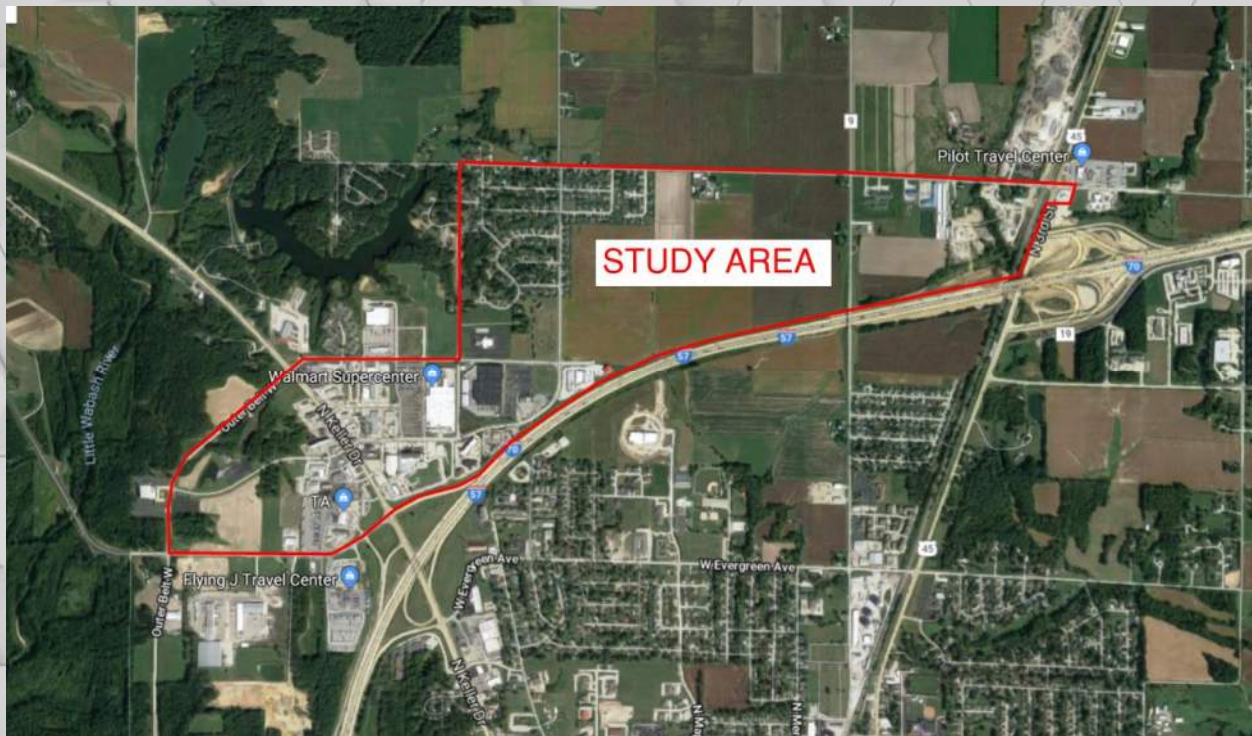


# N. Keller Drive Area Traffic Study

Effingham, Illinois



**PREPARED BY:**

Farnsworth Group, Inc.  
400 West Jefferson, Suite A  
Effingham, Illinois 62401  
(217) 342.5668  
(217) 342.5853

Farnsworth Group Project No. 0180939.00  
November 12, 2018

## ***Executive Summary***

It is the purpose of this study to estimate the vehicular volumes that will be generated by future development in the North Keller Drive Study Area and analyze the ability of the study area's roadway network to accommodate it in three analysis years; 2025, 2030, and 2040. The roadway network to be analyzed was established after coordination with the City of Effingham. In addition to the existing roadways through the study area, two new roadways are included in years 2030 and 2040; Ford Avenue extended to N. 4<sup>th</sup> Street and Damron Court from Avenue of Mid-America to N. Keller Drive. This analysis will determine the lanes and traffic control to be provided at the study intersections.

From this analysis, various conclusions can be drawn about the adequacy of the study roadway network as the area develops further. These conclusions can be summarized as follows:

- The existing roadway network should function adequately in the Year 2025 with minimal changes to the existing intersections.
- The Damron Court extension will divert a large volume of traffic from the intersection of N. Keller Drive & Avenue of Mid-America.
- The Ford Avenue extension to N. 4<sup>th</sup> Street will divert traffic from the Rickelman Avenue intersections at N. Raney Street and Charlotte Street and concentrate it at the intersection with N. 4<sup>th</sup> Street. This results in a very heavy westbound left-turn and northbound right-turn volume.
- In Year 2040, traffic volumes on N. Keller Drive south of Damron Court will warrant widening to provide three lanes in each direction. However, this would require widening the existing bridge over I-57/70. For the sake of improving traffic flow in this 600 feet of N. Keller Drive, widening the bridge would be too costly to justify, especially since none of the approaches on N. Keller Drive intersections are LOS E or F.

The traffic analyses in this report were initially performed using existing traffic control and lane configurations. The capacity analysis results were then used to determine where there were deficiencies and improvements implemented to yield acceptable delays and LOS. Recommended improvements are summarized as follows:

### Year 2025

1. Rickelman Avenue & N. Raney Street: The northbound and westbound approaches are currently free-flow while the eastbound approach is stop-controlled. This should be revised so that the eastbound and westbound approaches are free-flow and the northbound approach is stop-controlled.

### Year 2030

1. All existing protected/permitted left-turn signal heads should be replaced with flashing

yellow left-turn signal heads.

2. Avenue of Mid-America & Damron Court: Traffic signals should be installed. The eastbound and westbound approaches should provide one exclusive left-turn lane, one exclusive thru lane, and one shared thru/right-turn lane. The northbound approach should provide one exclusive left-turn lane, one exclusive thru lane, and one exclusive right-turn lane. The southbound approach should provide one exclusive left-turn lane and one shared thru/right-turn lane.
3. N. Keller Drive & Damron Court: Traffic signals should be installed. A northbound right-turn lane should be installed. The westbound approach should provide one exclusive left-turn lane and one shared left/thru/right-turn lane. The eastbound approach should provide one exclusive left-turn lane and one shared thru/right-turn lane.
4. N. Keller Drive & Avenue of Mid-America: The westbound approach should be changed to provide one exclusive left-turn lane and one shared thru/right-turn lane. The existing split-phased signal phasing for the eastbound and westbound approaches should be changed to provide protected/permitted left-turn signal phasing. Finally, a northbound right-turn overlap phase should be provided.
5. Ford Avenue & N. Raney Street: Left-turn lanes should be provided on all approaches. The existing four-way stop control should be converted to a two-way stop with the N. Raney Street approaches stop-controlled and the Ford Avenue approaches free-flow.
6. Ford Avenue & Charlotte Street: The existing four-way stop control should be converted to a two-way stop with the Charlotte Street approaches stop-controlled and the Ford Avenue approaches free-flow.
7. Ford Avenue & N. 4<sup>th</sup> Street: This new intersection should be an all-way stop-controlled intersection. The northbound approach should provide a left-turn lane and a thru lane. The southbound approach should provide a thru lane and a right-turn lane. The eastbound approach should provide a left-turn lane and a right-turn lane.
8. Rickelman Avenue & N. 4<sup>th</sup> Street: This intersection should be reconstructed as a roundabout. Traffic signals are not warranted, in spite of the fact that delays for stopped vehicles are unacceptable. Oftentimes, this is tolerated because drivers have other options at their disposal if they do not want to accept long delays. However, forcing drivers to use other roadways because of unacceptable delays at this intersection defeats the purpose of extending Ford Avenue to N. 4<sup>th</sup> Street. Therefore, a roundabout is the best solution at this intersection, functioning very well.

#### Year 2040

1. Ford Avenue & Charlotte Street: Traffic signals should be installed.
2. Ford Avenue & N. 4<sup>th</sup> Street: Traffic signals should be installed.

# Table of Contents

1. Introduction.....	1
2. Study Area Conditions.....	1
2.1 Description of the Existing Study Intersections .....	2
2.2 Description of the Existing Study Roadways .....	5
2.3 Existing Land Uses .....	6
2.4 Anticipated or Approved Future Development.....	6
2.5 Future Study Roadways.....	6
3. Trip Generation Characteristics of the Proposed Development.....	7
3.1 Site Traffic .....	7
3.2 Trip Generation.....	7
3.3 Trip Distribution.....	9
3.4 Peak Hour.....	9
4. Capacity Analysis .....	9
4.1 Capacity Analysis Scenarios .....	10
4.2 Traffic Signal Warrant Analysis .....	15
5. Conclusions.....	15
6. Recommended Improvements .....	15

## **1. Introduction**

At the request of the City of Effingham, Farnsworth Group, Inc. has prepared this traffic impact analysis for the area of Effingham north of Interstate 57/70 centered on N. Keller Drive. The area to be studied is generally within the boundaries of Rickelman Avenue on the north, Evergreen Avenue on the south, Outer Belt West on the west, and US 45 on the east. It is expected by the City that the area will develop over the next 22 years, providing commercial, industrial, and residential growth to an area already heavily developed, particularly in commercial properties. A Land Use Map provided by the City can be found in **Exhibit 1** in **Appendix A**.

It is the purpose of this study to estimate the vehicular volumes that will be generated by future development and analyze the ability of the roadway network to accommodate it in three analysis years; 2025, 2030, and 2040. The roadway network to be analyzed was established after coordination with the City of Effingham. In addition to the existing roadways through the study area, two new roadways are included in Years 2030 and 2040; Ford Avenue extended to N. 4<sup>th</sup> Street and Damron Court from Avenue of Mid-America to N. Keller Drive. This analysis will determine the lanes to be provided at the study intersections.

## **2. Study Area Conditions**

This study analyzes intersection capacities in the Years 2025, 2030, and 2040. The intersections to be analyzed for the Year 2025 scenario include:

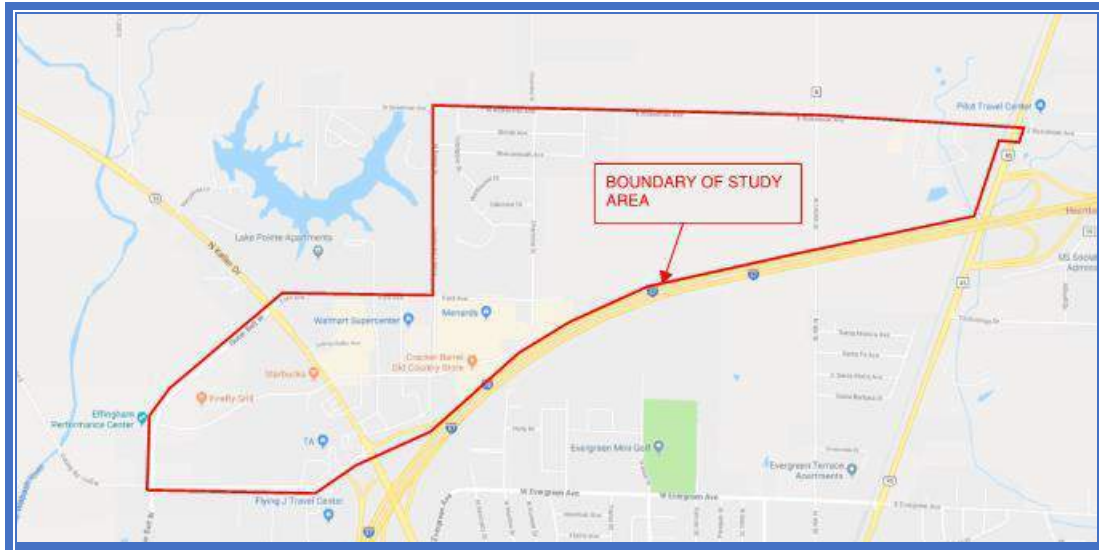
- N. Keller Drive & Outer Belt West/Ford Avenue
- N. Keller Drive & Thelma Keller Avenue
- N. Keller Drive & Avenue of Mid-America
- N. Keller Drive & Evergreen Avenue/I-57/70 Exit Ramp
- Outer Belt West & Avenue of Mid-America
- Outer Belt West & Evergreen Avenue
- Rickelman Avenue & N. Raney Street
- Rickelman Avenue & Charlotte Street
- Rickelman Avenue & N. 4<sup>th</sup> Street
- Rickelman Avenue & US Route 45
- Ford Avenue & N. Raney Street
- Ford Avenue & Charlotte Street
- Avenue of Mid-America & Wal-Mart Entrance
- Avenue of Mid-America & N. Raney Street

The intersection of Avenue of Mid-America & Wal-Mart Entrance is included due to the fact that it is the location of the future intersection of Avenue of Mid-America & Damron Court.

The intersections to be analyzed in the Years 2030 and 2040 scenarios include the intersections analyzed in the Year 2025 scenario with the following added intersections:

- N. Keller Drive & Damron Court
- Ford Avenue & N. 4<sup>th</sup> Street

A map of the study area in the City of Effingham is provided in **Figure 1**.



*Figure 1 – N. Keller Drive Study Area – Effingham, IL*

## 2.1 Description of the Existing Study Intersections

N. Keller Drive & Outer Belt West/Ford Avenue – This four-legged intersection is currently signalized. N. Keller Drive forms the north and south legs, Ford Avenue forms the east leg, and Outer Belt West forms the west leg. The northbound and southbound approaches each provide one exclusive left-turn lane, one exclusive thru lane, and one shared thru/right-turn lane. The eastbound and westbound approaches each provide one exclusive left-turn lane and one shared thru/right-turn lane. All left-turn phases are protected-permitted. The traffic signal installation is interconnected to the traffic signals along N. Keller Drive to the south. The network cycle length is 110 seconds.

N. Keller Drive & Thelma Keller Avenue – This three-legged intersection is currently unsignalized. N. Keller Drive forms the north and south legs while Thelma Keller Avenue forms the east leg. The westbound approach is stop-controlled. The southbound approach provides two thru lanes and a bi-directional left-turn lane median. The northbound approach provides one exclusive thru lane and one shared thru/right-turn lane. The westbound approach provides one exclusive left-turn lane and one exclusive right-turn lane. This intersection is approximately 800 feet south of the intersection at Ford Avenue and 500 feet north of the intersection at Avenue of Mid-America.

N. Keller Drive & Avenue of Mid-America – This four-legged intersection is currently signalized. N. Keller Drive forms the north and south legs while Avenue of Mid-America forms the east and west legs. The southbound approach provides one exclusive left-turn lane, one exclusive thru

lane, and one shared thru/right-turn lane while the northbound approach provides one exclusive left-turn lane, two exclusive thru lanes, and one exclusive right-turn lane. The westbound approach provides one exclusive left-turn lane and one shared left/thru/right-turn lane. The eastbound approach provides one exclusive left-turn lane and one shared thru/right-turn lane. The eastbound and westbound approaches are split-phased. The northbound and southbound left-turn phases are protected-permitted. The traffic signal installation is interconnected to the traffic signals along N. Keller Drive to the north and south. The network cycle length is 110 seconds.

N. Keller Drive & Evergreen Avenue/I-57/70 Exit Ramp – This four-legged intersection is currently signalized. N. Keller Drive forms the north and south legs while Evergreen Avenue forms the west leg and the I-57/70 exit ramp forms the east leg. The southbound approach provides two exclusive thru lanes and one exclusive right-turn lane while the northbound approach provides one exclusive left-turn lane and two exclusive thru lanes. The westbound approach provides one exclusive left-turn lane, one exclusive thru lane, and one exclusive right-turn lane. The eastbound approach provides one exclusive left-turn lane and one exclusive right-turn lane. The eastbound and westbound left-turn phases are protected only. The northbound and southbound left-turn phases are protected-permitted. The traffic signal installation is interconnected to the traffic signals along N. Keller Drive to the north and south. The network cycle length is 110 seconds.

Outer Belt West & Avenue of Mid-America – This four-legged intersection is currently unsignalized. Outer Belt West forms the north and south legs while Avenue of Mid-America forms the east leg. A commercial driveway forms the west leg. Each intersection approach provides one shared left/thru/right-turn lane. The eastbound and westbound approaches are stop-controlled.

Outer Belt West & Evergreen Avenue – This four-legged intersection is currently a four-way stop-controlled intersection. Outer Belt West forms the north and south legs while Evergreen Avenue forms the east and west legs. Each approach provides one shared left/thru/right-turn lane.

Rickelman Avenue & N. Raney Street – This three-legged intersection is currently an unsignalized intersection. N. Raney Street forms the south leg while Rickelman Avenue forms the east and west legs. Each approach provides one shared left/thru/right-turn lane. The eastbound approach is stop-controlled while the northbound and westbound approaches are free-flow.

Rickelman Avenue & Charlotte Street – This four-legged intersection is currently an unsignalized intersection. Charlotte Street forms the north and south legs while Rickelman Avenue forms the east and west legs. Each approach provides one shared left/thru/right-turn lane. The Charlotte Street legs are offset from one another by approximately 35 feet. The northbound and southbound approaches are stop-controlled.

Rickelman Avenue & N. 4th Street – This four-legged intersection is currently an unsignalized intersection. N. 4th Street forms the north and south legs while Rickelman Avenue forms the

east and west legs while N. 4<sup>th</sup> Street forms the north and south legs. Each approach provides one shared left/thru/right-turn lane. The northbound and southbound approaches are stop-controlled.

Rickelman Avenue & US Route 45 – This four-legged intersection is currently signalized. US Route 45 forms the north and south legs while Rickelman Avenue forms the east and west legs. The southbound approach provides one exclusive left-turn lane and one shared thru/right-turn lane while the northbound approach provides one exclusive left-turn lane, one exclusive thru lane, and one exclusive right-turn lane. The westbound approach provides one exclusive left-turn lane and one shared left/thru/right-turn lane. The eastbound and westbound approaches provide one exclusive left-turn lane and one shared thru/right-turn lane. The eastbound and westbound approaches are split-phased. The northbound and southbound left-turn phases are protected-permitted. There is an at-grade railroad crossing of Rickelman Avenue approximately 115 feet west of US Route 45. Pavement markings prohibit eastbound vehicles from stopping between the intersection and the railroad crossing.

Ford Avenue & N. Raney Street – This four-legged intersection is currently a four-way stop-controlled intersection. N. Raney Street forms the north and south legs while Ford Avenue forms the east and west legs. Each approach provides one shared left/thru/right-turn lane.

Ford Avenue & Charlotte Street – This four-legged intersection is currently a four-way stop-controlled intersection. Charlotte Street forms the north leg, Avenue of Mid-America forms the south leg, and Ford Avenue forms the east and west legs. The eastbound, westbound, and northbound approaches each provide one exclusive left-turn lane and one shared thru/right-turn lane. The southbound approach provides one shared left/thru/right-turn lane. Ford Avenue ends approximately 475 feet east of the intersection.

Avenue of Mid-America & Wal-Mart Entrance (Future Damron Court) – This four-legged intersection is currently unsignalized. Avenue of Mid-America forms the east and west legs. The north leg is formed by an entrance driveway for Wal-Mart while the south leg is formed by another commercial driveway. The eastbound and westbound approaches each provide one shared left-turn/thru lane and one shared thru/right-turn lane. The southbound approach provides one exclusive left-turn lane and one exclusive right-turn lane. The northbound approach provides one shared left/thru/right-turn lane. The northbound and southbound approaches are stop-controlled.

Avenue of Mid-America & N. Raney Street – This four-legged intersection is currently an unsignalized intersection. N. Raney Street forms the north and south legs while Avenue of Mid-America forms the east and west legs. The eastbound approach provides one exclusive left-turn lane and one shared thru/right-turn lane. The other three approaches each provide one shared left/thru/right-turn lane. The N. Raney Street legs are offset from one another by approximately 80 feet. The northbound and southbound approaches are stop-controlled.

**Exhibit 2** in **Appendix A** summarizes the intersection traffic control and lane configurations.



## 2.2 Description of the Existing Study Roadways

N. Keller Drive – N. Keller Drive is a north-south arterial roadway that provides two lanes in each direction separated by a two-way left-turn lane. The Illinois Department of Transportation has classified this roadway from I-57/70 to Avenue of Mid-America as a High-Accident Location Segment. The posted speed limit is 40 MPH. The current Average Daily Traffic (ADT) is 22,800 vehicles per day (VPD).

Avenue of Mid-America (west of N. Keller Drive) – Avenue of Mid-America west of N. Keller Drive is an east-west roadway that provides one lane in each direction with no median. The speed limit is not posted and is assumed to be 45 MPH. The current ADT is 2,950 VPD.

Avenue of Mid-America (east of N. Keller Drive and west of N. Raney Street) – This section of Avenue of Mid-America is an east-west roadway that provides two lanes in each direction with a two-way left-turn lane median at the west end and no median at the east end. The speed limit is not posted and is assumed to be 30 MPH. The current ADT is 10,200 VPD at the west end and 4,200 VPD on the east end.

Avenue of Mid-America (east of N. Raney Street) – This section of Avenue of Mid-America goes from an east-west roadway to north-south. It provides one lane in each direction with a two-way left-turn lane median. The posted speed limit is 30 MPH. The current ADT is 3,700 VPD.

Evergreen Avenue – Evergreen Avenue is an east-west roadway that provides one lane in each direction with no median. The speed limit is not posted and is assumed to be 40 MPH. The current ADT ranges from 1,100 VPD to 6,300 VPD closer to N. Keller Drive.

Outer Belt West – Outer Belt West is a north-south roadway that provides one lane in each direction with no median. The posted speed limit is 40 MPH. The current ADT ranges from 3,100 VPD south of Avenue of Mid-America to 1,700 VPD north of Avenue of Mid-America.

Thelma Keller Avenue – Thelma Keller Avenue is an east-west roadway that provides one lane in each direction separated by a two-way left-turn lane with portions of raised-curb median. The speed limit is not posted and is assumed to be 30 MPH. The current ADT is 2,200 VPD.

Rickelman Avenue - Rickelman Avenue is an east-west roadway that provides one lane in each direction with no median. The posted speed limit is 30 MPH. The current ADT ranges from 5,600 to 2,200 VPD.

N. Raney Street – N. Raney Street is a north-south roadway that provides one lane in each direction with no median. The posted speed limit is 30 MPH. The current ADT ranges from 500 VPD south of Ford Avenue to 2,700 VPD north of Ford Avenue.

Charlotte Street – Charlotte Street is a north-south roadway that provides one lane in each direction with no median. The posted speed limit is 30 MPH. The current ADT 3,450 VPD.

N. 4<sup>th</sup> Street – N. 4<sup>th</sup> Street is a north-south roadway that provides one lane in each direction with no median. The posted speed limit is 30 MPH. The current ADT 2,650 VPD.

Ford Avenue - Ford Avenue is an east-west roadway that provides one lane in each direction with no median. The posted speed limit is 30 MPH. The current ADT ranges from 5,350 VPD near N. Keller Drive to 3,000 VPD on the east end.

### 2.3 Existing Land Uses

Within the study area, the land along N. Keller Drive is primarily commercially developed land, as is the land east of N. Keller Drive bounded by Ford Avenue on the north and I-57/70 on the south. West of N. Keller Drive, with the exception of a truck stop and some light industrial properties south of Evergreen Avenue, performance center on Outer Belt West, and a restaurant on Avenue of Mid-America, the land is largely undeveloped. North of Ford Avenue and south of Rickelman Avenue, the existing development is largely residential. East of Charlotte Street, outside of a small area with single-family residential homes, the area is almost entirely undeveloped.

### 2.4 Anticipated or Approved Future Development

The Land Use Map provided by the City of Effingham was used to develop estimated development layouts for the three analysis years. These layouts can be found in **Exhibits 3A-3C** in **Appendix A**. The number of residential units assumed is based on the lots sizes of the adjacent residential areas. The commercial building sizes were established using a rough ratio of 100 sq. ft. of floor area for every 400 sq. ft. of parcel size.

The largest future developed property is the Meijer property located in the northwest quadrant of Ford Avenue & N. Raney Street. The trips generated by this property and the directional distribution of those trips are those that were assumed in the traffic study performed for the site and provided to Farnsworth Group by the City. The Meijer Property traffic study is a separate document and is available upon request.

### 2.5 Future Study Roadways

By the Year 2030, there is expected to be completed two roadway extensions. The base traffic volumes in Years 2030 and 2040 reflect the addition of the two roadways. The first new roadway is the extension of existing Damron Court from N. Keller Drive north and east to Avenue of Mid-America. Damron Court is currently a minor roadway that provides access to businesses on the west side of N. Keller Drive and is located approximately 400 feet south of the intersection at Avenue of Mid-America and 680 feet north of the intersection at Evergreen Avenue/I-57/70 Exit Ramp. The extension terminates at Avenue of Mid-America opposite the west entrance driveway to the existing Wal-Mart. This roadway extension will divert much of the northbound right-turn and westbound left-turn volumes from the intersection of N. Keller Drive & Avenue of Mid-America.

The second roadway extension is Ford Avenue from Charlotte Street to N. 4<sup>th</sup> Street. Not only will this roadway open up the land between Charlotte Street and N. 4<sup>th</sup> Street for development, it will provide better access to the study area for people who cross I-57/70 on N. 4<sup>th</sup> Street. It will also divert traffic from the Rickelman Avenue intersections at N. Raney Street and at Charlotte

Street. The base traffic volumes in Years 2030 and 2040 reflect these changes in travel patterns.

### 3. Trip Generation Characteristics of the Proposed Development

#### 3.1 Site Traffic

Peak hour traffic volumes were developed from traffic counts performed on September 6, 2018 at the study intersections. To generate future traffic volumes, an annual growth factor of 1% per year was applied to the existing peak hour volumes. This growth rate was recommended by the Illinois Department of Transportation. The peak hour traffic counts can be found in **Appendix B**. It is possible that actual traffic growth may differ from any assumptions made in this report.

#### 3.2 Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation Report, 9<sup>th</sup> Edition was used to estimate the number of trips generated by expected development. Trip Generation Reports can be found in **Appendix C. Tables 1-3** summarize the trips generated by assumed and approved developments within the study area in each of the analysis years. Given the planning nature of this report, pass-by trips have not been considered in establishing future traffic volumes. As pass-by trips, by definition, are not vehicles added to the roadway network and are instead drawn from existing traffic, they will have little effect on the study intersections. Only new trips will be added to the background traffic to establish the future traffic on the study roadway network.

	LAND USE	ITE CODE	SIZE	TOTAL GENERATED TRIPS						PASS-BY %	GENERATED PRIMARY TRIPS					
				AM TRIPS			PM TRIPS				AM TRIPS			PM TRIPS		
				IN	OUT	TOTAL	IN	OUT	TOTAL		IN	OUT	TOTAL	IN	OUT	TOTAL
1	MEIJER PROPERTY			260	270	530	605	625	1230	--	170	175	345	390	410	800
2	LIQUOR STORE		12,000 SF	0	0	0	100	95	195	40	0	0	0	60	55	115
3	FAST-FOOD RESTAURANT W/ DRIVE-THRU WINDOW	934	5,000 SF	115	110	225	85	80	165	50	60	55	115	45	40	85
4	SPECIALTY RETAIL CENTER	826	16,000 SF	0	0	0	20	25	45	35	0	0	0	15	15	30
5	MEDICAL-DENTAL OFFICE BUILDING	720	8,000 SF	15	5	20	10	20	30	0	15	5	20	10	20	30
6	SIT-DOWN RESTAURANT	932	12,000 SF	70	60	130	70	50	120	45	40	35	75	40	30	70
7	LOW-RISE APARTMENTS	221	10 UNITS	0	5	5	5	0	5	0	0	5	5	5	0	5
8	OFFICE SUPPLY SUPERSTORE	867	35,000 SF	0	0	0	65	55	120	25	0	0	0	50	40	90
9	SINGLE-FAMILY DETACHED HOUSING	210	10 UNITS	0	10	10	10	5	15	0	0	10	10	5	15	
10	AUTOMOBILE PARTS STORE	843	6,000 SF	10	5	15	20	15	35	45	5	5	10	10	10	20
11	TOWING COMPANY			10	5	15	5	10	15	0	10	5	15	5	10	15
12	GENERAL LIGHT INDUSTRIAL	110	70,000 SF	60	5	65	10	60	70	0	60	5	65	10	60	70

*Table 1 – Trips Generated by Future Development – Year 2025*

LAND USE	ITE CODE	SIZE	TOTAL GENERATED TRIPS							PASS-BY %	GENERATED PRIMARY TRIPS					
			AM TRIPS			PM TRIPS					AM TRIPS			PM TRIPS		
			IN	OUT	TOTAL	IN	OUT	TOTAL	IN		OUT	TOTAL	IN	OUT	TOTAL	
1 MEIJER PROPERTY			260	270	530	605	625	1230	--	170	175	345	390	410	800	
2 LIQUOR STORE		12,000 SF	0	0	0	100	95	195	40	0	0	0	60	55	115	
3 FAST-FOOD RESTAURANT W/ DRIVE-THRU WINDOW	934	5,000 SF	115	110	225	85	80	165	50	60	55	115	45	40	85	
4 SPECIALTY RETAIL CENTER	826	16,000 SF	0	0	0	20	25	45	35	0	0	0	15	15	30	
5 MEDICAL-DENTAL OFFICE BUILDING	720	8,000 SF	15	5	20	10	20	30	0	15	5	20	10	20	30	
6 SIT-DOWN RESTAURANT	932	12,000 SF	70	60	130	70	50	120	45	40	35	75	40	30	70	
7 LOW-RISE APARTMENTS	221	10 UNITS	0	5	5	5	0	5	0	0	5	5	5	0	5	
8 OFFICE SUPPLY SUPERSTORE	867	35,000 SF	0	0	0	65	55	120	25	0	0	0	50	40	90	
9 SINGLE-FAMILY DETACHED HOUSING	210	10 UNITS	0	10	10	10	5	15	0	0	10	10	10	5	15	
10 AUTOMOBILE PARTS STORE	843	6,000 SF	10	5	15	20	15	35	45	5	5	10	10	10	20	
11 TOWING COMPANY			10	5	15	5	10	15	0	10	5	15	5	10	15	
12 GENERAL LIGHT INDUSTRIAL	110	70,000 SF	60	5	65	10	60	70	0	60	5	65	10	60	70	
13 SPORTING GOODS SUPERSTORE	861	150,000 SF	0	0	0	130	145	275	25	0	0	0	100	110	210	
14 SPECIALTY RETAIL CENTER	826	50,000 SF	0	0	0	60	75	135	35	0	0	0	40	50	90	
15 CONVENTION CENTER EXPANSION		20,000 SF	40	10	50	10	40	50	0	40	10	50	10	40	50	
16 SIT-DOWN RESTAURANT	932	8,000 SF	45	40	85	50	30	80	45	25	20	45	30	15	45	
17 HOTEL	310	60 ROOMS	20	10	30	20	20	40	0	20	10	30	20	20	40	
18 SPECIALTY RETAIL CENTER	826	25,000 SF	0	0	0	30	40	70	35	0	0	0	20	25	45	
19 SINGLE-FAMILY DETACHED HOUSING	210	50 UNITS	10	30	40	30	20	50	0	10	30	40	30	20	50	

Table 2 – Trips Generated by Future Development – Year 2030

LAND USE	ITE CODE	SIZE	TOTAL GENERATED TRIPS							PASS-BY %	GENERATED PRIMARY TRIPS					
			AM TRIPS			PM TRIPS					AM TRIPS			PM TRIPS		
			IN	OUT	TOTAL	IN	OUT	TOTAL	IN		OUT	TOTAL	IN	OUT	TOTAL	
1 MEIJER PROPERTY			260	270	530	605	625	1230	--	170	175	345	390	410	800	
2 LIQUOR STORE		12,000 SF	0	0	0	100	95	195	40	0	0	0	60	55	115	
3 FAST-FOOD RESTAURANT W/ DRIVE-THRU WINDOW	934	5,000 SF	115	110	225	85	80	165	50	60	55	115	45	40	85	
4 SPECIALTY RETAIL CENTER	826	16,000 SF	0	0	0	20	25	45	35	0	0	0	15	15	30	
5 MEDICAL-DENTAL OFFICE BUILDING	720	8,000 SF	15	5	20	10	20	30	0	15	5	20	10	20	30	
6 SIT-DOWN RESTAURANT	932	12,000 SF	70	60	130	70	50	120	45	40	35	75	40	30	70	
7 LOW-RISE APARTMENTS	221	10 UNITS	0	5	5	5	0	5	0	0	5	5	5	0	5	
8 OFFICE SUPPLY SUPERSTORE	867	35,000 SF	0	0	0	65	55	120	25	0	0	0	50	40	90	
9 SINGLE-FAMILY DETACHED HOUSING	210	10 UNITS	0	10	10	10	5	15	0	0	10	10	10	5	15	
10 AUTOMOBILE PARTS STORE	843	6,000 SF	10	5	15	20	15	35	45	5	5	10	10	10	20	
11 TOWING COMPANY			10	5	15	5	10	15	0	10	5	15	5	10	15	
12 GENERAL LIGHT INDUSTRIAL	110	70,000 SF	60	5	65	10	60	70	0	60	5	65	10	60	70	
13 SPORTING GOODS SUPERSTORE	861	150,000 SF	0	0	0	130	145	275	25	0	0	0	100	110	210	
14 SPECIALTY RETAIL CENTER	826	50,000 SF	0	0	0	60	75	135	35	0	0	0	40	50	90	
15 CONVENTION CENTER EXPANSION		20,000 SF	40	10	50	10	40	50	0	40	10	50	10	40	50	
16 SIT-DOWN RESTAURANT	932	8,000 SF	45	40	85	50	30	80	45	25	20	45	30	15	45	
17 HOTEL	310	60 ROOMS	20	10	30	20	20	40	0	20	10	30	20	20	40	
18 SPECIALTY RETAIL CENTER	826	25,000 SF	0	0	0	30	40	70	35	0	0	0	20	25	45	
19 SINGLE-FAMILY DETACHED HOUSING	210	50 UNITS	10	30	40	30	20	50	0	10	30	40	30	20	50	
20 CONVENTION CENTER		30,000 SF	140	30	170	30	140	170	0	140	30	170	30	140	170	
21 FURNITURE STORE	890	75,000 SF	10	5	15	15	20	35	50	5	5	10	10	10	20	
22 AUTOMOBILE SALES	841	20,000 SF	30	10	40	20	30	50	10	25	10	35	20	25	45	
23 PET SUPPLY SUPERSTORE	876	20,000 SF	0	0	0	25	20	45	40	0	0	0	15	10	25	
24 SUPERMARKET	850	45,000 SF	95	60	155	215	210	425	35	60	40	100	140	135	275	
25 RESIDENTIAL CONDOMINIUMS/TOWNHOUSES	230	40 UNITS	5	15	20	15	5	20	0	5	15	20	15	5	20	
26 DISCOUNT CLUB	857	130,000 SF	45	20	65	270	275	545	25	35	15	50	205	205	410	

Table 3 – Trips Generated by Future Development – Year 2040

The locations of the traffic generators listed in Tables 1-3 can be seen in Exhibits 3A-3C in Appendix A.

### 3.3 Trip Distribution

In distributing the traffic generated by the future development, it is not realistic to apply a blanket distribution to all development within the study area. The Meijer property will attract users from a larger area than a liquor store. Likewise, people traveling to/from a property on Outer Belt West will take different routes into the study area than people traveling to/from a property on extended Ford Avenue. However, general ranges were used in distributing traffic that enters and leaves the study area. Those ranges are as follows:

- To/from the south via N. Keller Drive – 45-60%
- To/from the south via US Route 45 – 0-10%
- To/from the south via Outer Belt West – 0-10%
- To/from the south via N. 4<sup>th</sup> Street – 0-15%
- To/from the west via Evergreen Avenue – 5%
- To/from the north via N. Keller Drive – 10%
- To/from the north via US Route 45 – 5-10%

From the trip distributions assumed, trips were assigned to the study intersections for the Years 2025, 2030, and 2040. Worksheets showing development generated traffic by generator at each of the study intersections can be found in **Appendix D-F**. Exhibits showing the development generated traffic volumes at each intersection can be seen in **Exhibits 6A-6C** in **Appendix A**.

### 3.4 Peak Hour

The peak hour for the study area, the study intersections, and the outside street system may be different from one another. To determine the peak hour to be analyzed, the total entering traffic for all the study intersections was summed up and the highest volumes were found to be from 7:15-8:15 AM and 4:30-5:30 PM. Existing peak hour volumes are shown in **Exhibit 4** in **Appendix A**. Typical values for peak hour factors range from 0.80 to 0.95 for higher speed roads and urban/suburban intersections. For this traffic analysis, a Peak Hour Factor of 0.92 was used.

## 4. Capacity Analysis

The quality of service at an intersection is based on its ability to accommodate traffic that passes through in a timely and efficient manner. Efficiency is described in terms of Level of Service (LOS). The LOS rating system describes the operational characteristics of a particular intersection or roadway and ranges from A (free flow, minimal delay) to F (extreme congestion, unacceptable delay).

LOS is determined by the average control delay (in seconds per vehicle) of all vehicles entering the intersection. Average control delay is based on the peak 15-minute interval of the peak hour analyzed. Control delay is considered to be the stopped time a vehicle experiences plus the time lost due to acceleration and deceleration. Since control delay is an average value, some approaches could experience much greater delay than other approaches. Intersections that have low control delays have a high level of service; in contrast, intersections that have high

control delays have a low level of service. **Table 4** describes Level of Service for signalized and unsignalized intersections. According to the Highway Capacity Manual, LOS E is considered to be the limit of acceptable delay while LOS F indicates that intersection improvements are needed. For the purposes of this study, the minimum acceptable LOS for intersection approaches shall be a D.

Signalized Intersections		
Level of Service	Interpretation	Average Control Delay (seconds per vehicle)
A	Favorable progression. Most vehicles arrive during the green indication and travel through the intersection without stopping.	≤ 10
B	Good progression, with more vehicles stopping than for Level of Service A.	> 10-20
C	Individual cycle failures (i.e. one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear. Number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.	> 20-35
D	The volume-to-capacity ratio is high and either progression is ineffective or the cycle length is too long. Many vehicles stop and individual cycle failures are noticeable.	> 35-55
E	Progression is unfavorable. The volume-to-capacity ratio is high and the cycle length is long. Individual cycle failures are frequent.	> 55-80
F	The volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.	≥ 80

Unsignalized Intersections	
Level of Service	Average Control Delay (seconds per vehicle)
A	0-10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

*Table 4 – Level of Service Characteristics from HCM, 2010*

#### 4.1 Capacity Analysis Scenarios

An evaluation of the future traffic must include both the base traffic volumes (existing traffic volumes with an annual growth rate applied) plus traffic generated by development within the study area. Such an evaluation determines the adequacy of the study roadway network to

handle the future traffic. Recommendations can then be formulated from the analyses to improve traffic flow such that delay is minimized within economic feasibility. Background traffic volumes and development generated traffic volumes for the analysis years can be seen in **Exhibits 5A-5C and 6A-6C** in **Appendix A**, respectively. These volumes were then combined to determine the future traffic volumes as seen in **Exhibits 7A-7C** in **Appendix A**.

Evaluations have been made for the peak hours for each of the intersections in the study using Synchro, an established macroscopic traffic analysis software. The capacity reports showing control delay and LOS for each analysis year are included in **Appendix G-I**. **Tables 5-7** summarizes the control delay and LOS for the study intersections. The information in the tables includes intersection improvements where necessary to keep delay and LOS at the acceptable levels previously discussed. The improvements necessary to achieve these delays and Levels of Service are summarized in the next section.

INTERSECTION	PEAK HOUR	APPROACH				TOTAL
		NB	SB	EB	WB	
N. KELLER DR. & OUTER BELT W/FORD AVE.	AM	A (3.7)	B (12.9)	D (36.4)	D (40.6)	B (16.9)
	PM	A (8.3)	B (19.2)	D (39.2)	D (39.6)	C (21.7)
N. KELLER DR. & THELMA KELLER AVE. *	AM	--	--	--	B (11.2)	--
	PM	--	--	--	B (12.7)	--
N. KELLER DR. & AVE. OF MID-AMERICA	AM	A (5.7)	B (10.5)	C (29.7)	D (53.8)	B (15.3)
	PM	B (12.1)	C (24.1)	D (43.2)	D (52.3)	C (23.9)
N. KELLER DR. & EVERGREEN AVE./I-57/70 EXIT RAMP	AM	A (7.5)	B (18.4)	B (18.7)	C (35.0)	B (15.7)
	PM	B (15.3)	B (17.4)	B (17.6)	D (43.2)	B (18.8)
OUTER BELT W & AVE. OF MID-AMERICA *	AM	--	--	B (10.2)	B (10.8)	--
	PM	--	--	B (11.1)	B (12.8)	--
OUTER BELT W & EVERGREEN AVE.	AM	A (9.9)	A (9.5)	B (10.4)	A (8.3)	A (9.9)
	PM	B (12.4)	B (10.5)	A (9.4)	A (9.4)	A (11.0)
RICKELMAN AVE. & N. RANEY ST. *	AM	A (9.2)	--	--	--	--
	PM	B (10.6)	--	--	--	--
RICKELMAN AVE. & CHARLOTTE ST. *	AM	B (10.6)	C (15.2)	--	--	--
	PM	B (12.1)	D (32.1)	--	--	--
RICKELMAN AVE. & N. 4TH ST.	AM	A (9.9)	A (9.1)	B (11.6)	A (9.8)	A (10.6)
	PM	B (14.9)	B (10.6)	C (20.4)	C (20.2)	B (18.8)
RICKELMAN AVE. & US 45	AM	A (8.7)	B (12.0)	C (22.7)	D (38.9)	B (17.4)
	PM	B (10.2)	A (9.2)	B (26.8)	D (45.7)	B (17.4)
FORD AVE. & N. RANEY ST.	AM	A (8.5)	A (9.2)	B (10.5)	A (8.7)	A (9.6)
	PM	B (10.9)	C (15.0)	C (21.0)	B (14.1)	C (16.8)
FORD AVE. & CHARLOTTE ST.	AM	A (7.2)	A (9.4)	A (8.6)	A (7.1)	A (8.8)
	PM	A (8.8)	B (12.8)	B (13.5)	A (8.1)	A (12.3)
AVE. OF MID-AMERICA & WAL-MART ENT. *	AM	B (14.0)	A (9.6)	--	--	--
	PM	D (32.1)	B (12.8)	--	--	--
AVE. OF MID-AMERICA & N. RANEY ST. *	AM	B (10.4)	A (9.5)	--	--	--
	PM	B (12.5)	B (10.3)	--	--	--

\* - Signifies that the intersection is unsignalized. Delay and LOS given for stopped approaches

\*\* - Signifies that the intersection is a roundabout

LOS (Delay in seconds per vehicle)

*Table 5 – Intersection LOS and Delay – Year 2025*



INTERSECTION	PEAK HOUR	APPROACH				TOTAL
		NB	SB	EB	WB	
N. KELLER DR. & OUTER BELT W/FORD AVE.	AM	A (7.0)	B (14.7)	D (40.8)	D (35.8)	B (18.2)
	PM	A (8.9)	B (19.8)	D (46.0)	D (40.7)	C (23.2)
N. KELLER DR. & THELMA KELLER AVE. *	AM	--	--	--	B (11.7)	--
	PM	--	--	--	B (14.8)	--
N. KELLER DR. & AVE. OF MID-AMERICA	AM	A (3.3)	A (8.2)	C (26.9)	D (37.8)	A (9.3)
	PM	A (1.3)	A (6.4)	D (37.6)	D (38.7)	A (7.6)
N. KELLER DR. & EVERGREEN AVE./I-57/70 EXIT RAMP	AM	A (8.7)	B (16.5)	B (18.3)	C (30.6)	B (14.9)
	PM	B (19.8)	B (19.8)	B (17.6)	D (48.2)	C (22.2)
OUTER BELT W & AVE. OF MID-AMERICA *	AM	--	--	B (10.3)	B (10.9)	--
	PM	--	--	B (11.3)	B (13.3)	--
OUTER BELT W & EVERGREEN AVE.	AM	B (10.0)	A (9.7)	B (10.8)	A (8.4)	B (10.2)
	PM	B (13.0)	B (10.8)	A (9.6)	A (9.5)	B (11.4)
RICKELMAN AVE. & N. RANEY ST. *	AM	A (8.8)	--	--	--	--
	PM	A (9.0)	--	--	--	--
RICKELMAN AVE. & CHARLOTTE ST. *	AM	A (8.9)	A (9.3)	--	--	--
	PM	A (8.9)	A (9.6)	--	--	--
RICKELMAN AVE. & N. 4TH ST. **	AM	A (4.7)	A (4.7)	A (4.7)	A (4.2)	A (4.6)
	PM	A (6.2)	A (5.7)	A (5.5)	A (8.4)	A (7.3)
RICKELMAN AVE. & US 45	AM	A (9.6)	B (19.6)	C (25.4)	D (44.1)	C (21.4)
	PM	B (10.4)	C (23.5)	C (28.8)	D (48.1)	C (21.3)
FORD AVE. & N. RANEY ST. *	AM	B (13.8)	B (12.3)	--	--	--
	PM	C (21.0)	D (27.2)	--	--	--
FORD AVE. & CHARLOTTE ST. *	AM	B (11.0)	B (12.9)	--	--	--
	PM	C (20.6)	C (21.8)	--	--	--
AVE. OF MID-AMERICA & WAL-MART ENT.	AM	A (2.3)	A (6.6)	D (42.1)	D (41.9)	C (20.8)
	PM	A (5.1)	B (17.0)	D (39.6)	C (29.3)	B (17.4)
AVE. OF MID-AMERICA & N. RANEY ST. *	AM	B (10.4)	A (9.5)	--	--	--
	PM	B (14.4)	B (11.5)	--	--	--
N. KELLER DR. & DAMRON CT.	AM	A (5.4)	A (7.2)	D (38.3)	C (32.9)	B (10.8)
	PM	B (19.3)	C (24.8)	D (37.7)	C (32.8)	C (24.0)
FORD AVE. & N. 4TH ST. *	AM	A (9.2)	A (8.9)	B (10.2)	--	A (9.5)
	PM	B (12.2)	C (22.4)	C (21.3)	--	C (19.9)

\* - Signifies that the intersection is unsignalized. Delay and LOS given for stopped approaches

\*\* - Signifies that the intersection is a roundabout

LOS (Delay in seconds per vehicle)

Table 6 – Intersection LOS and Delay – Year 2030

INTERSECTION	PEAK HOUR	APPROACH				TOTAL
		NB	SB	EB	WB	
N. KELLER DR. & OUTER BELT W/FORD AVE.	AM	B (17.9)	B (15.7)	D (40.8)	D (41.3)	C (22.3)
	PM	C (20.6)	C (28.8)	D (46.2)	D (49.4)	C (32.6)
N. KELLER DR. & THELMA KELLER AVE. *	AM	--	--	--	B (12.2)	--
	PM	--	--	--	C (16.9)	--
N. KELLER DR. & AVE. OF MID-AMERICA	AM	A (7.2)	B (12.2)	C (26.6)	C (30.8)	B (12.5)
	PM	A (3.5)	B (10.1)	D (44.9)	D (45.4)	B (12.5)
N. KELLER DR. & EVERGREEN AVE./I-57/70 EXIT RAMP	AM	B (14.3)	C (21.1)	B (17.0)	D (36.1)	B (19.4)
	PM	D (37.7)	D (44.9)	C (34.3)	D (54.1)	D (41.5)
OUTER BELT W & AVE. OF MID-AMERICA *	AM	--	--	B (11.6)	B (11.6)	--
	PM	--	--	B (13.8)	C (17.9)	--
OUTER BELT W & EVERGREEN AVE.	AM	B (11.5)	B (11.2)	B (13.0)	B (10.3)	B (11.9)
	PM	C (17.8)	C (15.5)	B (11.5)	B (11.1)	C (15.3)
RICKELMAN AVE. & N. RANEY ST. *	AM	A (8.8)	--	--	--	--
	PM	A (9.1)	--	--	--	--
RICKELMAN AVE. & CHARLOTTE ST.	AM	A (8.9)	A (9.3)	--	--	--
	PM	A (8.9)	A (9.8)	--	--	--
RICKELMAN AVE. & N. 4TH ST. **	AM	A (4.9)	A (4.6)	A (5.2)	A (5.1)	A (5.0)
	PM	A (7.5)	A (6.4)	A (6.4)	B (10.3)	A (8.8)
RICKELMAN AVE. & US 45	AM	B (10.4)	C (23.0)	C (25.1)	D (47.5)	C (23.2)
	PM	B (14.4)	C (31.6)	C (30.8)	D (51.0)	C (25.8)
FORD AVE. & N. RANEY ST. *	AM	C (15.1)	B (13.1)	--	--	--
	PM	D (25.4)	E (35.3)	--	--	--
FORD AVE. & CHARLOTTE ST.	AM	B (12.7)	B (11.9)	D (42.4)	C (29.1)	C (30.4)
	PM	B (18.8)	B (18.8)	D (35.4)	C (23.4)	C (25.9)
AVE. OF MID-AMERICA & DAMRON CT.	AM	A (2.4)	A (7.1)	D (45.8)	D (44.7)	C (22.4)
	PM	A (5.6)	C (21.5)	C (31.2)	C (25.9)	B (16.8)
AVE. OF MID-AMERICA & N. RANEY ST.	AM	B (11.2)	A (10.0)	--	--	--
	PM	C (17.6)	B (13.1)	--	--	--
N. KELLER DR. & DAMRON CT.	AM	A (8.6)	A (7.4)	D (38.3)	D (49.2)	B (14.2)
	PM	C (31.0)	C (22.8)	D (37.4)	C (31.4)	C (29.2)
FORD AVE. & N. 4TH ST.	AM	A (5.5)	A (3.2)	C (33.9)	--	B (16.3)
	PM	B (10.7)	A (3.1)	C (26.7)	--	B (14.0)

\* - Signifies that the intersection is unsignalized. Delay and LOS given for stopped approaches

\*\* - Signifies that the intersection is a roundabout

LOS (Delay in seconds per vehicle)

*Table 7 – Intersection LOS and Delay – Year 2040*

## 4.2 Traffic Signal Warrant Analysis

There are eight traffic signal warrants in the Manual on Uniform Traffic Control Devices (MUTCD) regarding appropriate use of traffic signals. The satisfaction of a single warrant, however, does not itself demand the installation of a traffic signal. Warrants in the MUTCD include eight-hour vehicular volume, four-hour vehicular volume, peak hour volume, pedestrian volume, school crossings, coordinated signal systems, crash experience, and roadway network. As most of these warrants are meant for existing conditions and not meant for planning purposes as discussed in this report, only the peak hour volume warrant will be considered at intersections where stop-controlled delay indicates that signals should be considered.

In this study, the intersections at N. Keller Drive & Damron Court and Avenue of Mid-America & Damron Court are expected to meet the peak hour traffic signal warrant in 2030 and are analyzed as signalized intersections in 2030 and 2040. In the Year 2040, the intersections at Ford Avenue & N. 4<sup>th</sup> Street and Ford Avenue & N. Raney Street warrant traffic signals in 2040 and are therefore analyzed as signalized intersections in that year.

It is important to note that the analysis performed makes a number of assumptions regarding location of future development. Therefore, the unsignalized intersections in this study may meet warrants for signalization at any time in the design period if development differs substantially from what has been assumed in this report. See **Appendix J** for traffic signal warrant analysis.

## 5. Conclusions

From this analysis, various conclusions can be drawn about the adequacy of the study roadway network as the area develops further. These conclusions can be summarized as follows:

- The existing roadway network should function adequately in the Year 2025 with minimal changes to the existing intersections.
- The Damron Court extension by the Year 2030 will divert a large volume of traffic from the intersection of N. Keller Drive & Avenue of Mid-America.
- The Ford Avenue extension to N. 4<sup>th</sup> Street by the Year 2030 will divert traffic from the Rickelman Avenue intersections at N. Raney Street and Charlotte Street and concentrate it at the intersection with N. 4<sup>th</sup> Street. This results in a heavy westbound left-turn and northbound right-turn volume.
- In Year 2040, traffic volumes on N. Keller Drive south of Damron Court will warrant widening to provide three lanes in each direction. However, this would require widening the existing bridge over I-57/70. For the sake of improving traffic flow in this 600 feet of N. Keller Drive, widening the bridge would be too costly to justify, especially since none of the approaches on N. Keller Drive intersections are LOS E or F.

## 6. Recommended Improvements

The traffic analyses in this report were initially performed using existing traffic control and lane configurations. The capacity analysis results were then used to determine where there were

deficiencies and improvements implemented to yield acceptable delays and LOS. Recommended improvements are summarized as follows:

Year 2025

1. Rickelman Avenue & N. Raney Street: The northbound and westbound approaches are currently free-flow while the eastbound approach is stop-controlled. This should be revised so that the eastbound and westbound approaches are free-flow and the northbound approach is stop-controlled.

Year 2030

1. All existing protected/permitted left-turn signal heads should be replaced with flashing yellow left-turn signal heads.
2. Avenue of Mid-America & Damron Court: Traffic signals should be installed. The eastbound and westbound approaches should provide one exclusive left-turn lane, one exclusive thru lane, and one shared thru/right-turn lane. The northbound approach should provide one exclusive left-turn lane, one exclusive thru lane, and one exclusive right-turn lane. The southbound approach should provide one exclusive left-turn lane and one shared thru/right-turn lane.
3. N. Keller Drive & Damron Court: Traffic signals should be installed. A northbound right-turn lane should be constructed. The westbound approach should provide one exclusive left-turn lane and one shared left/thru/right-turn lane. The eastbound approach should provide one exclusive left-turn lane and one shared thru/right-turn lane.
4. N. Keller Drive & Avenue of Mid-America: The westbound approach should be changed to provide one exclusive left-turn lane and one shared thru/right-turn lane. The existing split-phased signal phasing for the eastbound and westbound approaches should be changed to provide protected/permitted left-turn signal phasing. Finally, a northbound right-turn overlap phase should be provided.
5. Ford Avenue & N. Raney Street: Left-turn lanes should be provided on all approaches. The existing four-way stop control should be converted to a two-way stop with the N. Raney Street approaches stop-controlled and the Ford Avenue approaches free-flow.
6. Ford Avenue & Charlotte Street: The existing four-way stop control should be converted to a two-way stop with the Charlotte Street approaches stop-controlled and the Ford Avenue approaches free-flow.
7. Ford Avenue & N. 4<sup>th</sup> Street: This new intersection should be an all-way stop-controlled intersection. The northbound approach should provide a left-turn lane and a thru lane. The southbound approach should provide a thru lane and a right-turn lane. The eastbound approach should provide a left-turn lane and a right-turn lane.
8. Rickelman Avenue & N. 4<sup>th</sup> Street: This intersection should be reconstructed as a roundabout. Traffic signals are not warranted, in spite of the fact that delays for stopped vehicles are unacceptable. Oftentimes, this is tolerated because drivers have other

options at their disposal if they do not want to accept long delays. However, forcing drivers to use other roadways because of unacceptable delays at this intersection defeats the purpose of extending Ford Avenue to N. 4<sup>th</sup> Street. Therefore, a roundabout is the best solution at this intersection, functioning very well.

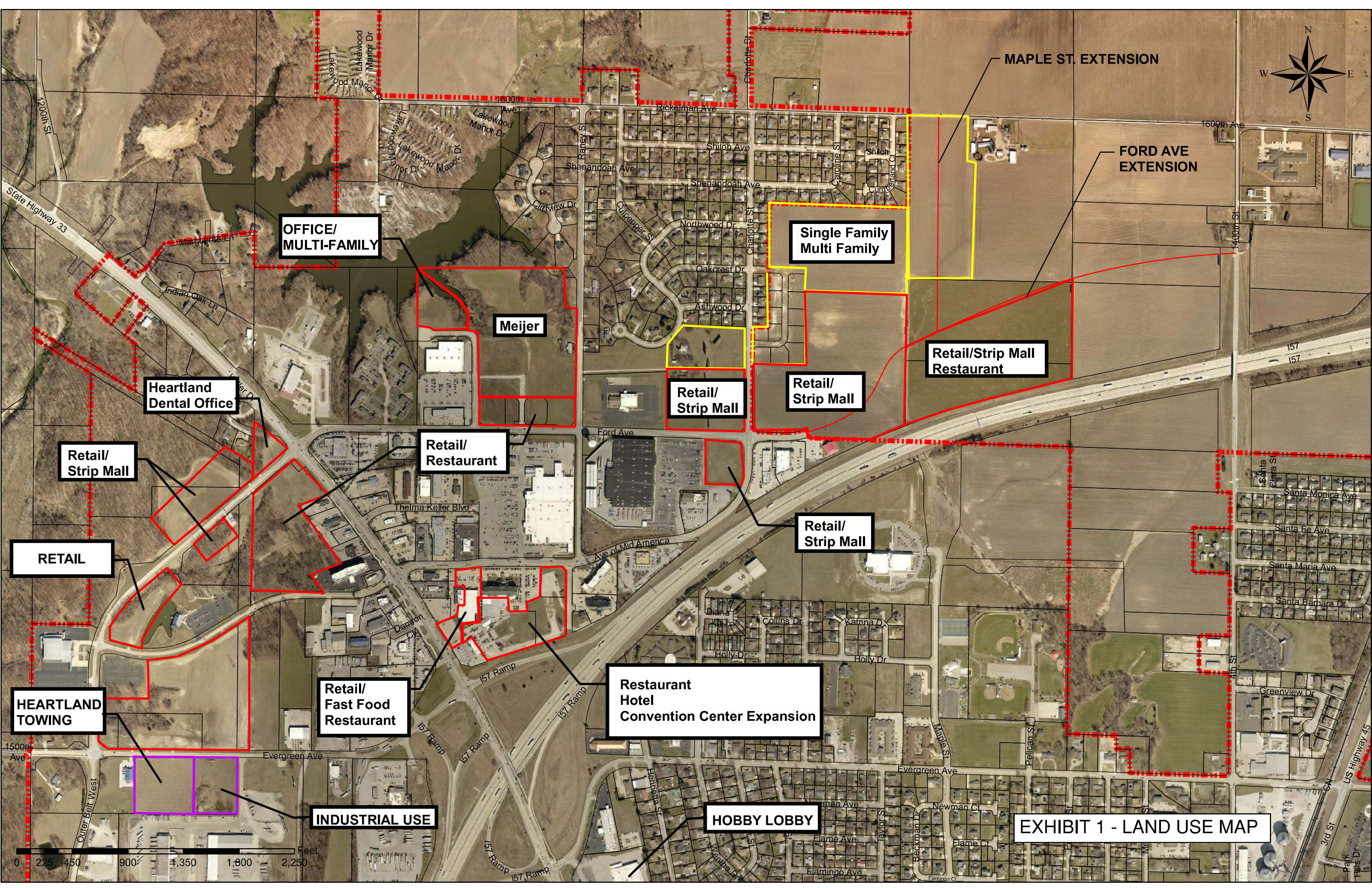
Year 2040

1. Ford Avenue & Charlotte Street: Traffic signals should be installed.
2. Ford Avenue & N. 4<sup>th</sup> Street: Traffic signals should be installed.

**Exhibits 8A-8C** in **Appendix A** shows the recommended intersection traffic control and lane configurations for Years 2025, 2030, and 2040.

## **Appendix A**

<u>Exhibit 1</u>	Land Use Map
<u>Exhibit 2</u>	Existing Intersection Control and Lane Configurations
<u>Exhibit 3A</u>	Approximate Development Layout – Year 2025
<u>Exhibit 3B</u>	Approximate Development Layout – Year 2030
<u>Exhibit 3C</u>	Approximate Development Layout – Year 2040
<u>Exhibit 4</u>	Existing Design Hourly Volumes - 2018
<u>Exhibit 5A</u>	Base Design Hourly Volumes - 2025
<u>Exhibit 5B</u>	Base Design Hourly Volumes - 2030
<u>Exhibit 5C</u>	Base Design Hourly Volumes - 2040
<u>Exhibit 6A</u>	Development Generated Design Hourly Volumes - 2025
<u>Exhibit 6B</u>	Development Generated Design Hourly Volumes - 2030
<u>Exhibit 6C</u>	Development Generated Design Hourly Volumes - 2040
<u>Exhibit 7A</u>	Future Design Hourly Volumes - 2025
<u>Exhibit 7B</u>	Future Design Hourly Volumes - 2030
<u>Exhibit 7C</u>	Future Design Hourly Volumes - 2040
<u>Exhibit 8A</u>	Recommended Intersection Control and Lane Configurations - 2025
<u>Exhibit 8B</u>	Recommended Intersection Control and Lane Configurations - 2030
<u>Exhibit 8C</u>	Recommended Intersection Control and Lane Configurations - 2040



**OFFICE/  
MULTI-FAMILY**

**Meijer**

**Single Family  
Multi Family**

**Retail/Strip Mall  
Restaurant**

**Retail/  
Strip Mall**

**Retail/  
Strip Mall**

**Heartland  
Dental Office**

**Retail/  
Strip Mall**

**Retail/  
Restaurant**

**Retail/  
Strip Mall**

**RETAIL**

**HEARTLAND  
TOWING**

**Retail/  
Fast Food  
Restaurant**

**Restaurant  
Hotel  
Convention Center Expansion**

**INDUSTRIAL USE**

**HOBBY LOBBY**

**EXHIBIT 1 - LAND USE MAP**



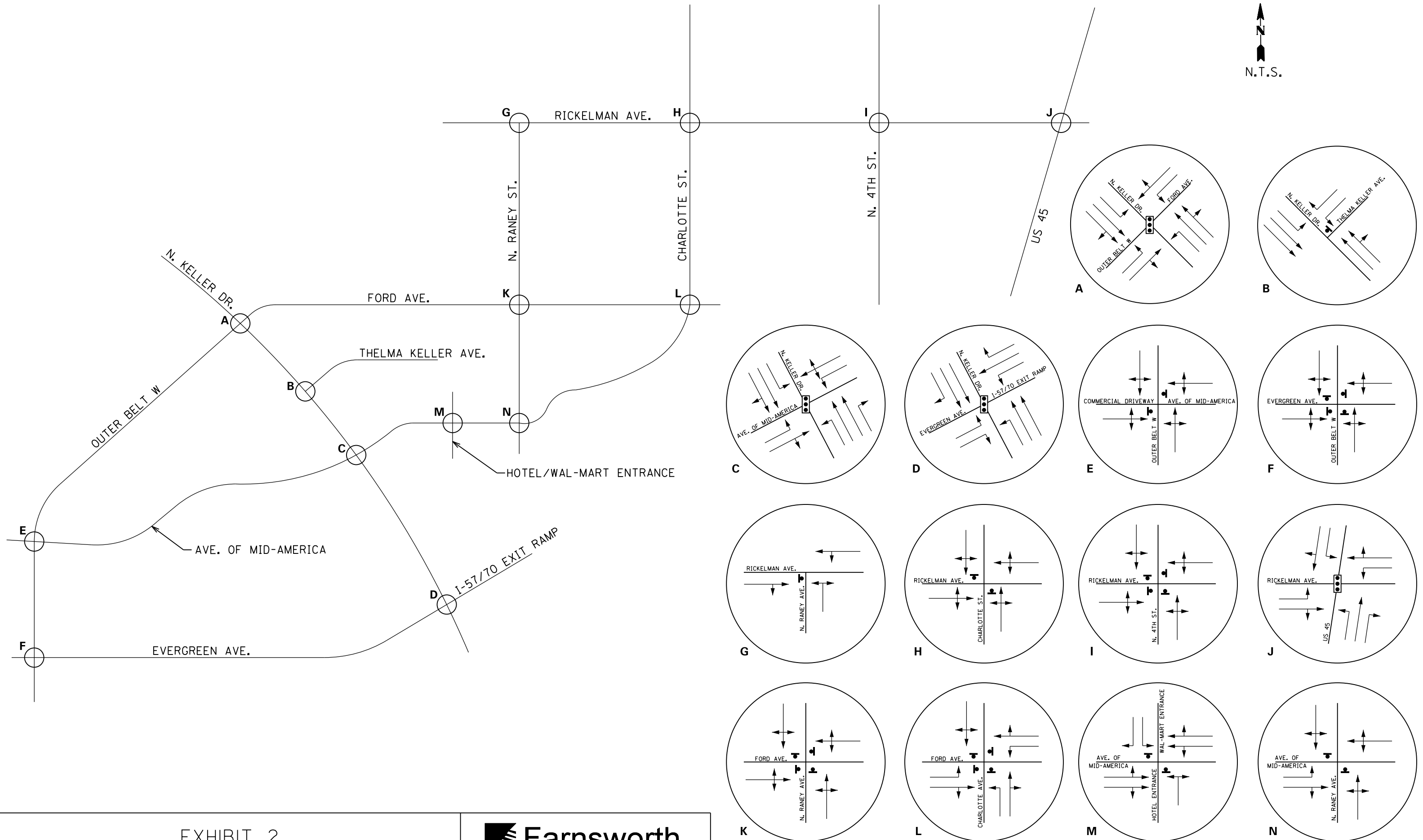
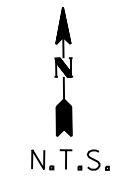
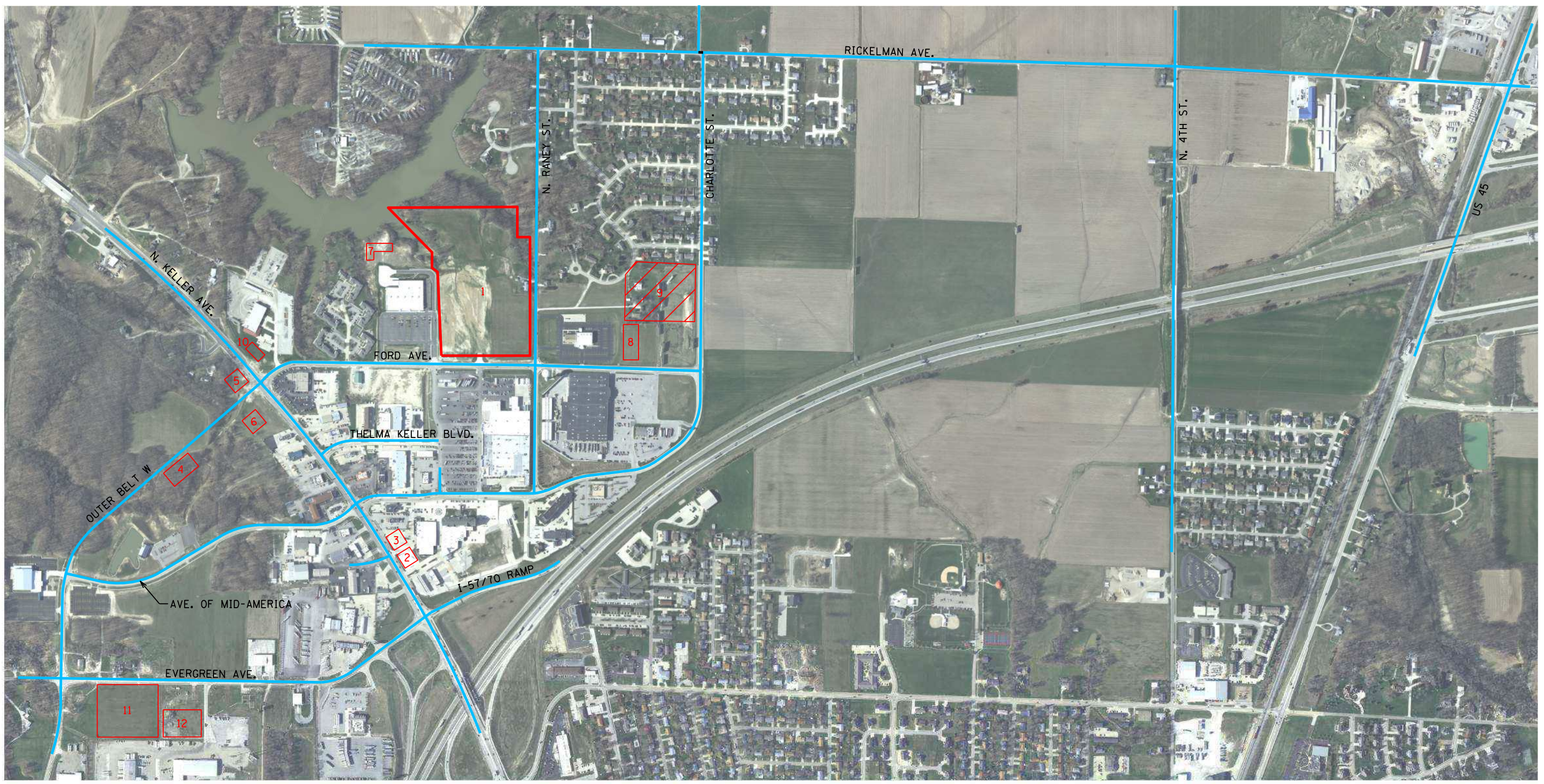
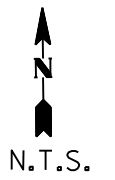


