	159.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	112.7			
Effective green, *g* (sec)	19.7			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	159.7			
Vr	159.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	93.0	19.7		
v (vph)	159.7	159.7		
s (vph)	0	1800		
c (vph)	0	314.6	X=	0.5
v' (vph)	159.7	159.7		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	9.1			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	93.0	9.1	10.6	112.7
q_1 (veh)	0	4.1	0	
n_a (veh)	4.1	0.4	0.5	5
n_d (veh)	0	4.5	0.5	5
q_2 (veh)	4.1	0	0	
d_i (veh-sec)	191.9	18.7	0	210.6
	d_1=	42.1	sec/veh	

Table D- 217: Cycle 7 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	17.8			
Effective green time, *g* (s)	19.8			
Effective red time, *r* (s)	90.2			
Cycle7				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	65.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	110.0			
Effective green, *g* (sec)	19.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	65.4			
Vr	65.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	90.2	19.8		
v (vph)	65.4	65.4		
s (vph)	0	1800		
c (vph)	0	323.9	X=	0.2
v' (vph)	65.4	65.4		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	90.2	3.4	16.4	110.0
q_1 (veh)	0	1.6	0	
n_a (veh)	1.6	0.1	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.6	0	0	
d_i (veh-sec)	74.0	2.8	0	76.8
	d_1=	38.4	sec/veh	

Table D- 218: Cycle 8 of IQA Model for Northbound and Second Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	18.4			
Effective green time, *g* (s)	20.4			
Effective red time, *r* (s)	96.3			
Cycle8				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	92.6			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	116.7			
Effective green, *g* (sec)	20.4			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	92.6			
Vr	92.6			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	96.3	20.4		
v (vph)	92.6	92.6		
s (vph)	0	1800		
c (vph)	0	314.3	X=	0.3
v' (vph)	92.6	92.6		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	5.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	96.3	5.2	15.1	116.7
q_1 (veh)	0	2.5	0	
n_a (veh)	2.5	0.1	0.4	3
n_d (veh)	0	2.6	0.4	3
q_2 (veh)	2.5	0	0	
d_i (veh-sec)	119.2	6.5	0	125.7
	d_1=	41.9	sec/veh	

Table D- 219: Summary Table of IQA Model Analysis Results of the Second Left Turn Lane from the Middle of the Road for Northbound of Video 4

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	49.0	2	98.1
2	39.2	1	39.2
3	48.8	2	97.7
4	27.9	6	167.4
5	0.0	0	0.0
6	42.1	5	210.6
7	38.4	2	76.8
8	41.9	3	125.7
Total	287.4	21	815.4
	Average Delay For the 15-minutes (sec/veh)=		**38.8**

Table D- 220: Cycle 2 of IQA Model for Northbound and Through Lane of Video 4

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	34.0			
Effective green time, *g* (s)	37.0			
Effective red time, *r* (s)	70.7			
Cycle2				
# of Vehicles in the cycle	6			
Volume, *V* (vph)	200.6			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	107.7			
Effective green, *g* (sec)	37.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.3			
Vg	200.6			
Vr	200.6			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	70.7	37.0		
v (vph)	200.6	200.6		
s (vph)	0	1800		
c (vph)	0	618.1	X=	0.3
v' (vph)	200.6	200.6		
v (vpsec)	0.1			
s(vpsec)	0.5			
t_c	8.9			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	70.7	8.9	28.1	107.7
q_1 (veh)	0	3.9	0	
n_a (veh)	3.9	0.5	1.6	6
n_d (veh)	0	4.4	1.6	6
q_2 (veh)	3.9	0	0	
d_i (veh-sec)	139.3	17.5	0	156.7
	d_1=	26.1	sec/veh	

Table D- 221: Cycle 3 of IQA Model for Northbound and Through Lane of Video 4

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	28.0			
Effective green time, *g* (s)	31.0			
Effective red time, *r* (s)	101.1			
Cycle3				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	27.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	132.1			
Effective green, *g* (sec)	31.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	27.3			
Vr	27.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	101.1	31.0		
v (vph)	27.3	27.3		
s (vph)	0	1800		
c (vph)	0	422.1	X=	0.1
v' (vph)	27.3	27.3		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	101.1	1.6	29.4	132.1
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.2	1
n_d (veh)	0	0.8	0.2	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	38.7	0.6	0	39.3
	d_1=	39.3	sec/veh	

Table D- 222: Cycle 4 of IQA Model for Northbound and Through Lane of Video 4

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	39.2			
Effective green time, *g* (s)	42.2			
Effective red time, *r* (s)	43.4			
Cycle4				
# of Vehicles in the cycle	8			
Volume, *V* (vph)	336.6			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	85.6			
Effective green, *g* (sec)	42.2			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g*/*C*=	0.5			
Vg	336.6			
Vr	336.6			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	43.4	42.2		
v (vph)	336.6	336.6		
s (vph)	0	1800		
c (vph)	0	887.7	X=	0.4
v' (vph)	336.6	336.6		
v (vpsec)	0.1			
s(vpsec)	0.5			
t_c	10.0			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	43.4	10.0	32.2	85.6
q_1 (veh)	0	4.1	0	
n_a (veh)	4.1	0.9	3.0	8
n_d (veh)	0	5.0	3.0	8
q_2 (veh)	4.1	0	0	
d_i (veh-sec)	87.9	20.2	0	108.1
	d_1=	13.5	sec/veh	

