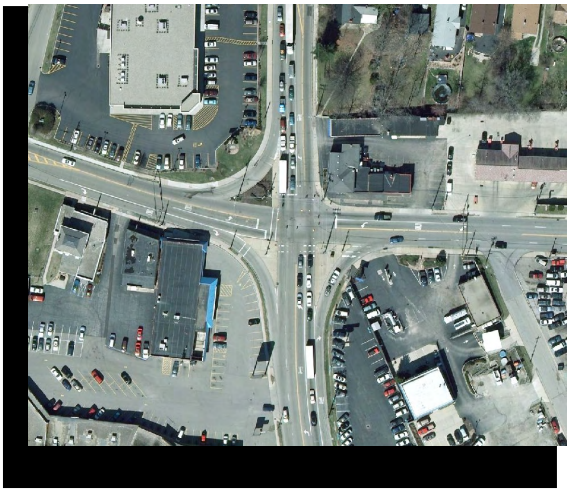
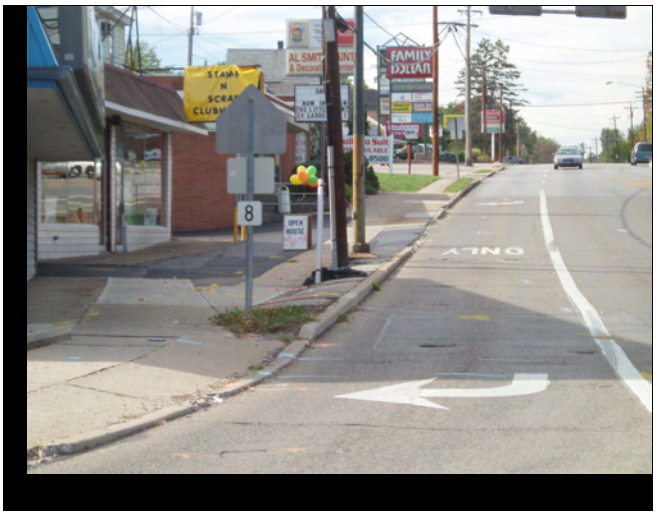
UNIVERSITY OF Cincinnati

Bridgetown, Glenway and Race Intersection Improvement Study





Fall Quarter 2007
Prepared for John C. Niehaus
Hamilton County Engineer's Office
ODOT

Prepared by:

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I. Executive Summary

Introduction

The intersection of Bridgetown, Glenway and Race is a major crossroads within Green Township. Very recently, the *Western Hamilton County Transportation* study ranked improvement of this intersection as the second highest ranked need in Green Township that did not at the time have a formal study or plan. During the peak periods the geometrics and traffic volumes lead to significant queues along every approach.

The purpose of this report is to identify a set of recommendations regarding the improvement of the intersection of Bridgetown, Glenway, and Race Roads. These recommendations look to satisfy needs of all stakeholders involved. This project aims to provide an acceptable level of service for motorists, while keeping the intersection safe for motorists and pedestrians. At the same time, this study aims to make recommendations that are of minimal impact for property holders and businesses. These recommendations will be the product of analyzing the existing conditions of the intersection, identifying alternatives, and performing capacity analyses for these alternatives.

Existing Conditions

The intersection of Race and Glenway is a major crossroads within western Hamilton County, serving about 45000 vehicles as of 2007. An intersection of a state route and county roads, this intersection is a gateway to points throughout western Hamilton County.

Bridgetown Road within the Bridgetown Area is a four lane facility that is classified by the Hamilton County Thoroughfare Plan as a minor arterial. Race Road is a four lane facility that is classified as a major arterial, while Glenway Avenue is a five lane facility that is also classified as a major arterial. State Route 264 travels north along Glenway Avenue and continues west on Bridgetown Road, and this alignment is under ODOT maintenance. Race Road and the eastern approach of Bridgetown Road are under Hamilton County Engineer's Office maintenance.

Figure 1, located in the *Existing Conditions* section of the report, is an existing schematic of the intersection. Each approach has a left turn lane and three approaches have a channelized right turn lane, and the storage lengths of these turn lanes are located in *Table 1*, also located in the *Existing Conditions* section. Only the southbound approach possesses two through lanes at the intersection. Traffic control at the intersection consists of a traffic signal operating in six phases, last timed in 1992. The southbound left turn has no protected phase. All channelized right turns are stop controlled.

Turning movement counts were completed in July of 2007. These counts have been analyzed for three peak periods, and also grown to 2030 volumes. These counts can be found in *Tables 2 through 8*, located in the *Existing Conditions* section.

An accident analysis was completed for the intersection using crash data from 2004 to 2006. This data is found in *Appendix C*, and is summarized in *Figure 2*. Over the three analysis years, 134 accidents were observed, of which ten were injury accidents and 2 involved pedestrians.

Analysis of the existing conditions of the intersection has identified several deficiencies with the intersection. These deficiencies are identified below:

- Drivers demonstrate disregard for traffic control items within the channelized right turn. Often, the stop signs are treated as a yield sign by motorists. This action greatly decreases the safety for pedestrians crossing the channelized right turns.
- Only one through lane exists for the northbound approach, and the left turn lane is dropped from the same travel lane as the through lane. The two heavy movements combined cause a significant queue and delay for both northbound movements.
- A very heavy through movement exists for the southbound approach. In addition, no right turn lane exists at the intersection. The current geometry for this approach causes large southbound delays to be incurred.
- Left turn movements on Bridgetown Rd. are heavy during the PM peak, and these left turn movements currently incur significant queues and delays.
- A merging distance is provided for right turning vehicles from Bridgetown to Glenway. Coupled with the channelized right turn, motorists may attempt to make quick right turns with little regard for motorists heading south.
- The traffic signal has not been seen a timing change since the early 1990s. Current phasing, especially during the PM peak, leads to significant delays and queues that could be alleviated by optimized timing.

Alternatives Considered

Three alternatives have been identified for analysis and recommendations. The no build alternative leaves geometrics and timings as it currently is. The no build alternative with optimized timing keeps the geometrics of the intersection as is, but optimizes the timing at the intersection. The feasible alternative provides necessary lanes, storage lengths, and timings to provide an acceptable level of service. A schematic of this alternative can be found in *Figure 3*, and is described in great detail in the *Alternatives Considered* section.

Capacity Analysis

Capacity analyses were completed for the three alternatives using HCS 2000. HCS analyzes intersection according to the *Highway Capacity Manual (HCM)*. HCM measures effectiveness using the level of service (LOS) concept. The level of service concept for signalized intersection is described in *Table 9*, located in the *Capacity Analysis* section.

The three alternatives were analyzed for AM, Noon, and Peak periods in the years 2007 and 2030. The results of these analyses are described in great detail in *Tables 10 through 12*, located in the *Capacity Analysis* section of the report. Analysis shows that while the No Build Alternative operates at a LOS of E during the PM peak, which degrades to an LOS of F by 2030. The noon peak LOS also degrades to an E in 2030. An optimized timing of the intersection will provide an LOS no worse than a D during the 2007 analysis years, but by 2030 the LOS for the PM peaks degrades to an E with a delay of 74.5 seconds. The feasible alternative provides a LOS of C or better for all analysis periods, which a 2030 PM peak hour delay of 34.1 seconds.

Recommendations

After analyzing the three alternatives, short term and long term recommendations have been prepared for the intersection. These recommendations are summarized below:

Short Term Recommendations

- Optimize signal phasing and timing for each peak period

Long Term Recommendations

All lanes at the intersection will be widened to 12 feet and shifted as needed to accommodate the following intersection improvements.

Southbound Race Rd.

- Remove the channelized right turn lane
- Add a second northbound receiving lane
- Add a dedicated left turn lane with 100 feet of storage
- Add a dedicated right turn lane with 550 feet of storage

Northbound Glenway Ave.

- Remove the channelization of the right turn lane
- Modify the channelized right turn lane to become a drop right turn lane with 450 feet of storage
- Widen Glenway Ave. on the west side
- Add a second northbound through lane
- Extend the dedicated left turn lane to 450 feet of storage

Eastbound Bridgetown Rd.

- Remove the channelization of the right turn lane
- Modify the channelized right turn lane to become a drop right turn lane with 375 feet of storage
- Modify the travel lane to become a dedicated left turn lane with 375 feet of storage
- Widen Bridgetown Rd. on the north side
- Add a westbound receiving lane

Westbound Bridgetown Rd.

- Remove the inside eastbound receiving lane
- Modify the eastbound receiving lane to become a dedicated left turn lane with 325 feet of storage

Additional

- Mark crosswalks at each approach

II. Introduction

Green Township is a vibrant community within western Hamilton County Ohio. According to the latest census estimate, almost 61,000 residents call Green Township home. To serve these residents, a network of arterials and collectors has been constructed to ensure mobility through out the township. As the township and western Hamilton County has continued to grow, use of the roadway network has increased dramatically, causing congestion to exist on several of the arterials through out the county and township. One recent study, the *Western Hamilton County Transportation Study*, looked to create a map for future improvements within the western part of the county. Any deficiencies that did not currently have a study or plan were identified throughout the county, and from these deficiencies improvements were ranked and recommended. From this report the fifth highest ranked need in western Hamilton County and second highest ranked need in Green Township that did not at the time have a formal study or plan was an intersection improvement for Bridgetown Road, Race Road, and Glenway Avenue.

The intersection of Bridgetown Road, Race Road, and Glenway Avenue is a major intersection located in the community of Bridgetown, in Green Township. The intersection is along a major corridor into Western Hills, and Bridgetown travels west to Cleves. As of 2007, this intersection has seen a daily volume of 45,000 traveling through the intersection. Prior to 1990, the Chesapeake and Ohio Railroad ran trains on a viaduct located previously over the intersection. Certainly, this intersection is a major crossroads not only today, but also in the past; however, with the intersection's status as a major crossroads comes heavy traffic. This traffic coupled with the existing geometrics and timing plan leads to heavy congestion during the peak periods. Often, vehicles queue several hundred feet back from the intersection during the peak periods. These queues and delays are expected to only intensify in the coming years.

Photo: Intersection Location Map

The purpose of this report is to identify a set of recommendations regarding the improvement of the intersection of Bridgetown, Glenway, and Race Roads. These recommendations look to satisfy needs of all stakeholders involved. This project aims to provide an acceptable level of service for motorists, while keeping the intersection safe for motorists and pedestrians. At the same time, this study aims to make recommendations that are of minimal impact for property holders and businesses. These recommendations will be the product of analyzing the existing conditions of the intersection, identifying alternatives, and performing capacity analyses for these alternatives.

These tasks will be completed by the University of Cincinnati Traffic Engineering Team. For this report, the following classmates completed the following tasks:

- Qingyi Ai: HCS Analyses, Report
- Matthew Foreman: HCS Analyses, Report, Presentation
- Amruta Inapurapu: Parking Analysis
- Sudhir Itekyala: Accident Analysis, Report
- Zhixia Li: HCS Analyses, Report
- David Murnan: Field Data Collection, HCS Analyses, Report, Presentation
- Vijay Nemalapuri: Accident Analysis, Report
- Sarah Perrino: Report, Presentation
- Viswanath Pokala: Accident Analysis, Report
- Craig Schrader: Drafting, Schematics
- Nicholas Wilkerson: Drafting, Schematics
- Andrew Zoller: Parking Analysis

III. Existing Conditions

Photo: Aerial Image of intersection of Bridgetown Rd. & Glenway Ave and the surrounding area.

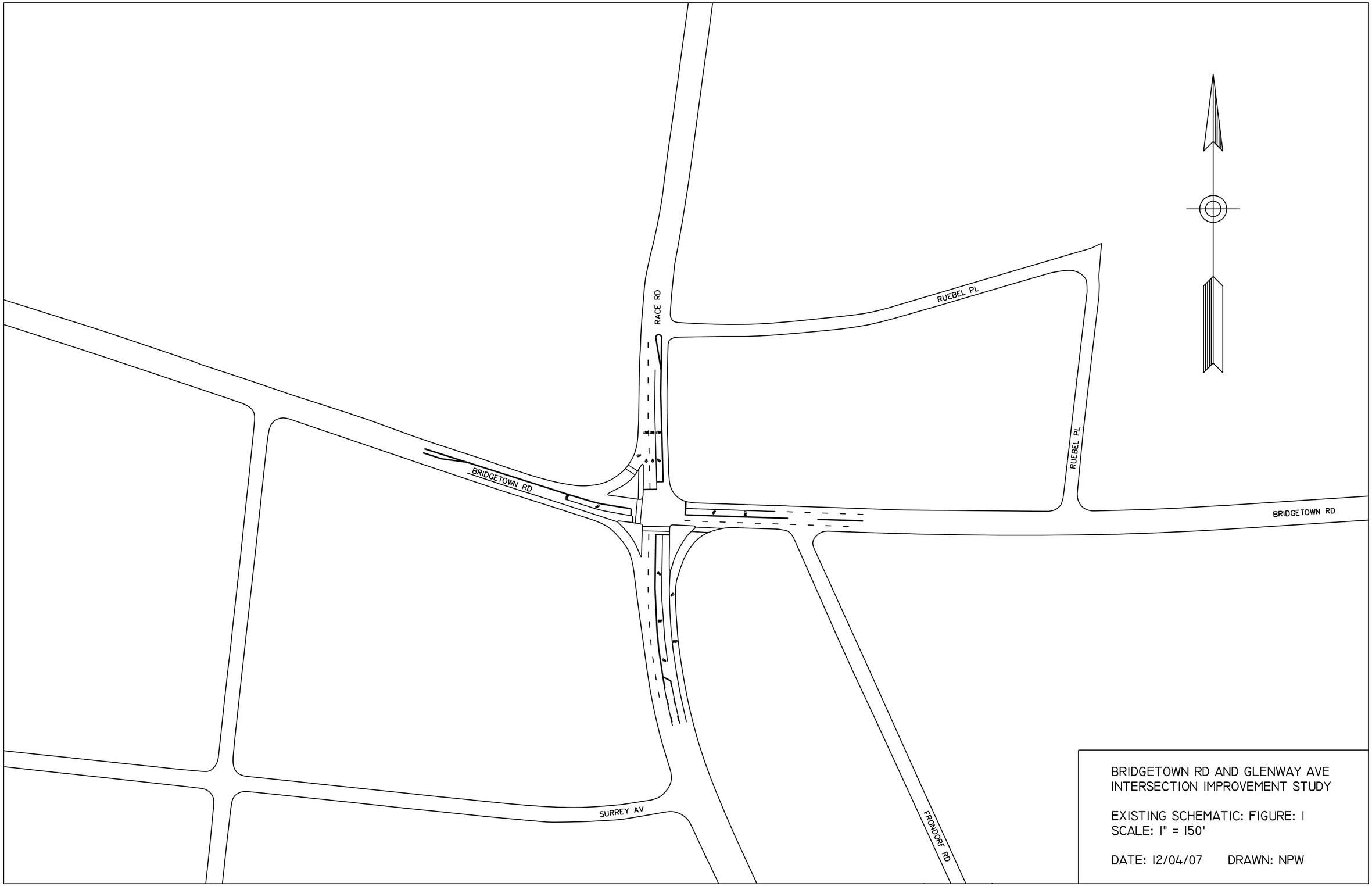
The intersection of Bridgetown Road and Glenway Avenue is a crossroads within a very vibrant community. From the south and west, one can travel along SR264 on their way to the Western Hills commercial district, Mack, or all the way to US50 in Cincinnati or Cleves. Traveling north through the intersection can take drivers to Harrison Avenue and on their way to Interstate 74, while vehicles traveling east can find themselves entering the heart of Cheviot. Certainly, this intersection is a very important crossroads within Green Township. In a given weekday, up to 45000 vehicles travel through the intersection on the way to their destinations within and outside of this community of around sixty thousand residents. This large number of vehicles, coupled with the current geometric design of the intersection, cause both safety and capacity related deficiencies. The purpose of this section is to identify the existing conditions of the intersection that result in the capacity and safety deficiencies at the intersection.