EXHIBIT 2  
EXISTING INTERSECTION CONTROL  
AND LANE CONFIGURATIONS

**Farnsworth**  
GROUP  
400 W. JEFFERSON, SUITE A  
EFFINGHAM, IL 62401  
(217) 342-5668



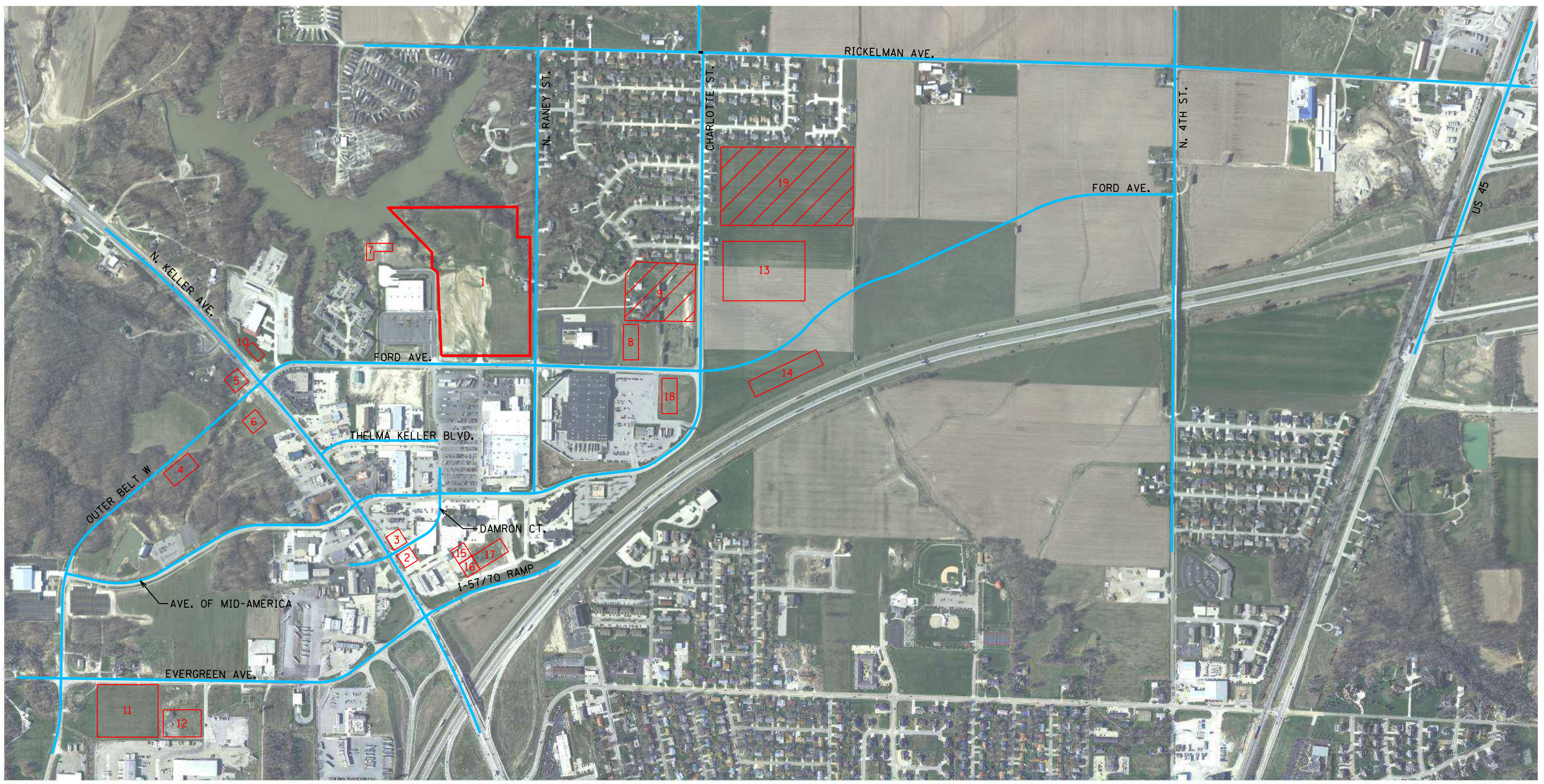
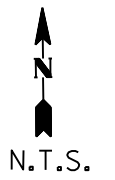


LEGEND

- 1 MEIJER PROPERTY
- 2 LIQUOR STORE - 12,000 SF
- 3 FAST-FOOD RESTAURANT W/ DRIVE-THRU - 5,000 SF
- 4 SPECIALTY RETAIL CENTER - 16,000 SF
- 5 MEDICAL-DENTAL OFFICE BUILDING - 8,000 SF
- 6 SIT-DOWN RESTAURANT - 12,000 SF
- 7 LOW-RISE APARTMENTS - 10 UNITS
- 8 OFFICE SUPPLY SUPERSTORE - 35,000 SF
- 9 SINGLE-FAMILY DETACHED HOUSING - 10 UNITS
- 10 AUTOMOBILE PARTS STORE - 6,000 SF
- 11 TOWING COMPANY
- 12 GENERAL LIGHT INDUSTRIAL

EXHIBIT 3A  
 APPROXIMATE DEVELOPMENT LAYOUT  
 YEAR 2025

**Farnsworth**  
 GROUP  
 400 W. JEFFERSON, SUITE A  
 EFFINGHAM, IL 62401  
 (217) 342-5668

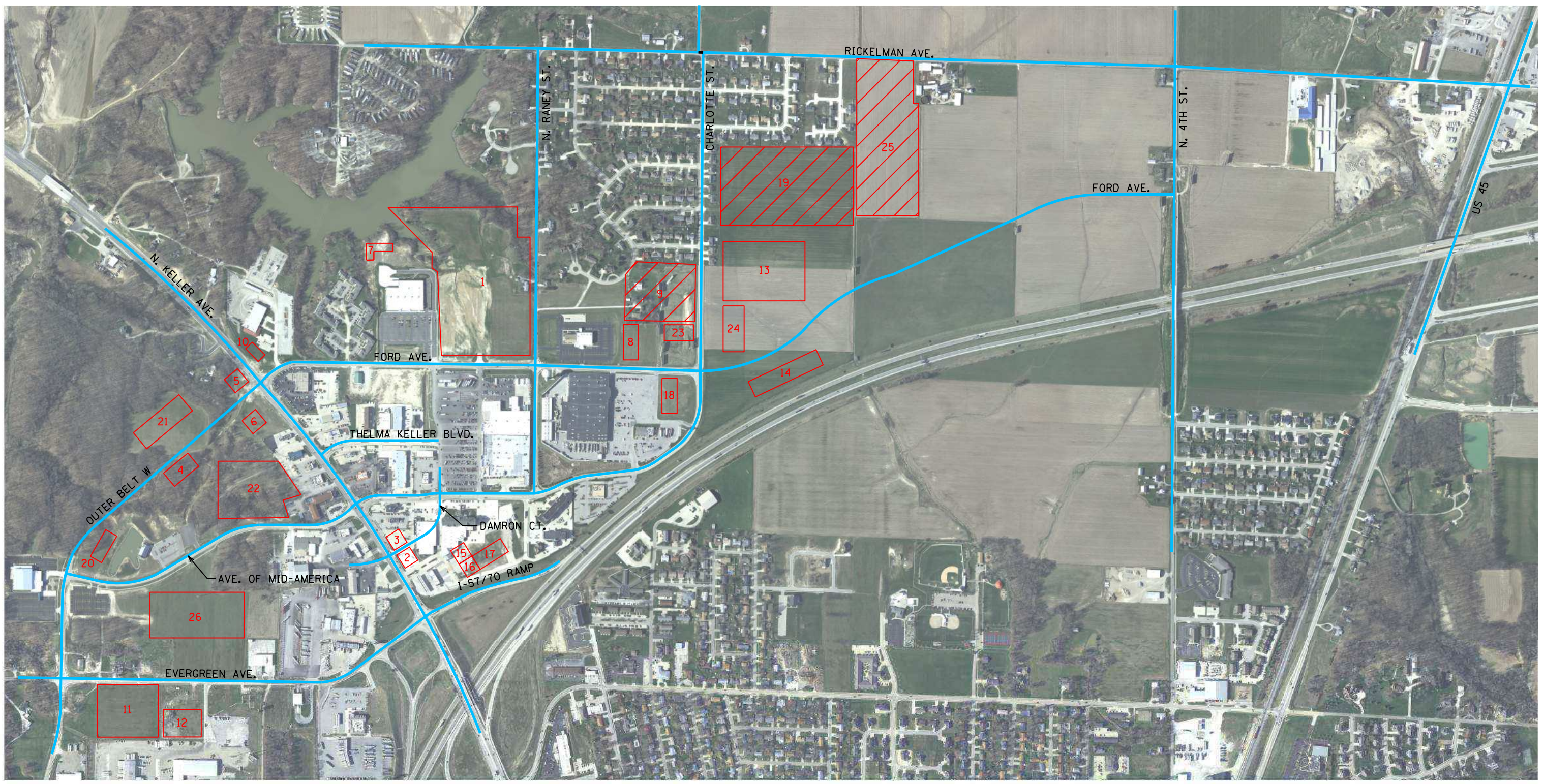


LEGEND

- |    |   |    |   |
|----|---|----|---|
| 1  | MEIJER PROPERTY                               | 15 | CONVENTION CENTER EXPANSION - 20,000 SF   |
| 2  | LIQUOR STORE - 12,000 SF                      | 16 | SIT-DOWN RESTAURANT - 8,000 SF            |
| 3  | FAST-FOOD RESTAURANT W/ DRIVE-THRU - 5,000 SF | 17 | HOTEL - 60 ROOMS                          |
| 4  | SPECIALTY RETAIL CENTER - 16,000 SF           | 18 | SPECIALTY RETAIL CENTER - 25,000 SF       |
| 5  | MEDICAL-DENTAL OFFICE BUILDING - 8,000 SF     | 19 | SINGLE-FAMILY DETACHED HOUSING - 50 UNITS |
| 6  | SIT-DOWN RESTAURANT - 12,000 SF               |    |   |
| 7  | LOW-RISE APARTMENTS - 10 UNITS                |    |   |
| 8  | OFFICE SUPPLY SUPERSTORE - 35,000 SF          |    |   |
| 9  | SINGLE-FAMILY DETACHED HOUSING - 10 UNITS     |    |   |
| 10 | AUTOMOBILE PARTS STORE - 6,000 SF             |    |   |
| 11 | TOWING COMPANY                                |    |   |
| 12 | GENERAL LIGHT INDUSTRIAL - 70,000 SF          |    |   |
| 13 | HOME IMPROVEMENT SUPERSTORE - 150,000 SF      |    |   |
| 14 | SPECIALTY RETAIL CENTER - 50,000 SF           |    |   |

EXHIBIT 3B  
 APPROXIMATE DEVELOPMENT LAYOUT  
 YEAR 2030

**Farnsworth**  
 GROUP  
 400 W. JEFFERSON, SUITE A  
 EFFINGHAM, IL 62401  
 (217) 342-5668



LEGEND

- |    |   |    |  |
|----|---|----|--|
| 1  | MEIJER PROPERTY                               | 15 | CONVENTION CENTER EXPANSION - 20,000 SF        |
| 2  | LIQUOR STORE - 12,000 SF                      | 16 | SIT-DOWN RESTAURANT - 8,000 SF                 |
| 3  | FAST-FOOD RESTAURANT W/ DRIVE-THRU - 5,000 SF | 17 | HOTEL - 60 ROOMS                               |
| 4  | SPECIALTY RETAIL CENTER - 16,000 SF           | 18 | SPECIALTY RETAIL CENTER - 25,000 SF            |
| 5  | MEDICAL-DENTAL OFFICE BUILDING - 8,000 SF     | 19 | SINGLE-FAMILY DETACHED HOUSING - 50 UNITS      |
| 6  | SIT-DOWN RESTAURANT - 12,000 SF               | 20 | CONVENTION CENTER - 30,000 SF                  |
| 7  | LOW-RISE APARTMENTS - 10 UNITS                | 21 | FURNITURE STORE - 75,000 SF                    |
| 8  | OFFICE SUPPLY SUPERSTORE - 35,000 SF          | 22 | AUTOMOBILE SALES - 20,000 SF                   |
| 9  | SINGLE-FAMILY DETACHED HOUSING - 10 UNITS     | 23 | PET SUPPLY SUPERSTORE - 20,000 SF              |
| 10 | AUTOMOBILE PARTS STORE - 6,000 SF             | 24 | SUPERMARKET - 45,000 SF                        |
| 11 | TOWING COMPANY                                | 25 | RESIDENTIAL CONDOMINIUMS/TOWNHOUSES - 40 UNITS |
| 12 | GENERAL LIGHT INDUSTRIAL - 70,000 SF          | 26 | DISCOUNT CLUB - 130,000 SF                     |
| 13 | HOME IMPROVEMENT SUPERSTORE - 150,000 SF      |    |  |
| 14 | SPECIALTY RETAIL CENTER - 50,000 SF           |    |  |

EXHIBIT 3C  
APPROXIMATE DEVELOPMENT LAYOUT  
YEAR 2040

**Farnsworth**  
GROUP  
400 W. JEFFERSON, SUITE A  
EFFINGHAM, IL 62401  
(217) 342-5668

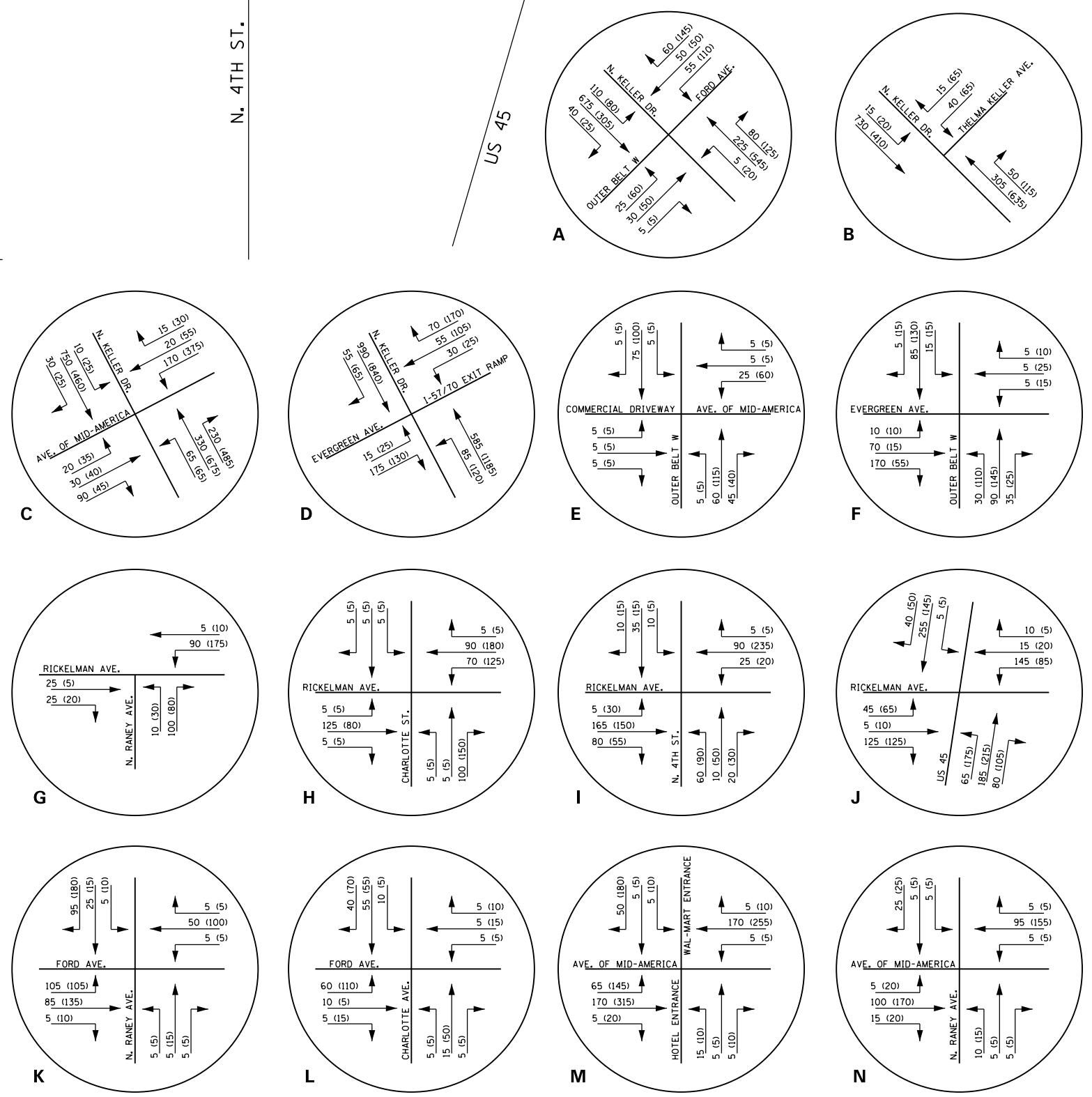
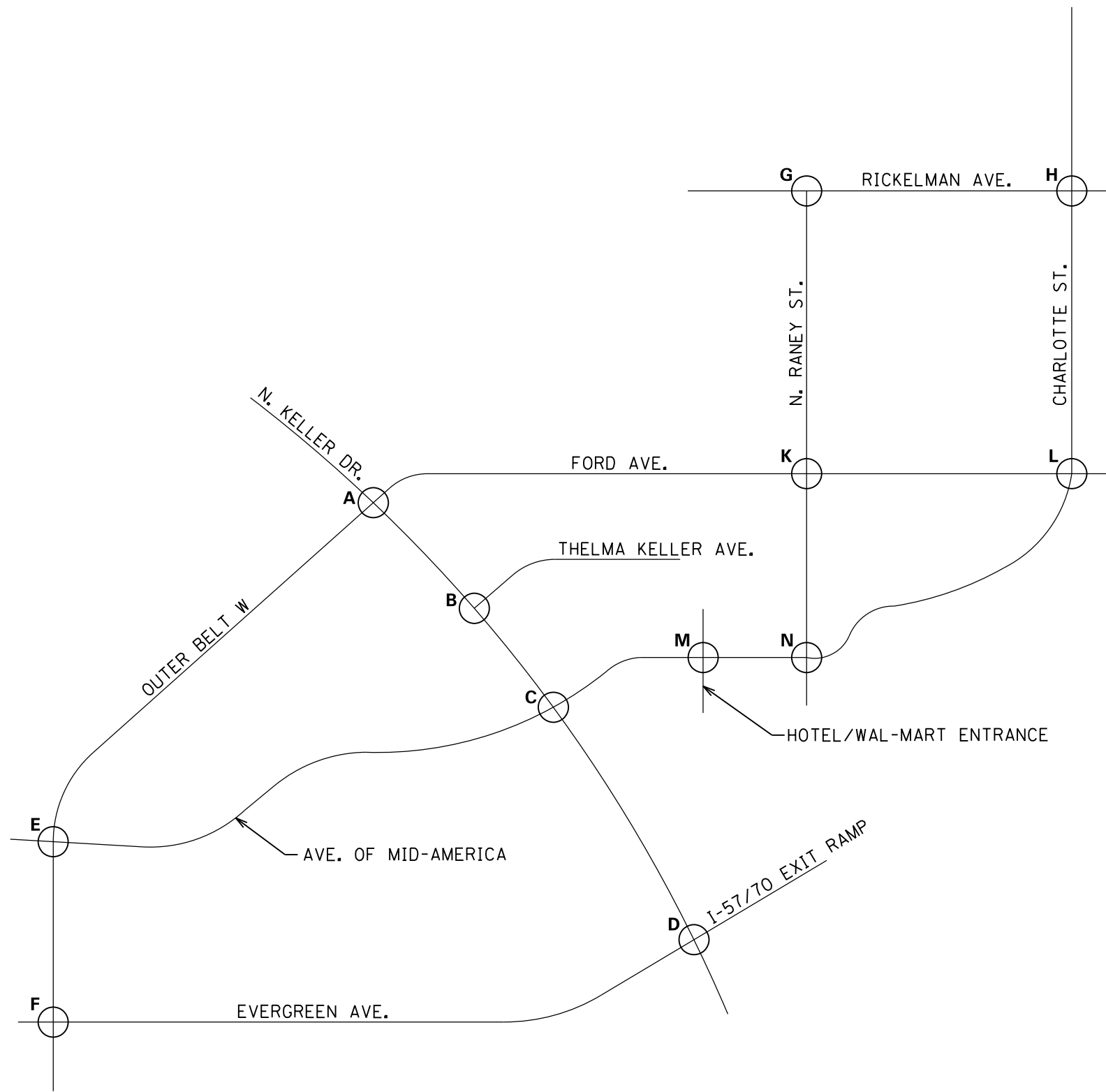
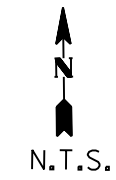


EXHIBIT 4  
EXISTING DESIGN HOURLY  
VOLUMES - 2018

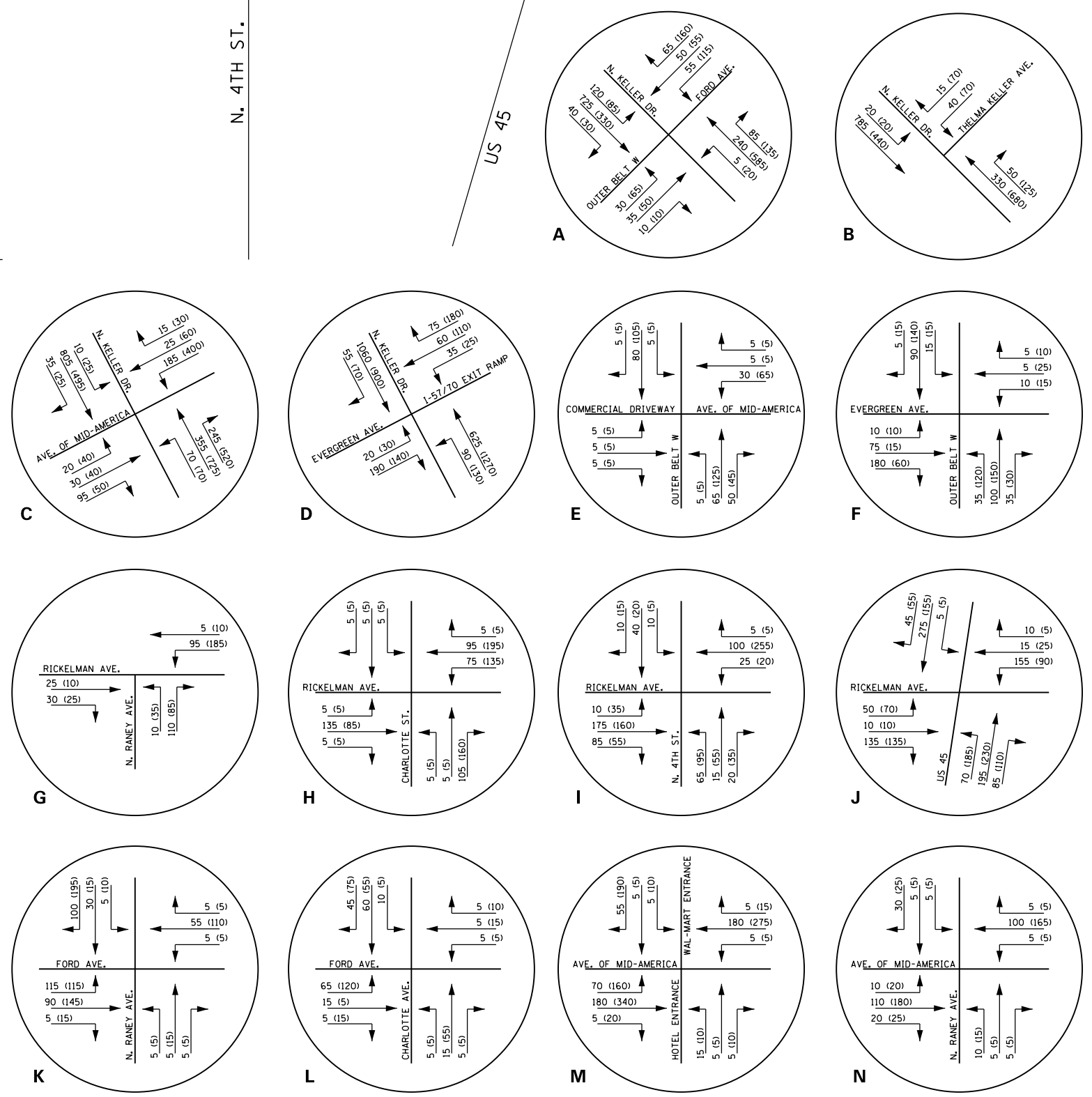
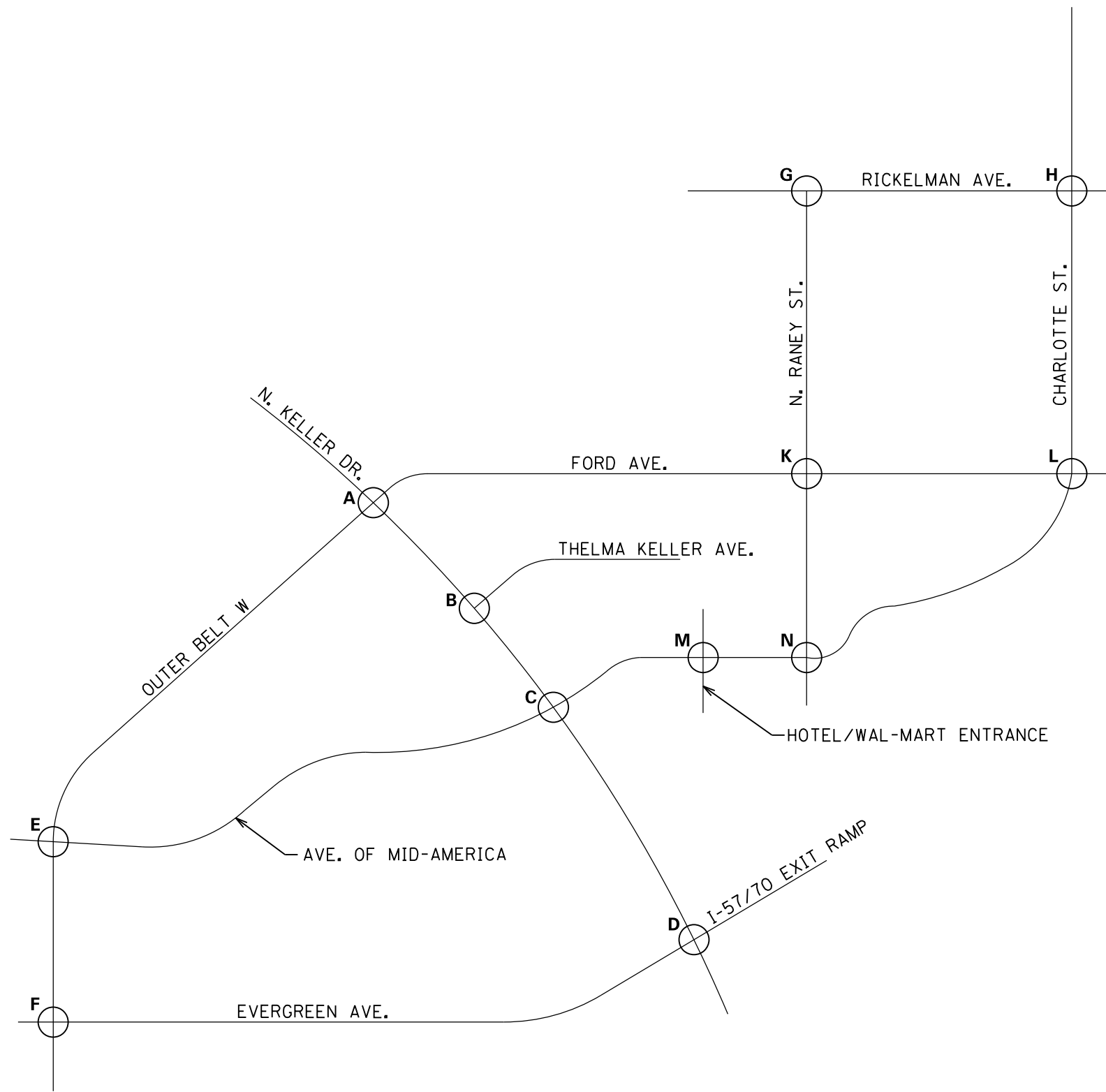
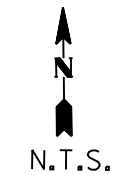


EXHIBIT 5A  
 BASE DESIGN HOURLY  
 VOLUMES - 2025

**Farnsworth**  
 GROUP  
 400 W. JEFFERSON, SUITE A  
 EFFINGHAM, IL 62401  
 (217) 342-5668

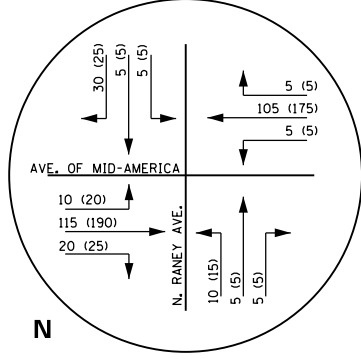
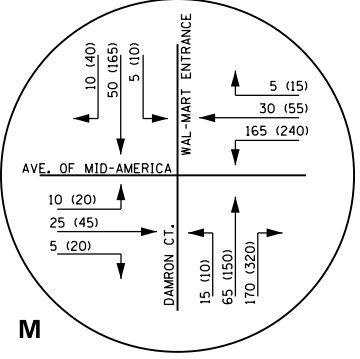
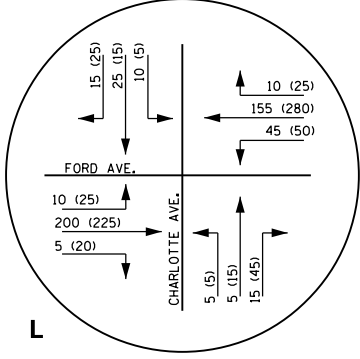
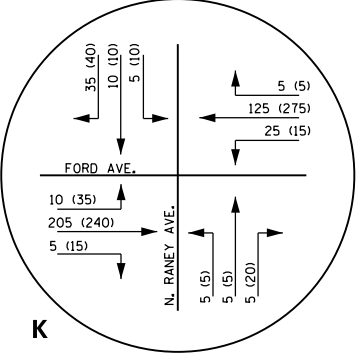
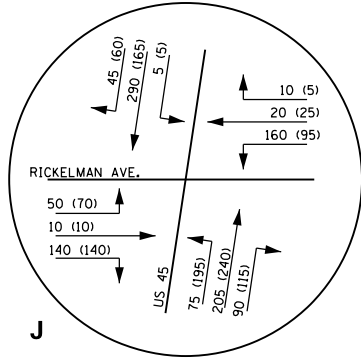
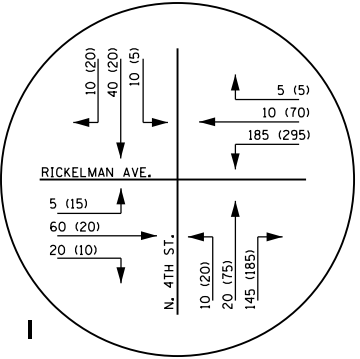
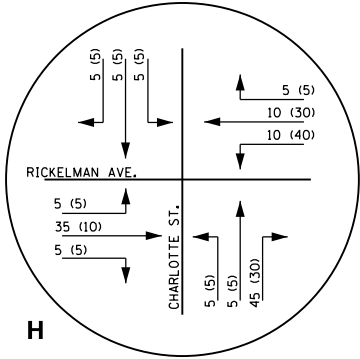
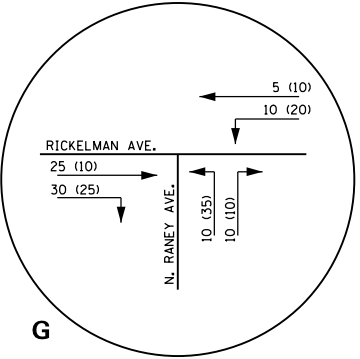
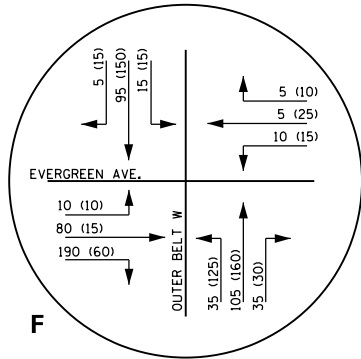
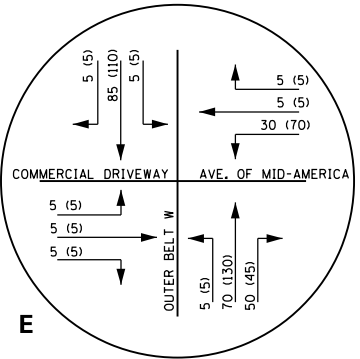
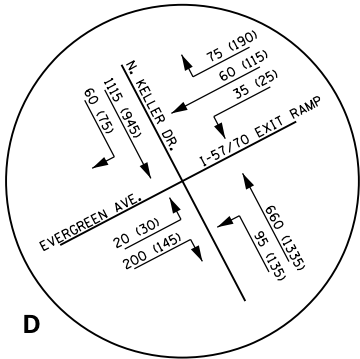
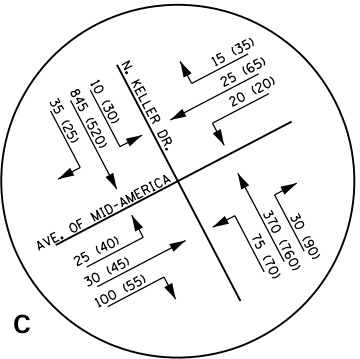
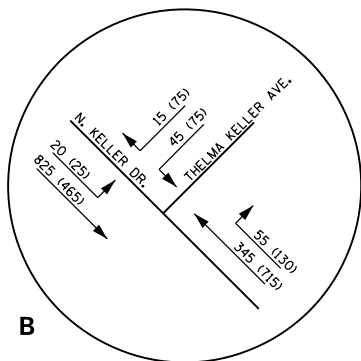
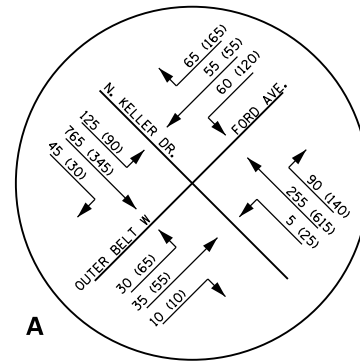
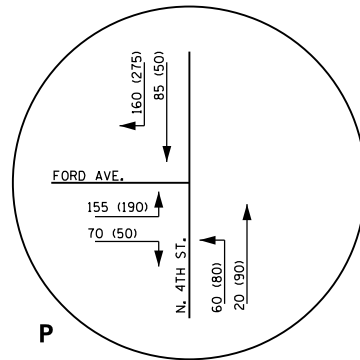
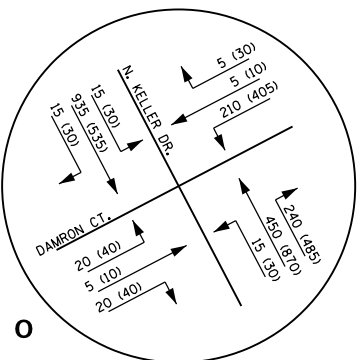
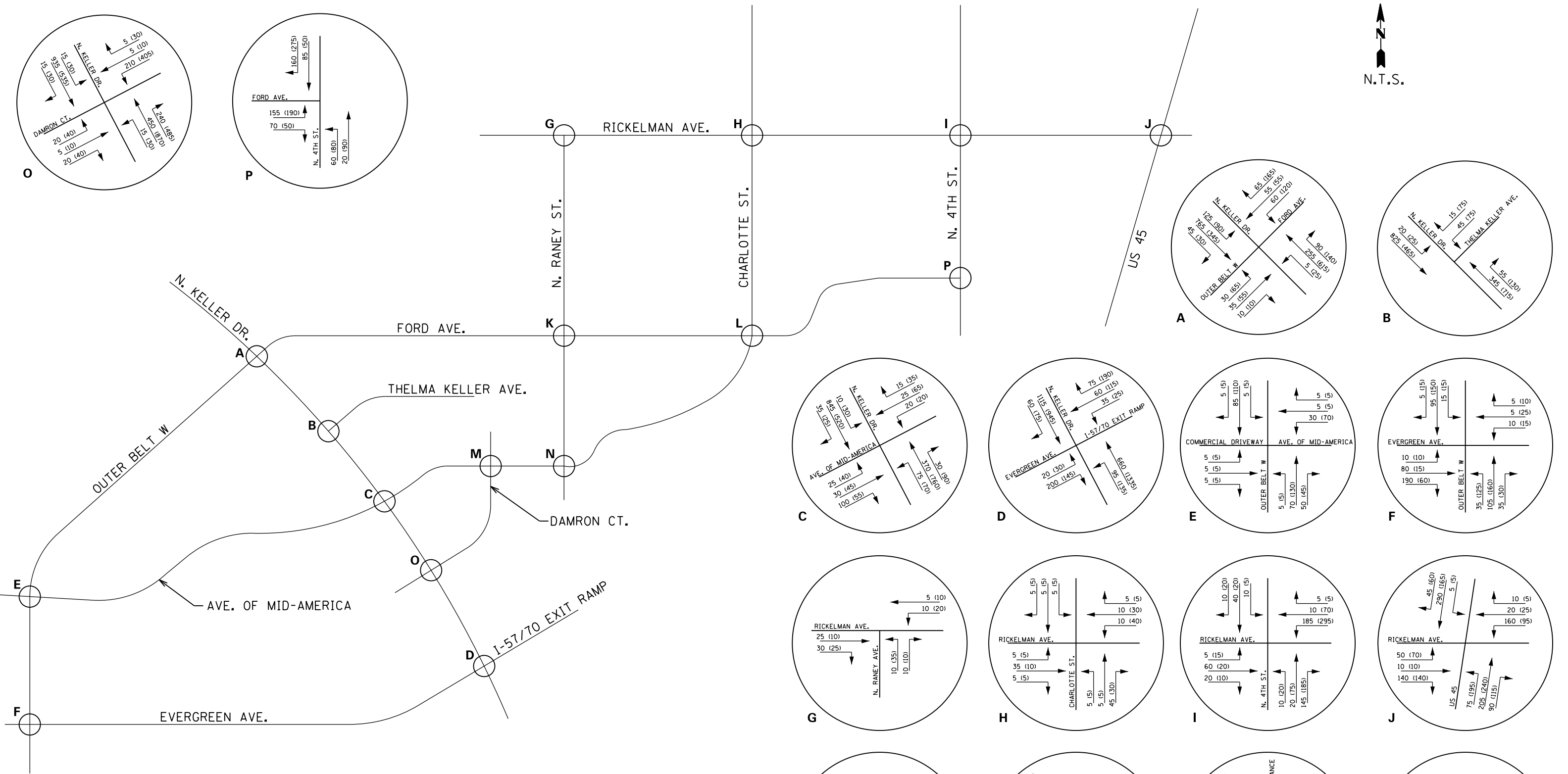
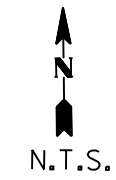


EXHIBIT 5B  
BASE DESIGN HOURLY  
VOLUMES - 2030

**Farnsworth**  
GROUP  
400 W. JEFFERSON, SUITE A  
EFFINGHAM, IL 62401  
(217) 342-5668

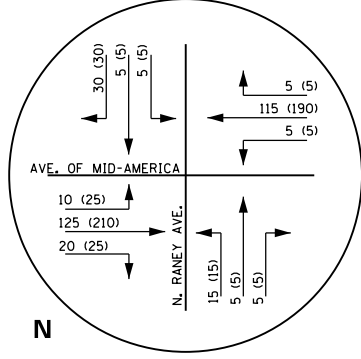
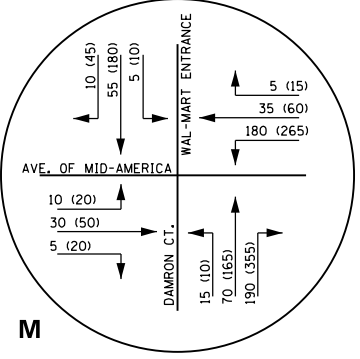
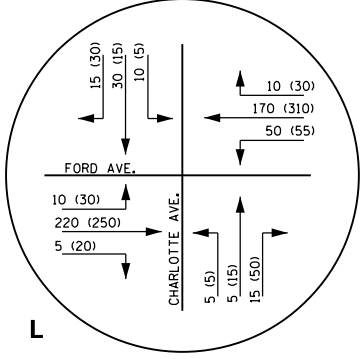
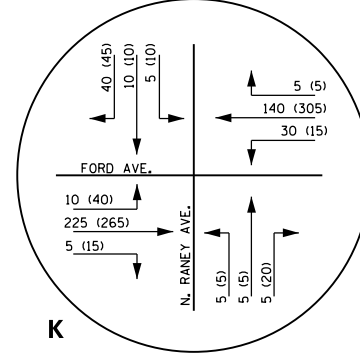
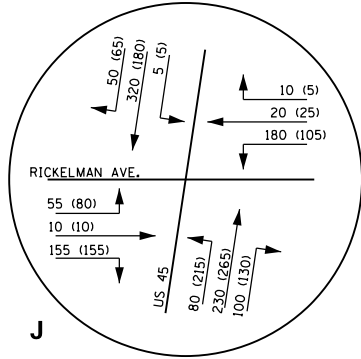
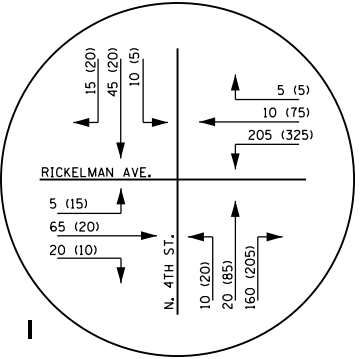
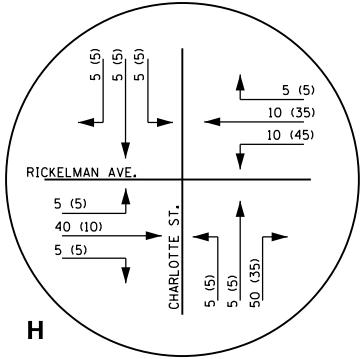
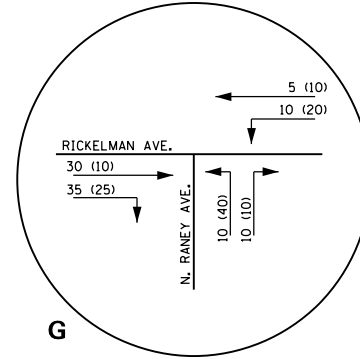
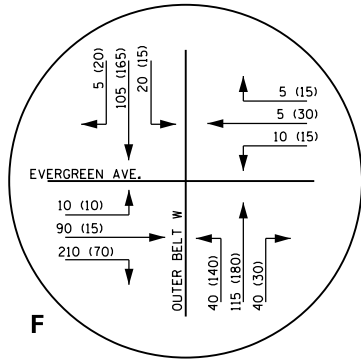
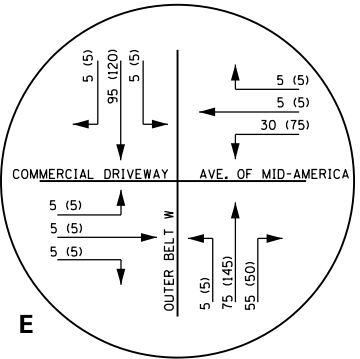
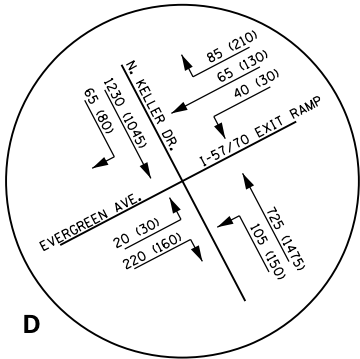
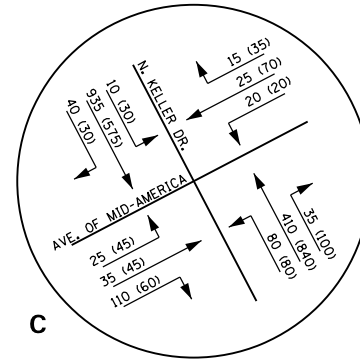
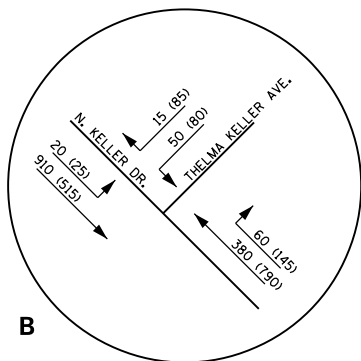
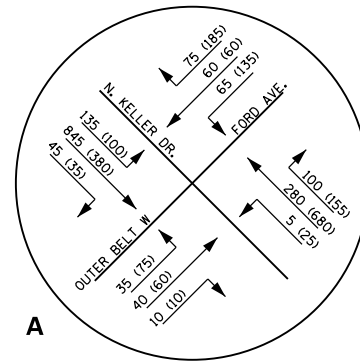
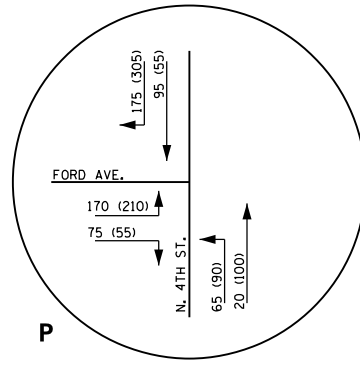
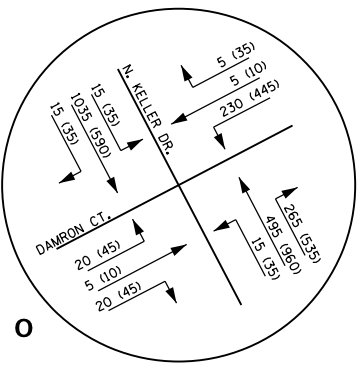
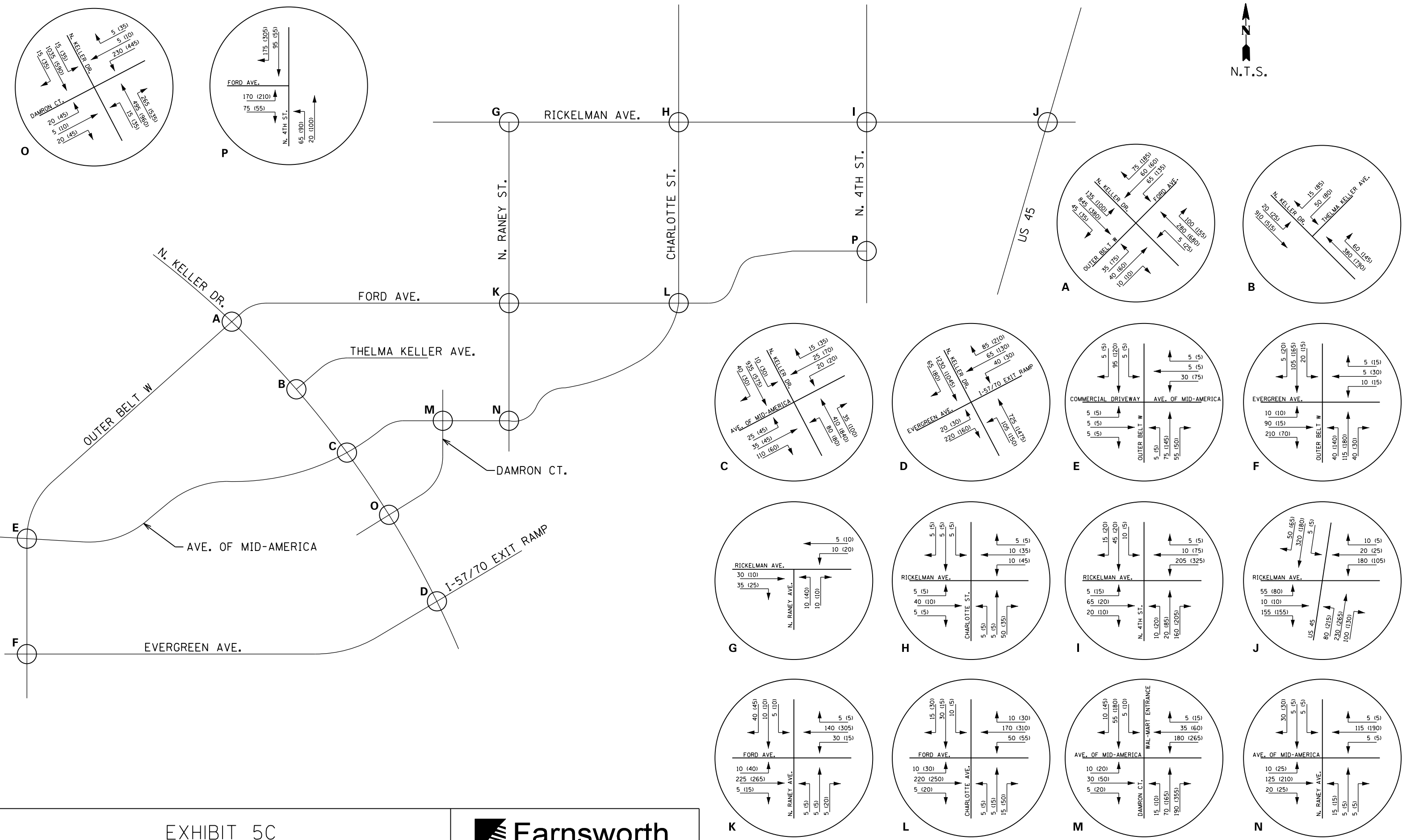
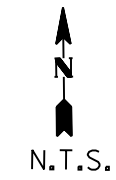


EXHIBIT 5C  
BASE DESIGN HOURLY  
VOLUMES - 2040

**Farnsworth**  
GROUP  
400 W. JEFFERSON, SUITE A  
EFFINGHAM, IL 62401  
(217) 342-5668

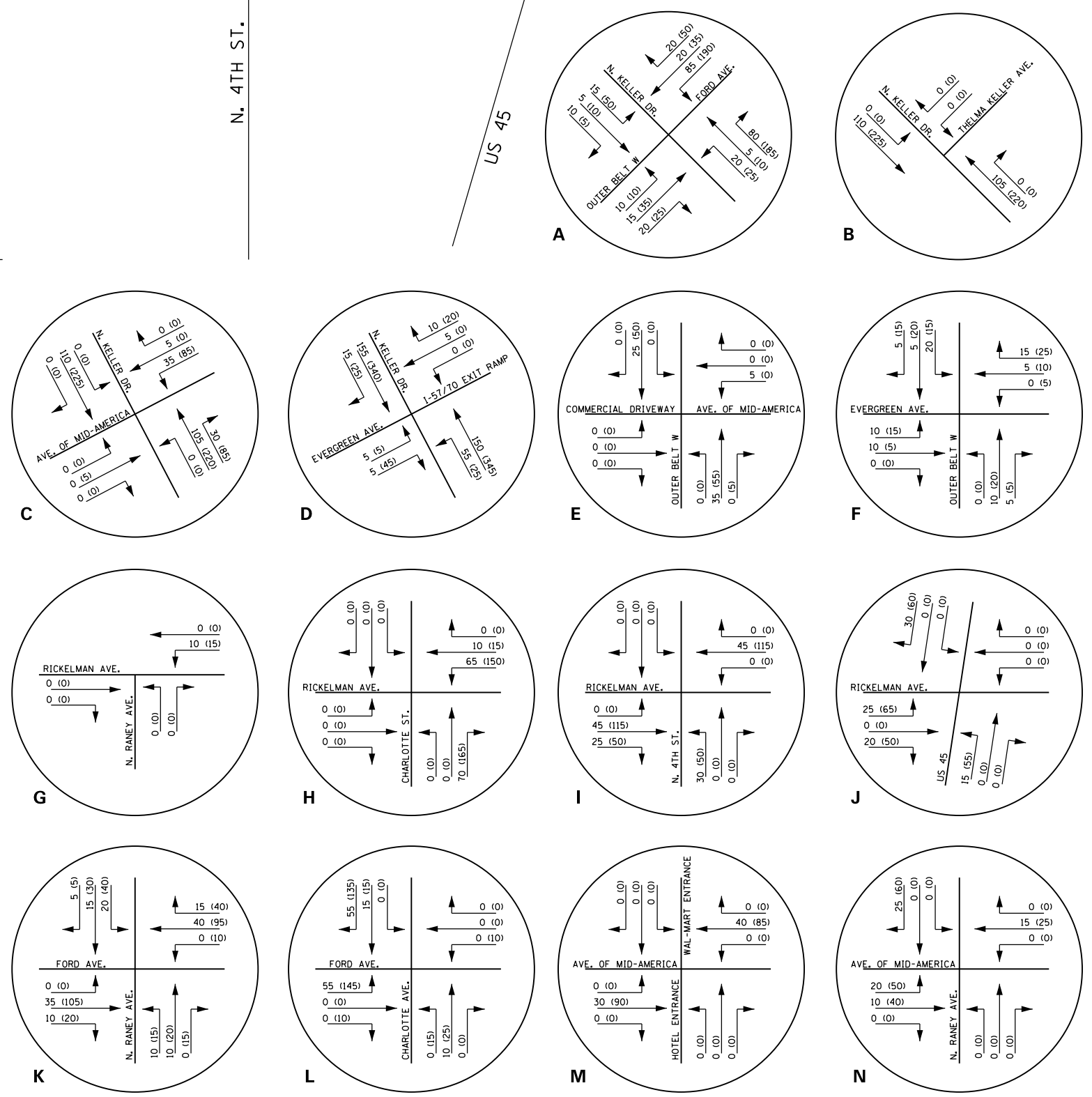
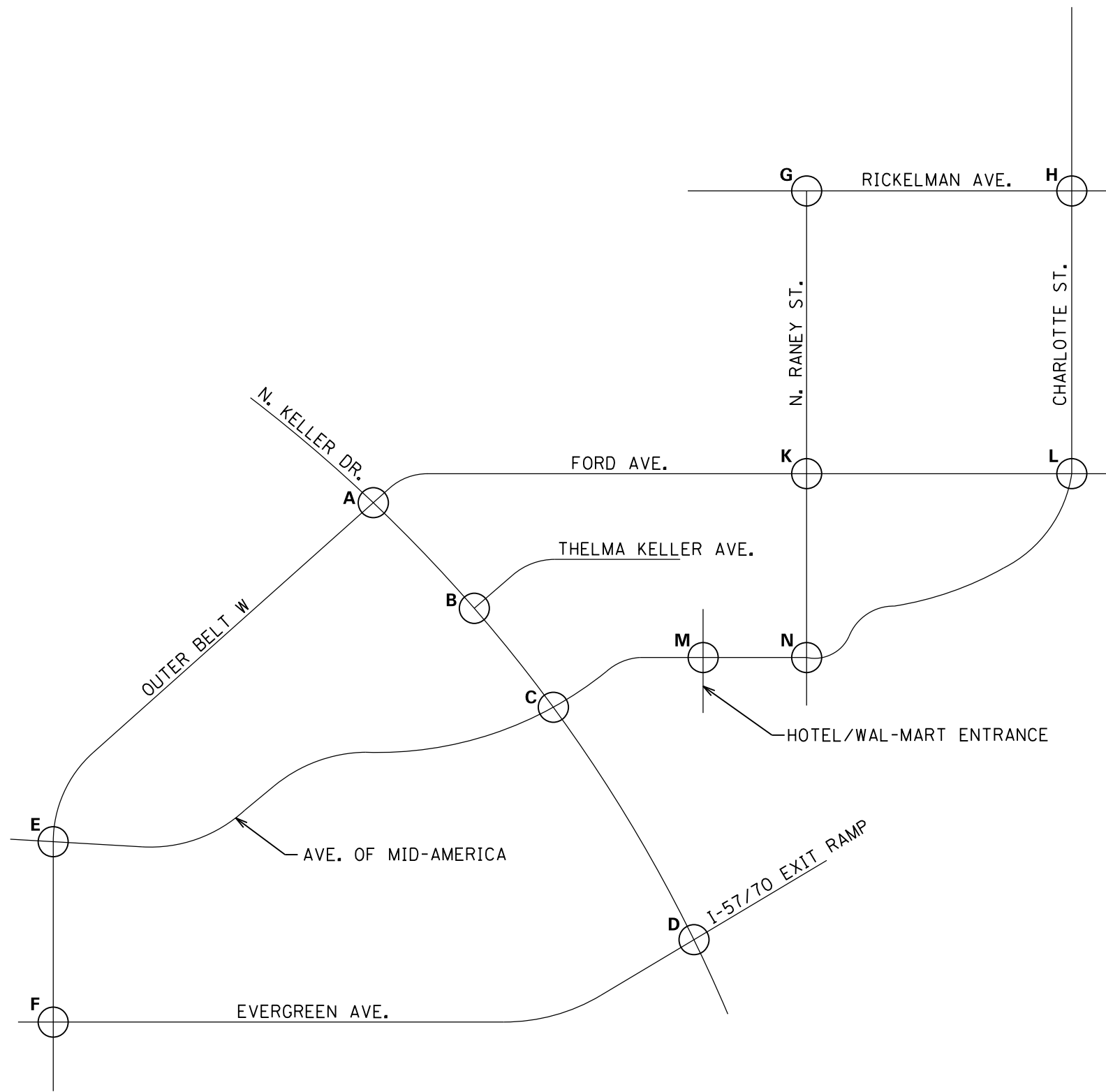
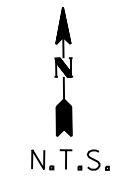


EXHIBIT 6A  
 DEVELOPMENT GENERATED DESIGN  
 HOURLY VOLUMES - 2025

**Farnsworth**  
 GROUP  
 400 W. JEFFERSON, SUITE A  
 EFFINGHAM, IL 62401  
 (217) 342-5668



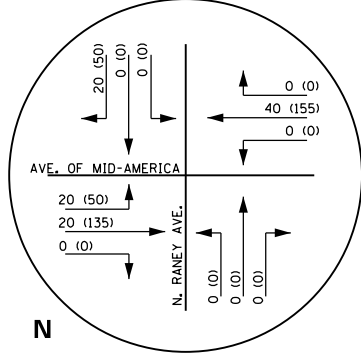
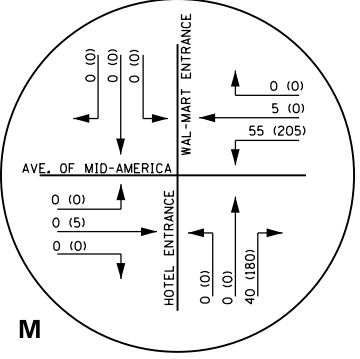
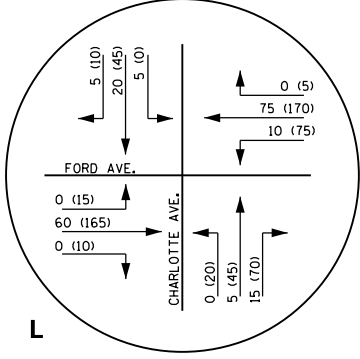
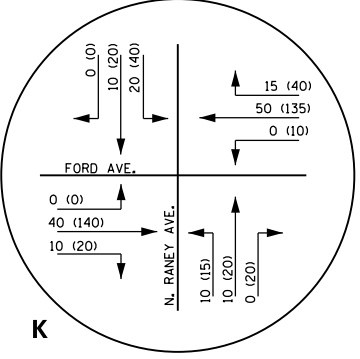
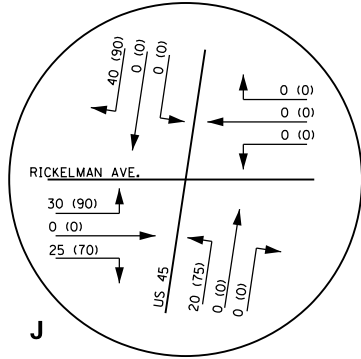
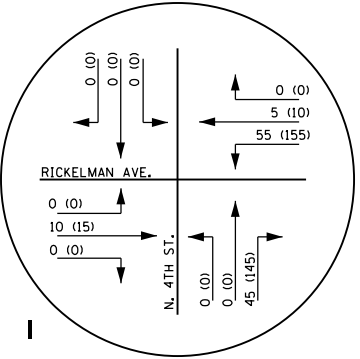
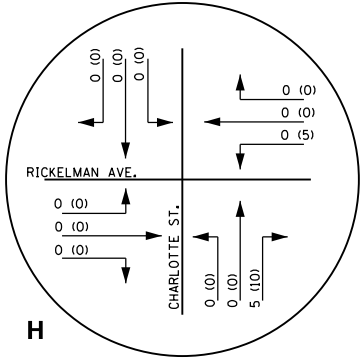
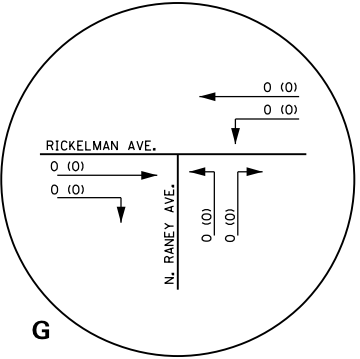
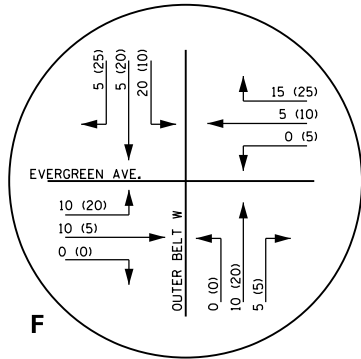
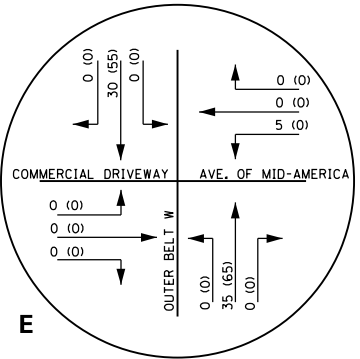
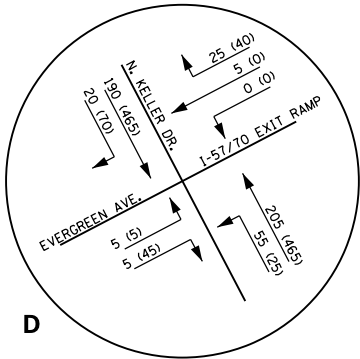
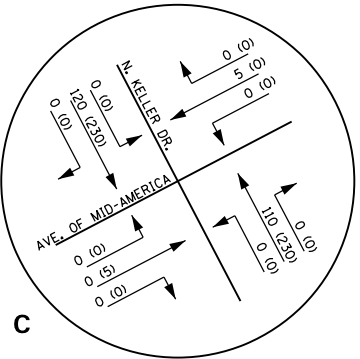
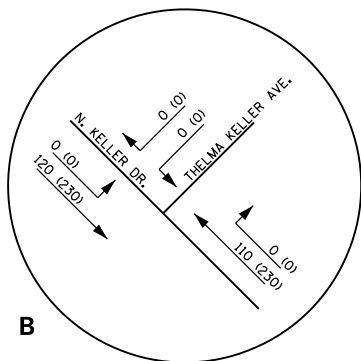
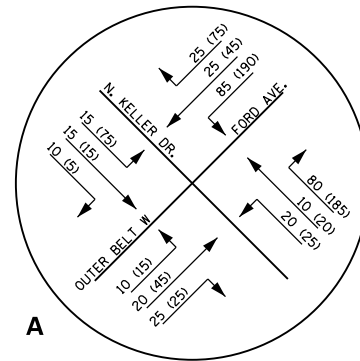
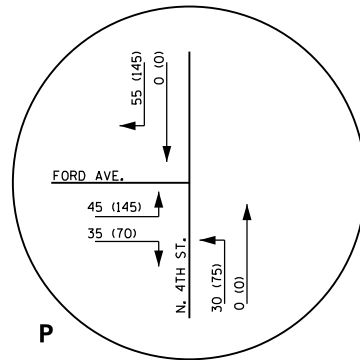
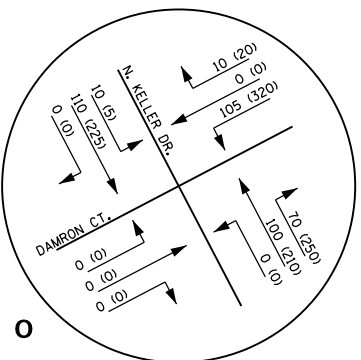
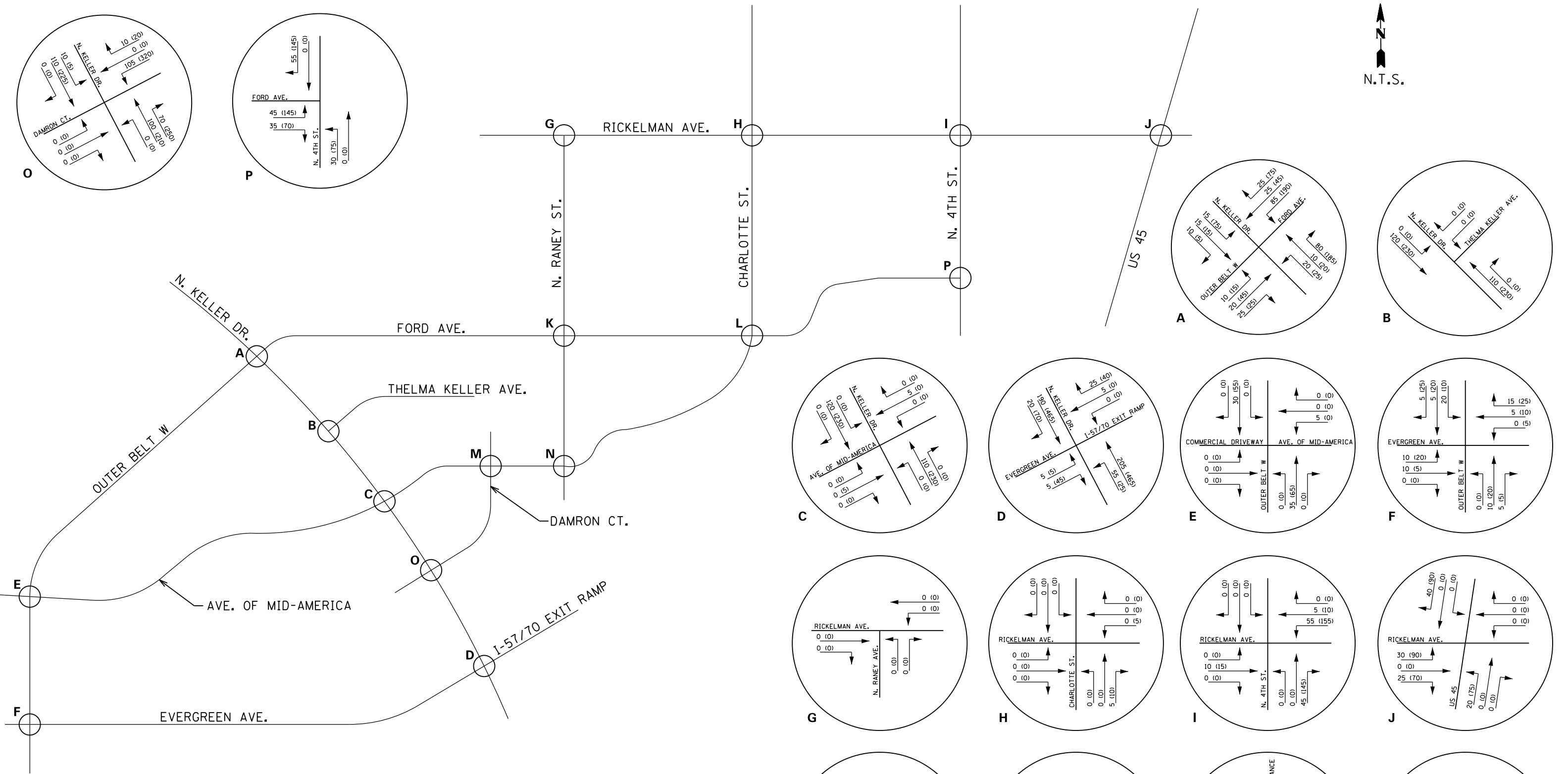
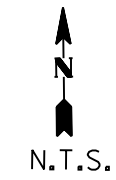


