

Heisley Road at SR 2

Area Traffic Analysis

Prepared for

***City of Mentor
City of Painesville
Shamrock Business Center, Ltd.***

June 4, 2008

Prepared by

Baker

ChallengeUs.

Michael Baker, Jr. Inc.

Introduction

The Cities of Mentor and Painesville are co-operating to facilitate economic development in the immediate area adjacent to the State Route 2 and Heisley Road Interchange. This economic development consist of 300 additional residential units (townhouses) and 400,000 square foot (sf) retail on the Shamrock Business Center Site, along with two hotels and 65,000 sf retail along Diamond Centre Drive in Mentor. Four concepts were evaluated to improve the flow of traffic in the area of the site as follows:

- Alternative A (Split Ramp) – Alternative A splits the SR 2 eastbound off-ramp to intersect Heisley Road at two locations; left turns would be accommodated at the existing intersection and through movements and right turns would be accommodated opposite the existing Diamond Centre Drive intersection.
- Alternative B – Alternative B realigns the existing SR 2 eastbound off-ramp to intersect Heisley Road opposite the existing Diamond Centre Drive intersection.
- Alternative C (Slip Ramp) – Alternative C provides access to the Shamrock Business Center development through a Frontage Road located opposite the existing SR 2 eastbound off ramp. The SR 2 eastbound on-ramp would exit from the newly proposed Frontage Road. For safe operations, the Frontage Road would only be one-lane, one-way eastbound to the on-ramp and entering the site. Traffic exiting the site would use Diamond Centre Drive or proposed Shamrock Boulevard to Jackson Street.
- Alternative D – The same improvements that are proposed for Alternative B are proposed for Alternative D with the addition of a loop ramp from southbound Heisley Road onto SR 2 eastbound. The northbound Heisley Road traffic would still use the existing on-ramp, but the southbound left turn movement would be removed and access to SR 2 eastbound provided via a loop ramp.

Michael Baker Jr., Inc. (Baker) was requested to perform a traffic analysis to assess the operation of the proposed concepts discussed above.

An annual background growth rate (ABGR) of 1.25% was applied to 2005 Raw Count Data to obtain 2010 No-Build Peak Hour Traffic Volumes. This rate was recently approved by ODOT for use in the analysis at the SR 2 interchange. Traffic volumes to be used in this analysis were submitted to ODOT for certification. A copy of the certification letter is included with this submission.

The original certification request submitted to ODOT included trip generation for the following land uses currently under construction, recently developed, or undeveloped: 400,000 sf retail, 300 apartments underway and 175 residential units (townhouses) planned for Shamrock site, and 110,000 sf of retail in Mentor. Following the submission to ODOT, it was clarified that the Mentor development will consist of two hotels (210 rooms) and 65,000 sf retail, and the Shamrock initial development will be 300 residential units (townhouses). The alternatives all assume a connection to Jackson Street from the

Shamrock site via proposed Shamrock Boulevard. ODOT was contacted regarding the change in trip generation and agreed that due to the minor scale of the change required, the volumes could be adjusted without requiring recertification. Table 1 depicts the total external trips that will be generated from Diamond Centre and the Shamrock site.

The split-ramp concept (Alternative A) was used for the purposes of obtaining certified traffic volumes. The 2010 No-Build Peak Hour Traffic Volumes were redistributed for the split-ramp concept and the site generated trips were applied to the 2010 No-Build Volumes to determine 2010 Build Peak Hour Traffic Volumes. Similarly, 2030 Build Peak Hour Traffic Volumes were also developed. Figures 1 and 2 depict the final peak hour traffic volumes for the split-ramp concept (Alternative A). Similarly, the Peak Hour Build Traffic Volumes were redistributed for each of the other alternatives evaluated. The corresponding peak hour traffic volumes can be found attached as Figures 3 through 8.

Traffic Analysis and Results

The intersections analyzed for each of the alternatives included Heisley Road and Blackbrook Drive, Heisley Road and SR 2 Westbound ramps, Heisley Road and SR 2 Eastbound ramps, Heisley Road and Diamond Centre Drive, and Heisley Road and the Steris Driveway. The existing lane configurations were used for the base condition analysis with the exception of the Heisley Road where widening is planned for this year. A proposed striping file was provided by Mentor depicting the Heisley Rd. improvements, which add a second through lane on Heisley Road, northbound and southbound, from Hendricks Road to SR 2 EB.

Traffic capacity analysis was conducted using Synchro™ 7 and HCS+. Year 2010 AM and PM peak hour traffic analysis was performed using the existing lane configurations with each of the proposed alternatives. The results were evaluated to determine if improvements were required based on the following requirements: overall LOS D or better, no movements with a v/c ratio > 1.00. Delay balancing was used in the analysis to the extent reasonable. Particularly at the intersections of Heisley Road and Steris Driveway and Heisley Road and Blackbrook Drive, balancing did not seem reasonable because the volume on the sidestreet approach was so low compared to Heisley Road that regardless of the amount of green time given to the sidestreet, the delay would not balance.

For the purposes of this analysis the improvements required to meet the established criteria in 2010 will be described as interim. The interim improvements required for each alternative are discussed in the sections below. The interim improvements were then analyzed using 2030 peak hour traffic volumes. The same criteria discussed above were used to gauge whether additional improvements were needed to satisfy the criteria. Improvements needed in 2030 to satisfy the established criteria are described as final.

Tables 2 through 6 compare the results of the analysis for each of the alternatives. The results of the analysis indicate that the PM Peak Hour is the worse-case analysis period for nearly all of the movements/intersections within the study area, with the exception of the southbound right turn movement at Heisley Road and SR 2 WB intersection, which is worse-case during the AM Peak Hour.

Some of the improvements required to satisfy the established criteria are the same for all of the alternatives. The improvements needed for all of the alternatives are as follows:

2010 Interim Improvements

- SR 2 WB Ramps
 - Convert WB Right turn lane to a shared left and right turn
 - Lengthen the NB left turn lane as much as is feasible
 - Add a SB right turn lane
- SR 2 EB Ramps
 - Third thru lane NB from Diamond Centre Drive intersection becomes the right turn lane.
- Diamond Centre Drive/new SR 2 EB ramp
 - Add a WB dual left turn lane
 - Add a third thru lane NB
 - Lengthen the NB right turn lane

The addition of a SB right turn lane at Heisley Road and SR 2 WB ramps intersection is based on base traffic volumes, not traffic generated by Diamond Centre and the Shamrock site.

2030 Final Improvements

- SR 2 WB Ramps
 - Add a NB dual left turn lane (requires new bridge over SR 2).

Additional improvements required by Alternative are discussed in the following sections.

Alternative A (Split Ramp)

The following (2010 interim) improvements, in addition to those described above, are needed to satisfy the requirements described above for Alternative A (graphically shown in Figure 9):

- Diamond Centre Drive/new SR 2 EB ramp
 - EB ramp configuration should be two through lanes and a right turn lane

The interim improvements recommended above were analyzed using the 2030 Build Peak Hour Traffic Volumes. The same criteria described above were used to determine if additional improvements were required. The following (final) improvements are needed

to satisfy the requirements in the year 2030 for Alternative A (graphically shown in Figure 10):

- Diamond Centre Drive/new SR 2 EB ramp
 - Extend NB thru lane that was added in the interim phase through Sterris Driveway
 - Convert EB center through lane to a shared through and right turn lane

Alternative B

The following (2010 interim) improvements, in addition to those described above, are needed to satisfy the requirements described above for Alternative B (graphically shown in Figure 11):

- Diamond Centre Drive/new SR 2 EB ramp
 - EB ramp configuration should be dual left turn lanes, dual through lanes, and a right turn lane
 - A dual right turn lane WB is recommended to mitigate queuing.

The interim improvements recommended above were analyzed using the 2030 Build Peak Hour Traffic Volumes. The same criteria described above were used to determine if additional improvements were required. The following (final) improvements are needed to satisfy the requirements in the year 2030 for Alternative B (graphically shown in Figure 12):

- Diamond Centre Drive/new SR 2 EB ramp
 - Extend NB thru lane that was added in the interim phase
 - Add WB dual right turn lane (if not added as interim improvement)
 - Convert EB outside thru lane to a shared thru-right turn lane

Alternative C

The following (2010 interim) improvements, in addition to those described above, are needed to satisfy the requirements described above for Alternative C (graphically shown in Figure 13):

- SR 2 EB ramps
 - Lengthen SB left turn lane to maximum practical extent
 - Add a left turn lane, thru lane, and right turn lane on EB approach resulting in dual left turn lanes, a single thru lane, and dual right turn lanes

The total storage length required (per the L&D manual) for the northbound right turn lane at the SR 2 EB ramps cannot be accommodated within the distance between Diamond Centre Drive and the SR 2 EB ramps intersection. Also, some individual movements at the Heisley Rd / EB off-ramp / Frontage Rd intersection will experience LOS F and have $v/c's > 1.0$ because the Frontage Road can only accept a single through lane from the off-ramp and a single left turn lane from Heisley Road SB. Due to the storage length

constraint and the unacceptable overall capacity analysis results for 2010, 2030 analysis were not advanced for this alternative.

Alternative D

Alternative D is basically the same as Alternative B, except for the addition of the loop ramp from Heisley Road southbound to SR 2 eastbound and removal of the existing southbound left turn lane at the SR 2 eastbound ramps. The traffic signal at the SR 2 eastbound ramps is also removed. Since the two alternatives are so similar, the same improvements recommended for Alternative B are also recommended for Alternative D. The improvements are shown graphically in Figures 14 and 15.

Results

The overall operation of Alternatives A, B, and D was very similar at the critical intersections (Diamond Centre Drive/Heisley Road and SR 2 EB ramps/Heisley Road). In all of the proposed alternatives, capacity is constrained at the Diamond Centre Drive intersection northbound before reaching the SR 2 EB ramps intersection. However, with the recommended improvements, vehicles are typically able to traverse the intersection within a single traffic cycle and the operational criteria are met throughout the system.

The Heisley Road SB left turn movement to Diamond Centre Drive also exhibits queuing during the year 2030, but the queue does not extend beyond the distance between the Diamond Centre Drive intersection and the intersection with the SR 2 EB ramps. This is a major benefit of the interchange reconfiguration.

Alternative D removes the traffic signal at the intersection of Heisley Road and the SR 2 eastbound on-ramps, however, since the constraining intersection is the intersection at Diamond Centre Drive, the removal of the traffic signal does not have a significant impact on overall operation. Removal of the traffic signal was considered for Alternative B, but it was determined that due to the high volume of left turns from Heisley Road southbound to the SR 2 eastbound on-ramps, the traffic signal was still needed. However, the southbound through movement would receive a green indication continuously.

A difference that distinguishes Alternative A from Alternative B/D is the phasing that is permitted at the intersection of Heisley Road and Diamond Centre Drive. Since the only movements eastbound from the new SR 2 eastbound off-ramp at Diamond Centre Drive under Alternative A are thru and right turns, a westbound right turn overlap can occur while the eastbound approach phase operates. Under Alternatives B and D, the eastbound left turn movement conflicts with the westbound right turn movement such that an overlap cannot occur. The additional green time that is allotted to the westbound

right turn under Alternative A significantly improves the operation of the westbound approach.

By keeping the SR 2 eastbound off-ramp traffic destined for Heisley Road northbound at the existing ramp location, Alternative A reduces the volume of traffic on Heisley Road northbound between Diamond Centre Drive and the SR 2 eastbound on-ramp intersection, which is already a high volume segment.

Recommendation

Operationally, the additional traffic generated by the future development can be accommodated through the implementation of the improvements recommended within this report under Alternative A, B, or D. The improvements can be implemented in phases with only those described as “interim” being needed to accommodate opening day (2010) traffic. The improvements can build upon each other in a way such that implementing the “final” improvements will not cause the “interim” improvements to be removed, simply expanded upon.

Based on the findings of this study, Alternative A (Split Ramp) is recommended as the preferred alternative. Though Alternatives B and D can operate under an acceptable level of service, Alternative A capitalizes on the existing infrastructure by utilizing the existing SR 2 eastbound off-ramp, and thus is the most cost-effective alternative with the least negative impact on the community. Implementing either Alternative B or D will require a five-lane eastbound ramp approaching Heisley Road, resulting in much more significant right-of-way acquisition and much greater adverse impact on the Avery Dennison property directly adjacent to the new ramp location. For these reasons, the City of Mentor also supports the implementation of Alternative A

Appendix I

Tables
Figures
Certified Traffic Request

**Table 1
Shamrock Business Center
Trip Generation**

RESIDENTIAL

land use	amount (dwelling units)	ITE code	daily rate	AM rate	PM rate	AM in	AM out	PM in	PM out	Daily ADT
townhouse	0	230	5.86	0.44	0.52	0	0	0	0	0
townhouse	300	230	5.86	0.44	0.52	22	110	105	51	1,758
apartments	300	220	6.72	0.51	0.62	31	122	121	65	2,016
Totals						53	232	225	117	3,774
assume 10% residential are internal						5	23	23	12	377
Total external						48	209	203	105	3,397

RETAIL

land use	amount (1,000 SF)	ITE code	daily rate	AM rate	PM rate	AM in	AM out	PM in	PM out	Daily ADT
retail	400	820	42.9	1.03	3.75	251	161	720	780	17,160
retail	65	820	42.9	1.03	3.75	41	26	117	127	2,789
Totals						292	187	837	907	19,949
assume 10% are internal from residential						29	19	84	91	1995
Total external						263	168	753	816	17,954

assume 44% **pass-by** trips (PM)
ITE Trip Generation Handbook (Fig. 5.5) $\ln(T) = -0.29 \ln(X) + 5.00$

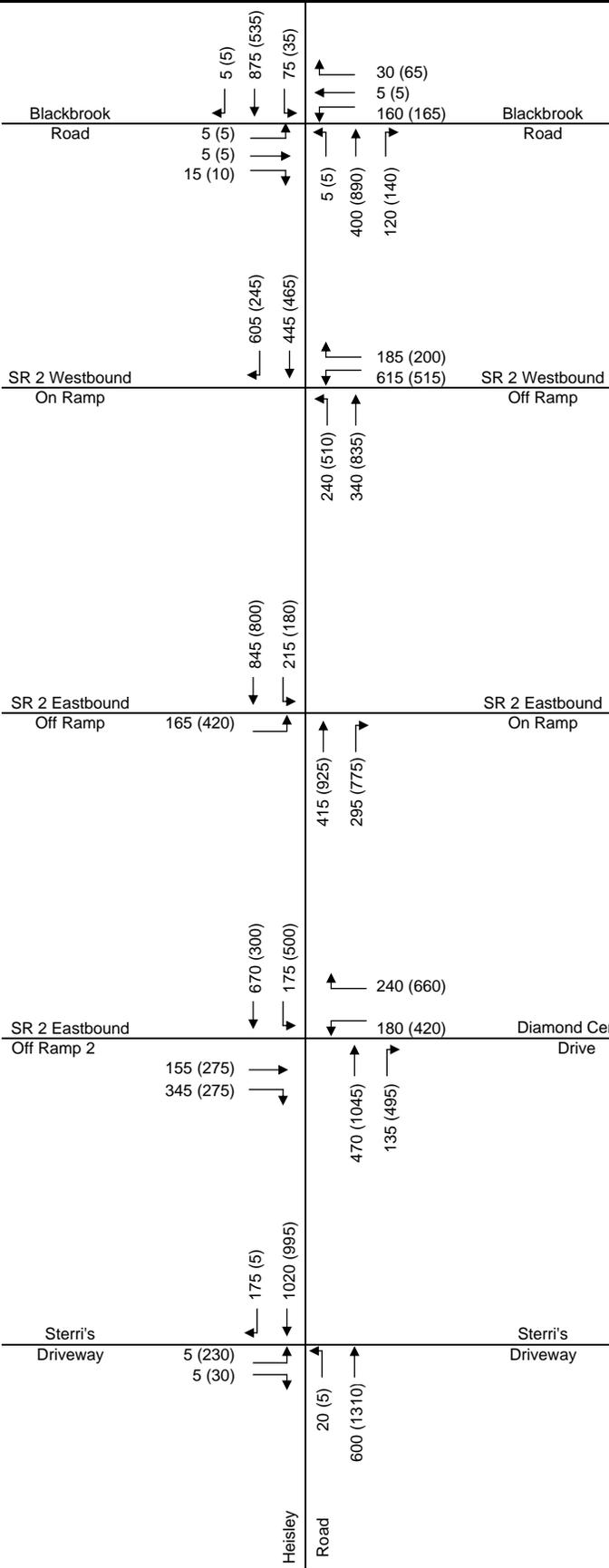
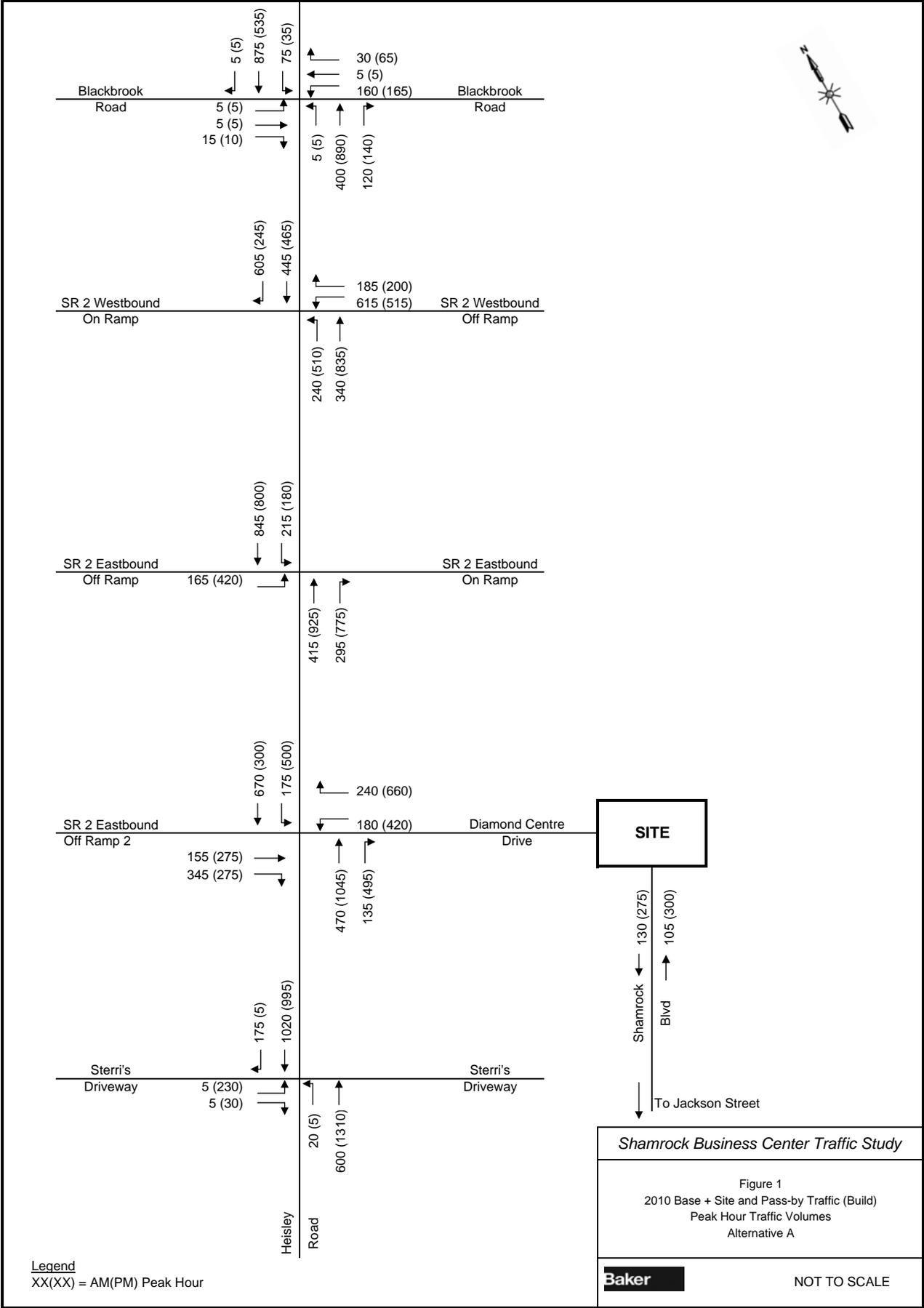
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HOTEL

land use	amount (rooms)	ITE code	daily rate	AM rate	PM rate	AM in	AM out	PM in	PM out	Daily ADT
motel	210	320	5.63	0.45	0.47	35	60	53	45	1,182
Totals						35	60	53	45	1,182
Total external						35	60	53	45	1,182

TOTAL EXTERNAL GENERATED TRIPS

						346	436	792	748	22,533
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SITE

Shamrock Blvd

130 (275)

105 (300)

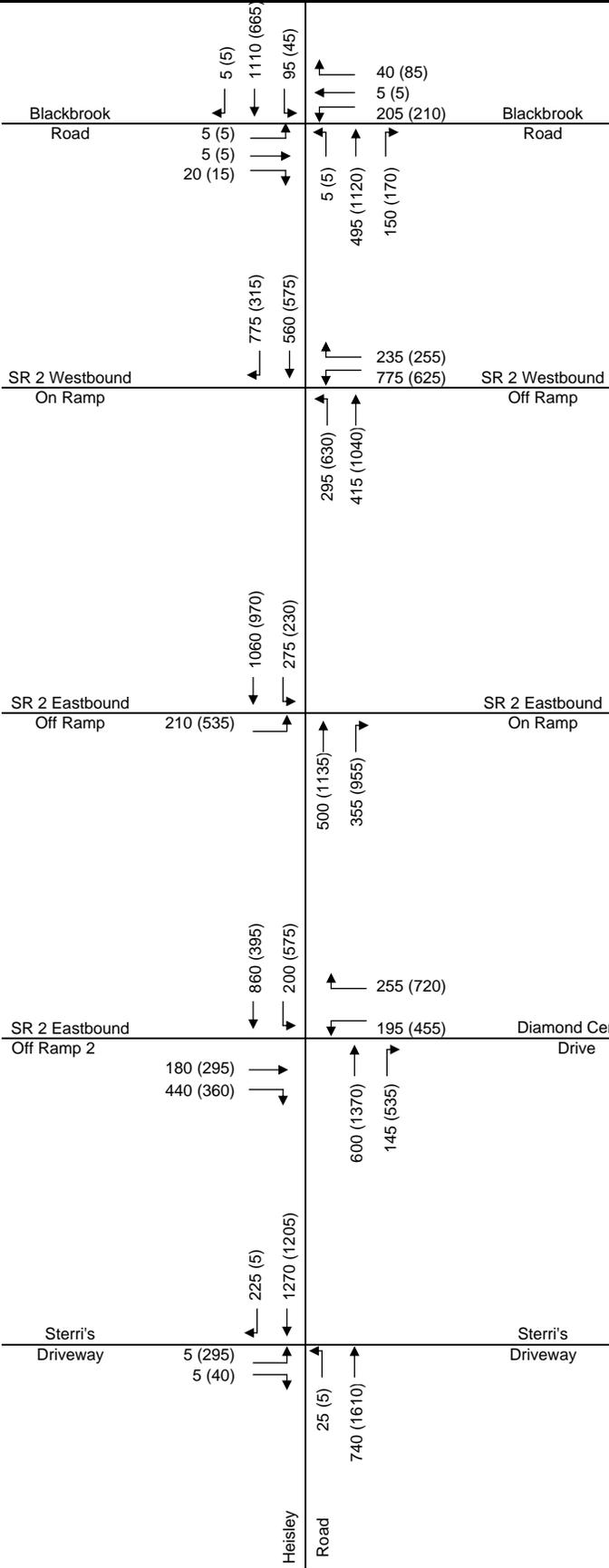
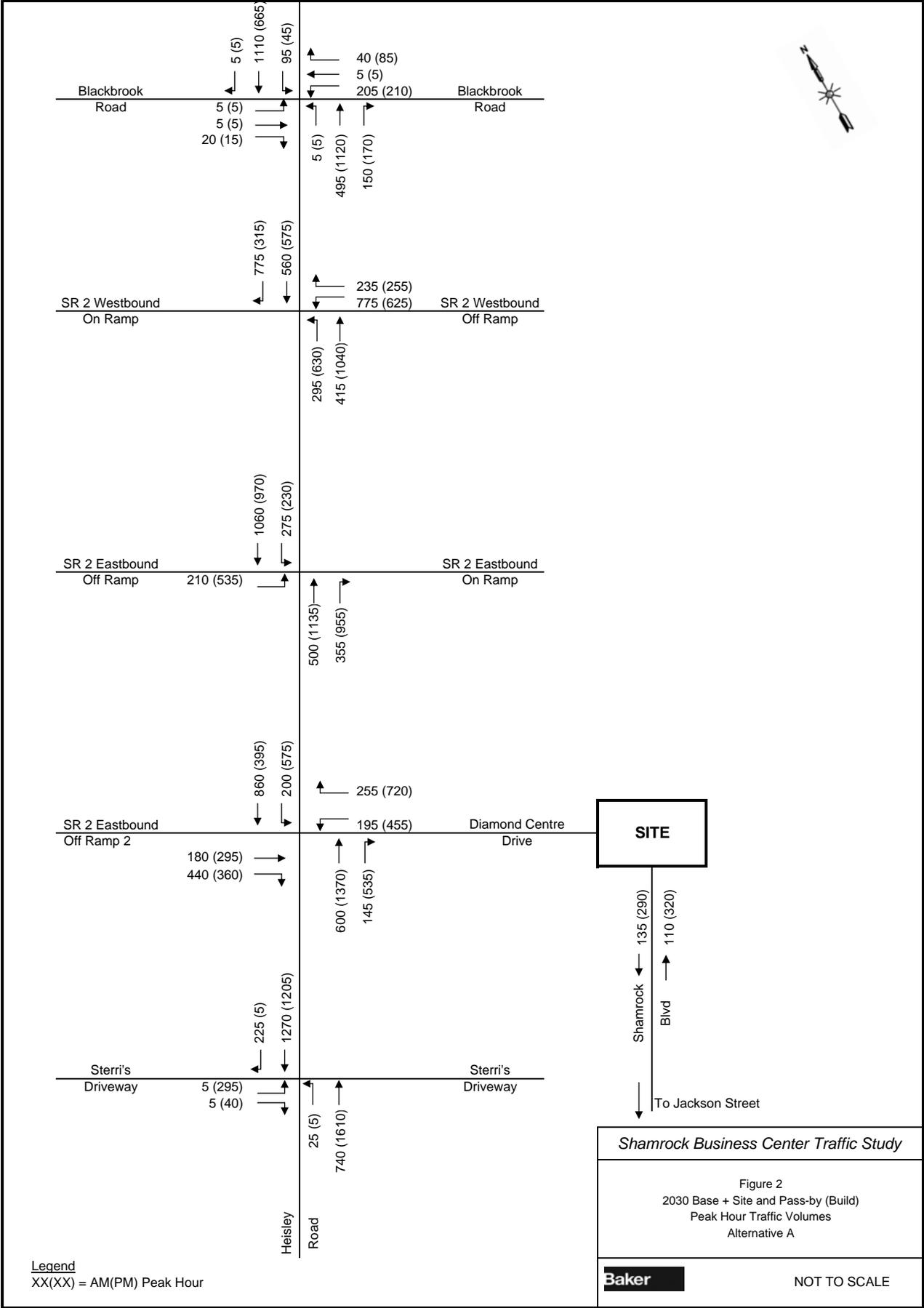
To Jackson Street