Existing Geometrics

Bridgetown Road within the Bridgetown Area is a four lane facility that is classified by the Hamilton County Thoroughfare Plan as a minor arterial. Race Road is a four lane facility that is classified as a major arterial, while Glenway Avenue is a five lane facility that is also classified as a major arterial. State Route 264 travels north along Glenway Avenue and continues west on Bridgetown Road, and this alignment is under ODOT maintenance. Race Road and the eastern approach of Bridgetown Road are under Hamilton County Engineer's Office maintenance.

Figure 1 is a schematic of the existing geometrics of the intersection. A complete description of the geometrics is as follows:

The intersection of Bridgetown Road and Glenway Avenue possesses left turn lanes on all four approaches. In addition, the westbound approach and the northbound approach also possess right turn lanes. A summary of the storage lengths at the intersection can be found in *Table 1*.



BRIDGETOWN RD AND GLENWAY AVE
INTERSECTION IMPROVEMENT STUDY

EXISTING SCHEMATIC: FIGURE: 1
SCALE: 1" = 150'

DATE: 12/04/07 DRAWN: NPW

F:\traffic.dwg 12/3/2007 2:49:56 PM

Table 1: Existing Storage Lengths

Direction	Turn Lane	Storage Length (ft)
Northbound	Left	215
Northbound	Right	260*
Southbound	Left	200
Westbound	Left	150*
Eastbound	Left	130
Eastbound	Right	270*

*Lane is created from Travel Lane

It is noted that the northbound and westbound right turn lanes and the eastbound left turn lane are created from the travel lane. In addition, the northbound left turn lane is created from a two-way left turn lane. The storage lengths listed in *Table 1* are only the lengths of the turn lane as it is marked.

The number of through lanes at the intersection may differ from the number of travel lanes on the arterial beyond the intersection. Currently, the only approach with two through lanes is the southbound approach. All other approaches possess only one through travel lane. The northbound, southbound, and eastbound approaches also have their right turns channelized by a raised concrete island. The right turn from Bridgetown Road onto Glenway Road also has a merging distance of approximately 30 feet on Glenway.

There are two marked crosswalks across the south and west approaches of the intersection. Unmarked crosswalks exist across the other two approaches. Crosswalks are also marked within all three channelized right turns.

Traffic Control

The intersection of Bridgetown Road and Glenway Avenue is an actuated, signalized intersection. Currently, the signal operates with a total of six phases in a cycle of 130 seconds. The intersection was last timed in 1992. Five-section signal heads control protected-permissive left turns on the northbound, eastbound, and westbound approaches, while the southbound left turn is a permissive only movement. All through movements at the intersection have a maximum green time of 40 seconds, while the left turn movements on Bridgetown have a maximum green time of 16 seconds. The northbound left turn movement has a maximum green time of 14 seconds. The existing timing sheet for the intersection provided by ODOT can be found in *Appendix A*.

Pedestrian signals mediate crossings for every approach except for across the east approach. These pedestrian signals contain “WALK” and “DON’T WALK” wordings rather than the symbols. The walk time for signalized pedestrian crossings is seven seconds, while the clearance interval is ten seconds.

The channelized right turns are not controlled by the traffic signals; rather, they are stop sign controlled. For eastbound right turns, the stop sign is located behind the marked crosswalk, and there is a marked merging distance on Glenway for the turn. The stop sign on the southbound approach is located at the intersection of the channelized right turn and Bridgetown Road. There are no traffic control devices that exist near the crosswalk across this channelized turn other than the marked crosswalk lines. There exist two stop signs for the northbound channelized right turn. One is located on the at the stop bar on the left side of the turn lane, while the other is located back from the turn lane on the right. Both signs are located in before the crosswalk, which is directly in front of the stop bar.

Traffic Volumes

Traffic counts were performed at the intersection by the Hamilton County Engineer's Office on July 27 and 30 of 2007. Counts were completed for a twelve hour period starting at 6AM and ending at 6PM, and the manual count data can be found in *Appendix B*. From this 12 hour count, a growth factor of 1.43 was applied by the Engineer's Office to determine an intersection ADT of 43603. It is observed that the heaviest daily volume occurs on Glenway Avenue, with an estimated ADT of almost 30500 vehicles traveling on the road. Race Road is estimated to have an ADT of about 24500 vehicles, while Bridgetown Road is estimated to have an ADT of about 18000 vehicles west of the intersection.

It is advantageous to analyze this intersection during three peak periods: AM, Noon, and PM peak. Each of these peaks has the heaviest movements associated with a traffic pattern. The peak hours have been identified for this intersection, and the volumes associated with the peak hours can be found in *Tables 2 through 4*.

Table 2: 2007 AM Peak Hour (8am-9am) Turning Movement Counts

Start Time	Race Road			Bridgetown Road			Glenway Avenue			Bridgetown Road			Interval Total
	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
8:00 AM	7	124	26	34	25	6	18	98	31	48	52	44	513
8:15 AM	5	121	33	35	38	5	23	97	34	53	57	34	535
8:30 AM	7	130	25	35	23	7	16	82	25	35	62	38	485
8:45 AM	5	128	17	43	41	4	18	105	35	36	66	49	547
Total	24	503	101	147	127	22	75	382	125	172	237	165	2080
PHF	0.86	0.97	0.77	0.85	0.77	0.79	0.82	0.91	0.89	0.81	0.90	0.84	0.95

Table 3: 2007 Noon Peak Hour (12:15pm-1:15pm) Turning Movement Counts

Start Time	Race Road			Bridgetown Road			Glenway Avenue			Bridgetown Road			Interval Total
	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
12:15 PM	10	135	23	81	58	19	54	126	51	45	68	47	717
12:30 PM	6	172	19	52	53	11	68	170	56	48	59	60	774
12:45 PM	10	171	24	41	64	12	71	162	68	46	61	81	811
1:00 PM	15	138	23	43	64	16	62	164	74	30	58	50	737
Total	41	616	89	217	239	58	255	622	249	169	246	238	3039
PHF	0.68	0.90	0.93	0.67	0.93	0.76	0.90	0.91	0.84	0.88	0.90	0.73	0.94

Table 4: 2007 PM Peak Hour (4:30pm-5:30pm) Turning Movement Counts

Start Time	Race Road			Bridgetown Road			Glenway Avenue			Bridgetown Road			Interval Total
	Southbound			Westbound			Northbound			Eastbound			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:30 PM	10	226	57	63	94	9	69	141	48	51	62	40	870
4:45 PM	4	192	48	69	73	16	57	166	56	55	57	43	836
5:00 PM	10	187	52	51	91	20	47	168	60	61	61	47	855
5:15 PM	8	223	47	51	105	14	51	166	80	34	46	56	881
Total	32	828	204	234	363	59	224	641	244	201	226	186	3442
PHF	0.80	0.92	0.89	0.85	0.86	0.74	0.81	0.95	0.76	0.82	0.91	0.83	0.98

It is noted that during the AM and PM peaks the heaviest movement is the southbound through movement, with an impressive 828 vehicles traveling south onto Glenway Avenue during the PM peak. The AM peak also experiences a significant number of through vehicles on the northbound and eastbound approaches, and the eastbound approach also has heavy left and right turn movements. The noon peak experiences a high volume of traffic traveling north and south through the intersection. A significant number of vehicles also turn south onto Glenway Avenue from both the east and west bound approaches. The PM peak is the heaviest of all peaks; having almost 1500 more vehicles enter the intersection than during the AM peak. While the north and southbound through movements are the heaviest movements during the PM peak, there are many other heavy movements. Every left turn with the exception of the southbound left turn has more than 200 vehicles making the movement. Heavy right turn movements exist on every approach except the westbound approach. These heavy movements lead to deficient operation during the PM peak, with queues for heavy movements often extending several hundred feet.

Growth data has been provided by OKI, and growth factors have been derived to inflate these volumes to a projected 2030 volume. These growth factors can be found in *Table 5*.

Table 5: Derived Intersection Growth Factors

Approach	Growth Factor
Southbound	1.12
Westbound	1.25
Northbound	1.07
Eastbound	1.33

Using these growth factors, the existing turning movement counts have been inflated to projected 2030 volumes. The 2030 volumes for the intersection can be found in *Tables 6 through 8.*

Table 6: 2030 AM Peak Hour (8am-9am) Turning Movement Counts

Start Time	Race Road Southbound			Bridgetown Road Westbound			Glenway Avenue Northbound			Bridgetown Road Eastbound			Interval Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
8:00 AM	8	139	29	38	28	7	20	110	35	54	58	49	575
8:15 AM	6	136	37	39	43	6	26	109	38	59	64	38	601
8:30 AM	8	146	28	39	26	8	18	92	28	39	70	43	545
8:45 AM	6	144	19	48	46	4	20	118	39	40	74	55	613
Total	28	565	113	164	143	25	84	429	140	192	266	185	2334
PHF	0.88	0.97	0.76	0.85	0.78	0.78	0.81	0.91	0.90	0.81	0.90	0.84	0.95

Table 7: 2030 Noon Peak Hour (12:15pm-1:15pm) Turning Movement Counts

Start Time	Race Road Southbound			Bridgetown Road Westbound			Glenway Avenue Northbound			Bridgetown Road Eastbound			Interval Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
12:15 PM	11	152	26	91	65	21	61	141	57	51	76	53	805
12:30 PM	7	193	21	58	59	12	76	191	63	54	66	67	867
12:45 PM	11	192	27	46	72	13	80	182	76	52	68	91	910
1:00 PM	17	155	26	48	72	18	70	184	83	34	65	56	828
Total	46	692	100	243	268	64	287	698	279	191	275	267	3410
PHF	0.68	0.90	0.93	0.67	0.93	0.76	0.90	0.91	0.84	0.88	0.90	0.73	0.94

Table 8: 2030 PM Peak Hour (5:30pm-6:30pm) Turning Movement Counts

Start Time	Race Road Southbound			Bridgetown Road Westbound			Glenway Avenue Northbound			Bridgetown Road Eastbound			Interval Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4:30 PM	11	254	64	71	106	10	77	158	54	57	70	45	977
4:45 PM	4	216	54	77	82	18	64	186	63	62	64	48	938
5:00 PM	11	210	58	57	102	22	53	189	67	68	68	53	958
5:15 PM	9	250	53	57	118	16	57	186	90	38	52	63	989
Total	35	930	229	262	408	66	251	719	274	225	254	209	3862
PHF	0.80	0.92	0.89	0.85	0.86	0.75	0.81	0.95	0.76	0.83	0.91	0.83	0.98

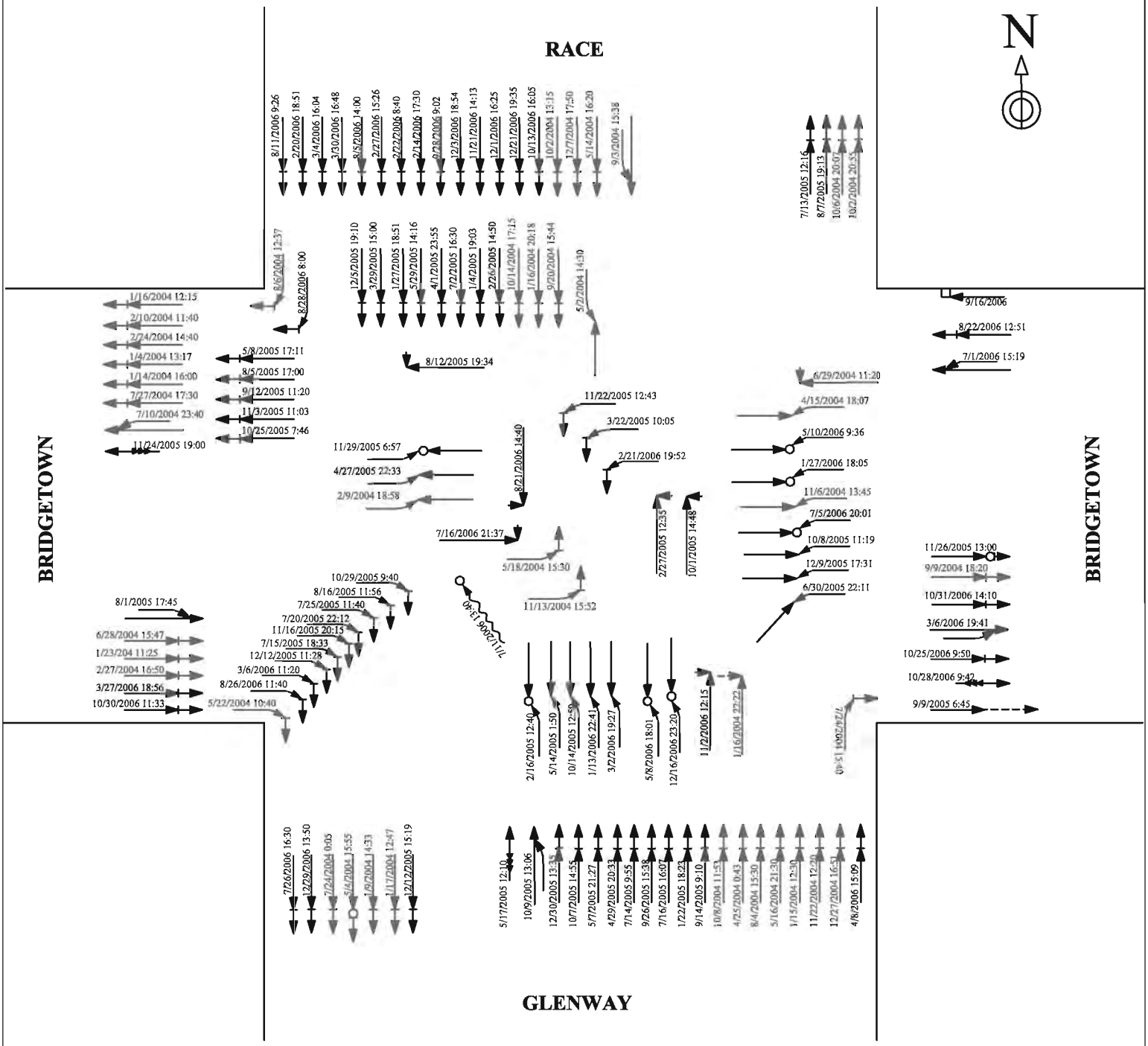
Accident Analysis

The intersection of Bridgetown Road and Glenway Avenue is a high accident location in Hamilton County. In 2005, the intersection was not only the highest accident location in Green Township, but it was also the highest accident location within Hamilton County. For this reason, this section seeks to identify problem movements through the accident history.

Intersection crash data has been provided by the Hamilton County Engineer's Office, and this data can be found in *Appendix C*. From this data it is observed that 134 accidents have occurred at the intersection between 2004 and 2006. Of those accidents, ten were injury accidents, two were pedestrian related, and none were fatal. A collision diagram has been prepared for this intersection, and is located in *Figure 2.*

Collision Diagram

Analysis Year: 2004-2006



Legend

Conditions

- Moving Vehicle
- Backing Vehicle
- Pedestrian
- Fixed Object
- Injury
- Fatal

Collision Types

- Rear End
- Head On
- Sideswipe
- Out of Control
- Angle

Accident Summary

Bridgetown, Race, and Glenway Roads

Property Damage Only:	122
Injury:	10
Fatal:	0
Involving Pedestrians	2
Total Accidents:	134

From the collision diagram, it is noted that a significant number of rear end accidents occur on the northbound and southbound approaches, with the vast majority of the rear end accidents occurring during the afternoon. These accidents can be attributed to the large volume of vehicles utilizing these approaches. A large number of rear end accidents also have occurred west of the intersection on Bridgetown while heading west. It is noted that a major driveway exists on Bridgetown west of the intersection, and it is possible that a high number of turns into or out of this driveway could be stopping westbound traffic, leading to unexpected conditions and rear end collisions. Angle collisions involving right turning vehicles from Bridgetown and southbound vehicles is also observed. It is noted that current geometrics and control at the intersection promote a quick turn from Bridgetown onto Glenway. It is possible that drivers may be making this quick right turn with disregard for vehicles already in the mainline. Such disregard could be resulting in the right angle collisions.

Nine of the ten injury accidents involve vehicles inside of the intersection. Of those accidents, seven involve left turning vehicles. There are 22 accidents observed involving left turning vehicles. With the volumes heading through the intersection and the permissive green left turns, these accidents will continue to occur under existing conditions.