EXHIBIT 6B  
DEVELOPMENT GENERATED DESIGN  
HOURLY VOLUMES - 2030

**Farnsworth**  
GROUP  
400 W. JEFFERSON, SUITE A  
EFFINGHAM, IL 62401  
(217) 342-5668

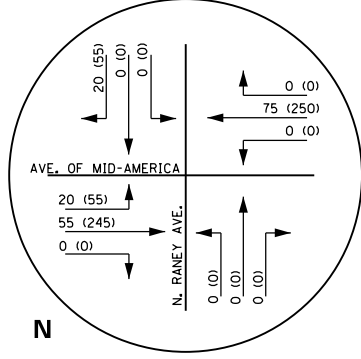
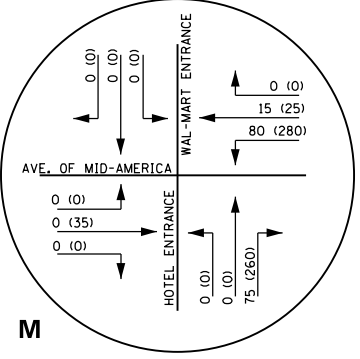
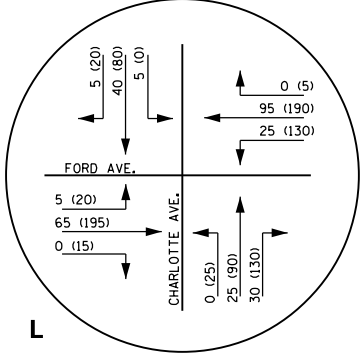
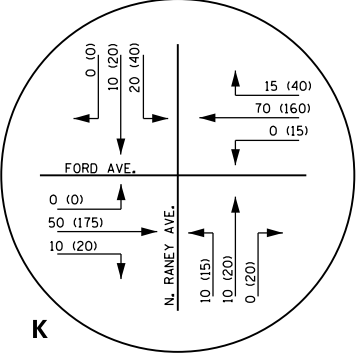
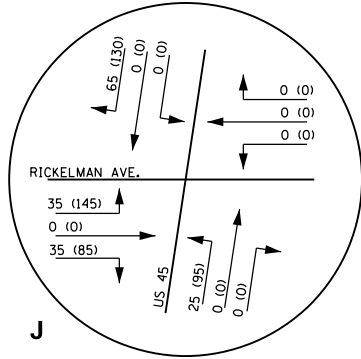
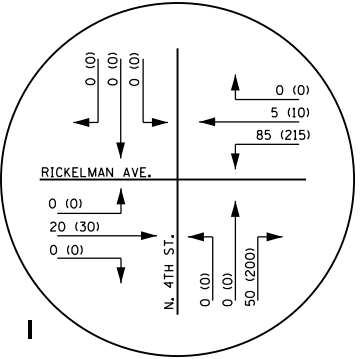
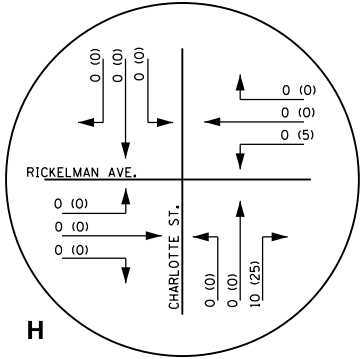
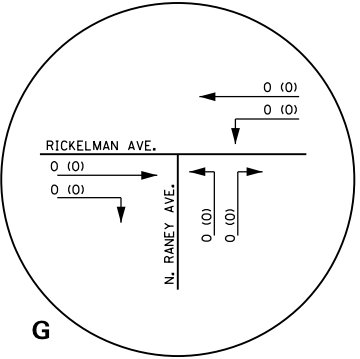
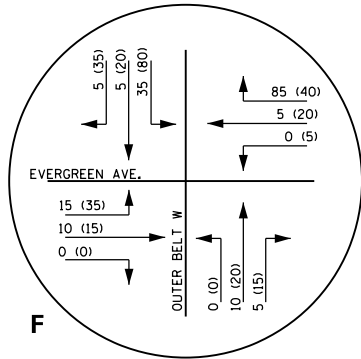
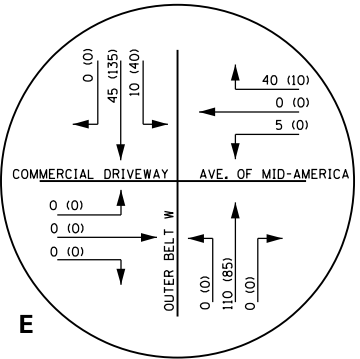
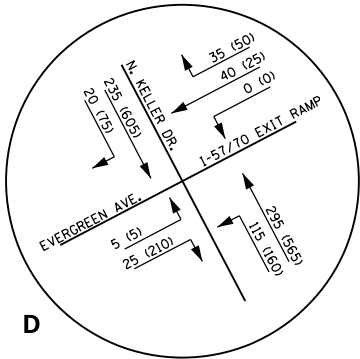
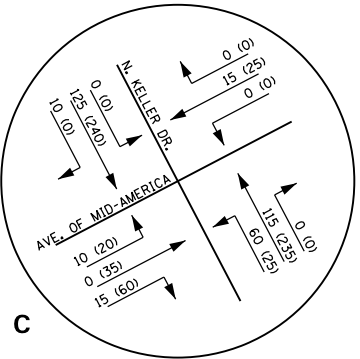
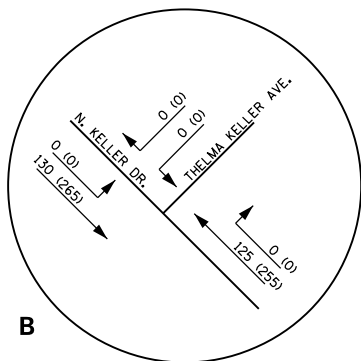
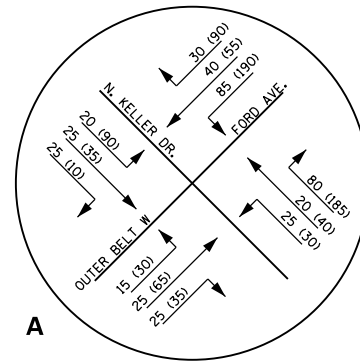
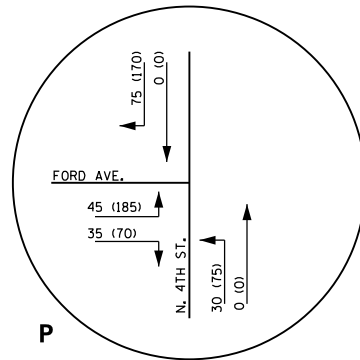
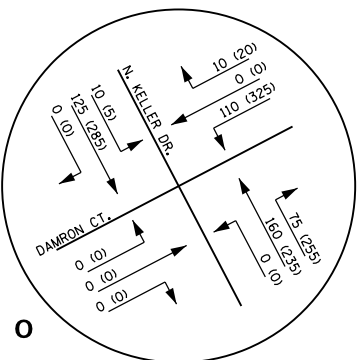
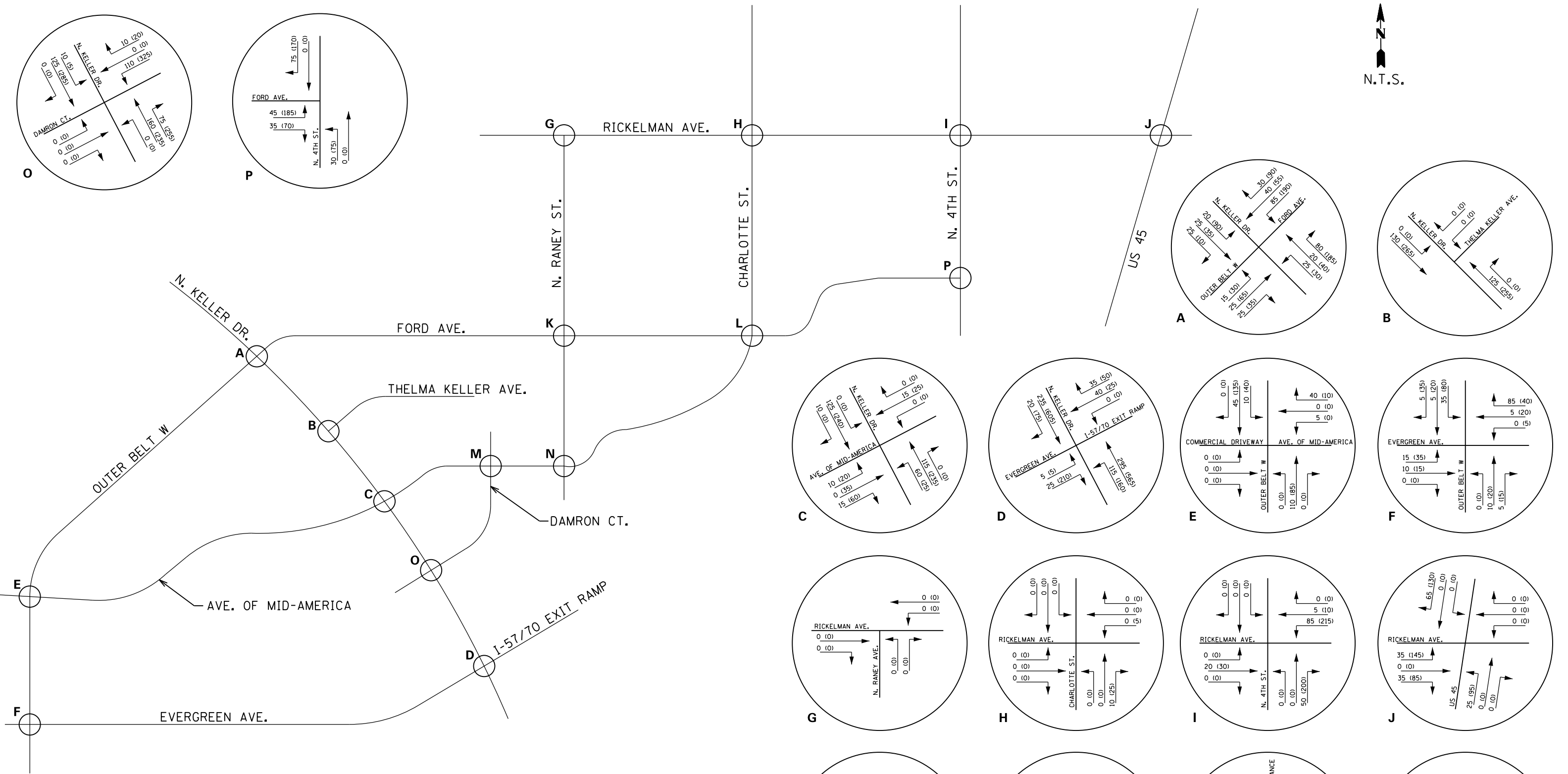
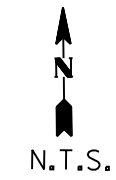


EXHIBIT 6C  
DEVELOPMENT GENERATED DESIGN  
HOURLY VOLUMES - 2040

**Farnsworth**  
GROUP  
400 W. JEFFERSON, SUITE A  
EFFINGHAM, IL 62401  
(217) 342-5668

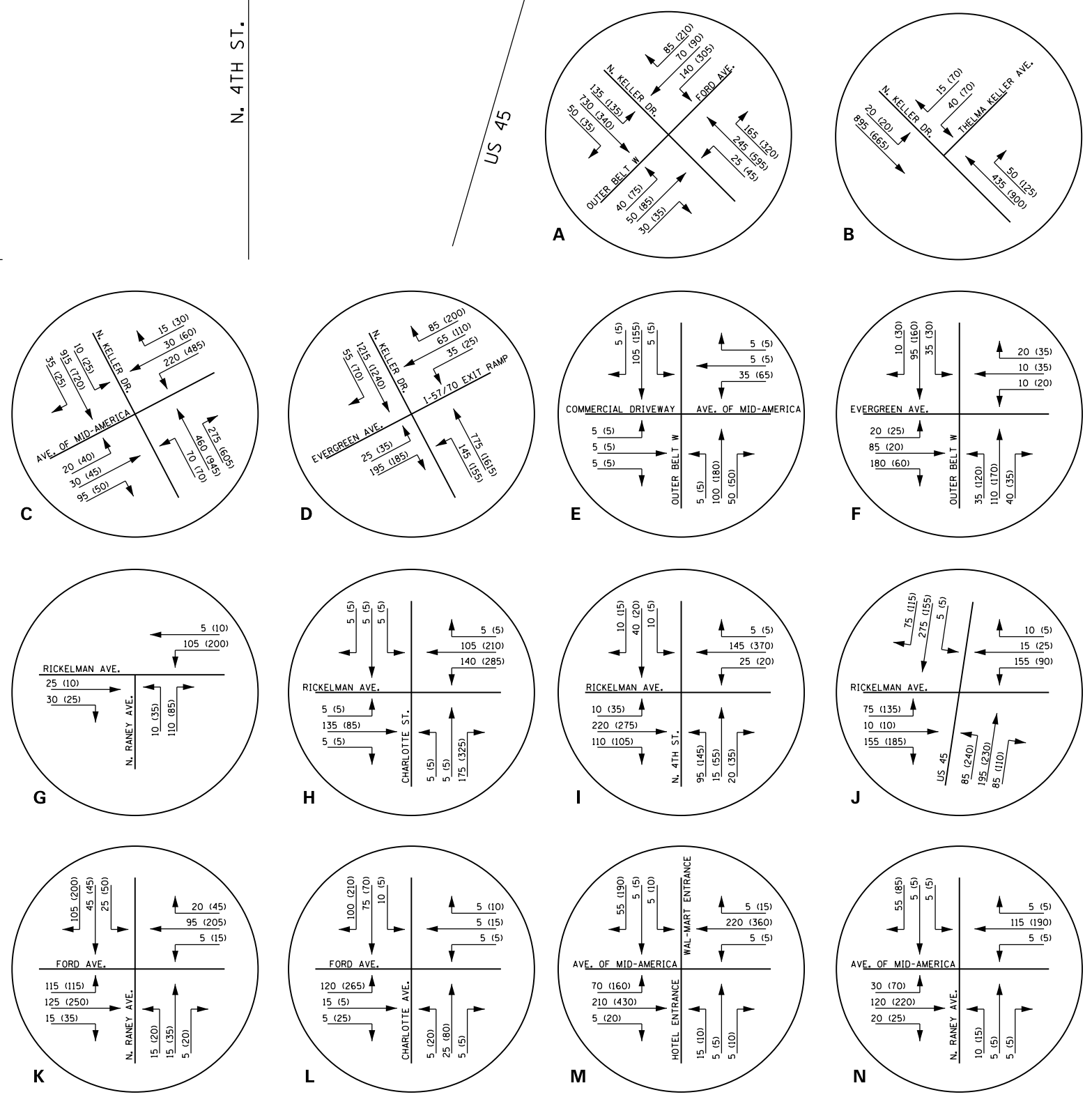
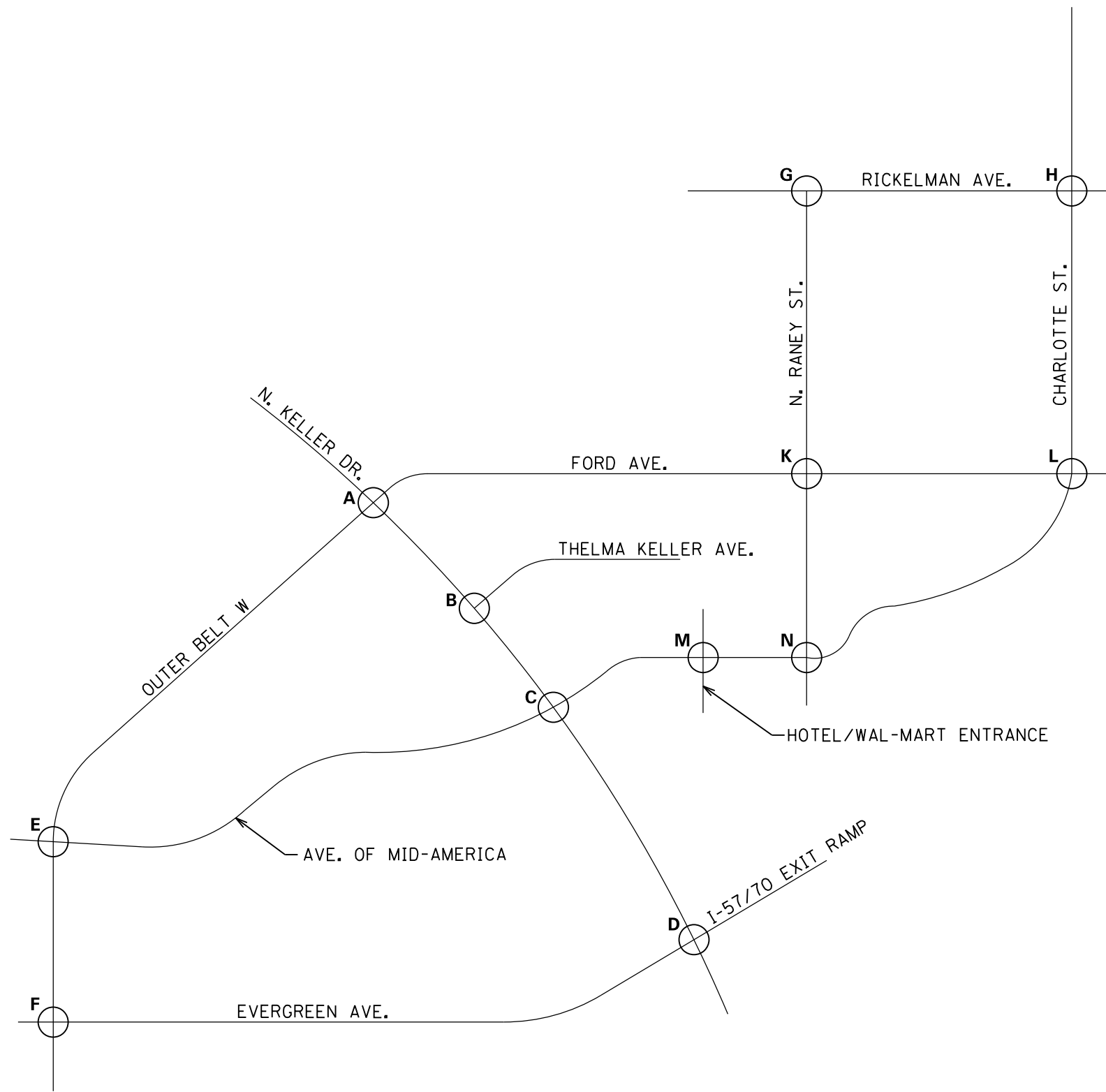
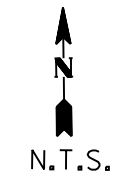


EXHIBIT 7A  
FUTURE DESIGN HOURLY VOLUMES  
2025

**Farnsworth**  
GROUP  
400 W. JEFFERSON, SUITE A  
EFFINGHAM, IL 62401  
(217) 342-5668

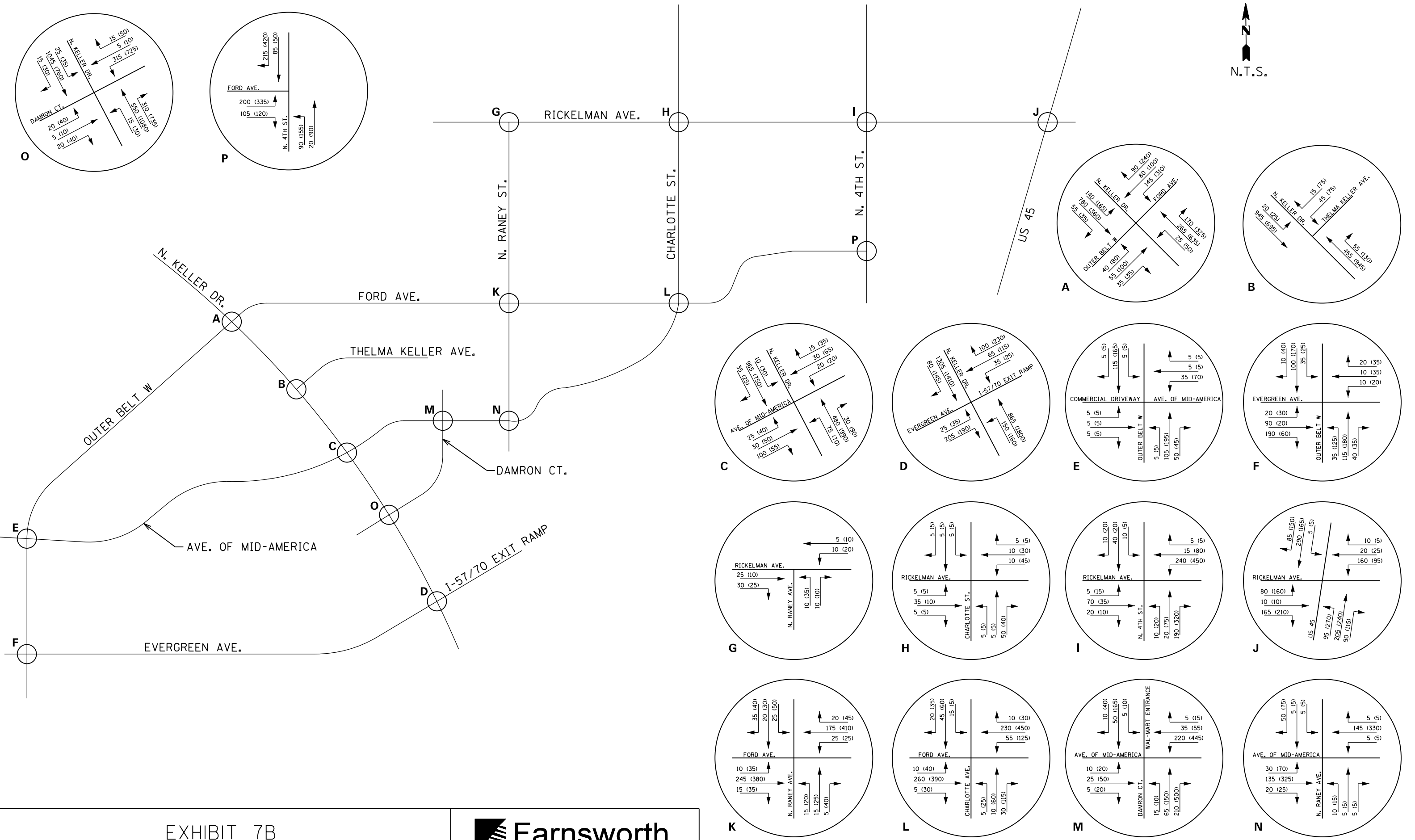
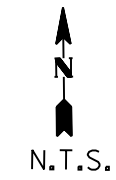


EXHIBIT 7B  
FUTURE DESIGN HOURLY VOLUMES  
2030

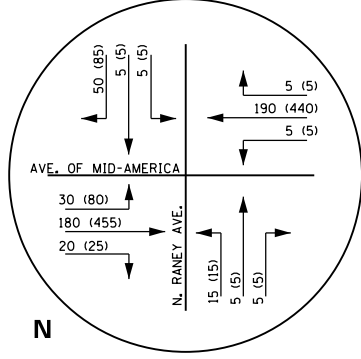
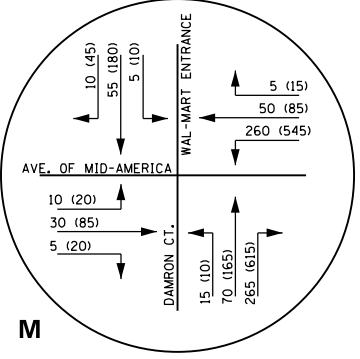
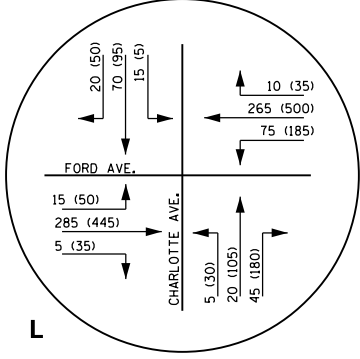
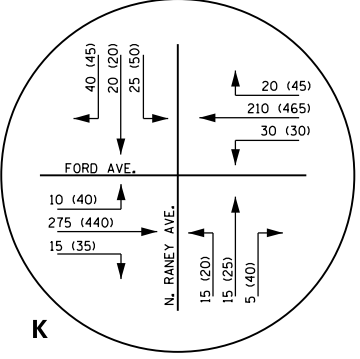
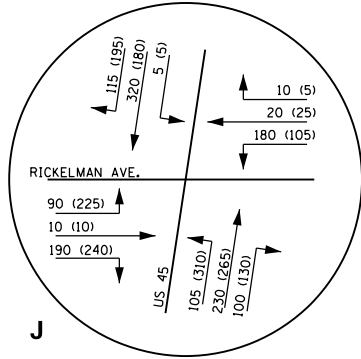
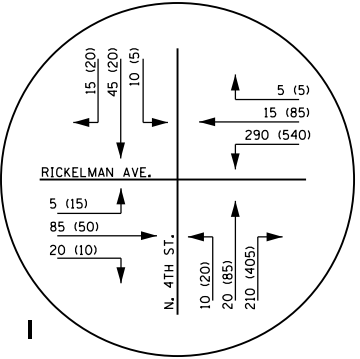
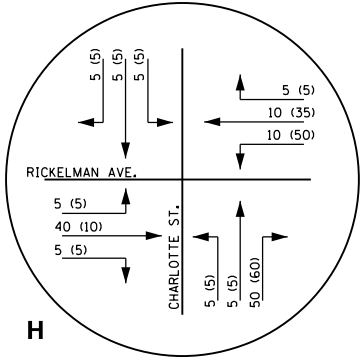
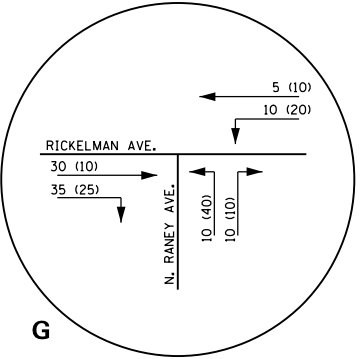
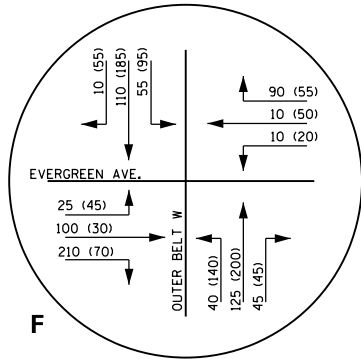
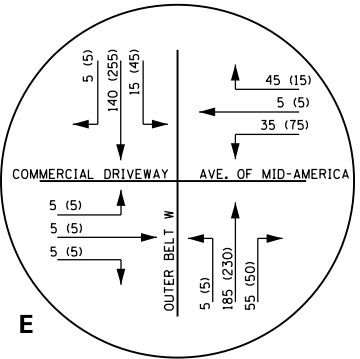
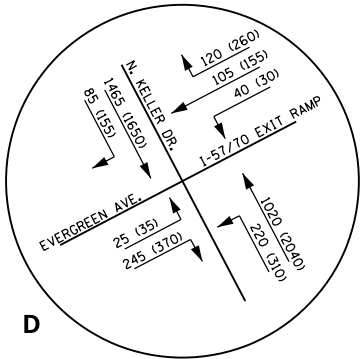
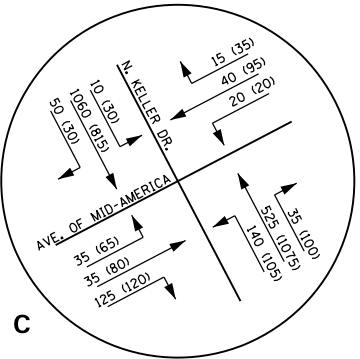
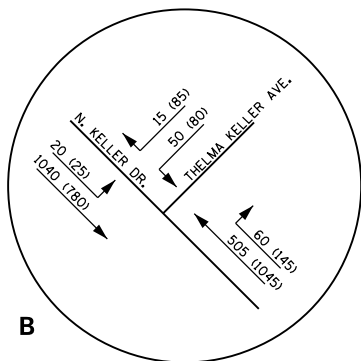
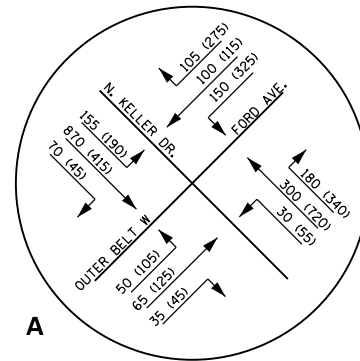
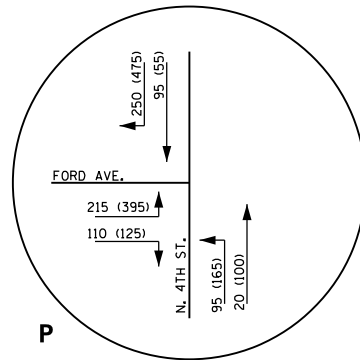
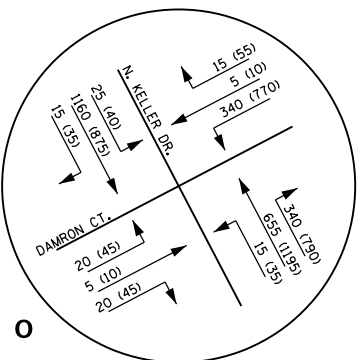
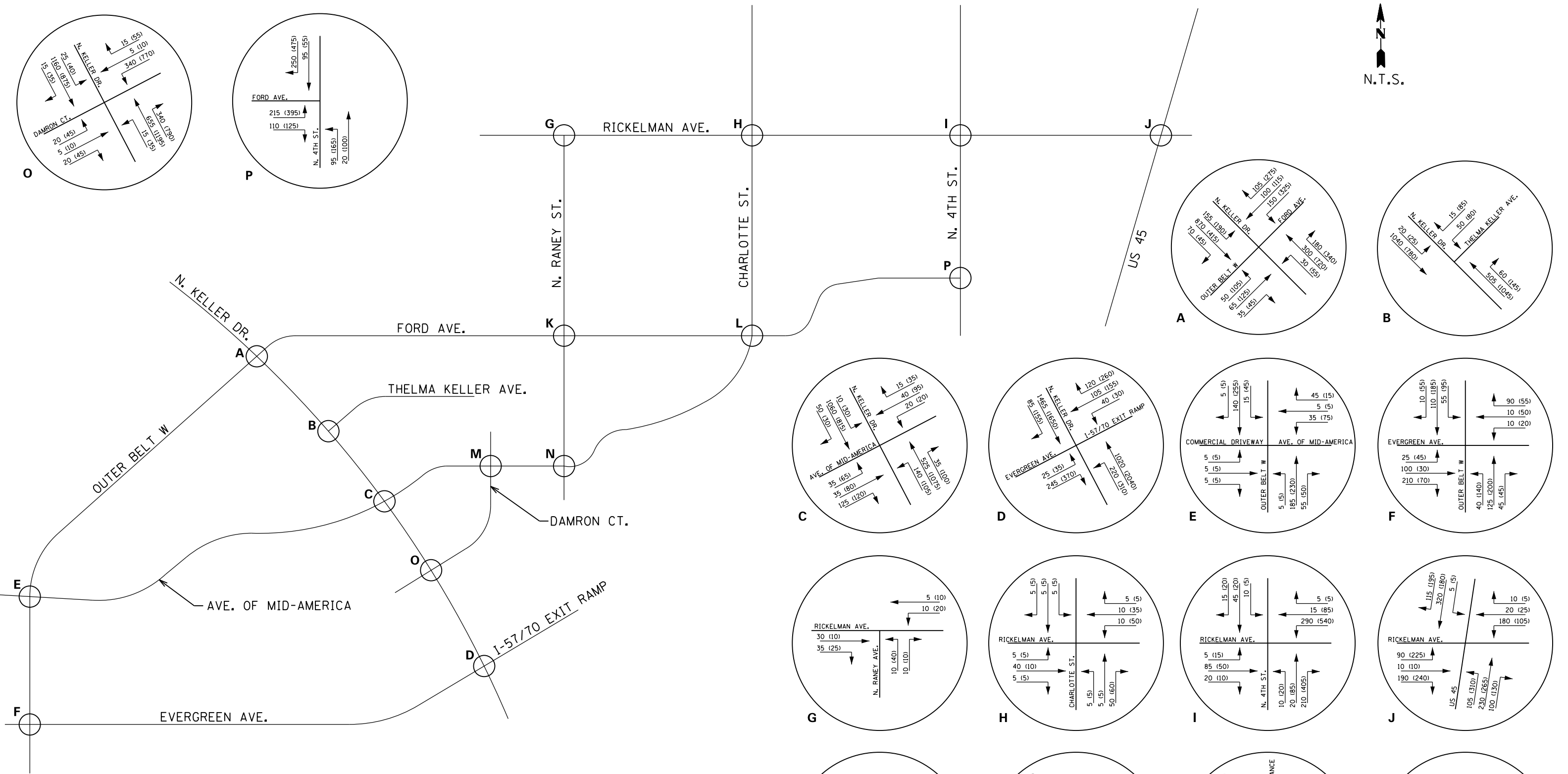
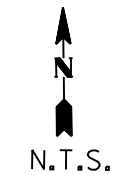


EXHIBIT 7C  
FUTURE DESIGN HOURLY VOLUMES  
2040

 **Farnsworth**  
GROUP  
400 W. JEFFERSON, SUITE A  
EFFINGHAM, IL 62401  
(217) 342-5668

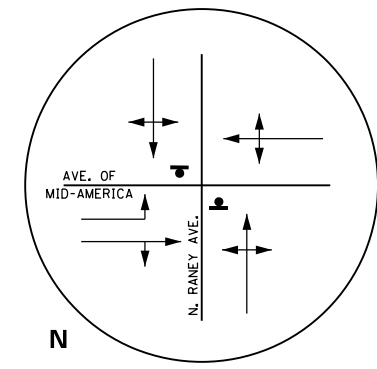
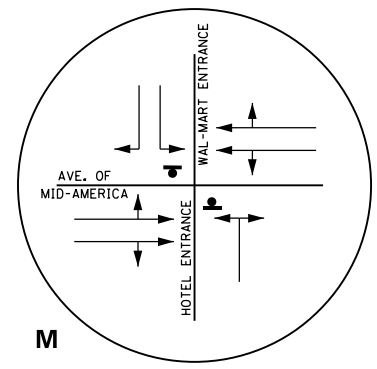
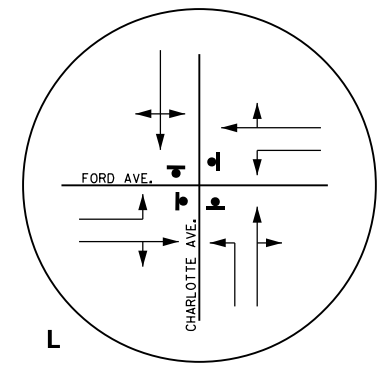
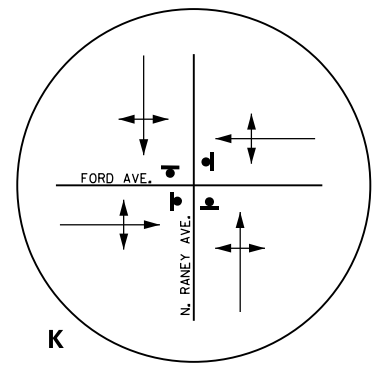
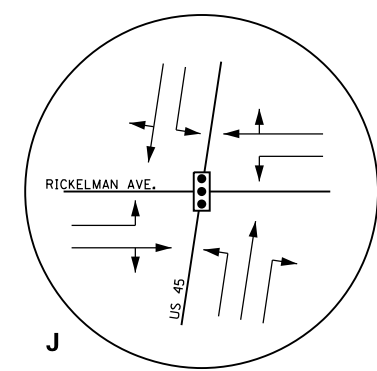
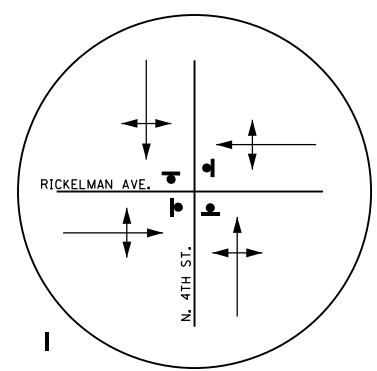
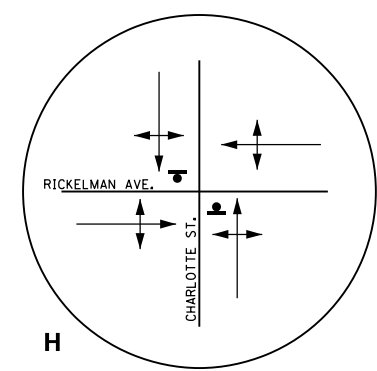
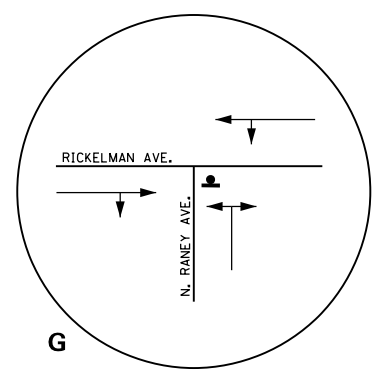
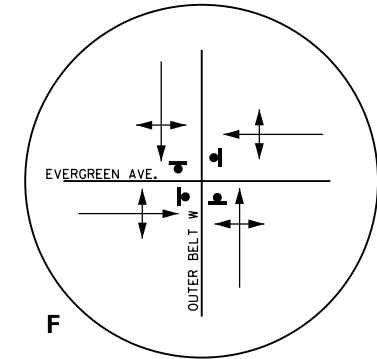
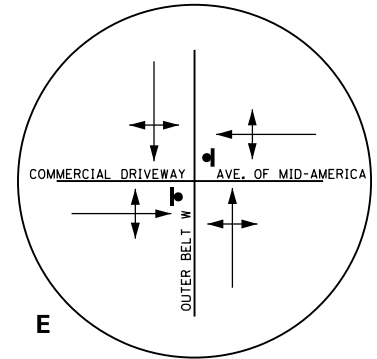
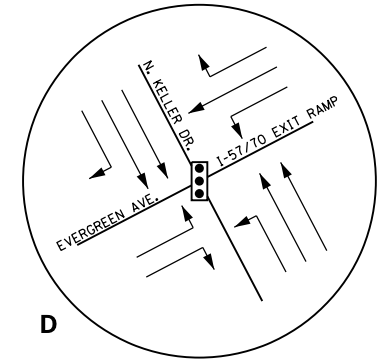
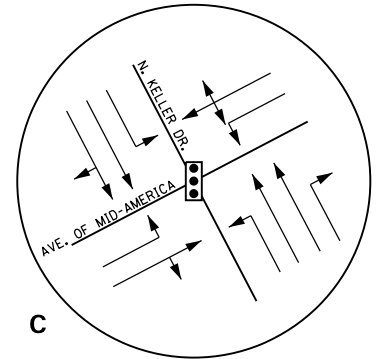
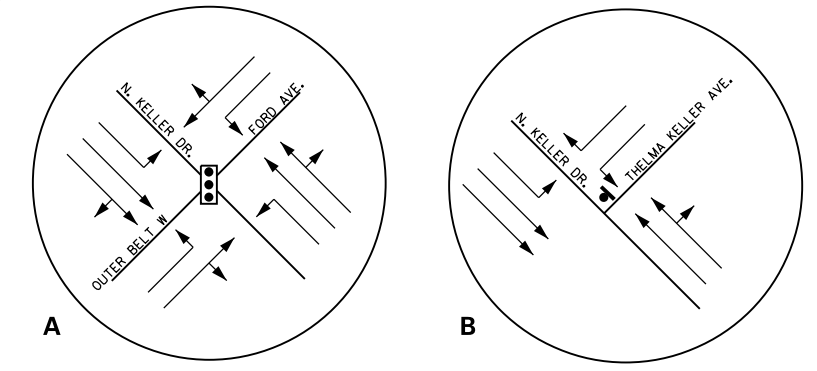
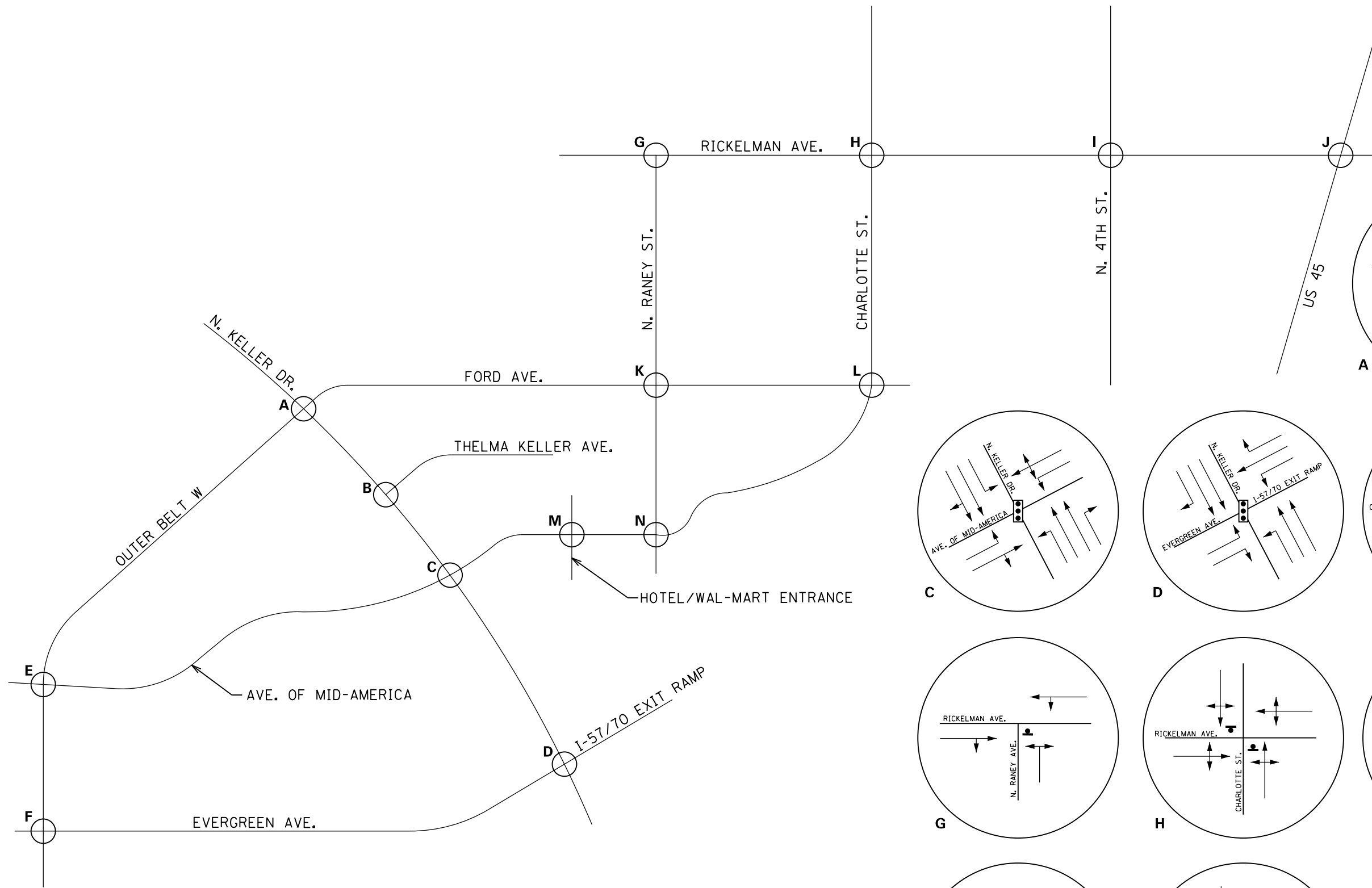
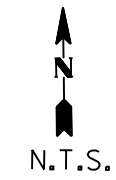
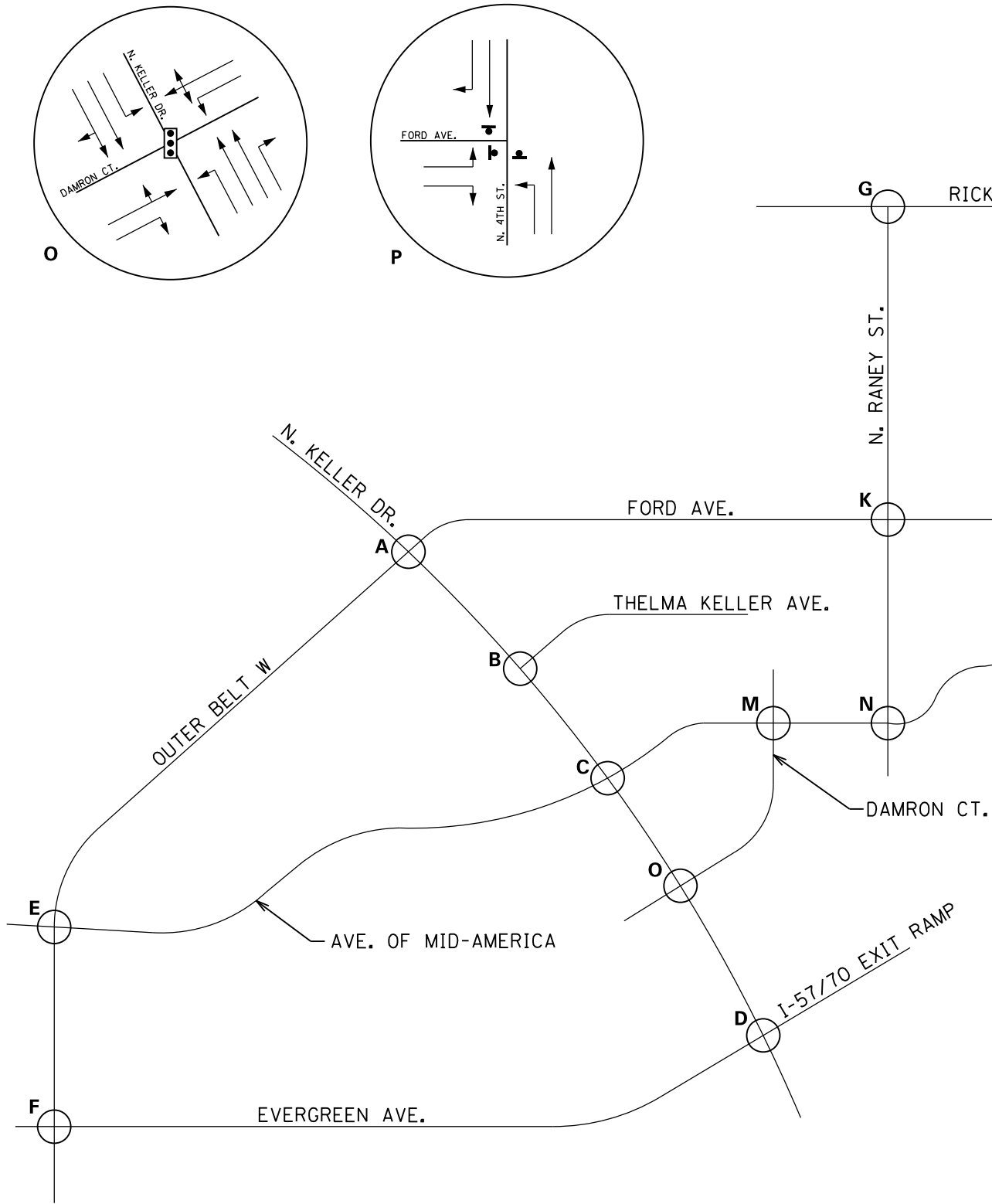
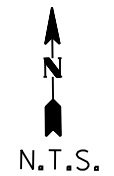
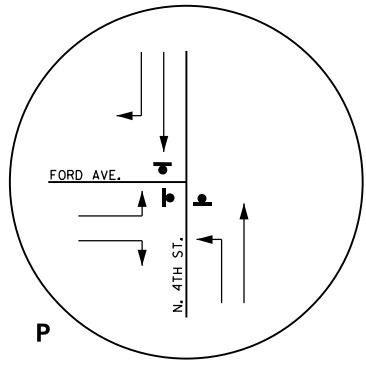
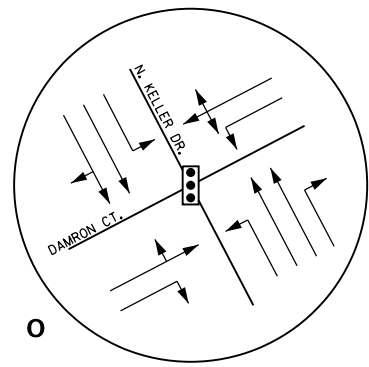


EXHIBIT 8A  
RECOMMENDED INTERSECTION CONTROL  
AND LANE CONFIGURATIONS - 2025

**Farnsworth**  
GROUP  
400 W. JEFFERSON, SUITE A  
EFFINGHAM, IL 62401  
(217) 342-5668



NOTE: ALL EXISTING PROTECTED/PERMITTED LEFT-TURN SIGNALS SHOULD BE REPLACED WITH FLASHING YELLOW LEFT-TURN SIGNALS.

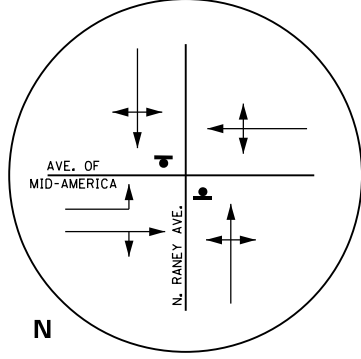
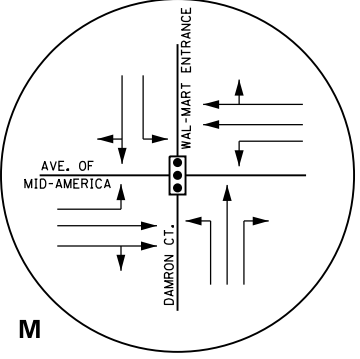
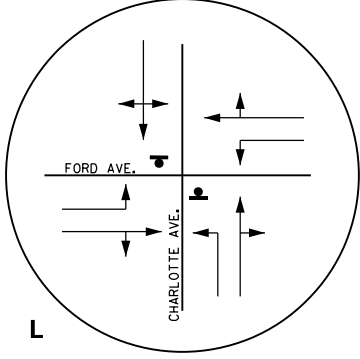
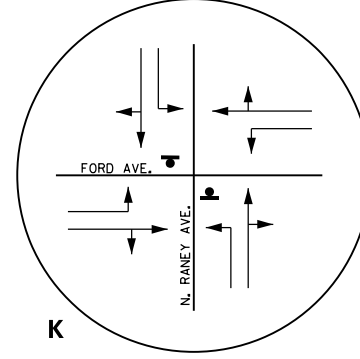
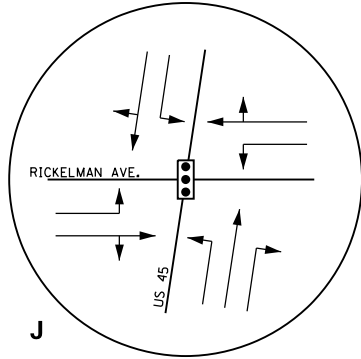
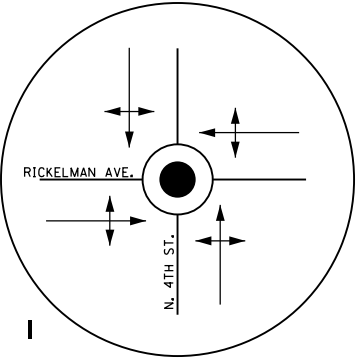
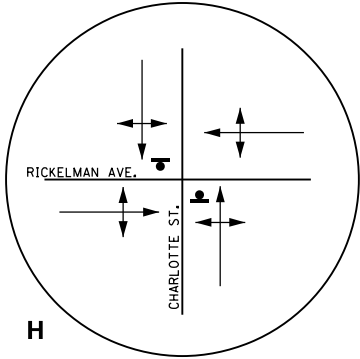
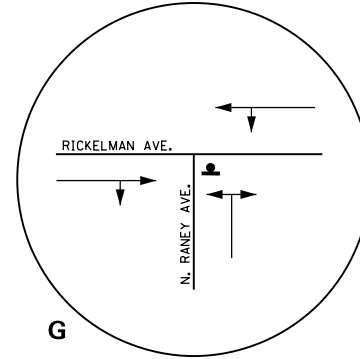
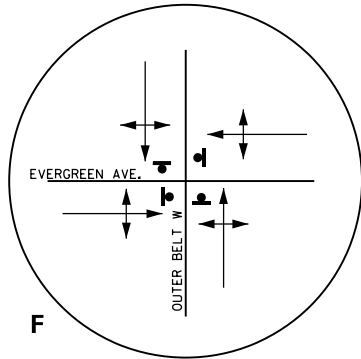
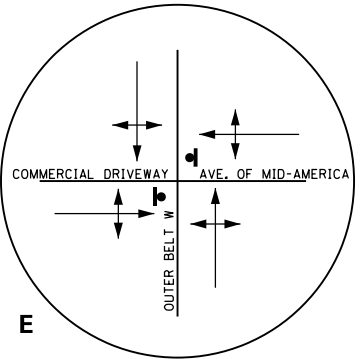
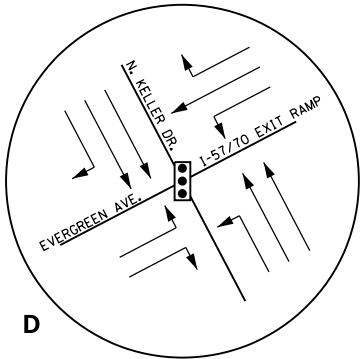
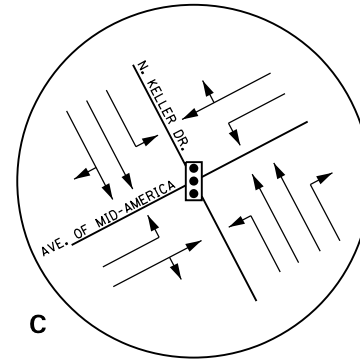
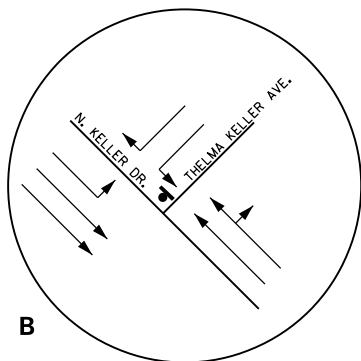
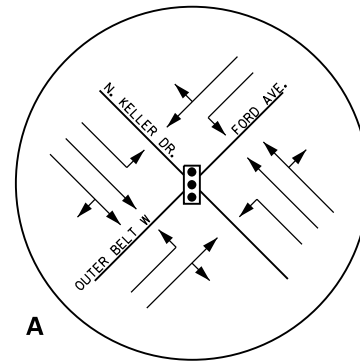


EXHIBIT 8B  
RECOMMENDED INTERSECTION CONTROL  
AND LANE CONFIGURATIONS - 2030

**Farnsworth**  
GROUP  
400 W. JEFFERSON, SUITE A  
EFFINGHAM, IL 62401  
(217) 342-5668

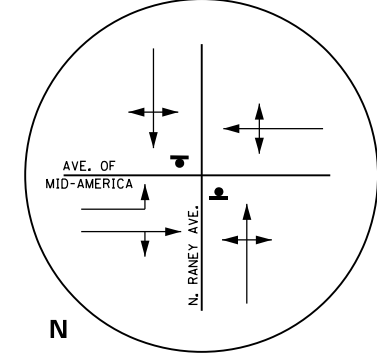
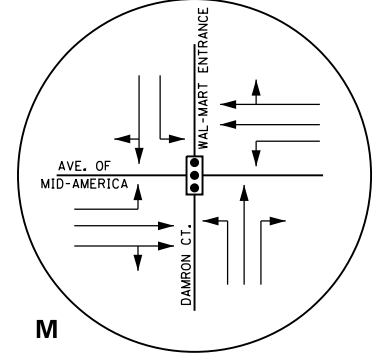
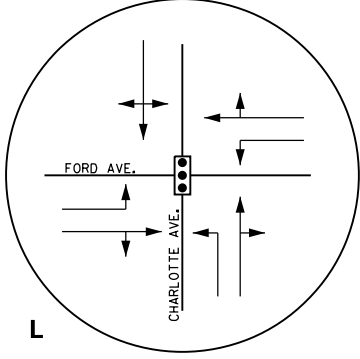
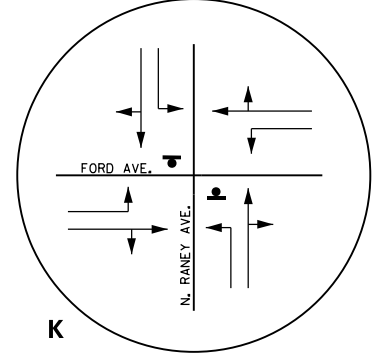
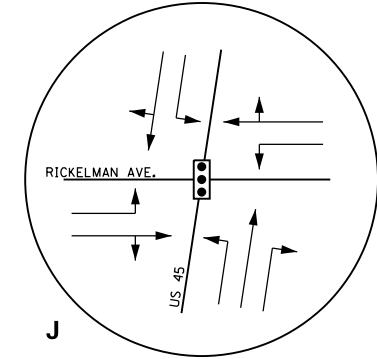
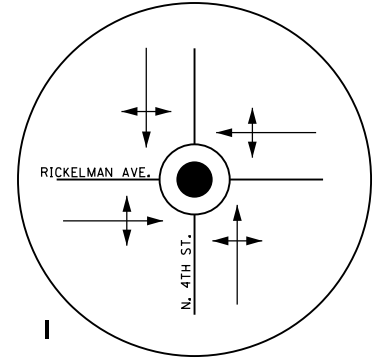
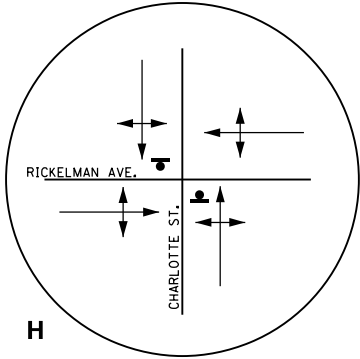
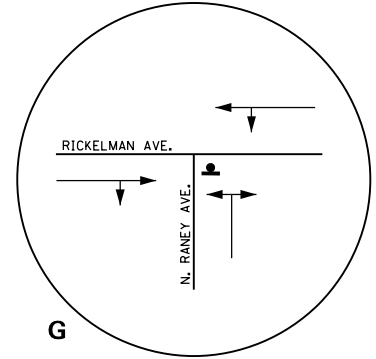
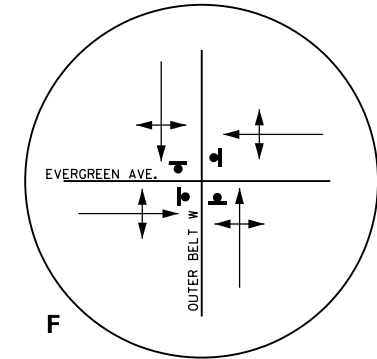
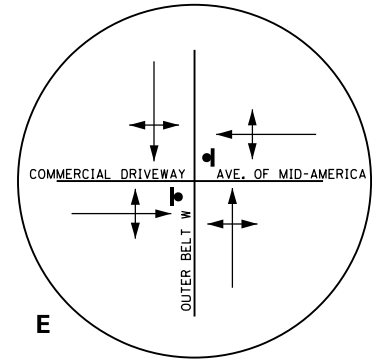
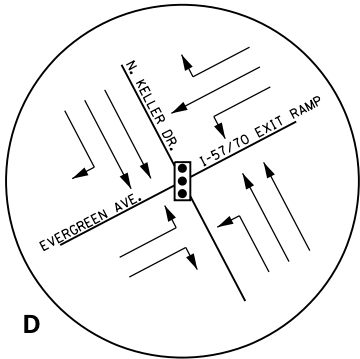
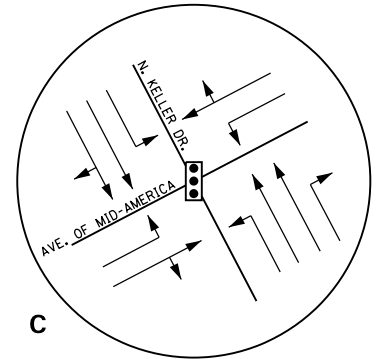
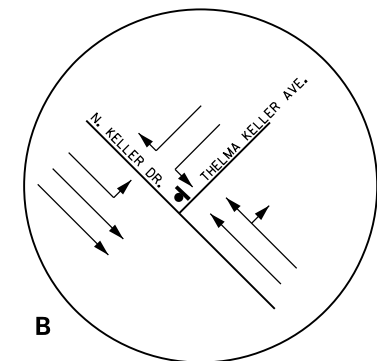
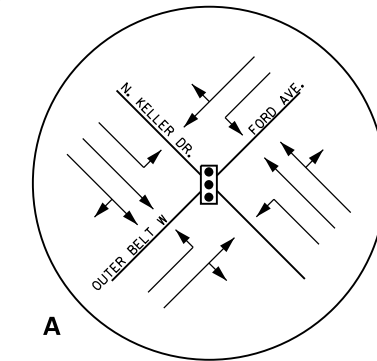
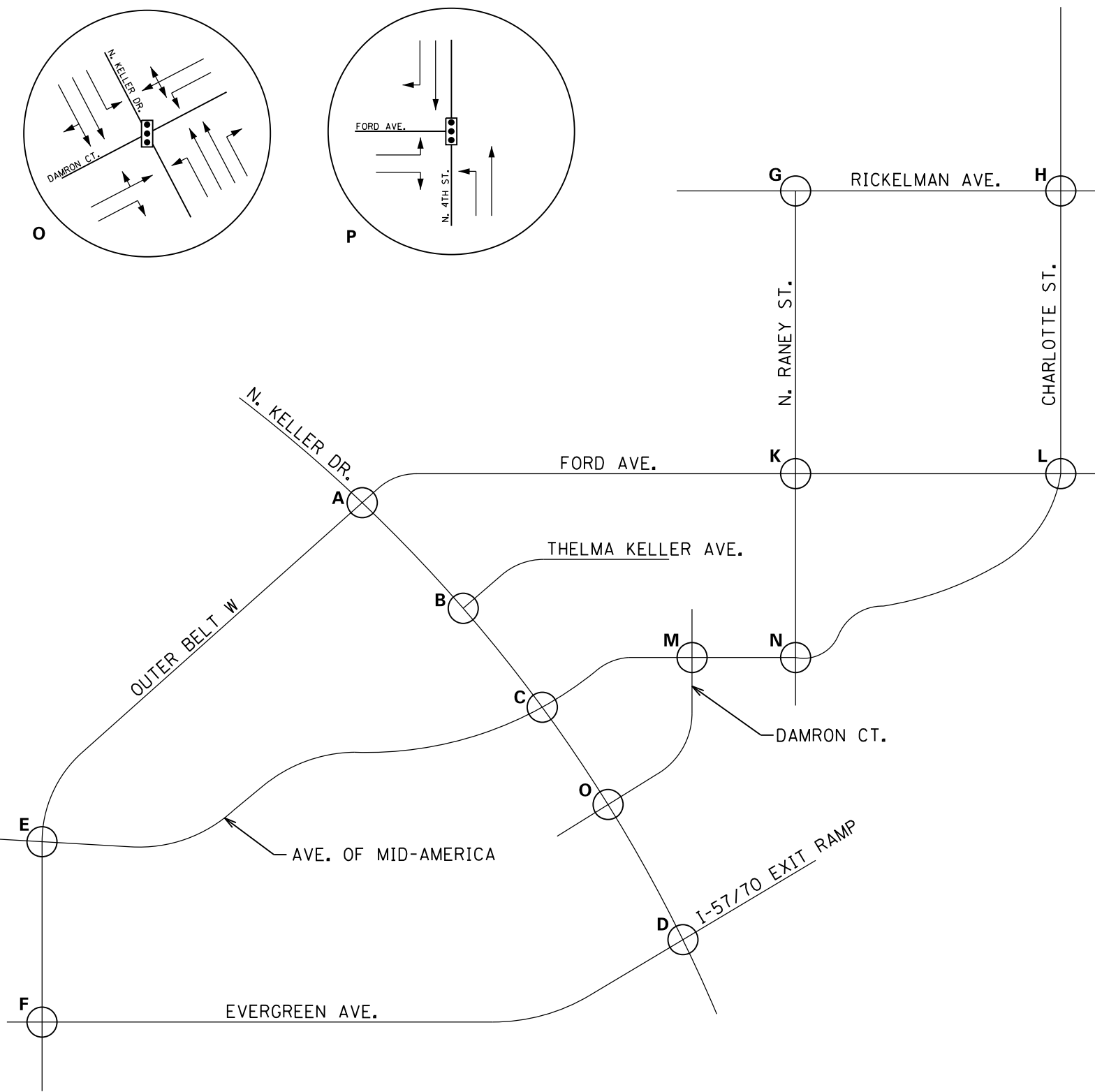
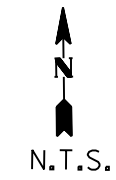
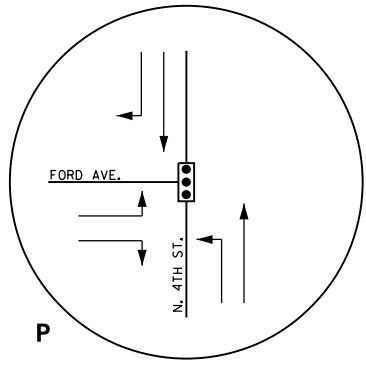
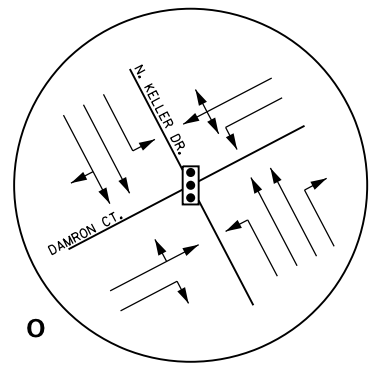


EXHIBIT 8C  
RECOMMENDED INTERSECTION CONTROL  
AND LANE CONFIGURATIONS - 2040

**Farnsworth**  
GROUP  
400 W. JEFFERSON, SUITE A  
EFFINGHAM, IL 62401  
(217) 342-5668



## **Appendix B**

### Intersection Traffic Volume Counts

**A - N. Keller Dr. & Outer Belt W**

Direction	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 07:15:00	16	158	23	20	13	7	16	57	0	2	7	7
2018-09-06 07:30:00	10	189	33	14	6	12	12	53	0	2	6	8
2018-09-06 07:45:00	6	209	30	12	24	20	25	49	1	1	11	5
2018-09-06 08:00:00	6	121	24	13	5	14	26	66	2	2	7	7
<b>2018 AM Total</b>	<b>38</b>	<b>677</b>	<b>110</b>	<b>59</b>	<b>48</b>	<b>53</b>	<b>79</b>	<b>225</b>	<b>3</b>	<b>7</b>	<b>31</b>	<b>27</b>
<b>2025 AM Total</b>	<b>41</b>	<b>726</b>	<b>118</b>	<b>63</b>	<b>51</b>	<b>57</b>	<b>85</b>	<b>241</b>	<b>3</b>	<b>8</b>	<b>33</b>	<b>29</b>
<b>2030 AM Total</b>	<b>43</b>	<b>763</b>	<b>124</b>	<b>66</b>	<b>54</b>	<b>60</b>	<b>89</b>	<b>254</b>	<b>3</b>	<b>8</b>	<b>35</b>	<b>30</b>
<b>2040 AM Total</b>	<b>47</b>	<b>843</b>	<b>137</b>	<b>73</b>	<b>60</b>	<b>66</b>	<b>98</b>	<b>280</b>	<b>4</b>	<b>9</b>	<b>39</b>	<b>34</b>

Direction	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 16:30:00	7	85	22	30	12	28	37	129	4	2	13	9
2018-09-06 16:45:00	8	78	26	37	17	27	32	120	3	1	10	17
2018-09-06 17:00:00	6	77	20	40	6	35	28	186	9	3	15	18
2018-09-06 17:15:00	6	66	11	40	15	18	27	111	4	1	10	15
<b>2018 PM Total</b>	<b>27</b>	<b>306</b>	<b>79</b>	<b>147</b>	<b>50</b>	<b>108</b>	<b>124</b>	<b>546</b>	<b>20</b>	<b>7</b>	<b>48</b>	<b>59</b>
<b>2025 PM Total</b>	<b>29</b>	<b>328</b>	<b>85</b>	<b>158</b>	<b>54</b>	<b>116</b>	<b>133</b>	<b>585</b>	<b>21</b>	<b>8</b>	<b>51</b>	<b>63</b>
<b>2030 PM Total</b>	<b>30</b>	<b>345</b>	<b>89</b>	<b>166</b>	<b>56</b>	<b>122</b>	<b>140</b>	<b>615</b>	<b>23</b>	<b>8</b>	<b>54</b>	<b>66</b>
<b>2040 PM Total</b>	<b>34</b>	<b>381</b>	<b>98</b>	<b>183</b>	<b>62</b>	<b>134</b>	<b>154</b>	<b>680</b>	<b>25</b>	<b>9</b>	<b>60</b>	<b>73</b>

**B - N. Keller Dr. & Thelma Keller Ave.**

Direction Start Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 07:15:00	0	162	4	4	0	9	13	67	0	0	0	0
2018-09-06 07:30:00	0	202	2	7	0	5	9	64	0	0	0	0
2018-09-06 07:45:00	0	232	4	0	0	8	16	80	0	0	0	0
2018-09-06 08:00:00	0	134	7	2	0	17	10	96	0	0	0	0
<b>2018 AM Total</b>	<b>0</b>	<b>730</b>	<b>17</b>	<b>13</b>	<b>0</b>	<b>39</b>	<b>48</b>	<b>307</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>2025 AM Total</b>	<b>0</b>	<b>783</b>	<b>18</b>	<b>14</b>	<b>0</b>	<b>42</b>	<b>51</b>	<b>329</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>2030 AM Total</b>	<b>0</b>	<b>823</b>	<b>19</b>	<b>15</b>	<b>0</b>	<b>44</b>	<b>54</b>	<b>346</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>2040 AM Total</b>	<b>0</b>	<b>909</b>	<b>21</b>	<b>16</b>	<b>0</b>	<b>49</b>	<b>60</b>	<b>382</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Direction Start Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 16:30:00	1	112	6	14	0	11	32	153	0	1	0	1
2018-09-06 16:45:00	1	106	5	19	0	19	32	138	1	1	0	0
2018-09-06 17:00:00	1	103	8	16	0	12	28	204	3	0	0	0
2018-09-06 17:15:00	1	91	1	18	2	24	23	140	4	2	0	0
<b>2018 PM Total</b>	<b>4</b>	<b>412</b>	<b>20</b>	<b>67</b>	<b>2</b>	<b>66</b>	<b>115</b>	<b>635</b>	<b>8</b>	<b>4</b>	<b>0</b>	<b>1</b>
<b>2025 PM Total</b>	<b>4</b>	<b>442</b>	<b>21</b>	<b>72</b>	<b>2</b>	<b>71</b>	<b>123</b>	<b>681</b>	<b>9</b>	<b>4</b>	<b>0</b>	<b>1</b>
<b>2030 PM Total</b>	<b>5</b>	<b>464</b>	<b>23</b>	<b>75</b>	<b>2</b>	<b>74</b>	<b>130</b>	<b>716</b>	<b>9</b>	<b>5</b>	<b>0</b>	<b>1</b>
<b>2040 PM Total</b>	<b>5</b>	<b>513</b>	<b>25</b>	<b>83</b>	<b>2</b>	<b>82</b>	<b>143</b>	<b>790</b>	<b>10</b>	<b>5</b>	<b>0</b>	<b>1</b>

**C - N. Keller Dr. & Ave. of Mid-America**

Direction	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 07:15:00	7	170	3	1	3	31	42	74	20	22	4	6
2018-09-06 07:30:00	11	206	2	3	10	45	52	70	15	24	4	3
2018-09-06 07:45:00	6	233	2	3	3	54	65	89	18	30	12	10
2018-09-06 08:00:00	8	142	3	6	6	41	69	96	12	14	8	1
<b>2018 AM Total</b>	<b>32</b>	<b>751</b>	<b>10</b>	<b>13</b>	<b>22</b>	<b>171</b>	<b>228</b>	<b>329</b>	<b>65</b>	<b>90</b>	<b>28</b>	<b>20</b>
<b>2025 AM Total</b>	<b>34</b>	<b>805</b>	<b>11</b>	<b>14</b>	<b>24</b>	<b>183</b>	<b>244</b>	<b>353</b>	<b>70</b>	<b>96</b>	<b>30</b>	<b>21</b>
<b>2030 AM Total</b>	<b>36</b>	<b>846</b>	<b>11</b>	<b>15</b>	<b>25</b>	<b>20</b>	<b>30</b>	<b>371</b>	<b>73</b>	<b>101</b>	<b>32</b>	<b>23</b>
<b>2040 AM Total</b>	<b>40</b>	<b>935</b>	<b>12</b>	<b>16</b>	<b>27</b>	<b>22</b>	<b>33</b>	<b>410</b>	<b>81</b>	<b>112</b>	<b>35</b>	<b>25</b>