Shamrock Business Center Traffic Study

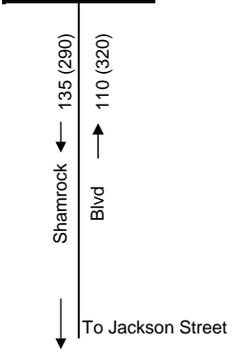
Figure 1
2010 Base + Site and Pass-by Traffic (Build)
Peak Hour Traffic Volumes
Alternative A

Baker

NOT TO SCALE

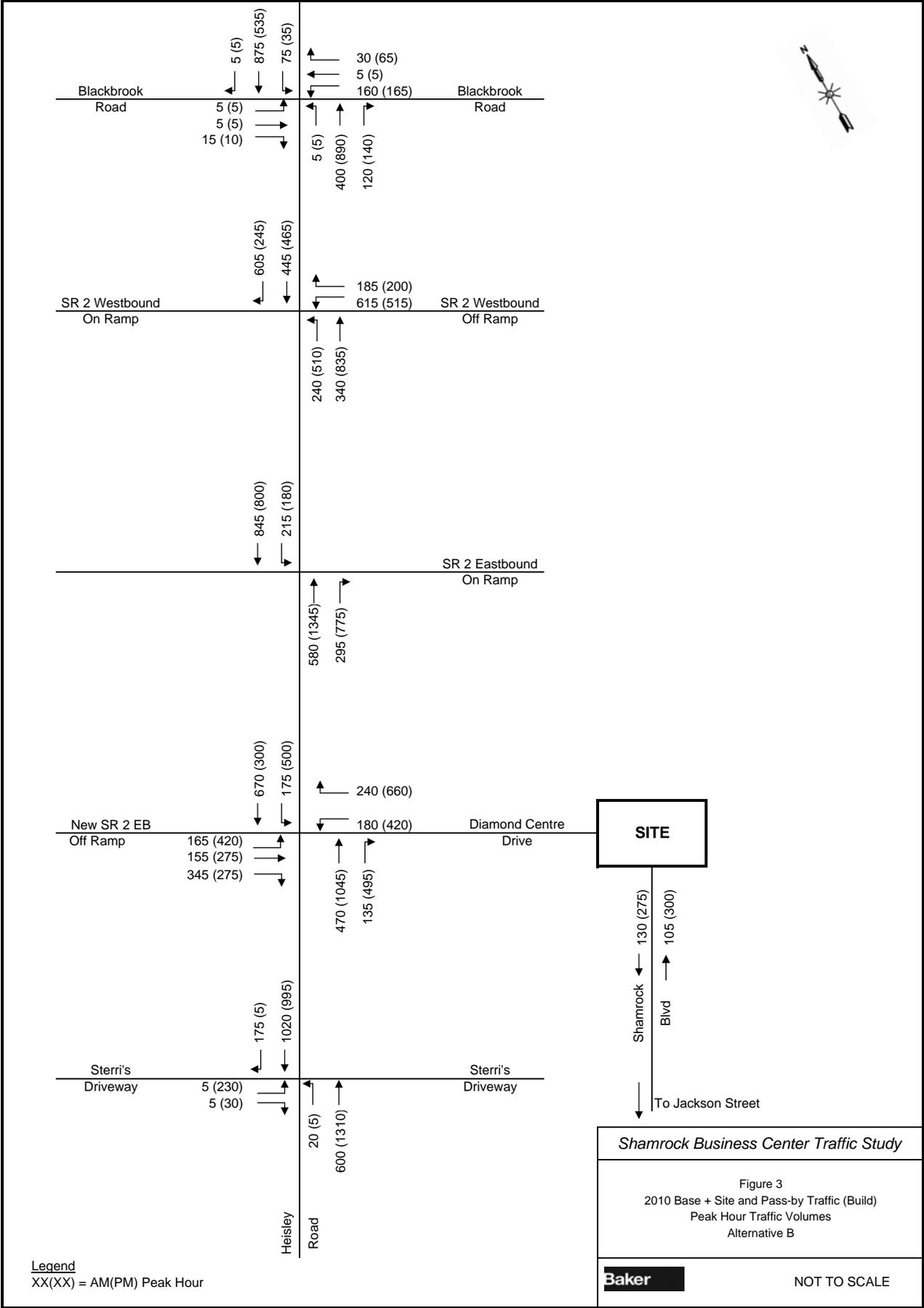


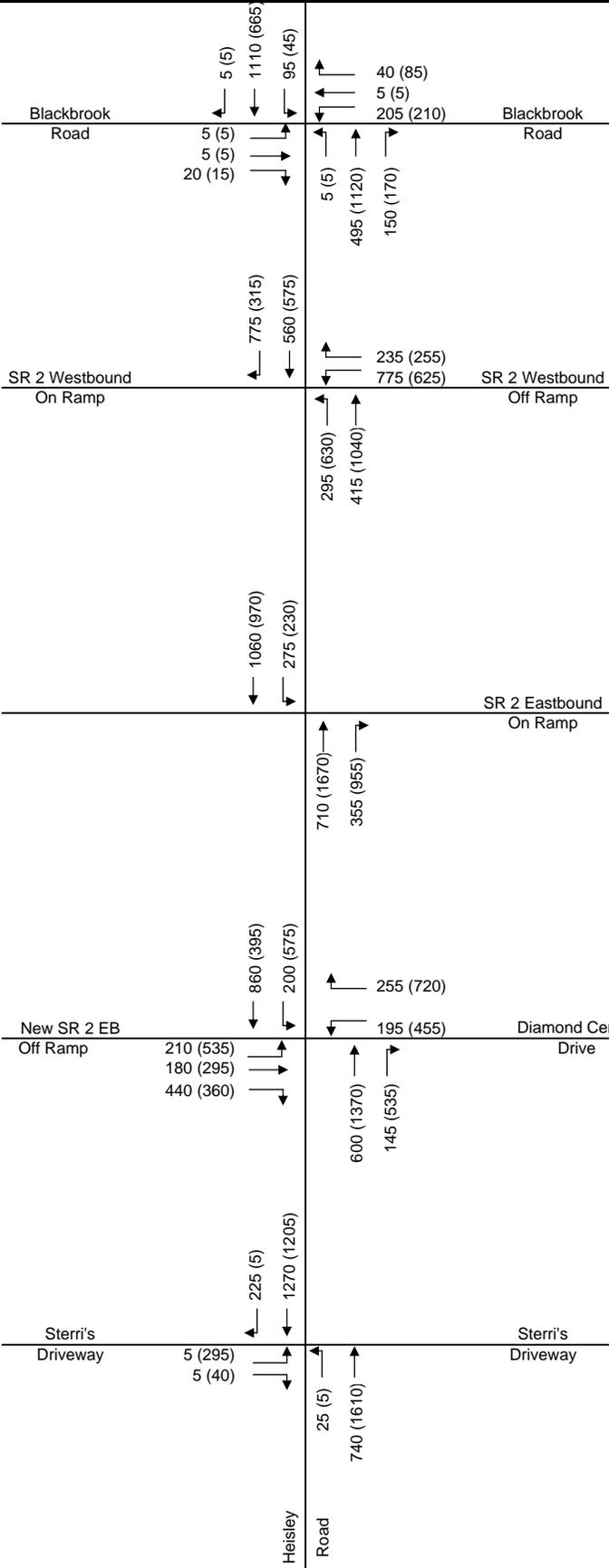
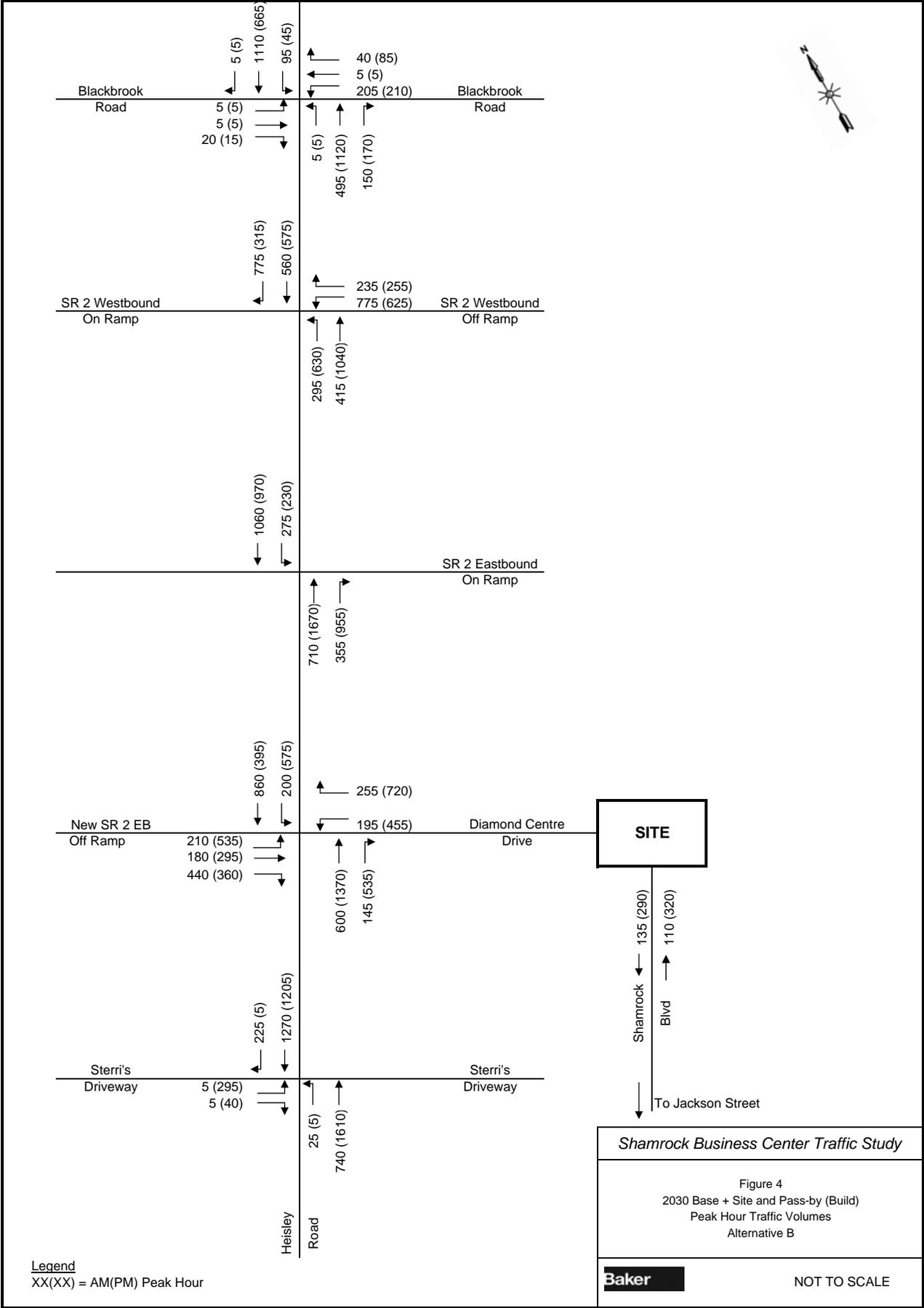
SITE



Shamrock Business Center Traffic Study

Figure 2
 2030 Base + Site and Pass-by (Build)
 Peak Hour Traffic Volumes
 Alternative A





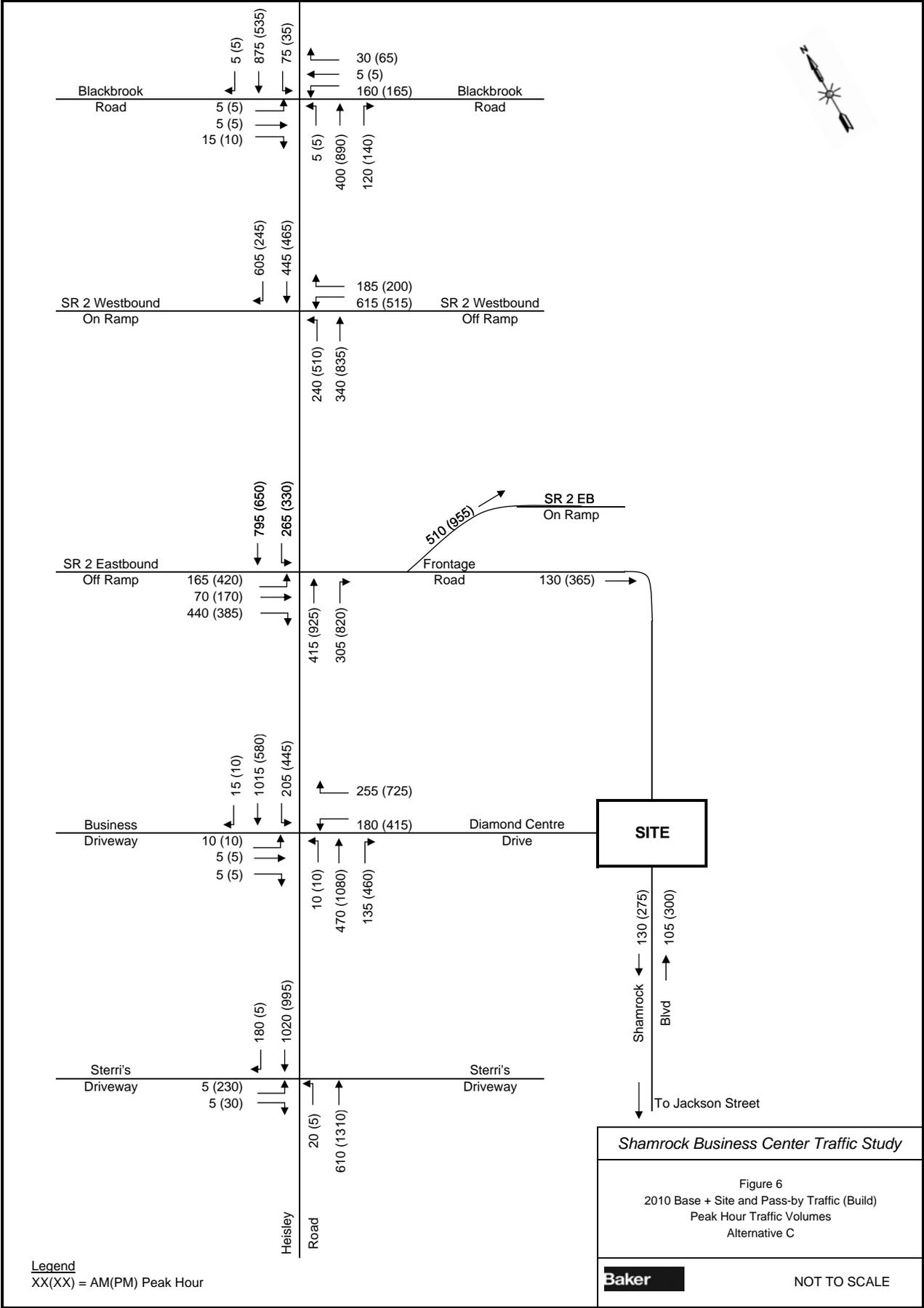
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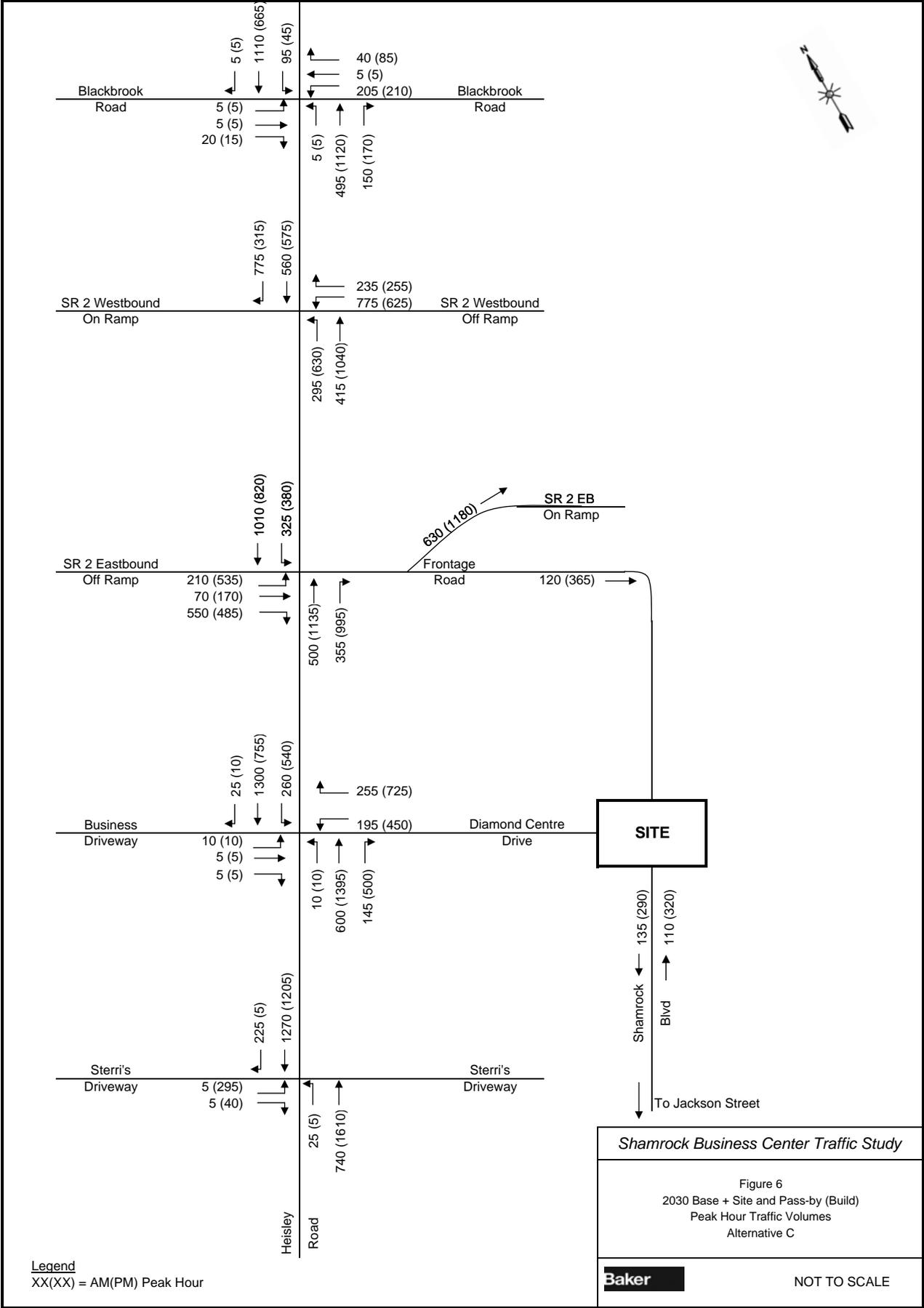
Shamrock Blvd
 To Jackson Street

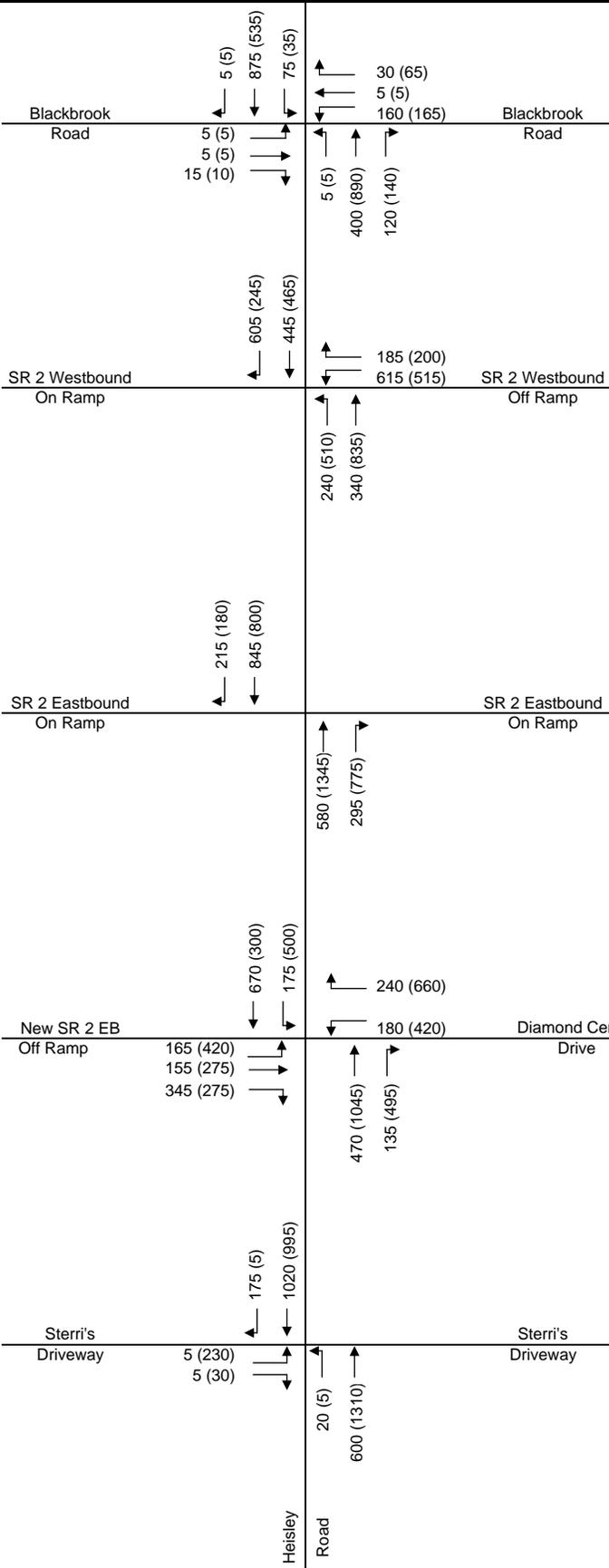
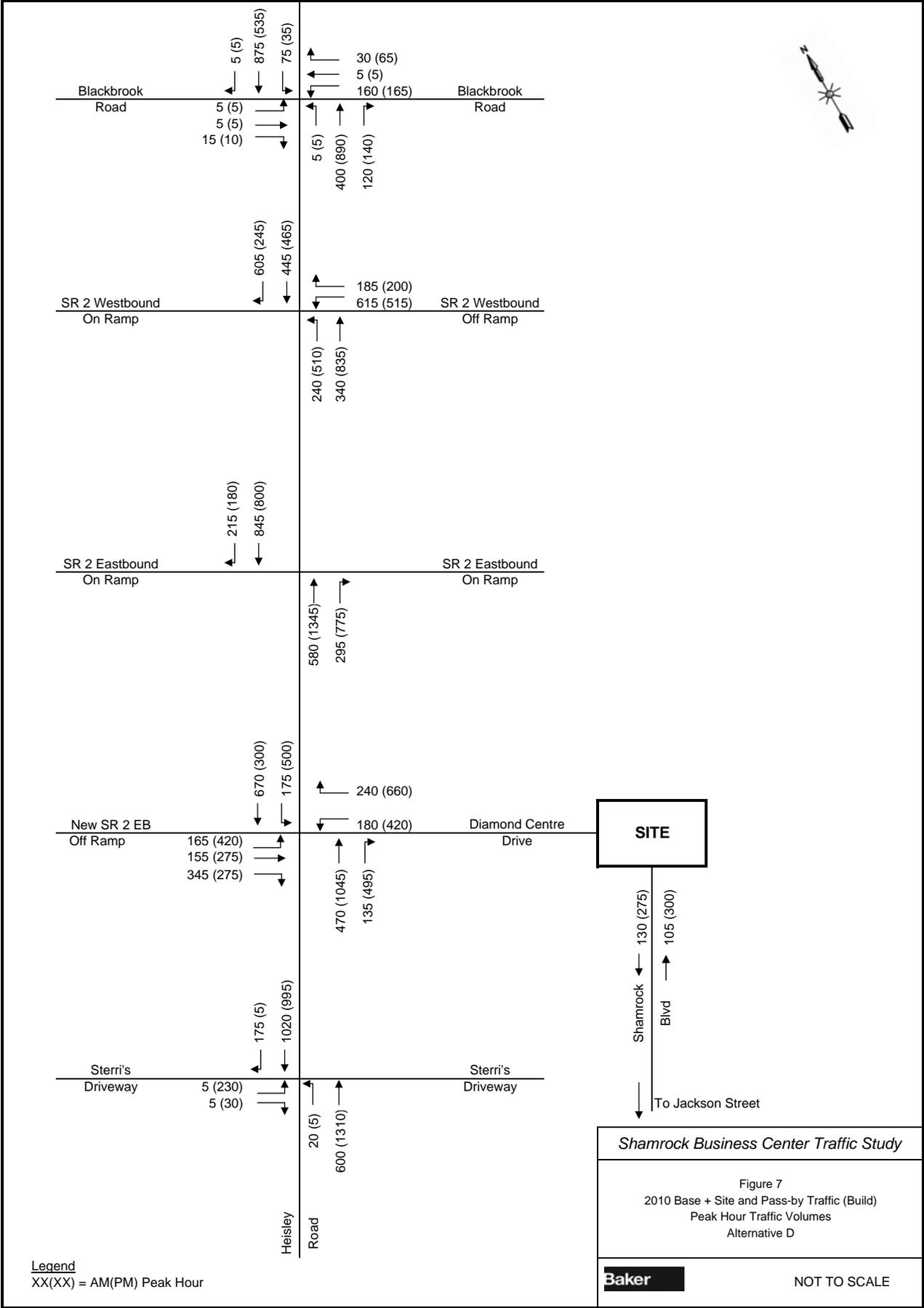
Shamrock Business Center Traffic Study