Parking Analysis

There are several properties directly abutting the intersection and its right of way. A survey of these properties' parking lots has been completed, and an analysis of their current parking stalls and the required minimum stalls for each potentially impacted property has been analyzed. The results of this parking analysis can be found in Appendix D.

Identified Deficiencies

Analysis of the existing conditions of the intersection has identified several deficiencies with the intersection. These deficiencies are identified below:

- Drivers demonstrate disregard for traffic control items within the channelized right turn. Often, the stop signs are treated as a yield sign by motorists. This action greatly decreases the safety for pedestrians crossing the channelized right turns.
- Only one through lane exists for the northbound approach, and the left turn lane is dropped from the same travel lane as the through lane. The two heavy movements combined cause a significant queue and delay for both northbound movements.
- A very heavy through movement exists for the southbound approach. In addition, no right turn lane exists at the intersection. The current geometry for this approach causes large southbound delays to be incurred.
- Left turn movements on Bridgetown Rd. are heavy during the PM peak, and these left turn movements currently incur significant queues and delays.

- A merging distance is provided for right turning vehicles from Bridgetown to Glenway. Coupled with the channelized right turn, motorists may attempt to make quick right turns with little regard for motorists heading south.
- The traffic signal has not been seen a timing change since the early 1990s. Current phasing, especially during the PM peak, leads to significant delays and queues that could be alleviated by optimized timing.

IV. Alternatives Considered

A total of three alternatives have been identified for analysis and possible recommendations. These alternatives consist of a no build alternative, an optimized timing only alternative, and the feasible alternative. These alternatives are discussed in detail below.

No Build

The intersection will retain remain unchanged from the way it is today. Although the traffic volumes grow year by year, the geometry and signal phasing and timing still remain the same as they are. This alternative will serve as a baseline for evaluating the other alternatives, allowing for the comparison of current conditions to the proposed alternatives.

No Build – Optimized Timing

There will not be any changes to the intersection except that the signal phasing and timing are optimized for each peak period. Signal timings are optimized using the program HCS 2000. These optimizations aim to obtain better levels of service (LOS) as well as balanced levels of service for each approach.

Feasible Alternative

The geometry of this intersection will be changed, and the signal timing and phasing will be changed or optimized for this alternative. Storage lengths are determined according the *ODOT Location and Design Manual*. A schematic of the proposed improvements can be found in *Figure 3*. A description of the geometric improvements is as follows:

Southbound (Race Rd.): All lanes will be widened to 12 feet. The centerline of the roadway will be shifted 12 feet to the west to allow for the construction of a second lane heading north. The geometric design of the lanes approaching the intersection will consist of a dedicated right turn lane with a storage length of 550 feet, two through lanes, and one dedicated left turn lane with a storage length of 100 feet. The channelized right turn is to be removed.

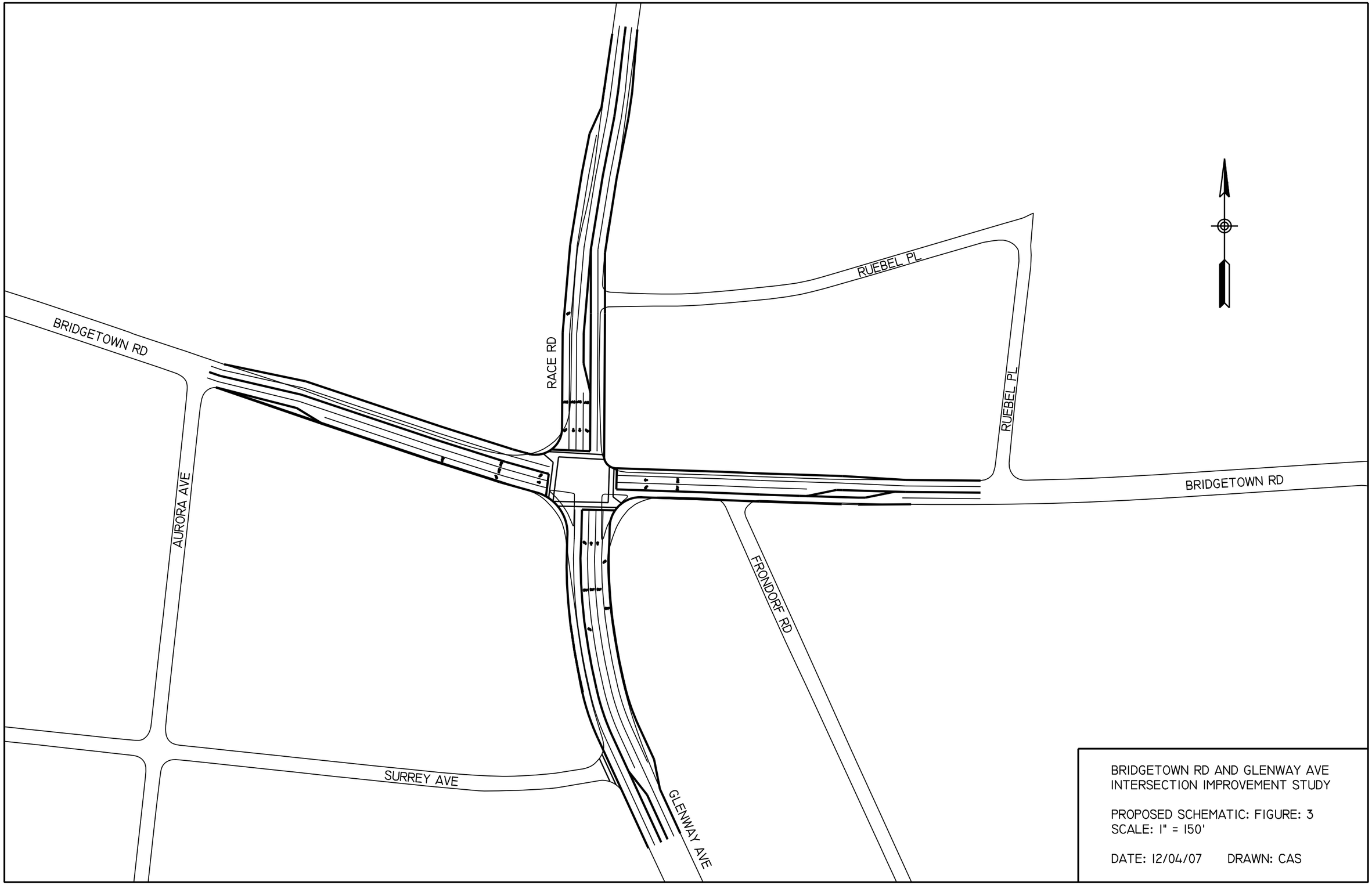
Northbound (Glenway Ave.): All lanes are to be widened to 12 foot widths. To accommodate a second through lane, the centerline of Glenway Ave. will be shifted 12 feet west. There will remain two receiving lanes, and the left turn lane will be extended to be 450 feet in length. The right turn lane will remain where it is located currently, except it will be modified to be a drop right turn lane with a storage length of 450 feet. The channelization of the right turn is to be removed. Widening of Glenway Avenue is to be accomplished through the acquisition of land on the west side of the road.

Eastbound (Bridgetown Rd.): All lanes are to be widened to 12 foot lanes. The left turn, through, and right turn lanes will be extended. The right turn lane will become a drop

lane, while the left turn lane will be created from the travel lane. Both turn lanes will have a storage length of 375 feet. The channelized right turn will be removed. One additional receiving lane will be built by acquiring land on the north side of this approach.

Westbound (Bridgetown Rd.): A second through lane is to be constructed. The resulting approach geometry will consist of a through-right lane, a through lane, and a left turn lane. The left turn lane, with a storage length of 325 feet, will be constructed by removing the inside receiving lane and replacing it with the turn lane. As a result, only one receiving lane will exist heading east on Bridgetown Rd. All lanes will be widened to a 12 foot width.

Other Improvements: Crosswalks will be marked across each approach.



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V. Capacity Analysis

The level of service (LOS) concept, as defined in the *Highway Capacity Manual (HCM)*, is the most prevalent and popular method of determining the adequacy of a roadway network element. For a signalized intersection, the level of service of the intersection is determined by its control delay and is ranked from A-F, with A being the best LOS. A description of the LOS criteria for a signalized intersection can be found in *Table 9*.

Table 9: Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (sec/veh)	General Description
A	≤ 10	Free Flow
B	>10-20	Stable Flow (Slight Delays)
C	>20-35	Stable Flow (Acceptable Delays)
D	>35-55	Approaching Unstable Flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55-80	Unstable Flow (Intolerable Delay)
F	>80	Forced Flow (Jammed)

From Highway Capacity Manual, 2000

Capacity Analyses have been completed for the three alternatives using the program *Highway Capacity Software (HCS)*. The capacity analyses were completed for the AM, Noon, and PM peak hours. Each alternative has two analyses per peak period, one for the design year of 2007 and one for the design year of 2030. The HCS output for these analyses can be found in *Appendix E*. The results of these analyses are summarized below for each peak period.

AM Peak

Capacity analyses were completed for the three alternatives during the AM Peak Period. The result of the HCS analyses is summarized in *Table 10*.

Table 10: Capacity Analyses Results for AM Peak

Alternative	Analysis Year	Level of Service (Delay)												
		Bridgetown Rd. (EB)			Bridgetown Rd. (WB)			Glenway Ave. (NB)			Race Rd. (SB)			Intersection
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
No Build Alternative	2007	C (22.4s)	D (37.4s)	D (36.3s)	C (22.1s)	D (35.3s)		C (23.1s)	C (25.7s)	C (21.8s)	C (32.3s)	D (39.5s)		
		C (32.3s)			**C (29.0s)**			**C (24.5s)**			**D (39.2s)**			**C (31.6s)**
	2030	C (23.2s)	D (38.7s)	D (37.0s)	C (22.9s)	D (35.8s)		C (24.2 s)	C (27.0s)	C (22.0s)	C (32.6s)	D (41.5s)		
		C (32.9s)			**C (29.7s)**			**C (25.5s)**			**D (41.1s)**			**C (32.9s)**
No Build / Optimized Timing Alternative	2007	C (20.4s)	C (27.7c)	C (26.8s)	B (18.1s)	C (25.9s)		B (15.9s)	B (17.6s)	B (14.8s)	C (20.1s)	C (24.4s)		
		C (25.1s)			**C (22.2s)**			**B (16.7s)**			**C (24.2s)**			**C (22.1s)**
	2030	B (19.4s)	C (26.9s)	C (25.1s)	B (16.5s)	C (24.0s)		B (16.5s)	B (18.3s)	B (14.6s)	C (20.5s)	C (27.2s)		
		C (24.0s)			**C (20.4s)**			**B (17.2s)**			**C (26.9s)**			**C (22.4s)**
Feasible Alternative	2007	B (18.8s)	C (29.3s)	C (28.0s)	B (19.4s)	C (25.1s)		B (12.0s)	B (12.0s)	B (11.6s)	B (16.8s)	B (19.1s)	B (17.9s)	
		C (25.6s)			**C (22.4s)**			**B (11.9s)**			**B (18.8s)**			**B (19.4s)**
	2030	B (19.0s)	C (23.7s)	C (23.1s)	C (20.1s)	C (21.0s)		B (17.3s)	B (17.1s)	B (16.5s)	C (21.9s)	C (25.3s)	C (23.4s)	
		C (22.0s)			**C (20.6s)**			**B (17.0s)**			**C (24.8)**			**C (21.2s)**

It is seen that the worst LOS of the three alternatives occurs during the 2030 analysis year of the no build alternative; however, this LOS improves to a C with an average control delay of 32.9 seconds under the feasible alternative. Overall, the intersection appears to perform well during the AM peak, except for some minor lane group delays. For the through-right lane group on Race Road, it is noted that an optimized timing will improve the delay in that lane group by almost 15 seconds, while the feasible alternative will change the D LOS to a B in 2007 and a very acceptable C LOS in 2030. Similarly, the eastbound approach on Bridgetown Road is projected to operate with a delay of almost 33 seconds in 2030 under the no build alternative, while both the feasible alternative and optimized timing alternative project a delay in the mid 20s. Similar improvements are seen on the other three approaches, while the northbound LOS improves to a B under both the optimized timing alternative and feasible alternative.

The overall intersection LOS for the AM peak is seen under the Feasible Alternative; however, an optimized timing will also produce an acceptable LOS, and the no build alternative will also retain an LOS of C in the 2030 design year.

Noon Peak

The commercial nature of the Glenway Avenue corridor necessitates that a capacity analysis be completed during the noon peak period. This analysis has been completed, and a summary of the analysis can be seen in *Table 11*.

The noon peak period has a much greater effect on capacity at the intersection. The No Build Alternative has a current LOS of D during this period, and the 2030 LOS for the no build alternative is seen to be an E, which suggests that the flow of traffic at the intersection will deteriorate to an unstable flow by 2030 if no action is taken. An optimized timing plan for the intersection will improve the current LOS to a C; however, by 2030 an optimized timing plan will only produce an intersection LOS of D with a delay of approximately 44 seconds. The feasible alternative would produce an acceptable LOS of C with a delay of 27 seconds in its build year, while by 2030 the LOS would remain a C with a delay of about 33 seconds. The 2030 delay for the feasible alternative is about 20 seconds better than if no action would be taken at all, and 10 seconds better than if only the timing was optimized.

It is also noted that certain movements have a very poor LOS during the Noon Peak. It is observed that the southbound left turn lane degrades to a level of service of F with a control delay of 226 seconds in 2030 under the no build alternative. The optimized timing will only be able to improve this LOS to an E, while the feasible alternative will improve the LOS to a C. Similarly, the northbound left turn is currently operating with an LOS of F with a delay that is expected to degrade from 88 seconds in 2007 to 174 seconds in 2030. An optimized timing plan for the intersection would be able to improve the LOS of the left turn to a D in 2007, but by 2030 the LOS would degrade to a borderline E that is on the verge of being an F. The feasible alternative would improve the LOS to a D with control delay of 36 seconds in 2007, to an LOS of D with a delay of 54 seconds in 2030. While the delay may approach the realm of unstable flow, this delay is a definite

improvement for the amount of right of way (ROW) acquisition involved in its construction.

PM Peak

From a volume standpoint, the PM peak period is the busiest of the three peak periods. The PM peak also has its own distinct traffic patterns and movements that differentiate itself from the AM and Noon Peak. For these reasons, it is imperative that capacity analyses are completed for the PM peak. These analyses have been completed, and the results of the analyses can be found in *Table 12*.

Being the busiest peak period, it is expected that the PM peak should have the highest delays and worst levels of service. As expected the no build alternative finds that the worst intersection delay occurs during the PM peak. With a delay of 67 seconds, the intersection currently operates at a LOS of E. This delay is projected to increase to 88 seconds by 2030, which will create a jammed state at the intersection in addition to a LOS of F. These levels of service are unacceptable, and further capacity analysis shows that optimized timings will do not enough to improve the capacity at the intersection. An optimized timing plan will yield a LOS that is precariously close to an E under the current volumes and geometrics. By 2030 an optimized timing plan would yield a LOS of E with a delay of 74.5 seconds. This LOS would be little comfort to motorists delayed at the intersection. The feasible alternative would yield a LOS of C under the current volumes, and during the design year the level of service would remain a C for the feasible alternative at the intersection.

The feasible alternative also makes great improvements for certain lane groups. It is observed that the southbound through-right lane group operates at a LOS of F during the PM peak. While an optimized timing will produce a LOS of E for that lane group, the feasible alternative will improve the LOS to C in 2007 and a D in 2030, which is a great improvement over the projected delay of 140 seconds seen for the no build alternative in 2030. The entire Race Road approach's delay in 2030 would improve by over 100 seconds if the feasible alternative was implemented. Similar improvements can be seen for other approaches, especially the westbound through-right lane group. Under the feasible alternative, the delay would improve to 39 seconds from 87 seconds under the no build alternative.