Table D- 223: Cycle 5 of IQA Model for Northbound and Through Lane of Video 4

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	23.2			
Effective green time, *g* (s)	26.2			
Effective red time, *r* (s)	114.6			
Cycle5				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	76.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	140.9			
Effective green, *g* (sec)	26.2			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	76.7			
Vr	76.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	114.6	26.2		
v (vph)	76.7	76.7		
s (vph)	0	1800		
c (vph)	0	335.2	X=	0.2
v' (vph)	76.7	76.7		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	5.1			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	114.6	5.1	21.1	140.9
q_1 (veh)	0	2.4	0	
n_a (veh)	2.4	0.1	0.4	3
n_d (veh)	0	2.6	0.4	3
q_2 (veh)	2.4	0	0	
d_i (veh-sec)	139.9	6.2	0	146.2
	d_1=	48.7	sec/veh	

Table D- 224: Cycle 6 of IQA Model for Northbound and Through Lane of Video 4

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	29.1			
Effective green time, *g* (s)	32.1			
Effective red time, *r* (s)	80.7			
Cycle6				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	63.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	112.7			
Effective green, *g* (sec)	32.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.3			
Vg	63.9			
Vr	63.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	80.7	32.1		
v (vph)	63.9	63.9		
s (vph)	0	1800		
c (vph)	0	512.1	X=	0.1
v' (vph)	63.9	63.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.0			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	80.7	3.0	29.1	112.7
q_1 (veh)	0	1.4	0	
n_a (veh)	1.4	0.1	0.5	2
n_d (veh)	0	1.5	0.5	2
q_2 (veh)	1.4	0	0	
d_i (veh-sec)	57.7	2.1	0	59.8
	d_1=	29.9	sec/veh	

Table D- 225: Cycle 7 of IQA Model for Northbound and Through Lane of Video 4

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	34.6			
Effective green time, *g* (s)	37.6			
Effective red time, *r* (s)	72.4			
Cycle7				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	98.2			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	110.0			
Effective green, *g* (sec)	37.6			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rp*x*g*/*C*=	0.3			
Vg	98.2			
Vr	98.2			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	72.4	37.6		
v (vph)	98.2	98.2		
s (vph)	0	1800		
c (vph)	0	615.6	X=	0.2
v' (vph)	98.2	98.2		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	4.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	72.4	4.2	33.5	110.0
q_1 (veh)	0	2.0	0	
n_a (veh)	2.0	0.1	0.9	3
n_d (veh)	0	2.1	0.9	3
q_2 (veh)	2.0	0	0	
d_i (veh-sec)	71.5	4.1	0	75.6
	d_1=	25.2	sec/veh	

Table D- 226: Cycle 8 of IQA Model for Northbound and Through Lane of Video 4

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	25.5			
Effective green time, *g* (s)	28.5			
Effective red time, *r* (s)	88.1			
Cycle8				
# of Vehicles in the cycle	8			
Volume, *V* (vph)	246.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	116.7			
Effective green, *g* (sec)	28.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	246.9			
Vr	246.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	88.1	28.5		
v (vph)	246.9	246.9		
s (vph)	0	1800		
c (vph)	0	440.2	X=	0.6
v′ (vph)	246.9	246.9		
v (vpsec)	0.1			
s(vpsec)	0.5			
t_c	14.0			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t′* (sec)	88.1	14.0	14.5	116.7
q_1 (veh)	0	6.0	0	
n_a (veh)	6.0	1.0	1.0	8
n_d (veh)	0	7.0	1.0	8
q_2 (veh)	6.0	0	0	
d_i (veh-sec)	266.3	42.3	0	308.7
	d_1=	38.6	sec/veh	

Table D- 227: Summary Table of IQA Model Analysis Results of the Through for Northbound of Video 4

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	0.0	0	0.0
2	26.1	6	156.7
3	39.3	1	39.3
4	13.5	8	108.1
5	48.7	3	146.2
6	29.9	2	59.8
7	25.2	3	75.6
8	38.6	8	308.7
Total	221.4	31	894.4
	Average Delay For the 15-minutes (sec/veh)=		**28.9**

Table D- 228: Cycle 1 of IQA Model for Northbound and Right Turn Lane of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	36.8			
Effective green time, *g* (s)	38.8			
Effective red time, *r* (s)	89			
Cycle1				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	28.2			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	127.8			
Effective green, *g* (sec)	38.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	28.2			
Vr	28.2			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	89.0	38.8		
v (vph)	28.2	28.2		
s (vph)	0	1800		
c (vph)	0	546.2	X=	0.1
v' (vph)	28.2	28.2		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	89.0	1.4	37.4	127.8
q_1 (veh)	0	0.7	0	
n_a (veh)	0.7	0	0.3	1
n_d (veh)	0	0.7	0.3	1
q_2 (veh)	0.7	0	0	
d_i (veh-sec)	31.0	0.5	0	31.5
	d_1=	31.5	sec/veh	