Figure 4
 2030 Base + Site and Pass-by (Build)
 Peak Hour Traffic Volumes
 Alternative B

Baker NOT TO SCALE

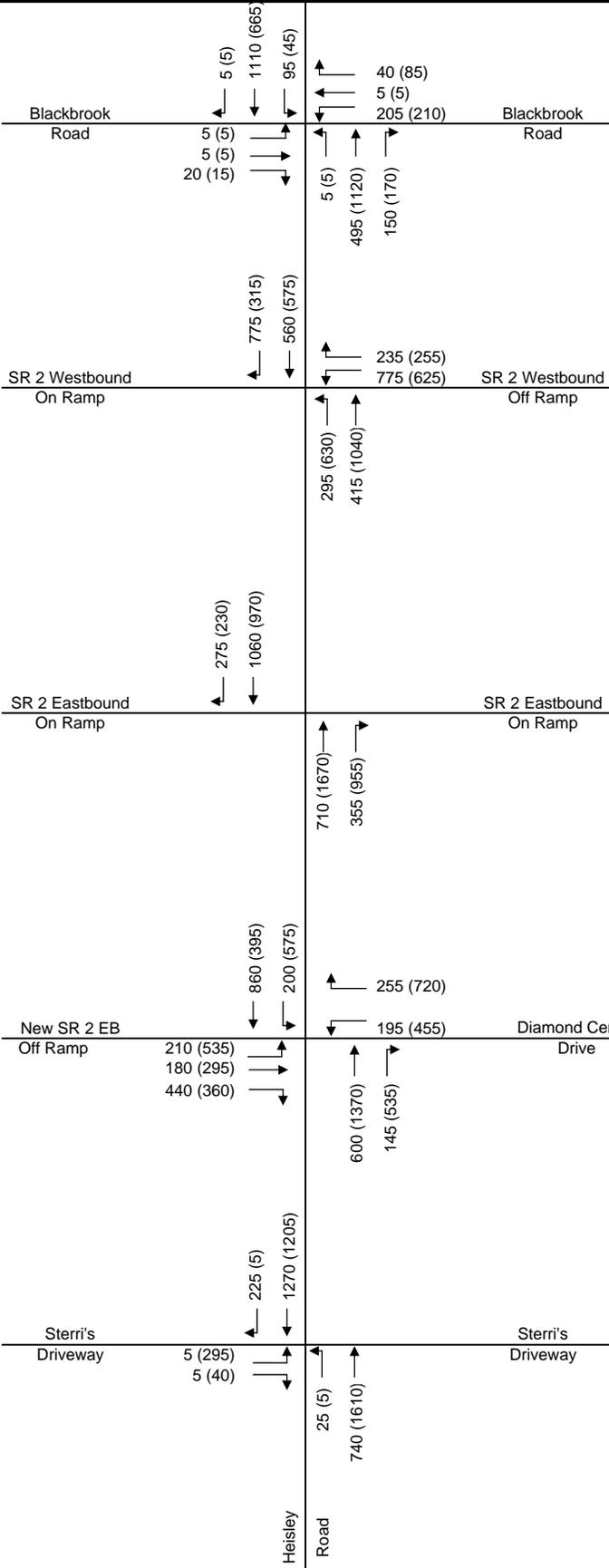
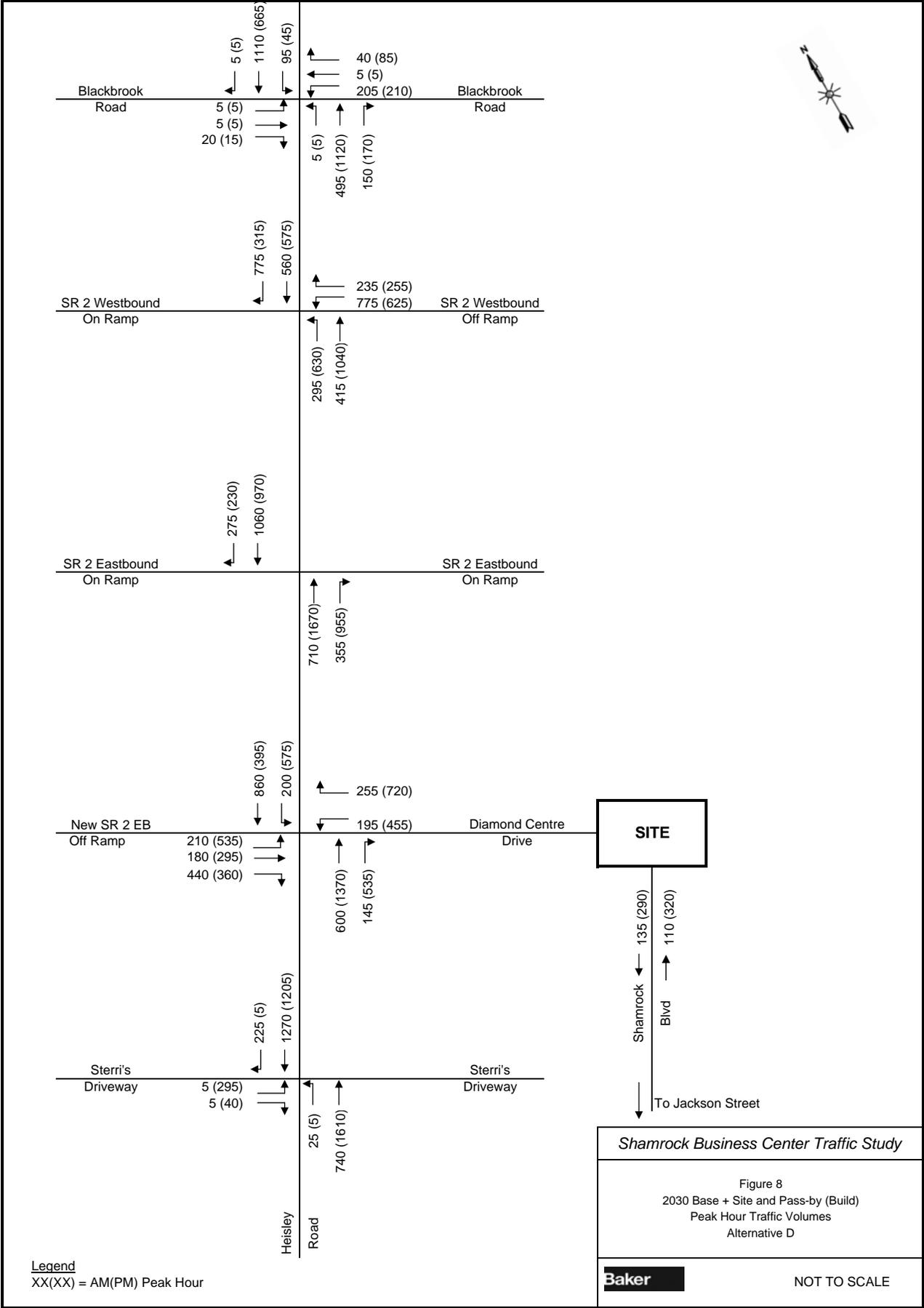






SITE

Shamrock Blvd
 ↓ 130 (275)
 ↑ 105 (300)
 ↓ To Jackson Street



SITE

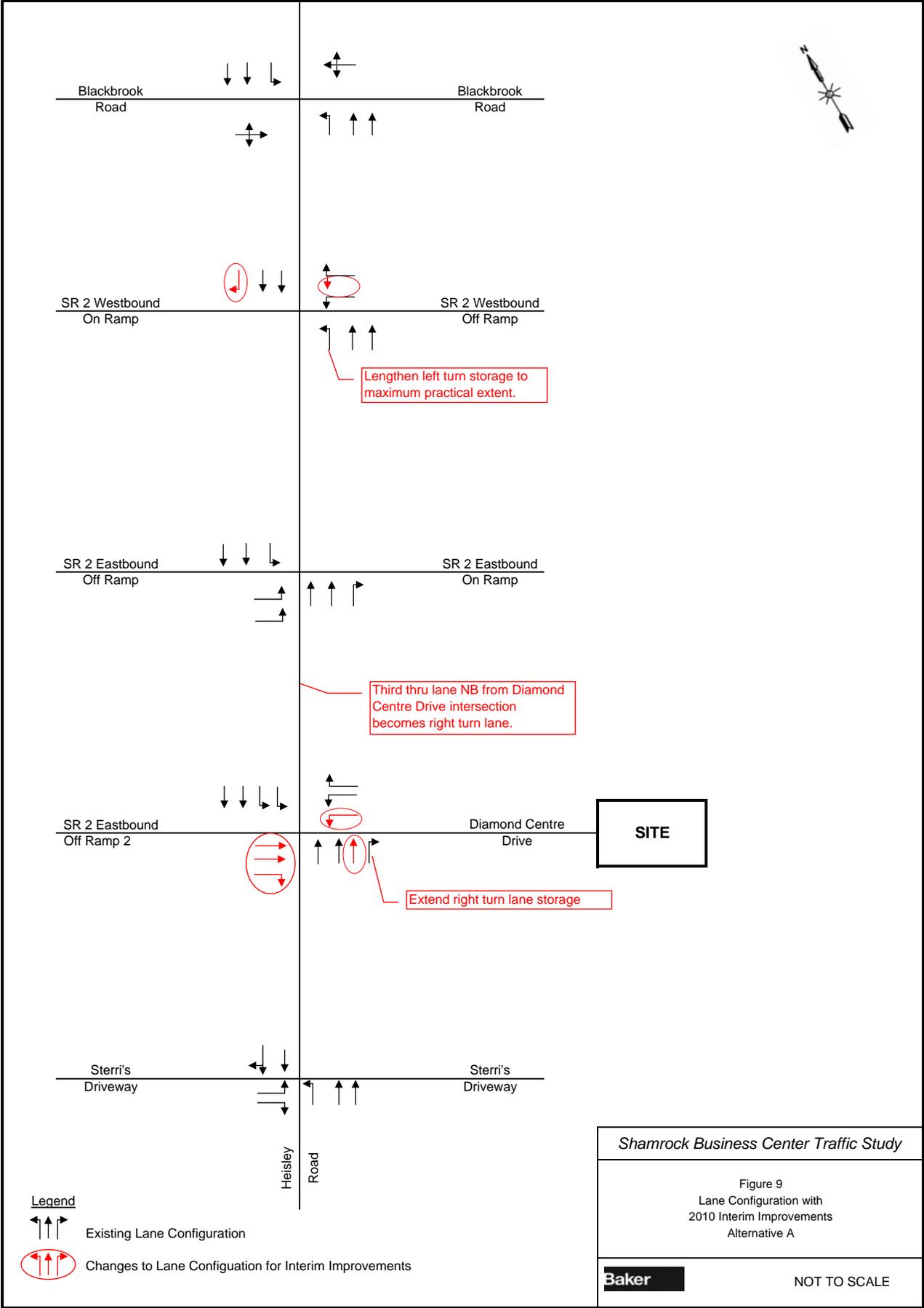
Shamrock Blvd
 135 (290)
 110 (320)
 To Jackson Street

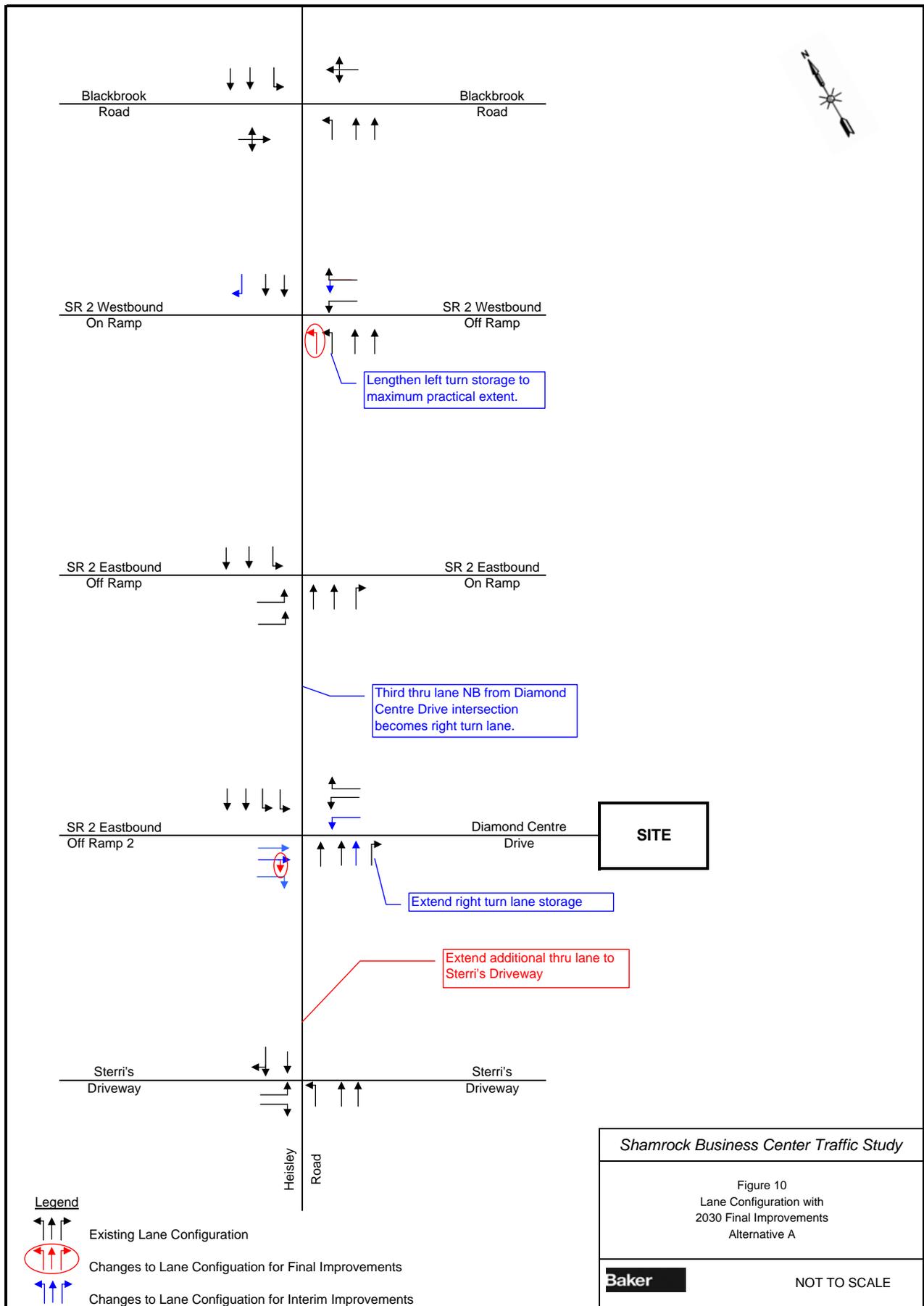
Shamrock Business Center Traffic Study

Figure 8
 2030 Base + Site and Pass-by (Build)
 Peak Hour Traffic Volumes
 Alternative D