Table 11: Capacity Analyses Results for Noon Peak

Alternative	Analysis Year	Level of Service (Delay)												
		Bridgetown Rd. (EB)			Bridgetown Rd. (WB)			Glenway Ave. (NB)			Race Rd. (SB)			Intersection
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
No Build Alternative	2007	C (24.0s)	D (37.7s)	D (43.6s)	C (28.3s)	D (40.2s)		*F (87.5s)*	D (36.5s)	C (24.7s)	D (42.0s)	D (43.5s)		
		D (36.8s)			**C (34.3s)**			**D (45.1s)**			**D (43.4s)**			**D (40.9s)**
	2030	C (27.0s)	D (39.2s)	D (48.4s)	D (45.0s)	D (42.7s)		*F (173.8s)*	D (45.8s)	C (25.5s)	*F (225.7s)*	D (46.7s)		
		D (40.0s)			**D (43.8s)**			***E (69.8s)***			***E (59.6s)***			***E (56.0s)***
No Build / Optimized Timing Alternative	2007	C (20.7s)	C (25.8s)	C (33.3s)	D (39.9s)	C (28.7s)		D (41.6s)	C (25.7s)	B (15.7s)	C (27.8s)	D (38.1s)		
		C (27.6s)			**C (34.2s)**			**C (26.9s)**			**D (37.3s)**			**C (30.9s)**
	2030	C (27.5s)	C (31.3s)	D (51.6s)	*E (65.2s)*	D (37.7s)		*E (79.2s)*	D (35.4s)	B (17.1s)	*E (69.1s)*	D (45.4s)		
		D (38.7s)			**D (51.3s)**			**D (41.0s)**			**D (47.1s)**			**D (43.8s)**
Feasible Alternative	2007	B (18.9s)	C (28.1s)	C (34.2s)	D (50.7s)	C (26.1s)		D (36.1s)	B (15.6s)	B (15.7s)	C (23.0s)	C (26.1s)	C (22.5s)	
		C (28.4s)			**D (38.2s)**			**C (20.2s)**			**C (25.4s)**			**C (26.6s)**
	2030	B (17.6s)	C (31.2s)	D (46.1s)	D (52.0s)	C (27.8s)		D (53.4s)	B (17.9s)	B (18.0s)	C (29.5s)	D (38.9s)	C (27.4s)	
		C (34.0s)			**D (39.7s)**			**C (25.9s)**			**D (36.9s)**			**C (32.9s)**

Table 12: Capacity Analyses Results for PM Peak

Alternative	Analysis Year	Level of Service (Delay)												
		Bridgetown Rd. (EB)			Bridgetown Rd. (WB)			Glenway Ave. (NB)			Race Rd. (SB)			Intersection
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
No Build Alternative	2007	*E (68.6s)*	D (36.9s)	D (37.2s)	C (24.4s)	*E (61.8s)*		*F (126.7s)*	D (35.8s)	C (25.3s)	D (36.4s)	*F (105.9s)*		
		D (47.8s)			**D (48.6s)**			**D (52.9s)**			***F (103.5s)***			***E (66.5s)***
	2030	*F (107.8s)*	D (37.9s)	D (38.4s)	C (27.3s)	*F (86.9s)*		*F (174.6s)*	D (44.2s)	C (26.3s)	*E (68.6s)*	*F (143.1s)*		
		E (61.7s)			***E (65.8s)***			***E (68.0s)***			***F (140.6s)***			***F (88.0s)***
No Build / Optimized Timing Alternative	2007	*F (139.0s)*	C (30.5s)	C (31.1s)	D (36.7s)	*F (101.6s)*		*F (81.4s)*	C (20.7s)	B (14.9s)	C (21.8s)	*E (56.8s)*		
		E (67.8s)			***E (78.6s)***			**C (32.4s)**			***E (55.6s)***			**D (54.9s)**
	2030	*F (124.3s)*	D (36.5s)	D (37.5s)	D (49.0s)	*F (165.7s)*		*F (190.7s)*	C (26.6s)	B (17.1s)	C (25.2s)	*E (63.7s)*		
		E (66.5s)			***F (124.4s)***			***E (59.8s)***			***E (62.4s)***			***E (74.5s)***
Feasible Alternative	2007	C (26.3s)	D (35.3s)	D (38.6s)	C (27.2s)	D (35.7s)		C (30.3s)	B (13.1s)	B (13.5s)	C (21.4s)	C (32.2s)	C (25.2s)	
		C (33.3s)			**C (32.7s)**			**B (16.9s)**			**C (30.3s)**			**C (27.0s)**
	2030	D (39.2s)	D (38.4s)	D (46.8s)	D (41.7s)	D (38.8s)		D (49.3s)	B (14.7s)	B (15.4s)	C (24.0s)	D (42.4s)	C (37.2s)	
		D (41.3s)			**D (39.8s)**			**C (22.4s)**			**D (38.8s)**			**C (34.1s)**

VI. Recommendations

After analyzing the three alternatives, short term and long term recommendations have been prepared for the intersection. In the short term outlook, it is recommended that the signal phasing and timing be optimized for each peak period. Optimization of the signal reduces the delay of the intersection by about 10 seconds for each peak period. This raises the LOS of the intersection from D to C in the noon peak, and form E to D in the PM peak. Ultimately in the long term outlook it is recommended that the geometry of the intersection be altered and the signal be optimized for the improved intersection.

Short Term Recommendations

- Optimize signal phasing and timing for each peak period

Long Term Recommendations

All lanes at the intersection will be widened to 12 feet and shifted as needed to accommodate the following intersection improvements.

Southbound Race Rd.

- Remove the channelized right turn lane
- Add a second northbound receiving lane
- Add a dedicated left turn lane with 100 feet of storage
- Add a dedicated right turn lane with 550 feet of storage

Northbound Glenway Ave.

- Remove the channelization of the right turn lane
- Modify the channelized right turn lane to become a drop right turn lane with 450 feet of storage
- Widen Glenway Ave. on the west side
- Add a second northbound through lane
- Extend the dedicated left turn lane to 450 feet of storage

Eastbound Bridgetown Rd.

- Remove the channelization of the right turn lane
- Modify the channelized right turn lane to become a drop right turn lane with 375 feet of storage
- Modify the travel lane to become a dedicated left turn lane with 375 feet of storage
- Widen Bridgetown Rd. on the north side
- Add a westbound receiving lane

Westbound Bridgetown Rd.

- Remove the inside eastbound receiving lane
- Modify the eastbound receiving lane to become a dedicated left turn lane with 325 feet of storage

Additional

- Mark crosswalks at each approach

VII. Appendices

Appendix A

Existing Signal Timing

GAMMATRONIX SC-8000 SERIES NEMA CONTROLLER

KEY NO.	INTERVAL	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8
2	MINIMUM INITIAL (TRUE)	8.0	18	8.0	9.0		18	8.0	9.0
7 *	ADDED INITIAL (SEC./ACT.)								
4 *	PASSAGE TIME	3.0	4.0	3.0	3.5		4.0	3.0	3.5
8	BEFORE REDUCTION		20				20		
9	TIME TO MIN.		35				35		
3 *	MIN. GAP		3.0				3.0		
10	MAX. 1	14.0	40	16	40		40	16	40
11	MAX. 2	14.0	40	16	40		40	16	40
5 *	YELLOW CLEARANCE	3.0	4.0	3.0	4.0		4.0	3.0	4.0
6 *	RED CLEARANCE	1.5	1.5	1.5	1.5		1.5	1.5	1.5
0	WALK		7.0		7.0				7.0
1	PED. CLEARANCE		10		10				10
12 RECALL CODE	13 CALL TO NON-ACT. CODE (CNA)								
00 - NONE	00 - NONE		✓		✓	✓ ✓		✓	✓ ✓
01 - VEH.	01 - CNA No. 1		✓				✓ ✓		
02 - MAX.	02 - CNA No. 2								
03 - NON-LOCK	03 - CNA 1 & 2	✓	✓	✓				✓	
04 - PED.	* DISPLAY IN TENTH OF SEC.								

SUPPLEMENTAL INFORMATION

Ø1 Left turn Delay = 6.0 sec.
Ø3+7 Left turn Delay = 8.0 sec.

MIN. INITIAL – THIS IS TRUE MINIMUM.

ADDED INITIAL – THIS ADDS TO MINIMUM INITIAL IN SEC./ACT. IN TENTH OF SEC.

PASSAGE TIME – IN TENTH OF SECONDS.

BEFORE REDUCTION – TIME BEFORE REDUCTION OF GAP STARTS IN SEC.

TIME TO MIN. – TIME IN SECONDS TO REDUCE.

MIN. GAP – IF NOT DESIRED THIS SHOULD BE SET TO SAME VALUE AS PASSAGE TIME IN TENTH OF SECONDS.

MAX. 1
MAX 2
} TRUE MAX. GREEN BEGINNING WHEN CALL IS PLACED ON ANOTHER PHASE. THIS SHOULD BE SET GREATER THAN MAX. INITIAL.

YELLOW CLEARANCE
RED CLEARANCE
} IN TENTH OF SECONDS.

INITIALIZATION – TO INITIALIZE IN Ø1 GREEN, PUSH "MONITOR PH. INT.", THEN 0 1 FOR RING No. 1, THEN 1, 2 FOR PHASE 1, INTERVAL 2 (MIN. GR.) AND THEN ENTER.

TO OBSERVE & CHANGE TIMING – PRESS "MONITOR RING" AND SELECTED RING (01 OR 02), PUSH "MONITOR PH. INT.", THEN PHASE No., THEN INTERVAL (WALK, MIN. INT., ETC.); TO CHANGE ANY VALUE, PRESS NEW VALUE AND THEN PRESS "ENTER VALUE".

FOR OPERATIONAL DISPLAY MODE – PRESS "MONITOR RING" AND SELECT RING (1 OR 2)

INTERSECTION SR-264 + Race Rd.

COUNTY Hamilton DISTRICT 8 SIGNAL NO. 264-7.99

FILE NO. 203 APPROVED [signature] DATE 2-20-92

Appendix B

Turning Movement Counts

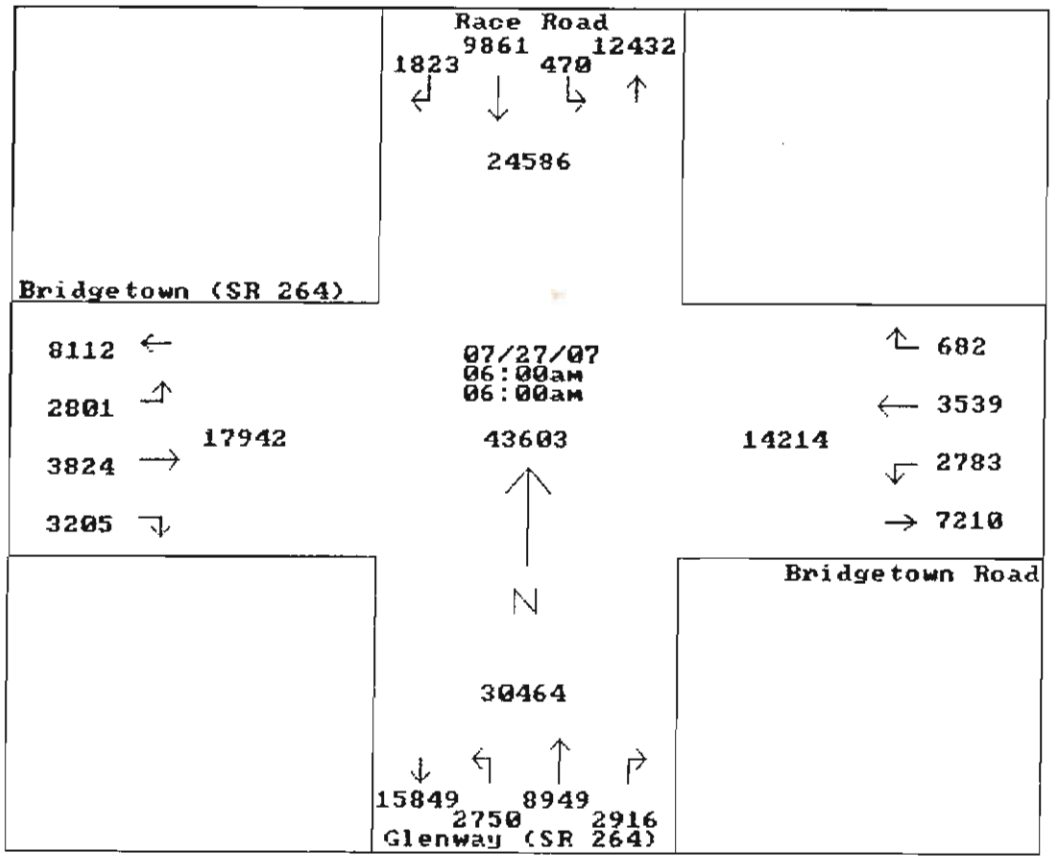
Count Dates: July 27 & 30, 2007
Count Days: Friday & Monday
Count By: Kellie Kammer
Weather: Sunny & Hot

Hamilton County Engineer's Office
William W. Brayshaw, P.E.-P.S.
Hamilton County Engineer
**** Traffic Department ****

Study Name: 264RACB
Site Code : 00000000
Start Date: 07/27/07

Unshifted

Start Time	Race Road From North				Bridgetown Road From East				Glenway (SR 264) From South				Bridgetown (SR 264) From West				Intvl. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
Grp 1	1.430	1.430	1.430	1.430	1.430	1.430	1.430	1.430	1.430	1.430	1.430	1.430	1.430	1.430	1.430	1.430	
07/27/0																	
06:00	470	9861	1823	0	2783	3539	682	0	2750	8949	2916	0	2801	3824	3205	0	43603
% Apr.	3.8	81.1	14.9	-	39.7	50.5	9.7	-	18.8	61.2	19.9	-	28.4	38.9	32.6	-	-
% Int.	1.0	22.6	4.1	-	6.3	8.1	1.5	-	6.3	20.5	6.6	-	6.4	8.7	7.3	-	-



24 Hour Count (Factor = 1.43)

Bridgetown, Glenway (S.R. 264) & Race Road

Green Township

2007 Manual Traffic Count

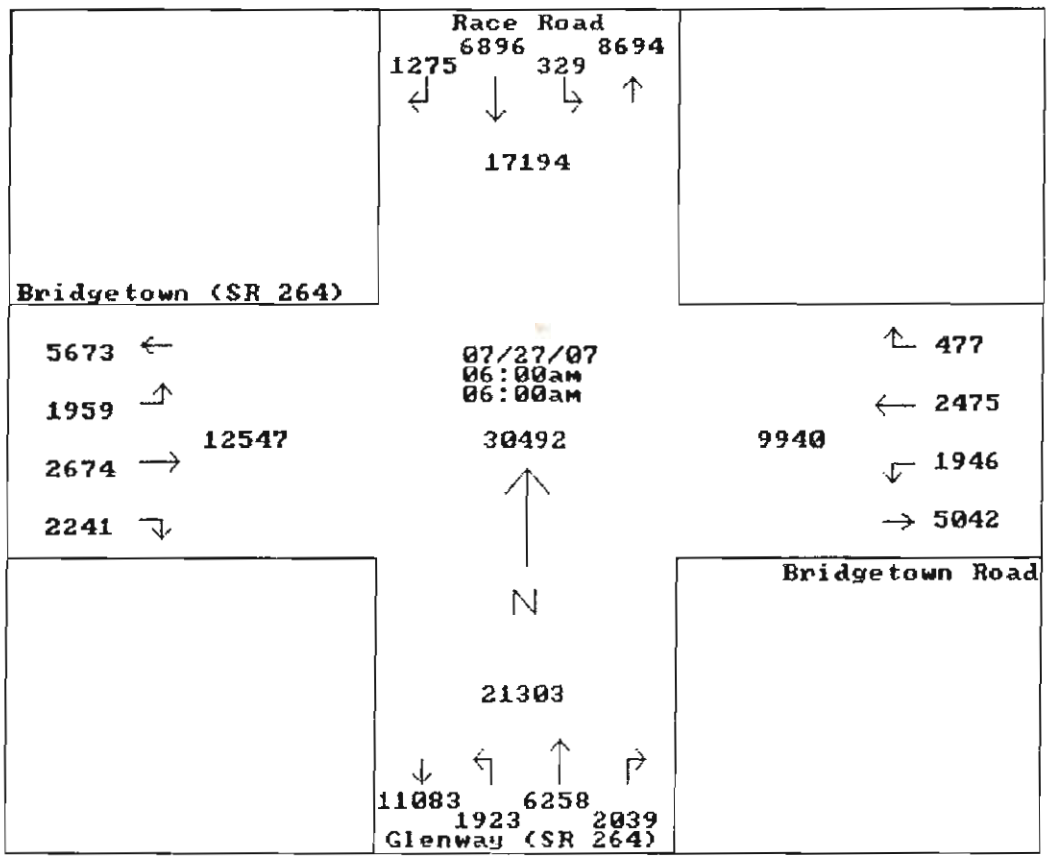
Count Dates: July 27 & 30, 2007
Count Days: Friday & Monday
Count By: Kellie Kammer
Weather: Sunny & Hot