Table D- 229: Cycle 2 of IQA Model for Northbound and Right Turn Lane of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	34.0			
Effective green time, *g* (s)	36.0			
Effective red time, *r* (s)	71.7			
Cycle2				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	66.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	107.7			
Effective green, *g* (sec)	36.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	66.9			
Vr	66.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	71.7	36.0		
v (vph)	66.9	66.9		
s (vph)	0	1800		
c (vph)	0	601.3	X=	0.1
v' (vph)	66.9	66.9		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	2.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	71.7	2.8	33.2	107.7
q_1 (veh)	0	1.3	0	
n_a (veh)	1.3	0.1	0.6	2
n_d (veh)	0	1.4	0.6	2
q_2 (veh)	1.3	0	0	
d_i (veh-sec)	47.7	1.8	0	49.6
	d_1=	24.8	sec/veh	

Table D- 230: Cycle 3 of IQA Model for Northbound and Right Turn Lane of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	28.0			
Effective green time, *g* (s)	30.0			
Effective red time, *r* (s)	102.1			
Cycle3				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	54.5			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	132.1			
Effective green, *g* (sec)	30.0			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.2			
Vg	54.5			
Vr	54.5			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	102.1	30.0		
v (vph)	54.5	54.5		
s (vph)	0	1800		
c (vph)	0	408.5	X=	0.1
v' (vph)	54.5	54.5		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	102.1	3.2	26.8	132.1
q_1 (veh)	0	1.5	0	
n_a (veh)	1.5	0	0.4	2
n_d (veh)	0	1.6	0.4	2
q_2 (veh)	1.5	0	0	
d_i (veh-sec)	78.9	2.5	0	81.4
	d_1=	40.7	sec/veh	

Table D- 231: Cycle 4 of IQA Model for Northbound and Right Turn Lane of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	39.2			
Effective green time, *g* (s)	41.2			
Effective red time, *r* (s)	44.4			
Cycle4				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	84.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	85.6			
Effective green, *g* (sec)	41.2			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.5			
Vg	84.1			
Vr	84.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	44.4	41.2		
v (vph)	84.1	84.1		
s (vph)	0	1800		
c (vph)	0	866.7	X=	0.1
v' (vph)	84.1	84.1		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	2.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	44.4	2.2	39.0	85.6
q_1 (veh)	0	1.0	0	
n_a (veh)	1.0	0.1	0.9	2
n_d (veh)	0	1.1	0.9	2
q_2 (veh)	1.0	0	0	
d_i (veh-sec)	23.0	1.1	0	24.1
	d_1=	12.1	sec/veh	

Table D- 232: Cycle 5 of IQA Model for Northbound and Right Turn Lane of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	23.2			
Effective green time, *g* (s)	25.2			
Effective red time, *r* (s)	115.6			
Cycle5				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	102.2			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	140.9			
Effective green, *g* (sec)	25.2			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	102.2			
Vr	102.2			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	115.6	25.2		
v (vph)	102.2	102.2		
s (vph)	0	1800		
c (vph)	0	322.4	X=	0.3
v' (vph)	102.2	102.2		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	7.0			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	115.6	7.0	18.3	140.9
q_1 (veh)	0	3.3	0	
n_a (veh)	3.3	0.2	0.5	4
n_d (veh)	0	3.5	0.5	4
q_2 (veh)	3.3	0	0	
d_i (veh-sec)	189.9	11.4	0	201.3
	d_1=	50.3	sec/veh	

Table D- 233: Cycle 6 of IQA Model for Northbound and Right Turn Lane of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	29.1			
Effective green time, *g* (s)	31.1			
Effective red time, *r* (s)	81.7			
Cycle6				
# of Vehicles in the cycle	5			
Volume, *V* (vph)	159.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	112.7			
Effective green, *g* (sec)	31.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.3			
Vg	159.7			
Vr	159.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	81.7	31.1		
v (vph)	159.7	159.7		
s (vph)	0	1800		
c (vph)	0	496.1	X=	0.3
v' (vph)	159.7	159.7		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	7.9			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	81.7	7.9	23.1	112.7
q_1 (veh)	0	3.6	0	
n_a (veh)	3.6	0.4	1.0	5
n_d (veh)	0	4.0	1.0	5
q_2 (veh)	3.6	0	0	
d_i (veh-sec)	147.9	14.4	0	162.3
	d_1=	32.5	sec/veh	

Table D- 234: Cycle 7 of IQA Model for Northbound and Right Turn Lane of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	34.6			
Effective green time, *g* (s)	36.6			
Effective red time, *r* (s)	73.4			
Cycle7				
# of Vehicles in the cycle	5			
Volume, *V* (vph)	163.6			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	110.0			
Effective green, *g* (sec)	36.6			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.3			
Vg	163.6			
Vr	163.6			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	73.4	36.6		
v (vph)	163.6	163.6		
s (vph)	0	1800		
c (vph)	0	599.2	X=	0.3
v' (vph)	163.6	163.6		
v (vpsec)	0.05			
s(vpsec)	0.5			
t_c	7.3			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	73.4	7.3	29.3	110.0
q_1 (veh)	0	3.3	0	
n_a (veh)	3.3	0.3	1.3	5
n_d (veh)	0	3.7	1.3	5
q_2 (veh)	3.3	0	0	
d_i (veh-sec)	122.4	12.2	0	134.6
	d_1=	26.9	sec/veh	