Baker

NOT TO SCALE

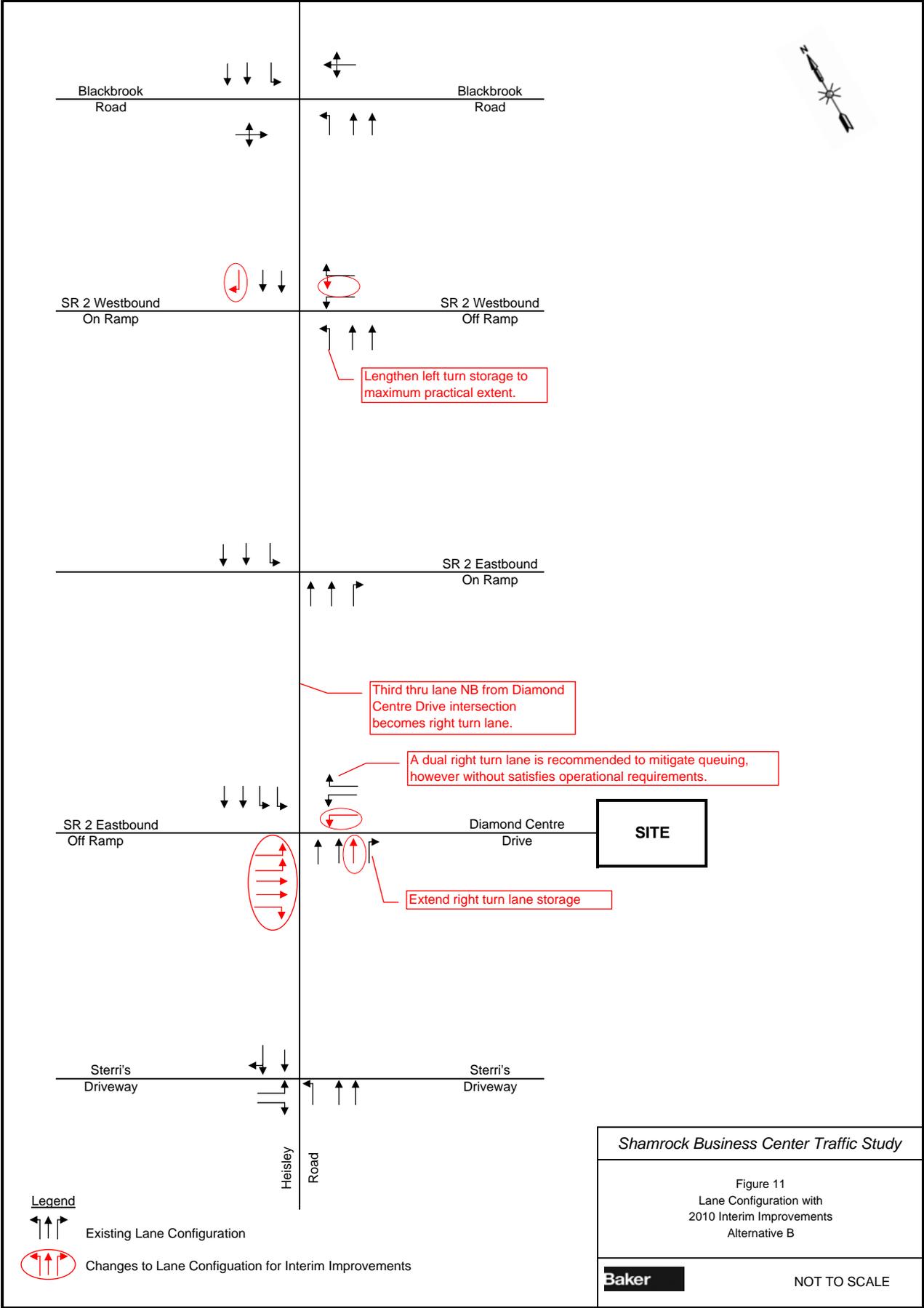


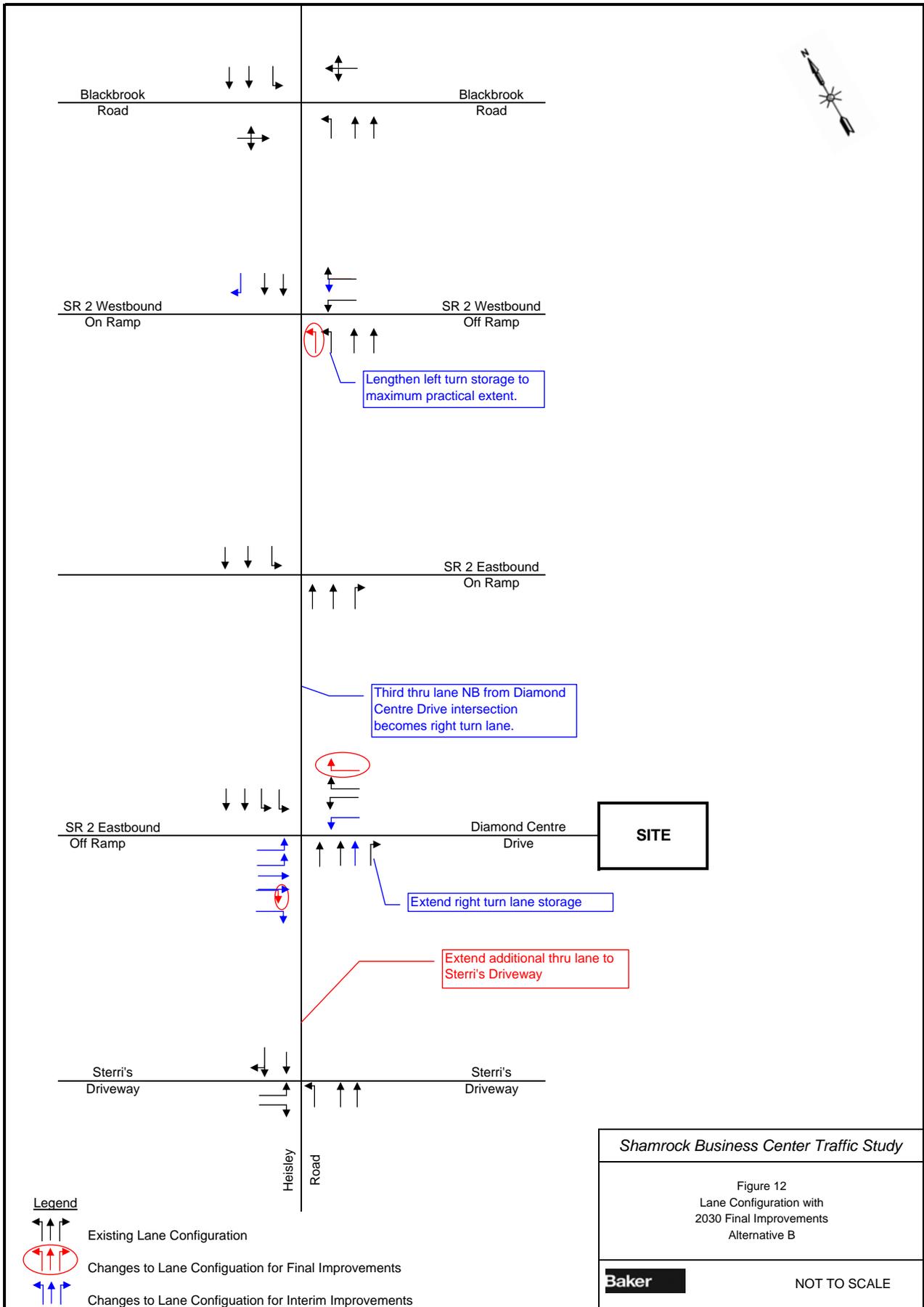


Shamrock Business Center Traffic Study

Figure 10
Lane Configuration with
2030 Final Improvements
Alternative A

Baker NOT TO SCALE

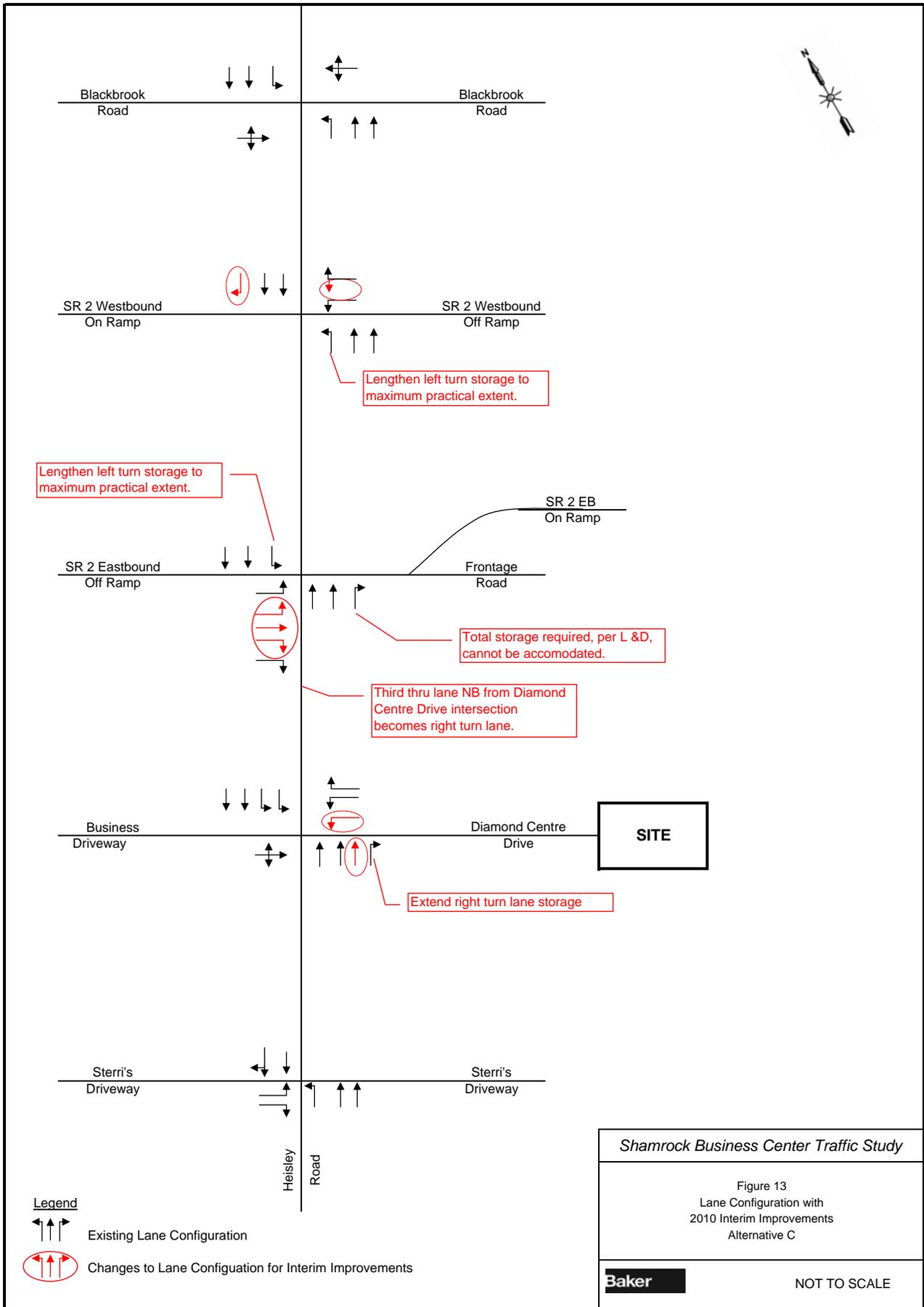


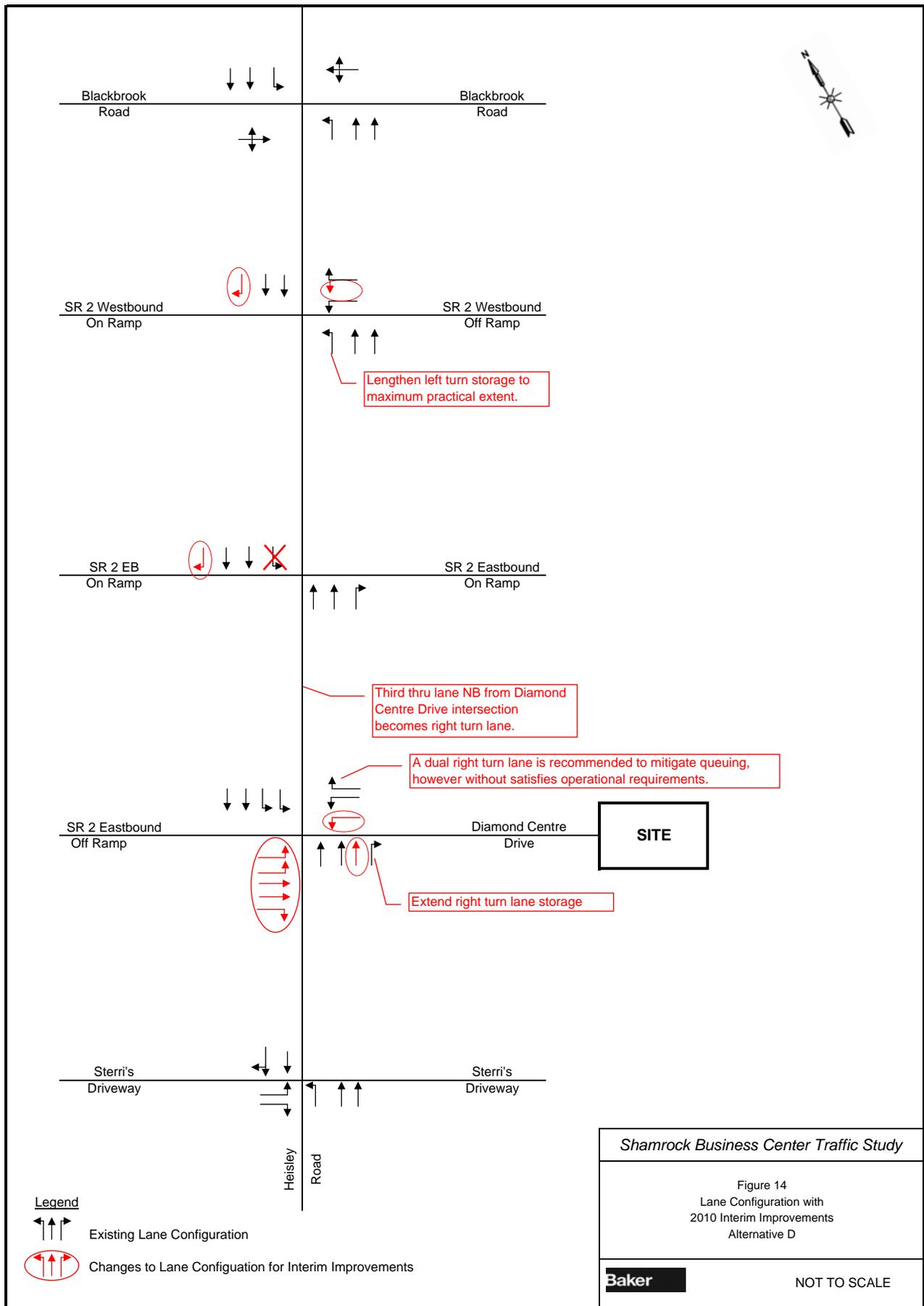


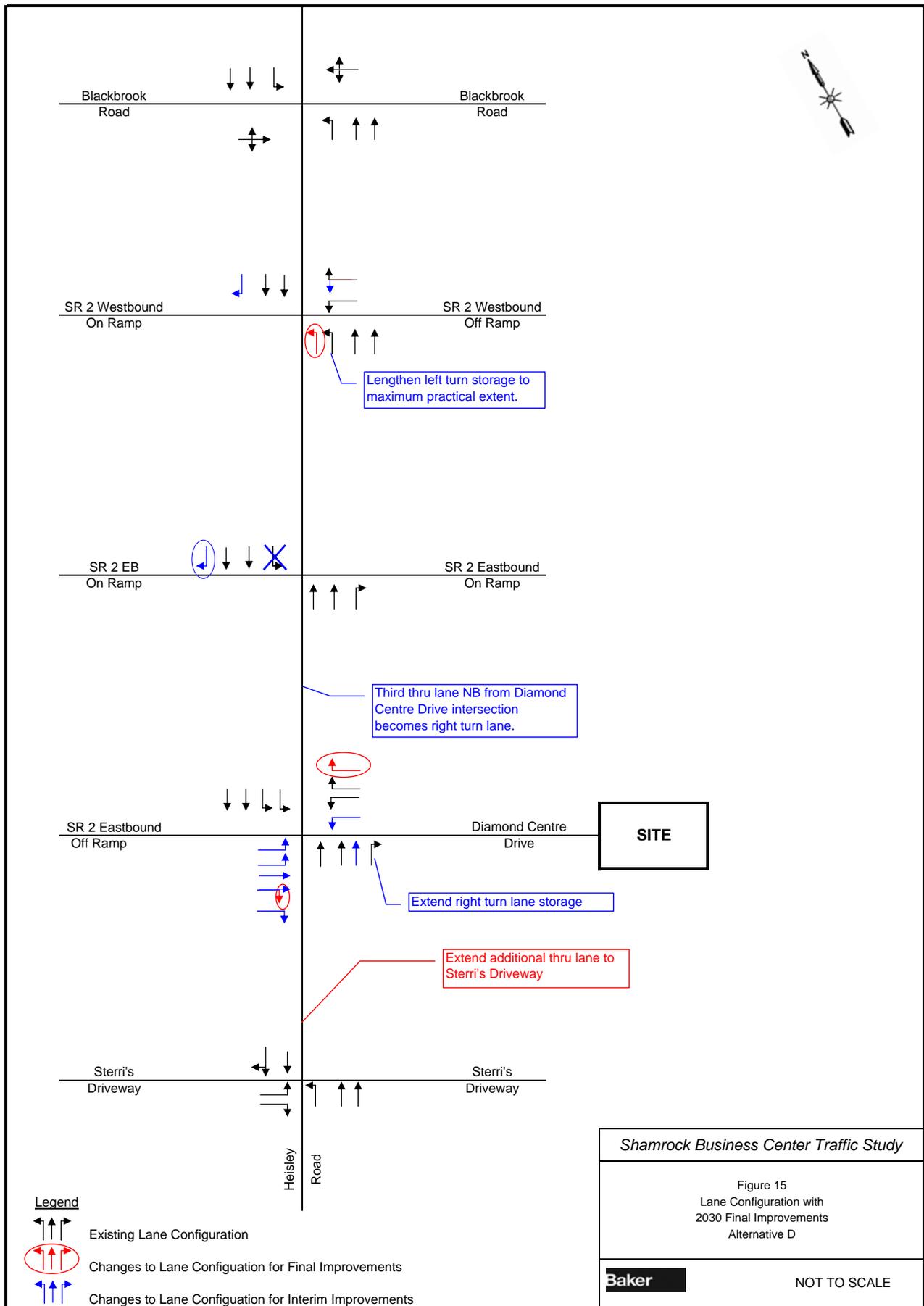
Shamrock Business Center Traffic Study

Figure 12
Lane Configuration with
2030 Final Improvements
Alternative B

Baker NOT TO SCALE







Blackbrook Road

SR 2 Westbound On Ramp

SR 2 EB On Ramp

SR 2 Eastbound Off Ramp

Sterri's Driveway

Blackbrook Road

SR 2 Westbound Off Ramp

SR 2 Eastbound On Ramp

Diamond Centre Drive

Sterri's Driveway

Heisley Road

Lengthen left turn storage to maximum practical extent.

Third thru lane NB from Diamond Centre Drive intersection becomes right turn lane.

Extend right turn lane storage

Extend additional thru lane to Sterri's Driveway

SITE

Shamrock Business Center Traffic Study

Figure 15
Lane Configuration with
2030 Final Improvements
Alternative D

Baker

NOT TO SCALE

Table 3a.		ALTERNATIVE A																ALTERNATIVE B																	
HEISLEY ROAD & DIAMOND CENTRE DRIVE		OVERALL	EB				WB				NB				SB				OVERALL	EB				WB				NB				SB			
			APP	LT	TH	RT	APP	LT	TH	RT	APP	LT	TH	RT	APP	LT	TH	RT		APP	LT	TH	RT	APP	LT	TH	RT	APP	LT	TH	RT	APP	LT	TH	RT
AM Peak Hour																																			
2010 Existing	LOS	C	C	C	C	C	D	C	C	C	C	B	B	D	A			C	D	D	D	D	D	D	C	C	C	B	C	E	B				
Configuration	delay (sec)	23.7	33.0	29.4	34.6	32.4	40.0	26.7	22.8	25.7	12.9	15.3	42.0	8.3			30.9	41.3	39.0	38.8	43.5	37.2	53.7	24.9	25.4	28.6	14.1	23.9	55.5	15.6					
	v/c			0.23	0.77		0.67	0.40		0.44	0.18		0.62	0.52				0.25	0.23	0.76		0.69	0.41			0.38	0.17		0.63	0.48					
2010 with	LOS	C	D	C	D	B	D	A	C	C	B	C	D	C			C	C	D	D	B	C	D	C	C	C	C	C	A	C	A				
Interim	delay (sec)	26.7	41.6	24.8	49.2	17.9	36.3	4.0	24.0	26.1	16.6	24.5	41.0	20.2			21.6	26.8	36.6	36.4	17.7	33.1	41.0	27.1	32.5	34.9	24.2	6.4	24.5	1.6					
Improvements	v/c			0.18	0.88		0.44	0.28		0.34	0.21		0.60	0.56				0.31	0.29	0.50		0.46	0.51			0.46	0.26		0.20	0.42					
2030 with	LOS	C	D	C	D	B	D	A	C	C	B	C	D	B			C	C	C	C	D	C	D	A	C	C	C	C	D	B					
Interim	delay (sec)	26.4	36.7	20.6	43.3	18.2	38.2	2.9	28.4	30.4	19.7	22.5	48.7	16.4			28.1	33.7	22.7	22.4	43.6	21.8	41.2	7.0	31.2	33.6	21.2	24.2	51.3	17.9					
Improvements	v/c			0.16	0.88		0.52	0.28		0.53	0.28		0.73	0.71				0.19	0.16	0.87		0.49	0.27			0.53	0.27		0.71	0.71					
2030 with	LOS	C	C	C	D	B	C	A	C	C	B	B	D	B			C	C	C	C	C	C	D	A	C	C	B	C	D	C					
Full	delay (sec)	22.4	33.4	32.0	35.9	19.1	33.1	8.4	24.2	26.7	14.1	16.0	41.1	10.2			27.2	32.3	29.6	32.3	34.6	20.0	36.4	7.5	27.8	30.6	16.1	25.7	45.8	21.1					
Improvements	v/c			0.58	0.66		0.36	0.29		0.45	0.22		0.60	0.61				0.26	0.52	0.59		0.36	0.16			0.47	0.23		0.61	0.63					
PM Peak Hour																																			
2010 Existing	LOS	F	F	D	F	D	D	C	E	F	B	F	F	B			F	F	E	D	F	C	E	A	F	F	B	F	F	B					
Configuration	delay (sec)	86.2	159.7	52.0	267.4	35.4	53.1	24.1	60.6	82.1	15.1	146.9	225.3	16.4			83.3	87.7	60.2	47.4	170.0	24.7	55.6	5.1	118.9	168.7	13.6	88.1	130.0	18.4					
	v/c			0.63	1.42		0.86	0.72		1.05	0.55		1.35	0.21				0.84	0.53	1.20		0.86	0.66			1.25	0.61		1.13	0.23					
2010 with	LOS	C	E	D	E	C	D	B	C	D	C	C	D	A			D	E	D	D	F	D	D	D	D	E	C	D	E	B					
Interim	delay (sec)	34.7	59.3	53.0	65.6	24.4	46.4	10.4	34.6	39.8	23.6	31.6	49.3	2.1			52.0	56.0	46.7	42.3	83.7	46.7	39.6	51.3	54.2	66.8	27.7	49.9	69.3	17.6					
Improvements	v/c			0.66	0.83		0.66	0.72		0.72	0.65		0.77	0.18				0.67	0.42	0.95		0.53	0.97			0.97	0.70		0.92	0.22					
2030 with	LOS	E	F	D	F	C	D	B	E	F	C	E	F	A			F	F	D	D	F	F	D	F	F	F	C	D	F	A					
Interim	delay (sec)	63.3	106.2	41.8	159.0	25.7	49.5	10.7	66.3	80.4	30.2	74.0	123.3	2.1			85.6	82.0	52.3	41.8	159.0	100.8	47.6	134.4	94.9	121.0	28.2	53.2	88.5	1.9					
Improvements	v/c			0.44	1.19		0.74	0.79		1.05	0.77		1.12	0.26				0.81	0.44	1.19		0.71	1.20			1.15	0.80		1.01	0.26					
2030 with	LOS	D	E	E	E	C	E	A	D	D	C	D	E	A			D	E	E	D	E	D	E	C	D	D	C	C	D	A					
Full	delay (sec)	42.3	64.4	63.2	66.9	30.0	74.4	1.9	39.0	43.4	27.8	48.5	75.9	8.6			47.6	60.7	67.4	54.4	57.2	46.9	74.4	29.5	47.3	54.8	28.2	33.0	53.8	2.6					
Improvements	v/c			0.88	0.83		0.94	0.49		0.87	0.74		0.97	0.22				0.91	0.80	0.76		0.94	0.72			0.96	0.80		0.89	0.23					

TABLE 3b.		ALTERNATIVE C																ALTERNATIVE D																	
HEISLEY ROAD & DIAMOND CENTRE DRIVE		OVERALL	EB				WB				NB				SB				OVERALL	EB				WB				NB				SB			
			APP	LT	TH	RT	APP	LT	TH	RT	APP	LT	TH	RT	APP	LT	TH	RT		APP	LT	TH	RT	APP	LT	TH	RT	APP	LT	TH	RT				
AM Peak Hour																																			
2010 Existing	LOS	C	D		D		D	D		C	B	E	B	A	C	D	B		C	D	C	C	D	C	C		C	B	B	D	A				
Configuration	delay (sec)	24.4	47.7		47.7		39.8	47.8		33.8	13.9	58.0	15.5	5.2	23.6	43.4	19.6		24.6	35.2	33.1	23.9	37.3	30.7	44.3		20.4	23.1		26.8	10.1	15.3	44.8	7.5	
	v/c				0.28			0.71		0.62		0.62	0.28	0.13		0.59	0.63			0.25	0.23	0.79		0.67		0.41			0.42	0.18		0.59	0.50		
2010 with	LOS	B	D		D		C	D		C	B	E	B	A	B	D	B		C	C	D	D	C	C	D		B	C	B	C	B				
Interim	delay (sec)	18.5	47.7		47.7		30.9	35.9		27.1	13.1	60.2	15.1	2.5	16.4	45.4	10.6		23.6	27.8	36.1	35.9	20.3	24.8	36.7		15.8	32.7		35.8	21.8	14.9	28.3	11.3	
Improvements	v/c				0.28			0.33		0.51		0.42	0.20	0.14		0.64	0.64			0.30	0.28	0.53		0.35		0.35			0.49	0.24		0.23	0.46		
2030 with	LOS																		C	C	C	C	D	C	D		A	C		C	C	C	D	C	
Interim	delay (sec)																		30.5	33.7	22.7	22.4	43.6	21.8	41.2		7.0	31.2		33.6	21.2	31.1	51.3	26.4	
Improvements	v/c																			0.19	0.16	0.87		0.49		0.27			0.53	0.27		0.71	0.71		
2030 with	LOS																		C	D	C	D	D	C	D		C	C		C	B	C	D	B	
Full	delay (sec)																		27.9	35.9	32.2	35.7	39.8	30.3	36.4		25.6	24.5		27.7	11.0	23.1	46.1	17.8	
Improvements	v/c																			0.29	0.59	0.67		0.36		0.31			0.43	0.21		0.62	0.59		
PM Peak Hour																																			
2010 Existing	LOS	D	C		C		D	E		C	E	C	E	E	C	D	A		F	F	E	D	F	C	E		A	F		F	B	F	F	B	
Configuration	delay (sec)	43.6	25.2		25.2		42.8	70.0		25.6	59.8	25.3	59.4	61.3	22.4	43.0	6.9		83.3	87.7	60.2	47.4	170.0	24.7	55.6		5.1	118.9		168.7	13.6	88.1	130.0	18.4	
	v/c				0.04			0.97		0.75		0.05	0.99	0.95		0.66	0.33			0.84	0.53	1.20		0.86		0.66			1.25	0.61		1.13	0.23		
2010 with	LOS	C	C		C		C	D		C	C	E	C	D	B	C	A		D	E	D	D	F	D	D		D	D		E	C	E	E	B	
Interim	delay (sec)	26.7	29.6		29.6		29.4	37.1		24.6	31.7	60.8	27.1	41.9	17.1	32.7	5.3		52.9	56.0	46.7	42.3	83.7	46.4	38.6		51.3	53.9		66.8	26.6	56.0	78.5	18.4	
Improvements	v/c				0.05			0.68		0.82		0.44	0.61	0.84		0.57	0.32			0.67	0.42	0.95		0.51		0.97			0.97	0.69		0.97	0.23		
2030 with	LOS																		F	F	D	D	F	F	D		F	F		F	C	E	F	A	
Interim	delay (sec)																		86.0	82.0	52.3	41.8	159.0	100.8	47.6		134.4	94.9		121.0	28.2	55.5	88.5	7.6	
Improvements	v/c																			0.81	0.44	1.19		0.71		1.20			1.15	0.80		1.01	0.26		
2030 with	LOS																		D	E	E	D	D	D	E		C	D		E	C	D	E	A	
Full	delay (sec)																		49.3	56.3	61.1	51.7	54.0	46.4	73.3		29.3	52.8		61.8	29.8	37.4	61.9	1.6	
Improvements	v/c																			0.89	0.77	0.73		0.93		0.72			0.99	0.81		0.89	0.23		

Form version: **August 2007**.
Please check for and use latest version from:
<http://www.dot.state.oh.us/urban/CT/CertTraffic.htm>



Ohio Department of Transportation
Office of Technical Services - *Modeling & Forecasting Section*
Certified Traffic Request Form

1980 W. Broad Street, 2nd Floor, Columbus, OH 43223 Phone: (614)466-7825 Fax (614)752-8646 www.dot.state.oh.us/urban/CT/CertTraffic.htm

Use this form to submit a request for Certified Traffic forecasts. Please provide all the information. Add an additional sheet if necessary. You may submit this request using the print form button, then, print to pdf format. You may mail or fax the form to the Project Analyses Administrator at the Office of Technical Services. For email send to: CertTraffic@dot.state.oh.us

REQUESTOR:

Name Organization

Address

Phone Fax Email

SELECT ONE: OTS to provide forecast Forecasts provided for OTS review and certification

NOTE: Please include a street-network map of the study area. For all future scenarios, drawing(s) of every alternative for which certified traffic is sought, is required.

REQUEST:

Type: New

Revision/Update

Reason(s) Change in future year(s) of interest
 Change in design alternative/alignment
 Change in project boundaries
 Other change(s) - specify below

Date of original request

Project Details:

PID District County Route

Log Point - From: To:

Project Boundaries &
Any Other Relevant
Project Information

Heisley Road from Blackbrook Road to Sterris' Driveway (Project location map attached).
Cover letter explaining project attached.

Project Opening Year

Project Design Year

Select Required Design Designations

K & D Factors T24 TD 8th highest hour factor

Turning movement volumes:

ADT AM Peak PM Peak

Identify Study Intersection(s) Where Turning Movement Needed

Heisley Road and Blackbrook Road
Heisley Road and S.R. 2 westbound ramps
Heisley Road and S.R. 2 eastbound ramps
Heisley Road and Diamond Centre Drive
Heisley Road and Sterris' Driveway

Bridges Requiring
Separate Design
Designations (if
any)

Reset Form

Print Form

Committed and/or
Planned
Development in
vicinity
(if any)

Shamrock Business Center development (described in attached memorandum) and 110,000 sf of additional retail development on existing Diamond Centre Boulevard.

Special Conditions
and/or Need by
Date
(if any)

SCHEDULE:

Technical Services' goal is to meet time requirement 100 percent of the time. The District Office will be contacted to determine priority amongst pending requests for multiple projects from the same District. Technical Services will notify you immediately of any known problems which will impact the ability to respond within 45 working days of receipt of a request.

DO NOT WRITE BELOW - FOR INTERNAL USE ONLY

Date request received

State Job No.

Analyst assigned

Request logged in
tracker on and by

Forecast source

Notes

Project Type

Date of completion

Checked & Sent on

Reset Form

Print Form

Baker

Michael Baker Jr., Inc.

A Unit of Michael Baker Corporation

Airside Business Park
100 Airside Drive
Moon Township, PA 15108

(412) 269-6300
FAX (412) 375-3994

March 19, 2008

Ms. Leigh Oesterling
Office of Technical Services
Modeling & Forecasting Section
Ohio Department of Transportation
1980 W. Broad Street, 2nd Floor
Columbus, OH 43223

**Subject: SR-2/Heisley Road Interchange Modification
Certified Traffic Request**

Ms. Oesterling:

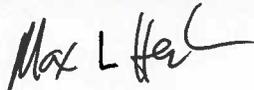
Michael Baker Jr., Inc. (Baker) is requesting certification of the peak hour turning movement volumes being submitted by way of this memorandum. This request is being made through authorization by ODOT – District 12. The subject interchange is located in Mentor, Lake County, Ohio. A location map is included. The requested traffic data is being utilized to evaluate a new design concept that proposes to split the existing S.R. 2 eastbound off ramp at Heisley Road. The concept is being evaluated by the cities of Mentor and Painesville to accommodate anticipated traffic from the development of the Shamrock Business Center in Painesville, Ohio. The development is a proposed residential and retail development located within Painesville, although access is provided via Heisley Road and Diamond Centre Drive in Mentor. A letter from the District 12 Transportation Planning & Programs Administrator summarizing a recent meeting about the proposal and authorizing this request for traffic approval is attached.

The included memorandum presents the methodology that was used to develop the proposed AM and PM Peak Hour Volumes for Opening Year, 2010, and Design Year, 2030.

If you have any questions or concerns, please contact me at (412)269-4606 or Lori Duguid at (412)269-7919. If possible, we would like to receive certification of the proposed volumes by April 18, 2008.

Sincerely,

MICHAEL BAKER JR., INC.



Max Heckman, P.E., PTOE, PMP
Project Manager

Enclosure

Project Area and Description

The project area is within Mentor and Painesville, Lake County, Ohio. Refer to Figure 1 for the project location map. The Shamrock Business Centre development is within Painesville, but access is provided via Diamond Centre Drive to Heisley Road in Mentor. Two access points are anticipated for the development, Diamond Center Drive to Heisley Road, and Shamrock Boulevard to Jackson Street. Access to S.R. 2 is provided via Heisley Road.

The proposed development is mixed-use with both retail (400,000 SF) and residential (475 dwelling units) components. An additional 110,000 sf of retail is anticipated along existing Diamond Centre Drive in Mentor. Proposed improvements to the project area include splitting the SR 2 eastbound off-ramp so it intersects Heisley Road at two locations. The left turn movements will remain at the existing location, intersecting Heisley Road at the intersection of Heisely Road and the SR 2 eastbound on-ramp. The through movements and right turns will intersect Heisely Road at Diamond Centre Drive. Figure 2 depicts a conceptual sketch of the proposed improvements.

The following intersections were included in the volume development and will be included in subsequent analysis:

- Heisley Road and Blackbrook Road
- Heisley Road and S.R. 2 westbound ramps
- Heisley Road and S.R. 2 eastbound ramps
- Heisley Road and Diamond Centre Drive
- Heisley Road and Sterris' Driveway

Volume Development

Traffic volume development for this study is based on manual turning movement data, NOACA travel-demand model data, and ITE trip generation for the proposed development. Each step of the volume development process is documented in Figures 3 through 12. The steps utilized are described as follows:

1. Manual turning movement traffic counts were conducted within the study area in February 2005. The traffic count data is included as Attachment A. AM and PM peak hour volumes were determined from the manual turning movement counts (Figure 3).
2. The manual turning movement data was balanced and rounded (Figure 4).
3. The NOACA travel-demand model was used to assess annual background growth rates within the project area. The results of the model indicated an annual background growth rate of 1.25%.
4. An annual background rate of 1.25% was applied to the 2005 AM and PM peak hour volumes over 5 years to obtain 2010 Base volumes (Figure 5).
5. The 2010 Base volumes were re-distributed for the proposed ramp configuration and Shamrock Drive connection to Jackson Street. Fifteen percent (15%) of the existing traffic at the intersection of Heisley Road and Diamond Centre Drive was assumed to enter/exit via Shamrock Drive (Figure 6). This percentage was estimated by reviewing results of model runs done by Baker for the Jackson-Heisley Network Access Study. This study, being done for Painesville with support from NOACA and ODOT, is currently on hold while funding issues are addressed.
6. Using the 2010 Redistributed Base volumes, the annual background growth rate of 1.25% was applied over 20 years to obtain 2030 AM and PM peak hour volumes (Figure 7).