Direction	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 16:30:00	7	110	7	8	14	84	119	158	15	14	12	10
2018-09-06 16:45:00	7	119	8	6	12	108	122	159	11	16	8	8
2018-09-06 17:00:00	4	111	4	11	19	92	112	204	16	9	9	9
2018-09-06 17:15:00	5	120	6	4	11	90	132	155	22	8	9	9
<b>2018 PM Total</b>	<b>23</b>	<b>460</b>	<b>25</b>	<b>29</b>	<b>56</b>	<b>374</b>	<b>485</b>	<b>676</b>	<b>64</b>	<b>47</b>	<b>38</b>	<b>36</b>
<b>2025 PM Total</b>	<b>25</b>	<b>493</b>	<b>27</b>	<b>31</b>	<b>60</b>	<b>401</b>	<b>520</b>	<b>725</b>	<b>69</b>	<b>50</b>	<b>41</b>	<b>39</b>
<b>2030 PM Total</b>	<b>26</b>	<b>518</b>	<b>28</b>	<b>33</b>	<b>63</b>	<b>20</b>	<b>90</b>	<b>762</b>	<b>72</b>	<b>53</b>	<b>43</b>	<b>41</b>
<b>2040 PM Total</b>	<b>29</b>	<b>573</b>	<b>31</b>	<b>36</b>	<b>70</b>	<b>22</b>	<b>99</b>	<b>841</b>	<b>80</b>	<b>59</b>	<b>47</b>	<b>45</b>

**D - N. Keller Dr. & Evergreen Ave.**

Direction	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 07:15:00	14	224	0	23	14	4	0	126	25	28	0	3
2018-09-06 07:30:00	20	252	0	16	14	11	0	129	24	48	0	6
2018-09-06 07:45:00	13	327	0	12	12	10	0	165	22	49	0	3
2018-09-06 08:00:00	6	185	0	17	14	6	0	164	15	52	0	5
<b>2018 AM Total</b>	<b>53</b>	<b>988</b>	<b>0</b>	<b>68</b>	<b>54</b>	<b>31</b>	<b>0</b>	<b>584</b>	<b>86</b>	<b>177</b>	<b>0</b>	<b>17</b>
<b>2025 AM Total</b>	<b>57</b>	<b>1059</b>	<b>0</b>	<b>73</b>	<b>58</b>	<b>33</b>	<b>0</b>	<b>626</b>	<b>92</b>	<b>190</b>	<b>0</b>	<b>18</b>
<b>2030 AM Total</b>	<b>60</b>	<b>1113</b>	<b>0</b>	<b>77</b>	<b>61</b>	<b>35</b>	<b>0</b>	<b>658</b>	<b>97</b>	<b>199</b>	<b>0</b>	<b>19</b>
<b>2040 AM Total</b>	<b>66</b>	<b>1230</b>	<b>0</b>	<b>85</b>	<b>67</b>	<b>39</b>	<b>0</b>	<b>727</b>	<b>107</b>	<b>220</b>	<b>0</b>	<b>21</b>

Direction	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 16:30:00	17	186	0	40	28	7	0	291	25	32	0	8
2018-09-06 16:45:00	16	218	0	30	25	4	0	302	34	33	0	8
2018-09-06 17:00:00	15	234	0	44	24	8	0	309	29	26	0	4
2018-09-06 17:15:00	17	202	0	55	27	4	0	284	33	39	0	6
<b>2018 PM Total</b>	<b>65</b>	<b>840</b>	<b>0</b>	<b>169</b>	<b>104</b>	<b>23</b>	<b>0</b>	<b>1186</b>	<b>121</b>	<b>130</b>	<b>0</b>	<b>26</b>
<b>2025 PM Total</b>	<b>70</b>	<b>901</b>	<b>0</b>	<b>181</b>	<b>112</b>	<b>25</b>	<b>0</b>	<b>1272</b>	<b>130</b>	<b>139</b>	<b>0</b>	<b>28</b>
<b>2030 PM Total</b>	<b>73</b>	<b>947</b>	<b>0</b>	<b>190</b>	<b>117</b>	<b>26</b>	<b>0</b>	<b>1336</b>	<b>136</b>	<b>146</b>	<b>0</b>	<b>29</b>
<b>2040 PM Total</b>	<b>81</b>	<b>1046</b>	<b>0</b>	<b>210</b>	<b>129</b>	<b>29</b>	<b>0</b>	<b>1476</b>	<b>151</b>	<b>162</b>	<b>0</b>	<b>32</b>

**E - Ave. of Mid-America & Outer Belt W**

Direction	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 07:15:00	0	28	0	0	0	4	9	16	1	0	0	0
2018-09-06 07:30:00	0	15	0	1	0	10	7	14	0	1	0	0
2018-09-06 07:45:00	0	20	0	0	0	8	17	16	0	0	0	0
2018-09-06 08:00:00	1	13	0	0	1	4	13	15	0	0	1	1
<b>2018 AM Total</b>	<b>1</b>	<b>76</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>26</b>	<b>46</b>	<b>61</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>2025 AM Total</b>	<b>1</b>	<b>81</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>28</b>	<b>49</b>	<b>65</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>2030 AM Total</b>	<b>1</b>	<b>86</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>29</b>	<b>52</b>	<b>69</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>2040 AM Total</b>	<b>1</b>	<b>95</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>32</b>	<b>57</b>	<b>76</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>

Direction	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 16:30:00	0	27	2	0	0	13	12	25	0	1	0	0
2018-09-06 16:45:00	0	27	0	1	0	11	9	24	0	0	0	0
2018-09-06 17:00:00	0	20	1	1	1	21	10	36	0	0	1	1
2018-09-06 17:15:00	2	24	0	0	2	17	11	31	3	0	0	0
<b>2018 PM Total</b>	<b>2</b>	<b>98</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>62</b>	<b>42</b>	<b>116</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>2025 PM Total</b>	<b>2</b>	<b>105</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>66</b>	<b>45</b>	<b>124</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>2030 PM Total</b>	<b>2</b>	<b>110</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>70</b>	<b>47</b>	<b>131</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>2040 PM Total</b>	<b>2</b>	<b>122</b>	<b>4</b>	<b>2</b>	<b>4</b>	<b>77</b>	<b>52</b>	<b>144</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>1</b>

**F - Evergreen & Outer Belt W**

Direction Start Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 07:15:00	1	29	2	0	1	3	10	21	6	69	13	3
2018-09-06 07:30:00	1	20	4	2	2	2	9	19	7	60	23	2
2018-09-06 07:45:00	0	21	7	3	0	0	9	28	11	30	20	2
2018-09-06 08:00:00	1	13	2	1	3	2	5	23	8	11	15	2
<b>2018 AM Total</b>	<b>3</b>	<b>83</b>	<b>15</b>	<b>6</b>	<b>6</b>	<b>7</b>	<b>33</b>	<b>91</b>	<b>32</b>	<b>170</b>	<b>71</b>	<b>9</b>
<b>2025 AM Total</b>	<b>3</b>	<b>89</b>	<b>16</b>	<b>6</b>	<b>6</b>	<b>8</b>	<b>35</b>	<b>98</b>	<b>34</b>	<b>182</b>	<b>76</b>	<b>10</b>
<b>2030 AM Total</b>	<b>3</b>	<b>94</b>	<b>17</b>	<b>7</b>	<b>7</b>	<b>8</b>	<b>37</b>	<b>103</b>	<b>36</b>	<b>192</b>	<b>80</b>	<b>10</b>
<b>2040 AM Total</b>	<b>4</b>	<b>103</b>	<b>19</b>	<b>7</b>	<b>7</b>	<b>9</b>	<b>41</b>	<b>113</b>	<b>40</b>	<b>212</b>	<b>88</b>	<b>11</b>

Direction Start Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 16:30:00	5	33	1	2	6	6	3	35	27	15	4	1
2018-09-06 16:45:00	4	35	1	2	7	4	7	31	20	14	1	1
2018-09-06 17:00:00	3	34	4	5	4	2	9	37	32	16	3	4
2018-09-06 17:15:00	3	30	7	2	7	2	7	40	32	10	5	3
<b>2018 PM Total</b>	<b>15</b>	<b>132</b>	<b>13</b>	<b>11</b>	<b>24</b>	<b>14</b>	<b>26</b>	<b>143</b>	<b>111</b>	<b>55</b>	<b>13</b>	<b>9</b>
<b>2025 PM Total</b>	<b>16</b>	<b>142</b>	<b>14</b>	<b>12</b>	<b>26</b>	<b>15</b>	<b>28</b>	<b>153</b>	<b>119</b>	<b>59</b>	<b>14</b>	<b>10</b>
<b>2030 PM Total</b>	<b>17</b>	<b>149</b>	<b>15</b>	<b>12</b>	<b>27</b>	<b>16</b>	<b>29</b>	<b>161</b>	<b>125</b>	<b>62</b>	<b>15</b>	<b>10</b>
<b>2040 PM Total</b>	<b>19</b>	<b>164</b>	<b>16</b>	<b>14</b>	<b>30</b>	<b>17</b>	<b>32</b>	<b>178</b>	<b>138</b>	<b>68</b>	<b>16</b>	<b>11</b>

**G - Rickelman Ave. & N. Raney St.**

Direction Start Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 07:15:00					0	21	22		3	10	5	
2018-09-06 07:30:00					2	17	29		3	5	10	
2018-09-06 07:45:00					3	27	33		1	10	4	
2018-09-06 08:00:00					1	25	17		1	2	4	
<b>2018 AM Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>90</b>	<b>101</b>	<b>0</b>	<b>8</b>	<b>27</b>	<b>23</b>	<b>0</b>
<b>2025 AM Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>96</b>	<b>108</b>	<b>0</b>	<b>9</b>	<b>29</b>	<b>25</b>	<b>0</b>
<b>2030 AM Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>10</b>	<b>10</b>	<b>0</b>	<b>9</b>	<b>30</b>	<b>26</b>	<b>0</b>
<b>2040 AM Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7</b>	<b>11</b>	<b>11</b>	<b>0</b>	<b>10</b>	<b>34</b>	<b>29</b>	<b>0</b>

Direction Start Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 16:30:00					0	31	16		8	7	2	
2018-09-06 16:45:00					5	52	22		6	4	3	
2018-09-06 17:00:00					3	50	19		11	4	1	
2018-09-06 17:15:00					2	40	22		6	6	1	
<b>2018 PM Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>173</b>	<b>79</b>	<b>0</b>	<b>31</b>	<b>21</b>	<b>7</b>	<b>0</b>
<b>2025 PM Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>185</b>	<b>85</b>	<b>0</b>	<b>33</b>	<b>23</b>	<b>8</b>	<b>0</b>
<b>2030 PM Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>20</b>	<b>10</b>	<b>0</b>	<b>35</b>	<b>24</b>	<b>8</b>	<b>0</b>
<b>2040 PM Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>12</b>	<b>22</b>	<b>11</b>	<b>0</b>	<b>39</b>	<b>26</b>	<b>9</b>	<b>0</b>



**H - Rickelman Ave. & Charlotte St.**

Direction Start Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 07:15:00	0	1	0	0	16	6	19	0	0	1	26	1
2018-09-06 07:30:00	1	1	1	0	20	20	29	0	0	0	41	0
2018-09-06 07:45:00	0	0	1	1	28	17	31	0	0	0	38	0
2018-09-06 08:00:00	2	0	0	1	26	26	21	0	0	1	20	0
<b>2018 AM Total</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>90</b>	<b>69</b>	<b>100</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>125</b>	<b>1</b>
<b>2025 AM Total</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>96</b>	<b>74</b>	<b>107</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>134</b>	<b>1</b>
<b>2030 AM Total</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>10</b>	<b>10</b>	<b>45</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>35</b>	<b>1</b>
<b>2040 AM Total</b>	<b>4</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>11</b>	<b>11</b>	<b>50</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>39</b>	<b>1</b>

Direction Start Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 16:30:00	0	0	0	1	28	38	46	0	2	1	18	0
2018-09-06 16:45:00	2	0	2	1	55	32	41	0	1	1	22	1
2018-09-06 17:00:00	0	0	0	1	55	31	31	0	0	0	20	0
2018-09-06 17:15:00	0	0	0	0	43	24	33	0	0	1	18	0
<b>2018 PM Total</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>3</b>	<b>181</b>	<b>125</b>	<b>151</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>78</b>	<b>1</b>
<b>2025 PM Total</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>3</b>	<b>194</b>	<b>134</b>	<b>162</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>84</b>	<b>1</b>
<b>2030 PM Total</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>3</b>	<b>30</b>	<b>40</b>	<b>30</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>10</b>	<b>1</b>
<b>2040 PM Total</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>4</b>	<b>33</b>	<b>44</b>	<b>33</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>11</b>	<b>1</b>

**I - Rickelman Ave. & N. 4th St.**

Direction Start Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 07:15:00	2	8	2	0	13	4	3	3	6	18	32	0
2018-09-06 07:30:00	4	11	1	1	23	8	3	2	15	19	49	2
2018-09-06 07:45:00	3	14	5	1	17	7	8	5	23	28	52	5
2018-09-06 08:00:00	2	4	1	0	38	4	5	2	16	16	30	0
<b>2018 AM Total</b>	<b>11</b>	<b>37</b>	<b>9</b>	<b>2</b>	<b>91</b>	<b>23</b>	<b>19</b>	<b>12</b>	<b>60</b>	<b>81</b>	<b>163</b>	<b>7</b>
<b>2025 AM Total</b>	<b>12</b>	<b>40</b>	<b>10</b>	<b>2</b>	<b>98</b>	<b>25</b>	<b>20</b>	<b>13</b>	<b>64</b>	<b>87</b>	<b>175</b>	<b>8</b>
<b>2030 AM Total</b>	<b>12</b>	<b>42</b>	<b>10</b>	<b>2</b>	<b>10</b>	<b>185</b>	<b>145</b>	<b>20</b>	<b>10</b>	<b>20</b>	<b>60</b>	<b>5</b>
<b>2040 AM Total</b>	<b>14</b>	<b>46</b>	<b>11</b>	<b>2</b>	<b>11</b>	<b>204</b>	<b>160</b>	<b>22</b>	<b>11</b>	<b>22</b>	<b>66</b>	<b>6</b>

Direction Start Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 16:30:00	6	5	1	0	58	5	9	11	18	19	38	7
2018-09-06 16:45:00	6	2	2	0	58	2	6	14	20	10	45	8
2018-09-06 17:00:00	3	3	0	1	68	7	10	15	31	11	37	6
2018-09-06 17:15:00	1	7	1	3	52	5	6	10	20	13	31	10
<b>2018 PM Total</b>	<b>16</b>	<b>17</b>	<b>4</b>	<b>4</b>	<b>236</b>	<b>19</b>	<b>31</b>	<b>50</b>	<b>89</b>	<b>53</b>	<b>151</b>	<b>31</b>
<b>2025 PM Total</b>	<b>17</b>	<b>18</b>	<b>4</b>	<b>4</b>	<b>253</b>	<b>20</b>	<b>33</b>	<b>54</b>	<b>95</b>	<b>57</b>	<b>162</b>	<b>33</b>
<b>2030 PM Total</b>	<b>18</b>	<b>19</b>	<b>5</b>	<b>5</b>	<b>70</b>	<b>295</b>	<b>185</b>	<b>75</b>	<b>20</b>	<b>10</b>	<b>20</b>	<b>15</b>
<b>2040 PM Total</b>	<b>20</b>	<b>21</b>	<b>5</b>	<b>5</b>	<b>77</b>	<b>326</b>	<b>204</b>	<b>83</b>	<b>22</b>	<b>11</b>	<b>22</b>	<b>17</b>

**J - Rickelman Ave. & US 45**

Direction	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 07:15:00	9	56	1	0	2	32	16	51	7	19	2	11
2018-09-06 07:30:00	11	60	1	1	4	37	18	47	14	44	1	8
2018-09-06 07:45:00	5	82	1	4	5	40	24	45	19	43	0	14
2018-09-06 08:00:00	16	59	0	3	5	34	21	41	25	19	4	13
<b>2018 AM Total</b>	<b>41</b>	<b>257</b>	<b>3</b>	<b>8</b>	<b>16</b>	<b>143</b>	<b>79</b>	<b>184</b>	<b>65</b>	<b>125</b>	<b>7</b>	<b>46</b>
<b>2025 AM Total</b>	<b>44</b>	<b>276</b>	<b>3</b>	<b>9</b>	<b>17</b>	<b>153</b>	<b>85</b>	<b>197</b>	<b>70</b>	<b>134</b>	<b>8</b>	<b>49</b>
<b>2030 AM Total</b>	<b>46</b>	<b>290</b>	<b>3</b>	<b>9</b>	<b>18</b>	<b>161</b>	<b>89</b>	<b>207</b>	<b>73</b>	<b>141</b>	<b>8</b>	<b>52</b>
<b>2040 AM Total</b>	<b>51</b>	<b>320</b>	<b>4</b>	<b>10</b>	<b>20</b>	<b>178</b>	<b>98</b>	<b>229</b>	<b>81</b>	<b>156</b>	<b>9</b>	<b>57</b>

Direction	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 16:30:00	9	36	0	2	5	28	25	42	50	35	4	16
2018-09-06 16:45:00	12	35	0	1	6	20	15	68	42	35	1	14
2018-09-06 17:00:00	19	40	2	1	3	20	26	53	44	38	1	19
2018-09-06 17:15:00	12	35	3	1	7	18	38	50	38	18	2	14
<b>2018 PM Total</b>	<b>52</b>	<b>146</b>	<b>5</b>	<b>5</b>	<b>21</b>	<b>86</b>	<b>104</b>	<b>213</b>	<b>174</b>	<b>126</b>	<b>8</b>	<b>63</b>
<b>2025 PM Total</b>	<b>56</b>	<b>157</b>	<b>5</b>	<b>5</b>	<b>23</b>	<b>92</b>	<b>112</b>	<b>228</b>	<b>187</b>	<b>135</b>	<b>9</b>	<b>68</b>
<b>2030 PM Total</b>	<b>59</b>	<b>165</b>	<b>6</b>	<b>6</b>	<b>24</b>	<b>97</b>	<b>117</b>	<b>240</b>	<b>196</b>	<b>142</b>	<b>9</b>	<b>71</b>
<b>2040 PM Total</b>	<b>65</b>	<b>182</b>	<b>6</b>	<b>6</b>	<b>26</b>	<b>107</b>	<b>129</b>	<b>265</b>	<b>217</b>	<b>157</b>	<b>10</b>	<b>78</b>

**K - Ford Ave. & N. Raney St.**

Direction Start Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 07:15:00	28	3	0	0	9	0	0	3	0	0	21	24
2018-09-06 07:30:00	17	9	0	0	12	0	0	0	1	0	18	34
2018-09-06 07:45:00	29	8	1	0	9	0	0	1	0	1	25	28
2018-09-06 08:00:00	21	6	0	0	19	0	0	2	1	2	20	21
<b>2018 AM Total</b>	<b>95</b>	<b>26</b>	<b>1</b>	<b>0</b>	<b>49</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>2</b>	<b>3</b>	<b>84</b>	<b>107</b>
<b>2025 AM Total</b>	<b>102</b>	<b>28</b>	<b>1</b>	<b>0</b>	<b>53</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>2</b>	<b>3</b>	<b>90</b>	<b>115</b>
<b>2030 AM Total</b>	<b>35</b>	<b>10</b>	<b>5</b>	<b>5</b>	<b>125</b>	<b>25</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>205</b>	<b>10</b>
<b>2040 AM Total</b>	<b>39</b>	<b>11</b>	<b>6</b>	<b>6</b>	<b>138</b>	<b>28</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>226</b>	<b>11</b>

Direction Start Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 16:30:00	37	3	0	1	24	1	0	1	0	3	38	23
2018-09-06 16:45:00	44	4	3	0	20	1	0	4	0	3	37	26
2018-09-06 17:00:00	46	6	4	0	31	0	0	5	1	5	29	32
2018-09-06 17:15:00	53	3	2	1	26	1	0	6	2	1	33	25
<b>2018 PM Total</b>	<b>180</b>	<b>16</b>	<b>9</b>	<b>2</b>	<b>101</b>	<b>3</b>	<b>0</b>	<b>16</b>	<b>3</b>	<b>12</b>	<b>137</b>	<b>106</b>
<b>2025 PM Total</b>	<b>193</b>	<b>17</b>	<b>10</b>	<b>2</b>	<b>108</b>	<b>3</b>	<b>0</b>	<b>17</b>	<b>3</b>	<b>13</b>	<b>147</b>	<b>114</b>
<b>2030 PM Total</b>	<b>40</b>	<b>10</b>	<b>10</b>	<b>5</b>	<b>275</b>	<b>15</b>	<b>20</b>	<b>5</b>	<b>5</b>	<b>15</b>	<b>240</b>	<b>35</b>
<b>2040 PM Total</b>	<b>44</b>	<b>11</b>	<b>11</b>	<b>6</b>	<b>304</b>	<b>17</b>	<b>22</b>	<b>6</b>	<b>6</b>	<b>17</b>	<b>265</b>	<b>39</b>

**L - Ford Ave. & Charlotte St.**

Direction	Southbound			Westbound			Northbound			Eastbound			
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	
2018-09-06 07:15:00	5	10	0	1	1	0	0	1	0	0	1	2	17
2018-09-06 07:30:00	13	22	3	3	0	0	0	4	0	0	1	1	14
2018-09-06 07:45:00	9	10	1	0	1	0	0	4	1	0	0	6	16
2018-09-06 08:00:00	13	14	5	0	3	0	0	1	5	0	1	3	15
<b>2018 AM Total</b>	<b>40</b>	<b>56</b>	<b>9</b>	<b>4</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>14</b>	<b>1</b>	<b>3</b>	<b>14</b>	<b>2</b>	<b>62</b>
<b>2025 AM Total</b>	<b>43</b>	<b>60</b>	<b>10</b>	<b>4</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>1</b>	<b>3</b>	<b>15</b>	<b>2</b>	<b>66</b>
<b>2030 AM Total</b>	<b>15</b>	<b>25</b>	<b>10</b>	<b>10</b>	<b>155</b>	<b>45</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>15</b>	<b>5</b>	<b>5</b>	<b>10</b>
<b>2040 AM Total</b>	<b>17</b>	<b>28</b>	<b>11</b>	<b>11</b>	<b>171</b>	<b>50</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>17</b>	<b>6</b>	<b>6</b>	<b>11</b>

Direction	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 16:30:00	16	17	1	6	4	2	0	17	1	6	1	28
2018-09-06 16:45:00	19	15	0	0	2	0	0	14	4	6	0	32
2018-09-06 17:00:00	18	11	1	1	6	1	0	11	0	4	2	25
2018-09-06 17:15:00	17	10	0	1	2	0	0	9	1	0	1	25
<b>2018 PM Total</b>	<b>70</b>	<b>53</b>	<b>2</b>	<b>8</b>	<b>14</b>	<b>3</b>	<b>0</b>	<b>51</b>	<b>6</b>	<b>16</b>	<b>4</b>	<b>110</b>
<b>2025 PM Total</b>	<b>75</b>	<b>57</b>	<b>2</b>	<b>9</b>	<b>15</b>	<b>3</b>	<b>0</b>	<b>55</b>	<b>6</b>	<b>17</b>	<b>4</b>	<b>118</b>
<b>2030 PM Total</b>	<b>25</b>	<b>15</b>	<b>5</b>	<b>25</b>	<b>280</b>	<b>50</b>	<b>45</b>	<b>15</b>	<b>5</b>	<b>20</b>	<b>225</b>	<b>25</b>
<b>2040 PM Total</b>	<b>28</b>	<b>17</b>	<b>6</b>	<b>28</b>	<b>309</b>	<b>55</b>	<b>50</b>	<b>17</b>	<b>6</b>	<b>22</b>	<b>249</b>	<b>28</b>

**M - Ave. of Mid-America & Wal-Mart Entrance (Damron Ct.)**

Direction Start Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 07:15:00	5	0	1	1	35	0	0	0	4	0	29	13
2018-09-06 07:30:00	19	0	0	1	51	0	1	1	1	1	43	14
2018-09-06 07:45:00	12	1	0	0	44	0	2	0	3	1	48	16
2018-09-06 08:00:00	13	0	3	1	39	1	0	0	5	1	49	20
<b>2018 AM Total</b>	<b>49</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>169</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>13</b>	<b>3</b>	<b>169</b>	<b>63</b>
<b>2025 AM Total</b>	<b>53</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>181</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>14</b>	<b>3</b>	<b>181</b>	<b>68</b>
<b>2030 AM Total</b>	<b>10</b>	<b>50</b>	<b>5</b>	<b>3</b>	<b>30</b>	<b>165</b>	<b>170</b>	<b>65</b>	<b>15</b>	<b>3</b>	<b>25</b>	<b>10</b>
<b>2040 AM Total</b>	<b>11</b>	<b>55</b>	<b>5</b>	<b>4</b>	<b>33</b>	<b>182</b>	<b>188</b>	<b>72</b>	<b>16</b>	<b>4</b>	<b>28</b>	<b>11</b>

Direction Start Time	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 16:30:00	40	0	3	4	69	0	0	1	1	7	83	34
2018-09-06 16:45:00	45	0	2	4	70	2	4	1	3	1	76	41
2018-09-06 17:00:00	52	0	2	2	66	2	3	0	5	6	66	35
2018-09-06 17:15:00	41	0	1	2	51	0	1	0	2	4	91	37
<b>2018 PM Total</b>	<b>178</b>	<b>0</b>	<b>8</b>	<b>12</b>	<b>256</b>	<b>4</b>	<b>8</b>	<b>2</b>	<b>11</b>	<b>18</b>	<b>316</b>	<b>147</b>
<b>2025 PM Total</b>	<b>191</b>	<b>0</b>	<b>9</b>	<b>13</b>	<b>274</b>	<b>4</b>	<b>9</b>	<b>2</b>	<b>12</b>	<b>19</b>	<b>339</b>	<b>158</b>
<b>2030 PM Total</b>	<b>40</b>	<b>165</b>	<b>10</b>	<b>15</b>	<b>55</b>	<b>240</b>	<b>320</b>	<b>150</b>	<b>10</b>	<b>20</b>	<b>45</b>	<b>20</b>
<b>2040 PM Total</b>	<b>44</b>	<b>182</b>	<b>11</b>	<b>17</b>	<b>61</b>	<b>265</b>	<b>353</b>	<b>166</b>	<b>11</b>	<b>22</b>	<b>50</b>	<b>22</b>

**N - N. Raney St. & Ave. of Mid-America**

Direction	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 07:15:00	3	0	0	1	23	0	0	0	0	4	13	3
2018-09-06 07:30:00	8	0	0	0	32	0	0	0	3	5	29	0
2018-09-06 07:45:00	8	0	2	0	19	0	0	0	4	3	34	2
2018-09-06 08:00:00	7	0	1	0	20	0	0	0	2	5	26	2
<b>2018 AM Total</b>	<b>26</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>94</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>17</b>	<b>102</b>	<b>7</b>
<b>2025 AM Total</b>	<b>28</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>101</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>12</b>	<b>18</b>	<b>109</b>	<b>8</b>
<b>2030 AM Total</b>	<b>29</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>106</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>12</b>	<b>19</b>	<b>115</b>	<b>8</b>
<b>2040 AM Total</b>	<b>32</b>	<b>0</b>	<b>4</b>	<b>1</b>	<b>117</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>14</b>	<b>21</b>	<b>127</b>	<b>9</b>

Direction	Southbound			Westbound			Northbound			Eastbound		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left
2018-09-06 16:30:00	6	1	0	0	49	0	0	0	1	6	37	1
2018-09-06 16:45:00	7	0	0	0	42	1	0	0	1	6	44	4
2018-09-06 17:00:00	6	0	5	0	36	0	0	0	5	4	41	6
2018-09-06 17:15:00	5	0	0	0	27	0	0	0	6	6	47	8
<b>2018 PM Total</b>	<b>24</b>	<b>1</b>	<b>5</b>	<b>0</b>	<b>154</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>13</b>	<b>22</b>	<b>169</b>	<b>19</b>
<b>2025 PM Total</b>	<b>26</b>	<b>1</b>	<b>5</b>	<b>0</b>	<b>165</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>14</b>	<b>24</b>	<b>181</b>	<b>20</b>
<b>2030 PM Total</b>	<b>27</b>	<b>1</b>	<b>6</b>	<b>0</b>	<b>174</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>25</b>	<b>190</b>	<b>21</b>
<b>2040 PM Total</b>	<b>30</b>	<b>1</b>	<b>6</b>	<b>0</b>	<b>192</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>16</b>	<b>27</b>	<b>210</b>	<b>24</b>

## **Appendix C**

ITE Trip Generation Reports



# General Light Industrial (110)

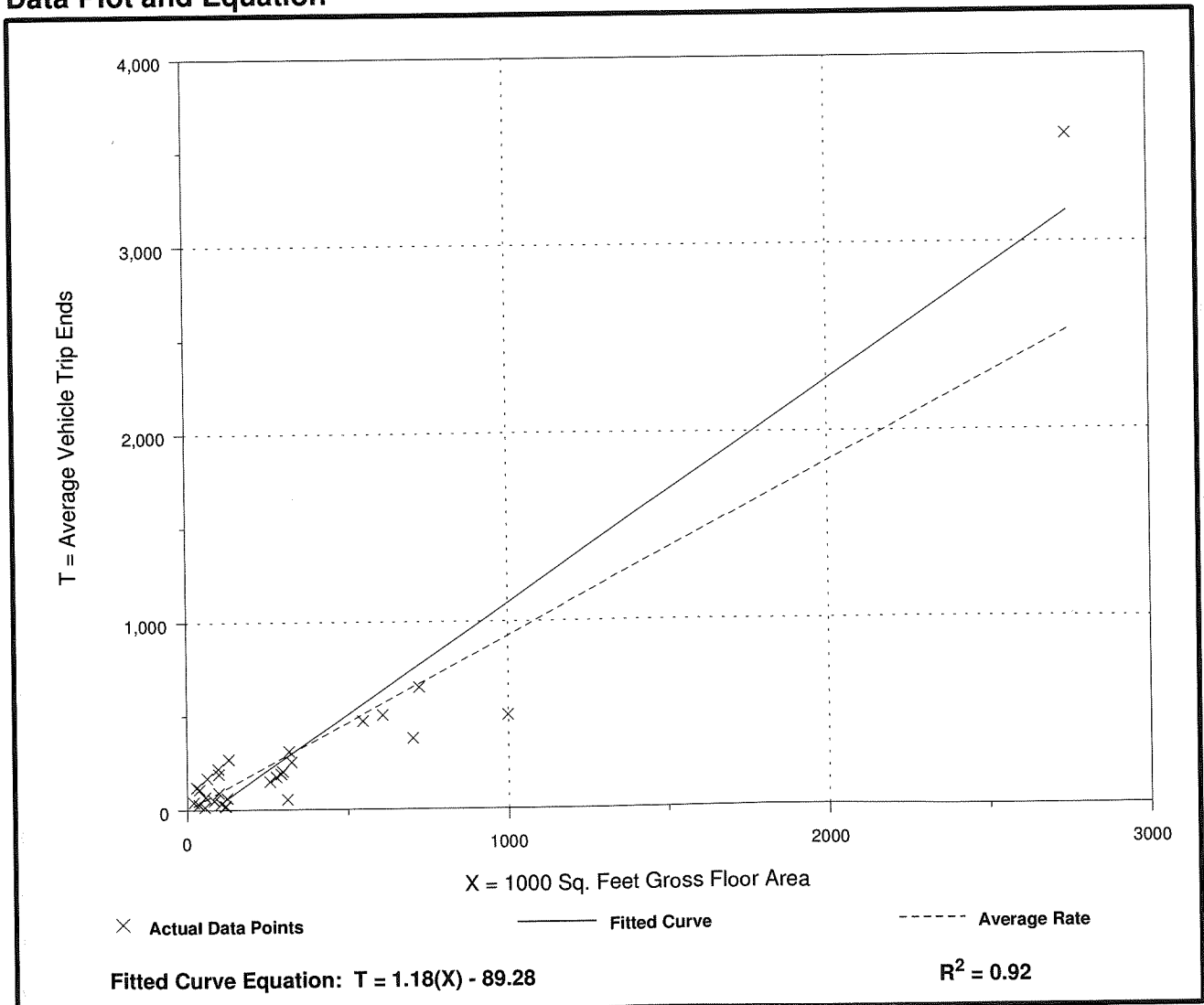
**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**

Number of Studies: 29  
 Average 1000 Sq. Feet GFA: 336  
 Directional Distribution: 88% entering, 12% exiting

### Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
0.92	0.17 - 4.00	1.07

### Data Plot and Equation



# General Light Industrial (110)

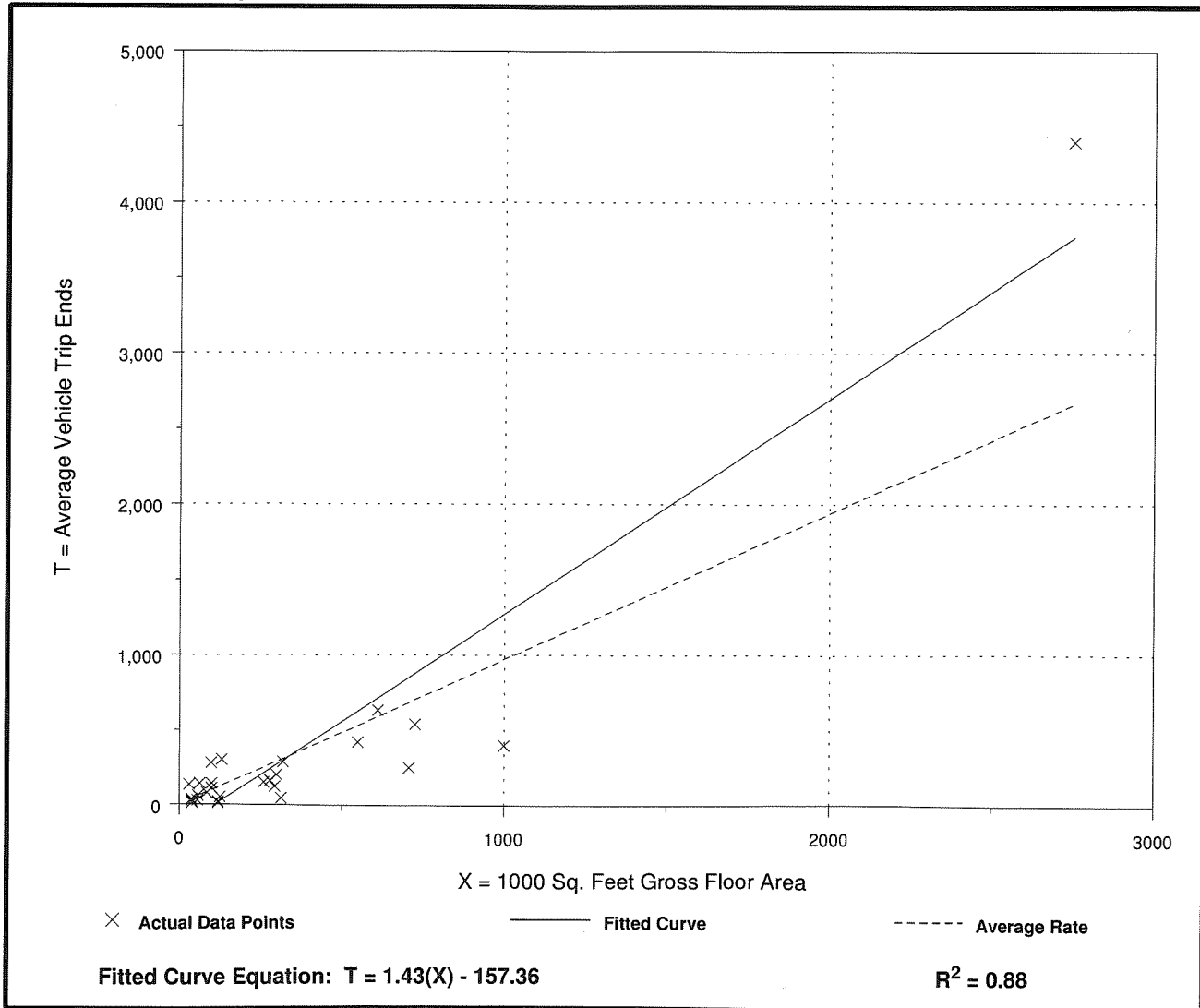
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area  
 On a: Weekday,  
 Peak Hour of Adjacent Street Traffic,  
 One Hour Between 4 and 6 p.m.

Number of Studies: 27  
 Average 1000 Sq. Feet GFA: 345  
 Directional Distribution: 12% entering, 88% exiting

## Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
0.97	0.08 - 4.50	1.16

## Data Plot and Equation



# Low-Rise Apartment (221)

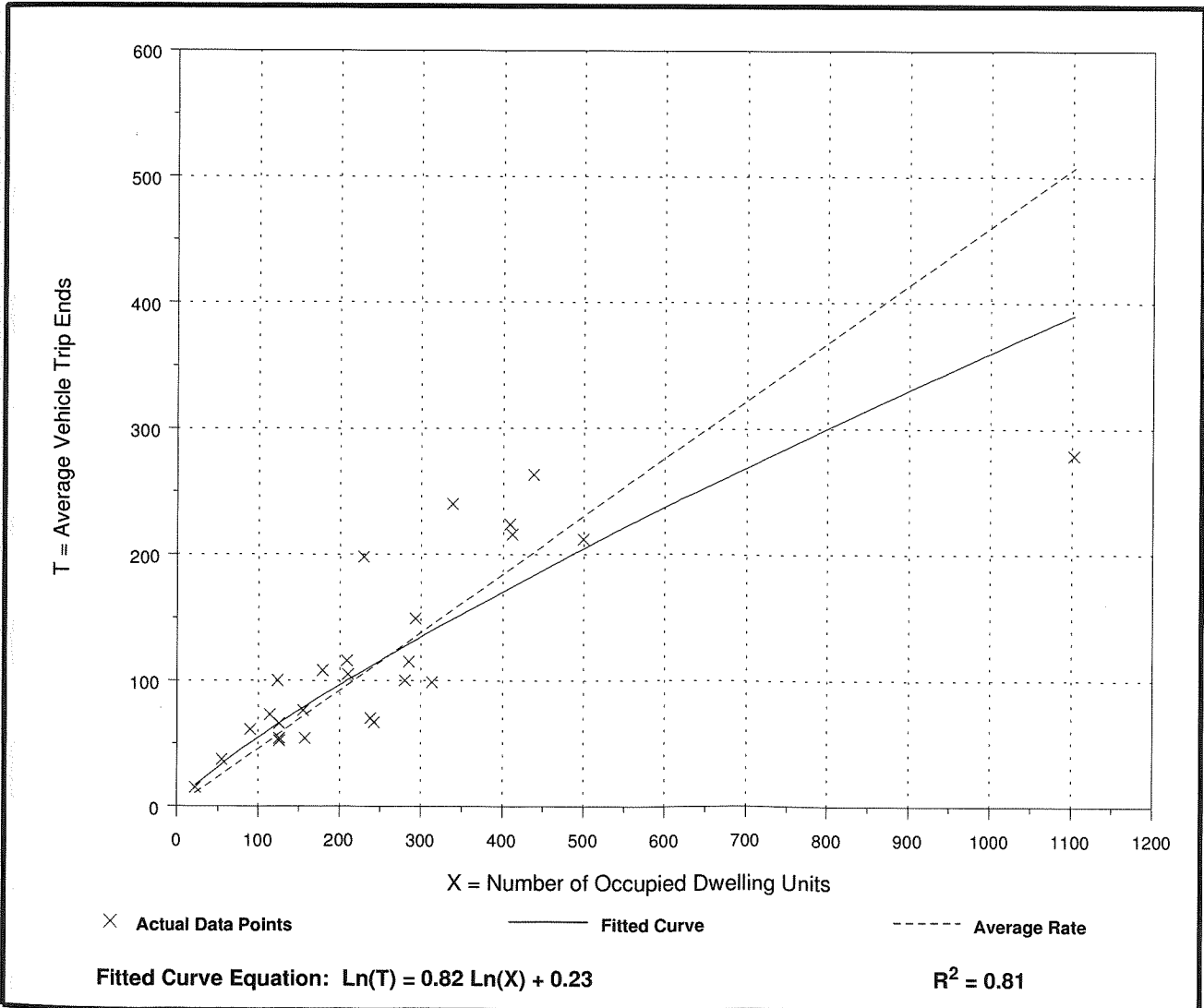
**Average Vehicle Trip Ends vs: Occupied Dwelling Units**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**

Number of Studies: 27  
 Avg. Num. of Occupied Dwelling Units: 257  
 Directional Distribution: 21% entering, 79% exiting

### Trip Generation per Occupied Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.46	0.25 - 0.86	0.70

### Data Plot and Equation



# Low-Rise Apartment (221)

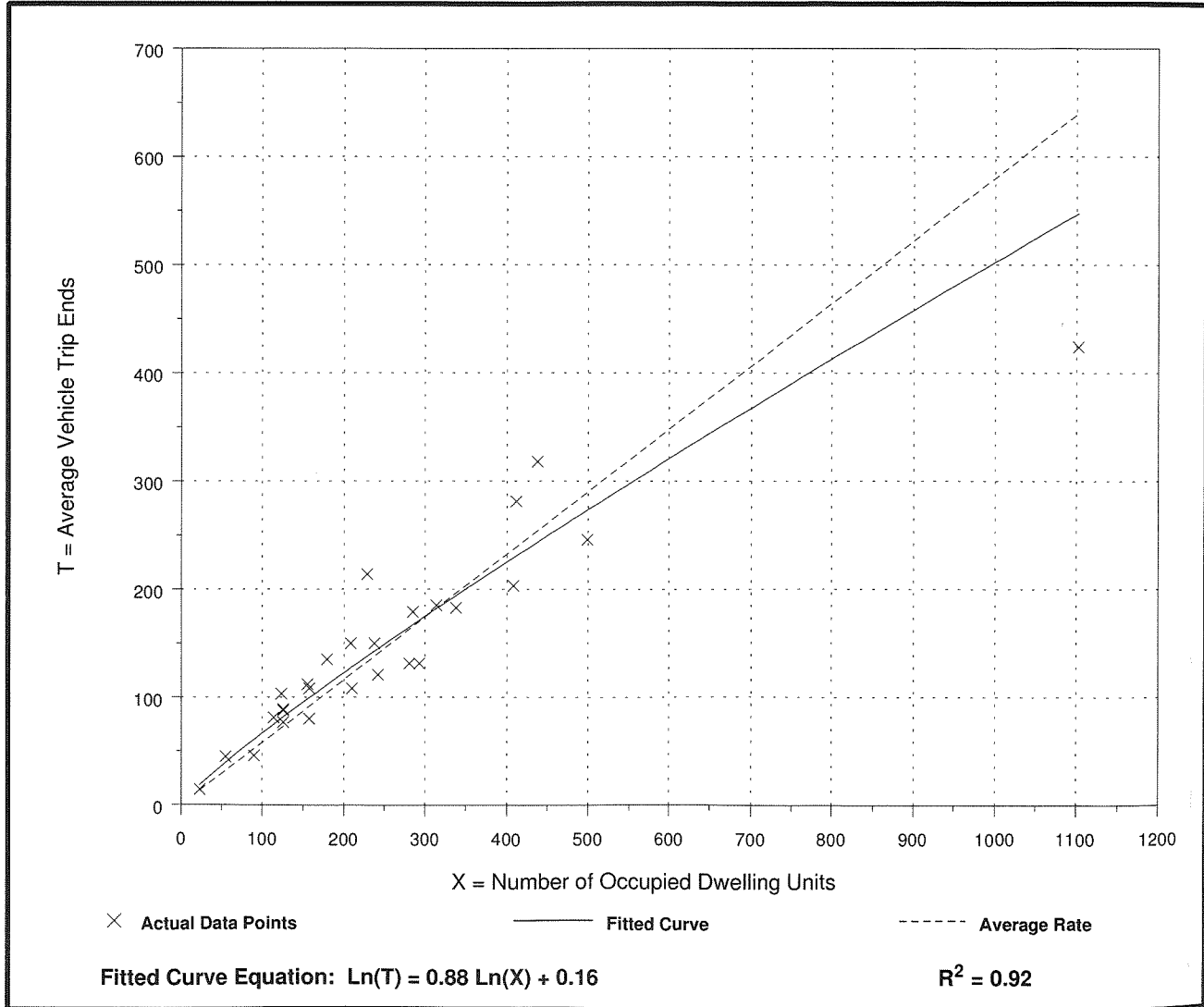
**Average Vehicle Trip Ends vs: Occupied Dwelling Units**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

Number of Studies: 27  
 Avg. Num. of Occupied Dwelling Units: 257  
 Directional Distribution: 65% entering, 35% exiting

### Trip Generation per Occupied Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.58	0.38 - 0.93	0.77

### Data Plot and Equation



# Residential Condominium/Townhouse (230)

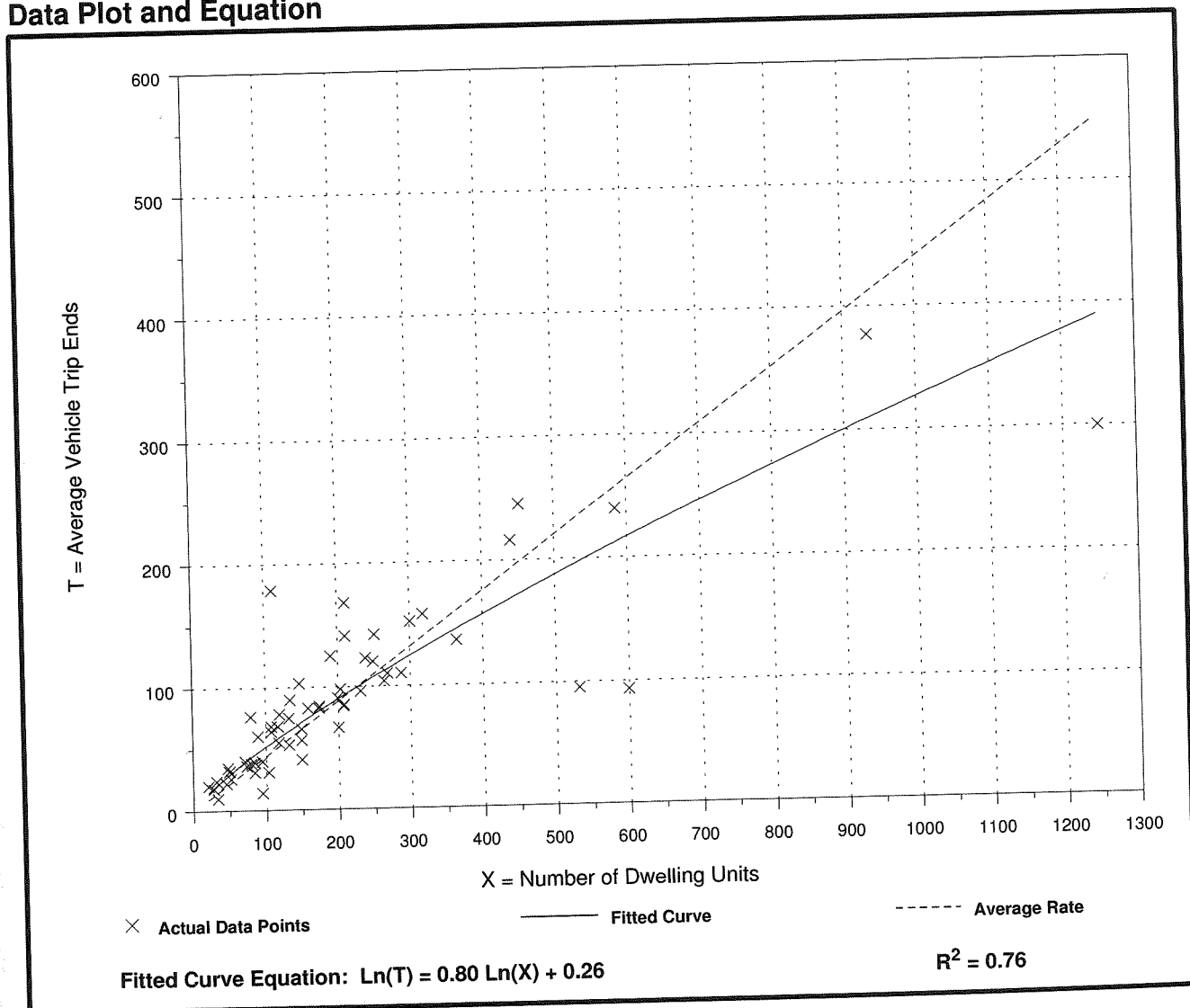
Average Vehicle Trip Ends vs: Dwelling Units  
On a: Weekday,  
Peak Hour of Adjacent Street Traffic,  
One Hour Between 7 and 9 a.m.

Number of Studies: 59  
Avg. Number of Dwelling Units: 213  
Directional Distribution: 17% entering, 83% exiting

## Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.44	0.15 - 1.61	0.69

## Data Plot and Equation



# Residential Condominium/Townhouse (230)

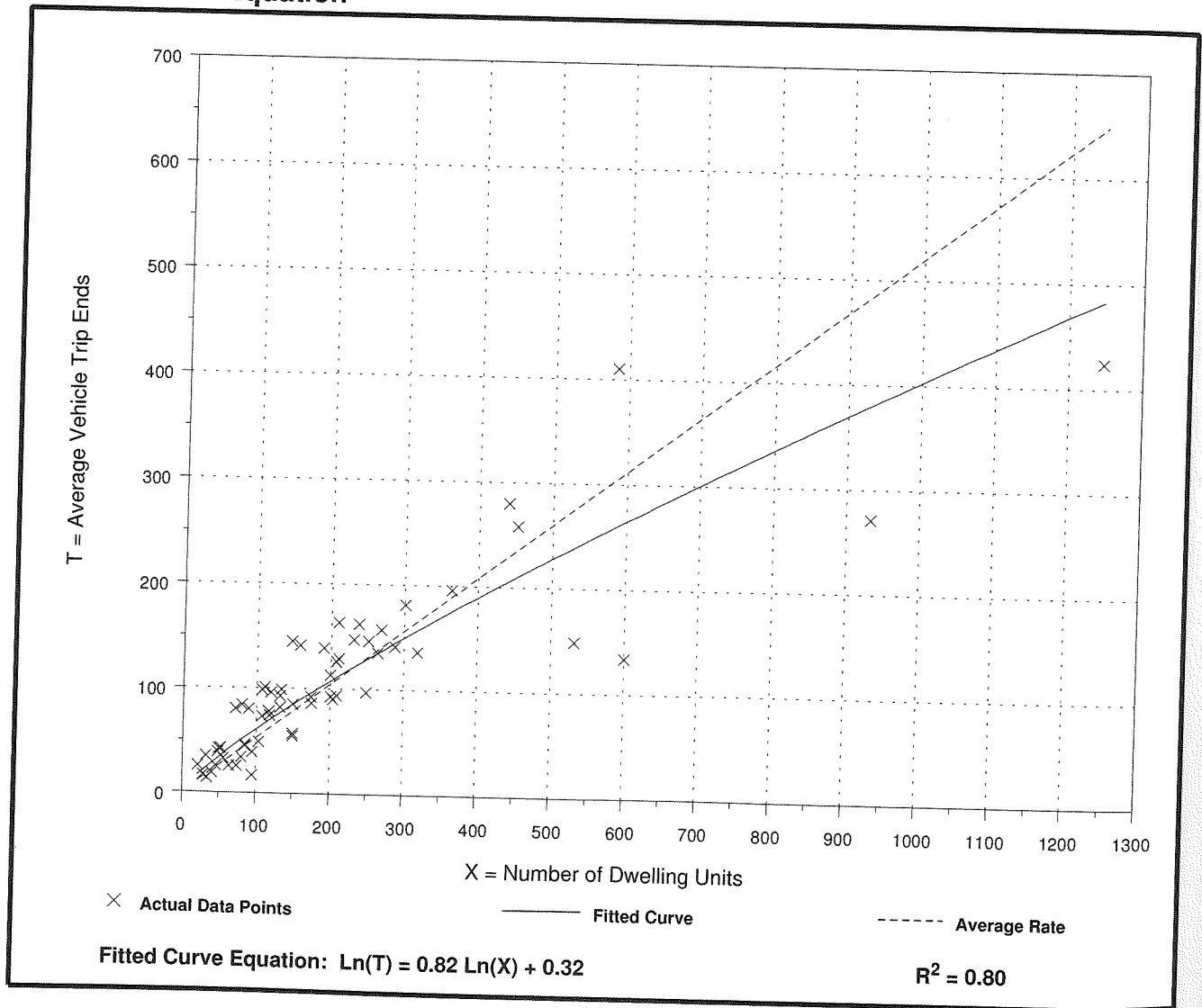
**Average Vehicle Trip Ends vs: Dwelling Units**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

Number of Studies: 62  
 Avg. Number of Dwelling Units: 205  
 Directional Distribution: 67% entering, 33% exiting

## Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.52	0.18 - 1.24	0.75

## Data Plot and Equation



# Hotel (310)

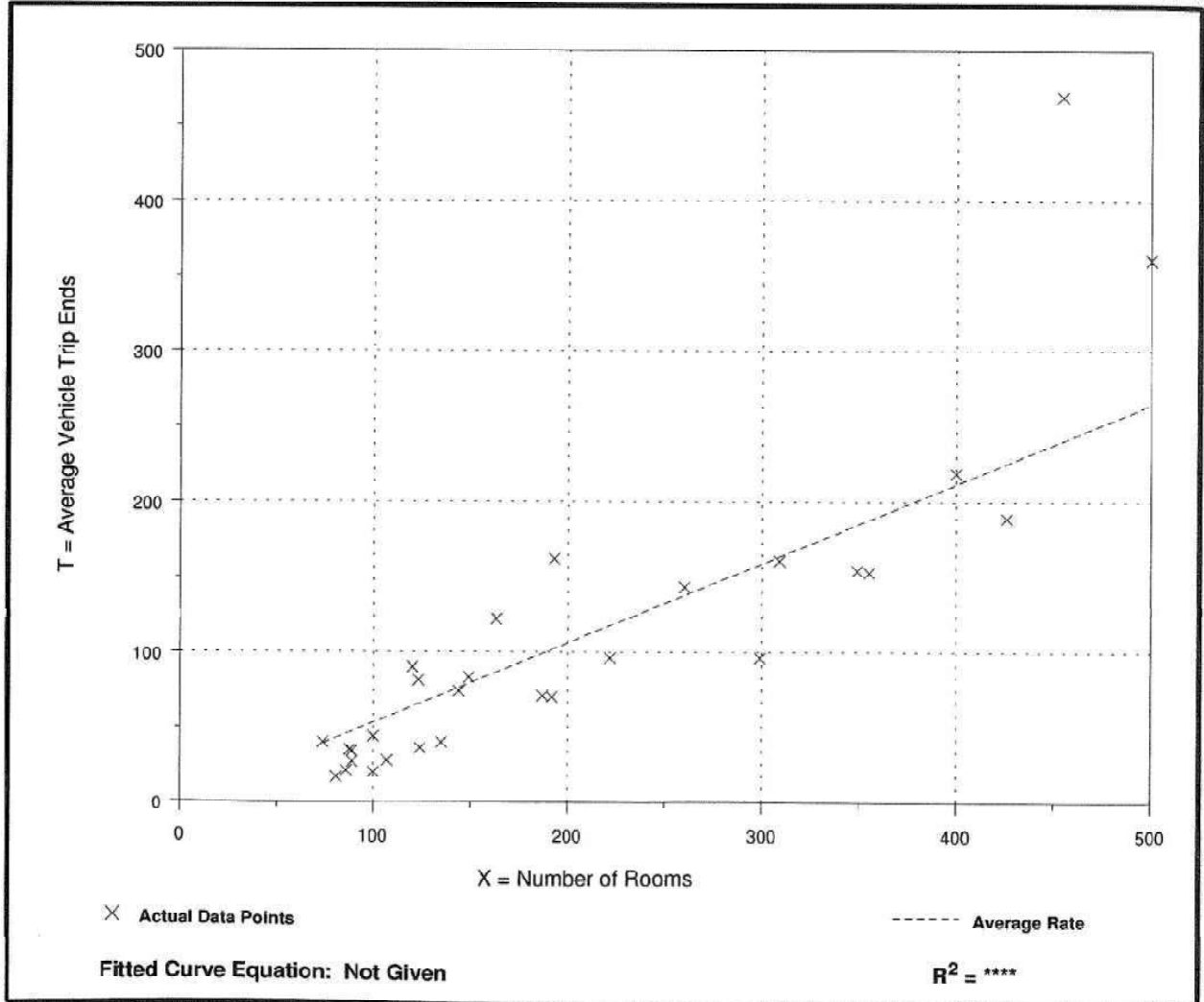
**Average Vehicle Trip Ends vs: Rooms**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**

Number of Studies: 29  
 Average Number of Rooms: 204  
 Directional Distribution: 59% entering, 41% exiting

### Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.53	0.20 - 1.03	0.76

### Data Plot and Equation



# Hotel (310)

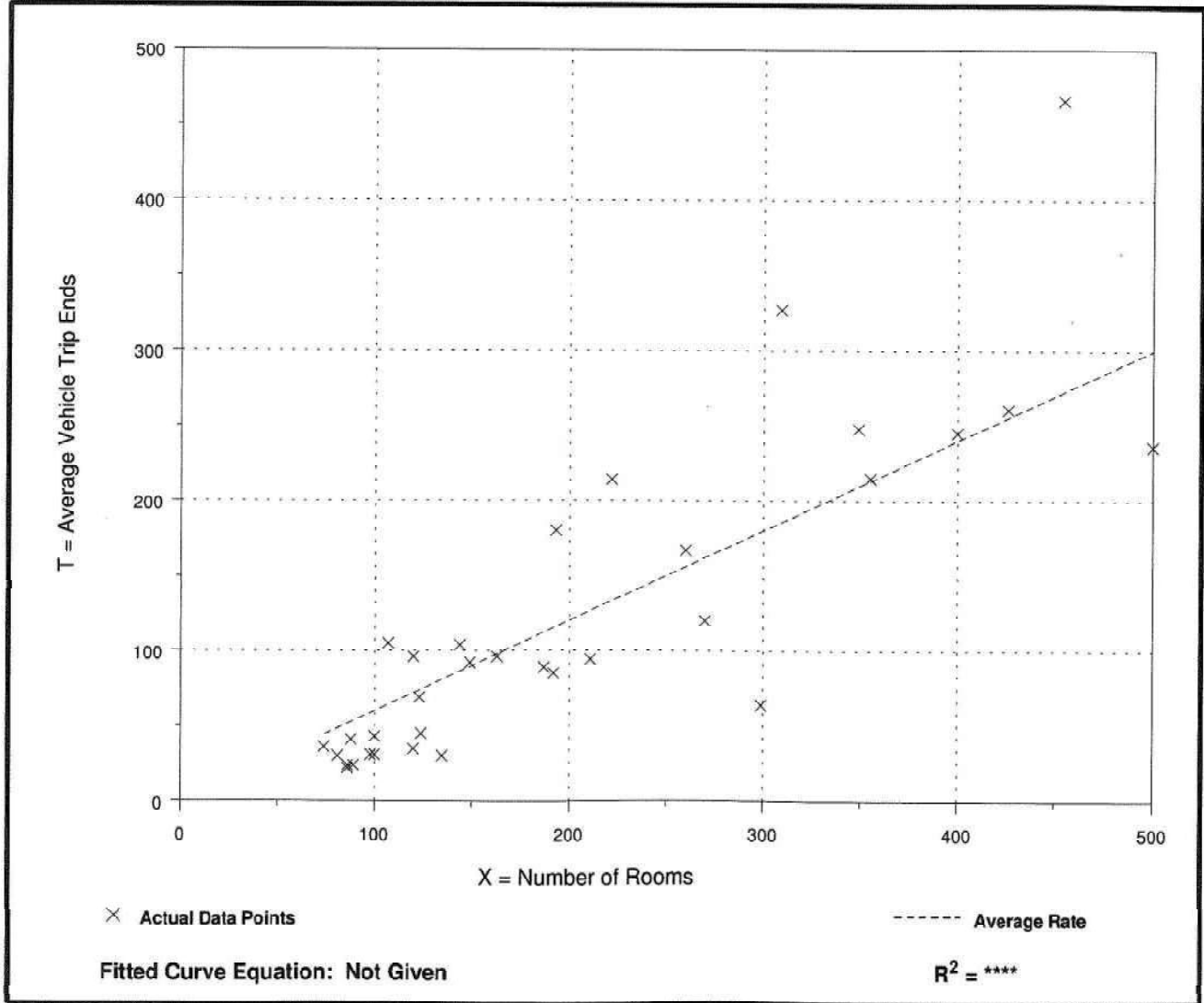
**Average Vehicle Trip Ends vs: Rooms**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

Number of Studies: 33  
 Average Number of Rooms: 200  
 Directional Distribution: 51% entering, 49% exiting

## Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.60	0.21 - 1.06	0.81

## Data Plot and Equation





# Medical-Dental Office Building (720)

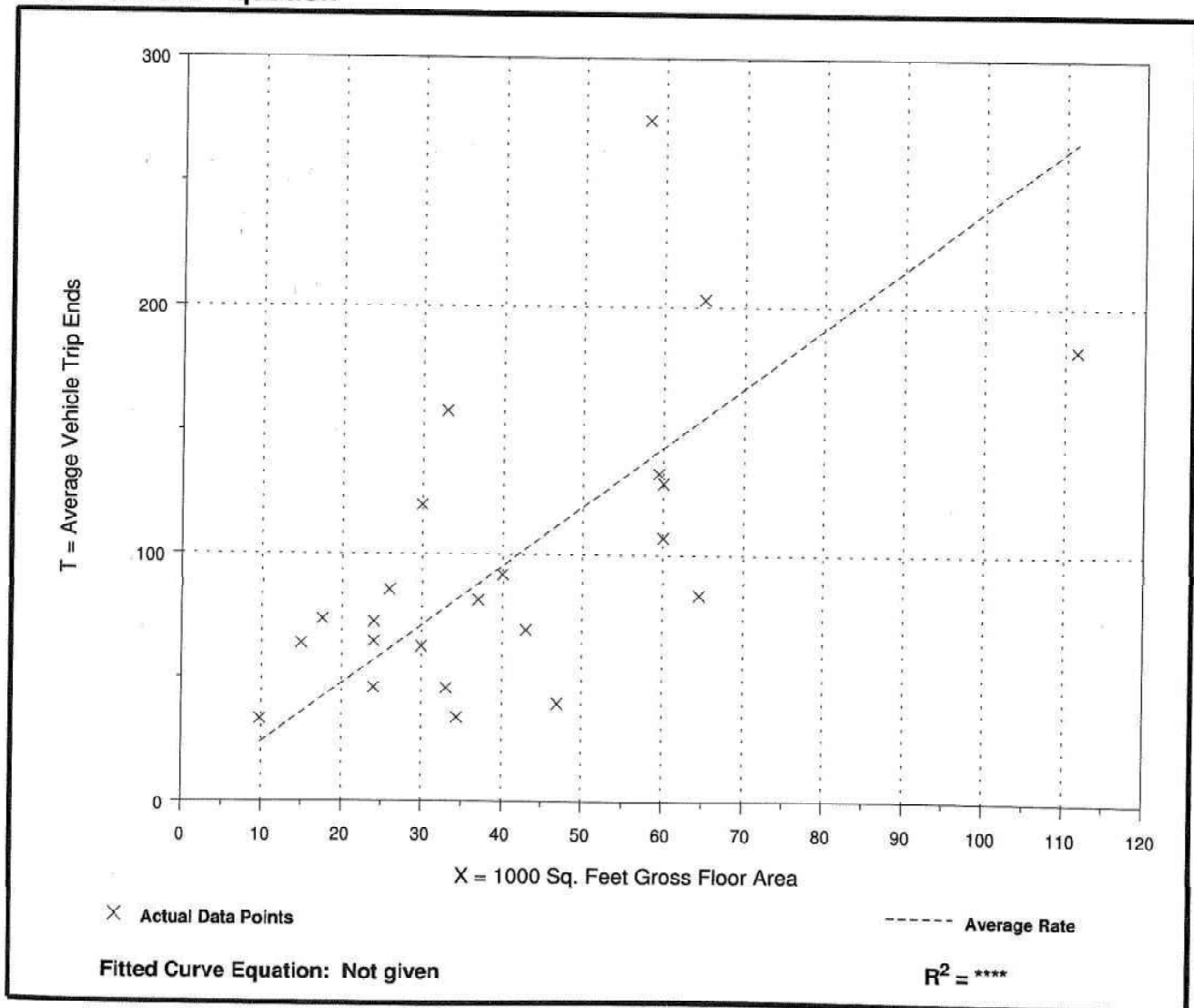
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area  
On a: Weekday,  
Peak Hour of Adjacent Street Traffic,  
One Hour Between 7 and 9 a.m.

Number of Studies: 23  
Average 1000 Sq. Feet GFA: 41  
Directional Distribution: 79% entering, 21% exiting

### Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
2.39	0.85 - 4.79	1.89

### Data Plot and Equation



# Medical-Dental Office Building (720)

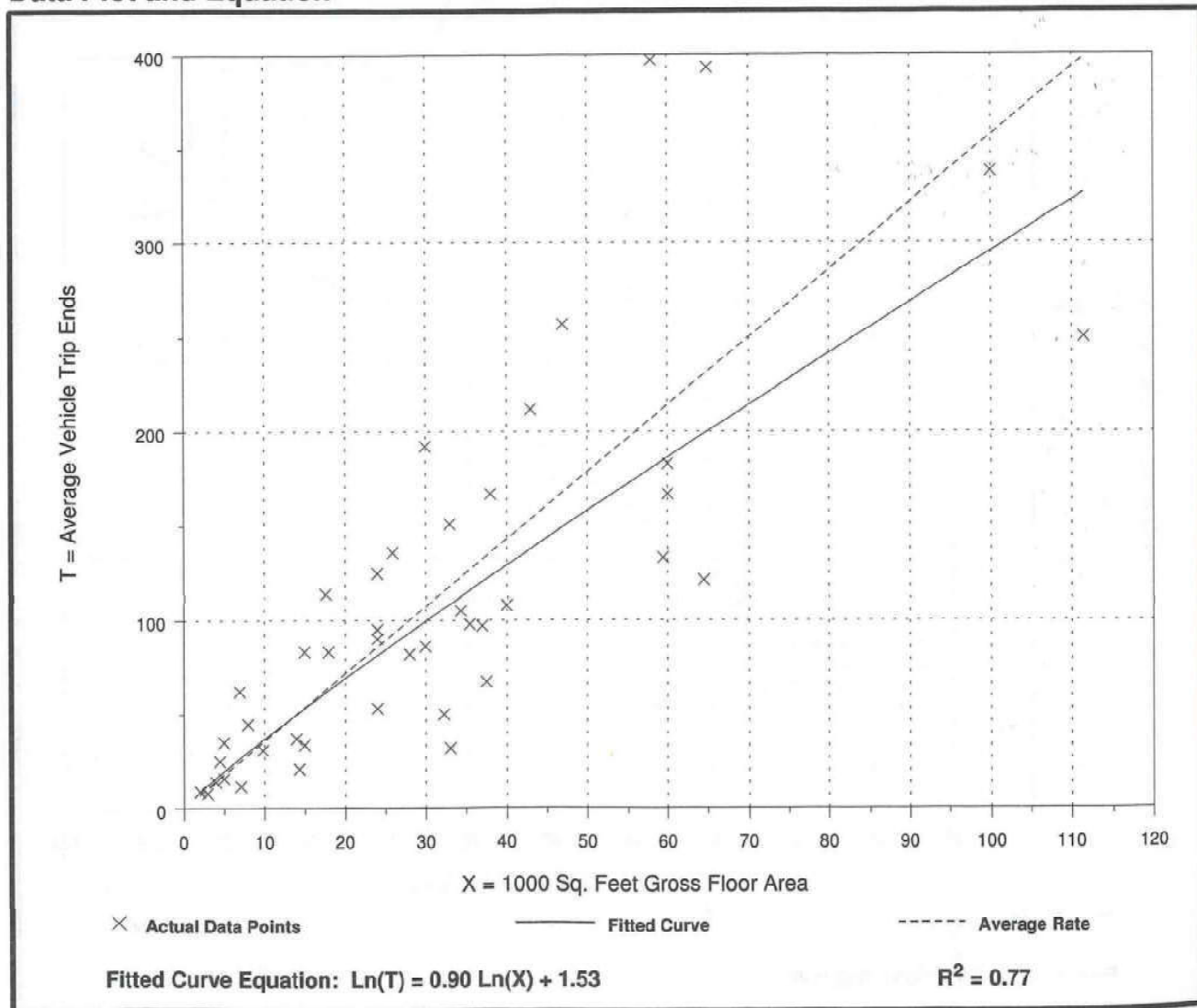
**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

Number of Studies: 43  
 Average 1000 Sq. Feet GFA: 31  
 Directional Distribution: 28% entering, 72% exiting

## Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
3.57	0.97 - 8.86	2.47

## Data Plot and Equation



# Specialty Retail Center (826)

Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Leasable Area  
 On a: Weekday,  
 Peak Hour of Adjacent Street Traffic,  
 One Hour Between 4 and 6 p.m.