Table D- 235: Cycle 8 of IQA Model for Northbound and Right Turn Lane of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	25.5			
Effective green time, *g* (s)	27.5			
Effective red time, *r* (s)	89.1			
Cycle8				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	61.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	116.7			
Effective green, *g* (sec)	27.5			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	61.7			
Vr	61.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	89.1	27.5		
v (vph)	61.7	61.7		
s (vph)	0	1800		
c (vph)	0	424.7	X=	0.1
v' (vph)	61.7	61.7		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	89.1	3.2	24.4	116.7
q_1 (veh)	0	1.5	0	
n_a (veh)	1.5	0.1	0.4	2
n_d (veh)	0	1.6	0.4	2
q_2 (veh)	1.5	0	0	
d_i (veh-sec)	68.1	2.4	0	70.5
	d_1=	35.3	sec/veh	

Table D- 236: Summary Table of IQA Model Analysis Results of the Right Turn Lane for Northbound of Video 4

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	31.5	1	31.5
2	24.8	2	49.6
3	40.7	2	81.4
4	12.1	2	24.1
5	50.3	4	201.3
6	32.5	5	162.3
7	26.9	5	134.6
8	35.3	2	70.5
Total	254.0	23	755.4
	Average Delay For the 15-minutes (sec/veh)=		**32.8**

Table D- 237: Cycle 1 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	7.7			
Effective green time, *g* (s)	9.7			
Effective red time, *r* (s)	118.0			
Cycle1				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	56.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	127.8			
Effective green, *g* (sec)	9.7			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	56.4			
Vr	56.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	118.0	9.7		
v (vph)	56.4	56.4		
s (vph)	0	1800		
c (vph)	0	137.1	X=	0.4
v' (vph)	56.4	56.4		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	118.0	3.8	5.9	127.8
q_1 (veh)	0	1.8	0	
n_a (veh)	1.8	0.1	0.1	2
n_d (veh)	0	1.9	0.1	2
q_2 (veh)	1.8	0	0	
d_i (veh-sec)	109.1	3.5	0	112.6
	d_1=	56.3	sec/veh	

Table D- 238: Cycle 3 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	13.1			
Effective green time, *g* (s)	15.1			
Effective red time, *r* (s)	116.9			
Cycle3				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	27.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	132.1			
Effective green, *g* (sec)	15.1			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	27.3			
Vr	27.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	116.9	15.1		
v (vph)	27.3	27.3		
s (vph)	0	1800		
c (vph)	0	206.2	X=	0.1
v′ (vph)	27.3	27.3		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	116.9	1.8	13.3	132.1
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	51.8	0.8	0	52.6
	d_1=	52.6	sec/veh	

Table D- 239: Cycle 6 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	10.6			
Effective green time, *g* (s)	12.6			
Effective red time, *r* (s)	100.2			
Cycle6				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	31.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	112.7			
Effective green, *g* (sec)	12.6			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	31.9			
Vr	31.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	100.2	12.6		
v (vph)	31.9	31.9		
s (vph)	0	1800		
c (vph)	0	200.7	X=	0.2
v' (vph)	31.9	31.9		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	100.2	1.8	10.8	112.7
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	44.5	0.8	0	45.3
	d_1=	45.3	sec/veh	

Table D- 240: Cycle 7 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	12.7			
Effective green time, *g* (s)	14.7			
Effective red time, *r* (s)	95.3			
Cycle7				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	32.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	110.0			
Effective green, *g* (sec)	14.7			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	32.7			
Vr	32.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	95.3	14.7		
v (vph)	32.7	32.7		
s (vph)	0	1800		
c (vph)	0	240.5	X=	0.1
v' (vph)	32.7	32.7		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	95.3	1.8	12.9	110.0
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	41.3	0.8	0	42.1
	d_1=	42.1	sec/veh	

Table D- 241: Cycle 8 of IQA Model for Southbound and First Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	11.6			
Effective green time, *g* (s)	13.6			
Effective red time, *r* (s)	103.1			
Cycle8				
# of Vehicles in the cycle	6			
Volume, *V* (vph)	185.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	116.7			
Effective green, *g* (sec)	13.6			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	185.1			
Vr	185.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	103.1	13.6		
v (vph)	185.1	185.1		
s (vph)	0	1800		
c (vph)	0	209.4	X=	0.9
v' (vph)	185.1	185.1		
v (vpsec)	0.1			
s(vpsec)	0.5			
t_c	11.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	103.1	11.8	1.7	116.7
q_1 (veh)	0	5.3	0	
n_a (veh)	5.3	0.6	0.1	6
n_d (veh)	0	5.9	0.1	6
q_2 (veh)	5.3	0	0	
d_i (veh-sec)	273.3	31.3	0	304.7
	d_1=	50.8	sec/veh	

Table D- 242: Summary Table of IQA Model Analysis Results of the First Left Turn Lane from the Middle of the Road for Southbound of Video4

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	56.3	2	112.6
2	0.0	0	0.0
3	52.6	1	52.6
4	0.0	0	0.0
5	0.0	0	0.0
6	45.3	1	45.3
7	42.1	1	42.1
8	50.8	1	50.8
Total	247.0	6	303.3
	Average Delay For the 15-minutes (sec/veh)=		**50.5**