7. ITE Trip Generation Manual (7th edition) was used to determine the number of trips generated by the proposed development during the AM and PM peak hours. Since the development is mixed-use, 10% of the site generated traffic was assumed to be internal. Based on the ITE Trip Generation Handbook (Fig. 5.5), a pass-by rate of 24% was applied to the PM Peak Hour. The breakdown of the trip generation is shown in Table 1. The percentage distribution for the generated external trips and pass-by trips is shown in Figures 8 and 9, respectively. Twenty-five percent (25%) of the new site traffic was assumed to use the proposed Shamrock Boulevard extension to Jackson Street, again from review of model runs done for the Jackson-Heisley Study. The corresponding number of generated external trips and pass-by trips are shown in Figures 10 and 11, respectively. The numbers from Figures 10 and 11 are combined and shown in Figure 12.
8. The total number of generated external trips and pass-by trips (Figure 12) was added to the 2010 Redistributed Base volumes (Figure 6) to determine the final 2010 Build Volumes (Figure 13). Additionally, the generated external trips and pass-by trips (Figure 12) were added to the 2030 Redistributed Base trips (Figure 7) to determine the final 2030 Build Volumes (Figure 14).

Conclusion

The 2010 and 2030 AM and PM peak hour volumes being proposed for certification are based on manual turning movement counts, NOACA travel-demand model data, and approved methodologies for trip generation from the ITE Trip Generation Manual. The certified traffic data will be used to further evaluate the concept currently being proposed for the project area.



OHIO DEPARTMENT OF TRANSPORTATION

DISTRICT 12 • 5500 TRANSPORTATION BLVD • GARFIELD HEIGHTS, OH 44125 • (216) 581-2333

February 19, 2008

City of Painesville
7 Richmond Street
Painesville, Ohio 44077-0601

Attn: Ms. Rita McMahon, City Manager

RE: SR-2/Heisley Road Interchange Modification

Dear Madam:

This letter is in regard to a meeting held on February 15, 2008 with the Division of Roadway Engineering located at our Central Office in Columbus. The Cities of Mentor and Painesville, the District 12 Office and a representative of the Shamrock Business Center development were also in attendance.

The meeting was requested by the cities to discuss a new design concept that proposes to split the existing eastbound off ramp at Heisley Road. The proposal would direct exiting traffic for northbound on SR-44 generally along the existing exit ramp alignment and southbound thru Diamond Center traffic onto a split off ramp that terminates across from the existing Diamond Center Drive or slightly modified alignment of such. While this concept has potential no determination on its acceptance can be made without further analysis. In discussions on the new concept, the following were suggested next actions:

1. Check on certified traffic that was previously obtained and update to address new design concept as required. Re-certification, if needed, can be requested directly from our Columbus Office of Technical Services. A four to eight week response time table should be anticipated.
2. In addition to the split ramp concept, other feasible more traditional configurations should be investigated. One discussed was a direct alignment of the eastbound off ramp with Diamond Center Drive with the addition of a southbound to eastbound entrance loop ramp to eliminate the signal at the existing southern ramps. The loop ramp may not be required for the proposed Phase 2 build of Shamrock estimated to be another 400,000 SF of retail/office space.
3. Assuming one of the new conceptual alternatives meets the traffic requirements, the preferred alternative should also be checked that it meets LOS requirements for the proposed full build out of Shamrock which will include the new interchange on SR-44 and other infrastructure improvements.
4. The final check based again on an alternative meeting traffic requirements will be to check on the geometric layout to ensure design standards are also met. It should be assumed FHWA would be reluctant to grant any design exceptions on a completely modified interchange. However, that would be a decision by FHWA.

5. If the split ramp option meets requirements and is preferred, the L/A will need to be extended and controlled between the ramp termini's. In doing such, it may require a centerline barrier to control ingress/egress access for the BP gas station and Burger King on the east side and car repair shop located on the west side of Heisley Road. This may also be required for other alternatives.

It is requested the District Office be copied on all submissions to Central Office. By copy of this letter, all other interested parties are advised of the current status of the proposed ramp modifications.

Any questions in regard to this matter, please contact this office.

Respectfully,

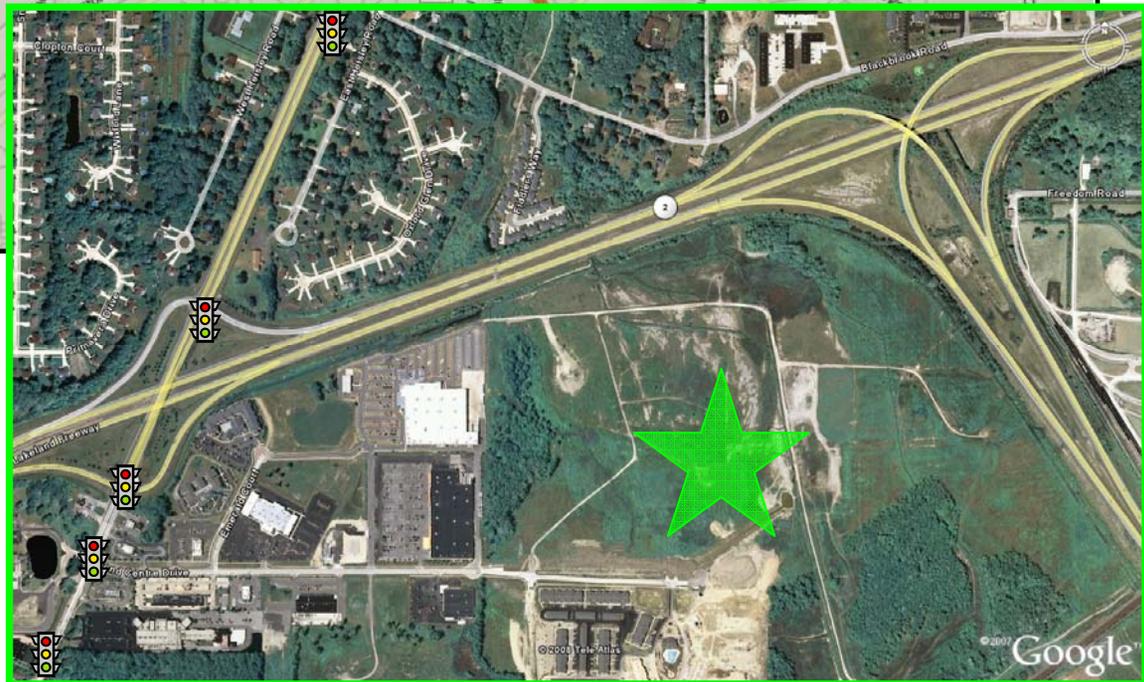
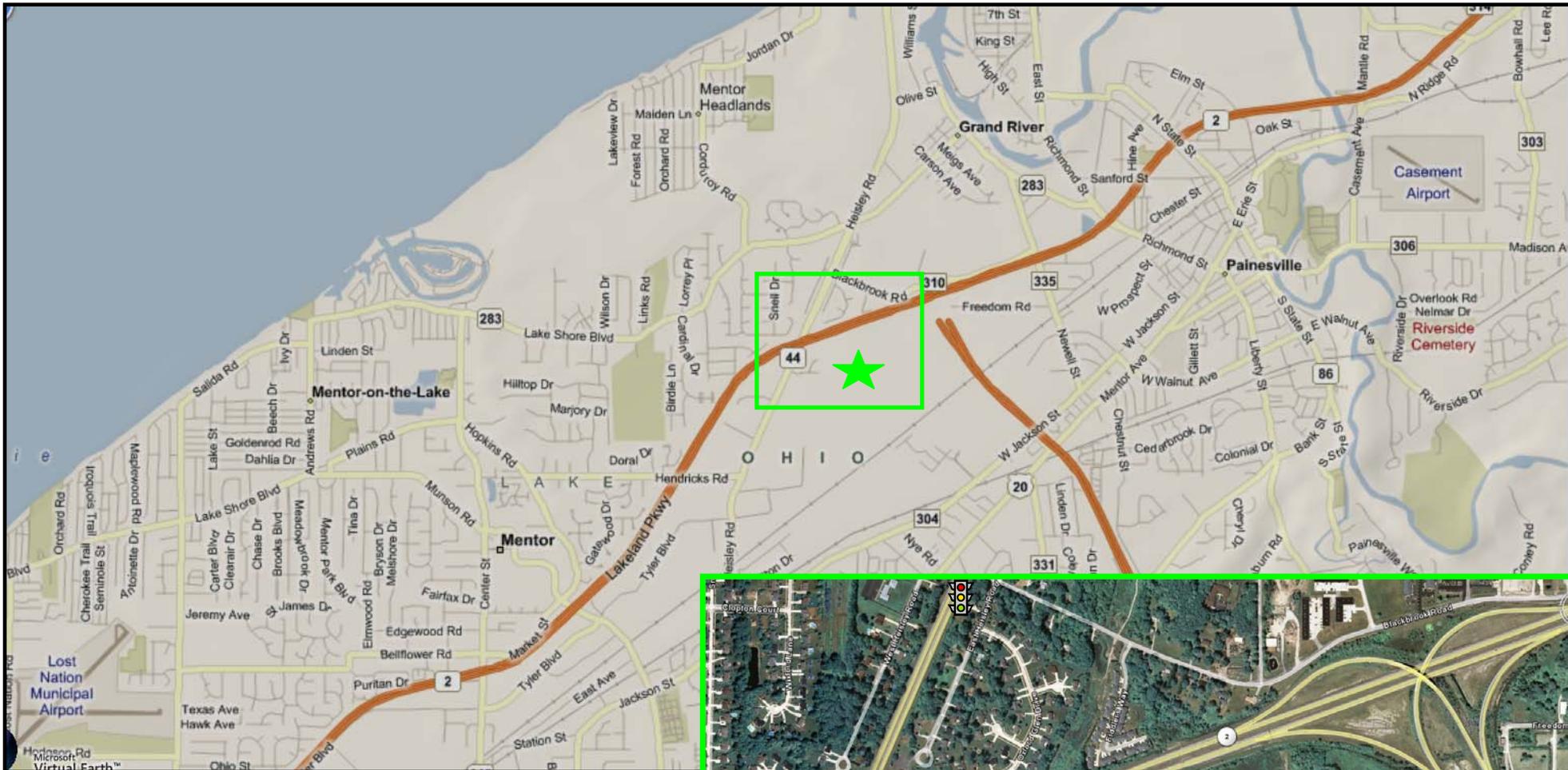


Dale A. Schiavoni, P.E.,
Transportation Planning &
Programs Administrator

DAS:krs

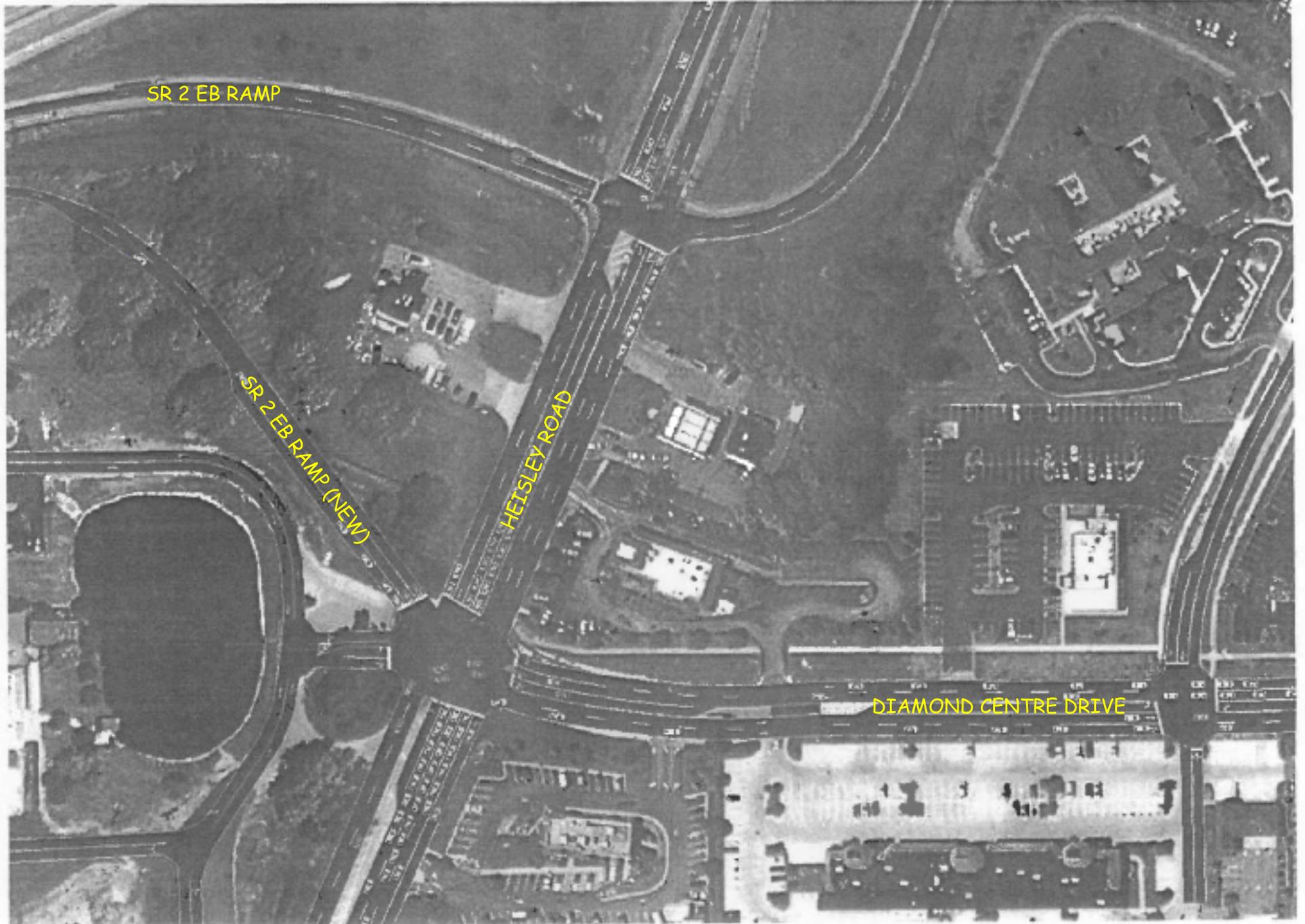
C: J. Martynowski, J. Gibson, M. Gallito, D. DiSanto, B. Teeuwan, D. Gross, J. Young,
D. Becker, file

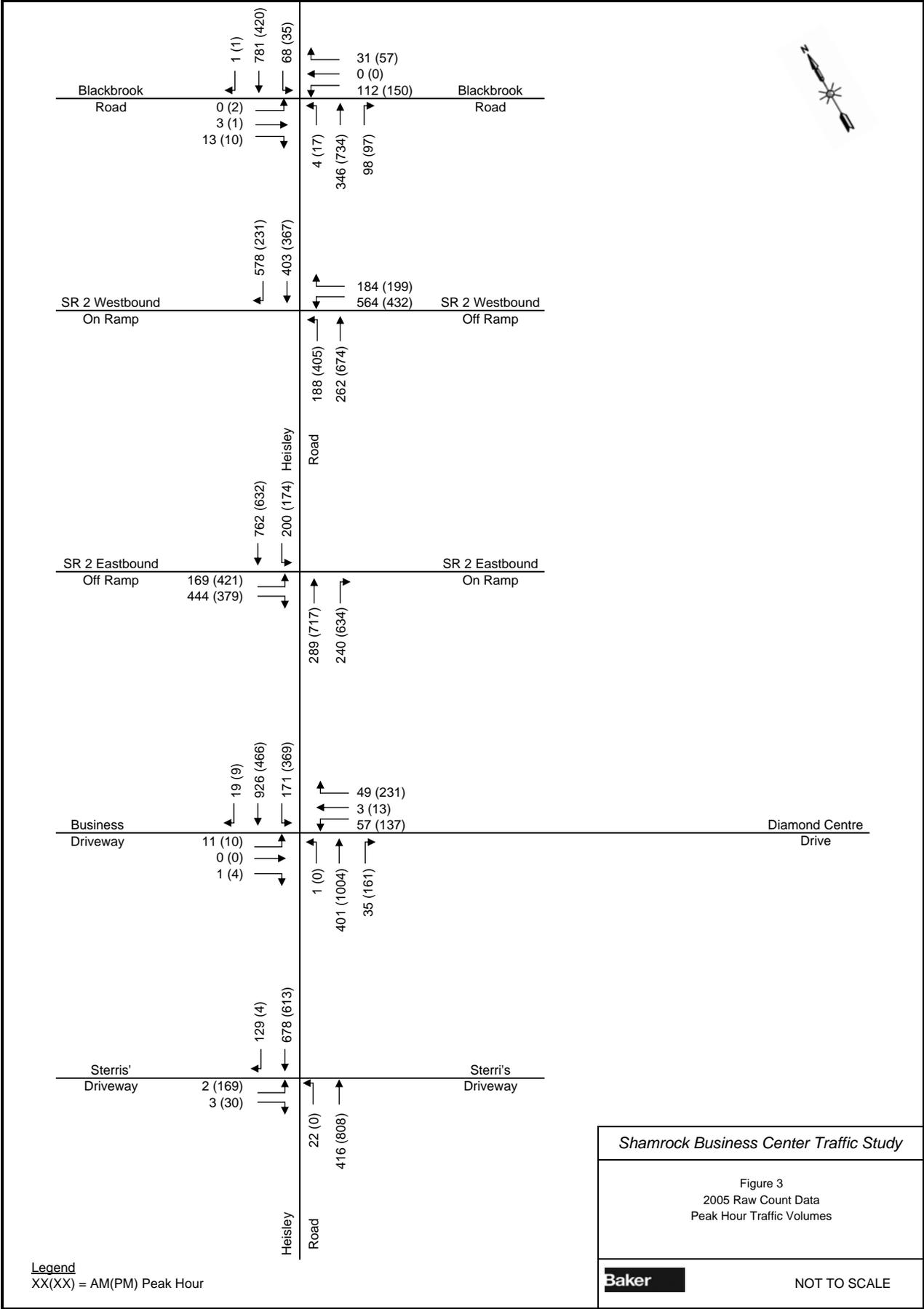
Figure 1: Project Location Map

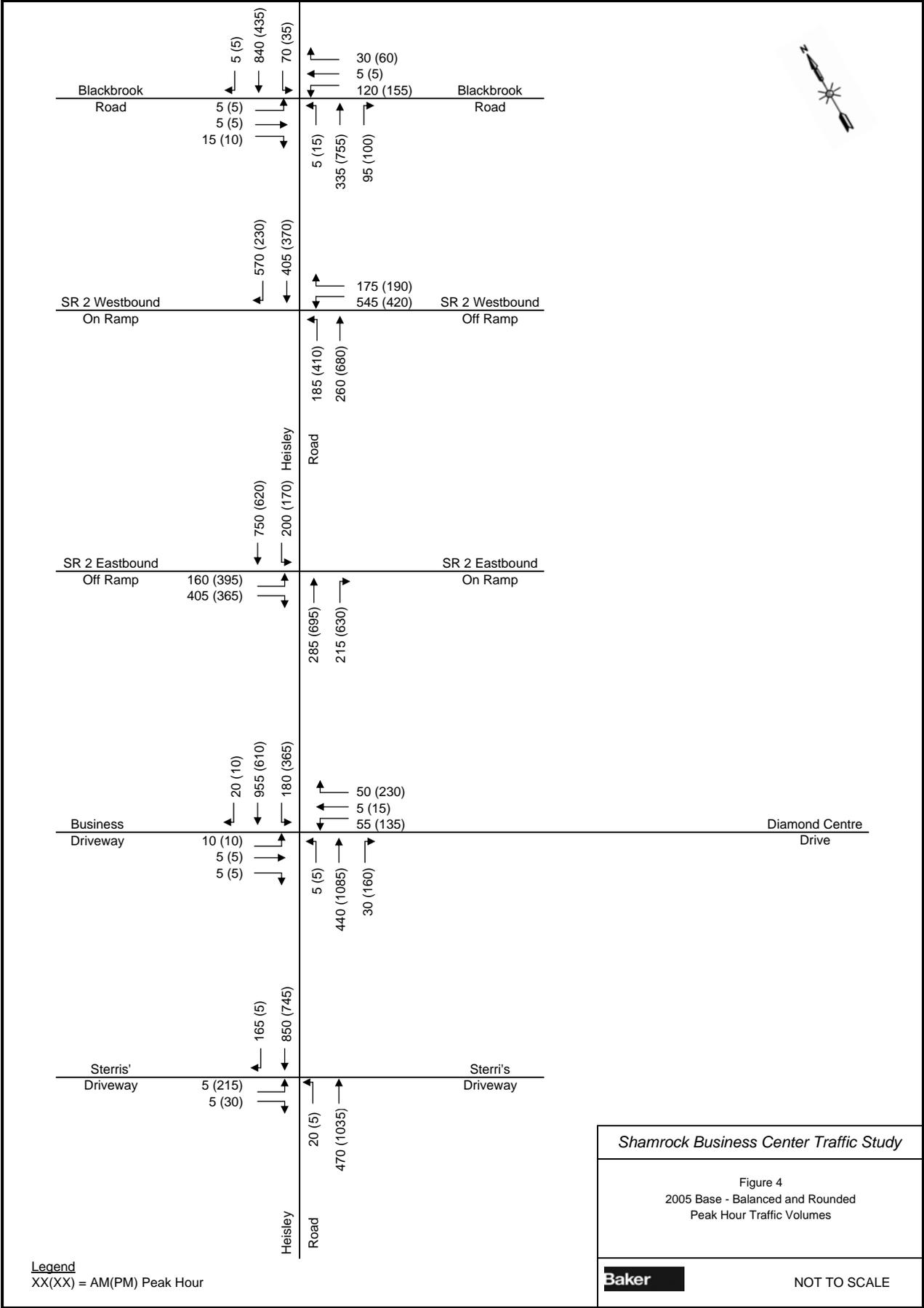


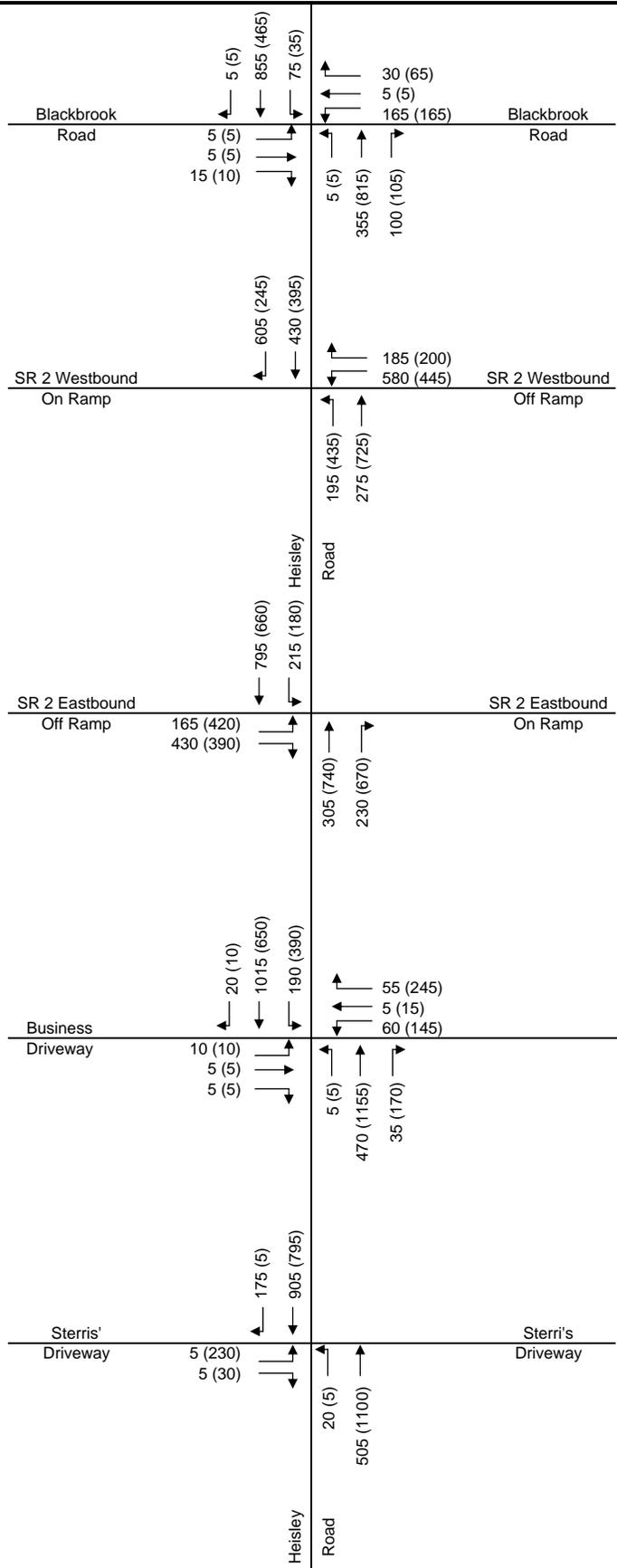
-  Project Area
-  Proposed Shamrock Business Centre
-  Existing Signalized Intersections