Hamilton County Engineer's Office
William W. Brayshaw, P.E.-P.S.
Hamilton County Engineer
**** Traffic Department ****

Study Name: 264RACB
Site Code : 00000000
Start Date: 07/27/07
Page : 1

Unshifted

Start Time	Race Road From North				Bridgetown Road From East				Glenway (SR 264) From South				Bridgetown (SR 264) From West				Intvl. Total
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
07/27/07																	
06:00	329	6896	1275	0	1946	2475	477	0	1923	6258	2039	0	1959	2674	2241	0	30492
% Apr.	3.8	81.1	15.0	-	39.7	50.5	9.7	-	18.8	61.2	19.9	-	28.4	38.9	32.6	-	-
% Int.	1.0	22.6	4.1	-	6.3	8.1	1.5	-	6.3	20.5	6.6	-	6.4	8.7	7.3	-	-



12 Hour Count

Bridgetown, Glenway (S.R. 264) & Race Road

Green Township

2007 Manual Traffic Count

Traffic Count Performed by Hamilton County Engineer's Office
July 27 & 30, 2007

	Race Road			Bridgetown Road			Glenway Avenue			Bridgetown Road				
	Southbound			Westbound			Northbound			Eastbound			Interval	Hourly
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Total	Total
6:00 AM	1	38	1	2	6	2	6	39	10	30	20	22	177	-
6:15 AM	4	52	3	7	5	4	3	50	19	43	28	22	240	-
6:30 AM	1	69	8	10	9	7	1	63	9	43	40	29	289	-
6:45 AM	1	84	8	8	14	2	9	76	7	45	47	44	345	1051
7:00 AM	4	61	13	16	19	6	10	69	26	76	64	34	398	1272
7:15 AM	7	96	13	17	25	5	17	85	20	55	91	22	453	1485
7:30 AM	6	104	21	19	27	8	14	85	16	59	68	32	459	1655
7:45 AM	4	140	28	17	30	9	8	88	38	58	64	46	530	1840
8:00 AM	7	124	26	34	25	6	18	98	31	48	52	44	513	1955
8:15 AM	5	121	33	35	38	5	23	97	34	53	57	34	535	2037
8:30 AM	7	130	25	35	23	7	16	82	25	35	62	38	485	2063
8:45 AM	5	128	17	43	41	4	18	105	35	36	66	49	547	2080
9:00 AM	9	113	20	42	29	8	29	83	33	34	41	40	481	2048
9:15 AM	3	115	24	30	39	6	37	94	28	35	51	54	516	2029
9:30 AM	9	116	20	27	38	7	23	126	34	31	37	44	512	2056
9:45 AM	7	107	23	33	46	9	36	105	38	27	58	53	542	2051
10:00 AM	9	116	30	36	41	9	34	95	28	25	46	39	508	2078
10:15 AM	8	119	22	31	42	9	27	120	32	34	47	39	530	2092
10:30 AM	9	143	18	37	37	9	31	118	37	24	41	39	543	2123
10:45 AM	6	126	24	45	44	4	43	130	42	26	46	61	597	2178
11:00 AM	4	137	23	37	47	12	38	127	29	40	55	53	602	2272
11:15 AM	4	147	29	36	58	8	51	142	30	30	48	43	626	2368
11:30 AM	6	123	15	58	50	10	53	148	40	28	55	57	643	2468
11:45 AM	5	124	23	46	43	8	58	165	55	44	42	46	659	2530
12:00 PM	7	145	11	52	62	13	53	142	25	42	65	53	670	2598
12:15 PM	10	135	23	81	58	19	54	126	51	45	68	47	717	2689
12:30 PM	6	172	19	52	53	11	68	170	56	48	59	60	774	2820
12:45 PM	10	171	24	41	64	12	71	162	68	46	61	81	811	2972
1:00 PM	15	138	23	43	64	16	62	164	74	30	58	50	737	3039
1:15 PM	8	144	31	42	74	11	50	136	52	33	50	57	688	3010
1:30 PM	7	173	13	47	59	7	67	158	69	43	54	63	760	2996
1:45 PM	11	136	29	54	65	21	50	173	73	41	54	46	753	2938
2:00 PM	8	169	40	30	57	9	56	151	46	39	56	48	709	2910
2:15 PM	8	183	30	40	59	17	57	172	59	38	57	50	770	2992
2:30 PM	10	158	18	46	66	14	65	165	46	46	52	52	738	2970
2:45 PM	5	189	30	58	69	22	45	193	53	33	65	61	823	3040
3:00 PM	11	170	33	44	67	8	58	182	59	29	67	43	771	3102
3:15 PM	6	175	29	69	57	13	43	172	73	47	56	55	795	3127
3:30 PM	8	172	37	50	54	7	48	150	54	41	77	62	760	3149
3:45 PM	8	196	49	38	76	10	69	162	45	39	74	47	813	3139
4:00 PM	11	212	40	53	85	12	37	165	51	34	71	46	817	3185
4:15 PM	5	197	35	57	84	5	52	174	46	34	59	47	795	3185
4:30 PM	10	226	57	63	94	9	69	141	48	51	62	40	870	3295
4:45 PM	4	192	48	69	73	16	57	166	56	55	57	43	836	3318
5:00 PM	10	187	52	51	91	20	47	168	60	61	61	47	855	3356
5:15 PM	8	223	47	51	105	14	51	166	80	34	46	56	881	3442
5:30 PM	6	187	46	61	98	17	40	146	56	52	55	47	811	3383
5:45 PM	6	213	44	53	65	10	51	164	43	39	64	56	808	3355
Total:	329	6896	1275	1946	2475	477	1923	6258	2039	1959	2674	2241	30492	

Appendix C

Crash Data

2004 Crash Report

William W. Brayshaw PE - PS *The Hamilton County Engineer's Traffic Department*

Source	Report #	Date	Day	Time	Twp	Address	Road	Intersects	Distance/Dir.	Inj	Ped	Fat	Crash Type	Comments
Hamco	6411	10/2/2004	SA	13:15	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Green	2057	12/7/2004	TU	17:50	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Green	1274	8/6/2004	FR	12:37	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	WB - ACD
Green	758	5/14/2004	FR	16:20	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Green	1450	9/3/2004	FR	15:38	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Sideswipe/Passing	SB improper lane chg
Hamco	6749	10/14/2004	TH	17:15	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Green	95	1/16/2004	FR	20:18	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Green	1539	9/20/2004	MO	15:44	Gr	3814	Race	Bridgetown & Glenway	100 N	0	0	0	Rear End	SB - ACD
Hamco	6508	10/6/2004	WE	20:07	Gr	3814	Race	Bridgetown & Glenway	100 N	0	0	0	Rear End	NB-ACD mult.pileup
Hamco	6416	10/2/2004	SA	20:55	Gr	3818	Race	Bridgetown & Glenway	125 N	0	0	0	Rear End	NB - ACD
Hamco	5879	9/9/2004	TH	18:20	Gr	4555	Bridgetown	Glenway & Race	100 E	0	0	0	Rear End	EB - ACD
Hamco	374	1/16/2004	FR	12:15	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	WB - ACD
Hamco	3226	5/22/2004	SA	10:40	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	SB - ACD
Green	588	4/15/2004	TH	18:07	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Left Turn	WB to SB into EB
Green	335	2/27/2004	FR	16:50	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	EB - ACD
Green	249	2/10/2004	TU	11:40	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	WB-ACD mult.pileup
Hamco	1241	2/24/2004	TU	14:40	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	WB - ACD
Green	128	1/23/2004	FR	11:25	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	EB - ACD
Green	695	5/2/2004	MO	14:30	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Left Turn	SB to EB into NB
Hamco	381	1/16/2004	FR	22:22	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	2	0	Angle	NB ran red into EB

2004 Crash Report

William W. Brayshaw PE - PS *The Hamilton County Engineer's Traffic Department*

Source	Report #	Date	Day	Time	Twp	Address	Road	Intersects	Distance/Dir.	Inj	Ped	Fat	Crash Type	Comments
Green	19	1/4/2004	SU	13:17	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	WB-ACD mult.pileup
Green	245	2/9/2004	MO	18:58	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Left Turn	EB to NB into WB
Green	1129	7/10/2004	SA	23:40	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Sideswipe/Passing	WB improper lane chg
Hamco	4179	6/28/2004	MO	15:47	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	EB - ACD
Hamco	4198	6/29/2004	TU	11:20	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Angle	WB into SB
Hamco	334	1/14/2004	WE	16:00	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	WB - ACD
Green	1853	11/6/2004	SA	13:45	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Left Turn	WB to SB into EB
Green	1835	11/3/2004	WE	15:52	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	NB - ACD
Hamco	4826	7/27/2004	TU	17:30	Gr	5508	Bridgetown SR 264	Glenway & Race	80 W	0	0	0	Rear End	WB - ACD
Hamco	3125	5/18/2004	TU	15:30	Gr	5510	Bridgetown SR 264	Glenway & Race	100 W	0	0	0	Rear End	NB - ACD
Hamco	9003	12/27/2004	MO	16:51	Gr	6645	Glenway SR 264	Bridgetown & Race	50 S	0	0	0	Rear End	NB - ACD
Hamco	4737	7/24/2004	SA	0:05	Gr	6645	Glenway SR 264	Bridgetown & Race	50 S	0	0	0	Rear End	SB - ACD
Hamco	2765	5/4/2004	TU	15:55	Gr	6645	Glenway SR 264	Bridgetown & Race	50 S	1	0	0	Rear End	SB - ACD
Green	1957	11/22/2004	MO	12:20	Gr	6650	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	NB - ACD
Green	62	1/9/2004	FR	14:33	Gr	6650	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	SB - ACD
Green	93	1/15/2004	TH	12:30	Gr	6650	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	NB - ACD
Green	102	1/17/2004	SA	12:47	Gr	6650	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	SB - ACD
Green	772	5/16/2004	SU	21:30	Gr	6650	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	NB - ACD
Green	1255	8/4/2004	WE	15:30	Gr	6650	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	NB - ACD
Hamco	4742	7/24/2004	SA	15:40	Gr	6650	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	EB - ACD

2004 Crash Report

William W. Brayshaw PE - PS *The Hamilton County Engineer's Traffic Department*

Source	Report #	Date	Day	Time	Twp	Address	Road	Intersects	Distance/Dir.	Inj	Ped	Fat	Crash Type	Comments
Green	656	4/25/2004	SU	0:43	Gr	6650	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	NB - ACD
Green	1635	10/8/2004	FR	11:53	Gr	6650	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	NB - ACD

2005 Crash Report

William W. Brayshaw PE - PS *The Hamilton County Engineer's Traffic Department*

Source	Report #	Date	Day	Time	Twp	Address	Road	Intersects	Distance/Dir.	Inj	Ped	Fat	Crash Type	Comments
Hamco	6633	10/14/2005	FR	12:59	Gr		Race	Bridgetown & Glenway	100 N	0	0	0	Left Turn	NB to WB into SB
Green	1949	12/5/2005	MO	19:10	Gr	3800	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Hamco	2089	3/29/2005	TU	15:00	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Green	177	1/27/2005	TH	18:51	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Green	842	5/29/2005	SA	14:16	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Green	530	4/1/2005	FR	23:55	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Green	1000	7/2/2005	SA	16:30	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Hamco	72	1/4/2005	TU	19:03	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Hamco	3162	5/14/2005	SA	1:50	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Left Turn	NB to WB into SB
Green	1192	8/7/2005	SU	19:13	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	NB - ACD
Hamco	1386	2/26/2005	SA	14:50	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Hamco	4522	7/13/2005	WE	12:16	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	NB - ACD
Hamco	5848	9/9/2005	FR	6:45	Gr	4560	Bridgetown	Glenway & Race	85 E	0	1	0	Pedestrian Action	EB into pedestrian
Green	487	3/22/2005	TU	10:05	Gr	4599	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	SB - ACD
Hamco	6489	10/8/2005	SA	11:19	Gr	4599	Bridgetown SR 264	Glenway & Race	0	0	0	0	Left Turn	WB to SB into EB
Green	1973	12/9/2005	FR	17:31	Gr	4599	Bridgetown SR 264	Glenway & Race	0	0	0	0	Left Turn	WB to SB into EB
Green	1519	10/1/2005	SA	14:48	Gr	4599	Bridgetown SR 264	Glenway & Race	0	0	0	0	Angle	NB into WB
Hamco	1412	2/27/2005	SU	12:35	Gr	4599	Bridgetown SR 264	Glenway & Race	0	0	0	0	Angle	NB @ SS into WB
Hamco	7720	11/22/2005	TU	12:43	Gr	4599	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	SB - ACD
Green	1874	11/26/2005	SA	13:00	Gr	4599	Bridgetown SR 264	Glenway & Race	0	1	0	0	Rear End	EB - ACD

2005 Crash Report

William W. Brayshaw PE - PS *The Hamilton County Engineer's Traffic Department*

Source	Report #	Date	Day	Time	Twp	Address	Road	Intersects	Distance/Dir.	Inj	Ped	Fat	Crash Type	Comments
Hamco	3002	5/8/2005	SU	17:11	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	WB - ACD
Hamco	8296	12/12/2005	MO	11:28	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	SB - ACD
Hamco	4987	8/1/2005	MO	17:45	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Sideswipe/Passing	SB improper lane chg
Hamco	5087	8/5/2005	FR	17:00	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	WB - ACD
Green	990	6/30/2005	TH	22:11	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Left Turn	WB to SB into EB&NB
Green	1073	7/15/2005	FR	18:33	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	SB - ACD
Green	1409	9/12/2005	MO	11:20	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	WB-ACD mult.pileup
Hamco	7854	11/24/2005	TH	19:00	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Improper Backing	Back down WB lane
Hamco	7215	11/3/2005	TH	11:03	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	WB-ACD mult.pileup
Hamco	7569	11/16/2005	WE	20:15	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	SB - ACD
Green	1236	8/12/2005	FR	19:34	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Angle	WB into SB
Hamco	2743	4/27/2005	WE	22:33	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Left Turn	EB to NB into WB
Green	1686	10/25/2005	TU	7:46	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	WB - ACD
Green	1135	7/20/2005	TU	22:12	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	SB - ACD
Hamco	7884	11/29/2005	TU	6:57	Gr	5500	Bridgetown SR 264	Glenway & Race	0	1	0	0	Left Turn	EB to NB into WB
Hamco	4802	7/25/2005	MO	11:40	Gr	5501	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	SB - ACD
Hamco	5329	8/16/2005	TU	11:56	Gr	5501	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	SB - ACD
Green	1718	10/29/2005	SA	9:40	Gr	6500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	SB - ACD
Hamco	5952	9/14/2005	WE	9:10	Gr	6610	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	NB - ACD
Green	139	1/22/2005	SA	18:23	Gr	6610	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	NB - ACD