Table D- 243: Cycle 2 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	19.8			
Effective green time, *g* (s)	21.8			
Effective red time, *r* (s)	85.8			
Cycle2				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	133.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	107.7			
Effective green, *g* (sec)	21.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	133.7			
Vr	133.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	85.8	21.8		
v (vph)	133.7	133.7		
s (vph)	0	1800		
c (vph)	0	364.9	X=	0.4
v' (vph)	133.7	133.7		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	6.9			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	85.8	6.9	14.9	107.7
q_1 (veh)	0	3.2	0	
n_a (veh)	3.2	0.3	0.6	4
n_d (veh)	0	3.4	0.6	4
q_2 (veh)	3.2	0	0	
d_i (veh-sec)	136.9	11.0	0	147.9
	d_1=	37.0	sec/veh	

Table D- 244: Cycle 4 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	14.2			
Effective green time, *g* (s)	16.2			
Effective red time, *r* (s)	69.4			
Cycle4				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	42.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	85.6			
Effective green, *g* (sec)	16.2			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	42.1			
Vr	42.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	69.4	16.2		
v (vph)	42.1	42.1		
s (vph)	0	1800		
c (vph)	0	340.8	X=	0.1
v' (vph)	42.1	42.1		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	69.4	1.7	14.5	85.6
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.2	1
n_d (veh)	0	0.8	0.2	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	28.1	0.7	0	28.8
	d_1=	28.8	sec/veh	

Table D- 245: Cycle 5 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	12.8			
Effective green time, *g* (s)	14.8			
Effective red time, *r* (s)	126.1			
Cycle5				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	51.1			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	140.9			
Effective green, *g* (sec)	14.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	51.1			
Vr	51.1			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	126.1	14.8		
v (vph)	51.1	51.1		
s (vph)	0	1800		
c (vph)	0	189.1	X=	0.3
v' (vph)	51.1	51.1		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	3.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	126.1	3.7	11.1	140.9
q_1 (veh)	0	1.8	0	
n_a (veh)	1.8	0.1	0.2	2
n_d (veh)	0	1.8	0.2	2
q_2 (veh)	1.8	0	0	
d_i (veh-sec)	112.8	3.3	0	116.1
	d_1=	58.1	sec/veh	

Table D- 246: Cycle 7 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	12.7			
Effective green time, *g* (s)	14.7			
Effective red time, *r* (s)	95.3			
Cycle7				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	32.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	110.0			
Effective green, *g* (sec)	14.7			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	32.7			
Vr	32.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	95.3	14.7		
v (vph)	32.7	32.7		
s (vph)	0	1800		
c (vph)	0	240.479869	X=	0.1
v' (vph)	32.7	32.7		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	95.3	1.8	12.9	110.0
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	41.3	0.8	0	42.1
	d_1=	42.1	sec/veh	

Table D- 247: Cycle 8 of IQA Model for Southbound and Second Left Turn Lane from the Middle of the Road of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	11.6			
Effective green time, *g* (s)	13.6			
Effective red time, *r* (s)	103.1			
Cycle8				
# of Vehicles in the cycle	3			
Volume, *V* (vph)	92.6			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	116.7			
Effective green, *g* (sec)	13.6			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	92.6			
Vr	92.6			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	103.1	13.6		
v (vph)	92.6	92.6		
s (vph)	0	1800		
c (vph)	0	209.4	X=	0.4
v' (vph)	92.6	92.6		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	5.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	103.1	5.6	8.0	116.7
q_1 (veh)	0	2.7	0	
n_a (veh)	2.7	0.1	0.2	3
n_d (veh)	0	2.8	0.2	3
q_2 (veh)	2.7	0	0	
d_i (veh-sec)	136.7	7.4	0	144.1
	d_1=	48.0	sec/veh	

Table D- 248: Summary Table of IQA Model Analysis Results of the Second Left Turn Lane from the Middle of the Road for Southbound of Video4

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	0.0	0	0.0
2	37.0	4	147.9
3	0.0	0	0.0
4	28.8	1	28.8
5	58.1	2	116.2
6	0.0	0	0.0
7	42.1	1	42.1
8	48.0	3	144.1
Total	226.3	11	479.0
	Average Delay For the 15-minutes (sec/veh)=		**43.5**

Table D- 249: Cycle 1 of IQA Model for Southbound and Through Lane of Video 4

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	28.8			
Effective green time, *g* (s)	31.8			
Effective red time, *r* (s)	96			
Cycle1				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	56.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	127.8			
Effective green, *g* (sec)	31.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	56.4			
Vr	56.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	96.0	31.8		
v (vph)	56.4	56.4		
s (vph)	0	1800		
c (vph)	0	447.6	X=	0.1
v' (vph)	56.4	56.4		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.1			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	96.0	3.1	28.7	127.8
q_1 (veh)	0	1.5	0	
n_a (veh)	1.5	0	0.4	2
n_d (veh)	0	1.6	0.4	2
q_2 (veh)	1.5	0	0	
d_i (veh-sec)	72.1	2.3	0	74.5
	d_1=	37.2	sec/veh	

Table D- 250: Cycle 2 of IQA Model for Southbound and Through Lane of Video 4

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	38.9			
Effective green time, *g* (s)	41.9			
Effective red time, *r* (s)	65.7			
Cycle2				
# of Vehicles in the cycle	5			
Volume, *V* (vph)	167.2			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	107.7			
Effective green, *g* (sec)	41.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= *Rpxg/C*=	0.4			
Vg	167.2			
Vr	167.2			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	65.7	41.9		
v (vph)	167.2	167.2		
s (vph)	0	1800		
c (vph)	0	701.0	X=	0.2
v′ (vph)	167.2	167.2		
v (vpsec)	0.05			
s(vpsec)	0.5			
t_c	6.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t′* (sec)	65.7	6.7	35.2	107.7
q_1 (veh)	0	3.1	0	
n_a (veh)	3.1	0.3	1.6	5
n_d (veh)	0	3.4	1.6	5
q_2 (veh)	3.1	0	0	
d_i (veh-sec)	100.3	10.3	0	110.6
	d_1=	22.1	sec/veh	