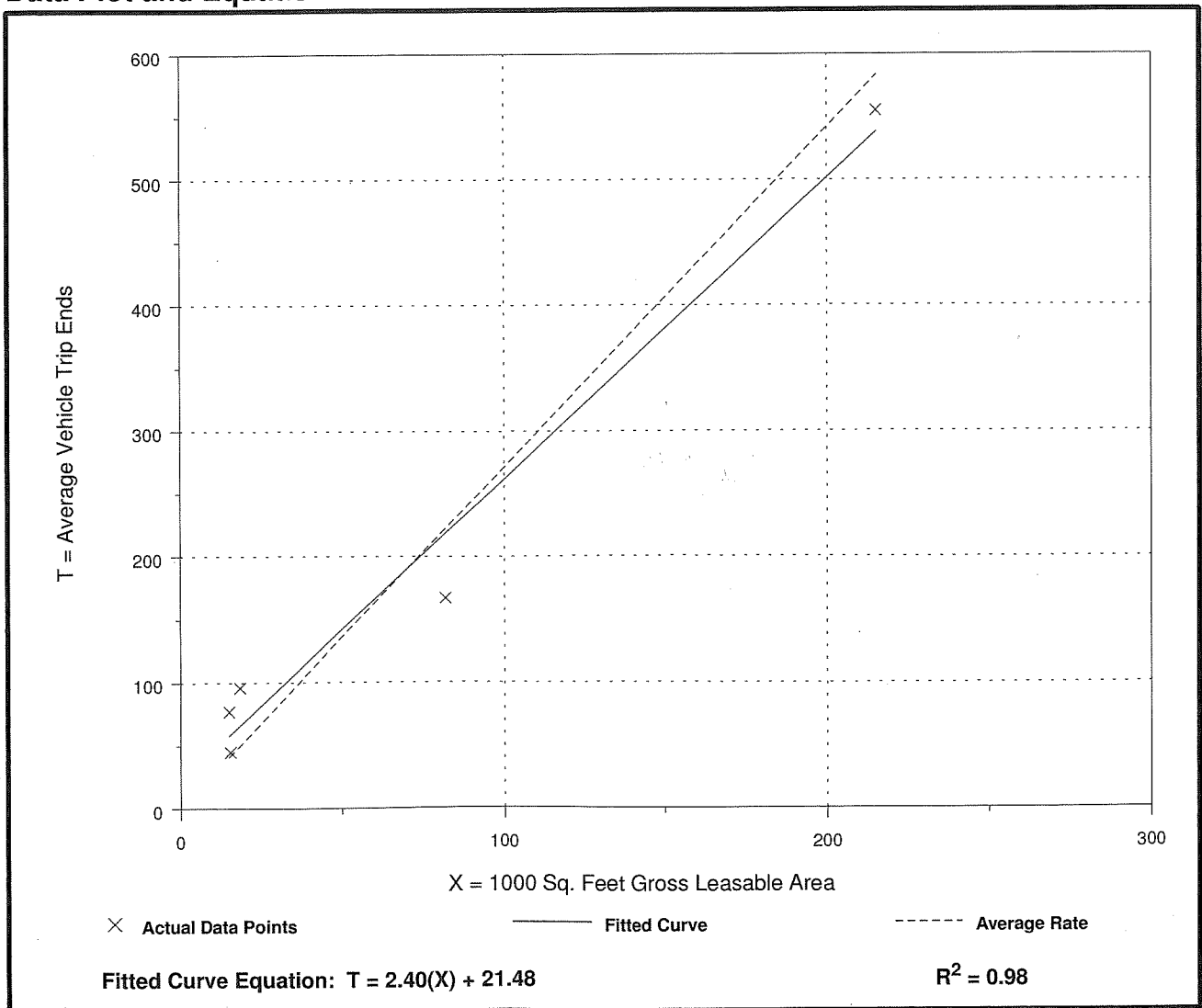
Number of Studies: 5  
 Average 1000 Sq. Feet GLA: 69  
 Directional Distribution: 44% entering, 56% exiting

## Trip Generation per 1000 Sq. Feet Gross Leasable Area

Average Rate	Range of Rates	Standard Deviation
2.71	2.03 - 5.16	1.83

### Data Plot and Equation

*Caution - Use Carefully - Small Sample Size*



# Automobile Sales (841)

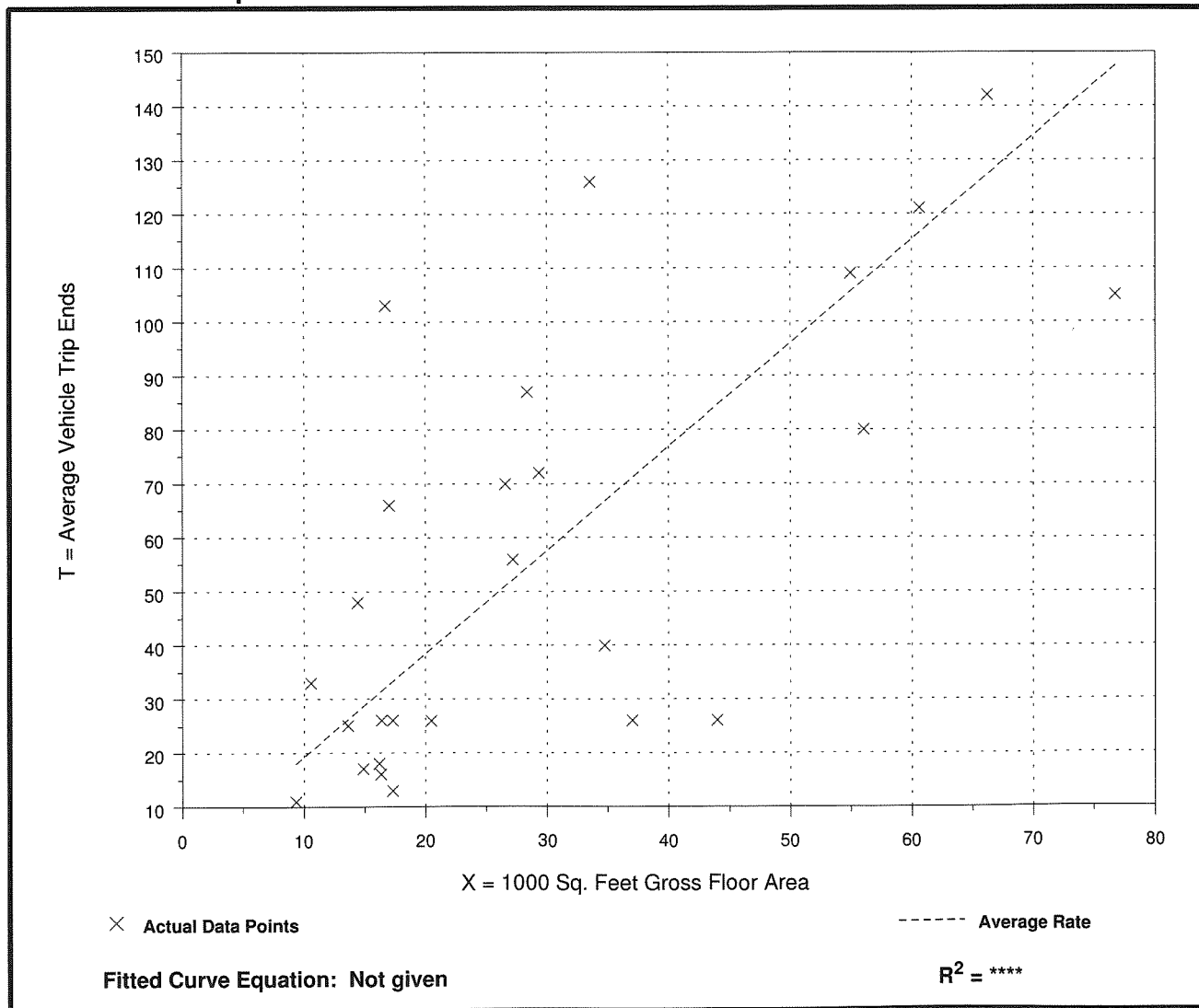
**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**

Number of Studies: 26  
 Average 1000 Sq. Feet GFA: 30  
 Directional Distribution: 75% entering, 25% exiting

## Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
1.92	0.59 - 6.17	1.72

## Data Plot and Equation



# Automobile Sales (841)

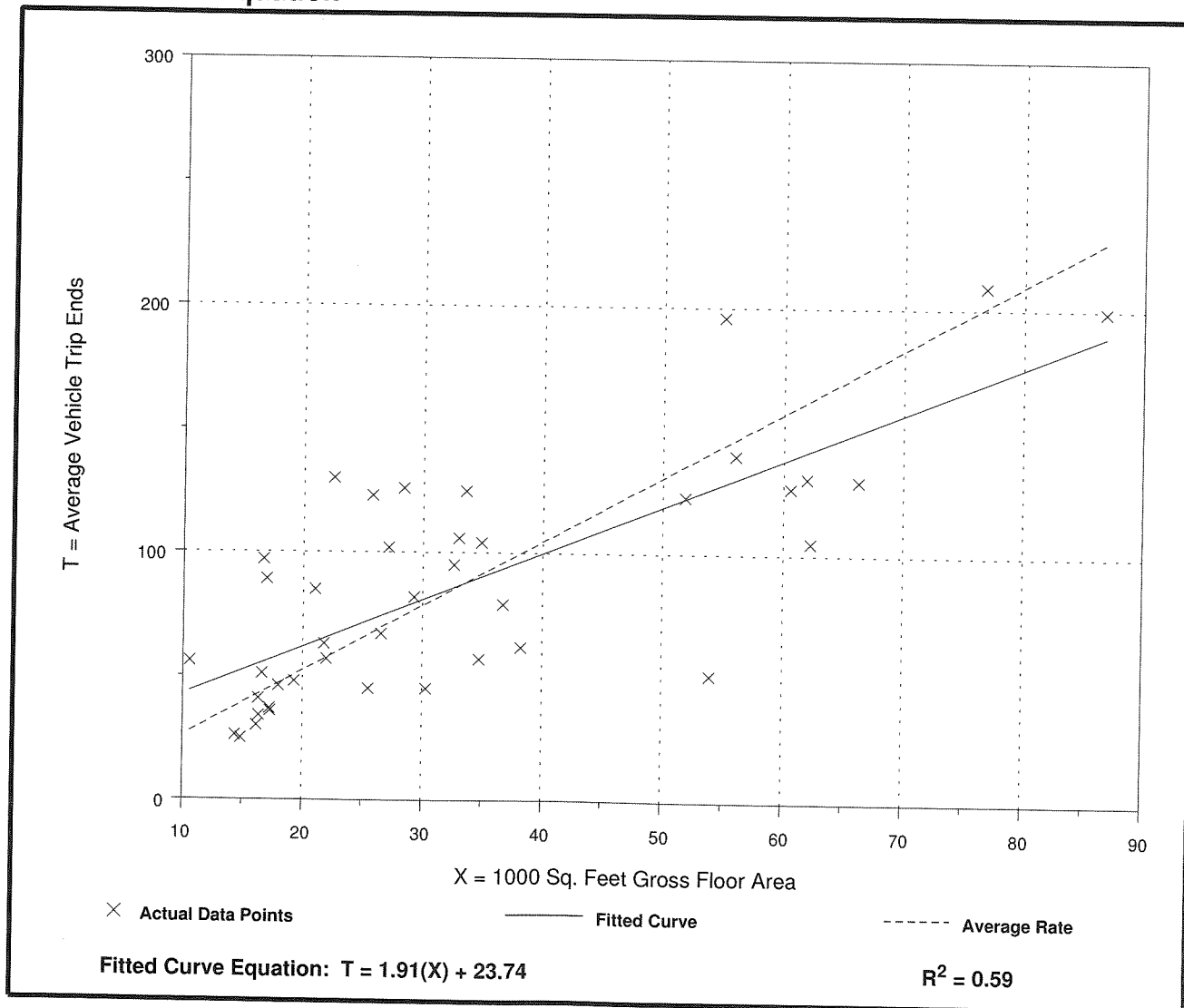
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area  
On a: Weekday,  
Peak Hour of Adjacent Street Traffic,  
One Hour Between 4 and 6 p.m.

Number of Studies: 41  
Average 1000 Sq. Feet GFA: 33  
Directional Distribution: 40% entering, 60% exiting

## Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
2.62	0.94 - 5.81	1.90

## Data Plot and Equation



# Automobile Parts Sales (843)

**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**

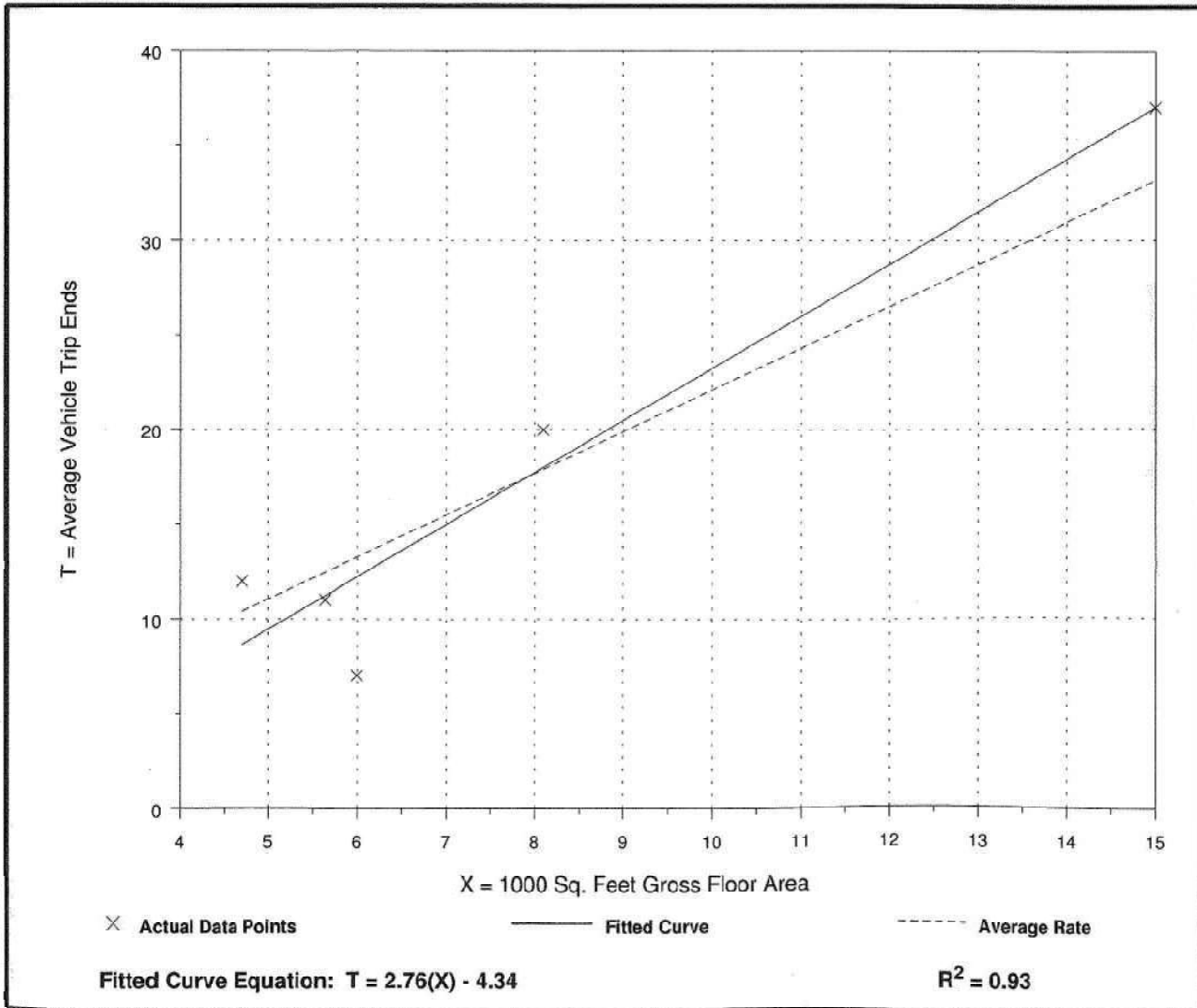
Number of Studies: 5  
 Average 1000 Sq. Feet GFA: 8  
 Directional Distribution: Not available

## Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
2.21	1.17 - 2.55	1.49

## Data Plot and Equation

*Caution - Use Carefully - Small Sample Size*



# Automobile Parts Sales (843)

**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

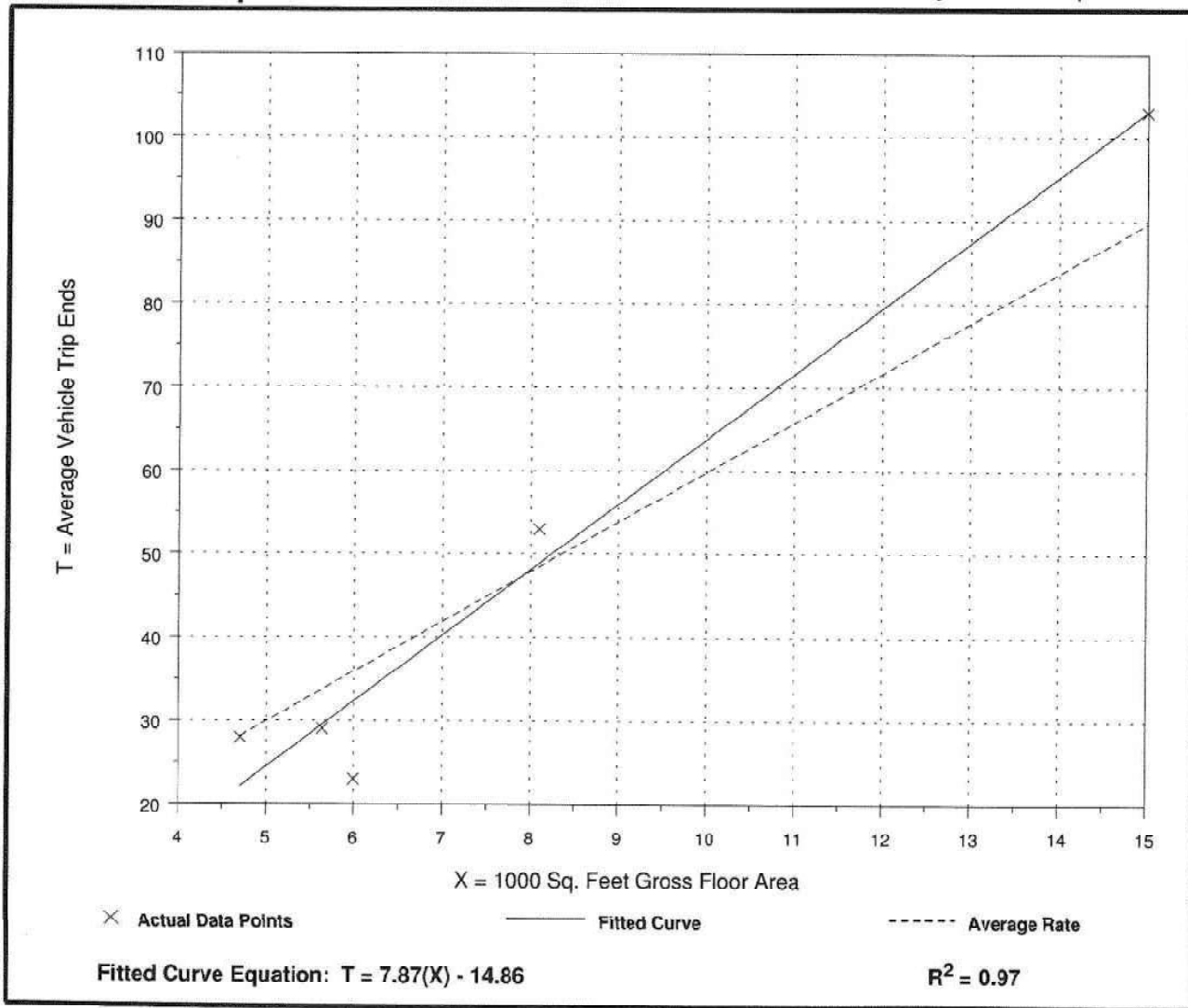
Number of Studies: 5  
 Average 1000 Sq. Feet GFA: 8  
 Directional Distribution: 49% entering, 51% exiting

## Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
5.98	3.83 - 6.87	2.57

## Data Plot and Equation

*Caution - Use Carefully - Small Sample Size*



# Supermarket (850)

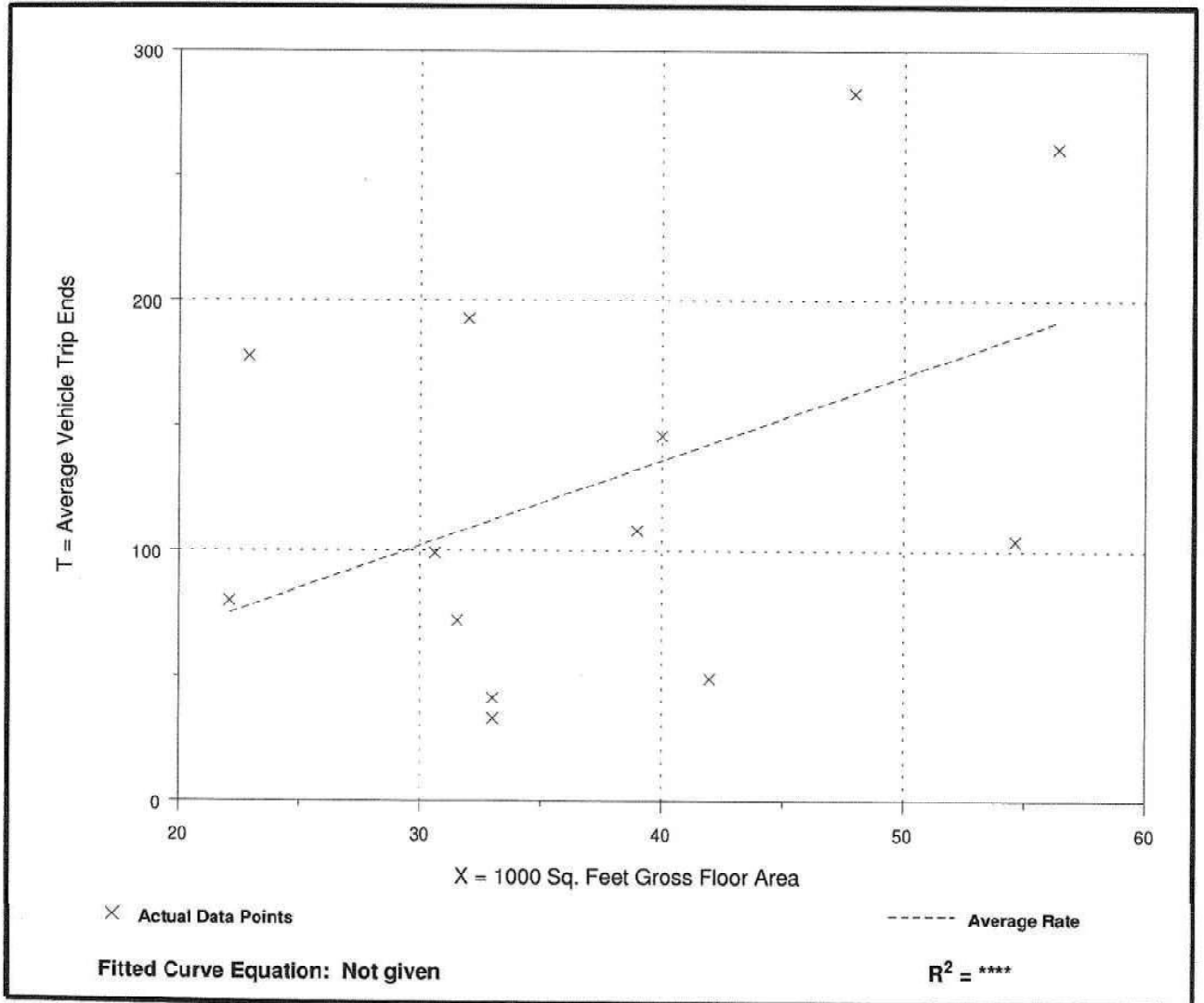
**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**

Number of Studies: 13  
 Average 1000 Sq. Feet GFA: 37  
 Directional Distribution: 62% entering, 38% exiting

### Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
3.40	1.00 - 7.78	2.64

### Data Plot and Equation





# Supermarket (850)

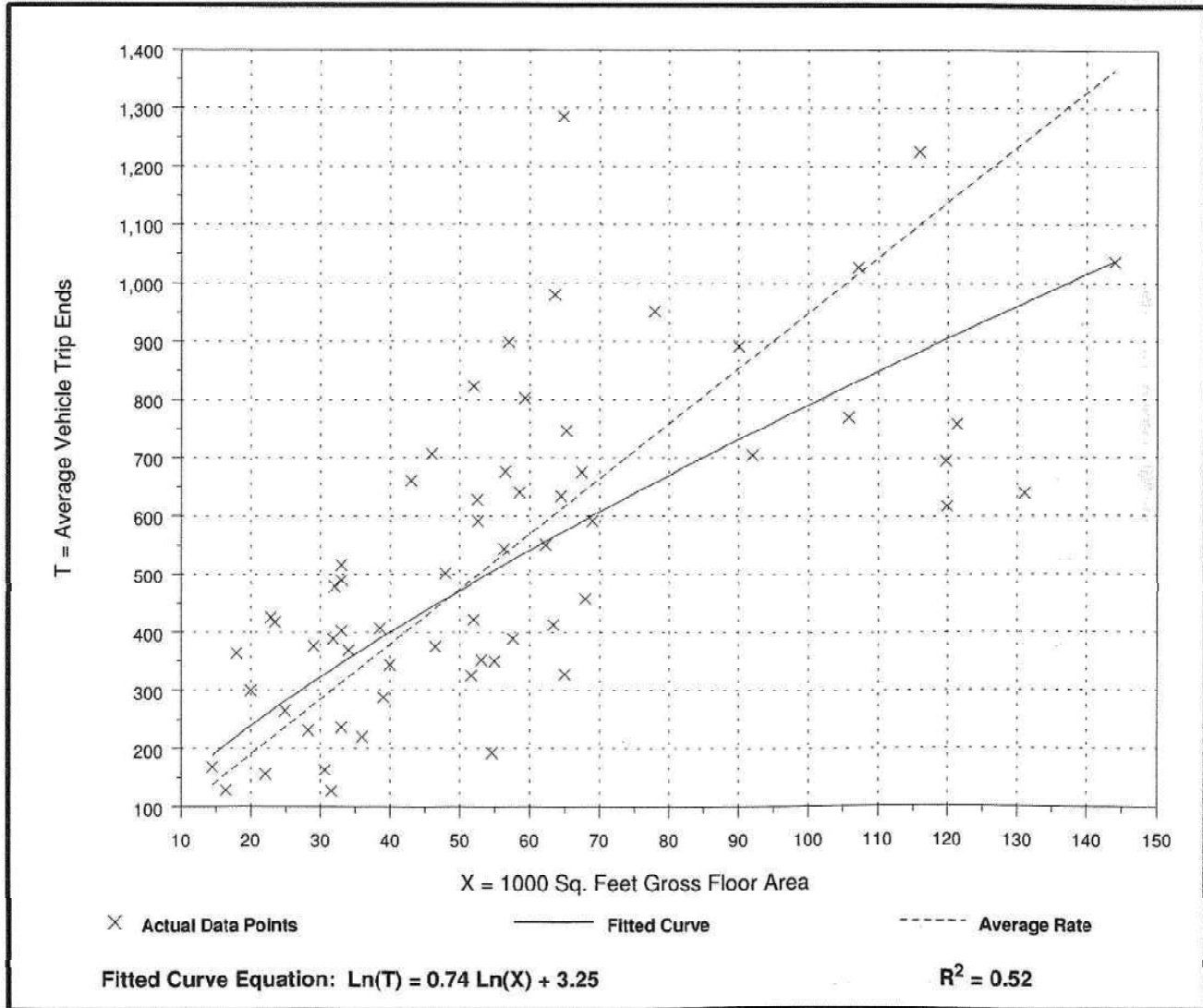
**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

Number of Studies: 62  
 Average 1000 Sq. Feet GFA: 56  
 Directional Distribution: 51% entering, 49% exiting

## Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
9.48	3.53 - 20.29	4.81

## Data Plot and Equation



# Discount Club (857)

**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**

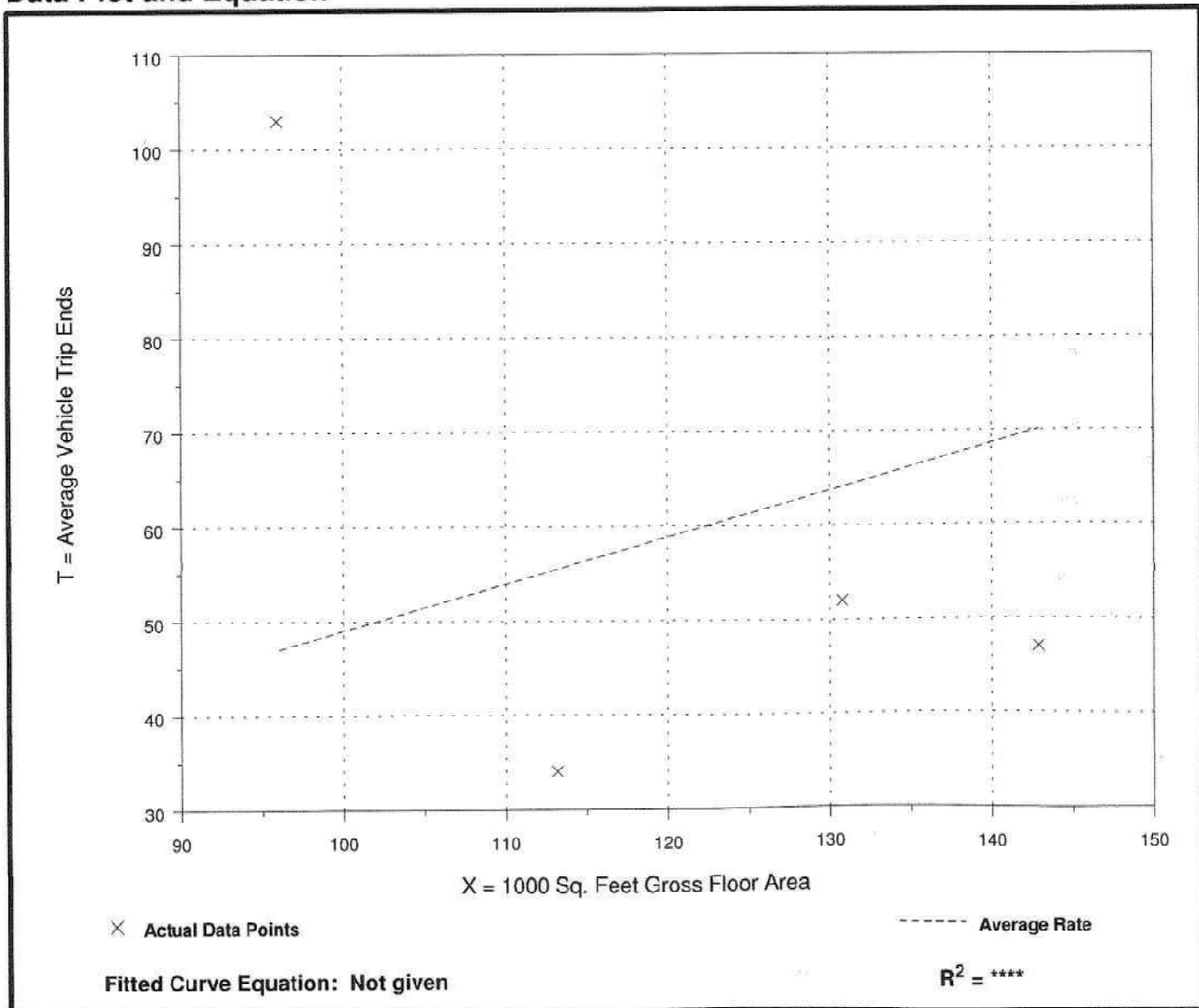
Number of Studies: 4  
 Average 1000 Sq. Feet GFA: 121  
 Directional Distribution: 70% entering, 30% exiting

## Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
0.49	0.30 - 1.07	0.76

## Data Plot and Equation

*Caution - Use Carefully - Small Sample Size*



# Discount Club (857)

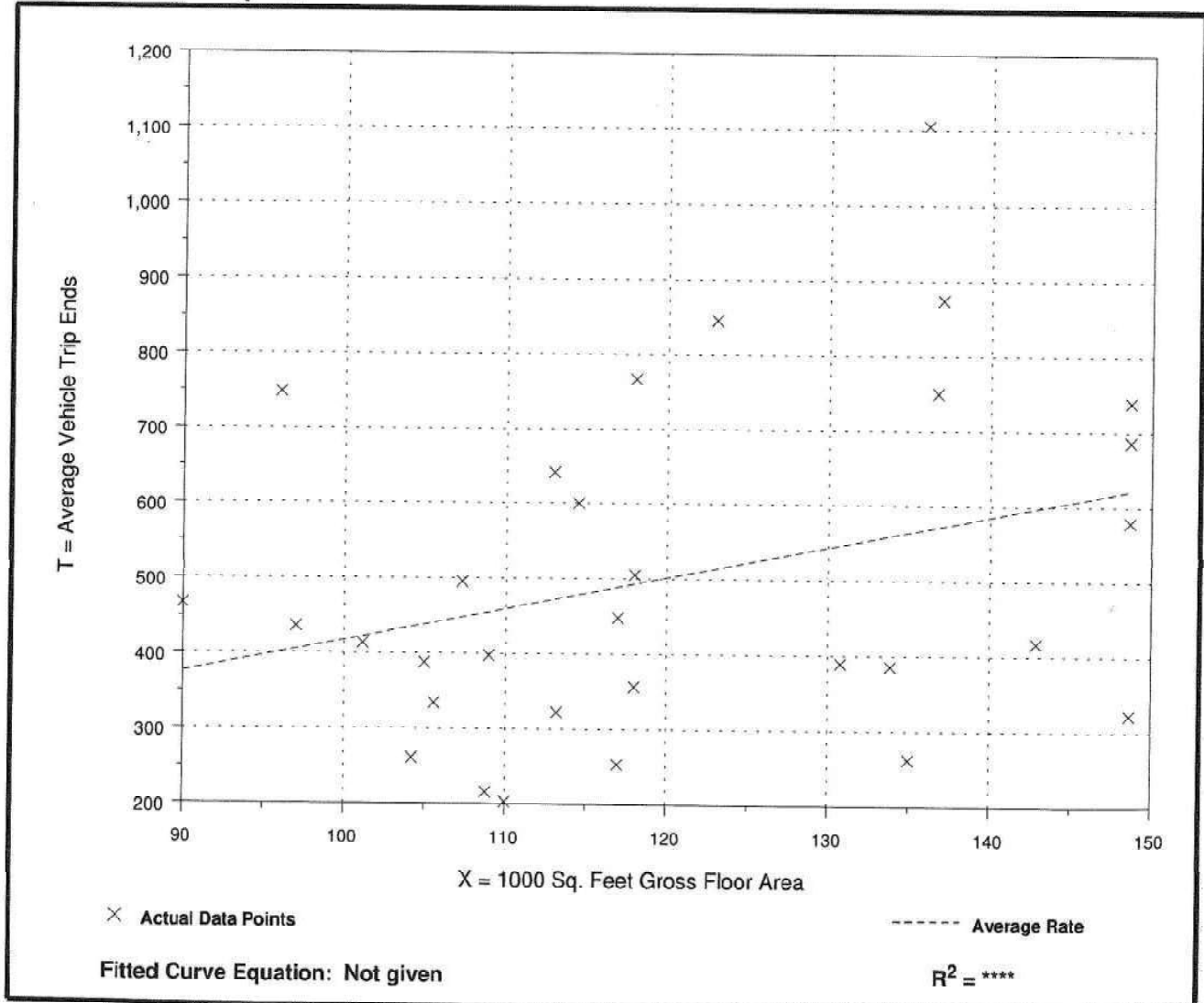
**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

Number of Studies: 31  
 Average 1000 Sq. Feet GFA: 120  
 Directional Distribution: 50% entering, 50% exiting

### Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
4.18	1.85 - 8.13	2.65

### Data Plot and Equation



# Sporting Goods Superstore (861)

**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

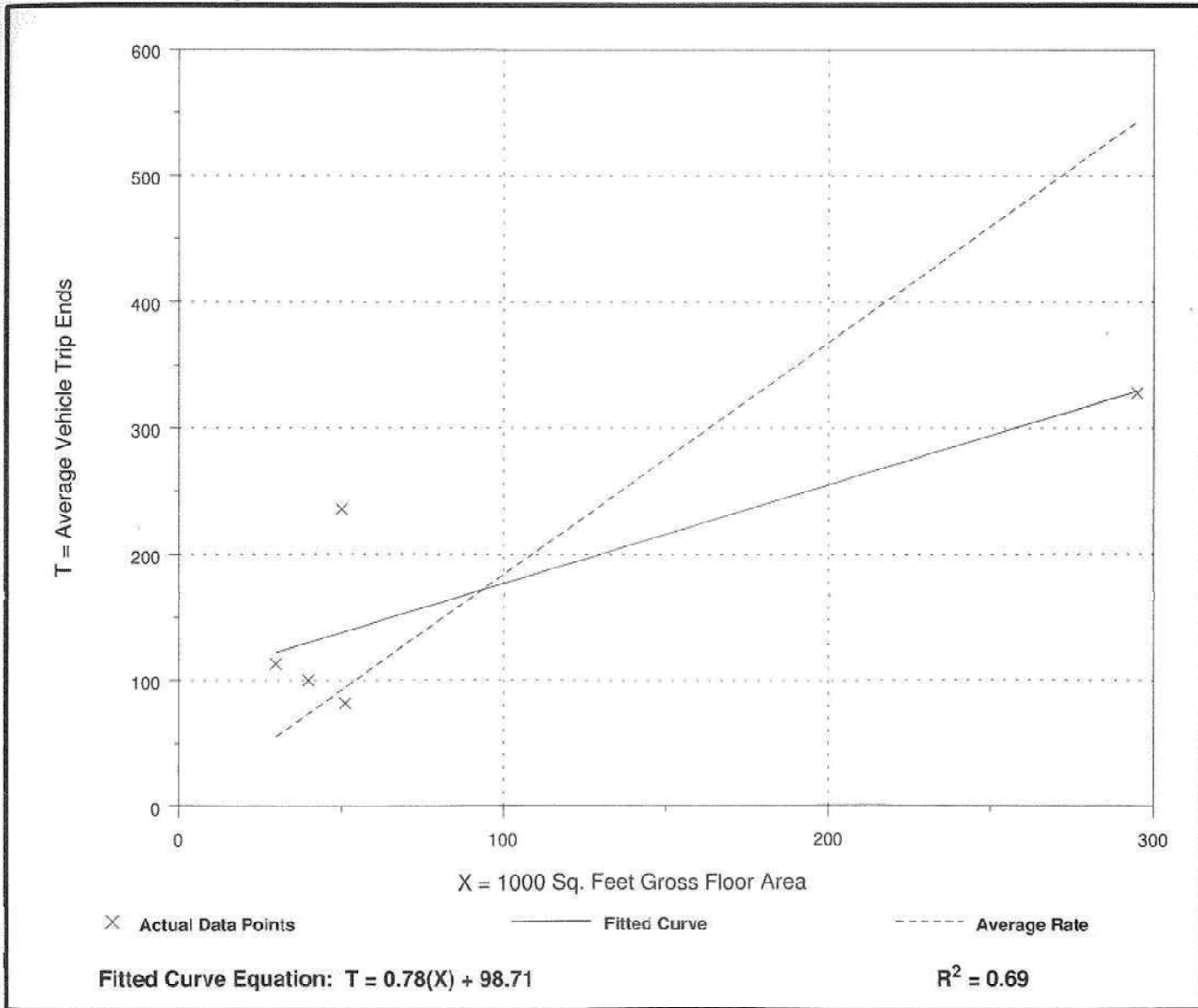
Number of Studies: 5  
 Average 1000 Sq. Feet GFA: 93  
 Directional Distribution: 48% entering, 52% exiting

### Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
1.84	1.11 - 4.69	1.82

### Data Plot and Equation

*Caution - Use Carefully - Small Sample Size*



# Apparel Store (876)

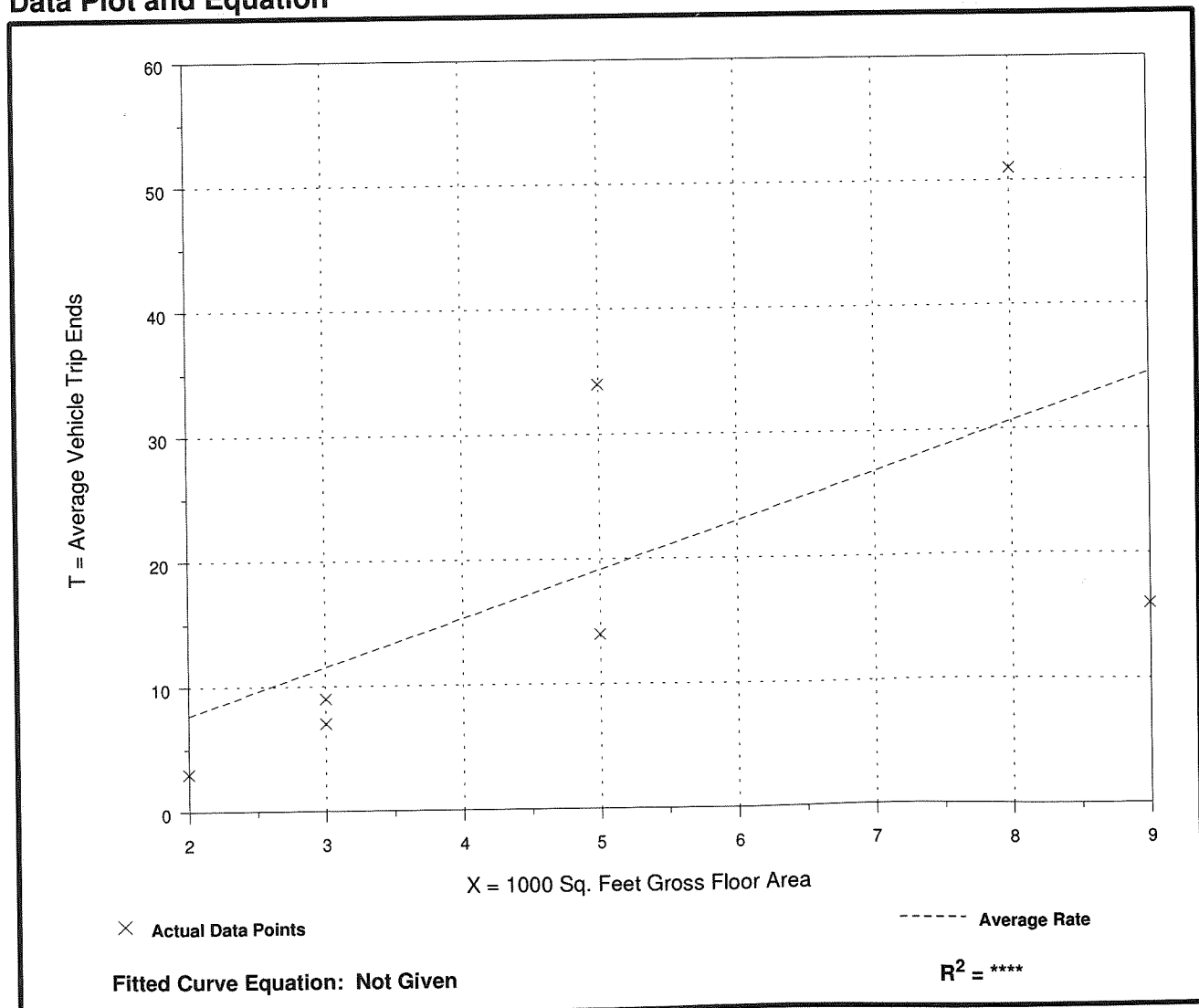
**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

Number of Studies: 7  
 Average 1000 Sq. Feet GFA: 5  
 Directional Distribution: 50% entering, 50% exiting

## Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
3.83	1.50 - 6.80	2.81

## Data Plot and Equation



# Furniture Store (890)

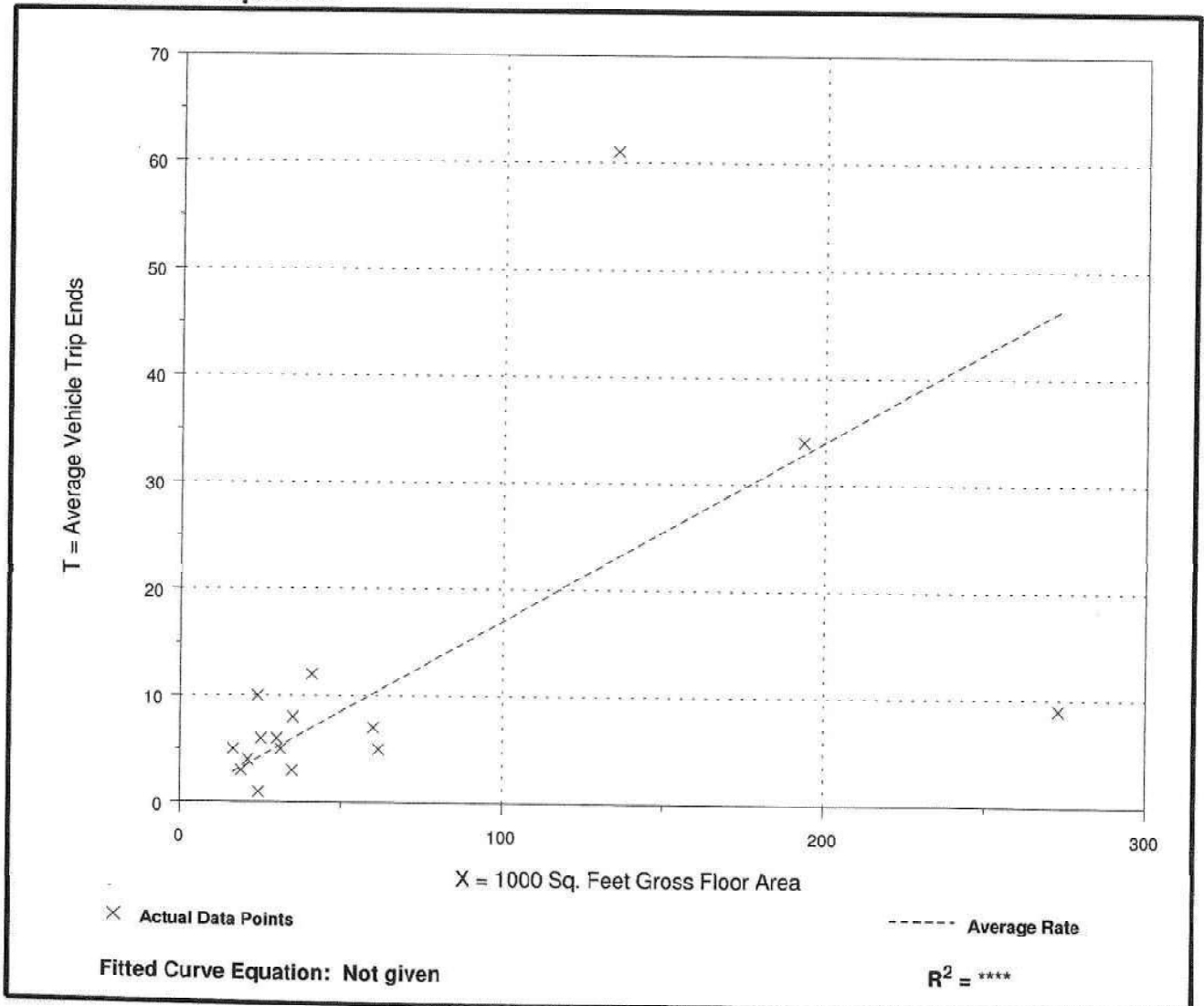
**Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**

Number of Studies: 16  
 Average 1000 Sq. Feet GFA: 64  
 Directional Distribution: 69% entering, 31% exiting

### Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
0.17	0.03 - 0.45	0.44

### Data Plot and Equation



# Furniture Store (890)

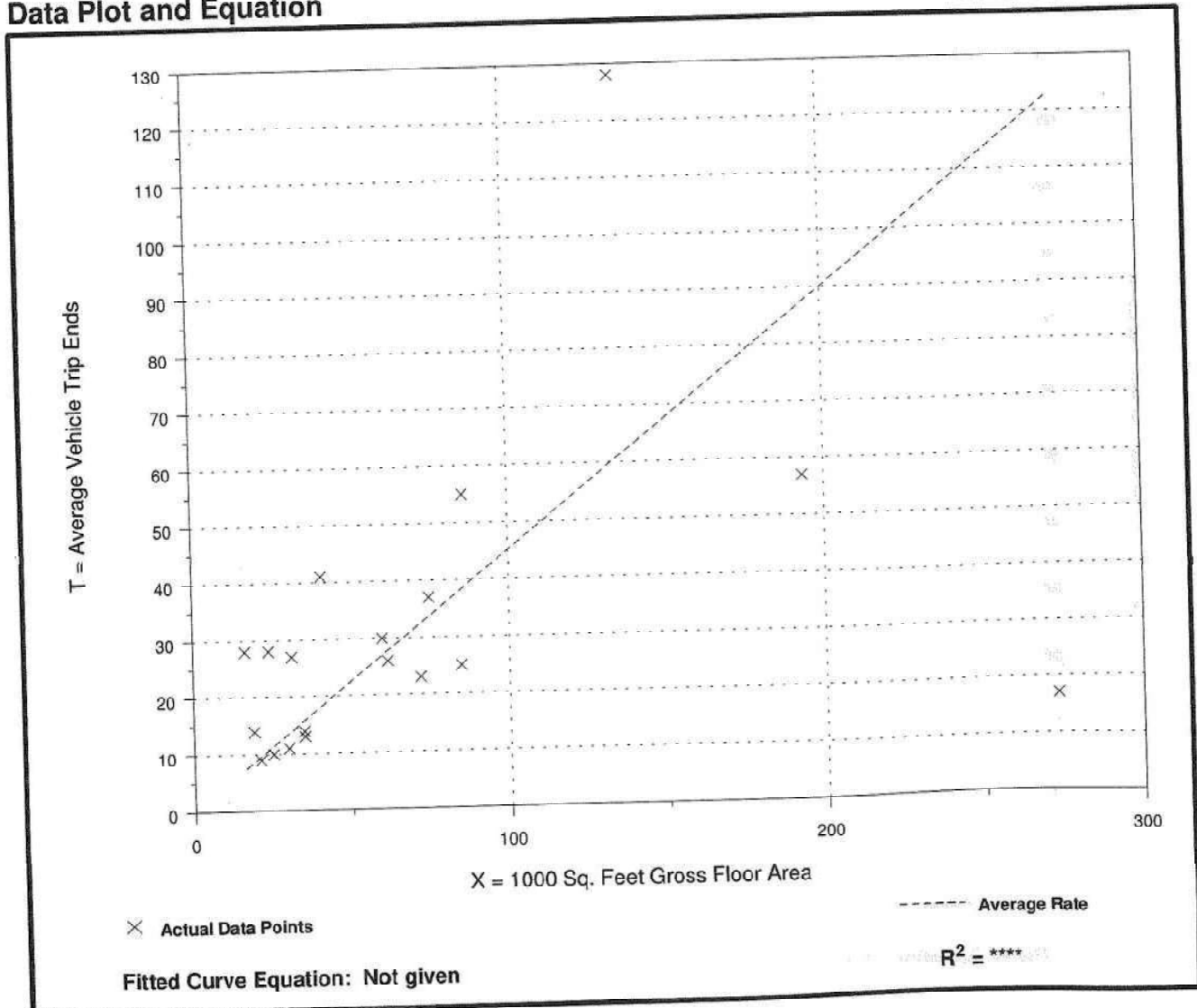
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area  
On a: Weekday,  
Peak Hour of Adjacent Street Traffic,  
One Hour Between 4 and 6 p.m.

Number of Studies: 19  
Average 1000 Sq. Feet GFA: 69  
Directional Distribution: 48% entering, 52% exiting

## Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
0.45	0.06 - 1.70	0.74

## Data Plot and Equation



# High-Turnover (Sit-Down) Restaurant (932)

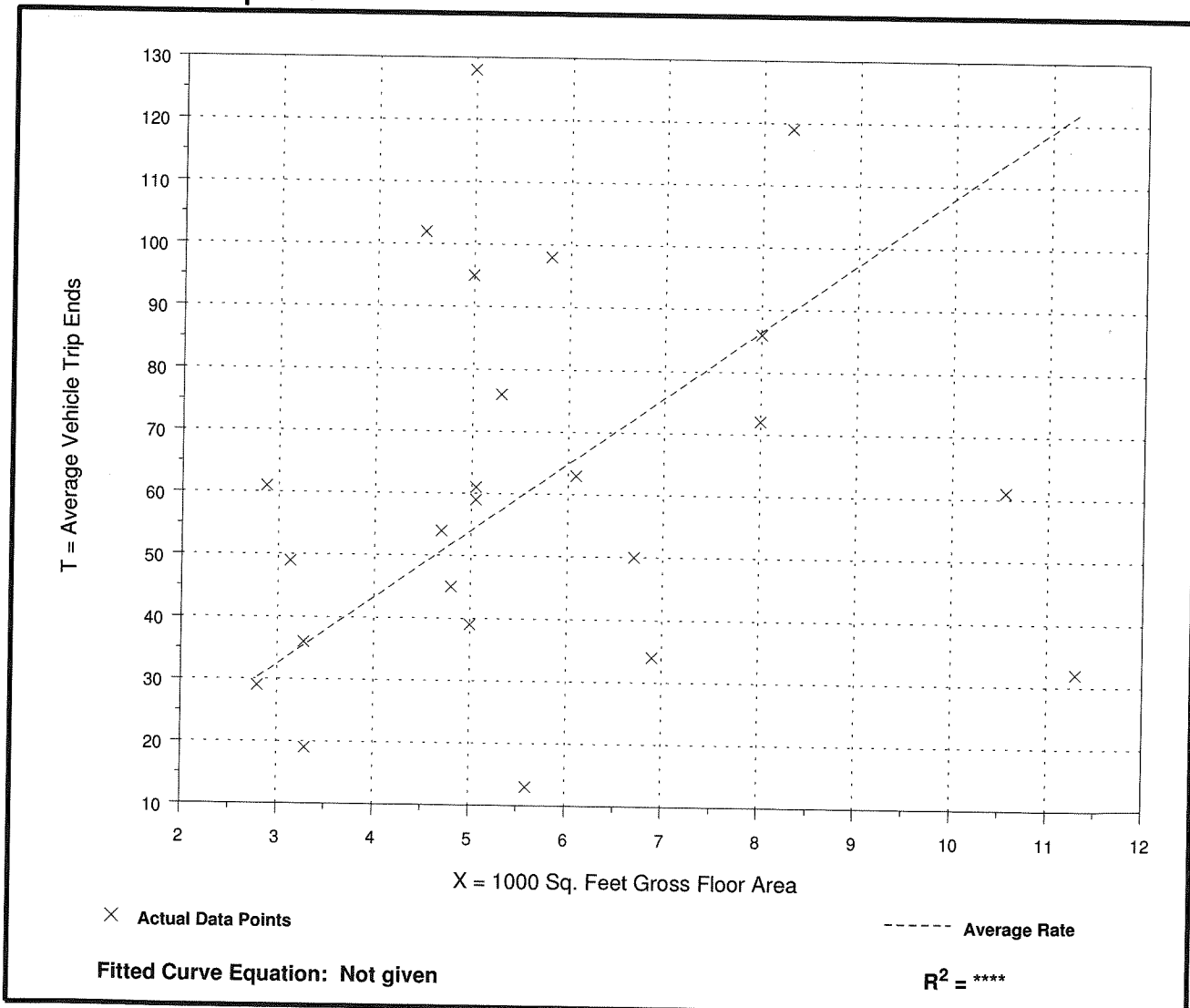
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area  
On a: Weekday,  
Peak Hour of Adjacent Street Traffic,  
One Hour Between 7 and 9 a.m.

Number of Studies: 24  
Average 1000 Sq. Feet GFA: 6  
Directional Distribution: 55% entering, 45% exiting

## Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
10.81	2.32 - 25.60	6.59

## Data Plot and Equation





# High-Turnover (Sit-Down) Restaurant (932)

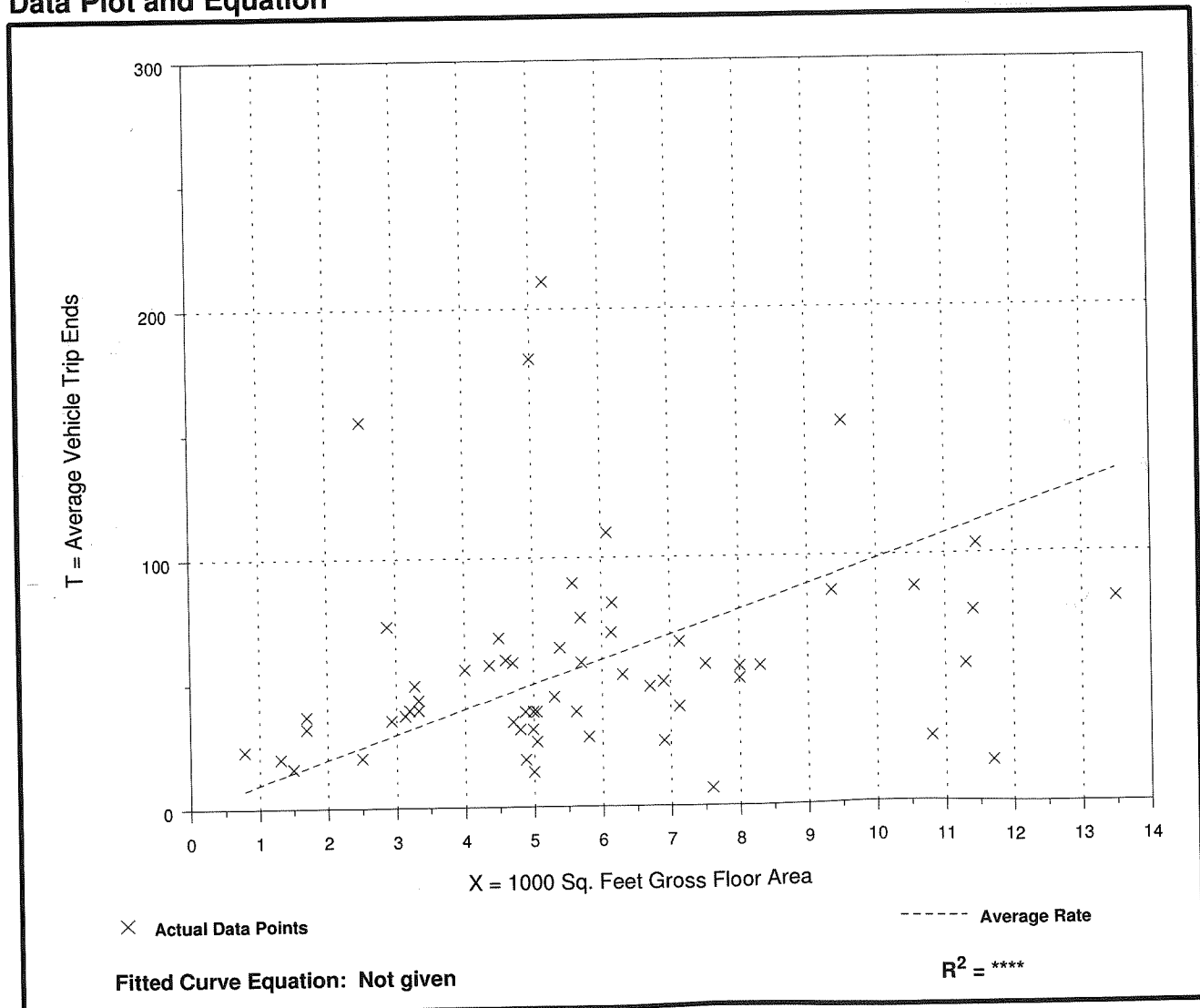
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area  
 On a: Weekday,  
 Peak Hour of Adjacent Street Traffic,  
 One Hour Between 4 and 6 p.m.

Number of Studies: 60  
 Average 1000 Sq. Feet GFA: 6  
 Directional Distribution: 60% entering, 40% exiting

## Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
9.85	0.92 - 62.00	8.54

## Data Plot and Equation



# Fast-Food Restaurant with Drive-Through Window (934)

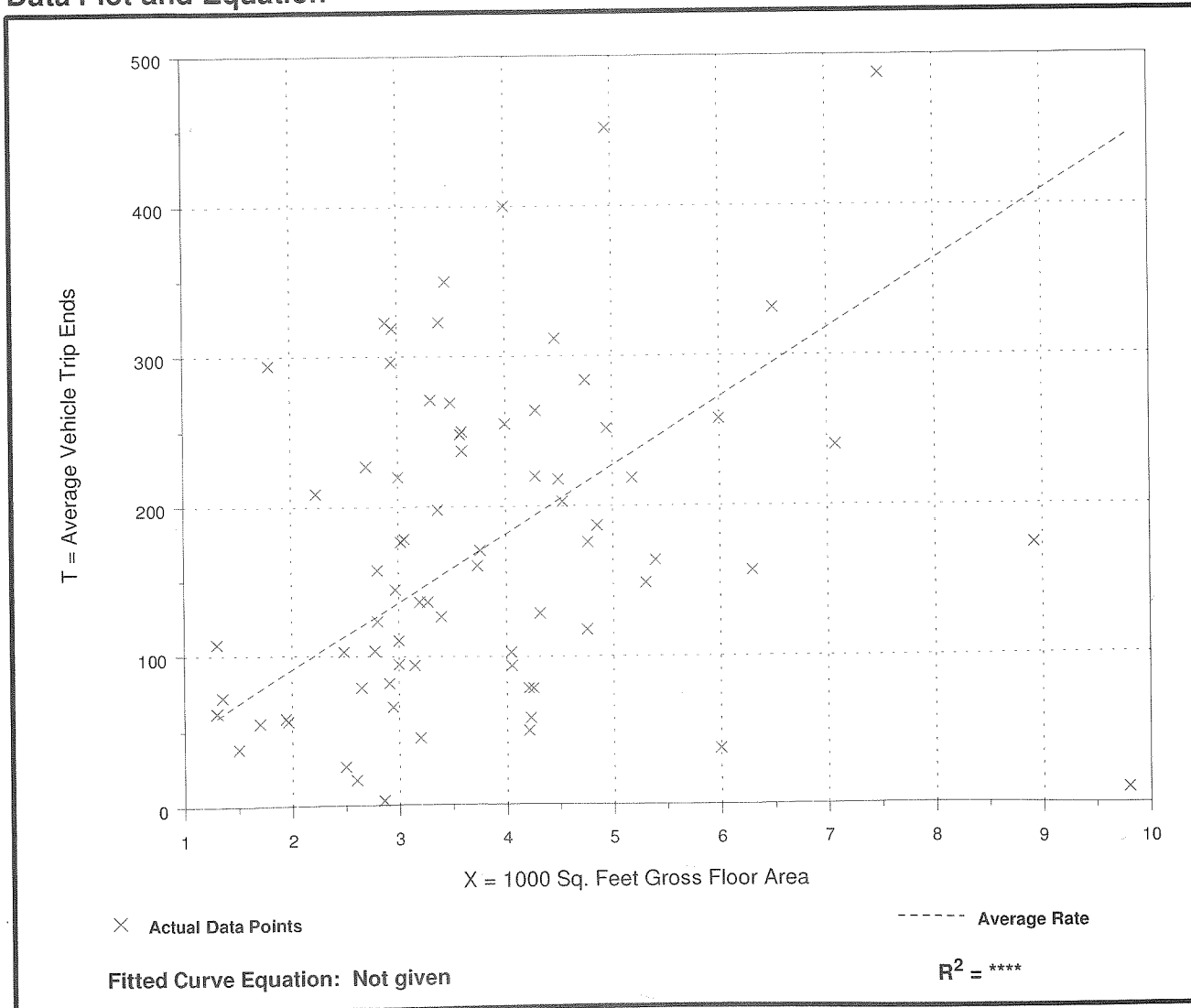
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area  
On a: Weekday,  
Peak Hour of Adjacent Street Traffic,  
One Hour Between 7 and 9 a.m.

Number of Studies: 75  
Average 1000 Sq. Feet GFA: 4  
Directional Distribution: 51% entering, 49% exiting

## Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
45.42	1.02 - 163.33	28.63

## Data Plot and Equation



# Fast-Food Restaurant with Drive-Through Window (934)

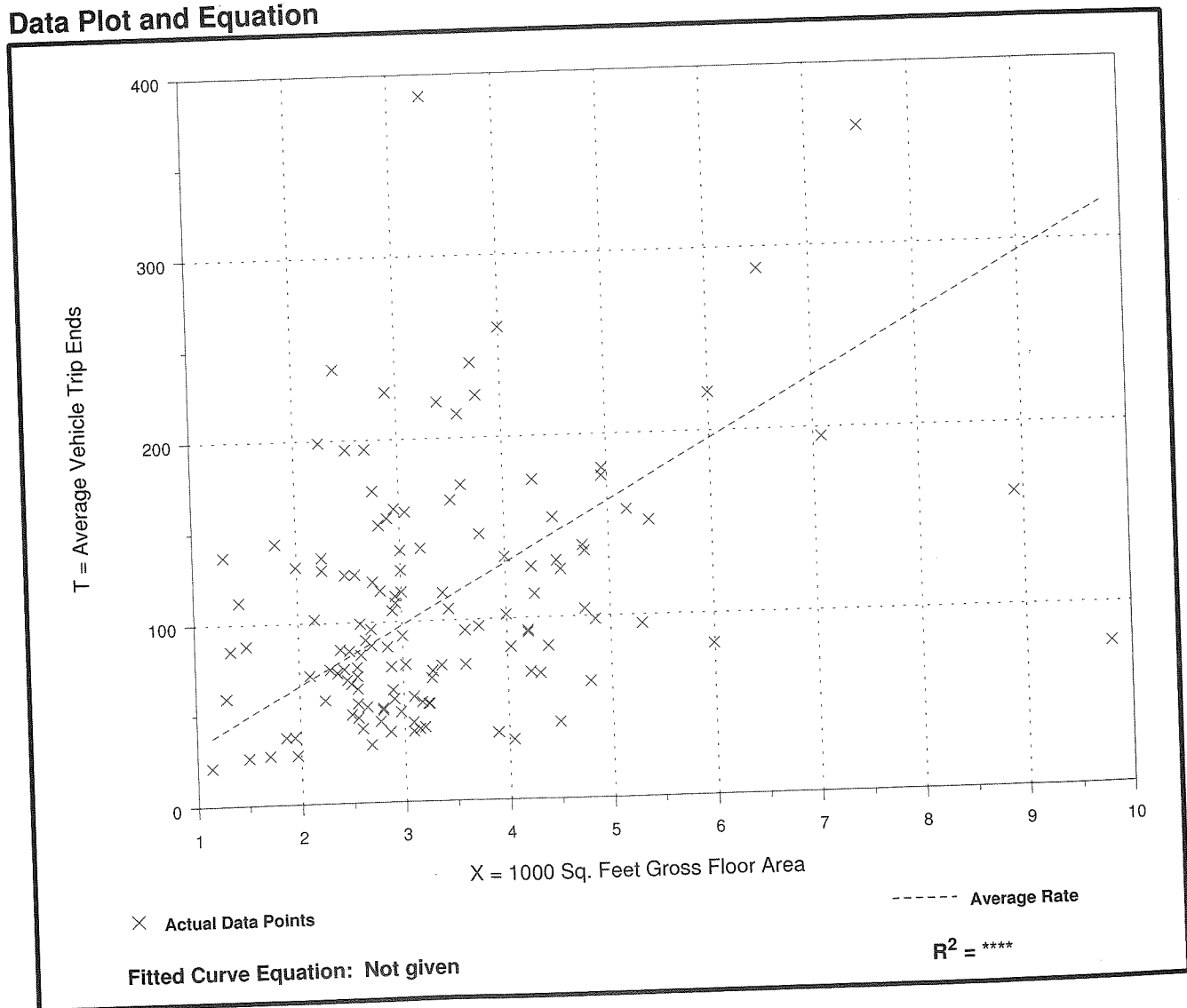
Average Vehicle Trip Ends vs: 1000 Sq. Feet Gross Floor Area  
 On a: Weekday,  
 Peak Hour of Adjacent Street Traffic,  
 One Hour Between 4 and 6 p.m.