2005 Crash Report

William W. Brayshaw PE - PS *The Hamilton County Engineer's Traffic Department*

Source	Report #	Date	Day	Time	Twp	Address	Road	Intersects	Distance/Dir.	Inj	Ped	Fat	Crash Type	Comments
Green	1996	12/12/2005	MO	15:19	Gr	6610	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	SB - ACD
Green	1557	10/9/2005	SU	13:06	Gr	6610	Glenway SR 264	Bridgetown & Race	0	0	0	0	Sideswipe/Passing	NB improper lane chg
Green	307	2/16/2005	WE	12:40	Gr	6610	Glenway SR 264	Bridgetown & Race	0	1	0	0	Left Turn	SB ran red into NW
Green	1078	7/16/2005	SA	16:07	Gr	6610	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	NB - ACD
Hamco	6239	9/26/2005	MO	15:38	Gr	6610	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	NB - ACD
Hamco	4555	7/14/2005	TH	9:55	Gr	6610	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	NB - ACD
Hamco	2787	4/29/2005	FR	20:33	Gr	6610	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	NB - ACD
Hamco	2994	5/7/2005	SA	21:27	Gr	6610	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	NB - ACD
Hamco	3219	5/17/2005	TU	12:10	Gr	6610	Glenway SR 264	Bridgetown & Race	0	0	0	0	Improper Backing	Back down NB lane
Hamco	6476	10/7/2005	FR	14:55	Gr	6610	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	NB - ACD
Green	2121	12/30/2005	FR	13:35	Gr	6611	Glenway SR 264	Bridgetown & Race	235 S	1	0	0	Rear End	NB - ACD

2006 Crash Report

William W. Brayshaw PE - PS *The Hamilton County Engineer's Traffic Department*

Source	Report #	Date	Day	Time	Twp	Address	Road	Intersects	Distance/Dir.	Inj	Ped	Fat	Crash Type	Comments
Green	1120	8/11/2006	FR	9:26	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Green	268	2/20/2006	MO	18:51	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Green	318	3/4/2006	SA	16:04	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Green	475	3/30/2006	TH	16:48	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Green	666	5/8/2006	MO	18:01	Gr	3801	Race	Bridgetown & Glenway	0	1	0	0	Left Turn	NB to WB into SB
Hamco	4642	8/5/2006	SA	14:00	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Hamco	1177	2/27/2006	MO	15:26	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Hamco	1105	2/22/2006	WE	8:40	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Green	229	2/14/2006	TU	17:30	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Hamco	5199	8/28/2006	MO	8:00	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	WB - ACD
Hamco	5789	9/28/2006	TH	9:02	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Green	1804	12/3/2006	SU	18:54	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Green	1743	11/21/2006	TU	14:13	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Green	1794	12/1/2006	FR	16:25	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Hamco	5016	8/21/2006	MO	14:40	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Angle	SB ran red into WB
Hamco	8051	12/21/2006	TH	19:35	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Hamco	6162	10/13/2006	FR	16:05	Gr	3801	Race	Bridgetown & Glenway	0	0	0	0	Rear End	SB - ACD
Hamco	5547	9/16/2006	SA		Gr	4560	Bridgetown	Glenway & Race	85 E	0	0	0	Fixed Object	Park car hit & run
Green	1177	8/22/2006	TU	12:51	Gr	4560	Bridgetown	Glenway & Race	85 E	0	0	0	Rear End	WB - ACD
Green	949	7/1/2006	SA	15:19	Gr	4560	Bridgetown	Glenway & Race	85 E	0	0	0	Sideswipe/Passing	WB improper lane chg

2006 Crash Report

William W. Brayshaw PE - PS *The Hamilton County Engineer's Traffic Department*

Source	Report #	Date	Day	Time	Twp	Address	Road	Intersects	Distance/Dir.	Inj	Ped	Fat	Crash Type	Comments
Green	1597	10/25/2006	WE	9:50	Gr	4599	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	EB - ACD
Hamco	1301	3/6/2006	MO	19:41	Gr	4599	Bridgetown SR 264	Glenway & Race	0	0	0	0	Sideswipe/Passing	EB improper lane chg
Hamco	2706	5/10/2006	WE	9:36	Gr	4599	Bridgetown SR 264	Glenway & Race	0	0	0	0	Left Turn	WB to SB into EB
Green	1607	10/31/2006	TU	14:10	Gr	4599	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	EB - ACD
Green	1587	10/28/2006	SA	9:42	Gr	4599	Bridgetown SR 264	Glenway & Race	0	0	0	0	Improper Backing	Back down EB lane
Green	276	2/21/2006	TU	19:52	Gr	4599	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	SB - ACD
Hamco	6729	11/2/2006	TH	12:15	Gr	4599	Bridgetown SR 264	Glenway & Race	0	0	0	0	Angle	NB into EB
Green	467	3/27/2006	MO	18:56	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	EB - ACD
Green	327	3/6/2006	MO	11:20	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	SB - ACD
Green	966	7/5/2006	WE	20:01	Gr	5500	Bridgetown SR 264	Glenway & Race	0	3	0	0	Left Turn	WB to SB into EB
Green	1014	7/16/2006	SU	21:37	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Angle	SB ran red into EB
Green	1193	8/26/2006	SA	11:40	Gr	5500	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	SB - ACD
Green	1589	10/30/2006	MO	11:33	Gr	5501	Bridgetown SR 264	Glenway & Race	0	0	0	0	Rear End	EB - ACD
Hamco	1224	3/2/2006	TH	19:27	Gr	6610	Glenway SR 264	Bridgetown & Race	0	0	0	0	Left Turn	NB to WB into SB
Green	124	1/27/2006	FR	18:05	Gr	6610	Glenway SR 264	Bridgetown & Race	0	4	0	0	Left Turn	WB to SB into EB
Green	523	4/8/2006	SA	15:09	Gr	6610	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	NB - ACD
Green	54	1/13/2006	FR	22:41	Gr	6610	Glenway SR 264	Bridgetown & Race	0	0	0	0	Left Turn	NB to WB into SB
Green	1043	7/26/2006	WE	16:30	Gr	6610	Glenway SR 264	Bridgetown & Race	0	0	0	0	Rear End	SB - ACD
Hamco	7912	12/16/2006	SA	23:20	Gr	6610	Glenway SR 264	Bridgetown & Race	0	1	0	0	Left Turn	NB to WB into SB
Green	1001	7/11/2006	TU	13:40	Gr	6610	Glenway SR 264	Bridgetown & Race	0	1	0	0	Fail to Control	WB tin EB & NB

2006 Crash Report

William W. Brayshaw PE - PS *The Hamilton County Engineer's Traffic Department*

Source	Report #	Date	Day	Time	Twp	Address	Road	Intersects	Distance/Dir.	Inj	Ped	Fat	Crash Type	Comments
Green	1968	12/29/2006	FR	13:50	Gr	6611	Glenway SR 264	Bridgetown & Race	235 S	0	0	0	Rear End	SB - ACD

Appendix D

Parking Analysis

Parking Analysis

Property	Existing Parking	Spots Impacted	Building SQFT	Minimum Stall Req.	Required Spaces Per Zoning
Walgreens	69	39	12347	61.735	62
Steak n' Shake	57	12	3726	37.26	37
Sherwin Williams	28	12	6131	15.3275	15
Enterprise	59*	36	1544	3.86	4
Wagon Wheel	14	0	1616	16.16	16

*Most is for car storage, plenty of customer parking

Appendix E

Capacity Analysis

No Build Alternative

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*Zhixia & Qingyi*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*AM Peak*	Analysis Year	*2007*
		Project ID	*Existing Conditions*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*1*	*0*	*1*	*1*	*1*	*1*	*2*	*0*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*TR*	
Volume, V (vph)	*172*	*237*	*165*	*147*	*127*	*22*	*75*	*382*	*125*	*24*	*503*	*101*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.81*	*0.90*	*0.84*	*0.85*	*0.77*	*0.79*	*0.82*	*0.91*	*0.89*	*0.86*	*0.97*	*0.77*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Extension of effective green, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*9.0*	*9.0*	*10.0*	*12.0*	*11.0*		*12.0*	*12.0*	*11.0*	*10.0*	*11.0*	
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	
Min. time for pedestrians, G_p	*13.2*			*13.2*			*3.2*			*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *16.0*	G = *40.0*	G =	G =	G = *14.0*	G = *40.0*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*						Cycle Length, C = *130.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*212*	*263*	*196*	*173*	*193*		*91*	*420*	*140*	*28*	*650*	
Lane group capacity, c	*494*	*539*	*475*	*478*	*556*		*331*	*851*	*699*	*286*	*1059*	
v/c ratio, X	*0.43*	*0.49*	*0.41*	*0.36*	*0.35*		*0.27*	*0.49*	*0.20*	*0.10*	*0.61*	
	0.47	*0.31*	*0.31*	*0.47*	*0.31*		*0.45*	*0.45*	*0.45*	*0.31*	*0.31*	

Total green ratio, g/C												
Uniform delay, d_1	21.8	36.7	35.7	21.6	34.9		22.6	25.3	21.6	32.1	38.4	
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.11	0.11	0.11	0.11	0.11		0.11	0.11	0.11	0.11	0.20	
Incremental delay, d_2	0.6	0.7	0.6	0.5	0.4		0.5	0.5	0.1	0.2	1.1	
Initial queue delay, d_3												
Control delay	22.4	37.4	36.3	22.1	35.3		23.1	25.7	21.8	32.3	39.5	
Lane group LOS	C	D	D	C	D		C	C	C	C	D	
Approach delay	32.3			29.0			24.5			39.2		
Approach LOS	C			C			C			D		
Intersection delay	31.6			X_C = 0.62			Intersection LOS			C		

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*Zhixia & Qingyi*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*Noon Peak*	Analysis Year	*2007*
		Project ID	*Existing Conditions*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*1*	*0*	*1*	*1*	*1*	*1*	*2*	*0*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*TR*	
Volume, V (vph)	*169*	*246*	*238*	*217*	*239*	*58*	*255*	*622*	*249*	*41*	*616*	*89*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.88*	*0.90*	*0.73*	*0.67*	*0.93*	*0.76*	*0.90*	*0.91*	*0.84*	*0.68*	*0.90*	*0.77*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Extension of effective green, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*9.0*	*9.0*	*10.0*	*12.0*	*11.0*		*12.0*	*12.0*	*11.0*	*10.0*	*11.0*	
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	
Min. time for pedestrians, G_p	*13.2*			*13.2*			*3.2*			*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *16.0*	G = *40.0*	G =	G =	G = *14.0*	G = *40.0*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*						Cycle Length, C = *130.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*192*	*273*	*326*	*324*	*333*		*283*	*684*	*296*	*60*	*800*	
Lane group capacity, c	*387*	*539*	*475*	*470*	*549*		*280*	*851*	*699*	*113*	*1068*	
v/c ratio, X	*0.50*	*0.51*	*0.69*	*0.69*	*0.61*		*1.01*	*0.80*	*0.42*	*0.53*	*0.75*	
	0.47	*0.31*	*0.31*	*0.47*	*0.31*		*0.45*	*0.45*	*0.45*	*0.31*	*0.31*	

Total green ratio, g/C												
Uniform delay, d_1	23.0	36.9	39.5	24.0	38.3		31.0	30.8	24.3	37.2	40.5	
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.11	0.12	0.26	0.26	0.19		0.50	0.35	0.11	0.13	0.30	
Incremental delay, d_2	1.0	0.8	4.1	4.3	1.9		56.5	5.6	0.4	4.7	3.0	
Initial queue delay, d_3												
Control delay	24.0	37.7	43.6	28.3	40.2		87.5	36.5	24.7	42.0	43.5	
Lane group LOS	C	D	D	C	D		F	D	C	D	D	
Approach delay	36.8			34.3			45.1			43.4		
Approach LOS	D			C			D			D		
Intersection delay	40.9			X_C = 0.91			Intersection LOS			D		

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*Zhixia & Qingyi*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*PM Peak*	Analysis Year	*2007*
		Project ID	*Existing Conditions*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*1*	*0*	*1*	*1*	*1*	*1*	*2*	*0*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*TR*	
Volume, V (vph)	*201*	*226*	*186*	*234*	*363*	*59*	*224*	*641*	*244*	*32*	*828*	*204*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.82*	*0.91*	*0.83*	*0.85*	*0.86*	*0.74*	*0.81*	*0.95*	*0.76*	*0.80*	*0.92*	*0.77*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Extension of effective green, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*9.0*	*9.0*	*10.0*	*12.0*	*11.0*		*12.0*	*12.0*	*11.0*	*10.0*	*11.0*	
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	
Min. time for pedestrians, G_p	*13.2*			*13.2*			*3.2*			*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *16.0*	G = *40.0*	G =	G =	G = *14.0*	G = *40.0*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*						Cycle Length, C = *130.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*245*	*248*	*224*	*275*	*502*		*277*	*675*	*321*	*40*	*1165*	
Lane group capacity, c	*268*	*539*	*475*	*491*	*554*		*251*	*851*	*699*	*119*	*1055*	
v/c ratio, X	*0.91*	*0.46*	*0.47*	*0.56*	*0.91*		*1.10*	*0.79*	*0.46*	*0.34*	*1.10*	
	0.47	*0.31*	*0.31*	*0.47*	*0.31*		*0.45*	*0.45*	*0.45*	*0.31*	*0.31*	

Total green ratio, g/C												
Uniform delay, d_1	35.3	36.3	36.4	22.9	43.2		39.3	30.6	24.8	34.7	45.0	
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.43	0.11	0.11	0.16	0.43		0.50	0.34	0.11	0.11	0.50	
Incremental delay, d_2	33.3	0.6	0.7	1.5	18.6		87.4	5.2	0.5	1.7	60.9	
Initial queue delay, d_3												
Control delay	68.6	36.9	37.2	24.4	61.8		126.7	35.8	25.3	36.4	105.9	
Lane group LOS	E	D	D	C	E		F	D	C	D	F	
Approach delay	47.8			48.6			52.9			103.5		
Approach LOS	D			D			D			F		
Intersection delay	66.5			X_C = 1.15			Intersection LOS			E		

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*Zhixia & Qingyi*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*AM Peak*	Analysis Year	*2030*
		Project ID	*Existing Conditions*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*1*	*0*	*1*	*1*	*1*	*1*	*2*	*0*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*TR*	
Volume, V (vph)	*192*	*266*	*185*	*164*	*143*	*25*	*84*	*429*	*140*	*28*	*565*	*113*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.81*	*0.90*	*0.84*	*0.85*	*0.78*	*0.78*	*0.82*	*0.91*	*0.90*	*0.88*	*0.97*	*0.76*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Extension of effective green, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*9.0*	*9.0*	*10.0*	*12.0*	*11.0*		*12.0*	*12.0*	*11.0*	*10.0*	*11.0*	
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	
Min. time for pedestrians, G_p	*13.2*			*13.2*			*3.2*			*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *16.0*	G = *40.0*	G =	G =	G = *14.0*	G = *40.0*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*						Cycle Length, C = *130.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*237*	*296*	*220*	*193*	*215*		*102*	*471*	*156*	*32*	*731*	
Lane group capacity, c	*476*	*539*	*475*	*451*	*555*		*303*	*851*	*699*	*264*	*1059*	
v/c ratio, X	*0.50*	*0.55*	*0.46*	*0.43*	*0.39*		*0.34*	*0.55*	*0.22*	*0.12*	*0.69*	
	0.47	*0.31*	*0.31*	*0.47*	*0.31*		*0.45*	*0.45*	*0.45*	*0.31*	*0.31*	

Total green ratio, g/C												
Uniform delay, d_1	22.4	37.5	36.3	22.3	35.4		23.5	26.2	21.9	32.4	39.6	
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.11	0.15	0.11	0.11	0.11		0.11	0.15	0.11	0.11	0.26	
Incremental delay, d_2	0.8	1.2	0.7	0.7	0.5		0.7	0.8	0.2	0.2	1.9	
Initial queue delay, d_3												
Control delay	23.2	38.7	37.0	22.9	35.8		24.2	27.0	22.0	32.6	41.5	
Lane group LOS	C	D	D	C	D		C	C	C	C	D	
Approach delay	33.3			29.7			25.5			41.1		
Approach LOS	C			C			C			D		
Intersection delay	32.9			X_C = 0.68			Intersection LOS			C		