Table D- 251: Cycle 3 of IQA Model for Southbound and Through Lane of Video 4

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	22.9			
Effective green time, *g* (s)	25.9			
Effective red time, *r* (s)	106.2			
Cycle3				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	109.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	132.1			
Effective green, *g* (sec)	25.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	109.0			
Vr	109.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	106.2	25.9		
v (vph)	109.0	109.0		
s (vph)	0	1800		
c (vph)	0	352.6	X=	0.3
v' (vph)	109.0	109.0		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	6.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	106.2	6.8	19.0	132.1
q_1 (veh)	0	3.2	0	
n_a (veh)	3.2	0.2	0.6	4
n_d (veh)	0	3.4	0.6	4
q_2 (veh)	3.2	0	0	
d_i (veh-sec)	170.8	11.0	0	181.8
	d_1=	45.5	sec/veh	

Table D- 252: Cycle 4 of IQA Model for Southbound and Through Lane of Video 4

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	33.9			
Effective green time, *g* (s)	36.9			
Effective red time, *r* (s)	48.7			
Cycle4				
# of Vehicles in the cycle	6			
Volume, *V* (vph)	252.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	85.6			
Effective green, *g* (sec)	36.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.4			
Vg	252.4			
Vr	252.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	48.7	36.9		
v (vph)	252.4	252.4		
s (vph)	0	1800		
c (vph)	0	776.2	X=	0.3
v′ (vph)	252.4	252.4		
v (vpsec)	0.1			
s(vpsec)	0.5			
t_c	7.9			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t′* (sec)	48.7	7.9	29.0	85.6
q_1 (veh)	0	3.4	0	
n_a (veh)	3.4	0.6	2.0	6
n_d (veh)	0	4.0	2.0	6
q_2 (veh)	3.4	0	0	
d_i (veh-sec)	83.0	13.5	0	96.6
	d_1=	16.1	sec/veh	

Table D- 253: Cycle 6 of IQA Model for Southbound and Through Lane of Video 4

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	21.8			
Effective green time, *g* (s)	24.8			
Effective red time, *r* (s)	88.0			
Cycle6				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	127.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	112.7			
Effective green, *g* (sec)	24.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	127.7			
Vr	127.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	88.0	24.8		
v (vph)	127.7	127.7		
s (vph)	0	1800		
c (vph)	0	395.5	X=	0.3
v' (vph)	127.7	127.7		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	6.7			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	88.0	6.7	18.1	112.7
q_1 (veh)	0	3.1	0	
n_a (veh)	3.1	0.2	0.6	4
n_d (veh)	0	3.4	0.6	4
q_2 (veh)	3.1	0	0	
d_i (veh-sec)	137.3	10.5	0	147.8
	d_1=	36.9	sec/veh	

Table D- 254: Cycle 7 of IQA Model for Southbound and Through Lane of Video 4

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	29.6			
Effective green time, *g* (s)	32.6			
Effective red time, *r* (s)	77.5			
Cycle7				
# of Vehicles in the cycle	8			
Volume, *V* (vph)	261.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	110.0			
Effective green, *g* (sec)	32.6			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.3			
Vg	261.7			
Vr	261.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	77.5	32.6		
v (vph)	261.7	261.7		
s (vph)	0	1800		
c (vph)	0	532.8	X=	0.5
v' (vph)	261.7	261.7		
v (vpsec)	0.1			
s(vpsec)	0.5			
t_c	13.2			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	77.5	13.2	19.4	110.0
q_1 (veh)	0	5.6	0	
n_a (veh)	5.6	1.0	1.4	8
n_d (veh)	0	6.6	1.4	8
q_2 (veh)	5.6	0	0	
d_i (veh-sec)	218.1	37.1	0	255.2
	d_1=	31.9	sec/veh	

Table D- 255: Cycle 8 of IQA Model for Southbound and Through Lane of Video 4

Yellow interval for movement, *y* (s)	4			
All red interval for movement , *ar* (s)	2			
Extension of effective green, *e* (s)	5			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	6			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	19.4			
Effective green time, *g* (s)	22.4			
Effective red time, *r* (s)	94.3			
Cycle8				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	30.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	116.7			
Effective green, *g* (sec)	22.4			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	30.9			
Vr	30.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	94.3	22.4		
v (vph)	30.9	30.9		
s (vph)	0	1800		
c (vph)	0	345.1	X=	0.1
v' (vph)	30.9	30.9		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	94.3	1.6	20.7	116.7
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.2	1
n_d (veh)	0	0.8	0.2	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	38.1	0.7	0	38.8
	d_1=	38.8	sec/veh	

Table D- 256: Summary Table of IQA Model Analysis Results of the Through Lane for Southbound of Video 4

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	37.2	2	74.5
2	22.1	5	110.6
3	45.5	4	181.8
4	16.1	6	96.6
5	0.0	0	0.0
6	36.9	4	147.8
7	31.9	8	255.2
8	38.8	1	38.8
Total	228.5	30	905.2
	Average Delay For the 15-minutes (sec/veh)=		**30.2**