Number of Studies: 132  
 Average 1000 Sq. Feet GFA: 3  
 Directional Distribution: 52% entering, 48% exiting

## Trip Generation per 1000 Sq. Feet Gross Floor Area

Average Rate	Range of Rates	Standard Deviation
32.65	7.96 - 117.15	19.73

## Data Plot and Equation



## **Appendix D**

Design Hourly Volumes by Generator – 2025

DESIGN HOURLY VOLUMES BY GENERATOR - 2025

INTERSECTION: A - N. KELLER DR. & FORD AVE./OUTER BELT W

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7					75	180	15	40							10	20			80	185	10	20	20	40
2-3			5	10					5	10														
4-6	20	25									5	5	5	5	5	10	20	25			10	10		
8							0	5							0	5					0	5	0	5
9																								
10					5	5	0	5											5	5			0	5
11-12																								
<b>TOTAL</b>	<b>20</b>	<b>25</b>	<b>5</b>	<b>10</b>	<b>80</b>	<b>185</b>	<b>15</b>	<b>50</b>	<b>5</b>	<b>10</b>	<b>10</b>	<b>5</b>	<b>10</b>	<b>10</b>	<b>15</b>	<b>35</b>	<b>20</b>	<b>25</b>	<b>85</b>	<b>190</b>	<b>20</b>	<b>35</b>	<b>20</b>	<b>50</b>



DESIGN HOURLY VOLUMES BY GENERATOR - 2025

INTERSECTION: C - N. KELLER DR. & AVE. OF MID-AMERICA

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7			75	180	20	35			80	185									20	40				
2-3			5	10	10	15			5	10									10	20				
4-6			20	25					20	25														
8					0	30													0	20				
9					0	5													5	5				
10			5	5					5	5														
11-12															0	5								
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>105</b>	<b>220</b>	<b>30</b>	<b>85</b>	<b>0</b>	<b>0</b>	<b>110</b>	<b>225</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>35</b>	<b>85</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>

DESIGN HOURLY VOLUMES BY GENERATOR - 2025

INTERSECTION: D - N. KELLER DR. & EVERGREEN/I-57/70 RAMP

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7			85	195					90	205	10	20											10	20
2-3			40	85					35	80	5	5	5	5										
4-6	10	15	20	25					20	25														
8			0	30					0	20														
9			0	5					5	5														
10			5	5					5	5														
11-12	45	10															5	45						
<b>TOTAL</b>	<b>55</b>	<b>25</b>	<b>150</b>	<b>345</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>155</b>	<b>340</b>	<b>15</b>	<b>25</b>	<b>5</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>45</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>10</b>	<b>20</b>



DESIGN HOURLY VOLUMES BY GENERATOR - 2025

INTERSECTION: E - OUTER BELT W & AVE. OF MID-AMERICA

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7			10	20					10	20														
2-3																								
4-6			20	25					10	25														
8			0	5					0	5														
9																								
10																								
11-12			5	5	0	5			5	0										5	0			
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>35</b>	<b>55</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>25</b>	<b>50</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

DESIGN HOURLY VOLUMES BY GENERATOR - 2025

INTERSECTION: F - OUTER BELT W & EVERGREEN AVE.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
1 & 7			5	10					5	10	5	10	5	10											
2-3															5	5					5	5			
4-6			5	5			10	15	0	5	0	5	5	5									10	15	
8			0	5					0	5															
9																									
10																									
11-12					5	5	10	0							5	0					0	5	0	5	10
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>20</b>	<b>5</b>	<b>5</b>	<b>20</b>	<b>15</b>	<b>5</b>	<b>20</b>	<b>5</b>	<b>15</b>	<b>10</b>	<b>15</b>	<b>10</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>5</b>	<b>10</b>	<b>15</b>	<b>25</b>	

DESIGN HOURLY VOLUMES BY GENERATOR - 2025

INTERSECTION: G - RICKELMAN AVE. & N. RANEY ST.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
1 & 7																									
2-3																				5	10				
4-6																			5	5					
8																									
9																									
10																									
11-12																									
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>15</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	

DESIGN HOURLY VOLUMES BY GENERATOR - 2025

INTERSECTION: H - RICKELMAN AVE. & CHARLOTTE ST.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7					50	125													50	120				
2-3					10	15													5	10	5	10		
4-6					5	10													5	5	5	5		
8					0	10													0	10				
9					5	0													0	5				
10																								
11-12					0	5													5	0				
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>70</b>	<b>165</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>65</b>	<b>150</b>	<b>10</b>	<b>15</b>	<b>0</b>	<b>0</b>

DESIGN HOURLY VOLUMES BY GENERATOR - 2025

INTERSECTION: 1 - RICKELMAN AVE. & N. 4TH ST.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7	20	40													30	85	20	40			30	80		
2-3	5	5													5	10	5	5			5	15		
4-6	5	5													5	5	0	5			5	5		
8															0	10					0	10		
9															5	0					0	5		
10																								
11-12															0	5								
<b>TOTAL</b>	<b>30</b>	<b>50</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>45</b>	<b>115</b>	<b>25</b>	<b>50</b>	<b>0</b>	<b>0</b>	<b>45</b>	<b>115</b>	<b>0</b>	<b>0</b>



DESIGN HOURLY VOLUMES BY GENERATOR - 2025

INTERSECTION: K - FORD AVE. & N. RANEY ST.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7	10	15	10	20			20	40	10	20					30	85	10	20			35	80	15	40
2-3									5	10														
4-6											5	5			5	10					5	5		
8					0	15									0	10			0	10	0	10		
9																								
10																								
11-12																								
<b>TOTAL</b>	<b>10</b>	<b>15</b>	<b>10</b>	<b>20</b>	<b>0</b>	<b>15</b>	<b>20</b>	<b>40</b>	<b>15</b>	<b>30</b>	<b>5</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>35</b>	<b>105</b>	<b>10</b>	<b>20</b>	<b>0</b>	<b>10</b>	<b>40</b>	<b>95</b>	<b>15</b>	<b>40</b>





DESIGN HOURLY VOLUMES BY GENERATOR - 2025

INTERSECTION: M - AVE. OF MID-AMERICA & WAL-MART ENTRANCE

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
1 & 7															20	35					20	40			
2-3															10	15					10	20			
4-6																									
8															0	30					0	20			
9															0	5					5	5			
10																									
11-12															0	5						5	0		
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>30</b>	<b>90</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>40</b>	<b>85</b>	<b>0</b>	<b>0</b>	

DESIGN HOURLY VOLUMES BY GENERATOR - 2025

INTERSECTION: N - AVE. OF MID-AMERICA & N. RANEY ST.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7											20	40	20	35										
2-3											5	10			10	15						5	10	
4-6																								
8											0	10	0	15	0	15						0	10	
9															0	5						5	5	
10																								
11-12															0	5						5	0	
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>25</b>	<b>60</b>	<b>20</b>	<b>50</b>	<b>10</b>	<b>40</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>25</b>	<b>0</b>

## **Appendix E**

Design Hourly Volumes by Generator – 2030

DESIGN HOURLY VOLUMES BY GENERATOR - 2030

INTERSECTION: A - N. KELLER DR. & FORD AVE./OUTER BELT W

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
1 & 7					75	180	15	40							10	20				80	185	10	20		
2-3			5	10					5	10															
4-6	20	25									5	5	5	10	10	10	25	25				10	10		
8							0	5							0	5						0	5	0	5
9																									
10					5	5	0	5											5	5				0	5
11-12											5	0	5	5	0	5						5	0		
13							0	10							0	5						0	5	0	10
14							0	5														0	5	0	5
15-17			5	10					10	5															
18							0	5																0	5
19							0	5																5	5
<b>TOTAL</b>	<b>20</b>	<b>25</b>	<b>10</b>	<b>20</b>	<b>80</b>	<b>185</b>	<b>15</b>	<b>75</b>	<b>15</b>	<b>15</b>	<b>10</b>	<b>5</b>	<b>10</b>	<b>15</b>	<b>20</b>	<b>45</b>	<b>25</b>	<b>25</b>	<b>85</b>	<b>190</b>	<b>25</b>	<b>45</b>	<b>25</b>	<b>75</b>	





DESIGN HOURLY VOLUMES BY GENERATOR - 2030

INTERSECTION: D - N. KELLER DR. & EVERGREEN/I-57/70 RAMP

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7			85	195					90	205	10	20											10	20
2-3			40	85					35	80	5	5	5	5										
4-6	10	15	20	25					20	25														
8			0	30					0	20													0	5
9			0	5					5	5														
10			5	5					5	5														
11-12	45	10															5	45				5	0	
13			0	45					0	55	0	5											0	5
14			0	20							0	25												
15-17			50	35					25	45	5	15											15	10
18			0	10					0	15														
19			5	10					10	10														
<b>TOTAL</b>	<b>55</b>	<b>25</b>	<b>205</b>	<b>465</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>190</b>	<b>465</b>	<b>20</b>	<b>70</b>	<b>5</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>45</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>25</b>	<b>40</b>

DESIGN HOURLY VOLUMES BY GENERATOR - 2030

INTERSECTION: E - OUTER BELT W & AVE. OF MID-AMERICA

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7			10	20					10	20														
2-3																								
4-6			20	25					10	20														
8			0	5					0	5														
9																								
10																								
11-12			5	10					10	0										5	0			
13			0	5					0	5														
14									0	5														
15-17																								
18																								
19																								
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>35</b>	<b>65</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>30</b>	<b>55</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>



DESIGN HOURLY VOLUMES BY GENERATOR - 2030

INTERSECTION: F - OUTER BELT W & EVERGREEN AVE.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
1&7			5	10					5	10	5	10	5	10											
2-3															5	5					5	5			
4-6			5	5			10	10	0	5	0	5	5	5									10	15	
8			0	5					0	5															
9																									
10																									
11-12					5	5	10	0							5	0				0	5	0	5	5	10
13											0	5	0	5											
14											0	5													
15-17																									
18																									
19																									
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>20</b>	<b>5</b>	<b>5</b>	<b>20</b>	<b>10</b>	<b>5</b>	<b>20</b>	<b>5</b>	<b>25</b>	<b>10</b>	<b>20</b>	<b>10</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>5</b>	<b>10</b>	<b>15</b>	<b>25</b>	



DESIGN HOURLY VOLUMES BY GENERATOR - 2030

INTERSECTION: H - RICKELMAN AVE. & CHARLOTTE ST.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR			
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM		
1 & 7																										
2-3																										
4-6																										
8																										
9					5	0														0	5					
10																										
11-12																										
13					0	10																				
14																										
15-17																										
18																										
19																										
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>10</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	

DESIGN HOURLY VOLUMES BY GENERATOR - 2030

INTERSECTION: 1 - RICKELMAN AVE. & N. 4TH ST.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
1 & 7					30	85														30	80				
2-3					5	10														5	15				
4-6					5	5														5	5				
8					0	10														0	10				
9															5	0						0	5		
10																									
11-12					0	5														5	0				
13					0	10									0	10				0	20				
14					0	10														0	10				
15-17					5	5														10	10				
18					0	5														0	5				
19															5	5						5	5		
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>45</b>	<b>145</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>15</b>	<b>0</b>	<b>0</b>	<b>55</b>	<b>155</b>	<b>5</b>	<b>10</b>	<b>0</b>	<b>0</b>	



DESIGN HOURLY VOLUMES BY GENERATOR - 2030

INTERSECTION:                     K - FORD AVE. & N. RANEY ST.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7	10	15	10	20			20	40	10	20					30	85	10	20			35	80	15	40
2-3																								
4-6															10	10					10	10		
8					0	20									0	10			0	10	0	10		
9																								
10																								
11-12															0	5					5	0		
13															0	15					0	15		
14															0	5					0	10		
15-17																								
18															0	5					0	5		
19															0	5					0	5		
<b>TOTAL</b>	<b>10</b>	<b>15</b>	<b>10</b>	<b>20</b>	<b>0</b>	<b>20</b>	<b>20</b>	<b>40</b>	<b>10</b>	<b>20</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>40</b>	<b>140</b>	<b>10</b>	<b>20</b>	<b>0</b>	<b>10</b>	<b>50</b>	<b>135</b>	<b>15</b>	<b>40</b>

DESIGN HOURLY VOLUMES BY GENERATOR - 2030

INTERSECTION: L - FORD AVE. & CHARLOTTE ST.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR			
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM		
1 & 7															50	125					10	20	50	120		
2-3			10	15																						
4-6															10	10						10	10			
8	0	15													0	10	0	10				0	10			
9			0	5					5	5																
10																										
11-12																										
13			0	25	0	25				0	30	0	5	0	5	0	10				0	30	0	10		
14					0	20															0	25	0	10		
15-17					5	5																	10	10		
18	0	5			0	5								0	5											
19			5	15				5	0	15	10	5	5	0	5											
<b>TOTAL</b>	<b>0</b>	<b>20</b>	<b>5</b>	<b>45</b>	<b>15</b>	<b>70</b>	<b>5</b>	<b>0</b>	<b>20</b>	<b>45</b>	<b>5</b>	<b>10</b>	<b>15</b>	<b>0</b>	<b>60</b>	<b>165</b>	<b>0</b>	<b>10</b>	<b>75</b>	<b>10</b>	<b>75</b>	<b>75</b>	<b>170</b>	<b>0</b>	<b>5</b>	

DESIGN HOURLY VOLUMES BY GENERATOR - 2030

INTERSECTION: M - AVE. OF MID-AMERICA & DAMRON COURT

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
1 & 7					20	35														20	40				
2-3					10	15														10	20				
4-6																									
8					0	30														0	20				
9					0	5														5	5				
10																									
11-12																									
13					0	50														0	60				
14					0	20														0	25				
15-17					5	5														10	10				
18					0	10														0	15				
19					5	10										0	5			10	10	5	0		
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>40</b>	<b>180</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>5</b>	<b>0</b>	<b>55</b>	<b>205</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	



DESIGN HOURLY VOLUMES BY GENERATOR - 2030

INTERSECTION: N - AVE. OF MID-AMERICA & N. RANEY ST.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7											20	40	20	35										
2-3															10	15					10	20		
4-6																								
8											0	10	0	15	0	15					0	10		
9															0	5					5	5		
10																								
11-12																								
13															0	50					0	60		
14															0	20					0	25		
15-17															5	5					10	10		
18															0	10					0	15		
19															5	15					15	10		
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>20</b>	<b>50</b>	<b>20</b>	<b>50</b>	<b>20</b>	<b>135</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>40</b>	<b>155</b>	<b>0</b>	<b>0</b>

DESIGN HOURLY VOLUMES BY GENERATOR - 2030

INTERSECTION: O - N. KELLER DR. & DAMRON CT.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
1 & 7			75	180	20	35			80	185										20	40				
2-3					45	90			5	10										40	85			5	10
4-6			20	25					20	25															
8					0	30														0	20				
9					0	5														5	5				
10			5	5					5	5															
11-12																									
13					0	50														0	60				
14					0	20														0	25				
15-17								10	5											30	60			5	10
18					0	10														0	15				
19					5	10														10	10				
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>100</b>	<b>210</b>	<b>70</b>	<b>250</b>	<b>10</b>	<b>5</b>	<b>110</b>	<b>225</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>105</b>	<b>320</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>10</b>	<b>20</b>



# Appendix F

Design Hourly Volumes by Generator – 2040

DESIGN HOURLY VOLUMES BY GENERATOR - 2040

INTERSECTION: A - N. KELLER DR. & FORD AVE./OUTER BELT W

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
1 & 7					75	180	15	40							10	20			80	185	10	20			
2-3			5	10					5	10															
4-6 & 21	25	30									5	5	5	10	10	10	25	35			10	10			
8 & 23							0	5							0	5					0	5	0	5	
9																									
10					5	5	0	5											5	5			0	5	
11-12											5	0	5	5	0	5						5	0		
13 & 24							5	25							5	10						0	15	5	25
14							0	5														0	5	0	5
15-17			5	10					10	5															
18							0	5															0	5	
19							0	5															5	5	
20											15	5	5	15	0	15						15	0		
22			5	0					5	0															
25																									
26			5	20					5	20															
<b>TOTAL</b>	<b>25</b>	<b>30</b>	<b>20</b>	<b>40</b>	<b>80</b>	<b>185</b>	<b>20</b>	<b>90</b>	<b>25</b>	<b>35</b>	<b>25</b>	<b>10</b>	<b>15</b>	<b>30</b>	<b>25</b>	<b>65</b>	<b>25</b>	<b>35</b>	<b>85</b>	<b>190</b>	<b>40</b>	<b>55</b>	<b>30</b>	<b>90</b>	



DESIGN HOURLY VOLUMES BY GENERATOR - 2040

INTERSECTION: C - N. KELLER DR. & AVE. OF MID-AMERICA

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7			75	180					80	185														
2-3			5	10					5	10														
4-6 & 21			25	30					25	35														
8 & 23																								
9																								
10			5	5					5	5														
11-12																								
13 & 24																								
14																								
15-17			5	10					10	5														
18																								
19															0	5						5	0	
20	40	10															10	40						
22	20	15									5	0	5	0	0	5	5	20				0	5	
25															0	5						5	0	
26											5	0	5	20	0	20						5	20	
<b>TOTAL</b>	<b>60</b>	<b>25</b>	<b>115</b>	<b>235</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>125</b>	<b>240</b>	<b>10</b>	<b>0</b>	<b>10</b>	<b>20</b>	<b>0</b>	<b>35</b>	<b>15</b>	<b>60</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>25</b>	<b>0</b>	<b>0</b>

DESIGN HOURLY VOLUMES BY GENERATOR - 2040

INTERSECTION: D - N. KELLER DR. & EVERGREEN/I-57/70 RAMP

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7			85	195					90	205	10	20											10	20
2-3			40	85					35	80	5	5	5	5										
4-6 & 21	10	15	25	30					25	35														
8 & 23			0	35					0	30													0	5
9			0	5					5	5														
10			5	5					5	5														
11-12	45	10															5	45				5	0	
13 & 24			25	110					20	110	0	10											5	10
14			0	20							0	25												
15-17			50	35					25	45	5	15											15	10
18			0	10					0	15														
19			5	10					10	10														
20	40	10	40	10					10	40							10	40				30	5	
22			15	10					5	20														
25			5	5					5	5													5	5
26	20	125															10	125				5	20	
<b>TOTAL</b>	<b>115</b>	<b>160</b>	<b>295</b>	<b>565</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>235</b>	<b>605</b>	<b>20</b>	<b>75</b>	<b>5</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>25</b>	<b>210</b>	<b>0</b>	<b>0</b>	<b>40</b>	<b>25</b>	<b>35</b>	<b>50</b>



DESIGN HOURLY VOLUMES BY GENERATOR - 2040

INTERSECTION: E - OUTER BELT W & AVE. OF MID-AMERICA

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7			10	20					10	20														
2-3																								
4-6 & 21			20	25					10	20														
8 & 23			0	5					0	5														
9																								
10																								
11-12			5	10					10	0										5	0			
13 & 24			5	10					0	15														
14									0	5														
15-17																								
18																								
19																								
20			70	15				10	40	15	70												40	10
22																								
25																								
26																								
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>110</b>	<b>85</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>40</b>	<b>45</b>	<b>135</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>40</b>	<b>10</b>

DESIGN HOURLY VOLUMES BY GENERATOR - 2040

INTERSECTION: F - OUTER BELT W & EVERGREEN AVE.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7			5	10					5	10	5	10	5	10										
2-3															5	5					5	5		
4-6 & 21			5	5			10	10	0	5	0	5	5	5									10	15
8 & 23			0	5					0	5														
9																								
10																								
11-12					5	5	10	0							5	0			0	5	0	5	5	10
13 & 24											0	15	5	10										
14											0	5												
15-17																								
18																								
19																								
20							15	70															70	15
22																								
25																								
26					0	10								0	10	0	10				0	10		
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>20</b>	<b>5</b>	<b>15</b>	<b>35</b>	<b>80</b>	<b>5</b>	<b>20</b>	<b>5</b>	<b>35</b>	<b>15</b>	<b>35</b>	<b>10</b>	<b>15</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>5</b>	<b>20</b>	<b>85</b>	<b>40</b>



DESIGN HOURLY VOLUMES BY GENERATOR - 2040

INTERSECTION: H - RICKELMAN AVE. & CHARLOTTE ST.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7																								
2-3																								
4-6 & 21																								
8 & 23																								
9					5	0														0	5			
10																								
11-12																								
13 & 24					5	25																		
14																								
15-17																								
18																								
19																								
20																								
22																								
25																								
26																								
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>25</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	

DESIGN HOURLY VOLUMES BY GENERATOR - 2040

INTERSECTION: 1 - RICKELMAN AVE. & N. 4TH ST.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
1 & 7					30	85														30	80				
2-3					5	10														5	15				
4-6 & 21					5	5														5	5				
8 & 23					0	10														0	10				
9															5	0						0	5		
10																									
11-12					0	5														5	0				
13 & 24					5	25									5	25				10	50				
14					0	10														0	10				
15-17					5	5														10	10				
18					0	5														0	5				
19															5	5						5	5		
20					0	15														15	0				
22					0	5														0	5				
25															5	0				0	5				
26					0	20														5	20				
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>50</b>	<b>200</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>20</b>	<b>30</b>	<b>0</b>	<b>0</b>	<b>85</b>	<b>215</b>	<b>5</b>	<b>10</b>	<b>0</b>	<b>0</b>	



DESIGN HOURLY VOLUMES BY GENERATOR - 2040

INTERSECTION: K - FORD AVE. & N. RANEY ST.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7	10	15	10	20			20	40	10	20					30	85	10	20			35	80	15	40
2-3																								
4-6 & 21															10	10					10	10		
8 & 23					0	20									0	10				0	15	0	10	
9																								
10																								
11-12															0	5						5	0	
13 & 24															10	35						5	40	
14															0	5						0	10	
15-17																								
18															0	5						0	5	
19															0	5						0	5	
20															0	15						15	0	
22																								
25																								
26																								
<b>TOTAL</b>	<b>10</b>	<b>15</b>	<b>10</b>	<b>20</b>	<b>0</b>	<b>20</b>	<b>20</b>	<b>40</b>	<b>10</b>	<b>20</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>50</b>	<b>175</b>	<b>10</b>	<b>20</b>	<b>0</b>	<b>15</b>	<b>70</b>	<b>160</b>	<b>15</b>	<b>40</b>

DESIGN HOURLY VOLUMES BY GENERATOR - 2040

INTERSECTION: L - FORD AVE. & CHARLOTTE ST.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
1 & 7															50	125				10	20	50	120		
2-3					10	15																			
4-6 & 21															10	10					10	10			
8 & 23	0	20													0	10	0	15			0	15			
9			0	5					5	5															
10																									
11-12															0	5									
13 & 24			15	60	15	60			10	60	0	15	5	10	5	25				10	60	5	25		
14					0	20									0	5				0	25	0	10		
15-17					5	5																			
18	0	5			0	5							0	5											
19			5	15			5	0	15	10	5	5	0	5										0	5
20															0	15					15	0			
22					0	5														0	5				
25			5	10					10	5															
26					0	20														5	20				
<b>TOTAL</b>	<b>0</b>	<b>25</b>	<b>25</b>	<b>90</b>	<b>30</b>	<b>130</b>	<b>5</b>	<b>0</b>	<b>40</b>	<b>80</b>	<b>5</b>	<b>20</b>	<b>5</b>	<b>20</b>	<b>65</b>	<b>195</b>	<b>0</b>	<b>15</b>	<b>25</b>	<b>130</b>	<b>95</b>	<b>190</b>	<b>0</b>	<b>5</b>	



DESIGN HOURLY VOLUMES BY GENERATOR - 2040

INTERSECTION:           M - AVE. OF MID-AMERICA & DAMRON COURT          

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1 & 7					20	35													20	40				
2-3					10	15													10	20				
4-6 & 21																								
8 & 23					0	40													0	30				
9					0	5													5	5				
10																								
11-12																								
13 & 24					30	120													20	120				
14					0	20													0	25				
15-17					5	5													10	10				
18					0	10													0	15				
19					5	10									0	5			10	10	5	0		
20																								
22															0	5					0	5		
25					5	5									0	5			5	5	5	0		
26															0	20					5	20		
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>75</b>	<b>265</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>35</b>	<b>0</b>	<b>0</b>	<b>80</b>	<b>280</b>	<b>15</b>	<b>25</b>	<b>0</b>	<b>0</b>	

DESIGN HOURLY VOLUMES BY GENERATOR - 2040

INTERSECTION: N - AVE. OF MID-AMERICA & N. RANEY ST.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
1 & 7											20	40	20	35								10	20		
2-3															10	15									
4-6 & 21																									
8 & 23											0	15	0	20	0	20						0	15		
9															0	5						5	5		
10																									
11-12																									
13 & 24															30	120						20	120		
14															0	20						0	25		
15-17															5	5						10	10		
18															0	10						0	15		
19															5	15						15	10		
20																									
22															0	5						0	5		
25															5	10						10	5		
26															0	20						5	20		
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>20</b>	<b>55</b>	<b>20</b>	<b>55</b>	<b>55</b>	<b>245</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>75</b>	<b>250</b>	<b>0</b>	<b>0</b>

DESIGN HOURLY VOLUMES BY GENERATOR - 2040

INTERSECTION: O - N. KELLER DR. & DAMRON CT.

GENERATOR	NBL		NBT		NBR		SBL		SBT		SBR		EBL		EBT		EBR		WBL		WBT		WBR		
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	
1 & 7			75	180	20	35			80	185										20	40				
2-3					45	90			5	10										40	85			5	10
4-6 & 21			20	25					20	25										0	20				
8 & 23					0	30														5	5				
9					0	5																			
10			5	5					5	5															
11-12																									
13 & 24					0	50														0	60				
14					0	20														0	25				
15-17																				30	60			5	10
18					0	10		10	5											0	15				
19					5	10														10	10				
20			40	10					10	40															
22			20	15					5	20															
25					5	5														5	5				
26																									
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>160</b>	<b>235</b>	<b>75</b>	<b>255</b>	<b>10</b>	<b>5</b>	<b>125</b>	<b>285</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>110</b>	<b>325</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>20</b>	
























# **Appendix G**

Intersection Capacity Analysis Reports – 2025

Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/11/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	50	30	140	70	85	25	245	165	135	730	50
Future Volume (vph)	40	50	30	140	70	85	25	245	165	135	730	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	115		0	145		0	160		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.943			0.918			0.940			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	1725	0	1641	1688	0	1770	3232	0	1770	3486	0
Flt Permitted	0.651			0.503			0.312			0.449		
Satd. Flow (perm)	1124	1725	0	869	1688	0	581	3232	0	836	3486	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			51			175			7	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1647			457			671			405	
Travel Time (s)		28.1			7.8			11.4			6.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	5%	2%	10%	5%	2%	2%	5%	5%	2%	2%	10%
Adj. Flow (vph)	43	54	33	152	76	92	27	266	179	147	793	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	87	0	152	168	0	27	445	0	147	847	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/11/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	24.2		9.9	24.2		9.9	24.1		9.9	24.1	
Total Split (s)	15.0	30.0		15.0	30.0		16.0	49.0		16.0	49.0	
Total Split (%)	13.6%	27.3%		13.6%	27.3%		14.5%	44.5%		14.5%	44.5%	
Maximum Green (s)	11.0	23.8		11.0	23.8		11.6	42.9		11.6	42.9	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	2.7		1.0	2.7		0.5	2.2		0.5	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.2		4.0	6.2		4.4	6.1		4.4	6.1	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	19.3	10.9		24.4	15.6		68.9	61.1		75.6	67.9	
Actuated g/C Ratio	0.18	0.10		0.22	0.14		0.63	0.56		0.69	0.62	
v/c Ratio	0.18	0.45		0.57	0.60		0.06	0.24		0.23	0.39	
Control Delay	31.2	39.0		42.3	39.1		5.4	3.6		8.2	13.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	31.2	39.0		42.3	39.1		5.4	3.6		8.2	13.7	
LOS	C	D		D	D		A	A		A	B	
Approach Delay		36.4			40.6			3.7			12.9	
Approach LOS		D			D			A			B	
90th %ile Green (s)	10.1	18.5		11.0	19.4		7.1	47.6		12.2	52.7	
90th %ile Term Code	Gap	Hold		Max	Gap		Gap	Coord		Gap	Coord	
70th %ile Green (s)	8.7	13.4		11.0	15.7		6.4	55.0		9.9	58.5	
70th %ile Term Code	Gap	Hold		Max	Gap		Gap	Coord		Gap	Coord	
50th %ile Green (s)	7.7	9.8		11.0	13.1		6.0	59.8		8.7	62.5	
50th %ile Term Code	Gap	Hold		Max	Gap		Gap	Coord		Gap	Coord	
30th %ile Green (s)	0.0	7.5		11.0	22.5		0.0	63.1		7.7	75.2	
30th %ile Term Code	Skip	Gap		Max	Hold		Skip	Coord		Gap	Coord	
10th %ile Green (s)	0.0	0.0		9.4	7.2		0.0	80.0		6.1	90.5	
10th %ile Term Code	Skip	Skip		Gap	Hold		Skip	Coord		Gap	Coord	
Stops (vph)	32	51		114	101		5	46		48	396	
Fuel Used(gal)	1	2		4	5		0	3		1	8	
CO Emissions (g/hr)	82	166		310	326		13	183		75	573	
NOx Emissions (g/hr)	16	32		60	63		3	36		15	112	
VOC Emissions (g/hr)	19	38		72	75		3	42		17	133	
Dilemma Vehicles (#)	0	3		0	5		0	17		0	35	
Queue Length 50th (ft)	24	41		90	80		4	11		33	168	
Queue Length 95th (ft)	48	85		134	144		m9	16		72	264	
Internal Link Dist (ft)		1567			377			591			325	
Turn Bay Length (ft)	215			115			145			160		
Base Capacity (vph)	282	393		272	405		517	1872		678	2153	

Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/11/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.15	0.22		0.56	0.41		0.05	0.24		0.22	0.39	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 12 (11%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.60  
 Intersection Signal Delay: 16.9  
 Intersection Capacity Utilization 56.2%  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.














Splits and Phases: 21: N. Keller Dr. & Outer Belt W/Ford Ave.

Ø1 16 s	Ø2 (R) 49 s	Ø3 15 s	Ø4 30 s
Ø5 16 s	Ø6 (R) 49 s	Ø7 15 s	Ø8 30 s

























HCM Unsignalized Intersection Capacity Analysis  
 41: N. Keller Dr. & Thelma Keller Ave.

10/11/2018

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			 			 	
Traffic Volume (veh/h)	40	15	435	50	20	895	
Future Volume (Veh/h)	40	15	435	50	20	895	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	43	16	473	54	22	973	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			TWLTL		TWLTL		
Median storage (veh)			2		2		
Upstream signal (ft)			567		671		
pX, platoon unblocked	0.91	0.95			0.95		
vC, conflicting volume	1030	264			527		
vC1, stage 1 conf vol	500						
vC2, stage 2 conf vol	530						
vCu, unblocked vol	581	120			398		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3			2.2		
p0 queue free %	92	98			98		
cM capacity (veh/h)	561	863			1100		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	43	16	315	212	22	486	486
Volume Left	43	0	0	0	22	0	0
Volume Right	0	16	0	54	0	0	0
cSH	561	863	1700	1700	1100	1700	1700
Volume to Capacity	0.08	0.02	0.19	0.12	0.02	0.29	0.29
Queue Length 95th (ft)	6	1	0	0	2	0	0
Control Delay (s)	11.9	9.2	0.0	0.0	8.3	0.0	0.0
Lane LOS	B	A			A		
Approach Delay (s)	11.2		0.0		0.2		
Approach LOS	B						
Intersection Summary							
Average Delay			0.5				
Intersection Capacity Utilization			34.7%		ICU Level of Service		A
Analysis Period (min)			15				

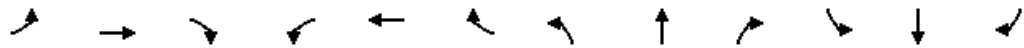
Lanes, Volumes, Timings  
 22: Ave. of Mid-America & N. Keller Dr.

10/18/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	30	95	220	30	15	70	460	275	10	915	35
Future Volume (vph)	20	30	95	220	30	15	70	460	275	10	915	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	100		240	115		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor												
Fr t		0.886			0.986				0.850		0.994	
Fl t Protected	0.950			0.950	0.966		0.950			0.950		
Satd. Flow (prot)	1770	1650	0	1681	1686	0	1770	3438	1583	1770	3421	0
Fl t Permitted	0.950			0.950	0.966		0.211			0.453		
Satd. Flow (perm)	1770	1650	0	1681	1686	0	393	3438	1583	844	3421	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		103			4				299			4
Link Speed (mph)		30			30			30				30
Link Distance (ft)		230			205			1047				567
Travel Time (s)		5.2			4.7			23.8				12.9
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	5%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	22	33	103	239	33	16	76	500	299	11	995	38
Shared Lane Traffic (%)				50%								
Lane Group Flow (vph)	22	136	0	119	169	0	76	500	299	11	1033	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1		2
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turn Type	Split	NA		Split	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases							2		2	6		
Detector Phase	4	4		8	8		5	2	2	1	6	
Switch Phase												

Lanes, Volumes, Timings  
 22: Ave. of Mid-America & N. Keller Dr.

10/18/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		23.9	23.9		9.5	23.4	23.4	9.5	23.4	
Total Split (s)	23.0	23.0		24.4	24.4		10.6	53.0	53.0	9.6	52.0	
Total Split (%)	20.9%	20.9%		22.2%	22.2%		9.6%	48.2%	48.2%	8.7%	47.3%	
Maximum Green (s)	20.0	20.0		18.5	18.5		7.1	47.6	47.6	6.1	46.6	
Yellow Time (s)	3.0	3.0		3.5	3.5		3.0	3.9	3.9	3.0	3.9	
All-Red Time (s)	0.0	0.0		2.4	2.4		0.5	1.5	1.5	0.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	3.0		5.9	5.9		3.5	5.4	5.4	3.5	5.4	
Lead/Lag							Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	
Act Effct Green (s)	8.6	8.6		15.9	15.9		73.7	69.4	69.4	71.1	63.7	
Actuated g/C Ratio	0.08	0.08		0.14	0.14		0.67	0.63	0.63	0.65	0.58	
v/c Ratio	0.16	0.61		0.49	0.68		0.23	0.23	0.27	0.02	0.52	
Control Delay	48.2	26.7		49.1	57.1		8.3	8.1	1.1	4.9	10.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	48.2	26.7		49.1	57.1		8.3	8.1	1.1	4.9	10.6	
LOS	D	C		D	E		A	A	A	A	B	
Approach Delay		29.7			53.8			5.7			10.5	
Approach LOS		C			D			A			B	
90th %ile Green (s)	13.7	13.7		21.9	21.9		6.5	51.1	51.1	5.5	50.1	
90th %ile Term Code	Gap	Gap		Gap	Gap		Hold	Coord	Coord	Gap	Coord	
70th %ile Green (s)	10.2	10.2		18.4	18.4		5.6	67.1	67.1	0.0	58.0	
70th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord	Coord	Skip	Coord	
50th %ile Green (s)	7.7	7.7		16.0	16.0		5.6	72.0	72.0	0.0	62.9	
50th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord	Coord	Skip	Coord	
30th %ile Green (s)	5.9	5.9		13.5	13.5		5.5	76.3	76.3	0.0	67.3	
30th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord	Coord	Skip	Coord	
10th %ile Green (s)	5.5	5.5		9.9	9.9		0.0	80.3	80.3	0.0	80.3	
10th %ile Term Code	Gap	Gap		Gap	Gap		Skip	Coord	Coord	Skip	Coord	
Stops (vph)	19	40		96	140		15	119	7	3	377	
Fuel Used(gal)	1	3		2	4		1	5	2	0	8	
CO Emissions (g/hr)	48	229		170	261		54	361	164	5	583	
NOx Emissions (g/hr)	9	44		33	51		11	70	32	1	113	
VOC Emissions (g/hr)	11	53		39	61		13	84	38	1	135	
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0	
Queue Length 50th (ft)	14	22		82	117		11	42	0	1	136	
Queue Length 95th (ft)	m38	80		135	183		24	87	17	m5	171	
Internal Link Dist (ft)		150			125			967			487	
Turn Bay Length (ft)							100		240	115		
Base Capacity (vph)	321	384		292	296		356	2167	1108	601	1983	

Lanes, Volumes, Timings  
 22: Ave. of Mid-America & N. Keller Dr.

10/18/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.07	0.35		0.41	0.57		0.21	0.23	0.27	0.02	0.52	

Intersection Summary























Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 104 (95%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.68  
 Intersection Signal Delay: 15.3  
 Intersection Capacity Utilization 61.4%  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: Ave. of Mid-America & N. Keller Dr.

Ø2 (R) 53 s	Ø1 9.6 s	Ø4 23 s	Ø8 24.4 s
Ø6 (R) 52 s	Ø5 10.6 s		

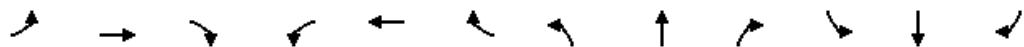
Lanes, Volumes, Timings  
 23: N. Keller Dr. & Evergreen Ave./I-57/70 Exit Ramp

10/11/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	0	195	35	65	85	145	775	0	0	1215	55
Future Volume (vph)	25	0	195	35	65	85	145	775	0	0	1215	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		165	185		220	250		0	0		115
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor												
Fr			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1641	0	1468	1770	1727	1538	1641	3438	0	0	3438	1468
Flt Permitted	0.950			0.950			0.127					
Satd. Flow (perm)	1641	0	1468	1770	1727	1538	219	3438	0	0	3438	1468
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			212			104						50
Link Speed (mph)		30			30			30				30
Link Distance (ft)		949			862			437				1047
Travel Time (s)		21.6			19.6			9.9				23.8
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	10%	2%	10%	2%	10%	5%	10%	5%	2%	2%	5%	10%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Adj. Flow (vph)	27	0	212	38	71	92	158	842	0	0	1321	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	0	212	38	71	92	158	842	0	0	1321	60
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Turn Type	Prot		Perm	Prot	NA	Perm	pm+pt	NA			NA	pm+ov
Protected Phases	7			3	8		5	2			6	7
Permitted Phases			4			8	2					6
Detector Phase	7		4	3	8	8	5	2			6	7
Switch Phase												

Lanes, Volumes, Timings  
 23: N. Keller Dr. & Evergreen Ave./I-57/70 Exit Ramp

10/11/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Minimum Split (s)	9.5		22.5	9.5	22.5	22.5	9.5	23.5			23.5	9.5
Total Split (s)	15.0		26.0	15.0	26.0	26.0	20.0	69.0			49.0	15.0
Total Split (%)	13.6%		23.6%	13.6%	23.6%	23.6%	18.2%	62.7%			44.5%	13.6%
Maximum Green (s)	11.0		22.0	11.0	22.0	22.0	16.0	63.5			43.5	11.0
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.9			3.9	3.0
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0	1.0	1.6			1.6	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)	4.0		4.0	4.0	4.0	4.0	4.0	5.5			5.5	4.0
Lead/Lag	Lead		Lag	Lead	Lag	Lag	Lead				Lag	Lead
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes				Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Minimum Gap (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Time Before Reduce (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Time To Reduce (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Recall Mode	None		None	None	None	None	None	C-Max			C-Max	None
Walk Time (s)			7.0		7.0	7.0		7.0			7.0	
Flash Dont Walk (s)			11.0		11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)			0		0	0		0			0	
Act Effct Green (s)	7.4		11.9	7.8	10.2	10.2	82.3	80.8			66.5	79.4
Actuated g/C Ratio	0.07		0.11	0.07	0.09	0.09	0.75	0.73			0.60	0.72
v/c Ratio	0.25		0.61	0.30	0.44	0.39	0.53	0.33			0.64	0.06
Control Delay	53.4		14.3	54.0	54.9	11.8	13.2	6.5			19.1	2.9
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	53.4		14.3	54.0	54.9	11.8	13.2	6.5			19.1	2.9
LOS	D		B	D	D	B	B	A			B	A
Approach Delay		18.7			35.0			7.5			18.4	
Approach LOS		B			C			A			B	
90th %ile Green (s)	9.7		14.6	10.5	15.4	15.4	16.6	71.4			50.8	9.7
90th %ile Term Code	Gap		Gap	Gap	Hold	Hold	Gap	Coord			Coord	Gap
70th %ile Green (s)	8.3		10.8	8.9	11.4	11.4	12.2	76.8			60.6	8.3
70th %ile Term Code	Gap		Hold	Gap	Gap	Gap	Gap	Coord			Coord	Gap
50th %ile Green (s)	7.2		9.4	7.7	9.9	9.9	9.2	79.4			66.2	7.2
50th %ile Term Code	Gap		Hold	Gap	Gap	Gap	Gap	Coord			Coord	Gap
30th %ile Green (s)	6.2		18.5	0.0	8.3	8.3	7.5	82.0			70.5	6.2
30th %ile Term Code	Gap		Hold	Skip	Gap	Gap	Gap	Coord			Coord	Gap
10th %ile Green (s)	0.0		6.0	0.0	6.0	6.0	6.0	94.5			84.5	0.0
10th %ile Term Code	Skip		Hold	Skip	Gap	Gap	Gap	Coord			Coord	Skip
Queue Length 50th (ft)	18		0	26	48	0	28	100			287	0
Queue Length 95th (ft)	46		69	59	90	38	77	169			433	m15
Internal Link Dist (ft)		869			782			357			967	
Turn Bay Length (ft)			165	185		220	250					115
Base Capacity (vph)	164		463	177	345	390	372	2525			2079	1120
Starvation Cap Reductn	0		0	0	0	0	0	0			0	0
Spillback Cap Reductn	0		0	0	0	0	0	0			0	0
Storage Cap Reductn	0		0	0	0	0	0	0			0	0
Reduced v/c Ratio	0.16		0.46	0.21	0.21	0.24	0.42	0.33			0.64	0.05

Intersection Summary

Area Type: Other

Lanes, Volumes, Timings  
 23: N. Keller Dr. & Evergreen Ave./I-57/70 Exit Ramp

10/11/2018

Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 8 (7%), Referenced to phase 2:NBTL and 6:SBT, Start of Green  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.64  
 Intersection Signal Delay: 15.7 Intersection LOS: B  
 Intersection Capacity Utilization 61.5% ICU Level of Service B  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.













Splits and Phases: 23: N. Keller Dr. & Evergreen Ave./I-57/70 Exit Ramp

 69 s	 49 s	 15 s	 26 s
 20 s	 49 s	 15 s	 26 s

# HCM Unsignalized Intersection Capacity Analysis

## 27: Outer Belt W & Ave. of Mid-America













10/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	5	5	5	35	5	5	5	100	50	5	105	5
Future Volume (Veh/h)	5	5	5	35	5	5	5	100	50	5	105	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	5	38	5	5	5	109	54	5	114	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	280	300	116	280	275	136	119			163		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	280	300	116	280	275	136	119			163		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	94	99	99	100			100		
cM capacity (veh/h)	661	609	936	657	628	913	1469			1416		
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	15	48	168	124								
Volume Left	5	38	5	5								
Volume Right	5	5	54	5								
cSH	710	673	1469	1416								
Volume to Capacity	0.02	0.07	0.00	0.00								
Queue Length 95th (ft)	2	6	0	0								
Control Delay (s)	10.2	10.8	0.2	0.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.2	10.8	0.2	0.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			22.1%		ICU Level of Service					A		
Analysis Period (min)			15									



HCM Unsignalized Intersection Capacity Analysis  
 29: Evergreen Ave. & Outer Belt W

10/11/2018

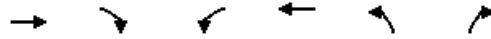
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	20	85	180	10	10	20	35	110	40	35	95	10
Future Volume (vph)	20	85	180	10	10	20	35	110	40	35	95	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	92	196	11	11	22	38	120	43	38	103	11
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	310	44	201	152								
Volume Left (vph)	22	11	38	38								
Volume Right (vph)	196	22	43	11								
Hadj (s)	-0.33	-0.22	-0.01	0.09								
Departure Headway (s)	4.5	5.0	5.0	5.1								
Degree Utilization, x	0.39	0.06	0.28	0.22								
Capacity (veh/h)	744	638	676	646								
Control Delay (s)	10.4	8.3	9.9	9.5								
Approach Delay (s)	10.4	8.3	9.9	9.5								
Approach LOS	B	A	A	A								

Intersection Summary

Delay	9.9		
Level of Service	A		
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis  
 1: N. Raney St. & Rickelman Ave.

10/11/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷	↶	↷
Traffic Volume (veh/h)	25	30	105	5	10	110
Future Volume (Veh/h)	25	30	105	5	10	110
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	33	114	5	11	120
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			60		276	44
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			60		276	44
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		98	88
cM capacity (veh/h)			1544		661	1027

















Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	60	119	131
Volume Left	0	114	11
Volume Right	33	0	120
cSH	1700	1544	981
Volume to Capacity	0.04	0.07	0.13
Queue Length 95th (ft)	0	6	12
Control Delay (s)	0.0	7.2	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	7.2	9.2
Approach LOS			A

Intersection Summary			
Average Delay		6.7	
Intersection Capacity Utilization		26.8%	ICU Level of Service
Analysis Period (min)		15	A

# HCM Unsignalized Intersection Capacity Analysis













## 11: Charlotte St. & Rickelman Ave.

10/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	135	5	140	105	5	5	5	175	5	5	5
Future Volume (Veh/h)	5	135	5	140	105	5	5	5	175	5	5	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	147	5	152	114	5	5	5	190	5	5	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None					None						
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	119			152			588	582	150	772	582	116
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	119			152			588	582	150	772	582	116
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			89			99	99	79	98	99	99
cM capacity (veh/h)	1469			1429			380	378	897	226	378	936
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	157	271	200	15								
Volume Left	5	152	5	5								
Volume Right	5	5	190	5								
cSH	1469	1429	840	369								
Volume to Capacity	0.00	0.11	0.24	0.04								
Queue Length 95th (ft)	0	9	23	3								
Control Delay (s)	0.3	4.8	10.6	15.2								
Lane LOS	A	A	B	C								
Approach Delay (s)	0.3	4.8	10.6	15.2								
Approach LOS			B	C								
Intersection Summary												
Average Delay				5.7								
Intersection Capacity Utilization				42.8%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis  
 6: N. 4th Street & Rickelman Ave.

10/11/2018























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	220	110	25	145	5	95	15	20	10	40	10
Future Volume (vph)	10	220	110	25	145	5	95	15	20	10	40	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	239	120	27	158	5	103	16	22	11	43	11
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	370	190	141	65								
Volume Left (vph)	11	27	103	11								
Volume Right (vph)	120	5	22	11								
Hadj (s)	-0.15	0.05	0.09	-0.03								
Departure Headway (s)	4.6	5.0	5.5	5.5								
Degree Utilization, x	0.47	0.26	0.21	0.10								
Capacity (veh/h)	748	676	590	576								
Control Delay (s)	11.6	9.8	9.9	9.1								
Approach Delay (s)	11.6	9.8	9.9	9.1								
Approach LOS	B	A	A	A								

**Intersection Summary**

Delay		10.6		
Level of Service		B		
Intersection Capacity Utilization		40.6%	ICU Level of Service	A
Analysis Period (min)		15		

Lanes, Volumes, Timings  
3: US Route 45 & Rickelman Ave

10/11/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	10	155	155	15	10	85	195	85	5	275	75
Future Volume (vph)	75	10	155	155	15	10	85	195	85	5	275	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	270		0	200		0	220		295	165		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr t		0.859			0.939				0.850		0.968	
Fl t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1600	0	1770	1749	0	1770	1863	1583	1770	1803	0
Fl t Permitted	0.950			0.950			0.477			0.621		
Satd. Flow (perm)	1770	1600	0	1770	1749	0	889	1863	1583	1157	1803	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		168			11				92		16	
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		2780			357			1797		1266		
Travel Time (s)		63.2			8.1			40.8		28.8		
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	82	11	168	168	16	11	92	212	92	5	299	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	179	0	168	27	0	92	212	92	5	381	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		8	8			2	8		6	
Permitted Phases							2		2	6		
Detector Phase	4	4		8	8		2	2	8	6	6	
Switch Phase												

Lanes, Volumes, Timings  
3: US Route 45 & Rickelman Ave

10/11/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5	
Total Split (s)	29.0	29.0		30.0	30.0		51.0	51.0	30.0	51.0	51.0	
Total Split (%)	26.4%	26.4%		27.3%	27.3%		46.4%	46.4%	27.3%	46.4%	46.4%	
Maximum Green (s)	24.5	24.5		25.5	25.5		46.5	46.5	25.5	46.5	46.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Minimum Gap (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Recall Mode	None	None		None	None		Max	Max	None	Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	9.2	9.2		13.2	13.2		46.7	46.7	64.5	46.7	46.7	
Actuated g/C Ratio	0.11	0.11		0.16	0.16		0.56	0.56	0.78	0.56	0.56	
v/c Ratio	0.42	0.55		0.59	0.09		0.18	0.20	0.07	0.01	0.37	
Control Delay	41.8	14.0		41.6	22.0		11.8	10.8	0.8	10.4	12.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	41.8	14.0		41.6	22.0		11.8	10.8	0.8	10.4	12.0	
LOS	D	B		D	C		B	B	A	B	B	
Approach Delay		22.7			38.9			8.7			12.0	
Approach LOS		C			D			A			B	
90th %ile Green (s)	13.1	13.1		19.7	19.7		46.5	46.5	19.7	46.5	46.5	
90th %ile Term Code	Gap	Gap		Gap	Gap		MaxR	MaxR	Gap	MaxR	MaxR	
70th %ile Green (s)	10.7	10.7		15.2	15.2		46.5	46.5	15.2	46.5	46.5	
70th %ile Term Code	Gap	Gap		Gap	Gap		MaxR	MaxR	Gap	MaxR	MaxR	
50th %ile Green (s)	9.2	9.2		13.0	13.0		46.5	46.5	13.0	46.5	46.5	
50th %ile Term Code	Gap	Gap		Gap	Gap		MaxR	MaxR	Gap	MaxR	MaxR	
30th %ile Green (s)	7.8	7.8		11.0	11.0		46.5	46.5	11.0	46.5	46.5	
30th %ile Term Code	Gap	Gap		Gap	Gap		MaxR	MaxR	Gap	MaxR	MaxR	
10th %ile Green (s)	6.1	6.1		8.4	8.4		46.5	46.5	8.4	46.5	46.5	
10th %ile Term Code	Gap	Gap		Gap	Gap		MaxR	MaxR	Gap	MaxR	MaxR	
Queue Length 50th (ft)	40	5		81	7		21	49	0	1	95	
Queue Length 95th (ft)	89	64		149	29		59	110	9	7	199	
Internal Link Dist (ft)		2700			277			1717			1186	
Turn Bay Length (ft)	270			200			220		295	165		
Base Capacity (vph)	526	593		547	548		501	1051	1253	653	1024	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.16	0.30		0.31	0.05		0.18	0.20	0.07	0.01	0.37	

Intersection Summary

Area Type: Other

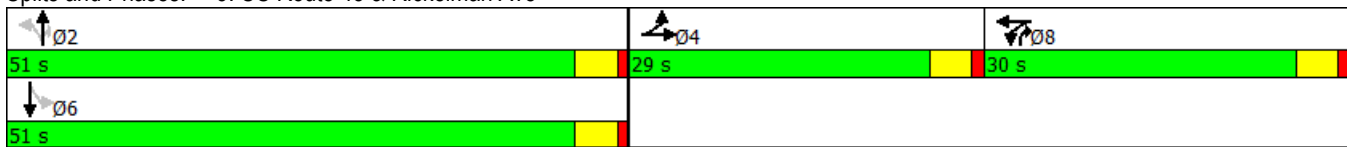
# Lanes, Volumes, Timings

## 3: US Route 45 & Rickelman Ave

10/11/2018

















Cycle Length: 110  
Actuated Cycle Length: 82.8  
Natural Cycle: 70  
Control Type: Actuated-Uncoordinated  
Maximum v/c Ratio: 0.59  
Intersection Signal Delay: 17.4  
Intersection LOS: B  
Intersection Capacity Utilization 57.4%  
ICU Level of Service B  
Analysis Period (min) 15  
90th %ile Actuated Cycle: 92.8  
70th %ile Actuated Cycle: 85.9  
50th %ile Actuated Cycle: 82.2  
30th %ile Actuated Cycle: 78.8  
10th %ile Actuated Cycle: 74.5

Splits and Phases: 3: US Route 45 & Rickelman Ave



HCM Unsignalized Intersection Capacity Analysis  
 18: N. Raney St. & Ford Ave.





















10/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	115	125	15	5	95	20	15	15	5	25	45	105
Future Volume (vph)	115	125	15	5	95	20	15	15	5	25	45	105
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	136	16	5	103	22	16	16	5	27	49	114
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	277	130	37	190								
Volume Left (vph)	125	5	16	27								
Volume Right (vph)	16	22	5	114								
Hadj (s)	0.12	-0.06	0.04	-0.28								
Departure Headway (s)	4.7	4.8	5.2	4.7								
Degree Utilization, x	0.37	0.17	0.05	0.25								
Capacity (veh/h)	720	706	620	712								
Control Delay (s)	10.5	8.7	8.5	9.2								
Approach Delay (s)	10.5	8.7	8.5	9.2								
Approach LOS	B	A	A	A								
Intersection Summary												
Delay			9.6									
Level of Service			A									
Intersection Capacity Utilization			37.8%	ICU Level of Service	A							
Analysis Period (min)			15									



HCM Unsignalized Intersection Capacity Analysis  
 20: Ford Ave. & Charlotte St.

10/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	120	15	5	5	5	5	5	25	5	10	75	100
Future Volume (vph)	120	15	5	5	5	5	5	25	5	10	75	100
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	130	16	5	5	5	5	5	27	5	11	82	109
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total (vph)	130	21	5	10	5	32	202					
Volume Left (vph)	130	0	5	0	5	0	11					
Volume Right (vph)	0	5	0	5	0	5	109					
Hadj (s)	0.53	-0.13	0.53	-0.32	0.53	-0.03	-0.27					
Departure Headway (s)	5.6	5.0	5.8	4.9	5.7	5.1	4.7					
Degree Utilization, x	0.20	0.03	0.01	0.01	0.01	0.05	0.27					
Capacity (veh/h)	608	688	584	683	607	671	731					
Control Delay (s)	8.9	6.9	7.6	6.8	7.5	7.1	9.4					
Approach Delay (s)	8.6		7.1		7.2		9.4					
Approach LOS	A		A		A		A					





















**Intersection Summary**

Delay	8.8											
Level of Service		A										
Intersection Capacity Utilization		37.3%		ICU Level of Service			A					
Analysis Period (min)		15										

# HCM Unsignalized Intersection Capacity Analysis

## 42: Avenue of Mid-America & WalMart Ent.


















10/11/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	70	210	5	5	220	5	15	0	5	5	0	55	
Future Volume (Veh/h)	70	210	5	5	220	5	15	0	5	5	0	55	
Sign Control		Free			Free			Stop			Stop		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	76	228	5	5	239	5	16	0	5	5	0	60	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type		None					None						
Median storage (veh)													
Upstream signal (ft)		961											
pX, platoon unblocked													
vC, conflicting volume	244			233			572	636	116	522	636	122	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	244			233			572	636	116	522	636	122	
tC, single (s)	4.2			4.1			7.5	6.5	7.1	7.5	6.5	7.0	
tC, 2 stage (s)													
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3	
p0 queue free %	94			100			96	100	99	99	100	93	
cM capacity (veh/h)	1312			1332			359	369	889	414	369	903	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2					
Volume Total	190	119	124	124	16	5	5	60					
Volume Left	76	0	5	0	16	0	5	0					
Volume Right	0	5	0	5	0	5	0	60					
cSH	1312	1700	1332	1700	359	889	414	903					
Volume to Capacity	0.06	0.07	0.00	0.07	0.04	0.01	0.01	0.07					
Queue Length 95th (ft)	5	0	0	0	3	0	1	5					
Control Delay (s)	3.5	0.0	0.3	0.0	15.5	9.1	13.8	9.3					
Lane LOS	A		A		C	A	B	A					
Approach Delay (s)	2.1		0.2		14.0		9.6						
Approach LOS					B		A						
Intersection Summary													
Average Delay			2.5										
Intersection Capacity Utilization			27.7%		ICU Level of Service				A				
Analysis Period (min)			15										

# HCM Unsignalized Intersection Capacity Analysis






















## 9: Avenue of Mid-America & N. Raney St.

10/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	120	20	5	115	5	10	5	5	5	5	55
Future Volume (Veh/h)	30	120	20	5	115	5	10	5	5	5	5	55
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	130	22	5	125	5	11	5	5	5	5	60
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None				TWLTL							
Median storage (veh)	2											
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	130			152			407	347	141	341	356	128
vC1, stage 1 conf vol							207	207		138	138	
vC2, stage 2 conf vol							200	140		204	218	
vCu, unblocked vol	130			152			407	347	141	341	356	128
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			98	99	99	99	99	93
cM capacity (veh/h)	1455			1429			644	651	907	714	650	923
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total	33	152	135	21	70							
Volume Left	33	0	5	11	5							
Volume Right	0	22	5	5	60							
cSH	1455	1700	1429	694	878							
Volume to Capacity	0.02	0.09	0.00	0.03	0.08							
Queue Length 95th (ft)	2	0	0	2	6							
Control Delay (s)	7.5	0.0	0.3	10.4	9.5							
Lane LOS	A		A	B	A							
Approach Delay (s)	1.3		0.3	10.4	9.5							
Approach LOS				B	A							
Intersection Summary												
Average Delay				2.8								
Intersection Capacity Utilization				21.3%	ICU Level of Service	A						
Analysis Period (min)	15											














Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/11/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	85	35	305	90	210	45	595	320	135	340	35
Future Volume (vph)	75	85	35	305	90	210	45	595	320	135	340	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	115		0	145		0	160		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.956			0.895			0.948				0.986
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	1744	0	1641	1653	0	1770	3259	0	1770	3464	0
Flt Permitted	0.488			0.484			0.512			0.154		
Satd. Flow (perm)	843	1744	0	836	1653	0	954	3259	0	287	3464	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			94			100				11
Link Speed (mph)		40			40			40				40
Link Distance (ft)		1647			457			671				405
Travel Time (s)		28.1			7.8			11.4				6.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	5%	2%	10%	5%	2%	2%	5%	5%	2%	2%	10%
Adj. Flow (vph)	82	92	38	332	98	228	49	647	348	147	370	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	130	0	332	326	0	49	995	0	147	408	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/11/2018

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases	4			8			2			6			
Detector Phase	7	4		3	8		5	2		1	6		
Switch Phase													
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0		
Minimum Split (s)	9.5	24.2		9.9	24.2		9.9	24.1		9.9	24.1		
Total Split (s)	23.0	27.0		23.0	27.0		15.0	45.0		15.0	45.0		
Total Split (%)	20.9%	24.5%		20.9%	24.5%		13.6%	40.9%		13.6%	40.9%		
Maximum Green (s)	19.0	20.8		19.0	20.8		10.6	38.9		10.6	38.9		
Yellow Time (s)	3.0	3.5		3.0	3.5		3.9	3.9		3.9	3.9		
All-Red Time (s)	1.0	2.7		1.0	2.7		0.5	2.2		0.5	2.2		
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.0	6.2		4.0	6.2		4.4	6.1		4.4	6.1		
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Recall Mode	None	None		None	None		None	C-Max		None	C-Max		
Walk Time (s)		7.0			7.0			7.0			7.0		
Flash Dont Walk (s)		11.0			11.0			11.0			11.0		
Pedestrian Calls (#/hr)		0			0			0			0		
Act Effct Green (s)	25.2	13.8		38.6	25.2		56.2	47.5		61.7	51.9		
Actuated g/C Ratio	0.23	0.13		0.35	0.23		0.51	0.43		0.56	0.47		
v/c Ratio	0.32	0.56		0.77	0.72		0.09	0.68		0.51	0.25		
Control Delay	26.8	47.1		41.5	37.7		3.5	8.5		18.8	19.3		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	26.8	47.1		41.5	37.7		3.5	8.5		18.8	19.3		
LOS	C	D		D	D		A	A		B	B		
Approach Delay		39.2			39.6			8.3			19.2		
Approach LOS		D			D			A			B		
90th %ile Green (s)	12.1	20.8		19.0	27.7		8.7	38.9		10.6	40.8		
90th %ile Term Code	Gap	Hold		Max	Max		Gap	Coord		Max	Coord		
70th %ile Green (s)	10.5	17.5		19.0	26.0		7.6	41.3		11.5	45.2		
70th %ile Term Code	Gap	Hold		Max	Gap		Gap	Coord		Gap	Coord		
50th %ile Green (s)	9.3	13.1		19.0	22.8		6.8	47.5		9.7	50.4		
50th %ile Term Code	Gap	Hold		Max	Gap		Gap	Coord		Gap	Coord		
30th %ile Green (s)	8.0	10.4		19.0	21.4		6.2	51.5		8.4	53.7		
30th %ile Term Code	Gap	Gap		Max	Hold		Gap	Coord		Gap	Coord		
10th %ile Green (s)	0.0	7.3		16.8	28.1		0.0	58.4		6.8	69.6		
10th %ile Term Code	Skip	Gap		Gap	Hold		Skip	Coord		Gap	Coord		
Stops (vph)	55	94		238	202		6	384		64	219		
Fuel Used(gal)	2	4		10	9		0	10		2	5		
CO Emissions (g/hr)	146	272		668	627		21	666		106	326		
NOx Emissions (g/hr)	28	53		130	122		4	129		21	63		
VOC Emissions (g/hr)	34	63		155	145		5	154		25	75		
Dilemma Vehicles (#)	0	4		0	11		0	41		0	17		
Queue Length 50th (ft)	39	76		190	158		3	26		45	87		
Queue Length 95th (ft)	67	128		252	250		m6	43		91	143		
Internal Link Dist (ft)		1567			377			591			325		
Turn Bay Length (ft)	215			115			145			160			
Base Capacity (vph)	406	343		432	451		597	1464		307	1641		

Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/11/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.20	0.38		0.77	0.72		0.08	0.68		0.48	0.25	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 21 (19%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 80  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.77  
 Intersection Signal Delay: 21.7  
 Intersection Capacity Utilization 74.9%  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.














Splits and Phases: 21: N. Keller Dr. & Outer Belt W/Ford Ave.

Ø1 15 s	Ø2 (R) 45 s	Ø3 23 s	Ø4 27 s
Ø5 15 s	Ø6 (R) 45 s	Ø7 23 s	Ø8 27 s

# HCM Unsignalized Intersection Capacity Analysis























41: N. Keller Dr. & Thelma Keller Ave.

10/17/2018

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			 			 	
Traffic Volume (veh/h)	70	70	900	125	20	665	
Future Volume (Veh/h)	70	70	900	125	20	665	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	76	76	978	136	22	723	
<b>Pedestrians</b>							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	TWLTL			TWLTL			
Median storage (veh)	2			2			
Upstream signal (ft)	567			671			
pX, platoon unblocked	0.80	0.78			0.78		
vC, conflicting volume	1452	557			1114		
vC1, stage 1 conf vol	1046						
vC2, stage 2 conf vol	406						
vCu, unblocked vol	828	0			574		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3			2.2		
p0 queue free %	82	91			97		
cM capacity (veh/h)	414	843			774		
<b>Direction, Lane #</b>	<b>WB 1</b>	<b>WB 2</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>	<b>SB 3</b>
Volume Total	76	76	652	462	22	362	362
Volume Left	76	0	0	0	22	0	0
Volume Right	0	76	0	136	0	0	0
cSH	414	843	1700	1700	774	1700	1700
Volume to Capacity	0.18	0.09	0.38	0.27	0.03	0.21	0.21
Queue Length 95th (ft)	17	7	0	0	2	0	0
Control Delay (s)	15.6	9.7	0.0	0.0	9.8	0.0	0.0
Lane LOS	C	A			A		
Approach Delay (s)	12.7		0.0		0.3		
Approach LOS	B						
<b>Intersection Summary</b>							
Average Delay			1.1				
Intersection Capacity Utilization			39.9%	ICU Level of Service	A		
Analysis Period (min)			15				

Lanes, Volumes, Timings  
 22: N. Keller Dr. & Ave. of Mid-America













10/11/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	45	50	485	60	30	70	945	605	25	720	25
Future Volume (vph)	40	45	50	485	60	30	70	945	605	25	720	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	100		240	115		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.921			0.984				0.850		0.995	
Flt Protected	0.950			0.950	0.967		0.950			0.950		
Satd. Flow (prot)	1770	1716	0	1681	1684	0	1770	3438	1583	1770	3424	0
Flt Permitted	0.950			0.950	0.967		0.248			0.185		
Satd. Flow (perm)	1770	1716	0	1681	1684	0	462	3438	1583	345	3424	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		44			5				655		3	
Link Speed (mph)		30			30			30		30		30
Link Distance (ft)		230			205			1047			567	
Travel Time (s)		5.2			4.7			23.8			12.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	5%	2%
Adj. Flow (vph)	43	49	54	527	65	33	76	1027	658	27	783	27
Shared Lane Traffic (%)				41%								
Lane Group Flow (vph)	43	103	0	311	314	0	76	1027	658	27	810	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	4	4		8	8		5	2		1	6	



Lanes, Volumes, Timings  
 22: N. Keller Dr. & Ave. of Mid-America

10/11/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							2		2	6		
Detector Phase	4	4		8	8		5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		23.9	23.9		9.5	23.4	23.4	9.5	23.4	
Total Split (s)	22.5	22.5		33.0	33.0		10.0	44.5	44.5	10.0	44.5	
Total Split (%)	20.5%	20.5%		30.0%	30.0%		9.1%	40.5%	40.5%	9.1%	40.5%	
Maximum Green (s)	19.5	19.5		27.1	27.1		6.5	39.1	39.1	6.5	39.1	
Yellow Time (s)	3.0	3.0		3.5	3.5		3.0	3.9	3.9	3.0	3.9	
All-Red Time (s)	0.0	0.0		2.4	2.4		0.5	1.5	1.5	0.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	3.0		5.9	5.9		3.5	5.4	5.4	3.5	5.4	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max	C-Max	None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	
Act Effct Green (s)	9.4	9.4		26.1	26.1		60.7	54.2	54.2	58.4	51.5	
Actuated g/C Ratio	0.09	0.09		0.24	0.24		0.55	0.49	0.49	0.53	0.47	
v/c Ratio	0.28	0.55		0.78	0.78		0.22	0.61	0.59	0.10	0.51	
Control Delay	51.1	39.8		52.7	51.8		12.2	18.2	2.8	15.1	24.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	51.1	39.8		52.7	51.8		12.2	18.2	2.8	15.1	24.4	
LOS	D	D		D	D		B	B	A	B	C	
Approach Delay		43.2			52.3			12.1			24.1	
Approach LOS		D			D			B			C	
90th %ile Green (s)	14.0	14.0		32.6	32.6		6.5	39.1	39.1	6.5	39.1	
90th %ile Term Code	Gap	Gap		Max	Max		Max	Coord	Coord	Max	Coord	
70th %ile Green (s)	11.2	11.2		30.4	30.4		8.8	43.8	43.8	6.8	41.8	
70th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord	Coord	Gap	Coord	
50th %ile Green (s)	9.2	9.2		26.5	26.5		7.6	50.3	50.3	6.2	48.9	
50th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord	Coord	Gap	Coord	
30th %ile Green (s)	7.3	7.3		23.3	23.3		6.7	65.1	65.1	0.0	54.9	
30th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord	Coord	Skip	Coord	
10th %ile Green (s)	5.5	5.5		17.6	17.6		0.0	72.6	72.6	0.0	72.6	
10th %ile Term Code	Gap	Gap		Gap	Gap		Skip	Coord	Coord	Skip	Coord	
Stops (vph)	36	53		260	260		21	538	34	13	522	
Fuel Used(gal)	1	3		7	7		1	14	5	0	10	
CO Emissions (g/hr)	96	200		465	465		60	991	382	18	691	
NOx Emissions (g/hr)	19	39		90	90		12	193	74	4	134	
VOC Emissions (g/hr)	22	46		108	108		14	230	89	4	160	
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0	
Queue Length 50th (ft)	29	41		216	214		14	195	0	8	214	
Queue Length 95th (ft)	m62	m93		301	301		m31	386	91	m26	321	
Internal Link Dist (ft)		150			125			967			487	
Turn Bay Length (ft)							100		240	115		
Base Capacity (vph)	313	340		441	445		340	1693	1112	268	1603	

Lanes, Volumes, Timings  
 22: N. Keller Dr. & Ave. of Mid-America

10/11/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.14	0.30		0.71	0.71		0.22	0.61	0.59	0.10	0.51	

Intersection Summary























Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 108 (98%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.78  
 Intersection Signal Delay: 23.9  
 Intersection Capacity Utilization 65.6%  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: N. Keller Dr. & Ave. of Mid-America

Ø1	Ø2 (R)	Ø4	Ø8
10 s	44.5 s	22.5 s	33 s
Ø5	Ø6 (R)		
10 s	44.5 s		














Lanes, Volumes, Timings  
 23: N. Keller Dr. & Evergreen Ave./I-57/70 Exit Ramp

10/11/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	0	185	25	110	200	155	1615	0	0	1240	70
Future Volume (vph)	35	0	185	25	110	200	155	1615	0	0	1240	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		165	185		220	250		0	0		115
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1641	0	1468	1770	1727	1538	1641	3438	0	0	3438	1468
Flt Permitted	0.950			0.950			0.107					
Satd. Flow (perm)	1641	0	1468	1770	1727	1538	185	3438	0	0	3438	1468
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			201			119						50
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		949			862			437			1047	
Travel Time (s)		21.6			19.6			9.9			23.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	2%	10%	2%	10%	5%	10%	5%	2%	2%	5%	10%
Adj. Flow (vph)	38	0	201	27	120	217	168	1755	0	0	1348	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	0	201	27	120	217	168	1755	0	0	1348	76
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Detector 1 Position(ft)	0		0	0	0	0	0	0			0	0
Detector 1 Size(ft)	20		20	20	6	20	20	6			6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot	NA	Perm	pm+pt	NA			NA	pm+ov
Protected Phases	7			3	8			5	2		6	7

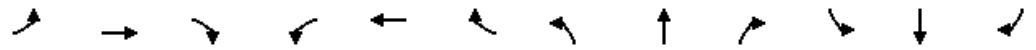
Lanes, Volumes, Timings  
 23: N. Keller Dr. & Evergreen Ave./I-57/70 Exit Ramp

10/11/2018

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases			4			8	2					6	
Detector Phase	7		4	3	8	8	5	2			6	7	
Switch Phase													
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0	
Minimum Split (s)	9.5		22.5	9.5	22.5	22.5	9.5	23.5			23.5	9.5	
Total Split (s)	15.0		24.0	15.0	24.0	24.0	16.0	71.0			55.0	15.0	
Total Split (%)	13.6%		21.8%	13.6%	21.8%	21.8%	14.5%	64.5%			50.0%	13.6%	
Maximum Green (s)	11.0		20.0	11.0	20.0	20.0	12.0	65.5			49.5	11.0	
Yellow Time (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.9			3.9	3.0	
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0	1.0	1.6			1.6	1.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0	4.0	4.0	5.5			5.5	4.0	
Lead/Lag	Lead		Lag	Lead	Lag	Lag	Lead				Lag	Lead	
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes				Yes	Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0	
Recall Mode	None		None	None	None	None	None	C-Max			C-Max	None	
Walk Time (s)			7.0		7.0	7.0		7.0			7.0		
Flash Dont Walk (s)			11.0		11.0	11.0		11.0			11.0		
Pedestrian Calls (#/hr)			0		0	0		0			0		
Act Effct Green (s)	8.0		16.4	7.2	13.6	13.6	78.3	76.8			62.2	75.8	
Actuated g/C Ratio	0.07		0.15	0.07	0.12	0.12	0.71	0.70			0.57	0.69	
v/c Ratio	0.32		0.52	0.23	0.56	0.74	0.62	0.73			0.69	0.07	
Control Delay	54.6		10.6	52.9	54.6	35.8	21.8	14.7			18.4	1.0	
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	
Total Delay	54.6		10.6	52.9	54.6	35.8	21.8	14.7			18.4	1.0	
LOS	D		B	D	D	D	C	B			B	A	
Approach Delay		17.6			43.2			15.3			17.4		
Approach LOS		B			D			B			B		
90th %ile Green (s)	10.9		21.6	9.4	20.1	20.1	12.0	65.5			49.5	10.9	
90th %ile Term Code	Gap		Hold	Gap	Max	Max	Max	Coord			Coord	Gap	
70th %ile Green (s)	9.2		17.3	8.1	16.2	16.2	14.5	71.1			52.6	9.2	
70th %ile Term Code	Gap		Hold	Gap	Gap	Gap	Gap	Coord			Coord	Gap	
50th %ile Green (s)	7.9		13.7	7.1	12.9	12.9	11.3	75.7			60.4	7.9	
50th %ile Term Code	Gap		Hold	Gap	Gap	Gap	Gap	Coord			Coord	Gap	
30th %ile Green (s)	6.7		21.6	0.0	10.9	10.9	8.3	78.9			66.6	6.7	
30th %ile Term Code	Gap		Hold	Skip	Gap	Gap	Gap	Coord			Coord	Gap	
10th %ile Green (s)	0.0		7.9	0.0	7.9	7.9	6.5	92.6			82.1	0.0	
10th %ile Term Code	Skip		Hold	Skip	Gap	Gap	Gap	Coord			Coord	Skip	
Stops (vph)	34		25	25	101	90	64	998			694	7	
Fuel Used(gal)	1		5	1	3	3	2	16			19	1	
CO Emissions (g/hr)	96		330	40	176	230	110	1108			1300	44	
NOx Emissions (g/hr)	19		64	8	34	45	21	215			253	8	
VOC Emissions (g/hr)	22		77	9	41	53	25	257			301	10	
Dilemma Vehicles (#)	0		0	0	0	0	0	0			0	0	
Queue Length 50th (ft)	26		0	18	82	67	35	371			293	1	
Queue Length 95th (ft)	59		62	47	133	142	114	623			456	m8	
Internal Link Dist (ft)		869			782			357			967		
Turn Bay Length (ft)			165	185		220	250					115	
Base Capacity (vph)	164		438	177	314	377	297	2399			1945	1065	

Lanes, Volumes, Timings  
 23: N. Keller Dr. & Evergreen Ave./I-57/70 Exit Ramp

10/11/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0		0	0	0	0	0	0			0	0
Spillback Cap Reductn	0		0	0	0	0	0	0			0	0
Storage Cap Reductn	0		0	0	0	0	0	0			0	0
Reduced v/c Ratio	0.23		0.46	0.15	0.38	0.58	0.57	0.73			0.69	0.07

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 97 (88%), Referenced to phase 2:NBTL and 6:SBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.74  
 Intersection Signal Delay: 18.8  
 Intersection Capacity Utilization 71.6%  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.