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*Zhixia & Qingyi*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*Noon Peak*	Analysis Year	*2030*
		Project ID	*Existing Conditions*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*1*	*0*	*1*	*1*	*1*	*1*	*2*	*0*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*TR*	
Volume, V (vph)	*191*	*275*	*267*	*243*	*268*	*64*	*287*	*698*	*279*	*46*	*692*	*100*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.88*	*0.90*	*0.73*	*0.67*	*0.93*	*0.76*	*0.90*	*0.91*	*0.84*	*0.68*	*0.90*	*0.93*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Extension of effective green, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*9.0*	*9.0*	*10.0*	*12.0*	*11.0*		*12.0*	*12.0*	*11.0*	*10.0*	*11.0*	
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	
Min. time for pedestrians, G_p	*13.2*			*13.2*			*3.2*			*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *16.0*	G = *40.0*	G =	G =	G = *14.0*	G = *40.0*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*					Cycle Length, C = *130.0*			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*217*	*306*	*366*	*363*	*372*		*319*	*767*	*332*	*68*	*877*	
Lane group capacity, c	*358*	*539*	*475*	*443*	*549*		*257*	*851*	*699*	*57*	*1072*	
v/c ratio, X	*0.61*	*0.57*	*0.77*	*0.82*	*0.68*		*1.24*	*0.90*	*0.47*	*1.19*	*0.82*	
	0.47	*0.31*	*0.31*	*0.47*	*0.31*		*0.45*	*0.45*	*0.45*	*0.31*	*0.31*	

Total green ratio, g/C												
Uniform delay, d_1	24.1	37.7	40.8	33.4	39.4		36.7	33.1	25.0	45.0	41.6	
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.19	0.16	0.32	0.36	0.25		0.50	0.42	0.11	0.50	0.36	
Incremental delay, d_2	2.9	1.4	7.6	11.6	3.3		137.1	12.7	0.5	180.7	5.1	
Initial queue delay, d_3												
Control delay	27.0	39.2	48.4	45.0	42.7		173.8	45.8	25.5	225.7	46.7	
Lane group LOS	C	D	D	D	D		F	D	C	F	D	
Approach delay	40.0			43.8			69.8			59.6		
Approach LOS	D			D			E			E		
Intersection delay	56.0			X_C = 1.31			Intersection LOS			E		

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*Zhixia & Qingyi*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*PM Peak*	Analysis Year	*2030*
		Project ID	*Existing Conditions*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*1*	*0*	*1*	*1*	*1*	*1*	*2*	*0*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*TR*	
Volume, V (vph)	*225*	*254*	*209*	*262*	*408*	*66*	*251*	*719*	*274*	*35*	*930*	*229*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.83*	*0.91*	*0.83*	*0.85*	*0.86*	*0.75*	*0.81*	*0.95*	*0.76*	*0.80*	*0.92*	*0.89*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Extension of effective green, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*9.0*	*9.0*	*10.0*	*12.0*	*11.0*		*12.0*	*12.0*	*11.0*	*10.0*	*11.0*	
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	
Min. time for pedestrians, G_p	*13.2*			*13.2*			*3.2*			*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *16.0*	G = *40.0*	G =	G =	G = *14.0*	G = *40.0*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*						Cycle Length, C = *130.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*271*	*279*	*252*	*308*	*562*		*310*	*757*	*361*	*44*	*1268*	
Lane group capacity, c	*260*	*539*	*475*	*465*	*554*		*251*	*851*	*699*	*63*	*1059*	
v/c ratio, X	*1.04*	*0.52*	*0.53*	*0.66*	*1.01*		*1.24*	*0.89*	*0.52*	*0.70*	*1.20*	
	0.47	*0.31*	*0.31*	*0.47*	*0.31*		*0.45*	*0.45*	*0.45*	*0.31*	*0.31*	

Total green ratio, g/C												
Uniform delay, d_1	40.5	37.1	37.2	23.8	45.0		39.3	32.8	25.6	39.7	45.0	
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.50	0.12	0.13	0.24	0.50		0.50	0.41	0.12	0.26	0.50	
Incremental delay, d_2	67.3	0.9	1.1	3.5	41.9		135.2	11.5	0.7	28.9	98.1	
Initial queue delay, d_3												
Control delay	107.8	37.9	38.4	27.3	86.9		174.6	44.2	26.3	68.6	143.1	
Lane group LOS	F	D	D	C	F		F	D	C	E	F	
Approach delay	61.7			65.8			68.0			140.6		
Approach LOS	E			E			E			F		
Intersection delay	88.0			X_C = 1.46			Intersection LOS			F		

No Build Alternative – Optimized Timing

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*Zhixia & Qingyi*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*AM Peak*	Analysis Year	*2007*
		Project ID	*Existing Conditions - Optimized Timing*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*1*	*0*	*1*	*1*	*1*	*1*	*2*	*0*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*TR*	
Volume, V (vph)	*172*	*237*	*165*	*147*	*127*	*22*	*75*	*382*	*125*	*24*	*503*	*101*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.81*	*0.90*	*0.84*	*0.85*	*0.77*	*0.79*	*0.82*	*0.91*	*0.89*	*0.86*	*0.97*	*0.77*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Extension of effective green, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*9.0*	*9.0*	*10.0*	*12.0*	*11.0*		*12.0*	*12.0*	*11.0*	*10.0*	*11.0*	
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	
Min. time for pedestrians, G_p	*13.2*			*13.2*			*3.2*			*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *7.5*	G = *26.0*	G =	G =	G = *5.5*	G = *31.0*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*					Cycle Length, C = *90.0*			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*212*	*263*	*196*	*173*	*193*		*91*	*420*	*140*	*28*	*650*	
Lane group capacity, c	*422*	*506*	*446*	*399*	*522*		*295*	*861*	*707*	*320*	*1186*	
v/c ratio, X	*0.50*	*0.52*	*0.44*	*0.43*	*0.37*		*0.31*	*0.49*	*0.20*	*0.09*	*0.55*	

Total green ratio, g/C	0.42	0.29	0.29	0.42	0.29		0.46	0.46	0.46	0.34	0.34	
Uniform delay, d_1	19.4	26.8	26.1	17.4	25.5		15.3	17.1	14.7	19.9	23.8	
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.11	0.13	0.11	0.11	0.11		0.11	0.11	0.11	0.11	0.15	
Incremental delay, d_2	1.0	1.0	0.7	0.8	0.4		0.6	0.4	0.1	0.1	0.5	
Initial queue delay, d_3												
Control delay	20.4	27.7	26.8	18.1	25.9		15.9	17.6	14.8	20.1	24.4	
Lane group LOS	C	C	C	B	C		B	B	B	C	C	
Approach delay	25.1			22.2			16.7			24.2		
Approach LOS	C			C			B			C		
Intersection delay	22.1			X_C = 0.63			Intersection LOS			C		

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*Zhixia & Qingyi*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*Noon Peak*	Analysis Year	*2007*
		Project ID	*Existing Conditions - Optimized Timing*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*1*	*0*	*1*	*1*	*1*	*1*	*2*	*0*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*TR*	
Volume, V (vph)	*169*	*246*	*238*	*217*	*239*	*58*	*255*	*622*	*249*	*41*	*616*	*89*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.88*	*0.90*	*0.73*	*0.67*	*0.93*	*0.76*	*0.90*	*0.91*	*0.84*	*0.68*	*0.90*	*0.77*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Extension of effective green, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*9.0*	*9.0*	*10.0*	*12.0*	*11.0*		*12.0*	*12.0*	*11.0*	*10.0*	*11.0*	
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	
Min. time for pedestrians, G_p	*13.2*			*13.2*			*3.2*			*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *6.5*	G = *22.5*	G =	G =	G = *10.0*	G = *21.0*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*					Cycle Length, C = *80.0*			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*192*	*273*	*326*	*324*	*333*		*283*	*684*	*296*	*60*	*800*	
Lane group capacity, c	*306*	*493*	*435*	*383*	*501*		*320*	*839*	*689*	*125*	*911*	
v/c ratio, X	*0.63*	*0.55*	*0.75*	*0.85*	*0.66*		*0.88*	*0.82*	*0.43*	*0.48*	*0.88*	

Total green ratio, g/C	0.42	0.28	0.28	0.42	0.28		0.44	0.44	0.44	0.26	0.26	
Uniform delay, d_1	16.6	24.5	26.2	23.9	25.4		17.5	19.4	15.3	24.9	28.3	
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.21	0.15	0.30	0.38	0.24		0.41	0.36	0.11	0.11	0.40	
Incremental delay, d_2	4.1	1.4	7.1	15.9	3.3		24.1	6.3	0.4	2.9	9.8	
Initial queue delay, d_3												
Control delay	20.7	25.8	33.3	39.9	28.7		41.6	25.7	15.7	27.8	38.1	
Lane group LOS	C	C	C	D	C		D	C	B	C	D	
Approach delay	27.6			34.2			26.9			37.3		
Approach LOS	C			C			C			D		
Intersection delay	30.9			X_C = 0.81			Intersection LOS			C		

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*Zhixia & Qingyi*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*PM Peak*	Analysis Year	*2007*
		Project ID	*Existing Conditions - Optimized Timing*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*1*	*0*	*1*	*1*	*1*	*1*	*2*	*0*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*TR*	
Volume, V (vph)	*201*	*226*	*186*	*234*	*363*	*59*	*224*	*641*	*244*	*32*	*828*	*204*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.82*	*0.91*	*0.83*	*0.85*	*0.86*	*0.74*	*0.81*	*0.95*	*0.76*	*0.80*	*0.92*	*0.77*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Extension of effective green, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*9.0*	*9.0*	*10.0*	*12.0*	*11.0*		*12.0*	*12.0*	*11.0*	*10.0*	*11.0*	
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	
Min. time for pedestrians, G_p	*13.2*			*13.2*			*3.2*			*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *7.0*	G = *23.0*	G =	G =	G = *9.5*	G = *30.5*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*					Cycle Length, C = *90.0*			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*245*	*248*	*224*	*275*	*502*		*277*	*675*	*321*	*40*	*1165*	
Lane group capacity, c	*210*	*448*	*395*	*357*	*461*		*274*	*935*	*768*	*185*	*1162*	
v/c ratio, X	*1.17*	*0.55*	*0.57*	*0.77*	*1.09*		*1.01*	*0.72*	*0.42*	*0.22*	*1.00*	

Total green ratio, g/C	0.38	0.26	0.26	0.38	0.26		0.49	0.49	0.49	0.34	0.34	
Uniform delay, d_1	24.6	29.0	29.2	26.8	33.5		24.2	17.9	14.5	21.2	29.8	
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.50	0.15	0.16	0.32	0.50		0.50	0.28	0.11	0.11	0.50	
Incremental delay, d_2	114.4	1.5	1.9	9.9	68.1		57.2	2.8	0.4	0.6	27.0	
Initial queue delay, d_3												
Control delay	139.0	30.5	31.1	36.7	101.6		81.4	20.7	14.9	21.8	56.8	
Lane group LOS	F	C	C	D	F		F	C	B	C	E	
Approach delay	67.8			78.6			32.4			55.6		
Approach LOS	E			E			C			E		
Intersection delay	54.9			X_C = 1.18			Intersection LOS			D		

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*Zhixia & Qingyi*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*AM Peak*	Analysis Year	*2030*
		Project ID	*Existing Conditions*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*1*	*0*	*1*	*1*	*1*	*1*	*2*	*0*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*TR*	
Volume, V (vph)	*192*	*266*	*185*	*164*	*143*	*25*	*84*	*429*	*140*	*28*	*565*	*113*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.81*	*0.90*	*0.84*	*0.85*	*0.78*	*0.78*	*0.82*	*0.91*	*0.90*	*0.88*	*0.97*	*0.76*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Extension of effective green, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*9.0*	*9.0*	*10.0*	*12.0*	*11.0*		*12.0*	*12.0*	*11.0*	*10.0*	*11.0*	
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	
Min. time for pedestrians, G_p	*13.2*			*13.2*			*3.2*			*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *7.5*	G = *22.5*	G =	G =	G = *6.0*	G = *24.0*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*					Cycle Length, C = *80.0*			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*237*	*296*	*220*	*193*	*215*		*102*	*471*	*156*	*32*	*731*	
Lane group capacity, c	*418*	*493*	*435*	*387*	*508*		*253*	*815*	*670*	*265*	*1032*	
v/c ratio, X	*0.57*	*0.60*	*0.51*	*0.50*	*0.42*		*0.40*	*0.58*	*0.23*	*0.12*	*0.71*	
	0.43	*0.28*	*0.28*	*0.43*	*0.28*		*0.43*	*0.43*	*0.43*	*0.30*	*0.30*	

Total green ratio, g/C												
Uniform delay, d_1	17.6	24.9	24.1	15.4	23.5		15.4	17.2	14.4	20.3	24.9	
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.16	0.19	0.11	0.11	0.11		0.11	0.17	0.11	0.11	0.27	
Incremental delay, d_2	1.8	2.0	1.0	1.0	0.6		1.1	1.0	0.2	0.2	2.3	
Initial queue delay, d_3												
Control delay	19.4	26.9	25.1	16.5	24.0		16.5	18.3	14.6	20.5	27.2	
Lane group LOS	B	C	C	B	C		B	B	B	C	C	
Approach delay	24.0			20.4			17.2			26.9		
Approach LOS	C			C			B			C		
Intersection delay	22.4			X_C = 0.73			Intersection LOS			C		

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*Zhixia & Qingyi*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*Noon Peak*	Analysis Year	*2030*
		Project ID	*Existing Conditions - Optimized Timing*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*1*	*0*	*1*	*1*	*1*	*1*	*2*	*0*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*TR*	
Volume, V (vph)	*191*	*275*	*267*	*243*	*268*	*64*	*287*	*698*	*279*	*46*	*692*	*100*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.88*	*0.90*	*0.73*	*0.67*	*0.93*	*0.76*	*0.90*	*0.91*	*0.84*	*0.68*	*0.90*	*0.93*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Extension of effective green, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*9.0*	*9.0*	*10.0*	*12.0*	*11.0*		*12.0*	*12.0*	*11.0*	*10.0*	*11.0*	
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	
Min. time for pedestrians, G_p	*13.2*			*13.2*			*3.2*			*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *9.0*	G = *22.5*	G =	G =	G = *10.5*	G = *23.0*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*					Cycle Length, C = *85.0*			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*217*	*306*	*366*	*363*	*372*		*319*	*767*	*332*	*68*	*877*	
Lane group capacity, c	*295*	*464*	*409*	*375*	*472*		*311*	*845*	*694*	*85*	*943*	
v/c ratio, X	*0.74*	*0.66*	*0.89*	*0.97*	*0.79*		*1.03*	*0.91*	*0.48*	*0.80*	*0.93*	

Total green ratio, g/C	0.42	0.26	0.26	0.42	0.26		0.45	0.45	0.45	0.27	0.27	
Uniform delay, d_1	18.3	27.8	30.1	27.2	29.0		21.4	21.9	16.5	28.9	30.2	
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.29	0.23	0.42	0.48	0.33		0.50	0.43	0.11	0.34	0.45	
Incremental delay, d_2	9.3	3.4	21.5	37.9	8.7		57.8	13.5	0.5	40.3	15.2	
Initial queue delay, d_3												
Control delay	27.5	31.3	51.6	65.2	37.7		79.2	35.4	17.1	69.1	45.4	
Lane group LOS	C	C	D	E	D		E	D	B	E	D	
Approach delay	38.7			51.3			41.0			47.1		
Approach LOS	D			D			D			D		
Intersection delay	43.8			X_C = 1.01			Intersection LOS			D		