Table D- 257: Cycle 2 of IQA Model for Southbound and Right Turn Lane of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	38.9			
Effective green time, *g* (s)	40.9			
Effective red time, *r* (s)	66.7			
Cycle2				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	133.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	107.7			
Effective green, *g* (sec)	40.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.4			
Vg	133.7			
Vr	133.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	66.7	40.9		
v (vph)	133.7	133.7		
s (vph)	0	1800		
c (vph)	0	684.3	X=	0.2
v' (vph)	133.7	133.7		
v (vpsec)	0.04			
s(vpsec)	0.5			
t_c	5.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	66.7	5.4	35.6	107.7
q_1 (veh)	0	2.5	0	
n_a (veh)	2.5	0.2	1.3	4
n_d (veh)	0	2.7	1.3	4
q_2 (veh)	2.5	0	0	
d_i (veh-sec)	82.7	6.6	0	89.4
	d_1=	22.3	sec/veh	

Table D- 258: Cycle 3 of IQA Model for Southbound and Right Turn Lane of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	22.9			
Effective green time, *g* (s)	24.9			
Effective red time, *r* (s)	107.2			
Cycle3				
# of Vehicles in the cycle	4			
Volume, *V* (vph)	109.0			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	132.1			
Effective green, *g* (sec)	24.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	109.0			
Vr	109.0			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	107.2	24.9		
v (vph)	109.0	109.0		
s (vph)	0	1800		
c (vph)	0	339.0	X=	0.3
v' (vph)	109.0	109.0		
v (vpsec)	0.03			
s(vpsec)	0.5			
t_c	6.9			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	107.2	6.9	18.0	132.1
q_1 (veh)	0	3.2	0	
n_a (veh)	3.2	0.2	0.5	4.0
n_d (veh)	0	3.5	0.5	4.0
q_2 (veh)	3.2	0	0	
d_i (veh-sec)	174.0	11.2	0	185.2
	d_1=	46.3	sec/veh	

Table D- 259: Cycle 4 of IQA Model for Southbound and Right Turn Lane of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	33.9			
Effective green time, *g* (s)	35.9			
Effective red time, *r* (s)	49.7			
Cycle4				
# of Vehicles in the cycle	5			
Volume, *V* (vph)	210.4			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	85.6			
Effective green, *g* (sec)	35.9			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.4			
Vg	210.4			
Vr	210.4			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	49.7	35.9		
v (vph)	210.4	210.4		
s (vph)	0	1800		
c (vph)	0	755.2	X=	0.3
v' (vph)	210.4	210.4		
v (vpsec)	0.1			
s(vpsec)	0.5			
t_c	6.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	49.7	6.6	29.3	85.6
q_1 (veh)	0	2.9	0	
n_a (veh)	2.9	0.4	1.7	5
n_d (veh)	0	3.3	1.7	5
q_2 (veh)	2.9	0	0	
d_i (veh-sec)	72.1	9.5	0	81.6
	d_1=	16.3	sec/veh	

Table D- 260: Cycle 5 of IQA Model for Southbound and Right Turn Lane of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	10.8			
Effective green time, *g* (s)	12.8			
Effective red time, *r* (s)	128.0			
Cycle5				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	25.6			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	140.9			
Effective green, *g* (sec)	12.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.1			
Vg	25.6			
Vr	25.6			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	128.0	12.8		
v (vph)	25.6	25.6		
s (vph)	0	1800		
c (vph)	0	163.9	X=	0.2
v' (vph)	25.6	25.6		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.8			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	128.0	1.8	11.0	140.9
q_1 (veh)	0	0.9	0	
n_a (veh)	0.9	0	0.1	1
n_d (veh)	0	0.9	0.1	1
q_2 (veh)	0.9	0	0	
d_i (veh-sec)	58.2	0.8	0	59.0
	d_1=	59.0	sec/veh	

Table D- 261: Cycle 7 of IQA Model for Southbound and Right Turn Lane of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	29.6			
Effective green time, *g* (s)	31.6			
Effective red time, *r* (s)	78.5			
Cycle7				
# of Vehicles in the cycle	6			
Volume, *V* (vph)	196.3			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	110.0			
Effective green, *g* (sec)	31.6			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.3			
Vg	196.3			
Vr	196.3			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δt (sec)	78.5	31.6		
v (vph)	196.3	196.3		
s (vph)	0	1800		
c (vph)	0	516.5	X=	0.4
v' (vph)	196.3	196.3		
v (vpsec)	0.1			
s(vpsec)	0.5			
t_c	9.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
$\Delta t'$ (sec)	78.5	9.6	22.0	110.0
q_1 (veh)	0	4.3	0	
n_a (veh)	4.3	0.5	1.2	6
n_d (veh)	0	4.8	1.2	6
q_2 (veh)	4.3	0	0	
d_i (veh-sec)	167.8	20.5	0	188.4
	d_1=	31.4	sec/veh	