FIGURE 2. CONCEPTUAL SKETCH OF PROPOSED IMPROVEMENT







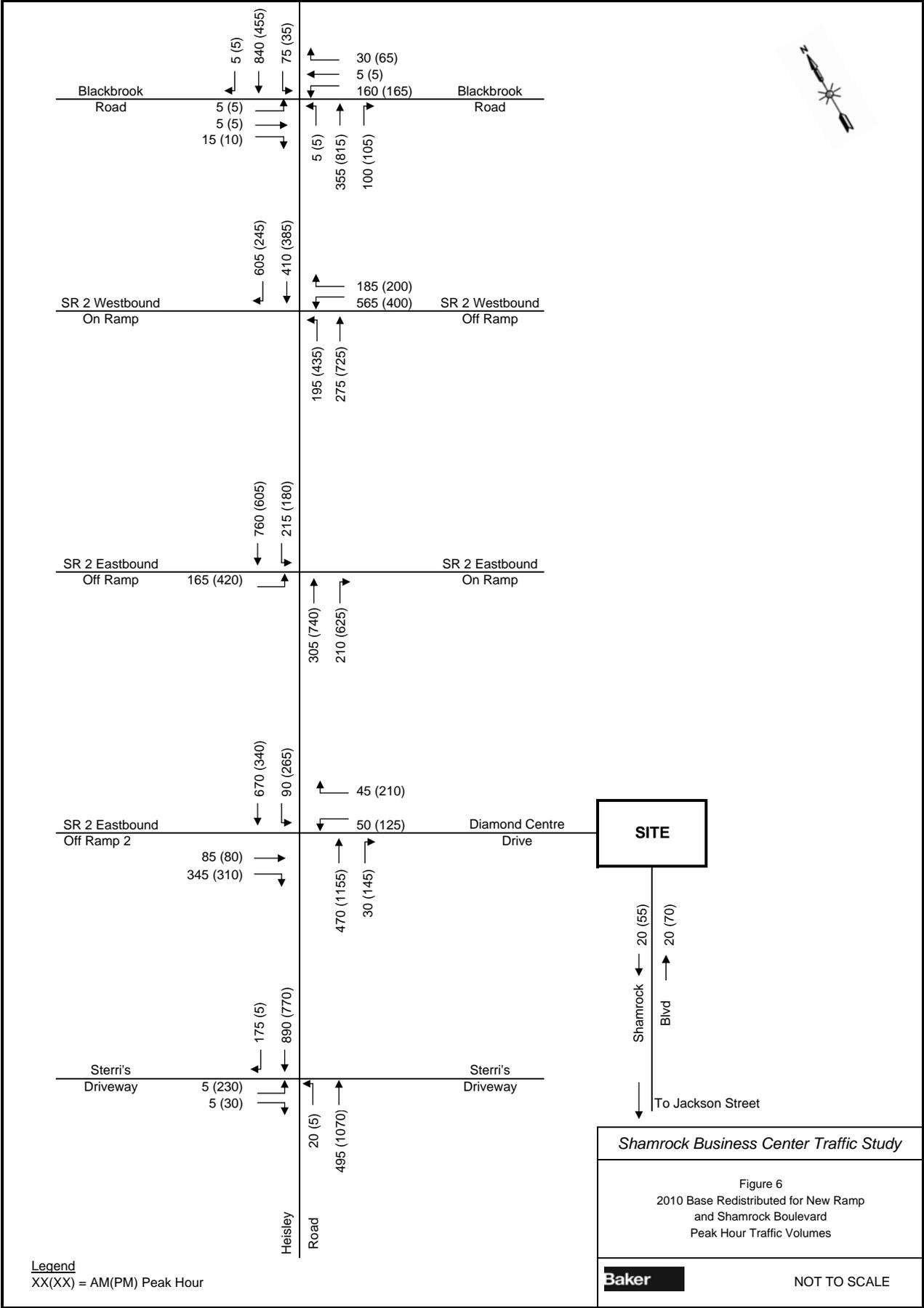


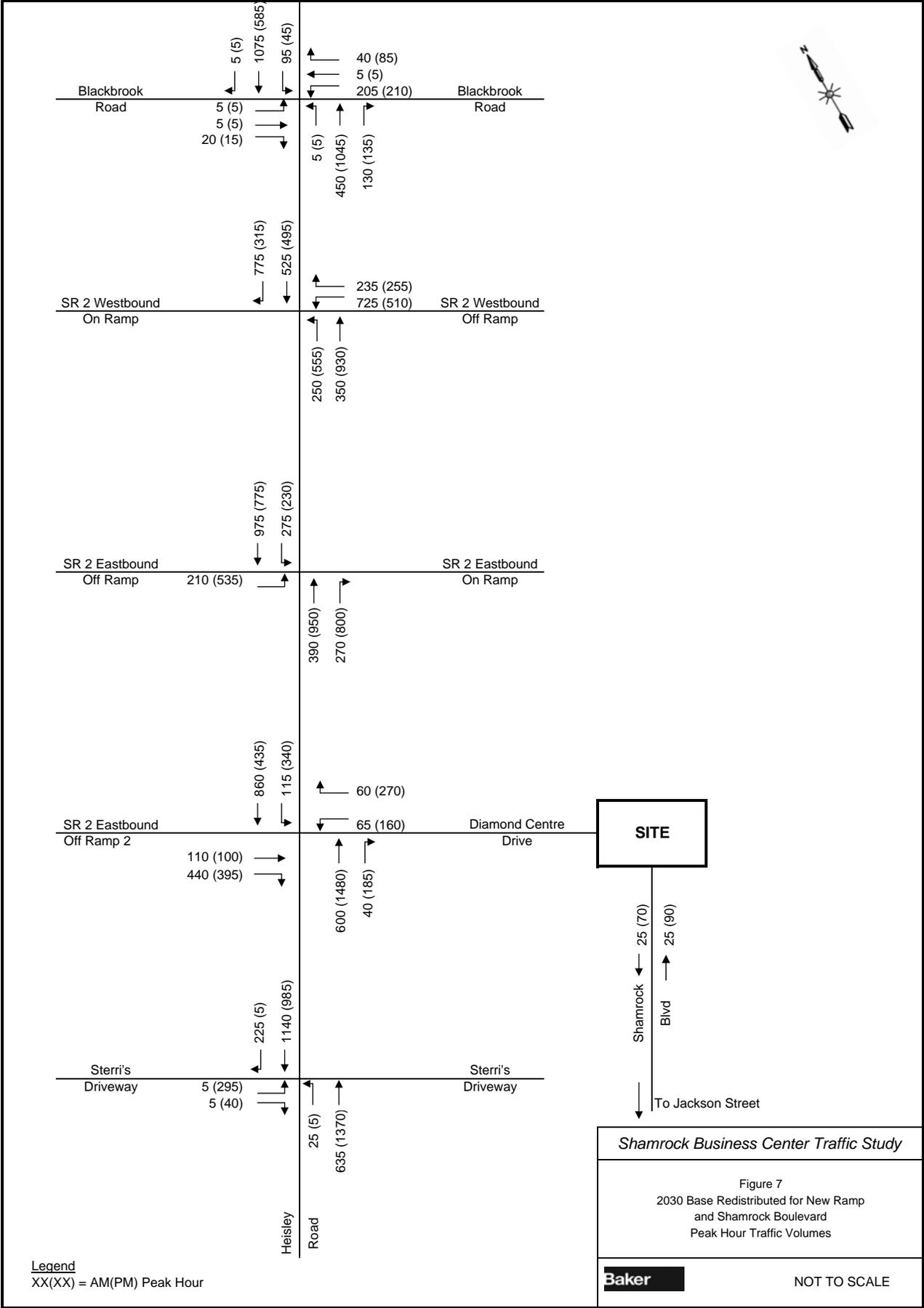
Legend
 XX(XX) = AM(PM) Peak Hour

Shamrock Business Center Traffic Study

Figure 5
 2010 Base
 Peak Hour Traffic Volumes

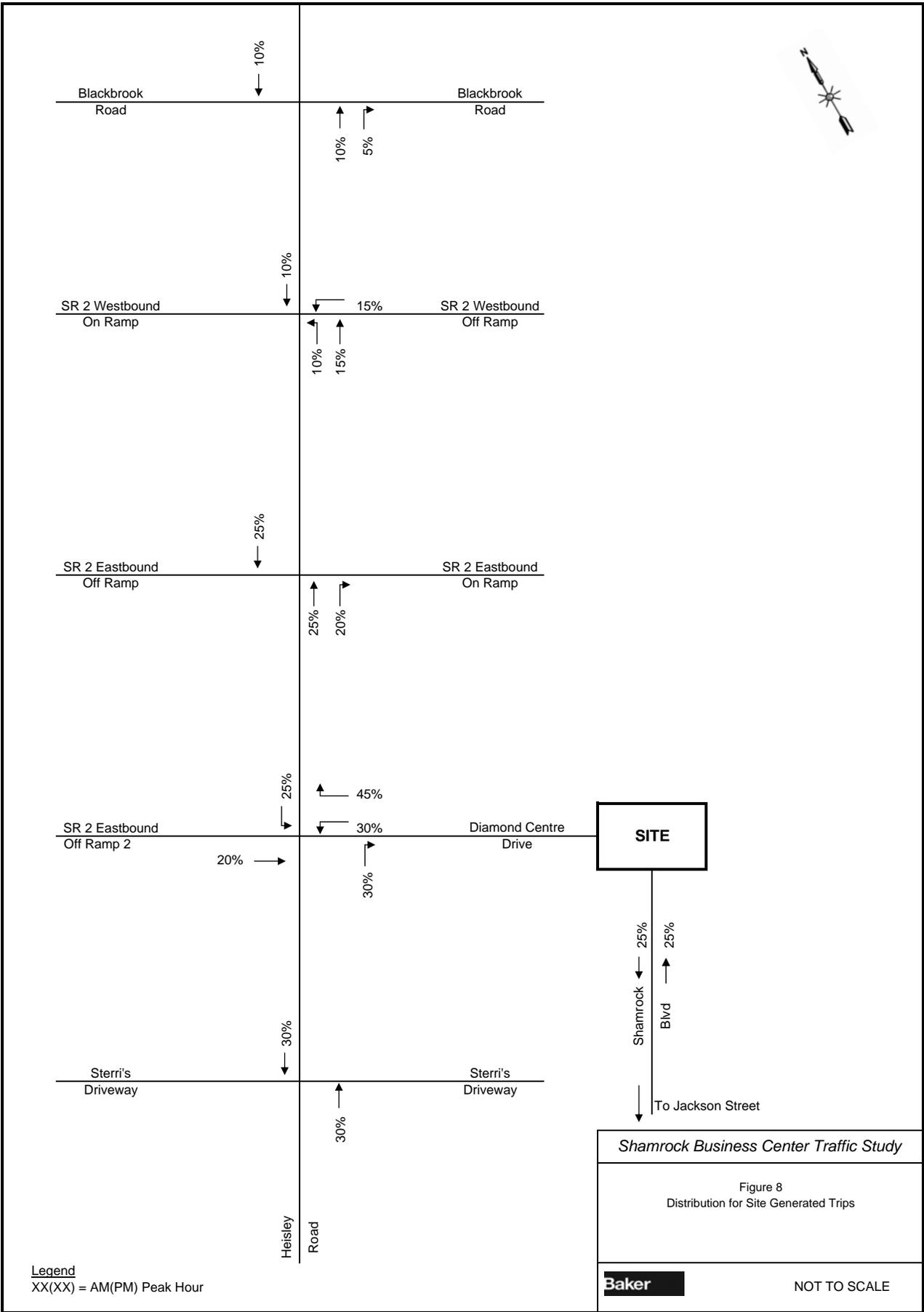
Baker NOT TO SCALE





**Table 1
Shamrock Business Center
Trip Generation**

Phase 1 (Residential)										
land use	amount (dwelling units)	ITE code	daily rate	AM rate	PM rate	AM in	AM out	PM in	PM out	Daily ADT
townhouse	175	230	5.86	0.44	0.52	13	64	61	30	1,026
apartments	300	220	6.72	0.51	0.62	31	122	121	65	2,016
Totals						44	186	182	95	3,042
assume 10% residential are internal						4	19	18	10	304
Total external						39	168	164	86	2,737
Phase 2 (Retail)										
land use	amount (1,000 SF)	ITE code	daily rate	AM rate	PM rate	AM in	AM out	PM in	PM out	Daily ADT
retail	400	820	42.9	1.03	3.75	251	161	720	780	17,160
retail	110	820	42.9	1.03	3.75	69	44	198	215	4,719
Totals						320	205	918	995	21,879
assume 10% are internal from residential						32	20	92	99	2188
Total external						288	184	826	895	19,691
assume 24% pass-by trips (PM) ITE Trip Generation Handbook (Fig. 5.5) $\ln(T)=-0.29 \ln(X) + 5.00$								230	230	
TOTAL EXTERNAL GENERATED TRIPS =(Residential External Trips + Retail External Trips - PassBy)						328	352	760	751	22,428





Blackbrook Road

SR 2 Westbound On Ramp

SR 2 Eastbound Off Ramp

SR 2 Eastbound Off Ramp 2

Sterri's Driveway

Heisley Road

Blackbrook Road

SR 2 Westbound Off Ramp

SR 2 Eastbound On Ramp

Diamond Centre Drive

Sterri's Driveway

SITE

Shamrock Blvd
↓ 15%
↑ 15%
To Jackson Street

16% →
-16% ↓
-17% ↓
17% ↓
52% →
33% →
-52% ↑
52% →

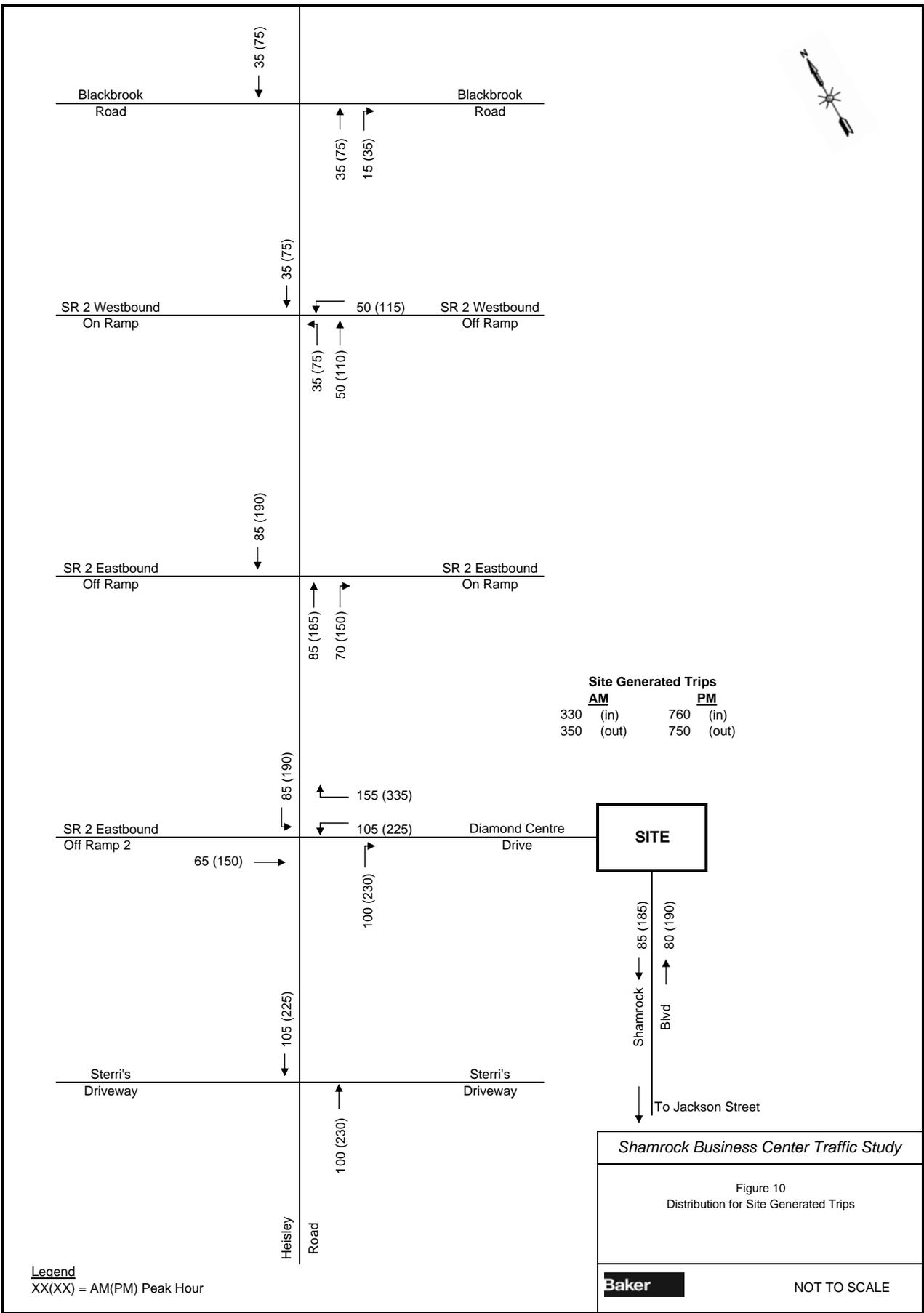
Legend
XX(XX) = AM(PM) Peak Hour

Shamrock Business Center Traffic Study

Figure 9
Distribution for Pass-By Trips

Baker

NOT TO SCALE



Legend
 XX(XX) = AM(PM) Peak Hour

Site Generated Trips

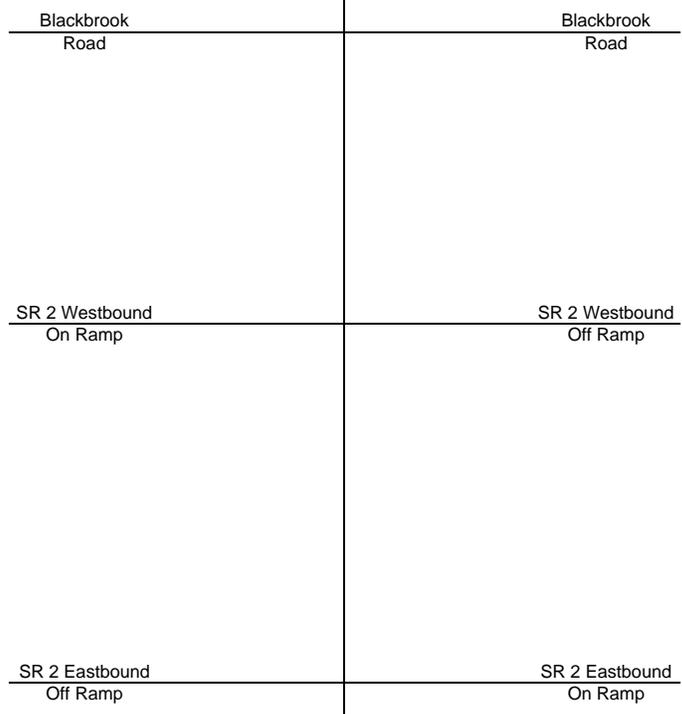
	<u>AM</u>	<u>PM</u>
(in)	330	760
(out)	350	750

Shamrock Business Center Traffic Study

Figure 10
 Distribution for Site Generated Trips

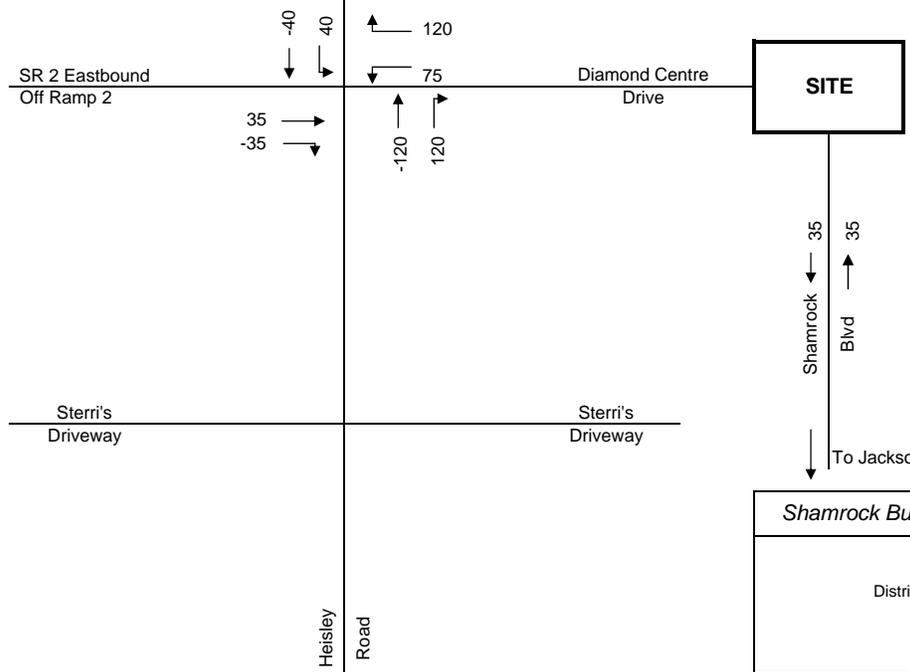
Baker

NOT TO SCALE



Pass-by Trips

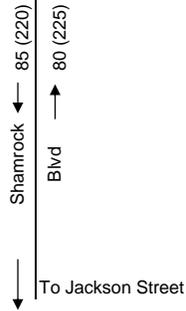
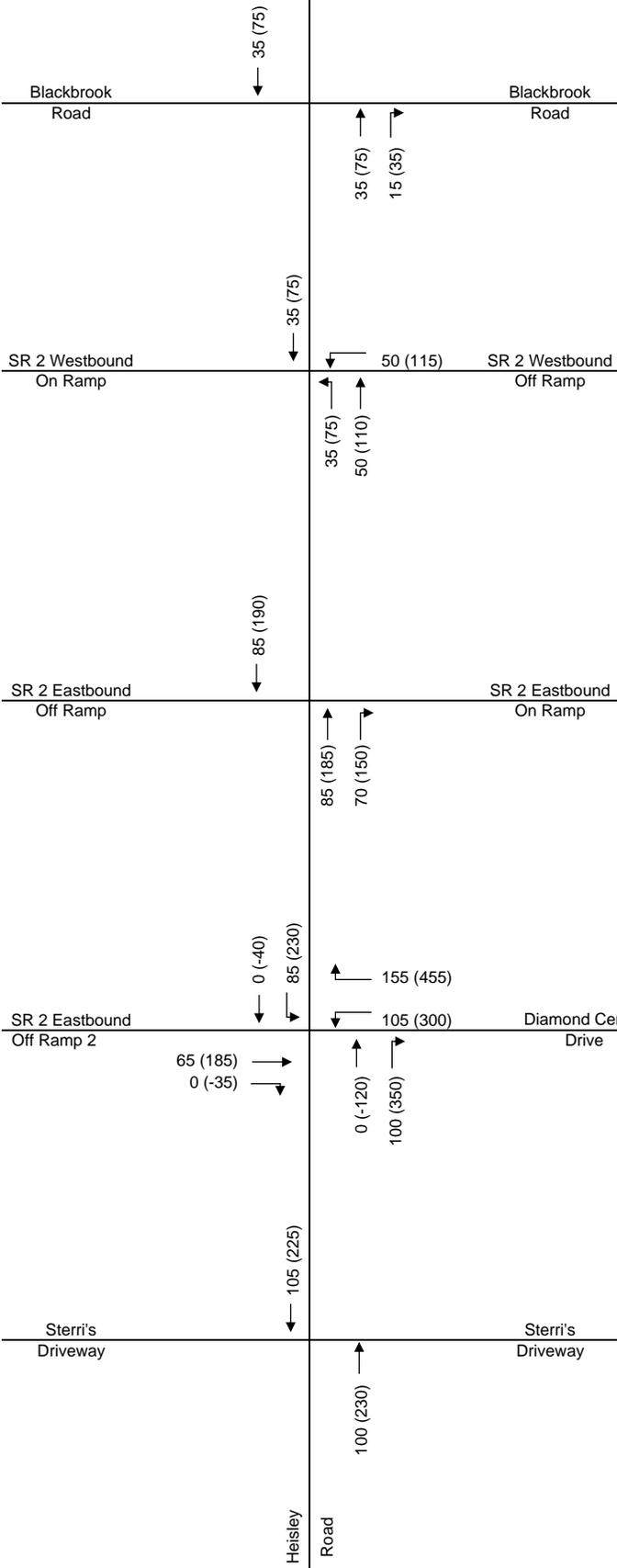
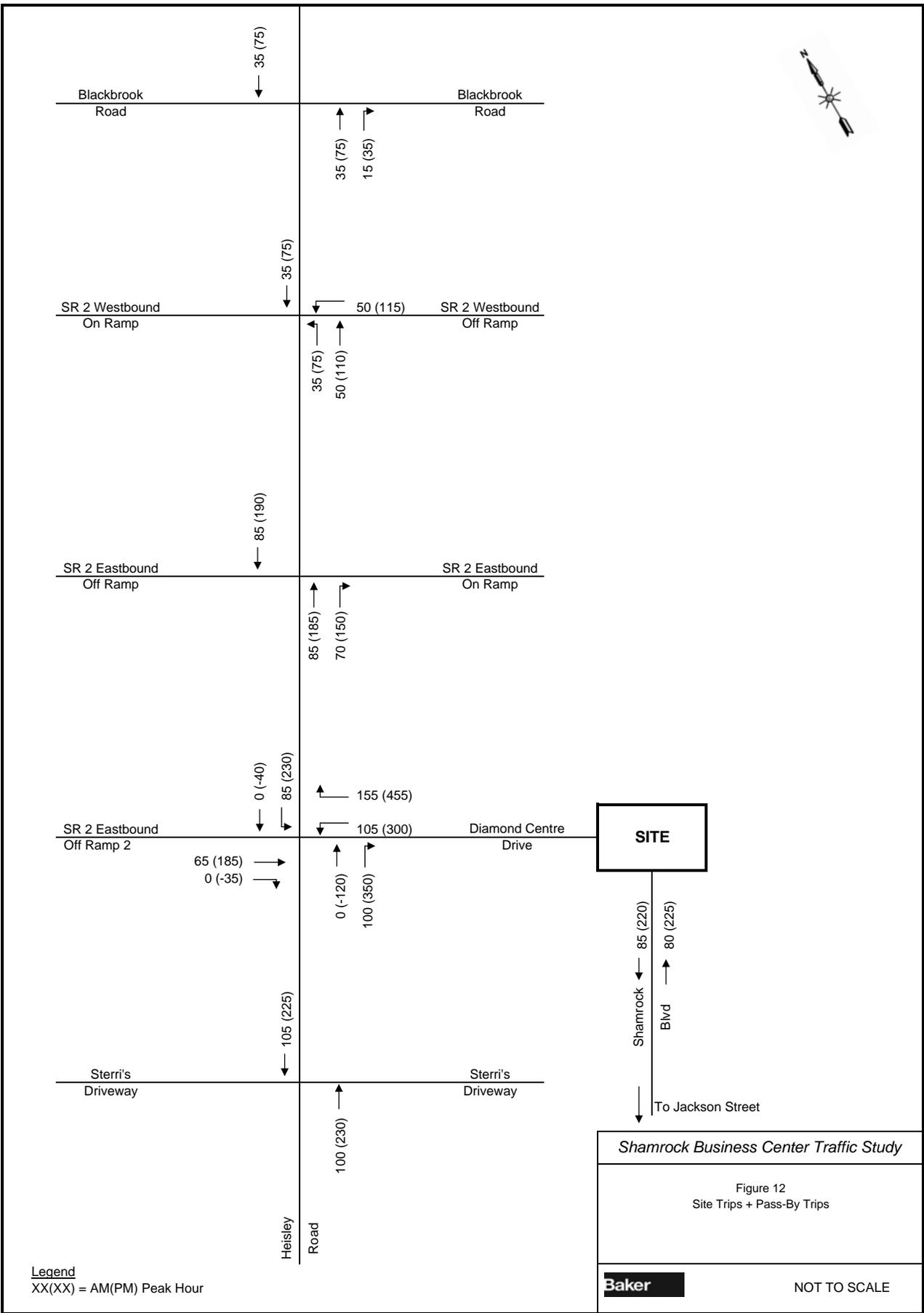
AM		PM	
0	(in)	230	(in)
0	(out)	230	(out)