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*Zhixia & Qingyi*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*PM Peak*	Analysis Year	*2030*
		Project ID	*Existing Conditions - Optimized Timing*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*1*	*0*	*1*	*1*	*1*	*1*	*2*	*0*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*TR*	
Volume, V (vph)	*225*	*254*	*209*	*262*	*408*	*66*	*251*	*719*	*274*	*35*	*930*	*229*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.83*	*0.91*	*0.83*	*0.85*	*0.86*	*0.75*	*0.81*	*0.95*	*0.76*	*0.80*	*0.92*	*0.89*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Extension of effective green, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*9.0*	*9.0*	*10.0*	*12.0*	*11.0*		*12.0*	*12.0*	*11.0*	*10.0*	*11.0*	
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	
Min. time for pedestrians, G_p	*13.2*			*13.2*			*3.2*			*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *10.0*	G = *25.0*	G =	G =	G = *9.0*	G = *36.0*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*						Cycle Length, C = *100.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*271*	*279*	*252*	*308*	*562*		*310*	*757*	*361*	*44*	*1268*	
Lane group capacity, c	*239*	*438*	*386*	*358*	*451*		*238*	*936*	*769*	*125*	*1239*	
v/c ratio, X	*1.13*	*0.64*	*0.65*	*0.86*	*1.25*		*1.30*	*0.81*	*0.47*	*0.35*	*1.02*	

Total green ratio, g/C	0.39	0.25	0.25	0.39	0.25		0.50	0.50	0.50	0.36	0.36	
Uniform delay, d_1	25.2	33.5	33.6	30.3	37.5		27.4	21.3	16.6	23.5	32.0	
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	
Delay calibration, k	0.50	0.22	0.23	0.39	0.50		0.50	0.35	0.11	0.11	0.50	
Incremental delay, d_2	99.0	3.1	3.9	18.7	128.2		163.3	5.4	0.5	1.7	31.7	
Initial queue delay, d_3												
Control delay	124.3	36.5	37.5	49.0	165.7		190.7	26.6	17.1	25.2	63.7	
Lane group LOS	F	D	D	D	F		F	C	B	C	E	
Approach delay	66.5			124.4			59.8			62.4		
Approach LOS	E			F			E			E		
Intersection delay	74.5			X_C = 1.59			Intersection LOS			E		

Feasible Alternative

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*DCM*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*AM Peak*	Analysis Year	*2007*
		Project ID	*LOS C*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*2*	*0*	*1*	*2*	*1*	*1*	*2*	*1*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*T*	*R*
Volume, V (vph)	*172*	*237*	*165*	*147*	*127*	*22*	*75*	*382*	*125*	*24*	*503*	*101*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.81*	*0.90*	*0.84*	*0.85*	*0.77*	*0.79*	*0.82*	*0.91*	*0.89*	*0.86*	*0.97*	*0.77*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*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, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	*3*
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*		*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	*0*
Min. time for pedestrians, G_p	*13.2*			*13.2*			*3.2*			*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *7.0*	G = *18.5*	G =	G =	G = *5.5*	G = *29.0*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*					Cycle Length, C = *80.0*			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*212*	*263*	*196*	*173*	*193*		*91*	*420*	*140*	*28*	*519*	*131*
Lane group capacity, c	*431*	*450*	*383*	*337*	*823*		*388*	*1755*	*783*	*355*	*1331*	*594*
v/c ratio, X	*0.49*	*0.58*	*0.51*	*0.51*	*0.23*		*0.23*	*0.24*	*0.18*	*0.08*	*0.39*	*0.22*

Total green ratio, g/C	0.38	0.23	0.23	0.38	0.23		0.49	0.49	0.49	0.36	0.36	0.36
Uniform delay, d_1	17.9	27.3	26.8	18.1	25.0		11.6	11.9	11.5	16.7	18.9	17.7
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
Delay calibration, k	0.11	0.18	0.12	0.12	0.11		0.11	0.11	0.11	0.11	0.11	0.11
Incremental delay, d_2	0.9	2.0	1.2	1.3	0.1		0.3	0.1	0.1	0.1	0.2	0.2
Initial queue delay, d_3												
Control delay	18.8	29.3	28.0	19.4	25.1		12.0	12.0	11.6	16.8	19.1	17.9
Lane group LOS	B	C	C	B	C		B	B	B	B	B	B
Approach delay	25.6			22.4			11.9			18.8		
Approach LOS	C			C			B			B		
Intersection delay	19.4			X_C = 0.57			Intersection LOS			B		

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*DCM*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*Noon Peak*	Analysis Year	*2007*
		Project ID	*LOS C*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*2*	*0*	*1*	*2*	*1*	*1*	*2*	*1*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*T*	*R*
Volume, V (vph)	*169*	*246*	*238*	*217*	*239*	*58*	*255*	*622*	*249*	*41*	*616*	*89*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.88*	*0.90*	*0.73*	*0.67*	*0.93*	*0.76*	*0.90*	*0.91*	*0.84*	*0.68*	*0.90*	*0.77*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*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, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	*3*
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*		*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	*0*
Min. time for pedestrians, G_p	*13.2*			*13.2*			*3.2*			*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *7.0*	G = *25.0*	G =	G =	G = *9.0*	G = *29.0*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*						Cycle Length, C = *90.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*192*	*273*	*326*	*324*	*333*		*283*	*684*	*296*	*60*	*684*	*116*
Lane group capacity, c	*412*	*541*	*460*	*365*	*975*		*331*	*1700*	*759*	*244*	*1183*	*528*
v/c ratio, X	*0.47*	*0.50*	*0.71*	*0.89*	*0.34*		*0.85*	*0.40*	*0.39*	*0.25*	*0.58*	*0.22*

Total green ratio, g/C	0.41	0.28	0.28	0.41	0.28		0.47	0.47	0.47	0.32	0.32	0.32
Uniform delay, d_1	18.1	27.3	29.2	28.4	25.9		17.0	15.5	15.4	22.5	25.4	22.2
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
Delay calibration, k	0.11	0.11	0.27	0.41	0.11		0.39	0.11	0.11	0.11	0.17	0.11
Incremental delay, d_2	0.8	0.8	5.0	22.3	0.2		19.2	0.2	0.3	0.5	0.7	0.2
Initial queue delay, d_3												
Control delay	18.9	28.1	34.2	50.7	26.1		36.1	15.6	15.7	23.0	26.1	22.5
Lane group LOS	B	C	C	D	C		D	B	B	C	C	C
Approach delay	28.4			38.2			20.2			25.4		
Approach LOS	C			D			C			C		
Intersection delay	26.6			X_C = 0.80			Intersection LOS			C		

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*DCM*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*PM Peak*	Analysis Year	*2007*
		Project ID	*LOS C*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*2*	*0*	*1*	*2*	*1*	*1*	*2*	*1*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*T*	*R*
Volume, V (vph)	*201*	*226*	*186*	*234*	*363*	*59*	*224*	*641*	*244*	*32*	*828*	*204*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.82*	*0.91*	*0.83*	*0.85*	*0.86*	*0.74*	*0.81*	*0.95*	*0.76*	*0.80*	*0.92*	*0.77*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*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, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	*3*
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*		*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	*0*
Min. time for pedestrians, G_p	*14.7*			*14.7*			*3.2*			*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *10.5*	G = *15.0*	G =	G =	G = *11.0*	G = *23.5*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*						Cycle Length, C = *80.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*245*	*248*	*224*	*275*	*502*		*277*	*675*	*321*	*40*	*900*	*265*
Lane group capacity, c	*340*	*365*	*310*	*370*	*665*		*341*	*1755*	*783*	*224*	*1079*	*481*
v/c ratio, X	*0.72*	*0.68*	*0.72*	*0.74*	*0.75*		*0.81*	*0.38*	*0.41*	*0.18*	*0.83*	*0.55*

Total green ratio, g/C	0.38	0.19	0.19	0.38	0.19		0.49	0.49	0.49	0.29	0.29	0.29
Uniform delay, d_1	19.1	30.3	30.5	19.3	30.8		16.4	12.9	13.1	21.1	26.4	23.8
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
Delay calibration, k	0.28	0.25	0.28	0.30	0.31		0.35	0.11	0.11	0.11	0.37	0.15
Incremental delay, d_2	7.3	5.0	8.1	7.9	4.9		13.9	0.1	0.4	0.4	5.8	1.4
Initial queue delay, d_3												
Control delay	26.3	35.3	38.6	27.2	35.7		30.3	13.1	13.5	21.4	32.2	25.2
Lane group LOS	C	D	D	C	D		C	B	B	C	C	C
Approach delay	33.3			32.7			16.9			30.3		
Approach LOS	C			C			B			C		
Intersection delay	27.0			X_C = 0.90			Intersection LOS			C		

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*DCM*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*AM Peak*	Analysis Year	*2030*
		Project ID	*LOS C*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*2*	*0*	*1*	*2*	*1*	*1*	*2*	*1*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*T*	*R*
Volume, V (vph)	*192*	*266*	*185*	*164*	*143*	*25*	*84*	*429*	*140*	*28*	*565*	*113*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.81*	*0.90*	*0.84*	*0.85*	*0.78*	*0.78*	*0.82*	*0.91*	*0.90*	*0.88*	*0.97*	*0.76*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*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, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	*3*
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*		*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	*0*
Min. time for pedestrians, G_p	*14.7*			*14.7*			*3.2*			*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *5.5*	G = *30.5*	G =	G =	G = *5.5*	G = *28.5*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*						Cycle Length, C = *90.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*237*	*296*	*220*	*193*	*215*		*102*	*471*	*156*	*32*	*582*	*149*
Lane group capacity, c	*507*	*660*	*561*	*397*	*1205*		*296*	*1540*	*687*	*295*	*1163*	*519*
v/c ratio, X	*0.47*	*0.45*	*0.39*	*0.49*	*0.18*		*0.34*	*0.31*	*0.23*	*0.11*	*0.50*	*0.29*

Total green ratio, g/C	0.45	0.34	0.34	0.45	0.34		0.43	0.43	0.43	0.32	0.32	0.32
Uniform delay, d_1	18.3	23.2	22.7	19.2	20.9		16.6	17.0	16.3	21.8	25.0	23.1
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
Delay calibration, k	0.11	0.11	0.11	0.11	0.11		0.11	0.11	0.11	0.11	0.11	0.11
Incremental delay, d_2	0.7	0.5	0.5	0.9	0.1		0.7	0.1	0.2	0.2	0.3	0.3
Initial queue delay, d_3												
Control delay	19.0	23.7	23.1	20.1	21.0		17.3	17.1	16.5	21.9	25.3	23.4
Lane group LOS	B	C	C	C	C		B	B	B	C	C	C
Approach delay	22.0			20.6			17.0			24.8		
Approach LOS	C			C			B			C		
Intersection delay	21.2			X_C = 0.57			Intersection LOS			C		

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*DCM*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*Noon Peak*	Analysis Year	*2030*
		Project ID	*LOS C*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*2*	*0*	*1*	*2*	*1*	*1*	*2*	*1*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*T*	*R*
Volume, V (vph)	*191*	*275*	*267*	*243*	*268*	*64*	*287*	*698*	*279*	*46*	*692*	*100*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.88*	*0.90*	*0.73*	*0.67*	*0.93*	*0.76*	*0.90*	*0.91*	*0.84*	*0.68*	*0.90*	*0.93*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*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, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	*3*
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*		*12.0*	*12.0*	*12.0*	*12.0*	*12.0*	*12.0*
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	*0*
Min. time for pedestrians, G_p	*14.7*			*14.7*						*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *11.0*	G = *23.5*	G =	G =	G = *13.0*	G = *22.5*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*						Cycle Length, C = *90.0*		

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*217*	*306*	*366*	*363*	*372*		*319*	*767*	*332*	*68*	*769*	*108*
Lane group capacity, c	*455*	*508*	*432*	*397*	*917*		*343*	*1600*	*714*	*174*	*918*	*410*
v/c ratio, X	*0.48*	*0.60*	*0.85*	*0.91*	*0.41*		*0.93*	*0.48*	*0.46*	*0.39*	*0.84*	*0.26*

Total green ratio, g/C	0.43	0.26	0.26	0.43	0.26		0.44	0.44	0.44	0.25	0.25	0.25
Uniform delay, d_1	16.8	29.2	31.5	26.7	27.5		22.2	17.6	17.5	28.1	32.0	27.1
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
Delay calibration, k	0.11	0.19	0.38	0.43	0.11		0.45	0.11	0.11	0.11	0.37	0.11
Incremental delay, d_2	0.8	2.0	14.5	25.3	0.3		31.2	0.2	0.5	1.5	6.9	0.3
Initial queue delay, d_3												
Control delay	17.6	31.2	46.1	52.0	27.8		53.4	17.9	18.0	29.5	38.9	27.4
Lane group LOS	B	C	D	D	C		D	B	B	C	D	C
Approach delay	34.0			39.7			25.9			36.9		
Approach LOS	C			D			C			D		
Intersection delay	32.9			X_C = 0.83			Intersection LOS			C		

HCS2000™ DETAILED REPORT

General Information		***Site Information***	
Analyst	*DCM*	Intersection	*Glenway/Bridgetown/Race*
Agency or Co.	*UC*	Area Type	*All other areas*
Date Performed	*2007-11-1*	Jurisdiction	*Hamliton County*
Time Period	*PM Peak*	Analysis Year	*2030*
		Project ID	*LOS C*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N_1	*1*	*1*	*1*	*1*	*2*	*0*	*1*	*2*	*1*	*1*	*2*	*1*
Lane group	*L*	*T*	*R*	*L*	*TR*		*L*	*T*	*R*	*L*	*T*	*R*
Volume, V (vph)	*225*	*254*	*209*	*262*	*408*	*66*	*251*	*719*	*274*	*35*	*930*	*229*
% Heavy vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-hour factor, PHF	*0.83*	*0.91*	*0.83*	*0.85*	*0.86*	*0.75*	*0.81*	*0.95*	*0.76*	*0.80*	*0.92*	*0.89*
Pretimed (P) or actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up lost time, l_1	*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, e	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*2.0*
Arrival type, AT	*3*	*3*	*3*	*3*	*3*		*3*	*3*	*3*	*3*	*3*	*3*
Unit extension, UE	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*	*3.0*
Filtering/metering, I	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*
Initial unmet demand, Q_b	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Ped / Bike / RTOR volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*
Lane width	*12.0*	*12.0*	*10.0*	*12.0*	*12.0*		*12.0*	*12.0*	*11.0*	*12.0*	*12.0*	*12.0*
Parking / Grade / Parking	*N*	*-5*	*N*	*N*	*-1*	*N*	*N*	*1*	*N*	*N*	*-3*	*N*
Parking maneuvers, N_m												
Buses stopping, N_B	*0*	*0*	*0*	*0*	*0*		*0*	*0*	*0*	*0*	*0*	*0*
Min. time for pedestrians, G_p	*14.7*			*14.7*						*13.2*		

Phasing	Excl. Left	EW Perm	03	04	NB Only	NS Perm	07	08
Timing	G = *11.5*	G = *18.5*	G =	G =	G = *13.0*	G = *27.0*	G =	G =
	Y = *4.5*	Y = *5.5*	Y =	Y =	Y = *4.5*	Y = *5.5*	Y =	Y =
Duration of Analysis, T = *0.25*					Cycle Length, C = *90.0*			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted flow rate, v	*271*	*279*	*252*	*308*	*562*		*310*	*757*	*361*	*44*	*1011*	*257*
Lane group capacity, c	*323*	*400*	*318*	*355*	*730*		*343*	*1780*	*768*	*211*	*1102*	*492*
v/c ratio, X	*0.84*	*0.70*	*0.79*	*0.87*	*0.77*		*0.90*	*0.43*	*0.47*	*0.21*	*0.92*	*0.52*

Total green ratio, g/C	0.38	0.21	0.21	0.38	0.21		0.49	0.49	0.49	0.30	0.30	0.30
Uniform delay, d_1	21.6	33.2	33.9	21.9	33.7		23.1	14.6	15.0	23.5	30.4	26.1
Progression factor, PF	1.000	1.000	1.000	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000
Delay calibration, k	0.37	0.26	0.34	0.40	0.32		0.42	0.11	0.11	0.11	0.44	0.13
Incremental delay, d_2	17.5	5.3	12.8	19.8	5.0		26.1	0.2	0.5	0.5	12.0	1.0
Initial queue delay, d_3												
Control delay	39.2	38.4	46.8	41.7	38.8		49.3	14.7	15.4	24.0	42.4	27.2
Lane group LOS	D	D	D	D	D		D	B	B	C	D	C
Approach delay	41.3			39.8			22.4			38.8		
Approach LOS	D			D			C			D		
Intersection delay	34.1			X_C = 0.94			Intersection LOS			C		