Splits and Phases: 23: N. Keller Dr. & Evergreen Ave./I-57/70 Exit Ramp

 71 s	 15 s	 24 s
 16 s	 55 s	 15 s
		 24 s

# HCM Unsignalized Intersection Capacity Analysis

















## 27: Outer Belt W & Ave. of Mid-America

10/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	5	5	5	65	5	5	5	180	50	5	155	5
Future Volume (Veh/h)	5	5	5	65	5	5	5	180	50	5	155	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	5	71	5	5	5	196	54	5	168	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	421	440	170	421	416	223	173			250		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	421	440	170	421	416	223	173			250		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	87	99	99	100			100		
cM capacity (veh/h)	533	507	873	529	523	817	1404			1316		
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	15	81	255	178								
Volume Left	5	71	5	5								
Volume Right	5	5	54	5								
cSH	601	541	1404	1316								
Volume to Capacity	0.02	0.15	0.00	0.00								
Queue Length 95th (ft)	2	13	0	0								
Control Delay (s)	11.1	12.8	0.2	0.2								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.1	12.8	0.2	0.2								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			30.8%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
 29: Evergreen Ave. & Outer Belt W

10/11/2018

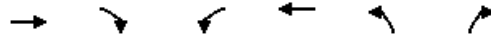
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	25	20	60	20	35	35	120	170	35	30	160	30
Future Volume (vph)	25	20	60	20	35	35	120	170	35	30	160	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	22	65	22	38	38	130	185	38	33	174	33
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	114	98	353	240								
Volume Left (vph)	27	22	130	33								
Volume Right (vph)	65	38	38	33								
Hadj (s)	-0.25	-0.15	0.08	0.02								
Departure Headway (s)	5.3	5.4	4.9	5.0								
Degree Utilization, x	0.17	0.15	0.48	0.33								
Capacity (veh/h)	598	582	708	683								
Control Delay (s)	9.4	9.4	12.4	10.5								
Approach Delay (s)	9.4	9.4	12.4	10.5								
Approach LOS	A	A	B	B								

**Intersection Summary**

Delay	11.0		
Level of Service	B		
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis  
 1: N. Raney St. & Rickelman Ave.

10/11/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷	↶	↷
Traffic Volume (veh/h)	10	25	200	10	35	85
Future Volume (Veh/h)	10	25	200	10	35	85
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	27	217	11	38	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			38		470	24
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			38		470	24
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			86		92	91
cM capacity (veh/h)			1572		476	1052

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	38	228	130
Volume Left	0	217	38
Volume Right	27	0	92
cSH	1700	1572	777
Volume to Capacity	0.02	0.14	0.17
Queue Length 95th (ft)	0	12	15
Control Delay (s)	0.0	7.3	10.6
Lane LOS		A	B
Approach Delay (s)	0.0	7.3	10.6
Approach LOS			B

















Intersection Summary			
Average Delay		7.7	
Intersection Capacity Utilization	32.1%	ICU Level of Service	A
Analysis Period (min)	15		



# HCM Unsignalized Intersection Capacity Analysis













## 11: Charlotte St. & Rickelman Ave.

10/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	85	5	285	210	5	5	5	325	5	5	5
Future Volume (Veh/h)	5	85	5	285	210	5	5	5	325	5	5	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	92	5	310	228	5	5	5	353	5	5	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None					None						
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	233			97			962	958	94	1310	958	230
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	233			97			962	958	94	1310	958	230
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			79			97	98	63	93	98	99
cM capacity (veh/h)	1335			1496			192	203	962	71	203	809
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	102	543	363	15								
Volume Left	5	310	5	5								
Volume Right	5	5	353	5								
cSH	1335	1496	870	148								
Volume to Capacity	0.00	0.21	0.42	0.10								
Queue Length 95th (ft)	0	19	52	8								
Control Delay (s)	0.4	5.4	12.1	32.1								
Lane LOS	A	A	B	D								
Approach Delay (s)	0.4	5.4	12.1	32.1								
Approach LOS			B	D								
Intersection Summary												
Average Delay			7.7									
Intersection Capacity Utilization			61.2%	ICU Level of Service						B		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
 6: N. 4th Street & Rickelman Ave.

10/11/2018























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	35	275	105	20	370	5	145	55	35	5	20	15
Future Volume (vph)	35	275	105	20	370	5	145	55	35	5	20	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	299	114	22	402	5	158	60	38	5	22	16
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	451	429	256	43								
Volume Left (vph)	38	22	158	5								
Volume Right (vph)	114	5	38	16								
Hadj (s)	-0.10	0.04	0.07	-0.17								
Departure Headway (s)	5.6	5.7	6.5	7.0								
Degree Utilization, x	0.70	0.68	0.46	0.08								
Capacity (veh/h)	622	598	505	414								
Control Delay (s)	20.4	20.2	14.9	10.6								
Approach Delay (s)	20.4	20.2	14.9	10.6								
Approach LOS	C	C	B	B								

**Intersection Summary**

Delay	18.8		
Level of Service	C		
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		














Lanes, Volumes, Timings  
3: US Route 45 & Rickelman Ave.

10/11/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	10	185	90	25	5	240	230	110	5	155	115
Future Volume (vph)	135	10	185	90	25	5	240	230	110	5	155	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	270		0	200		0	220		295	165		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.858			0.977				0.850		0.936	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1598	0	1770	1820	0	1770	1863	1583	1770	1744	0
Flt Permitted	0.950			0.950			0.553			0.588		
Satd. Flow (perm)	1770	1598	0	1770	1820	0	1030	1863	1583	1095	1744	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		201			5				120		50	
Link Speed (mph)		30			30			30		30		30
Link Distance (ft)		2780			357			1797			1266	
Travel Time (s)		63.2			8.1			40.8			28.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	147	11	201	98	27	5	261	250	120	5	168	125
Shared Lane Traffic (%)												
Lane Group Flow (vph)	147	212	0	98	32	0	261	250	120	5	293	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		8	8			2	8		6	
Permitted Phases							2		2		6	

Lanes, Volumes, Timings  
3: US Route 45 & Rickelman Ave.

10/11/2018

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector Phase	4	4		8	8		2	2	8	6	6		
Switch Phase													
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0		
Minimum Split (s)	22.5	22.5		22.5	22.5		22.5	22.5	22.5	22.5	22.5		
Total Split (s)	25.0	25.0		24.0	24.0		61.0	61.0	24.0	61.0	61.0		
Total Split (%)	22.7%	22.7%		21.8%	21.8%		55.5%	55.5%	21.8%	55.5%	55.5%		
Maximum Green (s)	20.5	20.5		19.5	19.5		56.5	56.5	19.5	56.5	56.5		
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5		
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		
Recall Mode	None	None		None	None		Max	Max	None	Max	Max		
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0		
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0		
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0		
Act Effct Green (s)	13.2	13.2		10.6	10.6		56.8	56.8	71.9	56.8	56.8		
Actuated g/C Ratio	0.14	0.14		0.11	0.11		0.60	0.60	0.76	0.60	0.60		
v/c Ratio	0.59	0.53		0.49	0.15		0.42	0.22	0.10	0.01	0.27		
Control Delay	48.4	11.8		48.9	35.7		14.2	10.5	0.9	10.2	9.2		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0		
Total Delay	48.4	11.8		48.9	35.7		14.2	10.5	0.9	10.2	9.2		
LOS	D	B		D	D		B	B	A	B	A		
Approach Delay		26.8			45.7			10.2				9.2	
Approach LOS		C			D			B				A	
90th %ile Green (s)	20.0	20.0		15.4	15.4		56.5	56.5	15.4	56.5	56.5		
90th %ile Term Code	Gap	Gap		Gap	Gap		MaxR	MaxR	Gap	MaxR	MaxR		
70th %ile Green (s)	15.3	15.3		12.4	12.4		56.5	56.5	12.4	56.5	56.5		
70th %ile Term Code	Gap	Gap		Gap	Gap		MaxR	MaxR	Gap	MaxR	MaxR		
50th %ile Green (s)	13.0	13.0		10.5	10.5		56.5	56.5	10.5	56.5	56.5		
50th %ile Term Code	Gap	Gap		Gap	Gap		MaxR	MaxR	Gap	MaxR	MaxR		
30th %ile Green (s)	10.9	10.9		8.8	8.8		56.5	56.5	8.8	56.5	56.5		
30th %ile Term Code	Gap	Gap		Gap	Gap		MaxR	MaxR	Gap	MaxR	MaxR		
10th %ile Green (s)	8.1	8.1		6.6	6.6		56.5	56.5	6.6	56.5	56.5		
10th %ile Term Code	Gap	Gap		Gap	Gap		MaxR	MaxR	Gap	MaxR	MaxR		
Stops (vph)	121	32		81	24		128	103	6	3	103		
Fuel Used(gal)	5	5		2	0		5	4	2	0	4		
CO Emissions (g/hr)	344	340		111	30		333	299	111	5	261		
NOx Emissions (g/hr)	67	66		22	6		65	58	22	1	51		
VOC Emissions (g/hr)	80	79		26	7		77	69	26	1	61		
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0		
Queue Length 50th (ft)	83	6		56	15		75	62	0	1	61		
Queue Length 95th (ft)	152	69		113	44		175	134	14	7	139		
Internal Link Dist (ft)		2700			277			1717				1186	
Turn Bay Length (ft)	270			200			220		295	165			
Base Capacity (vph)	387	506		368	382		621	1123	1235	660	1071		
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0		

Lanes, Volumes, Timings  
 3: US Route 45 & Rickelman Ave.

10/11/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.38	0.42		0.27	0.08		0.42	0.22	0.10	0.01	0.27	

Intersection Summary

















Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	94.2
Natural Cycle:	75
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.59
Intersection Signal Delay:	17.4
Intersection LOS:	B
Intersection Capacity Utilization:	60.4%
ICU Level of Service:	B
Analysis Period (min):	15
90th %ile Actuated Cycle:	105.4
70th %ile Actuated Cycle:	97.7
50th %ile Actuated Cycle:	93.5
30th %ile Actuated Cycle:	89.7
10th %ile Actuated Cycle:	84.7

Splits and Phases: 3: US Route 45 & Rickelman Ave.

02	04	08
61 s	25 s	24 s
06		
61 s		

HCM Unsignalized Intersection Capacity Analysis  
 18: N. Raney St. & Ford Ave.





















10/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	115	250	35	15	205	45	20	35	20	50	45	200
Future Volume (vph)	115	250	35	15	205	45	20	35	20	50	45	200
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	125	272	38	16	223	49	22	38	22	54	49	217
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	435	288	82	320								
Volume Left (vph)	125	16	22	54								
Volume Right (vph)	38	49	22	217								
Hadj (s)	0.06	-0.06	-0.07	-0.33								
Departure Headway (s)	5.8	5.9	6.7	5.9								
Degree Utilization, x	0.70	0.47	0.15	0.52								
Capacity (veh/h)	600	555	434	565								
Control Delay (s)	21.0	14.1	10.9	15.0								
Approach Delay (s)	21.0	14.1	10.9	15.0								
Approach LOS	C	B	B	C								

Intersection Summary			
Delay		16.8	
Level of Service		C	
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis  
 20: Ford Ave. & Charlotte St.

10/11/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	265	5	25	5	15	10	20	80	5	5	70	210
Future Volume (vph)	265	5	25	5	15	10	20	80	5	5	70	210
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	288	5	27	5	16	11	22	87	5	5	76	228
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total (vph)	288	32	5	27	22	92	309					
Volume Left (vph)	288	0	5	0	22	0	5					
Volume Right (vph)	0	27	0	11	0	5	228					
Hadj (s)	0.53	-0.56	0.53	-0.25	0.53	0.04	-0.40					
Departure Headway (s)	6.3	5.2	6.7	5.9	6.5	6.0	5.3					
Degree Utilization, x	0.50	0.05	0.01	0.04	0.04	0.15	0.46					
Capacity (veh/h)	553	661	486	548	517	558	646					
Control Delay (s)	14.2	7.2	8.6	8.0	8.6	8.9	12.8					
Approach Delay (s)	13.5		8.1		8.8		12.8					
Approach LOS	B		A		A		B					



















Intersection Summary

Delay	12.3
Level of Service	B
Intersection Capacity Utilization	49.1%
ICU Level of Service	A
Analysis Period (min)	15

# HCM Unsignalized Intersection Capacity Analysis

## 42: Avenue of Mid-America & WalMart Ent.

10/11/2018


















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	430	20	5	360	15	10	5	10	10	5	190
Future Volume (Veh/h)	160	430	20	5	360	15	10	5	10	10	5	190
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	174	467	22	5	391	16	11	5	11	11	5	207
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		961										
pX, platoon unblocked												
vC, conflicting volume	407			489			1241	1243	244	1004	1246	204
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	407			489			1241	1243	244	1004	1246	204
tC, single (s)	4.2			4.1			7.5	6.5	7.1	7.5	6.5	7.0
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	85			100			87	97	98	93	97	74
cM capacity (veh/h)	1141			1070			83	146	732	166	145	800
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	408	256	200	212	11	16	11	212				
Volume Left	174	0	5	0	11	0	11	0				
Volume Right	0	22	0	16	0	11	0	207				
cSH	1141	1700	1070	1700	83	325	166	723				
Volume to Capacity	0.15	0.15	0.00	0.12	0.13	0.05	0.07	0.29				
Queue Length 95th (ft)	13	0	0	0	11	4	5	31				
Control Delay (s)	4.6	0.0	0.3	0.0	54.6	16.7	28.3	12.0				
Lane LOS	A		A		F	C	D	B				
Approach Delay (s)	2.8		0.1		32.1		12.8					
Approach LOS					D		B					
Intersection Summary												
Average Delay			4.3									
Intersection Capacity Utilization			Err%		ICU Level of Service				H			
Analysis Period (min)			15									



# HCM Unsignalized Intersection Capacity Analysis

## 9: Avenue of Mid-America & N. Raney St.

10/11/2018























																
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
Lane Configurations																
Traffic Volume (veh/h)	70	220	25	5	190	5	15	5	5	5	5	85				
Future Volume (Veh/h)	70	220	25	5	190	5	15	5	5	5	5	85				
Sign Control	Free		Free		Free		Stop		Stop		Stop					
Grade	0%		0%		0%		0%		0%		0%					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92				
Hourly flow rate (vph)	76	239	27	5	207	5	16	5	5	5	5	92				
Pedestrians																
Lane Width (ft)																
Walking Speed (ft/s)																
Percent Blockage																
Right turn flare (veh)																
Median type	None				TWLTL											
Median storage (veh)					2											
Upstream signal (ft)																
pX, platoon unblocked																
vC, conflicting volume	212		266		718		626		252		618		638		210	
vC1, stage 1 conf vol					404		404				220		220			
vC2, stage 2 conf vol					314		222				398		418			
vCu, unblocked vol	212		266		718		626		252		618		638		210	
tC, single (s)	4.1		4.1		7.1		6.5		6.2		7.1		6.5		6.2	
tC, 2 stage (s)					6.1		5.5				6.1		5.5			
tF (s)	2.2		2.2		3.5		4.0		3.3		3.5		4.0		3.3	
p0 queue free %	94		100		97		99		99		99		99		89	
cM capacity (veh/h)	1358		1298		458		505		786		537		508		831	
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1											
Volume Total	76	266	217	26	102											
Volume Left	76	0	5	16	5											
Volume Right	0	27	5	5	92											
cSH	1358	1700	1298	508	785											
Volume to Capacity	0.06	0.16	0.00	0.05	0.13											
Queue Length 95th (ft)	4	0	0	4	11											
Control Delay (s)	7.8	0.0	0.2	12.5	10.3											
Lane LOS	A		A	B	B											
Approach Delay (s)	1.7		0.2	12.5	10.3											
Approach LOS				B	B											
Intersection Summary																
Average Delay			2.9													
Intersection Capacity Utilization			41.1%		ICU Level of Service				A							
Analysis Period (min)			15													

# Appendix H

Intersection Capacity Analysis Reports – 2030













Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								 			 	
Traffic Volume (vph)	40	55	35	145	80	90	25	265	170	140	780	55
Future Volume (vph)	40	55	35	145	80	90	25	265	170	140	780	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	115		0	145		0	160		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.942			0.921			0.941			0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	1724	0	1641	1692	0	1770	3235	0	1770	3486	0
Flt Permitted	0.641			0.516			0.278			0.424		
Satd. Flow (perm)	1107	1724	0	891	1692	0	518	3235	0	790	3486	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			51			140			8	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1647			457			671			405	
Travel Time (s)		28.1			7.8			11.4			6.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	5%	2%	10%	5%	2%	2%	5%	5%	2%	2%	10%
Adj. Flow (vph)	43	60	38	158	87	98	27	288	185	152	848	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	98	0	158	185	0	27	473	0	152	908	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	24.2		9.9	24.2		9.9	24.1		9.9	24.1	
Total Split (s)	12.0	30.0		19.0	37.0		12.0	42.0		19.0	49.0	
Total Split (%)	10.9%	27.3%		17.3%	33.6%		10.9%	38.2%		17.3%	44.5%	
Maximum Green (s)	8.0	23.8		15.0	30.8		7.6	35.9		14.6	42.9	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	2.7		1.0	2.7		0.5	2.2		0.5	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.2		4.0	6.2		4.4	6.1		4.4	6.1	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	19.4	10.0		29.5	20.1		64.6	56.8		71.8	63.9	
Actuated g/C Ratio	0.18	0.09		0.27	0.18		0.59	0.52		0.65	0.58	
v/c Ratio	0.19	0.54		0.48	0.53		0.07	0.27		0.25	0.45	
Control Delay	30.4	45.4		36.5	35.2		6.8	7.0		9.2	15.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	30.4	45.4		36.5	35.2		6.8	7.0		9.2	15.7	
LOS	C	D		D	D		A	A		A	B	
Approach Delay		40.8			35.8			7.0			14.7	
Approach LOS		D			D			A			B	
90th %ile Green (s)	8.0	14.7		15.0	21.7		7.1	47.1		12.5	52.5	
90th %ile Term Code	Max	Gap		Max	Hold		Gap	Coord		Gap	Coord	
70th %ile Green (s)	8.0	11.9		15.0	18.9		6.5	52.0		10.4	55.9	
70th %ile Term Code	Max	Gap		Max	Hold		Gap	Coord		Gap	Coord	
50th %ile Green (s)	7.6	10.0		14.2	16.6		6.1	56.0		9.1	59.0	
50th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Coord		Gap	Coord	
30th %ile Green (s)	0.0	8.1		12.2	24.3		0.0	61.1		7.9	73.4	
30th %ile Term Code	Skip	Gap		Gap	Hold		Skip	Coord		Gap	Coord	
10th %ile Green (s)	0.0	5.5		9.7	19.2		0.0	67.6		6.5	78.5	
10th %ile Term Code	Skip	Gap		Gap	Hold		Skip	Coord		Gap	Coord	
Stops (vph)	33	62		112	110		6	145		53	467	
Fuel Used(gal)	1	3		4	5		0	4		1	10	
CO Emissions (g/hr)	82	197		307	347		14	282		82	667	
NOx Emissions (g/hr)	16	38		60	68		3	55		16	130	
VOC Emissions (g/hr)	19	46		71	80		3	65		19	155	
Dilemma Vehicles (#)	0	3		0	6		0	23		0	38	
Queue Length 50th (ft)	23	49		89	89		5	24		38	200	
Queue Length 95th (ft)	48	99		138	156		13	33		74	289	
Internal Link Dist (ft)		1567			377			591			325	
Turn Bay Length (ft)	215			115			145			160		
Base Capacity (vph)	242	393		340	510		397	1737		648	2027	

Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.18	0.25		0.46	0.36		0.07	0.27		0.23	0.45	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 3 (3%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.54  
 Intersection Signal Delay: 18.2  
 Intersection Capacity Utilization 58.6%  
 Analysis Period (min) 15














Intersection LOS: B  
 ICU Level of Service B

Splits and Phases: 21: N. Keller Dr. & Outer Belt W/Ford Ave.



HCM Unsignalized Intersection Capacity Analysis  
 41: N. Keller Dr. & Thelma Keller Ave.

10/12/2018

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			 			 	
Traffic Volume (veh/h)	45	15	455	55	20	945	
Future Volume (Veh/h)	45	15	455	55	20	945	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	49	16	495	60	22	1027	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			TWLTL		TWLTL		
Median storage (veh)			2		2		
Upstream signal (ft)			567		671		
pX, platoon unblocked	0.87	0.96			0.96		
vC, conflicting volume	1082	278			555		
vC1, stage 1 conf vol	525						
vC2, stage 2 conf vol	558						
vCu, unblocked vol	613	173			461		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3			2.2		
p0 queue free %	91	98			98		
cM capacity (veh/h)	539	809			1056		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	49	16	330	225	22	514	514
Volume Left	49	0	0	0	22	0	0
Volume Right	0	16	0	60	0	0	0
cSH	539	809	1700	1700	1056	1700	1700
Volume to Capacity	0.09	0.02	0.19	0.13	0.02	0.30	0.30
Queue Length 95th (ft)	7	2	0	0	2	0	0
Control Delay (s)	12.3	9.5	0.0	0.0	8.5	0.0	0.0
Lane LOS	B	A			A		
Approach Delay (s)	11.7		0.0		0.2		
Approach LOS	B						
Intersection Summary							
Average Delay			0.6				
Intersection Capacity Utilization			36.1%		ICU Level of Service		A
Analysis Period (min)			15				













Lanes, Volumes, Timings  
 22: Avenue of Mid-America & N. Keller Dr.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	30	100	20	30	15	75	480	30	10	965	35
Future Volume (vph)	25	30	100	20	30	15	75	480	30	10	965	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	160		0	160		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.885			0.951				0.850		0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1649	0	1770	1771	0	1770	3539	1583	1770	3522	0
Flt Permitted	0.725			0.392			0.202			0.459		
Satd. Flow (perm)	1350	1649	0	730	1771	0	376	3539	1583	855	3522	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		109			16				63		4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		230			205			578			567	
Travel Time (s)		5.2			4.7			13.1			12.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	33	109	22	33	16	82	522	33	11	1049	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	142	0	22	49	0	82	522	33	11	1087	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pt+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	2 3	1	6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings  
 22: Avenue of Mid-America & N. Keller Dr.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2	2 3	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		23.9	23.9		9.5	22.5		9.5	23.4	
Total Split (s)	22.5	22.8		24.0	24.3		13.4	53.6		9.6	49.8	
Total Split (%)	20.5%	20.7%		21.8%	22.1%		12.2%	48.7%		8.7%	45.3%	
Maximum Green (s)	19.5	19.8		18.1	18.4		8.9	49.1		6.1	44.4	
Yellow Time (s)	3.0	3.0		3.5	3.5		3.5	3.5		3.0	3.9	
All-Red Time (s)	0.0	0.0		2.4	2.4		1.0	1.0		0.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	3.0		5.9	5.9		4.5	4.5		3.5	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)	14.9	9.1		14.6	10.2		82.8	81.1	94.6	79.2	72.7	
Actuated g/C Ratio	0.14	0.08		0.13	0.09		0.75	0.74	0.86	0.72	0.66	
v/c Ratio	0.13	0.60		0.14	0.28		0.22	0.20	0.02	0.02	0.47	
Control Delay	35.9	25.2		38.1	37.7		7.0	2.9	0.0	3.9	8.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	35.9	25.2		38.1	37.7		7.0	2.9	0.0	3.9	8.2	
LOS	D	C		D	D		A	A	A	A	A	
Approach Delay		26.9			37.8			3.3			8.2	
Approach LOS		C			D			A			A	
90th %ile Green (s)	8.6	13.8		8.3	13.5		8.7	64.9		6.1	60.4	
90th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Coord		Gap	Coord	
70th %ile Green (s)	7.6	10.3		7.3	10.0		7.5	79.0		0.0	66.1	
70th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Coord		Skip	Coord	
50th %ile Green (s)	6.8	7.7		6.6	7.5		6.8	82.3		0.0	70.1	
50th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Coord		Skip	Coord	
30th %ile Green (s)	0.0	5.5		5.9	14.4		6.2	85.2		0.0	73.6	
30th %ile Term Code	Skip	Gap		Gap	Hold		Gap	Coord		Skip	Coord	
10th %ile Green (s)	0.0	8.4		0.0	5.5		0.0	94.1		0.0	93.2	
10th %ile Term Code	Skip	Hold		Skip	Hold		Skip	Coord		Skip	Coord	
Stops (vph)	21	40		18	30		24	82	0	4	316	
Fuel Used(gal)	1	3		0	1		1	3	0	0	8	
CO Emissions (g/hr)	54	236		28	59		40	203	9	5	548	
NOx Emissions (g/hr)	11	46		6	12		8	39	2	1	107	
VOC Emissions (g/hr)	13	55		7	14		9	47	2	1	127	
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0	
Queue Length 50th (ft)	16	22		13	23		5	15	0	1	141	
Queue Length 95th (ft)	m37	81		33	58		35	28	0	m4	184	
Internal Link Dist (ft)		150			125			498			487	
Turn Bay Length (ft)							160			160		
Base Capacity (vph)	346	386		303	309		396	2609	1492	668	2328	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	



Lanes, Volumes, Timings  
 22: Avenue of Mid-America & N. Keller Dr.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.08	0.37		0.07	0.16		0.21	0.20	0.02	0.02	0.47	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 108 (98%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.60  
 Intersection Signal Delay: 9.3  
 Intersection Capacity Utilization 60.4%  
 Analysis Period (min) 15  
 Intersection LOS: A  
 ICU Level of Service B  
 m Volume for 95th percentile queue is metered by upstream signal.























Splits and Phases: 22: Avenue of Mid-America & N. Keller Dr.

Ø1	Ø2 (R)	Ø3	Ø4
9.6 s	53.6 s	24 s	22.8 s
Ø5	Ø6 (R)	Ø7	Ø8
13.4 s	49.8 s	22.5 s	24.3 s

Lanes, Volumes, Timings

23: Evergreen Ave./I-57/70 Exit Ramp & N. Keller Dr.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	0	205	35	65	100	150	865	0	0	1305	80
Future Volume (vph)	25	0	205	35	65	100	150	865	0	0	1305	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		165	185		220	250		0	0		75
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1468	1770	1727	1583	1641	3539	0	0	3539	1583
Flt Permitted	0.950			0.950			0.103					
Satd. Flow (perm)	1770	0	1468	1770	1727	1583	178	3539	0	0	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			223			149						50
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		949			862			437			468	
Travel Time (s)		21.6			19.6			9.9			10.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	10%	2%	10%	2%	10%	2%	2%	2%	2%	2%
Adj. Flow (vph)	27	0	223	38	71	109	163	940	0	0	1418	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	0	223	38	71	109	163	940	0	0	1418	87
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Detector 1 Position(ft)	0		0	0	0	0	0	0			0	0
Detector 1 Size(ft)	20		20	20	6	20	20	6			6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot	NA	Perm	pm+pt	NA			NA	pm+ov
Protected Phases	7			3	8		5	2			6	7

Lanes, Volumes, Timings

23: Evergreen Ave./I-57/70 Exit Ramp & N. Keller Dr.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4			8	2					6
Detector Phase	7		4	3	8	8	5	2			6	7
Switch Phase												
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Minimum Split (s)	9.5		22.5	9.5	22.5	22.5	9.5	23.5			22.5	9.5
Total Split (s)	22.4		30.0	15.0	22.6	22.6	17.0	65.0			48.0	22.4
Total Split (%)	20.4%		27.3%	13.6%	20.5%	20.5%	15.5%	59.1%			43.6%	20.4%
Maximum Green (s)	17.9		26.0	11.0	18.6	18.6	13.0	59.5			43.5	17.9
Yellow Time (s)	3.5		3.0	3.0	3.0	3.0	3.0	3.9			3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0	1.0	1.6			1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)	4.5		4.0	4.0	4.0	4.0	4.0	5.5			4.5	4.5
Lead/Lag	Lead		Lag	Lead	Lag	Lag	Lead				Lag	Lead
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes				Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	None		None	None	None	None	None	C-Max			C-Max	None
Walk Time (s)			7.0		7.0	7.0		7.0			7.0	
Flash Dont Walk (s)			11.0		11.0	11.0		11.0			11.0	
Pedestrian Calls (#/hr)			0		0	0		0			0	
Act Effct Green (s)	7.2		12.2	7.8	10.2	10.2	82.0	80.5			67.0	78.8
Actuated g/C Ratio	0.07		0.11	0.07	0.09	0.09	0.75	0.73			0.61	0.72
v/c Ratio	0.23		0.62	0.30	0.44	0.39	0.60	0.36			0.66	0.08
Control Delay	52.9		14.1	54.0	54.7	6.8	19.4	6.8			17.2	3.5
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.1	0.0
Total Delay	52.9		14.1	54.0	54.7	6.8	19.4	6.8			17.4	3.5
LOS	D		B	D	D	A	B	A			B	A
Approach Delay		18.3			30.6			8.7			16.5	
Approach LOS		B			C			A			B	
90th %ile Green (s)	9.4		15.0	10.5	15.6	15.6	16.9	71.0			51.1	9.4
90th %ile Term Code	Gap		Gap	Gap	Hold	Hold	Gap	Coord			Coord	Gap
70th %ile Green (s)	8.1		11.1	8.9	11.4	11.4	12.4	76.5			61.1	8.1
70th %ile Term Code	Gap		Hold	Gap	Gap	Gap	Gap	Coord			Coord	Gap
50th %ile Green (s)	7.1		9.8	7.7	9.9	9.9	9.4	79.0			66.6	7.1
50th %ile Term Code	Gap		Hold	Gap	Gap	Gap	Gap	Coord			Coord	Gap
30th %ile Green (s)	6.1		18.9	0.0	8.3	8.3	7.7	81.6			70.9	6.1
30th %ile Term Code	Gap		Hold	Skip	Gap	Gap	Gap	Coord			Coord	Gap
10th %ile Green (s)	0.0		6.0	0.0	6.0	6.0	6.1	94.5			85.4	0.0
10th %ile Term Code	Skip		Hold	Skip	Gap	Gap	Gap	Coord			Coord	Skip
Stops (vph)	25		29	34	60	6	56	306			795	11
Fuel Used(gal)	1		5	1	1	1	1	6			14	0
CO Emissions (g/hr)	68		377	56	104	59	99	408			960	29
NOx Emissions (g/hr)	13		73	11	20	11	19	79			187	6
VOC Emissions (g/hr)	16		87	13	24	14	23	95			223	7
Dilemma Vehicles (#)	0		0	0	0	0	0	0			0	0
Queue Length 50th (ft)	18		0	26	48	0	30	117			247	4
Queue Length 95th (ft)	47		72	59	90	23	101	194			558	12
Internal Link Dist (ft)		869			782			357			388	
Turn Bay Length (ft)			165	185		220	250					75
Base Capacity (vph)	288		517	177	292	391	316	2590			2156	1296

Lanes, Volumes, Timings

23: Evergreen Ave./I-57/70 Exit Ramp & N. Keller Dr.

10/12/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0		0	0	0	0	0	0			105	0
Spillback Cap Reductn	0		0	0	0	0	0	0			0	0
Storage Cap Reductn	0		0	0	0	0	0	0			0	0
Reduced v/c Ratio	0.09		0.43	0.21	0.24	0.28	0.52	0.36			0.69	0.07

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 3 (3%), Referenced to phase 2:NBTL and 6:SBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.66  
 Intersection Signal Delay: 14.9  
 Intersection Capacity Utilization 63.4%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service B

















Splits and Phases: 23: Evergreen Ave./I-57/70 Exit Ramp & N. Keller Dr.

 65 s	 15 s	 30 s
 17 s	 48 s	 22.4 s
		 22.6 s

# HCM Unsignalized Intersection Capacity Analysis













## 27: Outer Belt W & Ave. of Mid-America

10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	5	35	5	5	5	105	50	5	115	5
Future Volume (Veh/h)	5	5	5	35	5	5	5	105	50	5	115	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	5	38	5	5	5	114	54	5	125	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	296	316	128	296	291	141	130			168		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	296	316	128	296	291	141	130			168		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	94	99	99	100			100		
cM capacity (veh/h)	645	596	923	641	615	907	1455			1410		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	15	48	173	135								
Volume Left	5	38	5	5								
Volume Right	5	5	54	5								
cSH	696	658	1455	1410								
Volume to Capacity	0.02	0.07	0.00	0.00								
Queue Length 95th (ft)	2	6	0	0								
Control Delay (s)	10.3	10.9	0.2	0.3								
Lane LOS	B	B	A	A								
Approach Delay (s)	10.3	10.9	0.2	0.3								
Approach LOS	B	B										
<b>Intersection Summary</b>												
Average Delay			2.1									
Intersection Capacity Utilization			22.4%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
 29: Evergreen Ave. & Outer Belt W

10/12/2018

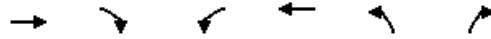
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	20	90	190	10	10	20	35	115	40	35	100	10
Future Volume (vph)	20	90	190	10	10	20	35	115	40	35	100	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	98	207	11	11	22	38	125	43	38	109	11
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	327	44	206	158								
Volume Left (vph)	22	11	38	38								
Volume Right (vph)	207	22	43	11								
Hadj (s)	-0.33	-0.22	-0.01	0.09								
Departure Headway (s)	4.6	5.1	5.0	5.2								
Degree Utilization, x	0.42	0.06	0.29	0.23								
Capacity (veh/h)	739	626	666	637								
Control Delay (s)	10.8	8.4	10.0	9.7								
Approach Delay (s)	10.8	8.4	10.0	9.7								
Approach LOS	B	A	B	A								

**Intersection Summary**

Delay		10.2										
Level of Service		B										
Intersection Capacity Utilization		38.1%	ICU Level of Service	A								
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis  
 1: N. Raney St. & Rickelman Ave.

10/12/2018



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷		↶
Traffic Volume (veh/h)	25	30	10	5	10	10
Future Volume (Veh/h)	25	30	10	5	10	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	33	11	5	11	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			60		70	44
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			60		70	44
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	99
cM capacity (veh/h)			1544		927	1027

















Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	60	16	22
Volume Left	0	11	11
Volume Right	33	0	11
cSH	1700	1544	974
Volume to Capacity	0.04	0.01	0.02
Queue Length 95th (ft)	0	1	2
Control Delay (s)	0.0	5.1	8.8
Lane LOS		A	A
Approach Delay (s)	0.0	5.1	8.8
Approach LOS			A

Intersection Summary			
Average Delay			2.8
Intersection Capacity Utilization	17.5%	ICU Level of Service	A
Analysis Period (min)			15

# HCM Unsignalized Intersection Capacity Analysis

## 11: Charlotte St. & Rickelman Ave.

10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	35	5	10	10	5	5	5	50	5	5	5
Future Volume (Veh/h)	5	35	5	10	10	5	5	5	50	5	5	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	38	5	11	11	5	5	5	54	5	5	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None					None						
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	16			43			94	88	40	142	88	14
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	16			43			94	88	40	142	88	14
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	99	95	99	99	100
cM capacity (veh/h)	1602			1566			875	793	1031	774	793	1067
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	48	27	64	15								
Volume Left	5	11	5	5								
Volume Right	5	5	54	5								
cSH	1602	1566	994	860								
Volume to Capacity	0.00	0.01	0.06	0.02								
Queue Length 95th (ft)	0	1	5	1								
Control Delay (s)	0.8	3.0	8.9	9.3								
Lane LOS	A	A	A	A								
Approach Delay (s)	0.8	3.0	8.9	9.3								
Approach LOS			A	A								
Intersection Summary												
Average Delay			5.4									
Intersection Capacity Utilization			14.0%	ICU Level of Service						A		
Analysis Period (min)			15									



# HCS7 Roundabouts Report

General Information				Site Information			
Analyst	RMM			Intersection	Rickelman & N. 4th St.		
Agency or Co.	FGI			E/W Street Name	Rickelman Ave.		
Date Performed	10/12/2018			N/S Street Name	N. 4th St.		
Analysis Year	2030			Analysis Time Period (hrs)	0.25		
Time Analyzed	AM Peak			Peak Hour Factor	0.92		
Project Description	2030 - Proposed Conditions			Jurisdiction			

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	5	70	20	0	240	15	5	0	10	20	190	0	10	40	10
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v <sub>pc</sub> ), pc/h	0	6	78	22	0	269	17	6	0	11	22	213	0	11	45	11
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

## Flow Computations, Capacity and v/c Ratios























Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		106			292			246			67	
Entry Volume veh/h		103			283			239			65	
Circulating Flow (v <sub>c</sub> ), pc/h	325			39			95			297		
Exiting Flow (v <sub>ex</sub> ), pc/h	302			39			34			336		
Capacity (c <sub>pce</sub> ), pc/h		991			1326			1253			1019	
Capacity (c), veh/h		962			1288			1216			990	
v/c Ratio (x)		0.11			0.22			0.20			0.07	

## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		4.7			4.7			4.7			4.2	
Lane LOS		A			A			A			A	
95% Queue, veh		0.4			0.8			0.7			0.2	
Approach Delay, s/veh	4.7			4.7			4.7			4.2		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh   LOS	4.6						A					













Lanes, Volumes, Timings  
3: US Route 45 & Rickelman Ave

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	10	165	160	20	10	95	205	90	5	290	85
Future Volume (vph)	80	10	165	160	20	10	95	205	90	5	290	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	270		0	200		0	220		295	165		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.859			0.950				0.850		0.966	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1600	0	1770	1770	0	1770	1863	1583	1770	1799	0
Flt Permitted	0.950			0.950			0.380			0.619		
Satd. Flow (perm)	1770	1600	0	1770	1770	0	708	1863	1583	1153	1799	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		179			11				98		16	
Link Speed (mph)		30			30			30		30		30
Link Distance (ft)		2780			357			1797			1266	
Travel Time (s)		63.2			8.1			40.8			28.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	11	179	174	22	11	103	223	98	5	315	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	190	0	174	33	0	103	223	98	5	407	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		8	8		5	2	8	1	6	
Permitted Phases							2		2	6		

Lanes, Volumes, Timings  
3: US Route 45 & Rickelman Ave

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		5	2	8	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5	22.5	9.5	22.5	
Total Split (s)	24.0	24.0		26.0	26.0		12.1	50.0	26.0	10.0	47.9	
Total Split (%)	21.8%	21.8%		23.6%	23.6%		11.0%	45.5%	23.6%	9.1%	43.5%	
Maximum Green (s)	19.5	19.5		21.5	21.5		7.6	45.5	21.5	5.5	43.4	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	None	None	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	10.0	10.0		14.4	14.4		53.3	52.0	70.2	48.7	44.5	
Actuated g/C Ratio	0.11	0.11		0.16	0.16		0.58	0.57	0.76	0.53	0.48	
v/c Ratio	0.46	0.57		0.63	0.11		0.21	0.21	0.08	0.01	0.46	
Control Delay	48.2	15.0		47.5	26.4		11.0	12.8	0.9	10.6	19.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	48.2	15.0		47.5	26.4		11.0	12.8	0.9	10.6	19.7	
LOS	D	B		D	C		B	B	A	B	B	
Approach Delay		25.4			44.1			9.6			19.6	
Approach LOS		C			D			A			B	
90th %ile Green (s)	14.4	14.4		21.5	21.5		7.6	45.5	21.5	5.5	43.4	
90th %ile Term Code	Gap	Gap		Max	Max		Max	MaxR	Max	Max	MaxR	
70th %ile Green (s)	11.7	11.7		16.9	16.9		7.6	55.5	16.9	0.0	43.4	
70th %ile Term Code	Gap	Gap		Gap	Gap		Max	Hold	Gap	Skip	MaxR	
50th %ile Green (s)	9.9	9.9		14.4	14.4		7.6	55.5	14.4	0.0	43.4	
50th %ile Term Code	Gap	Gap		Gap	Gap		Max	Hold	Gap	Skip	MaxR	
30th %ile Green (s)	8.4	8.4		12.0	12.0		7.4	55.3	12.0	0.0	43.4	
30th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Hold	Gap	Skip	MaxR	
10th %ile Green (s)	6.3	6.3		8.9	8.9		0.0	45.5	8.9	0.0	45.5	
10th %ile Term Code	Gap	Gap		Gap	Gap		Skip	MaxR	Gap	Skip	Hold	
Stops (vph)	71	32		142	20		41	99	6	3	238	
Fuel Used(gal)	3	5		3	0		2	4	1	0	7	
CO Emissions (g/hr)	204	315		194	25		124	276	92	5	455	
NOx Emissions (g/hr)	40	61		38	5		24	54	18	1	88	
VOC Emissions (g/hr)	47	73		45	6		29	64	21	1	105	
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0	
Queue Length 50th (ft)	49	6		98	11		24	56	0	1	153	
Queue Length 95th (ft)	103	71		172	38		61	149	10	7	288	
Internal Link Dist (ft)		2700			277			1717			1186	
Turn Bay Length (ft)	270			200			220		295	165		
Base Capacity (vph)	380	484		419	428		500	1054	1233	649	880	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	

Lanes, Volumes, Timings  
 3: US Route 45 & Rickelman Ave

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.23	0.39		0.42	0.08		0.21	0.21	0.08	0.01	0.46	

Intersection Summary






















Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 91.8  
 Natural Cycle: 80  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.63  
 Intersection Signal Delay: 21.4      Intersection LOS: C  
 Intersection Capacity Utilization 60.3%      ICU Level of Service B  
 Analysis Period (min) 15  
 90th %ile Actuated Cycle: 104.9  
 70th %ile Actuated Cycle: 97.6  
 50th %ile Actuated Cycle: 93.3  
 30th %ile Actuated Cycle: 89.2  
 10th %ile Actuated Cycle: 74.2

Splits and Phases: 3: US Route 45 & Rickelman Ave

Ø1	Ø2	Ø4	Ø8
10 s	50 s	24 s	26 s
Ø5	Ø6		
12.1 s	47.9 s		

HCM Unsignalized Intersection Capacity Analysis  
 18: N. Raney St. & Ford Ave.





















10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	245	15	25	175	20	15	15	5	25	20	35
Future Volume (Veh/h)	10	245	15	25	175	20	15	15	5	25	20	35
Sign Control	Free		Free		Stop		Stop					
Grade	0%		0%		0%		0%					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	266	16	27	190	22	16	16	5	27	22	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None					None						
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	212		282		589		562		274		556	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	212		282		589		562		274		556	
tC, single (s)	4.1		4.1		7.1		6.5		6.2		7.1	
tC, 2 stage (s)												
tF (s)	2.2		2.2		3.5		4.0		3.3		3.5	
p0 queue free %	99		98		96		96		99		94	
cM capacity (veh/h)	1341		1280		376		423		765		417	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	11	282	27	212	16	21	27	60				
Volume Left	11	0	27	0	16	0	27	0				
Volume Right	0	16	0	22	0	5	0	38				
cSH	1341	1700	1280	1700	376	474	417	615				
Volume to Capacity	0.01	0.17	0.02	0.12	0.04	0.04	0.06	0.10				
Queue Length 95th (ft)	1	0	2	0	3	3	5	8				
Control Delay (s)	7.7	0.0	7.9	0.0	15.0	13.0	14.2	11.5				
Lane LOS	A		A		B	B	B	B				
Approach Delay (s)	0.3		0.9		13.8		12.3					
Approach LOS					B		B					
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			35.2%		ICU Level of Service				A			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis























20: Ford Ave. & Charlotte St.

10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	260	5	55	230	10	5	10	30	15	45	20
Future Volume (Veh/h)	10	260	5	55	230	10	5	10	30	15	45	20
Sign Control	Free		Free				Stop				Stop	
Grade	0%		0%				0%				0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	283	5	60	250	11	5	11	33	16	49	22
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None				TWLTL							
Median storage (veh)	2											
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	261			288			724	688	286	719	686	256
vC1, stage 1 conf vol							308	308		376	376	
vC2, stage 2 conf vol							416	381		344	310	
vCu, unblocked vol	261			288			724	688	286	719	686	256
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			95			99	98	96	97	90	97
cM capacity (veh/h)	1303			1274			464	503	754	483	495	783
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	11	288	60	261	5	44	87					
Volume Left	11	0	60	0	5	0	16					
Volume Right	0	5	0	11	0	33	22					
cSH	1303	1700	1274	1700	464	670	543					
Volume to Capacity	0.01	0.17	0.05	0.15	0.01	0.07	0.16					
Queue Length 95th (ft)	1	0	4	0	1	5	14					
Control Delay (s)	7.8	0.0	8.0	0.0	12.8	10.7	12.9					
Lane LOS	A		A		B	B	B					
Approach Delay (s)	0.3		1.5		11.0		12.9					
Approach LOS					B		B					
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			38.4%		ICU Level of Service				A			
Analysis Period (min)	15											













Lanes, Volumes, Timings  
42: Damron Ct. & Avenue of Mid-America

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	25	5	220	35	5	15	65	210	5	50	10
Future Volume (vph)	10	25	5	220	35	5	15	65	210	5	50	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		100	100		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977			0.983				0.850		0.975	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	3458	0	1770	3361	0	1770	1863	1468	1770	1813	0
Flt Permitted	0.728			0.449			0.715			0.711		
Satd. Flow (perm)	1343	3458	0	836	3361	0	1332	1863	1468	1324	1813	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			5				228		10	
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		756			727			242		293		
Travel Time (s)		17.2			16.5			5.5		6.7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	2%	2%	5%	10%	2%	2%	10%	2%	2%	3%
Adj. Flow (vph)	11	27	5	239	38	5	16	71	228	5	54	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	32	0	239	43	0	16	71	228	5	65	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12		12		12
Link Offset(ft)		0			0			0		0		0
Crosswalk Width(ft)		16			16			16		16		16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1		2
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20		100
Trailing Detector (ft)	0	0		0	0		0	0	0	0		0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0		0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20		6
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	Perm		NA
Protected Phases	7	4		3	8			2	3			6

Lanes, Volumes, Timings  
42: Damron Ct. & Avenue of Mid-America

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		2	2	3	6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5	9.5	22.5	22.5	
Total Split (s)	15.0	23.0		50.0	58.0		37.0	37.0	50.0	37.0	37.0	
Total Split (%)	13.6%	20.9%		45.5%	52.7%		33.6%	33.6%	45.5%	33.6%	33.6%	
Maximum Green (s)	11.5	19.5		46.5	54.5		33.5	33.5	46.5	33.5	33.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5	0.5	0.5	0.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
Lead/Lag	Lead	Lag		Lead	Lag				Lead			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	Max	Max	
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	10.2	6.4		25.9	23.8		77.1	77.1	101.7	77.1	77.1	
Actuated g/C Ratio	0.09	0.06		0.24	0.22		0.70	0.70	0.92	0.70	0.70	
v/c Ratio	0.08	0.16		0.66	0.06		0.02	0.05	0.17	0.01	0.05	
Control Delay	30.4	46.1		44.3	28.4		7.5	7.1	0.4	8.0	6.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	30.4	46.1		44.3	28.4		7.5	7.1	0.4	8.0	6.5	
LOS	C	D		D	C		A	A	A	A	A	
Approach Delay		42.1			41.9			2.3				6.6
Approach LOS		D			D			A				A
90th %ile Green (s)	6.9	7.6		26.2	26.9		65.7	65.7	26.2	65.7	65.7	
90th %ile Term Code	Gap	Gap		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
70th %ile Green (s)	0.0	6.8		22.1	32.4		70.6	70.6	22.1	70.6	70.6	
70th %ile Term Code	Skip	Gap		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
50th %ile Green (s)	0.0	6.3		19.3	29.1		73.9	73.9	19.3	73.9	73.9	
50th %ile Term Code	Skip	Gap		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
30th %ile Green (s)	0.0	0.0		17.6	17.6		85.4	85.4	17.6	85.4	85.4	
30th %ile Term Code	Skip	Skip		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
10th %ile Green (s)	0.0	0.0		13.2	13.2		89.8	89.8	13.2	89.8	89.8	
10th %ile Term Code	Skip	Skip		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
Stops (vph)	8	26		184	27		6	20	4	3	17	
Fuel Used(gal)	0	1		4	1		0	1	2	0	0	
CO Emissions (g/hr)	13	44		297	42		12	49	115	3	22	
NOx Emissions (g/hr)	2	9		58	8		2	10	22	0	4	
VOC Emissions (g/hr)	3	10		69	10		3	11	27	1	5	
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0	
Queue Length 50th (ft)	1	10		144	10		3	15	0	1	12	
Queue Length 95th (ft)	m13	27		199	26		13	38	8	6	33	
Internal Link Dist (ft)		676			647			162			213	
Turn Bay Length (ft)	100			100			100		100	100		
Base Capacity (vph)	233	617		748	1667		933	1305	1468	927	1273	



Lanes, Volumes, Timings  
 42: Damron Ct. & Avenue of Mid-America

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.05	0.05		0.32	0.03		0.02	0.05	0.16	0.01	0.05	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.66  
 Intersection Signal Delay: 20.8  
 Intersection Capacity Utilization 33.0%  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.


















Splits and Phases: 42: Damron Ct. & Avenue of Mid-America

Ø2 (R) 37 s	Ø3 50 s	Ø4 23 s
Ø6 37 s	Ø7 15 s	Ø8 58 s

# HCM Unsignalized Intersection Capacity Analysis

## 9: Avenue of Mid-America & N. Raney St.

10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	120	20	5	115	5	10	5	5	5	5	55
Future Volume (Veh/h)	30	120	20	5	115	5	10	5	5	5	5	55
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	130	22	5	125	5	11	5	5	5	5	60
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None				TWLTL							
Median storage (veh)					2							
Upstream signal (ft)	727											
pX, platoon unblocked												
vC, conflicting volume	130			152			407	347	141	341	356	128
vC1, stage 1 conf vol							207	207		138	138	
vC2, stage 2 conf vol							200	140		204	218	
vCu, unblocked vol	130			152			407	347	141	341	356	128
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			98	99	99	99	99	93
cM capacity (veh/h)	1455			1429			644	651	907	714	650	923
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total	33	152	135	21	70							
Volume Left	33	0	5	11	5							
Volume Right	0	22	5	5	60							
cSH	1455	1700	1429	694	878							
Volume to Capacity	0.02	0.09	0.00	0.03	0.08							
Queue Length 95th (ft)	2	0	0	2	6							
Control Delay (s)	7.5	0.0	0.3	10.4	9.5							
Lane LOS	A		A	B	A							
Approach Delay (s)	1.3		0.3	10.4	9.5							
Approach LOS				B	A							
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization			21.3%		ICU Level of Service				A			
Analysis Period (min)			15									














Lanes, Volumes, Timings  
52: N. Keller Dr. & Damron Ct.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	5	20	315	5	15	15	550	310	25	1045	15
Future Volume (vph)	20	5	20	315	5	15	15	550	310	25	1045	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		0	100		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.878			0.987				0.850		0.998	
Flt Protected	0.950			0.950	0.958		0.950			0.950		
Satd. Flow (prot)	1770	1635	0	1681	1673	0	1770	3438	1583	1770	3433	0
Flt Permitted	0.950			0.950	0.958		0.184			0.400		
Satd. Flow (perm)	1770	1635	0	1681	1673	0	343	3438	1583	745	3433	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			4				337		2	
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		247			739			468		578		
Travel Time (s)		5.6			16.8			10.6		13.1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	5%	2%
Adj. Flow (vph)	22	5	22	342	5	16	16	598	337	27	1136	16
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	22	27	0	181	182	0	16	598	337	27	1152	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12		12		
Link Offset(ft)		0			0			0		0		
Crosswalk Width(ft)		16			16			16		16		
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		8	8		5	2	8	1	6	

Lanes, Volumes, Timings  
52: N. Keller Dr. & Damron Ct.

10/12/2018

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases							2		2	6			
Detector Phase	4	4		8	8		5	2	8	1	6		
Switch Phase													
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0		
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	23.5	22.5	9.5	23.5		
Total Split (s)	22.6	22.6		24.0	24.0		9.6	53.8	24.0	9.6	53.8		
Total Split (%)	20.5%	20.5%		21.8%	21.8%		8.7%	48.9%	21.8%	8.7%	48.9%		
Maximum Green (s)	18.6	18.6		20.0	20.0		5.6	48.3	20.0	5.6	48.3		
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.9	3.0	3.0	3.9		
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.6	1.0	1.0	1.6		
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	5.5	4.0	4.0	5.5		
Lead/Lag							Lag	Lead		Lag	Lead		
Lead-Lag Optimize?							Yes	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		
Recall Mode	None	None		None	None		None	C-Max	None	None	C-Max		
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0		
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0	11.0		11.0		
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0		
Act Effct Green (s)	6.9	6.9		18.8	18.8		75.9	68.9	94.8	76.7	70.8		
Actuated g/C Ratio	0.06	0.06		0.17	0.17		0.69	0.63	0.86	0.70	0.64		
v/c Ratio	0.20	0.22		0.63	0.63		0.05	0.28	0.24	0.05	0.52		
Control Delay	52.5	26.8		33.4	32.4		5.3	8.2	0.4	2.4	7.2		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.1	0.0	0.0		
Total Delay	52.5	26.8		33.4	32.4		5.3	8.2	0.5	2.4	7.3		
LOS	D	C		C	C		A	A	A	A	A		
Approach Delay		38.3			32.9			5.4			7.2		
Approach LOS		D			C			A			A		
90th %ile Green (s)	8.8	8.8		27.2	27.2		5.6	50.9	27.2	5.6	50.9		
90th %ile Term Code	Gap	Gap		Gap	Gap		Max	Coord	Gap	Max	Coord		
70th %ile Green (s)	7.6	7.6		22.1	22.1		5.5	57.3	22.1	5.5	57.3		
70th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord	Gap	Gap	Coord		
50th %ile Green (s)	6.8	6.8		18.8	18.8		0.0	61.4	18.8	5.5	70.9		
50th %ile Term Code	Gap	Gap		Gap	Gap		Skip	Coord	Gap	Gap	Coord		
30th %ile Green (s)	0.0	0.0		15.4	15.4		0.0	85.1	15.4	0.0	85.1		
30th %ile Term Code	Skip	Skip		Gap	Gap		Skip	Coord	Gap	Skip	Coord		
10th %ile Green (s)	0.0	0.0		10.7	10.7		0.0	89.8	10.7	0.0	89.8		
10th %ile Term Code	Skip	Skip		Gap	Gap		Skip	Coord	Gap	Skip	Coord		
Stops (vph)	20	12		130	128		6	240	1	3	331		
Fuel Used(gal)	0	0		3	3		0	4	1	0	8		
CO Emissions (g/hr)	25	18		219	216		7	297	81	10	571		
NOx Emissions (g/hr)	5	3		43	42		1	58	16	2	111		
VOC Emissions (g/hr)	6	4		51	50		2	69	19	2	132		
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0		
Queue Length 50th (ft)	15	3		125	124		2	116	0	1	29		
Queue Length 95th (ft)	40	31		185	183		m9	191	0	m4	307		
Internal Link Dist (ft)		167			659			388			498		
Turn Bay Length (ft)	100			100			100			100			
Base Capacity (vph)	299	294		333	335		309	2153	1405	572	2210		

Lanes, Volumes, Timings  
 52: N. Keller Dr. & Damron Ct.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	342	0	73	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	93	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.07	0.09		0.54	0.54		0.05	0.28	0.32	0.05	0.54	

Intersection Summary













Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.63  
 Intersection Signal Delay: 10.8  
 Intersection Capacity Utilization 53.3%  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 52: N. Keller Dr. & Damron Ct.

Ø2 (R)	Ø1	Ø4	Ø8
53.8 s	9.6 s	22.6 s	24 s
Ø6 (R)	Ø5		
53.8 s	9.6 s		

HCM Unsignalized Intersection Capacity Analysis  
 49: N. 4th Street & Ford Ave.






















10/12/2018

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	200	105	90	20	85	215
Future Volume (vph)	200	105	90	20	85	215
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	217	114	98	22	92	234
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	217	114	98	22	92	234
Volume Left (vph)	217	0	98	0	0	0
Volume Right (vph)	0	114	0	0	0	234
Hadj (s)	0.53	-0.67	0.53	0.03	0.03	-0.67
Departure Headway (s)	6.1	4.9	6.4	5.9	5.6	4.9
Degree Utilization, x	0.37	0.16	0.17	0.04	0.14	0.32
Capacity (veh/h)	560	687	536	577	604	695
Control Delay (s)	11.5	7.6	9.5	7.9	8.4	9.1
Approach Delay (s)	10.2		9.2		8.9	
Approach LOS	B		A		A	

Intersection Summary			
Delay	9.5		
Level of Service	A		
Intersection Capacity Utilization	29.4%	ICU Level of Service	A
Analysis Period (min)	15		













Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	100	35	310	100	240	50	635	325	165	360	35
Future Volume (vph)	80	100	35	310	100	240	50	635	325	165	360	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	115		0	145		0	160		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.961			0.894			0.949			0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	1752	0	1641	1651	0	1770	3263	0	1770	3469	0
Flt Permitted	0.504			0.433			0.502			0.128		
Satd. Flow (perm)	871	1752	0	748	1651	0	935	3263	0	238	3469	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			110			92			11	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1647			457			671			405	
Travel Time (s)		28.1			7.8			11.4			6.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	5%	2%	10%	5%	2%	2%	5%	5%	2%	2%	10%
Adj. Flow (vph)	87	109	38	337	109	261	54	690	353	179	391	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	147	0	337	370	0	54	1043	0	179	429	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	24.2		9.9	24.2		9.9	24.1		9.9	24.1	
Total Split (s)	9.8	24.3		23.0	37.5		10.0	45.7		17.0	52.7	
Total Split (%)	8.9%	22.1%		20.9%	34.1%		9.1%	41.5%		15.5%	47.9%	
Maximum Green (s)	5.8	18.1		19.0	31.3		5.6	39.6		12.6	46.6	
Yellow Time (s)	3.0	3.5		3.0	3.5		3.9	3.9		3.9	3.9	
All-Red Time (s)	1.0	2.7		1.0	2.7		0.5	2.2		0.5	2.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	6.2		4.0	6.2		4.4	6.1		4.4	6.1	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	21.5	13.5		38.2	28.2		54.3	46.2		63.1	52.8	
Actuated g/C Ratio	0.20	0.12		0.35	0.26		0.49	0.42		0.57	0.48	
v/c Ratio	0.41	0.65		0.82	0.73		0.11	0.73		0.62	0.26	
Control Delay	31.9	54.5		46.5	35.4		4.0	9.2		23.1	18.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	31.9	54.5		46.5	35.4		4.0	9.2		23.1	18.4	
LOS	C	D		D	D		A	A		C	B	
Approach Delay		46.0			40.7			8.9			19.8	
Approach LOS		D			D			A			B	
90th %ile Green (s)	5.8	18.1		19.0	31.3		5.6	39.6		12.6	46.6	
90th %ile Term Code	Max	Max		Max	Max		Max	Coord		Max	Coord	
70th %ile Green (s)	5.8	15.9		19.0	29.1		7.7	40.3		14.1	46.7	
70th %ile Term Code	Max	Gap		Max	Hold		Gap	Coord		Gap	Coord	
50th %ile Green (s)	5.8	13.7		19.0	26.9		6.9	44.9		11.7	49.7	
50th %ile Term Code	Max	Gap		Max	Hold		Gap	Coord		Gap	Coord	
30th %ile Green (s)	5.8	11.4		19.0	24.6		6.3	49.5		9.4	52.6	
30th %ile Term Code	Max	Gap		Max	Hold		Gap	Coord		Gap	Coord	
10th %ile Green (s)	0.0	8.2		16.9	29.1		0.0	56.8		7.4	68.6	
10th %ile Term Code	Skip	Gap		Gap	Hold		Skip	Coord		Gap	Coord	
Stops (vph)	65	114		244	224		7	318		82	226	
Fuel Used(gal)	2	5		10	10		0	9		2	5	
CO Emissions (g/hr)	165	325		702	697		24	649		142	334	
NOx Emissions (g/hr)	32	63		137	136		5	126		28	65	
VOC Emissions (g/hr)	38	75		163	162		5	151		33	78	
Dilemma Vehicles (#)	0	5		0	13		0	26		0	18	
Queue Length 50th (ft)	42	90		192	174		5	51		57	94	
Queue Length 95th (ft)	74	152		#279	272		11	64		117	137	
Internal Link Dist (ft)		1567			377			591			325	
Turn Bay Length (ft)	215			115			145			160		
Base Capacity (vph)	210	299		414	548		510	1424		316	1672	



Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.41	0.49		0.81	0.68		0.11	0.73		0.57	0.26	

Intersection Summary












Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 36 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.82  
 Intersection Signal Delay: 23.2 Intersection LOS: C  
 Intersection Capacity Utilization 78.9% ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 21: N. Keller Dr. & Outer Belt W/Ford Ave.



HCM Unsignalized Intersection Capacity Analysis  
 41: N. Keller Dr. & Thelma Keller Ave.

10/12/2018

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	75	75	945	130	25	695	
Future Volume (Veh/h)	75	75	945	130	25	695	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	82	82	1027	141	27	755	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			TWLTL		TWLTL		
Median storage (veh)			2		2		
Upstream signal (ft)			567		671		
pX, platoon unblocked	0.87	0.85			0.85		
vC, conflicting volume	1529	584			1168		
vC1, stage 1 conf vol	1098						
vC2, stage 2 conf vol	432						
vCu, unblocked vol	1077	149			838		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3			2.2		
p0 queue free %	76	89			96		
cM capacity (veh/h)	335	738			671		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	82	82	685	483	27	378	378
Volume Left	82	0	0	0	27	0	0
Volume Right	0	82	0	141	0	0	0
cSH	335	738	1700	1700	671	1700	1700
Volume to Capacity	0.24	0.11	0.40	0.28	0.04	0.22	0.22
Queue Length 95th (ft)	24	9	0	0	3	0	0
Control Delay (s)	19.2	10.5	0.0	0.0	10.6	0.0	0.0
Lane LOS	C	B			B		
Approach Delay (s)	14.8		0.0		0.4		
Approach LOS	B						
Intersection Summary							
Average Delay			1.3				
Intersection Capacity Utilization			41.6%		ICU Level of Service		A
Analysis Period (min)			15				

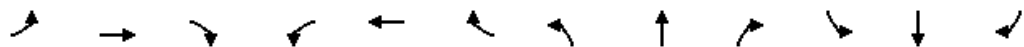
Lanes, Volumes, Timings  
 22: Ave. of Mid-America & N. Keller Dr.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	50	55	20	65	35	70	990	90	30	750	25
Future Volume (vph)	40	50	55	20	65	35	70	990	90	30	750	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	160		0	160		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.921			0.948				0.850		0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1716	0	1770	1766	0	1770	3539	1583	1770	3522	0
Flt Permitted	0.687			0.513			0.284			0.229		
Satd. Flow (perm)	1280	1716	0	956	1766	0	529	3539	1583	427	3522	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		52			21				98			4
Link Speed (mph)		30			30			30				30
Link Distance (ft)		230			205			578				567
Travel Time (s)		5.2			4.7			13.1				12.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	54	60	22	71	38	76	1076	98	33	815	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	114	0	22	109	0	76	1076	98	33	842	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane								Yes				Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1		2
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20		100
Trailing Detector (ft)	0	0		0	0		0	0	0	0		0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0		0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20		6
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt		NA
Protected Phases	7	4		3	8		5	2	3	1		6
Permitted Phases	4			8			2		2	6		

Lanes, Volumes, Timings  
 22: Ave. of Mid-America & N. Keller Dr.

10/12/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		9.5	23.9		9.5	22.5	9.5	9.5	23.4	
Total Split (s)	22.5	36.5		10.0	24.0		11.0	53.5	10.0	10.0	52.5	
Total Split (%)	20.5%	33.2%		9.1%	21.8%		10.0%	48.6%	9.1%	9.1%	47.7%	
Maximum Green (s)	19.5	33.5		5.5	18.1		6.5	49.0	5.5	6.5	47.1	
Yellow Time (s)	3.0	3.0		3.5	3.5		3.5	3.5	3.5	3.0	3.9	
All-Red Time (s)	0.0	0.0		1.0	2.4		1.0	1.0	1.0	0.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	3.0		4.5	5.9		4.5	4.5	4.5	3.5	5.4	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max	None	None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	12.2	11.3		14.7	13.3		79.8	75.3	85.3	77.8	71.0	
Actuated g/C Ratio	0.11	0.10		0.13	0.12		0.73	0.68	0.78	0.71	0.65	
v/c Ratio	0.26	0.51		0.13	0.47		0.16	0.44	0.08	0.09	0.37	
Control Delay	47.8	33.8		39.2	38.6		1.0	1.2	0.1	3.3	6.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.3	0.0	0.0	0.0	
Total Delay	47.8	33.8		39.2	38.6		1.0	1.5	0.1	3.3	6.5	
LOS	D	C		D	D		A	A	A	A	A	
Approach Delay		37.6			38.7			1.3			6.4	
Approach LOS		D			D			A			A	
90th %ile Green (s)	5.5	17.0		5.5	15.6		8.4	65.1	5.5	6.9	61.7	
90th %ile Term Code	Gap	Hold		Max	Gap		Gap	Coord	Max	Gap	Coord	
70th %ile Green (s)	5.5	14.2		5.5	12.8		7.4	68.5	5.5	6.3	65.5	
70th %ile Term Code	Gap	Hold		Max	Gap		Gap	Coord	Max	Gap	Coord	
50th %ile Green (s)	5.5	12.3		5.5	10.9		6.8	70.7	5.5	6.0	68.0	
50th %ile Term Code	Gap	Hold		Max	Gap		Gap	Coord	Max	Gap	Coord	
30th %ile Green (s)	0.0	7.4		5.5	14.5		6.2	85.1	5.5	0.0	73.5	
30th %ile Term Code	Skip	Gap		Max	Hold		Gap	Coord	Max	Skip	Coord	
10th %ile Green (s)	0.0	5.5		5.5	12.6		0.0	87.0	5.5	0.0	86.1	
10th %ile Term Code	Skip	Gap		Max	Hold		Skip	Coord	Max	Skip	Coord	
Stops (vph)	34	54		16	67		2	44	0	5	260	
Fuel Used(gal)	1	3		0	2		0	5	0	0	6	
CO Emissions (g/hr)	93	210		28	133		24	345	28	13	412	
NOx Emissions (g/hr)	18	41		5	26		5	67	6	2	80	
VOC Emissions (g/hr)	22	49		6	31		6	80	7	3	95	
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0	
Queue Length 50th (ft)	28	41		12	65		1	14	0	3	86	
Queue Length 95th (ft)	m59	m93		32	89		m2	20	m0	m7	165	
Internal Link Dist (ft)		150			125			498			487	
Turn Bay Length (ft)							160			160		
Base Capacity (vph)	392	558		168	308		464	2421	1249	383	2273	
Starvation Cap Reductn	0	0		0	0		0	670	0	0	0	

Lanes, Volumes, Timings  
 22: Ave. of Mid-America & N. Keller Dr.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.11	0.20		0.13	0.35		0.16	0.61	0.08	0.09	0.37	

Intersection Summary






















Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 24 (22%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.51  
 Intersection Signal Delay: 7.6 Intersection LOS: A  
 Intersection Capacity Utilization 51.3% ICU Level of Service A  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: Ave. of Mid-America & N. Keller Dr.