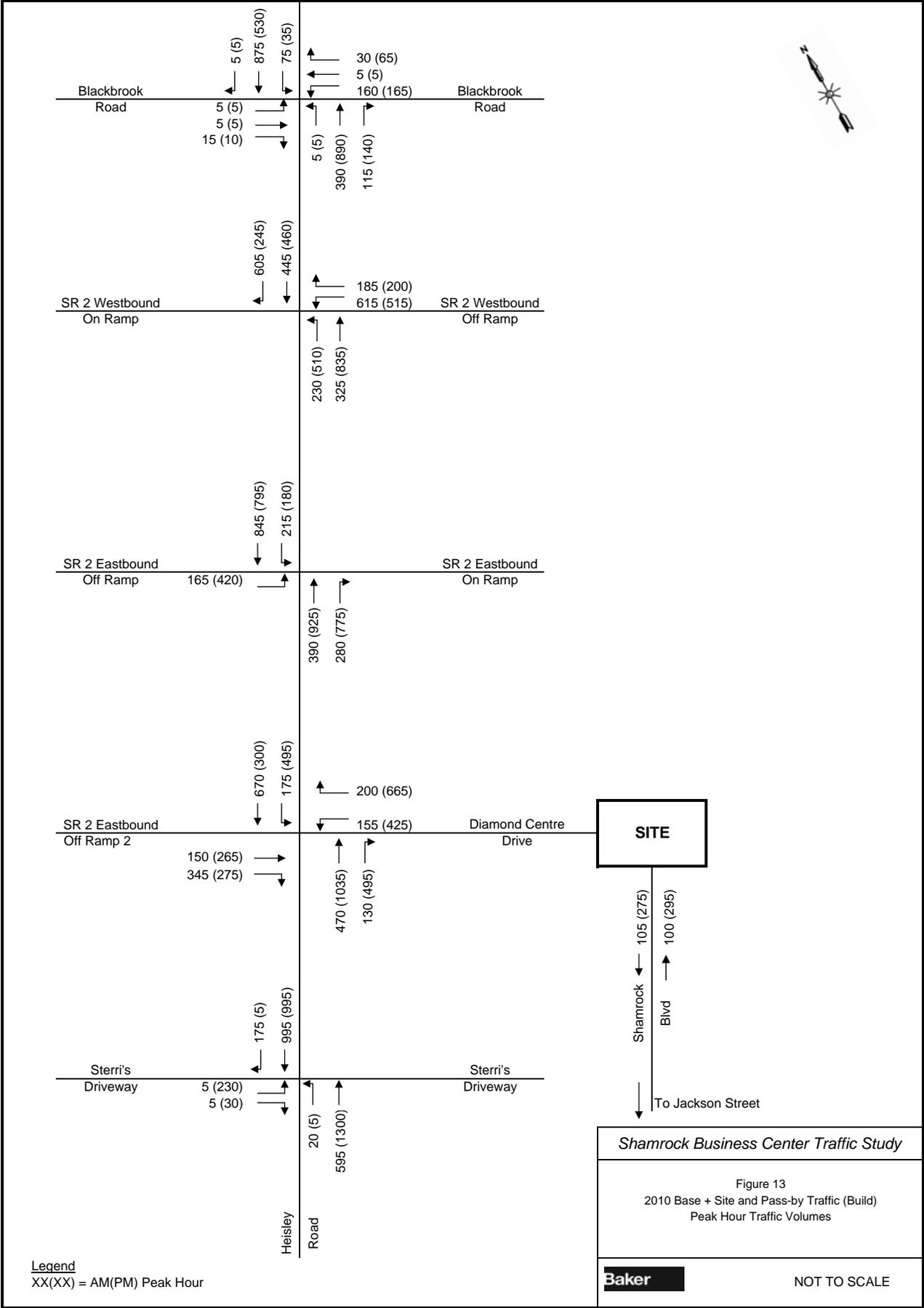


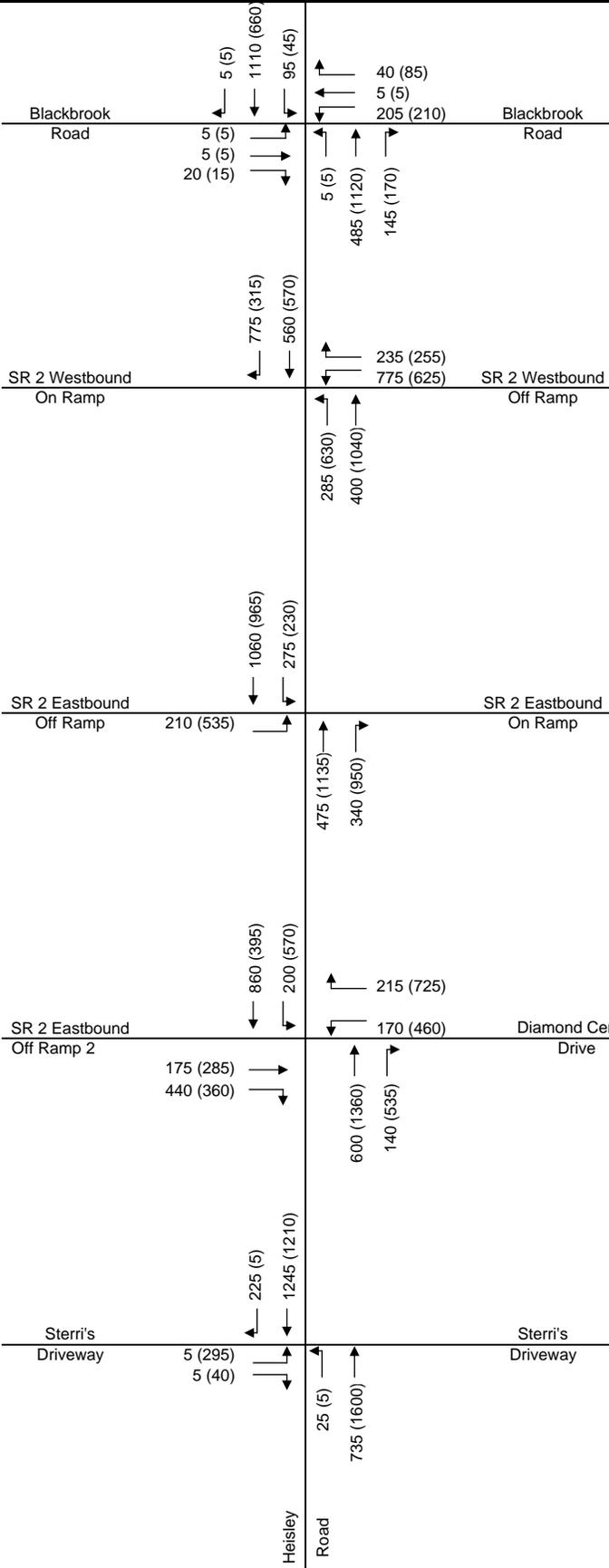
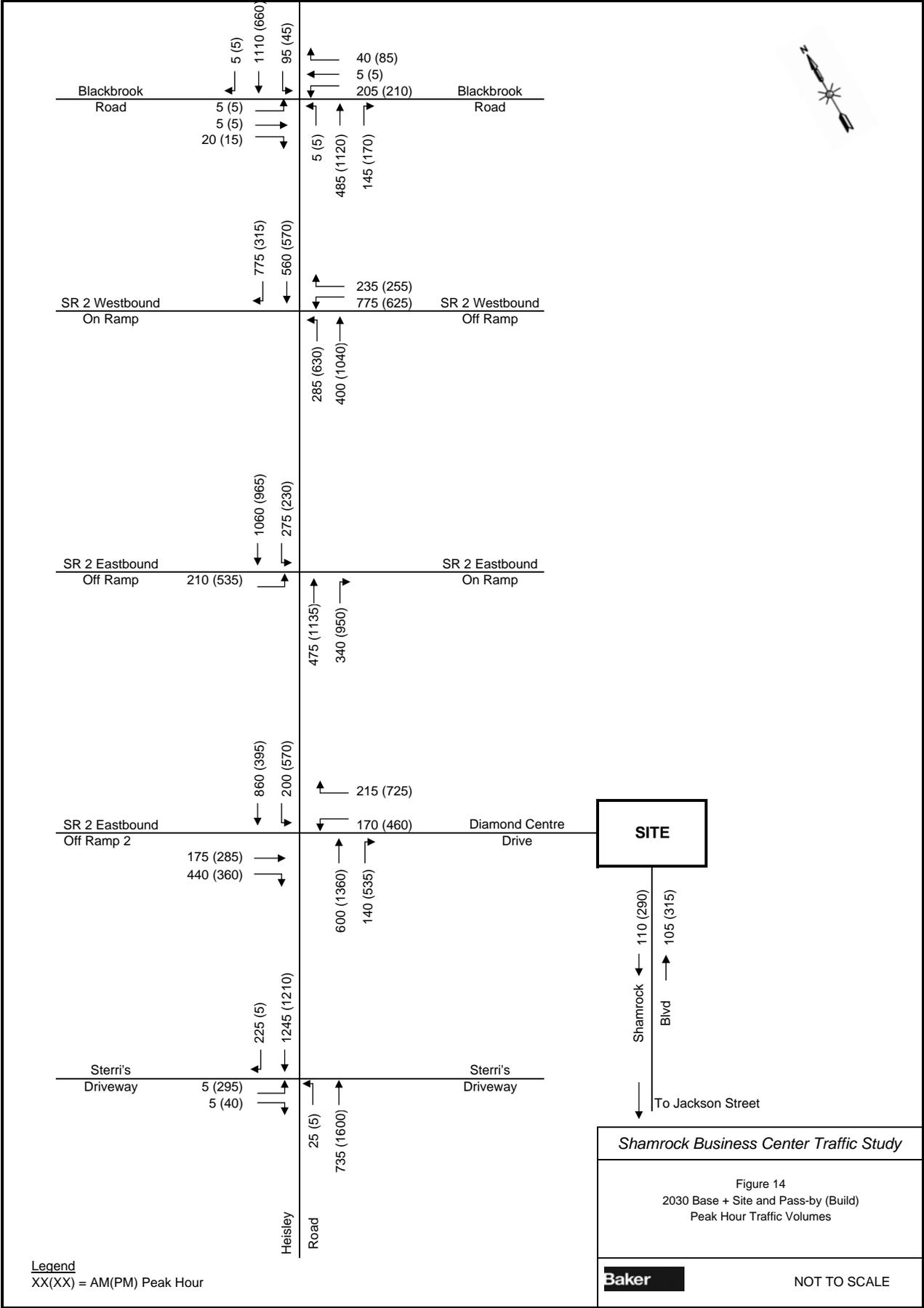
Legend
 XX(XX) = AM(PM) Peak Hour

Shamrock Business Center Traffic Study

Figure 11
 Distribution for Pass-By Trips







SITE

Shamrock Blvd
 To Jackson Street

Shamrock Business Center Traffic Study

Figure 14
 2030 Base + Site and Pass-by (Build)
 Peak Hour Traffic Volumes

Baker

NOT TO SCALE

TURNING MOVEMENT SUMMARY

Municipality: _____ File: HEISLEY BLACKBROOK.xls
 Intersection of: HEISLEY ROAD and BLACKBROOK ROAD
 Date: Feb. 9, 2005 Day: Wed. Comments: _____ Project: 34624
 Weather: _____ Recorder(s): ASK Data entry by: JTP Date entered: Feb. 11, 2005

TIME BEGINS	HEISLEY ROAD FROM NORTH						HEISLEY ROAD FROM SOUTH						TOTAL NORTH SOUTH	BLACKBROOK ROAD FROM EAST						BLACKBROOK ROAD FROM WEST						TOTAL EAST WEST	TOTAL ALL DIREC.	PEAK HOUR FACTOR				
	L	T	R	TOTAL	TRK	BUS	L	T	R	TOTAL	TRK	BUS		L	T	R	TOTAL	TRK	BUS	L	T	R	TOTAL	TRK	BUS			North	South	East	West	
	6:00	26	631	1	658	37	0	2	190	44	236	30		0	894	89	0	9	98	6	0	0	2	6	8			0	0	106	1000	0.791
6:15	24	718	1	743	33	0	4	210	57	271	28	0	1014	97	0	14	111	4	0	0	2	5	7	0	0	118	1132					
6:30	31	782	1	814	24	0	4	248	64	316	34	0	1130	99	0	14	113	3	0	0	2	6	8	0	0	121	1251					
6:45	41	807	1	849	35	0	2	267	69	338	32	0	1187	99	0	19	118	4	0	0	0	8	8	0	0	126	1313					
7:00	54	832	1	887	36	0	5	298	89	392	30	0	1279	111	0	25	136	4	0	0	2	13	15	0	0	151	1430	0.913	0.797	0.895	0.536	
7:15	68	781	1	850	44	0	4	346	98	448	34	0	1298	112	0	31	143	5	0	0	3	13	16	0	0	159	1457	0.874	0.818	0.941	0.571	
7:30	69	733	3	805	44	0	5	345	99	449	26	0	1254	109	0	39	148	10	0	0	3	15	18	0	0	166	1420					
7:45	62	646	3	711	33	0	6	347	97	450	29	0	1161	103	0	44	147	9	0	0	5	13	18	0	0	165	1326					
8:00	51	618	4	673	30	0	6	341	81	428	31	0	1101	98	1	39	138	10	0	0	5	12	17	0	0	155	1256	0.945	0.781	0.908	0.708	
3:00	29	447	3	479	25	0	4	592	111	707	30	0	1186	133	2	45	180	10	0	1	3	4	8	1	0	188	1374	0.862	0.815	0.849	0.667	
3:15	32	477	2	511	24	0	5	635	124	764	33	0	1275	115	2	43	160	8	0	2	3	6	11	1	0	171	1446					
3:30	27	473	3	503	20	0	7	670	115	792	24	0	1295	115	2	41	158	7	0	2	3	5	10	1	0	168	1463					
3:45	34	454	3	491	21	0	9	707	117	833	23	0	1324	143	1	42	186	3	0	1	1	6	8	0	0	194	1518					
4:00	32	440	2	474	18	0	11	696	111	818	16	0	1292	148	0	54	202	7	0	3	1	4	8	0	0	210	1502	0.933	0.942	0.692	0.500	
4:15	36	420	2	458	15	0	13	717	91	821	11	0	1279	168	0	50	218	9	0	2	1	3	6	0	0	224	1503					
4:30	35	420	1	456	13	0	17	734	97	848	14	0	1304	150	0	57	207	10	0	2	1	10	13	0	0	220	1524	0.898	0.918	0.709	0.464	
4:45	30	417	0	447	8	0	15	749	95	859	11	0	1306	116	0	55	171	10	0	2	1	13	16	0	0	187	1493					
5:00	37	421	0	458	6	0	15	756	93	864	15	0	1322	98	0	53	151	6	0	0	0	13	13	0	0	164	1486	0.962	0.935	0.770	0.464	
6:00																																
7:00																																
8:00																																
9:00																																
TOTALS	229	3389	11	3629	152	0	43	2873	529	3445	152	0	7074	677	3	225	905	43	0	4	13	52	69	1	0	974	8048					
ADT																																



100 WEST ERIE STREET
 PAINESVILLE, OHIO 44077
 PHONE (440) 354-9700 FAX (440) 352-8373

TURNING MOVEMENT SUMMARY

Municipality: MENTOR File: HEISLEY SR2 WB RAMPS.xls
 Intersection of: HEISLEY ROAD and SR 2 WB RAMPS
 Date: Feb. 3, 2005 Day: Thu. Comments: _____ Project: 34624
 Weather: _____ Recorder(s): DCF Data entry by: JTP Date entered: Feb. 7, 2005

TIME BEGINS	HEISLEY ROAD FROM NORTH						HEISLEY ROAD FROM SOUTH						TOTAL NORTH SOUTH	SR 2 WB OFF RAMP FROM EAST						FROM WEST						TOTAL EAST WEST	TOTAL ALL DIREC.	PEAK HOUR FACTOR				
	L	T	R	TOTAL	TRK	BUS	L	T	R	TOTAL	TRK	BUS		L	T	R	TOTAL	TRK	BUS	L	T	R	TOTAL	TRK	BUS			North	South	East	West	
6:00	0	243	471	714	24	0	115	139	0	254	23	0	968	345	0	101	446	18	0	-	-	-	-	-	-	446	1414	0.776	0.825	0.656	-	
6:15	0	267	571	838	28	0	141	167	0	308	27	0	1146	418	0	101	519	25	0	-	-	-	-	-	-	519	1665					
6:30	0	288	625	913	29	0	151	180	0	331	29	0	1244	472	0	115	587	32	0	-	-	-	-	-	-	587	1831					
6:45	0	338	642	980	31	0	170	206	0	376	32	0	1356	493	0	138	631	37	0	-	-	-	-	-	-	631	1987					
7:00	0	370	647	1017	32	0	190	226	0	416	35	0	1433	496	0	158	654	42	0	-	-	-	-	-	-	654	2087	0.921	0.897	0.847	-	
7:15	0	403	578	981	43	0	188	262	0	450	40	0	1431	564	0	184	748	43	0	-	-	-	-	-	-	748	2179	0.889	0.900	0.827	-	
7:30	0	430	497	927	53	0	175	292	0	467	42	0	1394	545	0	183	728	39	0	-	-	-	-	-	-	728	2122	0.840	0.934	0.805	-	
7:45	0	413	436	849	61	0	175	310	0	485	46	0	1334	517	0	180	697	35	0	-	-	-	-	-	-	697	2031					
8:00	0	406	389	795	71	0	173	309	0	482	47	0	1277	459	0	178	637	29	0	-	-	-	-	-	-	637	1914	0.933	0.949	0.705	-	
3:00	0	406	268	674	57	0	343	544	0	887	40	0	1561	331	0	187	518	40	0	-	-	-	-	-	-	518	2079	0.830	0.873	0.887	-	
3:15	0	400	263	663	54	0	339	572	0	911	38	0	1574	331	0	189	520	36	0	-	-	-	-	-	-	520	2094					
3:30	0	428	244	672	52	0	349	603	0	952	36	0	1624	320	0	182	502	31	0	-	-	-	-	-	-	502	2126					
3:45	0	452	257	709	52	0	335	609	0	944	32	0	1653	330	0	198	528	30	0	-	-	-	-	-	-	528	2181					
4:00	0	431	249	680	46	0	313	621	0	934	28	0	1614	353	0	205	558	28	0	-	-	-	-	-	-	558	2172	0.859	0.945	0.793	-	
4:15	0	434	250	684	41	0	356	618	0	974	24	0	1658	371	0	194	565	26	0	-	-	-	-	-	-	565	2223					
4:30	0	419	248	667	35	0	400	634	0	1034	20	0	1701	400	0	206	606	26	0	-	-	-	-	-	-	606	2307	0.842	0.842	0.861	-	
4:45	0	367	231	598	26	0	405	674	0	1079	17	0	1677	432	0	199	631	24	0	-	-	-	-	-	-	631	2308	0.859	0.879	0.896	-	
5:00	0	360	209	569	20	0	453	689	0	1142	14	0	1711	400	0	187	587	19	0	-	-	-	-	-	-	587	2298	0.936	0.930	0.868	-	
6:00																																
7:00																																
8:00																																
9:00																																
TOTALS	0	2216	2233	4449	250	0	1587	2528	0	4115	187	0	8564	2384	0	1016	3400	176	0	0	0	0	0	0	0	3400	11964					
ADT					6%						5%							5%														



100 WEST ERIE STREET
 PAINESVILLE, OHIO 44077
 PHONE (440) 354-9700 FAX (440) 352-8373

TURNING MOVEMENT SUMMARY

Municipality: MENTOR **File:** HEISLEY SR2 EB RAMPS.xls
Intersection of: HEISLEY ROAD and SR 2 EB RAMPS
Date: Feb. 3, 2005 **Day:** Thu. **Comments:** **Project:** 34624
Weather: Recorder(s): LHL **Data entry by:** JTP **Date entered:** Feb. 7, 2005

TIME BEGINS	HEISLEY ROAD FROM NORTH						HEISLEY ROAD FROM SOUTH						TOTAL NORTH SOUTH	FROM EAST						SR 2 EB OFF RAMP FROM WEST						TOTAL EAST WEST	TOTAL ALL DIREC.	PEAK HOUR FACTOR			
	L	T	R	TOTAL	TRK	BUS	L	T	R	TOTAL	TRK	BUS		L	T	R	TOTAL	TRK	BUS	L	T	R	TOTAL	TRK	BUS			North	South	East	West
	6:00	118	526	0	644	18	0	0	197	156	353	16		0	997	-	-	-	-	-	-	78	0	198	276			20	0	276	1273
6:15	125	600	0	725	19	0	0	222	167	389	16	0	1114	-	-	-	-	-	-	91	0	245	336	21	0	336	1450				
6:30	152	620	0	772	20	0	0	243	176	419	17	0	1191	-	-	-	-	-	-	103	0	266	369	21	0	369	1560				
6:45	171	644	0	815	20	0	0	265	181	446	18	0	1261	-	-	-	-	-	-	116	0	298	414	21	0	414	1675				
7:00	189	686	0	875	20	0	0	268	207	475	18	0	1350	-	-	-	-	-	-	136	0	366	502	22	0	502	1852	0.776	0.900	-	0.628
7:15	209	756	0	965	26	0	0	287	239	526	21	0	1491	-	-	-	-	-	-	156	0	415	571	28	0	571	2062				
7:30	200	762	0	962	29	0	0	289	240	529	21	1	1491	-	-	-	-	-	-	169	0	444	613	32	0	613	2104	0.853	0.900	-	0.766
7:45	188	725	0	913	31	0	0	290	245	535	22	1	1448	-	-	-	-	-	-	192	0	439	631	35	0	631	2079				
8:00	167	645	0	812	33	0	0	302	228	530	22	1	1342	-	-	-	-	-	-	172	0	370	542	33	0	542	1884	0.787	0.901	-	0.816
3:00	160	531	0	691	24	0	0	528	487	1015	33	0	1706	-	-	-	-	-	-	337	0	366	703	15	0	703	2409	0.847	0.875	-	0.862
3:15	178	519	0	697	22	0	0	545	517	1062	33	0	1759	-	-	-	-	-	-	389	0	352	741	17	0	741	2500				
3:30	185	520	0	705	19	0	0	554	531	1085	32	0	1790	-	-	-	-	-	-	398	0	344	742	18	0	742	2532				
3:45	177	549	0	726	17	0	0	541	555	1096	31	0	1822	-	-	-	-	-	-	410	0	351	761	20	0	761	2583				
4:00	180	547	0	727	14	0	0	559	574	1133	30	0	1860	-	-	-	-	-	-	409	0	334	743	21	0	743	2603	0.887	0.941	-	0.929
4:15	180	601	0	781	14	0	0	614	586	1200	30	0	1981	-	-	-	-	-	-	389	0	335	724	19	0	724	2705				
4:30	176	628	0	804	14	0	0	673	644	1317	32	0	2121	-	-	-	-	-	-	407	0	342	749	17	0	749	2870	0.935	0.860	-	0.936
4:45	171	639	0	810	12	0	0	709	636	1345	32	0	2155	-	-	-	-	-	-	417	0	347	764	15	0	764	2919				
5:00	174	632	0	806	11	0	0	717	634	1351	31	0	2157	-	-	-	-	-	-	421	0	379	800	14	0	800	2957	0.937	0.882	-	0.901
6:00																															
7:00																															
8:00																															
9:00																															
TOTALS	988	3567	0	4555	120	0	0	2571	2286	4857	150	1	9412	0	0	0	0	0	0	1553	0	2013	3566	125	0	3566	12978				
ADT						3%						3%											4%								



100 WEST ERIE STREET
 PAINESVILLE, OHIO 44077
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TURNING MOVEMENT SUMMARY

Municipality: MENTOR **File:** HEISLEY DIAMOND CENTRE.xls
Intersection of: HEISLEY ROAD and DIAMOND CENTRE DRIVE
Date: Feb. 3, 2005 **Day:** Thu. **Comments:** **Project:** 34624
Weather: Recorder(s): TPM **Data entry by:** JTP **Date entered:** Feb. 7, 2005