Table D- 262: Cycle 8 of IQA Model for Southbound and Right Turn Lane of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	19.4			
Effective green time, *g* (s)	21.4			
Effective red time, *r* (s)	95.3			
Cycle8				
# of Vehicles in the cycle	2			
Volume, *V* (vph)	61.7			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	116.7			
Effective green, *g* (sec)	21.4			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
P= Rpxg/C=	0.2			
Vg	61.7			
Vr	61.7			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	95.3	21.4		
v (vph)	61.7	61.7		
s (vph)	0	1800		
c (vph)	0	329.7	X=	0.2
v′ (vph)	61.7	61.7		
v (vpsec)	0.02			
s(vpsec)	0.5			
t_c	3.4			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t′* (sec)	95.3	3.4	18.0	116.7
q_1 (veh)	0	1.6	0	
n_a (veh)	1.6	0.1	0.3	2
n_d (veh)	0	1.7	0.3	2
q_2 (veh)	1.6	0	0	
d_i (veh-sec)	77.8	2.8	0	80.6
	d_1=	40.3	sec/veh	

Table D- 263: Cycle 9 of IQA Model for Southbound and Right Turn Lane of Video 4

Yellow interval for movement, *y* (s)	3.5			
All red interval for movement , *ar* (s)	1.5			
Extension of effective green, *e* (s)	4			
Start up lost time, l_1 (s)	2			
Sum of yellow and all red, *Y*, (s)	5			
Clearance lost time, l_2 (s)	1			
Total lost time for movement (s)	3			
Actual green time, *G* (s)	25.8			
Effective green time, *g* (s)	27.8			
Effective red time, *r* (s)	88.9			
Cycle9				
# of Vehicles in the cycle	1			
Volume, *V* (vph)	30.9			
Saturation flow rate, *S* (vph)	1800			
Cycle, *C* (sec)	116.7			
Effective green, *g* (sec)	27.8			
# of lanes, *n*	1			
Arrival Type, *AT*	3			
Rp=	1			
*P= Rp*x*g/C=*	0.2			
Vg	30.9			
Vr	30.9			
Initial Interval Analysis:				
Interval #	1	2		
Interval Description	red	green		
Δ*t* (sec)	88.9	27.8		
v (vph)	30.9	30.9		
s (vph)	0	1800		
c (vph)	0	428.1	X=	0.1
v' (vph)	30.9	30.9		
v (vpsec)	0.01			
s(vpsec)	0.5			
t_c	1.6			
IQA Computations:				
Interval #	1	2		
Interval Description	red	Blocked	Unblocked	Total
Δ*t'* (sec)	88.9	1.6	26.2	116.7
q_1 (veh)	0	0.8	0	
n_a (veh)	0.8	0	0.2	1
n_d (veh)	0	0.8	0.2	1
q_2 (veh)	0.8	0	0	
d_i (veh-sec)	33.9	0.6	0	34.5
	d_1=	34.5	sec/veh	

Table D- 264: Summary of IQA Model Analysis Results of the Right Turn Lane for Southbound of Video4

Cycle	Average Delay (sec/veh)	Number of Vehicles	(Average Delay) x (Number of Vehicles)
1	0.0	0	0.0
2	22.3	4	89.4
3	46.3	4	185.2
4	16.3	5	81.6
5	59.0	1	59.0
6	0.0	0	0.0
7	31.4	6	188.4
8	40.3	2	80.6
9	34.5	1	34.5
Total	250.2	23	718.7
	Average Delay For the 15-minutes (sec/veh)=		**31.2**

Table D- 265: Northbound of Video 1 IQA Model Summary

Type	Delay	Unit
Left Turns	45.8	sec/veh
Through	33.3	sec/veh
Right Turn	34.9	sec/veh
Approach	40.0	sec/veh
Total Volume	72	veh

Table D- 266: Southbound of Video 1 IQA Model Summary

Type	Delay	Unit
Left Turns	51.5	sec/veh
Through	43.3	sec/veh
Right Turn	42.5	sec/veh
Approach	45.6	sec/veh
Total Volume	45	veh

Table D- 267: Northbound of Video 2 IQA Model Summary

Type	Delay	Unit
Left Turns	42.3	sec/veh
Through	29.4	sec/veh
Right Turn	27.1	sec/veh
Approach	35.8	sec/veh
Total Volume	81	veh

Table D- 268: Southbound of Video 2 IQA Model Summary

Type	Delay	Unit
Left Turn	46.4	sec/veh
Through	36.7	sec/veh
Right Turn	38.4	sec/veh
Approach	40.4	sec/veh
Total Volume	66	veh

Table D- 269: Northbound of Video 3 IQA Model Summary

Type	Delay	Unit
Left Turn	41.5	sec/veh
Through	39.7	sec/veh
Right Turn	37.7	sec/veh
Approach	39.8	sec/veh
Total Volume	81	veh

Table D- 270: Southbound of Video 3 IQA Model Summary

Type	Delay	Unit
Left Turn	44.7	sec/veh
Through	38.5	sec/veh
Right Turn	39.5	sec/veh
Approach	41.2	sec/veh
Total Volume	57	veh

Table D- 271: Northbound of Video4 IQA Model Summary

Type	Delay	Unit
Left Turn	39.4	sec/veh
Through	28.9	sec/veh
Right Turn	32.8	sec/veh
Approach	34.2	sec/veh
Total Volume	91	veh

Table D- 272: Southbound of Video4 IQA Model Summary

Type	Delay	Unit
Left Turn	46.0	sec/veh
Through	30.2	sec/veh
Right Turn	31.2	sec/veh
Approach	34.4	sec/veh
Total Volume	70	Veh