TIME BEGINS	HEISLEY ROAD FROM NORTH						HEISLEY ROAD FROM SOUTH						TOTAL NORTH SOUTH	DIAMOND CENTRE DRIVE FROM EAST						AVERY DRIVE FROM WEST						TOTAL EAST WEST	TOTAL ALL DIREC.	PEAK HOUR FACTOR			
	L	T	R	TOTAL	TRK	BUS	L	T	R	TOTAL	TRK	BUS		L	T	R	TOTAL	TRK	BUS	L	T	R	TOTAL	TRK	BUS			North	South	East	West
6:00	88	614	4	706	14	0	1	242	14	257	11	0	963	35	1	43	79	5	0	12	1	2	15	1	0	94	1057	0.781	0.824	0.790	0.375
6:15	104	677	4	785	20	0	1	294	22	317	13	0	1102	38	1	42	81	4	0	0	0	0	0	0	0	81	1183				
6:30	120	720	7	847	25	0	1	331	26	358	14	0	1205	45	1	47	93	5	0	1	0	1	2	0	0	95	1300				
6:45	133	756	10	899	30	0	0	360	36	396	15	0	1295	52	2	48	102	5	0	6	0	1	7	3	0	109	1404				
7:00	133	895	16	1044	39	0	1	394	35	430	16	0	1474	55	3	50	108	5	0	5	0	0	5	3	0	113	1587	0.729	0.960	0.818	0.250
7:15	147	933	22	1102	42	0	1	400	32	433	18	0	1535	58	4	56	118	5	0	0	0	0	0	0	0	118	1653				
7:30	171	926	19	1116	45	0	1	401	35	437	21	0	1553	57	3	49	109	3	0	11	0	1	12	4	0	121	1674	0.779	0.975	0.879	0.429
7:45	174	857	16	1047	45	0	3	382	45	430	23	0	1477	56	2	63	121	2	0	7	0	2	9	1	0	130	1607				
8:00	178	696	9	883	41	0	2	353	52	407	25	0	1290	57	1	70	128	0	0	11	0	5	16	2	0	144	1434	0.887	0.942	0.800	0.571
3:00	268	525	2	795	25	0	0	663	151	814	15	0	1609	151	1	226	378	6	0	9	4	0	13	3	0	391	2000	0.933	0.831	0.926	0.813
3:15	266	505	0	771	24	0	0	709	157	866	14	0	1637	141	1	238	380	5	0	9	3	1	13	3	0	393	2030				
3:30	266	481	0	747	21	0	0	726	132	858	12	0	1605	125	1	250	376	4	0	8	3	2	13	2	0	389	1994				
3:45	299	480	0	779	20	0	0	781	130	911	12	0	1690	127	9	232	368	5	0	7	3	2	12	1	0	380	2070				
4:00	314	452	1	767	18	0	0	868	147	1015	13	0	1782	118	8	248	374	6	0	8	0	3	11	0	0	385	2167	0.783	0.852	0.899	0.917
4:15	367	465	3	835	17	0	0	918	147	1065	11	0	1900	131	12	227	370	8	0	9	0	3	12	0	0	382	2282				
4:30	369	466	9	844	16	0	0	1004	161	1165	10	0	2009	137	13	231	381	10	0	10	0	4	14	0	0	395	2404	0.861	0.933	0.934	0.700
4:45	386	455	14	855	13	0	3	952	156	1111	7	0	1966	133	5	248	386	11	0	9	0	4	13	0	0	399	2365				
5:00	393	453	13	859	11	0	3	910	141	1054	4	0	1913	130	5	253	388	12	0	11	0	5	16	0	0	404	2317	0.839	0.845	0.951	0.667
6:00																															
7:00																															
8:00																															
9:00																															
TOTALS	1374	3635	45	5054	148	0	7	3430	540	3977	84	0	9031	546	19	890	1455	34	0	56	5	15	76	9	0	1531	10562				
ADT						3%						2%													12%						



100 WEST ERIE STREET
 PAINESVILLE, OHIO 44077
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TURNING MOVEMENT SUMMARY

Municipality: _____ File: _____
 Intersection of: HEISLEY ROAD and STERRIS DRIVE
 Date: Feb. 9, 2005 Day: ##### Comments: _____ Project: _____
 Weather: _____ Recorder(s): _____ Data entry by: _____ Date entered: _____

TIME BEGINS	HEISLEY ROAD FROM NORTH						HEISLEY ROAD FROM SOUTH						TOTAL NORTH SOUTH	FROM EAST						STERRIS DRIVE FROM WEST						TOTAL EAST WEST	TOTAL ALL DIREC.	PEAK HOUR FACTOR			
	L	T	R	TOTAL	TRK	BUS	L	T	R	TOTAL	TRK	BUS		L	T	R	TOTAL	TRK	BUS	L	T	R	TOTAL	TRK	BUS			North	South	East	West
6:00	0	537	14	551	11	0	3	215	0	218	4	10	769	0	0	0	0	0	0	1	0	0	1	0	0	1	770	0.714	0.699	#####	0.250
6:15	0	591	21	612	11	0	6	263	0	269	3	10	881	0	0	0	0	0	0	2	0	0	2	0	0	2	883				
6:30	0	594	35	629	8	1	10	318	0	328	6	7	957	0	0	0	0	0	0	3	0	0	3	0	0	3	960				
6:45	0	603	62	665	7	2	11	369	0	380	10	5	1045	0	0	0	0	0	0	2	0	0	2	0	0	2	1047				
7:00	0	613	85	698	6	3	20	412	0	432	13	5	1130	0	0	0	0	0	0	2	0	2	4	0	0	4	1134	0.772	0.831	#####	0.500
7:15	0	673	122	795	10	4	22	427	0	449	20	5	1244	0	0	0	0	0	0	2	0	3	5	0	0	5	1249				
7:30	0	678	129	807	19	4	22	416	0	438	20	6	1245	0	0	0	0	0	0	2	0	3	5	0	0	5	1250	0.893	0.842	-	0.625
7:45	0	652	114	766	21	3	22	402	0	424	20	5	1190	0	0	0	0	0	0	2	0	3	5	0	0	5	1195				
8:00	0	613	105	718	27	8	16	365	0	381	24	5	1099	0	0	0	0	0	0	2	0	1	3	0	0	3	1102	0.794	0.850	#####	0.375
3:00	0	535	2	537	13	11	5	708	0	713	18	2	1250	0	0	0	0	0	0	16	0	10	26	0	0	26	1276	0.889	0.765	#####	0.722
3:15	0	546	2	548	11	13	5	764	0	769	16	1	1317	0	0	0	0	0	0	28	0	9	37	0	0	37	1354				
3:30	0	568	3	571	14	14	6	800	0	806	18	1	1377	0	0	0	0	0	0	32	0	11	43	0	0	43	1420				
3:45	0	579	4	583	14	10	6	787	0	793	17	1	1376	0	0	0	0	0	0	41	0	8	49	0	0	49	1425				
4:00	0	598	5	603	11	4	4	828	0	832	18	0	1435	0	0	0	0	0	0	49	0	10	59	0	0	59	1494	0.882	0.885	#####	0.819
4:15	0	602	6	608	11	2	3	803	0	806	13	0	1414	0	0	0	0	0	0	106	0	27	133	0	0	133	1547				
4:30	0	603	6	609	7	0	1	833	0	834	13	1	1443	0	0	0	0	0	0	145	0	27	172	0	0	172	1615				
4:45	0	613	4	617	7	0	0	808	0	808	11	1	1425	0	0	0	0	0	0	169	0	30	199	0	0	199	1624	0.902	0.967	-	0.541
5:00	0	580	3	583	6	0	0	762	0	762	7	3	1345	0	0	0	0	0	0	178	0	29	207	0	0	207	1552	0.905	0.911	#####	0.563
6:00																															
7:00																															
8:00																															
9:00																															
TOTALS	0	3476	214	3690	74	26	48	3290	0	3338	84	25	7028	0	0	0	0	0	0	248	0	52	300	0	0	300	7328				
ADT						3%																									



BURGESS & NIPLE

100 WEST ERIE STREET
 PAINESVILLE, OHIO 44077
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OHIO DEPARTMENT OF TRANSPORTATION

CENTRAL OFFICE, 1980 W. Broad St., P.O. BOX 899, COLUMBUS, OHIO 43216-0899

March 31, 2008

Lori J. Duguid, P.E., PTOE
Transportation Engineer
Michael Baker Jr., Inc.
Airside Business Park
100 Airside Drive
Moon Township, PA 15108

RE: SR-2/Heisley Road Interchange Modification

Dear Ms. Duguid:

In reply to a request dated March 19, 2008, the Office of Technical Services (OTS) has reviewed the subject study. The following comments apply:

1. The growth rate is acceptable and appropriately applied.
2. Trip Generation and Distribution are correct.
3. The 24% pass-by rate for the retail trips is appropriate.
4. 2010 and 2030 - Base + Site and Pass-by Traffic (Build) Peak Hour Traffic Volumes, as shown in Figures 13 and 14, are considered certified for use in this study.

For your use, I have included a plate that shows 2010/2030 AM DHV and PM DHV for SR-2 and the adjacent ramps.

If you have any questions, please contact me at (614) 752-5734.

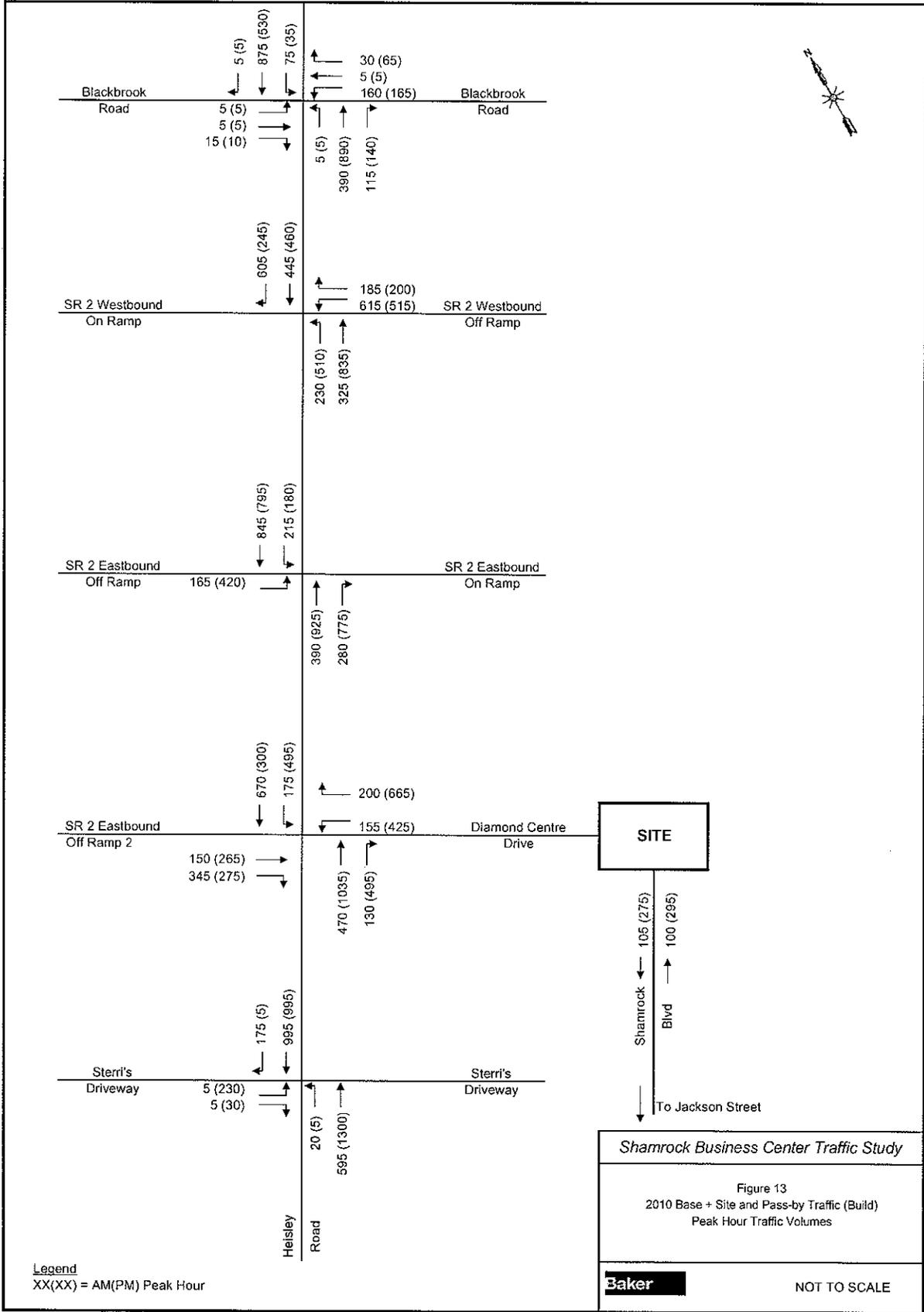
Respectfully,

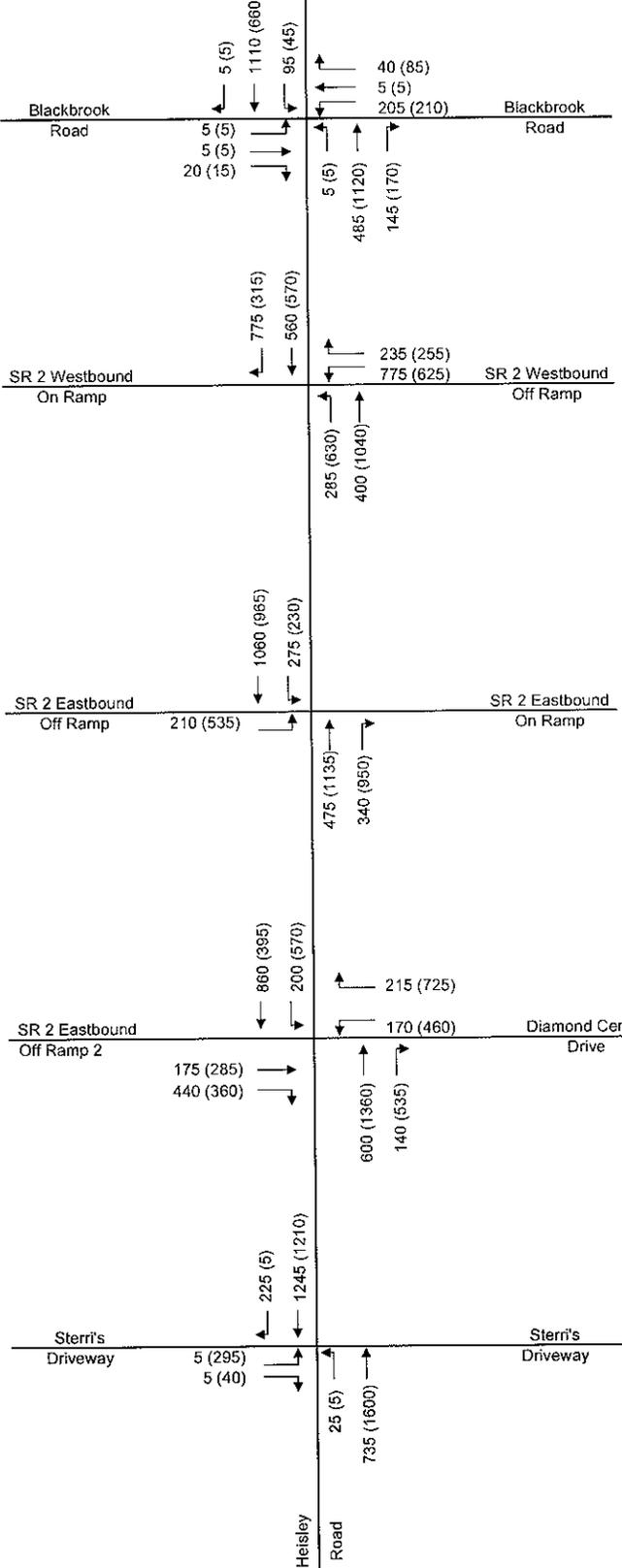
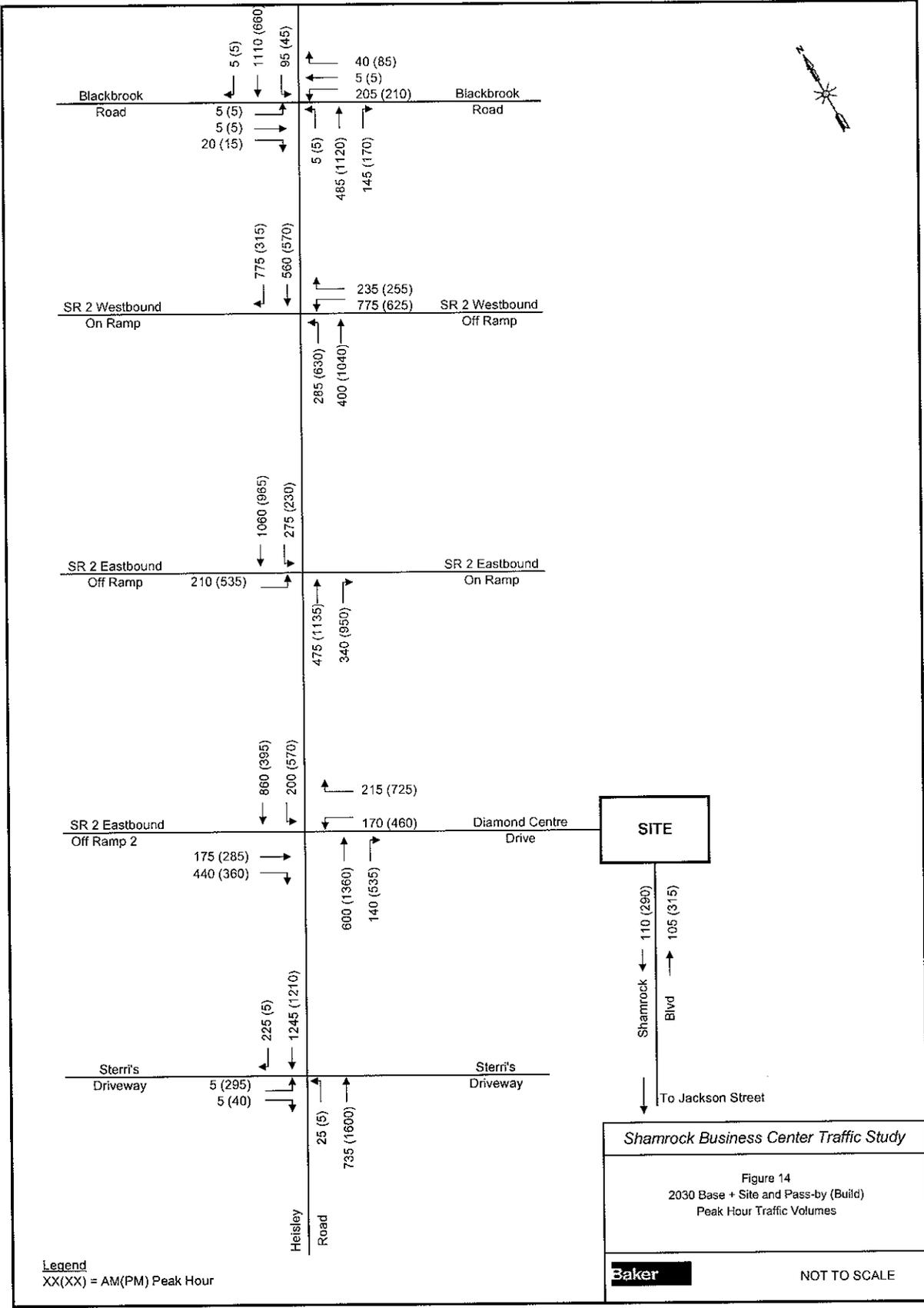
A handwritten signature in cursive script that reads "Peggy Siddle".

Peggy Siddle
Transportation Planner
Office of Technical Services

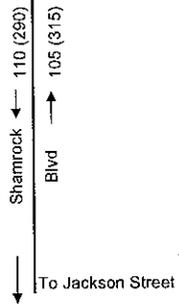
enc

c: J. McQuirt, OTS – L. Oesterling, OTS – File



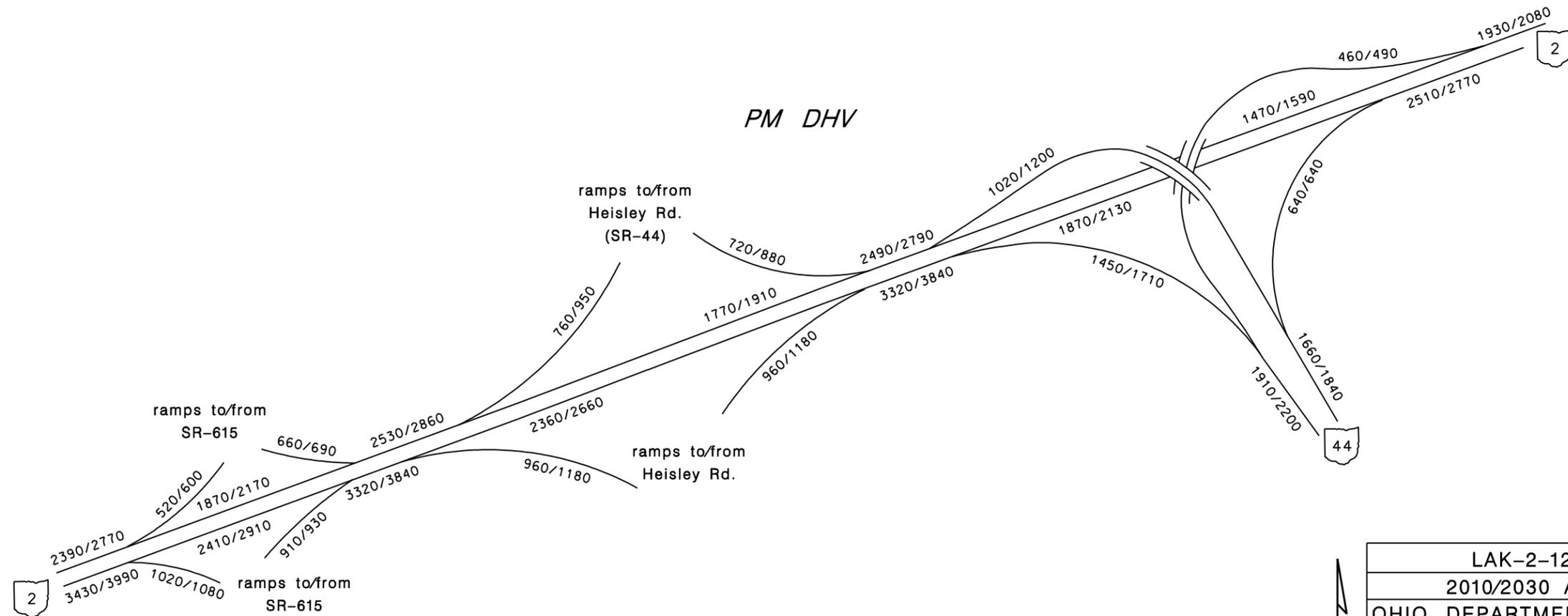
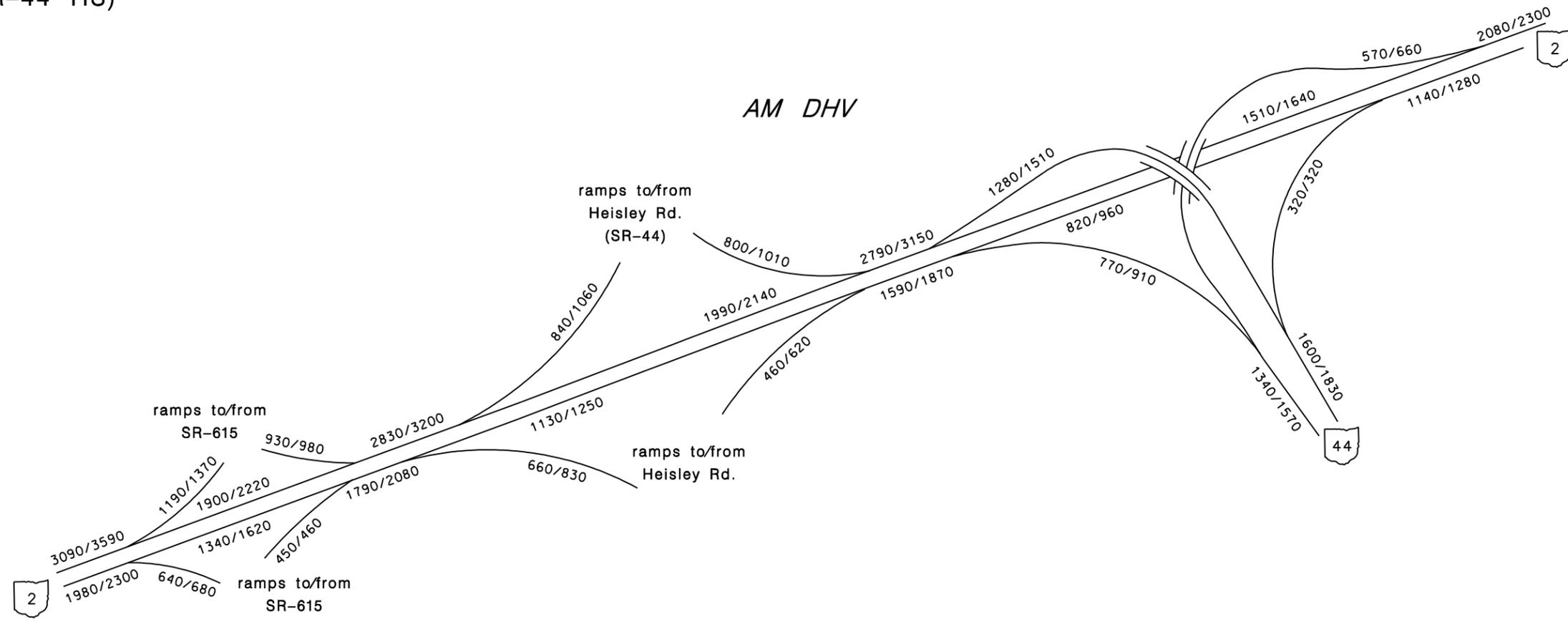


SITE



Shamrock Business Center Traffic Study

Figure 14
2030 Base + Site and Pass-by (Build)
Peak Hour Traffic Volumes



LAK-2-12.62 (SR-44 TIS)	
2010/2030 AM AND PM DHV	
OHIO DEPARTMENT OF TRANSPORTATION	
OFFICE OF TECHNICAL SERVICES	
MARCH 31, 2008	NOT TO SCALE