Lanes, Volumes, Timings  
 23: N. Keller Dr. & Evergreen Ave./I-57/70 Exit Ramp

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	0	190	25	115	230	160	1800	0	0	1410	145
Future Volume (vph)	35	0	190	25	115	230	160	1800	0	0	1410	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		165	185		220	250		0	0		75
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1468	1770	1727	1583	1641	3539	0	0	3539	1583
Flt Permitted	0.950			0.950			0.069					
Satd. Flow (perm)	1770	0	1468	1770	1727	1583	119	3539	0	0	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			207			109						94
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		949			862			437			468	
Travel Time (s)		21.6			19.6			9.9			10.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	10%	2%	10%	2%	10%	2%	2%	2%	2%	2%
Adj. Flow (vph)	38	0	207	27	125	250	174	1957	0	0	1533	158
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	0	207	27	125	250	174	1957	0	0	1533	158
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Detector 1 Position(ft)	0		0	0	0	0	0	0			0	0
Detector 1 Size(ft)	20		20	20	6	20	20	6			6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases	7			3	8			5	2			6

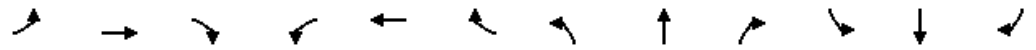
Lanes, Volumes, Timings  
 23: N. Keller Dr. & Evergreen Ave./I-57/70 Exit Ramp

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4			8	2					6
Detector Phase	7		4	3	8	8	5	2			6	6
Switch Phase												
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0
Minimum Split (s)	9.5		22.5	9.5	22.5	22.5	9.5	23.5			22.5	22.5
Total Split (s)	14.8		22.7	15.1	23.0	23.0	16.2	72.2			56.0	56.0
Total Split (%)	13.5%		20.6%	13.7%	20.9%	20.9%	14.7%	65.6%			50.9%	50.9%
Maximum Green (s)	10.3		18.7	11.1	19.0	19.0	12.2	66.7			51.5	51.5
Yellow Time (s)	3.5		3.0	3.0	3.0	3.0	3.0	3.9			3.5	3.5
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0	1.0	1.6			1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)	4.5		4.0	4.0	4.0	4.0	4.0	5.5			4.5	4.5
Lead/Lag	Lead		Lag	Lead	Lag	Lag	Lead				Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes				Yes	Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0
Recall Mode	None		None	None	None	None	None	C-Max			C-Max	C-Max
Walk Time (s)			7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)			11.0		11.0	11.0		11.0			11.0	11.0
Pedestrian Calls (#/hr)			0		0	0		0			0	0
Act Effct Green (s)	7.8		15.7	7.2	14.9	14.9	79.0	77.5			64.0	64.0
Actuated g/C Ratio	0.07		0.14	0.07	0.14	0.14	0.72	0.70			0.58	0.58
v/c Ratio	0.30		0.54	0.23	0.53	0.81	0.75	0.78			0.75	0.16
Control Delay	54.1		10.9	52.9	51.9	45.6	41.9	16.5			20.5	7.0
Queue Delay	0.0		0.0	0.0	0.0	0.3	0.0	1.3			0.7	0.0
Total Delay	54.1		10.9	52.9	51.9	45.9	41.9	17.8			21.1	7.0
LOS	D		B	D	D	D	D	B			C	A
Approach Delay		17.6			48.2			19.8			19.8	
Approach LOS		B			D			B			B	
90th %ile Green (s)	10.3		20.4	9.4	19.0	19.0	12.2	66.7			51.5	51.5
90th %ile Term Code	Max		Hold	Gap	Max	Max	Max	Coord			Coord	Coord
70th %ile Green (s)	8.9		20.5	8.1	19.2	19.2	13.4	67.9			51.5	51.5
70th %ile Term Code	Gap		Hold	Gap	Gap	Gap	Max	Coord			Coord	Coord
50th %ile Green (s)	7.7		16.9	7.1	15.8	15.8	12.3	72.5			57.2	57.2
50th %ile Term Code	Gap		Hold	Gap	Gap	Gap	Gap	Coord			Coord	Coord
30th %ile Green (s)	0.0		12.4	0.0	12.4	12.4	8.2	88.1			76.9	76.9
30th %ile Term Code	Skip		Hold	Skip	Gap	Gap	Gap	Coord			Coord	Coord
10th %ile Green (s)	0.0		8.1	0.0	8.1	8.1	6.7	92.4			82.7	82.7
10th %ile Term Code	Skip		Hold	Skip	Gap	Gap	Gap	Coord			Coord	Coord
Stops (vph)	34		25	25	104	129	85	1152			1090	42
Fuel Used(gal)	1		5	1	3	4	2	19			17	1
CO Emissions (g/hr)	96		340	40	179	307	166	1296			1192	68
NOx Emissions (g/hr)	19		66	8	35	60	32	252			232	13
VOC Emissions (g/hr)	22		79	9	41	71	39	300			276	16
Dilemma Vehicles (#)	0		0	0	0	0	0	0			0	0
Queue Length 50th (ft)	26		0	18	83	97	67	504			423	24
Queue Length 95th (ft)	59		63	47	139	185	#171	735			#703	m60
Internal Link Dist (ft)		869			782			357			388	
Turn Bay Length (ft)			165	185		220	250					75
Base Capacity (vph)	165		429	178	299	364	257	2493			2057	959

Lanes, Volumes, Timings  
 23: N. Keller Dr. & Evergreen Ave./I-57/70 Exit Ramp

10/12/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0		0	0	0	0	0	0			213	0
Spillback Cap Reductn	0		0	0	0	9	0	315			0	0
Storage Cap Reductn	0		0	0	0	0	0	0			0	0
Reduced v/c Ratio	0.23		0.48	0.15	0.42	0.70	0.68	0.90			0.83	0.16

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.81  
 Intersection Signal Delay: 22.2 Intersection LOS: C  
 Intersection Capacity Utilization 78.6% ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

















Splits and Phases: 23: N. Keller Dr. & Evergreen Ave./I-57/70 Exit Ramp

 72.2 s	 15.1 s	 22.7 s
 16.2 s	 56 s	 14.8 s
		 23 s















HCM Unsignalized Intersection Capacity Analysis  
 27: Outer Belt W & Ave. of Mid-America

10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	5	70	5	5	5	195	45	5	165	5
Future Volume (Veh/h)	5	5	5	70	5	5	5	195	45	5	165	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	5	76	5	5	5	212	49	5	179	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	446	462	182	446	440	236	184			261		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	446	462	182	446	440	236	184			261		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	85	99	99	100			100		
cM capacity (veh/h)	513	493	861	510	507	802	1391			1303		
Direction, Lane #												
	EB 1	WB 1	NB 1	SB 1								
Volume Total	15	86	266	189								
Volume Left	5	76	5	5								
Volume Right	5	5	49	5								
cSH	584	521	1391	1303								
Volume to Capacity	0.03	0.17	0.00	0.00								
Queue Length 95th (ft)	2	15	0	0								
Control Delay (s)	11.3	13.3	0.2	0.2								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.3	13.3	0.2	0.2								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			32.0%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
 29: Evergreen Ave. & Outer Belt W

10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	30	20	60	20	35	35	125	180	35	25	170	40
Future Volume (vph)	30	20	60	20	35	35	125	180	35	25	170	40
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	22	65	22	38	38	136	196	38	27	185	43
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	120	98	370	255								
Volume Left (vph)	33	22	136	27								
Volume Right (vph)	65	38	38	43								
Hadj (s)	-0.22	-0.15	0.08	0.00								
Departure Headway (s)	5.4	5.5	5.0	5.0								
Degree Utilization, x	0.18	0.15	0.51	0.36								
Capacity (veh/h)	583	566	700	676								
Control Delay (s)	9.6	9.5	13.0	10.8								
Approach Delay (s)	9.6	9.5	13.0	10.8								
Approach LOS	A	A	B	B								

**Intersection Summary**

Delay	11.4		
Level of Service	B		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis  
 1: N. Raney St. & Rickelman Ave.

















10/12/2018

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↖	↖	
Traffic Volume (veh/h)	10	25	20	10	35	10
Future Volume (Veh/h)	10	25	20	10	35	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	27	22	11	38	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			38		80	24
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			38		80	24
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		96	99
cM capacity (veh/h)			1572		910	1052
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	38	33	49			
Volume Left	0	22	38			
Volume Right	27	0	11			
cSH	1700	1572	938			
Volume to Capacity	0.02	0.01	0.05			
Queue Length 95th (ft)	0	1	4			
Control Delay (s)	0.0	4.9	9.0			
Lane LOS		A	A			
Approach Delay (s)	0.0	4.9	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			5.0			
Intersection Capacity Utilization			18.3%	ICU Level of Service	A	
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

11: Charlotte St. & Rickelman Ave.

10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	10	5	45	30	5	5	5	40	5	5	5
Future Volume (Veh/h)	5	10	5	45	30	5	5	5	40	5	5	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	11	5	49	33	5	5	5	43	5	5	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None					None						
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	38			16			164	160	14	202	160	36
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	38			16			164	160	14	202	160	36
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			99	99	96	99	99	100
cM capacity (veh/h)	1572			1602			772	708	1067	703	708	1037
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	21	87	53	15								
Volume Left	5	49	5	5								
Volume Right	5	5	43	5								
cSH	1572	1602	984	790								
Volume to Capacity	0.00	0.03	0.05	0.02								
Queue Length 95th (ft)	0	2	4	1								
Control Delay (s)	1.8	4.2	8.9	9.6								
Lane LOS	A	A	A	A								
Approach Delay (s)	1.8	4.2	8.9	9.6								
Approach LOS			A	A								
Intersection Summary												
Average Delay			5.8									
Intersection Capacity Utilization			18.9%	ICU Level of Service	A							
Analysis Period (min)			15									

# HCS7 Roundabouts Report

## General Information

Analyst	RMM
Agency or Co.	FGI
Date Performed	10/12/2018
Analysis Year	2030
Time Analyzed	PM Peak
Project Description	2030 - Proposed Conditions

## Site Information

Intersection	Rickelman & N. 4th St.
E/W Street Name	Rickelman Ave.
N/S Street Name	N. 4th St.
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.92
Jurisdiction	

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	15	35	10	0	450	80	5	0	20	75	320	0	5	20	20
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v <sub>pce</sub> ), pc/h	0	17	39	11	0	504	90	6	0	22	84	358	0	6	22	22
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

## Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		67			600			464			50	
Entry Volume veh/h		65			583			450			49	
Circulating Flow (v <sub>c</sub> ), pc/h	532			123			62			616		
Exiting Flow (v <sub>ex</sub> ), pc/h	403			134			107			537		
Capacity (c <sub>pce</sub> ), pc/h		802			1217			1295			736	
Capacity (c), veh/h		779			1182			1258			715	
v/c Ratio (x)		0.08			0.49			0.36			0.07	

## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		5.5			8.4			6.2			5.7	
Lane LOS		A			A			A			A	
95% Queue, veh		0.3			2.8			1.6			0.2	
Approach Delay, s/veh	5.5			8.4			6.2			5.7		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh   LOS	7.3						A					













Lanes, Volumes, Timings  
 3: US Route 45 & Rickelman Ave.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	10	210	95	25	5	270	240	115	5	165	150
Future Volume (vph)	160	10	210	95	25	5	270	240	115	5	165	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	270		0	200		0	220		295	165		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.857			0.977				0.850		0.929	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1596	0	1770	1820	0	1770	1810	1583	1770	1704	0
Flt Permitted	0.950			0.950			0.389			0.598		
Satd. Flow (perm)	1770	1596	0	1770	1820	0	725	1810	1583	1114	1704	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		228			5				125		43	
Link Speed (mph)		30			30			30		30		30
Link Distance (ft)		2780			357			1797			1266	
Travel Time (s)		63.2			8.1			40.8			28.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	5%	2%
Adj. Flow (vph)	174	11	228	103	27	5	293	261	125	5	179	163
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	239	0	103	32	0	293	261	125	5	342	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		pm+pt	NA	pm+ov	Perm	NA	
Protected Phases	4	4		8	8		5	2	8		6	

Lanes, Volumes, Timings  
3: US Route 45 & Rickelman Ave.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							2		2	6		
Detector Phase	4	4		8	8		5	2	8	6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5	22.5	22.5	22.5	
Total Split (s)	23.8	23.8		22.8	22.8		25.7	63.4	22.8	37.7	37.7	
Total Split (%)	21.6%	21.6%		20.7%	20.7%		23.4%	57.6%	20.7%	34.3%	34.3%	
Maximum Green (s)	19.3	19.3		18.3	18.3		21.2	58.9	18.3	33.2	33.2	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	Max	None	Max	Max	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0	0	0	0	
Act Effct Green (s)	14.7	14.7		11.1	11.1		59.2	59.2	74.8	40.8	40.8	
Actuated g/C Ratio	0.15	0.15		0.11	0.11		0.60	0.60	0.76	0.41	0.41	
v/c Ratio	0.66	0.55		0.52	0.15		0.50	0.24	0.10	0.01	0.47	
Control Delay	52.6	11.5		51.5	37.1		13.9	11.1	0.9	23.2	23.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	52.6	11.5		51.5	37.1		13.9	11.1	0.9	23.2	23.5	
LOS	D	B		D	D		B	B	A	C	C	
Approach Delay		28.8			48.1			10.4			23.5	
Approach LOS		C			D			B			C	
90th %ile Green (s)	19.3	19.3		15.9	15.9		20.6	58.9	15.9	33.8	33.8	
90th %ile Term Code	Max	Max		Gap	Gap		Gap	MaxR	Gap	Hold	Hold	
70th %ile Green (s)	18.6	18.6		13.1	13.1		16.5	58.9	13.1	37.9	37.9	
70th %ile Term Code	Gap	Gap		Gap	Gap		Gap	MaxR	Gap	Hold	Hold	
50th %ile Green (s)	14.8	14.8		11.0	11.0		13.5	58.9	11.0	40.9	40.9	
50th %ile Term Code	Gap	Gap		Gap	Gap		Gap	MaxR	Gap	Hold	Hold	
30th %ile Green (s)	12.4	12.4		9.2	9.2		11.2	58.9	9.2	43.2	43.2	
30th %ile Term Code	Gap	Gap		Gap	Gap		Gap	MaxR	Gap	Hold	Hold	
10th %ile Green (s)	9.2	9.2		6.9	6.9		8.6	58.9	6.9	45.8	45.8	
10th %ile Term Code	Gap	Gap		Gap	Gap		Gap	MaxR	Gap	Hold	Hold	
Stops (vph)	146	34		87	24		126	109	6	5	204	
Fuel Used(gal)	6	5		2	0		5	5	2	0	6	
CO Emissions (g/hr)	418	382		122	30		366	315	116	7	401	
NOx Emissions (g/hr)	81	74		24	6		71	61	23	1	78	
VOC Emissions (g/hr)	97	89		28	7		85	73	27	2	93	
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0	
Queue Length 50th (ft)	104	6		62	16		81	71	0	2	131	
Queue Length 95th (ft)	182	75		119	45		158	140	14	11	272	
Internal Link Dist (ft)		2700			277			1717			1186	
Turn Bay Length (ft)	270			200			220		295	165		
Base Capacity (vph)	348	497		330	344		661	1087	1226	461	731	

Lanes, Volumes, Timings  
 3: US Route 45 & Rickelman Ave.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.50	0.48		0.31	0.09		0.44	0.24	0.10	0.01	0.47	

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	98.5
Natural Cycle:	80
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.66
Intersection Signal Delay:	21.3
Intersection Capacity Utilization	66.6%
Analysis Period (min)	15
90th %ile Actuated Cycle:	107.6
70th %ile Actuated Cycle:	104.1
50th %ile Actuated Cycle:	98.2
30th %ile Actuated Cycle:	94
10th %ile Actuated Cycle:	88.5
Intersection LOS:	C
ICU Level of Service	C






















Splits and Phases: 3: US Route 45 & Rickelman Ave.

Ø2 63.4 s	Ø4 23.8 s	Ø8 22.8 s
Ø5 25.7 s	Ø6 37.7 s	



HCM Unsignalized Intersection Capacity Analysis  
 18: N. Raney St. & Ford Ave.





















10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	380	35	25	410	45	20	25	40	50	30	40
Future Volume (Veh/h)	35	380	35	25	410	45	20	25	40	50	30	40
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	413	38	27	446	49	22	27	43	54	33	43
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None					None						
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	495			451			1068	1057	432	1070	1052	470
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	495			451			1068	1057	432	1070	1052	470
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			98			86	87	93	66	84	93
cM capacity (veh/h)	1053			1109			156	212	624	160	211	593
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	38	451	27	495	22	70	54	76				
Volume Left	38	0	27	0	22	0	54	0				
Volume Right	0	38	0	49	0	43	0	43				
cSH	1053	1700	1109	1700	156	356	160	332				
Volume to Capacity	0.04	0.27	0.02	0.29	0.14	0.20	0.34	0.23				
Queue Length 95th (ft)	3	0	2	0	12	18	35	22				
Control Delay (s)	8.5	0.0	8.3	0.0	31.9	17.6	38.7	19.1				
Lane LOS	A		A		D	C	E	C				
Approach Delay (s)	0.7		0.4		21.0		27.2					
Approach LOS					C		D					
Intersection Summary												
Average Delay			4.9									
Intersection Capacity Utilization			45.2%		ICU Level of Service				A			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 20: Ford Ave. & Charlotte St.

10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	390	30	125	450	30	25	60	115	5	60	35
Future Volume (Veh/h)	40	390	30	125	450	30	25	60	115	5	60	35
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	424	33	136	489	33	27	65	125	5	65	38
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None					TWLTL						
Median storage (veh)	2											
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	522			457			1358	1320	440	1445	1320	506
vC1, stage 1 conf vol							526	526		778	778	
vC2, stage 2 conf vol							832	794		668	543	
vCu, unblocked vol	522			457			1358	1320	440	1445	1320	506
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			88			86	76	80	97	76	93
cM capacity (veh/h)	1044			1104			189	275	617	150	275	567
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total	43	457	136	522	27	190	108					
Volume Left	43	0	136	0	27	0	5					
Volume Right	0	33	0	33	0	125	38					
cSH	1044	1700	1104	1700	189	432	320					
Volume to Capacity	0.04	0.27	0.12	0.31	0.14	0.44	0.34					
Queue Length 95th (ft)	3	0	11	0	12	55	36					
Control Delay (s)	8.6	0.0	8.7	0.0	27.2	19.7	21.8					
Lane LOS	A		A		D	C	C					
Approach Delay (s)	0.7		1.8		20.6		21.8					
Approach LOS					C		C					
Intersection Summary												
Average Delay			5.7									
Intersection Capacity Utilization			49.5%		ICU Level of Service				A			
Analysis Period (min)	15											













Lanes, Volumes, Timings  
42: Avenue of Mid-America & WalMart Ent.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	50	20	445	55	15	10	150	500	10	165	40
Future Volume (vph)	20	50	20	445	55	15	10	150	500	10	165	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		100	100		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.957			0.968				0.850		0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	3387	0	1770	3295	0	1770	1863	1468	1770	1805	0
Flt Permitted	0.705			0.483			0.573			0.631		
Satd. Flow (perm)	1300	3387	0	900	3295	0	1067	1863	1468	1175	1805	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			16				543		11	
Link Speed (mph)		30			30			30		30		30
Link Distance (ft)		756			727			242		293		293
Travel Time (s)		17.2			16.5			5.5		6.7		6.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	2%	2%	5%	10%	2%	2%	10%	2%	2%	3%
Adj. Flow (vph)	22	54	22	484	60	16	11	163	543	11	179	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	76	0	484	76	0	11	163	543	11	222	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12		12		12
Link Offset(ft)		0			0			0		0		0
Crosswalk Width(ft)		16			16			16		16		16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	7	4		3	8			2	3		6	

Lanes, Volumes, Timings  
42: Avenue of Mid-America & WalMart Ent.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		2	2	3	6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5	9.5	22.5	22.5	
Total Split (s)	11.0	23.0		51.0	63.0		36.0	36.0	51.0	36.0	36.0	
Total Split (%)	10.0%	20.9%		46.4%	57.3%		32.7%	32.7%	46.4%	32.7%	32.7%	
Maximum Green (s)	7.5	19.5		47.5	59.5		32.5	32.5	47.5	32.5	32.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5	0.5	0.5	0.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
Lead/Lag	Lead	Lag		Lead	Lag				Lead			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	Max	Max	
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	12.4	7.2		45.4	41.2		57.6	57.6	98.3	57.6	57.6	
Actuated g/C Ratio	0.11	0.07		0.41	0.37		0.52	0.52	0.89	0.52	0.52	
v/c Ratio	0.13	0.31		0.73	0.06		0.02	0.17	0.40	0.02	0.23	
Control Delay	24.9	43.8		31.5	15.4		21.3	18.5	0.7	18.0	17.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	24.9	43.8		31.5	15.4		21.3	18.5	0.7	18.0	17.0	
LOS	C	D		C	B		C	B	A	B	B	
Approach Delay		39.6			29.3			5.1			17.0	
Approach LOS		D			C			A			B	
90th %ile Green (s)	7.1	9.2		46.6	48.7		43.7	43.7	46.6	43.7	43.7	
90th %ile Term Code	Gap	Gap		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
70th %ile Green (s)	6.7	8.0		40.6	41.9		50.9	50.9	40.6	50.9	50.9	
70th %ile Term Code	Gap	Gap		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
50th %ile Green (s)	0.0	7.2		36.5	47.2		55.8	55.8	36.5	55.8	55.8	
50th %ile Term Code	Skip	Gap		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
30th %ile Green (s)	0.0	6.3		31.7	41.5		61.5	61.5	31.7	61.5	61.5	
30th %ile Term Code	Skip	Gap		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
10th %ile Green (s)	0.0	0.0		26.8	26.8		76.2	76.2	26.8	76.2	76.2	
10th %ile Term Code	Skip	Skip		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
Stops (vph)	18	117		328	30		6	71	0	6	109	
Fuel Used(gal)	0	2		7	1		0	2	4	0	2	
CO Emissions (g/hr)	25	126		502	55		11	147	273	6	124	
NOx Emissions (g/hr)	5	24		98	11		2	29	53	1	24	
VOC Emissions (g/hr)	6	29		116	13		2	34	63	2	29	
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0	
Queue Length 50th (ft)	8	21		258	12		3	49	0	4	80	
Queue Length 95th (ft)	21	46		289	m25		m9	111	0	16	161	
Internal Link Dist (ft)		676			647			162			213	
Turn Bay Length (ft)	100			100			100		100	100		
Base Capacity (vph)	192	618		791	1789		558	976	1423	615	950	

Lanes, Volumes, Timings  
 42: Avenue of Mid-America & WalMart Ent.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.11	0.12		0.61	0.04		0.02	0.17	0.38	0.02	0.23	

Intersection Summary


















Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 14 (13%), Referenced to phase 2:NBTL, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.73  
 Intersection Signal Delay: 17.4  
 Intersection Capacity Utilization 49.3%  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 42: Avenue of Mid-America & WalMart Ent.

Ø2 (R) 36 s	Ø3 51 s	Ø4 23 s
Ø6 36 s	Ø7 11 s	Ø8 63 s

HCM Unsignalized Intersection Capacity Analysis  
 9: Avenue of Mid-America & N. Raney St.

10/12/2018

																	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR					
Lane Configurations																	
Traffic Volume (veh/h)	70	325	25	5	330	5	15	5	5	5	5	75					
Future Volume (Veh/h)	70	325	25	5	330	5	15	5	5	5	5	75					
Sign Control	Free			Free			Stop			Stop							
Grade	0%			0%			0%			0%							
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92					
Hourly flow rate (vph)	76	353	27	5	359	5	16	5	5	5	5	82					
Pedestrians																	
Lane Width (ft)																	
Walking Speed (ft/s)																	
Percent Blockage																	
Right turn flare (veh)																	
Median type	None				TWLTL												
Median storage (veh)					2												
Upstream signal (ft)	727																
pX, platoon unblocked																	
vC, conflicting volume	364		380			974		892		366		884		904		362	
vC1, stage 1 conf vol						518		518				372		372			
vC2, stage 2 conf vol						456		374				512		532			
vCu, unblocked vol	364		380			974		892		366		884		904		362	
tC, single (s)	4.1		4.1			7.1		6.5		6.2		7.1		6.5		6.2	
tC, 2 stage (s)						6.1		5.5				6.1		5.5			
tF (s)	2.2		2.2			3.5		4.0		3.3		3.5		4.0		3.3	
p0 queue free %	94		100			96		99		99		99		99		88	
cM capacity (veh/h)	1195		1178			363		418		679		437		427		683	
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1												
Volume Total	76	380	369	26	92												
Volume Left	76	0	5	16	5												
Volume Right	0	27	5	5	82												
cSH	1195	1700	1178	410	643												
Volume to Capacity	0.06	0.22	0.00	0.06	0.14												
Queue Length 95th (ft)	5	0	0	5	12												
Control Delay (s)	8.2	0.0	0.2	14.4	11.5												
Lane LOS	A		A	B	B												
Approach Delay (s)	1.4		0.2	14.4	11.5												
Approach LOS				B	B												
Intersection Summary																	
Average Delay			2.2														
Intersection Capacity Utilization			53.7%			ICU Level of Service				A							
Analysis Period (min)			15														













Lanes, Volumes, Timings  
52: N. Keller Dr. & Damron Ct.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	10	40	725	10	50	30	1080	735	35	760	30
Future Volume (vph)	40	10	40	725	10	50	30	1080	735	35	760	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		150	100		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.881			0.981				0.850		0.994	
Flt Protected	0.950			0.950	0.959		0.950			0.950		
Satd. Flow (prot)	1770	1641	0	1681	1665	0	1770	3438	1583	1770	3421	0
Flt Permitted	0.950			0.950	0.959		0.201			0.092		
Satd. Flow (perm)	1770	1641	0	1681	1665	0	374	3438	1583	171	3421	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			7				795		4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		247			739			468			578	
Travel Time (s)		5.6			16.8			10.6			13.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	5%	2%
Adj. Flow (vph)	43	11	43	788	11	54	33	1174	799	38	826	33
Shared Lane Traffic (%)				45%								
Lane Group Flow (vph)	43	54	0	433	420	0	33	1174	799	38	859	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		8	8		5	2	8	1	6	

Lanes, Volumes, Timings  
52: N. Keller Dr. & Damron Ct.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							2		2	6		
Detector Phase	4	4		8	8		5	2	8	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	23.5	22.5	9.5	23.5	
Total Split (s)	24.5	24.5		33.0	33.0		9.5	43.0	33.0	9.5	43.0	
Total Split (%)	22.3%	22.3%		30.0%	30.0%		8.6%	39.1%	30.0%	8.6%	39.1%	
Maximum Green (s)	21.0	21.0		29.5	29.5		5.5	37.5	29.5	5.5	37.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.9	3.0	3.0	3.9	
All-Red Time (s)	0.5	0.5		0.5	0.5		1.0	1.6	0.5	1.0	1.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.5	3.5		3.5	3.5		4.0	5.5	3.5	4.0	5.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max	None	None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	
Act Effct Green (s)	8.1	8.1		39.9	39.9		50.3	45.5	89.6	50.3	45.5	
Actuated g/C Ratio	0.07	0.07		0.36	0.36		0.46	0.41	0.81	0.46	0.41	
v/c Ratio	0.33	0.34		0.71	0.69		0.14	0.83	0.56	0.24	0.61	
Control Delay	54.3	24.4		33.4	32.1		16.2	30.0	2.2	23.6	23.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	1.0	0.1	0.0	1.1	
Total Delay	54.3	24.4		33.4	32.1		16.2	31.0	2.3	23.6	24.8	
LOS	D	C		C	C		B	C	A	C	C	
Approach Delay		37.7			32.8			19.3			24.8	
Approach LOS		D			C			B			C	
90th %ile Green (s)	11.0	11.0		39.5	39.5		5.5	37.5	39.5	5.5	37.5	
90th %ile Term Code	Gap	Gap		Max	Max		Max	Coord	Max	Max	Coord	
70th %ile Green (s)	9.3	9.3		41.2	41.2		5.5	37.5	41.2	5.5	37.5	
70th %ile Term Code	Gap	Gap		Max	Max		Max	Coord	Max	Max	Coord	
50th %ile Green (s)	8.1	8.1		42.4	42.4		5.5	37.5	42.4	5.5	37.5	
50th %ile Term Code	Gap	Gap		Max	Max		Max	Coord	Max	Max	Coord	
30th %ile Green (s)	6.8	6.8		42.8	42.8		0.0	47.9	42.8	0.0	47.9	
30th %ile Term Code	Gap	Gap		Gap	Gap		Skip	Coord	Gap	Skip	Coord	
10th %ile Green (s)	0.0	0.0		33.7	33.7		0.0	67.3	33.7	0.0	67.3	
10th %ile Term Code	Skip	Skip		Gap	Gap		Skip	Coord	Gap	Skip	Coord	
Stops (vph)	38	19		250	234		13	838	111	20	395	
Fuel Used(gal)	1	0		7	7		0	15	4	0	10	
CO Emissions (g/hr)	51	31		499	473		20	1061	253	30	669	
NOx Emissions (g/hr)	10	6		97	92		4	206	49	6	130	
VOC Emissions (g/hr)	12	7		116	110		5	246	59	7	155	
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0	
Queue Length 50th (ft)	29	7		164	155		7	~399	28	13	168	
Queue Length 95th (ft)	65	46		306	281		m12	#583	112	43	238	
Internal Link Dist (ft)		167			659			388			498	
Turn Bay Length (ft)	100			100			100		150	100		
Base Capacity (vph)	337	348		609	608		242	1423	1436	160	1418	



Lanes, Volumes, Timings  
52: N. Keller Dr. & Damron Ct.

10/12/2018

Starvation Cap Reductn	0	0		0	0		0	83	109	0	0	
Spillback Cap Reductn	0	3		0	0		0	0	0	0	308	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.13	0.16		0.71	0.69		0.14	0.88	0.60	0.24	0.77	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.83  
 Intersection Signal Delay: 24.0  
 Intersection Capacity Utilization 66.3%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service C

~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.













m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 52: N. Keller Dr. & Damron Ct.

9.5 s	43 s	24.5 s	33 s
9.5 s	43 s		

HCM Unsignalized Intersection Capacity Analysis  
 49: N. 4th Street & Ford Ave.

10/12/2018






















						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	335	120	155	90	50	420
Future Volume (vph)	335	120	155	90	50	420
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	364	130	168	98	54	457
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	364	130	168	98	54	457
Volume Left (vph)	364	0	168	0	0	0
Volume Right (vph)	0	130	0	0	0	457
Hadj (s)	0.53	-0.67	0.53	0.03	0.03	-0.67
Departure Headway (s)	7.2	6.0	7.5	7.0	6.7	6.0
Degree Utilization, x	0.72	0.22	0.35	0.19	0.10	0.76
Capacity (veh/h)	482	576	447	485	512	583
Control Delay (s)	25.6	9.4	13.3	10.4	9.2	24.0
Approach Delay (s)	21.3		12.2		22.4	
Approach LOS	C		B		C	
Intersection Summary						
Delay			19.9			
Level of Service			C			
Intersection Capacity Utilization			41.3%		ICU Level of Service A	
Analysis Period (min)			15			

# **Appendix I**

Intersection Capacity Analysis Reports – 2040














Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	65	35	150	100	105	30	300	180	155	870	70
Future Volume (vph)	50	65	35	150	100	105	30	300	180	155	870	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	115		0	145		0	160		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.948			0.923			0.944			0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	1733	0	1641	1695	0	1770	3246	0	1770	3480	0
Flt Permitted	0.612			0.518			0.235			0.397		
Satd. Flow (perm)	1057	1733	0	895	1695	0	438	3246	0	740	3480	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			45			139			10	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1647			457			671			405	
Travel Time (s)		28.1			7.8			11.4			6.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	5%	2%	10%	5%	2%	2%	5%	5%	2%	2%	10%
Adj. Flow (vph)	54	71	38	163	109	114	33	326	196	168	946	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	109	0	163	223	0	33	522	0	168	1022	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

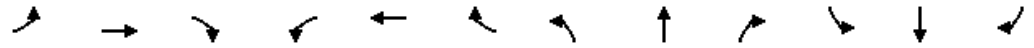
Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/12/2018

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases	4			8			2			6			
Detector Phase	7	4		3	8		5	2		1	6		
Switch Phase													
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0		
Minimum Split (s)	9.5	24.2		9.9	24.2		9.9	24.1		9.9	24.1		
Total Split (s)	10.3	26.3		16.0	32.0		10.2	51.7		16.0	57.5		
Total Split (%)	9.4%	23.9%		14.5%	29.1%		9.3%	47.0%		14.5%	52.3%		
Maximum Green (s)	6.3	20.1		12.0	25.8		5.8	45.6		11.6	51.4		
Yellow Time (s)	3.0	3.5		3.0	3.5		3.9	3.9		3.9	3.9		
All-Red Time (s)	1.0	2.7		1.0	2.7		0.5	2.2		0.5	2.2		
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.0	6.2		4.0	6.2		4.4	6.1		4.4	6.1		
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Recall Mode	None	None		None	None		None	C-Max		None	C-Max		
Walk Time (s)		7.0			7.0			7.0			7.0		
Flash Dont Walk (s)		11.0			11.0			11.0			11.0		
Pedestrian Calls (#/hr)		0			0			0			0		
Act Effct Green (s)	20.2	11.9		29.6	19.1		64.3	56.3		71.8	63.7		
Actuated g/C Ratio	0.18	0.11		0.27	0.17		0.58	0.51		0.65	0.58		
v/c Ratio	0.24	0.53		0.51	0.67		0.10	0.30		0.29	0.51		
Control Delay	31.3	45.5		37.4	44.1		10.2	18.4		9.6	16.7		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	31.3	45.5		37.4	44.1		10.2	18.4		9.6	16.7		
LOS	C	D		D	D		B	B		A	B		
Approach Delay		40.8			41.3			17.9			15.7		
Approach LOS		D			D			B			B		
90th %ile Green (s)	6.3	18.5		12.0	24.2		7.4	45.6		13.2	51.4		
90th %ile Term Code	Max	Hold		Max	Gap		Max	Coord		Max	Coord		
70th %ile Green (s)	6.3	14.4		12.0	20.1		6.6	52.0		10.9	56.3		
70th %ile Term Code	Max	Hold		Max	Gap		Gap	Coord		Gap	Coord		
50th %ile Green (s)	6.3	11.4		12.0	17.1		6.2	56.5		9.4	59.7		
50th %ile Term Code	Max	Hold		Max	Gap		Gap	Coord		Gap	Coord		
30th %ile Green (s)	6.3	9.0		12.0	14.7		0.0	60.1		8.2	72.7		
30th %ile Term Code	Max	Gap		Max	Hold		Skip	Coord		Gap	Coord		
10th %ile Green (s)	0.0	6.1		9.4	19.5		0.0	67.1		6.7	78.2		
10th %ile Term Code	Skip	Gap		Gap	Hold		Skip	Coord		Gap	Coord		
Stops (vph)	39	74		116	153		19	308		59	554		
Fuel Used(gal)	1	3		5	6		0	7		1	11		
CO Emissions (g/hr)	102	222		320	454		27	490		91	784		
NOx Emissions (g/hr)	20	43		62	88		5	95		18	153		
VOC Emissions (g/hr)	24	51		74	105		6	114		21	182		
Dilemma Vehicles (#)	0	3		0	7		0	14		0	43		
Queue Length 50th (ft)	29	60		94	122		12	111		41	231		
Queue Length 95th (ft)	56	109		141	192		32	217		83	345		
Internal Link Dist (ft)		1567			377			591			325		
Turn Bay Length (ft)	215			115			145			160			
Base Capacity (vph)	229	333		321	432		333	1727		596	2018		

Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/12/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.24	0.33		0.51	0.52		0.10	0.30		0.28	0.51	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 63 (57%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 75  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.67  
 Intersection Signal Delay: 22.3  
 Intersection Capacity Utilization 63.5%  
 Analysis Period (min) 15














Intersection LOS: C  
 ICU Level of Service B

Splits and Phases: 21: N. Keller Dr. & Outer Belt W/Ford Ave.

16 s	51.7 s	16 s	26.3 s
10.2 s	57.5 s	10.3 s	32 s

HCM Unsignalized Intersection Capacity Analysis  
 41: N. Keller Dr. & Thelma Keller Ave.

10/12/2018

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			 			 	
Traffic Volume (veh/h)	50	15	505	60	20	1040	
Future Volume (Veh/h)	50	15	505	60	20	1040	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	54	16	549	65	22	1130	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			TWLTL		TWLTL		
Median storage (veh)			2		2		
Upstream signal (ft)			567		671		
pX, platoon unblocked	0.85	0.96			0.96		
vC, conflicting volume	1190	307			614		
vC1, stage 1 conf vol	582						
vC2, stage 2 conf vol	609						
vCu, unblocked vol	663	204			523		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3			2.2		
p0 queue free %	89	98			98		
cM capacity (veh/h)	507	773			1002		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	54	16	366	248	22	565	565
Volume Left	54	0	0	0	22	0	0
Volume Right	0	16	0	65	0	0	0
cSH	507	773	1700	1700	1002	1700	1700
Volume to Capacity	0.11	0.02	0.22	0.15	0.02	0.33	0.33
Queue Length 95th (ft)	9	2	0	0	2	0	0
Control Delay (s)	12.9	9.8	0.0	0.0	8.7	0.0	0.0
Lane LOS	B	A			A		
Approach Delay (s)	12.2		0.0		0.2		
Approach LOS	B						
Intersection Summary							
Average Delay			0.6				
Intersection Capacity Utilization			38.7%		ICU Level of Service		A
Analysis Period (min)			15				

Lanes, Volumes, Timings  
 22: N. Keller Dr. & Avenue of Mid-America













10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	35	125	20	40	15	140	525	35	10	1060	50
Future Volume (vph)	35	35	125	20	40	15	140	525	35	10	1060	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	160		0	160		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.883			0.959				0.850		0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1645	0	1770	1786	0	1770	3539	1583	1770	3514	0
Flt Permitted	0.719			0.385			0.158			0.437		
Satd. Flow (perm)	1339	1645	0	717	1786	0	294	3539	1583	814	3514	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		136			15				63			5
Link Speed (mph)		30			30			30				30
Link Distance (ft)		230			205			578				567
Travel Time (s)		5.2			4.7			13.1				12.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	38	136	22	43	16	152	571	38	11	1152	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	174	0	22	59	0	152	571	38	11	1206	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane								Yes				Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1		2
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left		Thru
Leading Detector (ft)	20	100		20	100		20	100	20	20		100
Trailing Detector (ft)	0	0		0	0		0	0	0	0		0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0		0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20		6
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pt+ov	pm+pt		NA
Protected Phases	7	4		3	8		5	2	2 3	1		6
Permitted Phases	4			8			2			6		



Lanes, Volumes, Timings  
 22: N. Keller Dr. & Avenue of Mid-America

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4		3	8		5	2	2 3	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		23.9	23.9		9.5	22.5		9.5	23.4	
Total Split (s)	22.5	22.8		24.0	24.3		13.4	53.6		9.6	49.8	
Total Split (%)	20.5%	20.7%		21.8%	22.1%		12.2%	48.7%		8.7%	45.3%	
Maximum Green (s)	19.5	19.8		18.1	18.4		8.9	49.1		6.1	44.4	
Yellow Time (s)	3.0	3.0		3.5	3.5		3.5	3.5		3.0	3.9	
All-Red Time (s)	0.0	0.0		2.4	2.4		1.0	1.0		0.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	3.0		5.9	5.9		4.5	4.5		3.5	5.4	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0			11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0			0	
Act Effct Green (s)	16.1	9.8		14.8	10.4		82.4	80.5	94.0	74.8	67.2	
Actuated g/C Ratio	0.15	0.09		0.13	0.09		0.75	0.73	0.85	0.68	0.61	
v/c Ratio	0.17	0.64		0.14	0.32		0.43	0.22	0.03	0.02	0.56	
Control Delay	36.0	24.6		30.7	30.8		19.0	4.6	0.1	3.5	12.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	36.0	24.6		30.7	30.8		19.0	4.6	0.1	3.5	12.3	
LOS	D	C		C	C		B	A	A	A	B	
Approach Delay		26.6			30.8			7.2			12.2	
Approach LOS		C			C			A			B	
90th %ile Green (s)	9.4	15.1		8.2	13.9		14.8	63.6		6.2	53.1	
90th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Coord		Gap	Coord	
70th %ile Green (s)	8.3	11.0		7.3	10.0		11.4	78.3		0.0	61.5	
70th %ile Term Code	Gap	Gap		Gap	Hold		Gap	Coord		Skip	Coord	
50th %ile Green (s)	7.4	8.9		6.6	8.1		8.8	81.1		0.0	66.9	
50th %ile Term Code	Gap	Hold		Gap	Gap		Gap	Coord		Skip	Coord	
30th %ile Green (s)	0.0	5.5		5.9	14.4		7.7	85.2		0.0	72.1	
30th %ile Term Code	Skip	Gap		Gap	Hold		Gap	Coord		Skip	Coord	
10th %ile Green (s)	0.0	8.4		0.0	5.5		6.5	94.1		0.0	82.2	
10th %ile Term Code	Skip	Hold		Skip	Hold		Gap	Coord		Skip	Coord	
Stops (vph)	29	45		14	27		81	106	0	3	760	
Fuel Used(gal)	1	4		0	1		2	3	0	0	12	
CO Emissions (g/hr)	75	285		25	62		113	240	11	5	830	
NOx Emissions (g/hr)	15	55		5	12		22	47	2	1	162	
VOC Emissions (g/hr)	17	66		6	14		26	56	3	1	192	
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0	
Queue Length 50th (ft)	23	26		9	19		22	44	0	0	300	
Queue Length 95th (ft)	m47	91		25	45		98	67	1	m3	481	
Internal Link Dist (ft)		150			125			498			487	
Turn Bay Length (ft)							160			160		
Base Capacity (vph)	353	407		306	311		362	2588	1484	609	2147	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	

Lanes, Volumes, Timings  
 22: N. Keller Dr. & Avenue of Mid-America

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.11	0.43		0.07	0.19		0.42	0.22	0.03	0.02	0.56	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 108 (98%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.64  
 Intersection Signal Delay: 12.5 Intersection LOS: B  
 Intersection Capacity Utilization 68.4% ICU Level of Service C  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: N. Keller Dr. & Avenue of Mid-America

Ø1	Ø2 (R)	Ø3	Ø4
9.6 s	53.6 s	24 s	22.8 s
Ø5	Ø6 (R)	Ø7	Ø8
13.4 s	49.8 s	22.5 s	24.3 s

# Lanes, Volumes, Timings

## 23: Evergreen Ave./I-57/70 Exit Ramp & N. Keller Dr.














10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	0	245	40	105	120	220	1020	0	0	1465	85
Future Volume (vph)	25	0	245	40	105	120	220	1020	0	0	1465	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		165	185		220	250		0	0		75
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1468	1770	1727	1583	1641	3539	0	0	3539	1583
Flt Permitted	0.950			0.950			0.066					
Satd. Flow (perm)	1770	0	1468	1770	1727	1583	114	3539	0	0	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			266			121						89
Link Speed (mph)		30			30			30				30
Link Distance (ft)		949			862			437				468
Travel Time (s)		21.6			19.6			9.9				10.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	10%	2%	10%	2%	10%	2%	2%	2%	2%	2%
Adj. Flow (vph)	27	0	266	43	114	130	239	1109	0	0	1592	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	0	266	43	114	130	239	1109	0	0	1592	92
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Detector 1 Position(ft)	0		0	0	0	0	0	0			0	0
Detector 1 Size(ft)	20		20	20	6	20	20	6			6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type	Prot		Perm	Prot	NA	Perm	pm+pt	NA			NA	pm+ov
Protected Phases	7			3	8			5	2		6	7

Lanes, Volumes, Timings

23: Evergreen Ave./I-57/70 Exit Ramp & N. Keller Dr.

10/12/2018

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases			4			8	2					6	
Detector Phase	7		4	3	8	8	5	2			6	7	
Switch Phase													
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0	
Minimum Split (s)	9.5		22.5	9.5	22.5	22.5	9.5	23.5			22.5	9.5	
Total Split (s)	11.0		21.0	27.0	37.0	37.0	18.0	62.0			44.0	11.0	
Total Split (%)	10.0%		19.1%	24.5%	33.6%	33.6%	16.4%	56.4%			40.0%	10.0%	
Maximum Green (s)	6.5		17.0	23.0	33.0	33.0	14.0	56.5			39.5	6.5	
Yellow Time (s)	3.5		3.0	3.0	3.0	3.0	3.0	3.9			3.5	3.5	
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0	1.0	1.6			1.0	1.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	
Total Lost Time (s)	4.5		4.0	4.0	4.0	4.0	4.0	5.5			4.5	4.5	
Lead/Lag	Lead		Lag	Lead	Lag	Lag	Lead				Lag	Lead	
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes				Yes	Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0	
Recall Mode	None		None	None	None	None	None	C-Max			C-Max	None	
Walk Time (s)			7.0		7.0	7.0		7.0			7.0		
Flash Dont Walk (s)			11.0		11.0	11.0		11.0			11.0		
Pedestrian Calls (#/hr)			0		0	0		0			0		
Act Effct Green (s)	6.2		13.8	8.1	13.2	13.2	80.1	78.6			59.3	70.0	
Actuated g/C Ratio	0.06		0.13	0.07	0.12	0.12	0.73	0.71			0.54	0.64	
v/c Ratio	0.27		0.64	0.33	0.55	0.44	0.77	0.44			0.83	0.09	
Control Delay	56.6		13.0	54.3	54.8	13.7	42.6	8.2			22.1	1.3	
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.2	0.0	
Total Delay	56.6		13.0	54.3	54.8	13.7	42.6	8.2			22.3	1.3	
LOS	E		B	D	D	B	D	A			C	A	
Approach Delay		17.0			36.1			14.3			21.1		
Approach LOS		B			D			B			C		
90th %ile Green (s)	6.5		16.2	11.0	20.2	20.2	23.3	69.3			43.0	6.5	
90th %ile Term Code	Max		Gap	Gap	Hold	Hold	Gap	Coord			Coord	Max	
70th %ile Green (s)	6.5		12.4	9.3	14.7	14.7	19.4	74.8			52.4	6.5	
70th %ile Term Code	Max		Hold	Gap	Gap	Gap	Gap	Coord			Coord	Max	
50th %ile Green (s)	6.5		11.5	8.1	12.6	12.6	16.7	76.9			57.2	6.5	
50th %ile Term Code	Max		Hold	Gap	Gap	Gap	Gap	Coord			Coord	Max	
30th %ile Green (s)	6.1		21.2	0.0	10.6	10.6	13.1	79.3			63.2	6.1	
30th %ile Term Code	Gap		Hold	Skip	Gap	Gap	Gap	Coord			Coord	Gap	
10th %ile Green (s)	0.0		7.7	0.0	7.7	7.7	9.0	92.8			80.8	0.0	
10th %ile Term Code	Skip		Hold	Skip	Gap	Gap	Gap	Coord			Coord	Skip	
Stops (vph)	25		32	38	96	24	144	412			748	7	
Fuel Used(gal)	1		6	1	2	1	3	7			16	0	
CO Emissions (g/hr)	69		446	64	168	89	241	521			1123	26	
NOx Emissions (g/hr)	14		87	13	33	17	47	101			218	5	
VOC Emissions (g/hr)	16		103	15	39	21	56	121			260	6	
Dilemma Vehicles (#)	0		0	0	0	0	0	0			0	0	
Queue Length 50th (ft)	19		0	29	77	6	112	160			278	0	
Queue Length 95th (ft)	48		76	65	126	57	198	254			#822	11	
Internal Link Dist (ft)		869			782			357			388		
Turn Bay Length (ft)			165	185		220	250					75	
Base Capacity (vph)	104		460	370	518	559	325	2529			1908	1044	

# Lanes, Volumes, Timings

## 23: Evergreen Ave./I-57/70 Exit Ramp & N. Keller Dr.

10/12/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0		0	0	0	0	0	0			38	0
Spillback Cap Reductn	0		0	0	0	0	0	0			0	0
Storage Cap Reductn	0		0	0	0	0	0	0			0	0
Reduced v/c Ratio	0.26		0.58	0.12	0.22	0.23	0.74	0.44			0.85	0.09

### Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 101 (92%), Referenced to phase 2:NBTL and 6:SBT, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.83  
 Intersection Signal Delay: 19.4  
 Intersection Capacity Utilization 72.0%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service C  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

















### Splits and Phases: 23: Evergreen Ave./I-57/70 Exit Ramp & N. Keller Dr.



# HCM Unsignalized Intersection Capacity Analysis













## 27: Outer Belt W & Ave. of Mid-America

10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	5	5	35	5	45	5	185	55	15	140	5
Future Volume (Veh/h)	5	5	5	35	5	45	5	185	55	15	140	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	5	5	38	5	49	5	201	60	16	152	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	479	458	154	435	430	231	157			261		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	479	458	154	435	430	231	157			261		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	99	99	93	99	94	100			99		
cM capacity (veh/h)	458	492	891	515	510	808	1423			1303		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	15	92	266	173								
Volume Left	5	38	5	16								
Volume Right	5	49	60	5								
cSH	562	638	1423	1303								
Volume to Capacity	0.03	0.14	0.00	0.01								
Queue Length 95th (ft)	2	13	0	1								
Control Delay (s)	11.6	11.6	0.2	0.8								
Lane LOS	B	B	A	A								
Approach Delay (s)	11.6	11.6	0.2	0.8								
Approach LOS	B	B										
<b>Intersection Summary</b>												
Average Delay			2.6									
Intersection Capacity Utilization			29.5%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
 29: Evergreen Ave. & Outer Belt W

10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	25	100	210	90	10	10	40	125	45	55	110	10
Future Volume (vph)	25	100	210	90	10	10	40	125	45	55	110	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	109	228	98	11	11	43	136	49	60	120	11
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	364	120	228	191								
Volume Left (vph)	27	98	43	60								
Volume Right (vph)	228	11	49	11								
Hadj (s)	-0.32	0.14	-0.01	0.11								
Departure Headway (s)	5.0	5.8	5.5	5.7								
Degree Utilization, x	0.51	0.19	0.35	0.30								
Capacity (veh/h)	677	547	590	570								
Control Delay (s)	13.0	10.3	11.5	11.2								
Approach Delay (s)	13.0	10.3	11.5	11.2								
Approach LOS	B	B	B	B								

**Intersection Summary**

Delay	11.9		
Level of Service	B		
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis  
 1: N. Raney St. & Rickelman Ave.

10/12/2018

















	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖	↗	
Traffic Volume (veh/h)	30	35	10	5	10	10
Future Volume (Veh/h)	30	35	10	5	10	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	38	11	5	11	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			71		79	52
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			71		79	52
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	99
cM capacity (veh/h)			1529		917	1016
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	71	16	22			
Volume Left	0	11	11			
Volume Right	38	0	11			
cSH	1700	1529	964			
Volume to Capacity	0.04	0.01	0.02			
Queue Length 95th (ft)	0	1	2			
Control Delay (s)	0.0	5.1	8.8			
Lane LOS		A	A			
Approach Delay (s)	0.0	5.1	8.8			
Approach LOS			A			
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			17.5%	ICU Level of Service	A	
Analysis Period (min)			15			



# HCM Unsignalized Intersection Capacity Analysis

## 11: Charlotte St. & Rickelman Ave.

10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	40	5	10	10	5	5	5	50	5	5	5
Future Volume (Veh/h)	5	40	5	10	10	5	5	5	50	5	5	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	43	5	11	11	5	5	5	54	5	5	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None					None						
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	16			48			98	94	46	148	94	14
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	16			48			98	94	46	148	94	14
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	99	95	99	99	100
cM capacity (veh/h)	1602			1559			868	788	1024	768	788	1067
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	53	27	64	15								
Volume Left	5	11	5	5								
Volume Right	5	5	54	5								
cSH	1602	1559	987	855								
Volume to Capacity	0.00	0.01	0.06	0.02								
Queue Length 95th (ft)	0	1	5	1								
Control Delay (s)	0.7	3.0	8.9	9.3								
Lane LOS	A	A	A	A								
Approach Delay (s)	0.7	3.0	8.9	9.3								
Approach LOS			A	A								
Intersection Summary												
Average Delay			5.2									
Intersection Capacity Utilization			14.2%	ICU Level of Service	A							
Analysis Period (min)			15									

# HCS7 Roundabouts Report

General Information					Site Information				
Analyst	RMM				Intersection	Rickelman & N. 4th St.			
Agency or Co.	FGI				E/W Street Name	Rickelman Ave.			
Date Performed	10/12/2018				N/S Street Name	N. 4th St.			
Analysis Year	2040				Analysis Time Period (hrs)	0.25			
Time Analyzed	AM Peak				Peak Hour Factor	0.92			
Project Description	2040 - Proposed Conditions				Jurisdiction				

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	5	85	20	0	290	15	5	0	10	20	210	0	10	45	15
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v <sub>pce</sub> ), pc/h	0	6	95	22	0	325	17	6	0	11	22	235	0	11	50	17
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

## Flow Computations, Capacity and v/c Ratios























Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		123			348			268			78	
Entry Volume veh/h		119			338			260			76	
Circulating Flow (v <sub>c</sub> ), pc/h	386			39			112			353		
Exiting Flow (v <sub>ex</sub> ), pc/h	341			45			34			397		
Capacity (c <sub>pce</sub> ), pc/h		931			1326			1231			963	
Capacity (c), veh/h		904			1288			1195			935	
v/c Ratio (x)		0.13			0.26			0.22			0.08	

## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		5.2			5.1			4.9			4.6	
Lane LOS		A			A			A			A	
95% Queue, veh		0.5			1.1			0.8			0.3	
Approach Delay, s/veh	5.2			5.1			4.9			4.6		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh   LOS	5.0						A					














Lanes, Volumes, Timings  
3: US Route 45 & Rickelman Ave

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	10	190	180	20	10	105	230	100	5	320	115
Future Volume (vph)	90	10	190	180	20	10	105	230	100	5	320	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	270		0	200		0	220		295	165		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.858			0.950				0.850		0.960	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1598	0	1770	1770	0	1770	1863	1583	1770	1788	0
Flt Permitted	0.950			0.950			0.317			0.604		
Satd. Flow (perm)	1770	1598	0	1770	1770	0	590	1863	1583	1125	1788	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		207			11				109		19	
Link Speed (mph)		30			30			30		30		30
Link Distance (ft)		2780			357			1797			1266	
Travel Time (s)		63.2			8.1			40.8			28.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	11	207	196	22	11	114	250	109	5	348	125
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	218	0	196	33	0	114	250	109	5	473	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		8	8		5	2	8	1	6	
Permitted Phases							2		2	6		

Lanes, Volumes, Timings  
 3: US Route 45 & Rickelman Ave

10/12/2018

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector Phase	4	4		8	8		5	2	8	1	6		
Switch Phase													
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0		
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5	22.5	9.5	22.5		
Total Split (s)	24.0	24.0		26.0	26.0		12.1	50.0	26.0	10.0	47.9		
Total Split (%)	21.8%	21.8%		23.6%	23.6%		11.0%	45.5%	23.6%	9.1%	43.5%		
Maximum Green (s)	19.5	19.5		21.5	21.5		7.6	45.5	21.5	5.5	43.4		
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5		
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5		
Lead/Lag							Lead	Lag		Lead	Lag		
Lead-Lag Optimize?							Yes	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		
Recall Mode	None	None		None	None		None	Max	None	None	Max		
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0		
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0	11.0		11.0		
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0		
Act Effct Green (s)	10.8	10.8		15.5	15.5		55.2	53.8	73.0	49.3	43.7		
Actuated g/C Ratio	0.11	0.11		0.16	0.16		0.58	0.56	0.76	0.52	0.46		
v/c Ratio	0.49	0.60		0.69	0.11		0.26	0.24	0.09	0.01	0.57		
Control Delay	49.1	14.3		51.0	26.6		12.2	13.7	0.9	11.4	23.2		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0		
Total Delay	49.1	14.3		51.0	26.6		12.2	13.7	0.9	11.4	23.2		
LOS	D	B		D	C		B	B	A	B	C		
Approach Delay		25.1			47.5			10.4			23.0		
Approach LOS		C			D			B			C		
90th %ile Green (s)	16.4	16.4		21.5	21.5		7.6	45.5	21.5	5.5	43.4		
90th %ile Term Code	Gap	Gap		Max	Max		Max	MaxR	Max	Max	MaxR		
70th %ile Green (s)	12.6	12.6		18.5	18.5		7.6	55.5	18.5	0.0	43.4		
70th %ile Term Code	Gap	Gap		Gap	Gap		Max	Hold	Gap	Skip	MaxR		
50th %ile Green (s)	10.6	10.6		15.7	15.7		7.6	55.5	15.7	0.0	43.4		
50th %ile Term Code	Gap	Gap		Gap	Gap		Max	Hold	Gap	Skip	MaxR		
30th %ile Green (s)	8.9	8.9		13.1	13.1		7.6	55.5	13.1	0.0	43.4		
30th %ile Term Code	Gap	Gap		Gap	Gap		Max	Hold	Gap	Skip	MaxR		
10th %ile Green (s)	6.6	6.6		9.7	9.7		6.3	54.2	9.7	0.0	43.4		
10th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Hold	Gap	Skip	MaxR		
Stops (vph)	81	34		163	18		46	116	6	3	303		
Fuel Used(gal)	3	5		3	0		2	5	1	0	8		
CO Emissions (g/hr)	231	359		229	24		139	315	102	5	561		
NOx Emissions (g/hr)	45	70		44	5		27	61	20	1	109		
VOC Emissions (g/hr)	53	83		53	6		32	73	24	1	130		
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0		
Queue Length 50th (ft)	57	6		113	11		29	68	0	1	196		
Queue Length 95th (ft)	113	75		197	39		69	172	11	7	360		
Internal Link Dist (ft)		2700			277			1717			1186		
Turn Bay Length (ft)	270			200			220		295	165			
Base Capacity (vph)	363	492		401	409		435	1049	1231	617	828		
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0		

Lanes, Volumes, Timings  
 3: US Route 45 & Rickelman Ave

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.27	0.44		0.49	0.08		0.26	0.24	0.09	0.01	0.57	

Intersection Summary






















Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 95.5  
 Natural Cycle: 80  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.69  
 Intersection Signal Delay: 23.2      Intersection LOS: C  
 Intersection Capacity Utilization 66.9%      ICU Level of Service C  
 Analysis Period (min) 15  
 90th %ile Actuated Cycle: 106.9  
 70th %ile Actuated Cycle: 100.1  
 50th %ile Actuated Cycle: 95.3  
 30th %ile Actuated Cycle: 91  
 10th %ile Actuated Cycle: 84

Splits and Phases: 3: US Route 45 & Rickelman Ave

Ø1	Ø2	Ø4	Ø8
10 s	50 s	24 s	26 s
Ø5	Ø6		
12.1 s	47.9 s		





















HCM Unsignalized Intersection Capacity Analysis  
 18: N. Raney St. & Ford Ave.

10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	275	15	30	210	20	15	15	5	25	20	40
Future Volume (Veh/h)	10	275	15	30	210	20	15	15	5	25	20	40
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	299	16	33	228	22	16	16	5	27	22	43
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None					None						
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	250			315			677	645	307	639	642	239
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	250			315			677	645	307	639	642	239
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			95	96	99	93	94	95
cM capacity (veh/h)	1298			1245			323	377	733	364	375	800
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	11	315	33	250	16	21	27	65				
Volume Left	11	0	33	0	16	0	27	0				
Volume Right	0	16	0	22	0	5	0	43				
cSH	1298	1700	1245	1700	323	426	364	578				
Volume to Capacity	0.01	0.19	0.03	0.15	0.05	0.05	0.07	0.11				
Queue Length 95th (ft)	1	0	2	0	4	4	6	9				
Control Delay (s)	7.8	0.0	8.0	0.0	16.7	13.9	15.7	12.0				
Lane LOS	A		A		C	B	C	B				
Approach Delay (s)	0.3		0.9		15.1		13.1					
Approach LOS					C		B					
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			36.8%		ICU Level of Service				A			
Analysis Period (min)			15									













Lanes, Volumes, Timings  
20: Ford Ave. & Charlotte St.

10/18/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	285	5	75	265	10	5	20	45	15	70	20
Future Volume (vph)	15	285	5	75	265	10	5	20	45	15	70	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	205		0	135		0	0		0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998			0.994			0.896			0.974	
Flt Protected	0.950			0.950			0.950				0.993	
Satd. Flow (prot)	1770	1859	0	1770	1852	0	1770	1654	0	0	1778	0
Flt Permitted	0.578			0.232			0.707				0.969	
Satd. Flow (perm)	1077	1859	0	432	1852	0	1317	1654	0	0	1735	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			5			49			10	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1368			302			265			2637	
Travel Time (s)		31.1			6.9			6.0			59.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	4%	2%
Adj. Flow (vph)	16	310	5	82	288	11	5	22	49	16	76	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	315	0	82	299	0	5	71	0	0	114	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes			Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	

Lanes, Volumes, Timings  
20: Ford Ave. & Charlotte St.

10/18/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		9.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	73.0	73.0		13.0	86.0		24.0	24.0		24.0	24.0	
Total Split (%)	66.4%	66.4%		11.8%	78.2%		21.8%	21.8%		21.8%	21.8%	
Maximum Green (s)	68.5	68.5		8.5	81.5		19.5	19.5		19.5	19.5	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	7.0	7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)	25.7	25.7		36.0	36.0		65.0	65.0			65.0	
Actuated g/C Ratio	0.23	0.23		0.33	0.33		0.59	0.59			0.59	
v/c Ratio	0.06	0.73		0.34	0.49		0.01	0.07			0.11	
Control Delay	23.1	43.4		26.7	29.8		20.0	12.2			11.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	23.1	43.4		26.7	29.8		20.0	12.2			11.9	
LOS	C	D		C	C		B	B			B	
Approach Delay		42.4			29.1			12.7			11.9	
Approach LOS		D			C			B			B	
90th %ile Green (s)	35.4	35.4		8.5	48.4		52.6	52.6		52.6	52.6	
90th %ile Term Code	Gap	Gap		Max	Hold		Coord	Coord		Coord	Coord	
70th %ile Green (s)	29.1	29.1		8.5	42.1		58.9	58.9		58.9	58.9	
70th %ile Term Code	Gap	Gap		Max	Hold		Coord	Coord		Coord	Coord	
50th %ile Green (s)	25.4	25.4		8.5	38.4		62.6	62.6		62.6	62.6	
50th %ile Term Code	Gap	Gap		Max	Hold		Coord	Coord		Coord	Coord	
30th %ile Green (s)	21.8	21.8		8.2	34.5		66.5	66.5		66.5	66.5	
30th %ile Term Code	Gap	Gap		Gap	Hold		Coord	Coord		Coord	Coord	
10th %ile Green (s)	16.7	16.7		0.0	16.7		84.3	84.3		84.3	84.3	
10th %ile Term Code	Gap	Gap		Skip	Hold		Coord	Coord		Coord	Coord	
Stops (vph)	15	270		46	189		5	26			45	
Fuel Used(gal)	0	7		3	12		0	1			3	
CO Emissions (g/hr)	22	500		230	863		9	93			186	
NOx Emissions (g/hr)	4	97		45	168		2	18			36	
VOC Emissions (g/hr)	5	116		53	200		2	22			43	
Dilemma Vehicles (#)	0	0		0	0		0	0			0	
Queue Length 50th (ft)	10	218		38	151		2	14			32	
Queue Length 95th (ft)	28	285		61	188		11	55			73	
Internal Link Dist (ft)		1288			222			185			2557	
Turn Bay Length (ft)	125			205			135					
Base Capacity (vph)	670	1158		244	1373		778	997			1028	



Lanes, Volumes, Timings  
 20: Ford Ave. & Charlotte St.

10/18/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.02	0.27		0.34	0.22		0.01	0.07			0.11	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 30 (27%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.73  
 Intersection Signal Delay: 30.4  
 Intersection Capacity Utilization 43.1%  
 Analysis Period (min) 15























Intersection LOS: C  
 ICU Level of Service A

Splits and Phases: 20: Ford Ave. & Charlotte St.

--	--













Lanes, Volumes, Timings  
42: Damron Ct. & Avenue of Mid-America

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	30	5	260	50	5	15	70	265	5	55	10
Future Volume (vph)	10	30	5	260	50	5	15	70	265	5	55	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		100	100		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980			0.987				0.850		0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	3468	0	1770	3380	0	1770	1863	1468	1770	1817	0
Flt Permitted							0.711			0.708		
Satd. Flow (perm)	1845	3468	0	1863	3380	0	1324	1863	1468	1319	1817	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			5				288		9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		756			727			242			293	
Travel Time (s)		17.2			16.5			5.5			6.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	2%	2%	5%	10%	2%	2%	10%	2%	2%	3%
Adj. Flow (vph)	11	33	5	283	54	5	16	76	288	5	60	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	38	0	283	59	0	16	76	288	5	71	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1		2
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20		100
Trailing Detector (ft)	0	0		0	0		0	0	0	0		0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0		0
Detector 1 Size(ft)	20	6		20	6		20	6	20	20		6
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	Perm		NA
Protected Phases	7	4		3	8			2	3			6

Lanes, Volumes, Timings  
42: Damron Ct. & Avenue of Mid-America

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		2	2	3	6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5	9.5	22.5	22.5	
Total Split (s)	15.0	23.0		50.0	58.0		37.0	37.0	50.0	37.0	37.0	
Total Split (%)	13.6%	20.9%		45.5%	52.7%		33.6%	33.6%	45.5%	33.6%	33.6%	
Maximum Green (s)	11.5	19.5		46.5	54.5		33.5	33.5	46.5	33.5	33.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5	0.5	0.5	0.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
Lead/Lag	Lead	Lead		Lag	Lag					Lag		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes					Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	Max	Max	
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	6.5	6.6		24.1	24.1		76.7	76.7	101.5	76.7	76.7	
Actuated g/C Ratio	0.06	0.06		0.22	0.22		0.70	0.70	0.92	0.70	0.70	
v/c Ratio	0.10	0.18		0.70	0.08		0.02	0.06	0.21	0.01	0.06	
Control Delay	51.0	44.3		48.0	29.0		8.5	7.5	0.7	8.8	7.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	51.0	44.3		48.0	29.0		8.5	7.5	0.7	8.8	7.0	
LOS	D	D		D	C		A	A	A	A	A	
Approach Delay		45.8			44.7			2.4			7.1	
Approach LOS		D			D			A			A	
90th %ile Green (s)	7.5	7.9		32.2	32.6		59.4	59.4	32.2	59.4	59.4	
90th %ile Term Code	Gap	Gap		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
70th %ile Green (s)	0.0	7.1		17.0	27.6		75.4	75.4	17.0	75.4	75.4	
70th %ile Term Code	Skip	Gap		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
50th %ile Green (s)	0.0	6.5		14.4	24.4		78.6	78.6	14.4	78.6	78.6	
50th %ile Term Code	Skip	Gap		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
30th %ile Green (s)	0.0	0.0		20.3	20.3		82.7	82.7	20.3	82.7	82.7	
30th %ile Term Code	Skip	Skip		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
10th %ile Green (s)	0.0	0.0		15.4	15.4		87.6	87.6	15.4	87.6	87.6	
10th %ile Term Code	Skip	Skip		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
Stops (vph)	10	28		231	36		5	18	8	3	20	
Fuel Used(gal)	0	1		5	1		0	1	2	0	0	
CO Emissions (g/hr)	16	51		370	58		12	52	148	3	25	
NOx Emissions (g/hr)	3	10		72	11		2	10	29	1	5	
VOC Emissions (g/hr)	4	12		86	13		3	12	34	1	6	
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0	
Queue Length 50th (ft)	6	10		184	15		3	13	0	1	11	
Queue Length 95th (ft)	m21	27		250	30		12	37	26	7	42	
Internal Link Dist (ft)		676			647			162			213	
Turn Bay Length (ft)	100			100			100		100	100		
Base Capacity (vph)	186	618		836	1677		923	1299	1377	920	1270	

Lanes, Volumes, Timings  
 42: Damron Ct. & Avenue of Mid-America

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.06	0.06		0.34	0.04		0.02	0.06	0.21	0.01	0.06	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 5 (5%), Referenced to phase 2:NBT, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.70  
 Intersection Signal Delay: 22.4  
 Intersection Capacity Utilization 35.2%  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.


















Splits and Phases: 42: Damron Ct. & Avenue of Mid-America

Ø2 (R) 37 s	Ø4 23 s	Ø3 50 s
Ø6 37 s	Ø7 15 s	Ø8 58 s

# HCM Unsignalized Intersection Capacity Analysis

## 9: Avenue of Mid-America & N. Raney St.

10/12/2018

																
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
Lane Configurations																
Traffic Volume (veh/h)	30	180	20	5	190	5	15	5	5	5	5	50				
Future Volume (Veh/h)	30	180	20	5	190	5	15	5	5	5	5	50				
Sign Control	Free		Free		Stop		Stop									
Grade	0%		0%		0%		0%									
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92				
Hourly flow rate (vph)	33	196	22	5	207	5	16	5	5	5	5	54				
Pedestrians																
Lane Width (ft)																
Walking Speed (ft/s)																
Percent Blockage																
Right turn flare (veh)																
Median type	None				TWLTL											
Median storage (veh)					2											
Upstream signal (ft)	727															
pX, platoon unblocked																
vC, conflicting volume	212		218		549		495		207		489		504		210	
vC1, stage 1 conf vol					273		273				220		220			
vC2, stage 2 conf vol					276		222				270		284			
vCu, unblocked vol	212		218		549		495		207		489		504		210	
tC, single (s)	4.1		4.1		7.1		6.5		6.2		7.1		6.5		6.2	
tC, 2 stage (s)					6.1		5.5				6.1		5.5			
tF (s)	2.2		2.2		3.5		4.0		3.3		3.5		4.0		3.3	
p0 queue free %	98		100		97		99		99		99		99		93	
cM capacity (veh/h)	1358		1352		570		585		833		632		587		831	
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1											
Volume Total	33	218	217	26	64											
Volume Left	33	0	5	16	5											
Volume Right	0	22	5	5	54											
cSH	1358	1700	1352	610	786											
Volume to Capacity	0.02	0.13	0.00	0.04	0.08											
Queue Length 95th (ft)	2	0	0	3	7											
Control Delay (s)	7.7	0.0	0.2	11.2	10.0											
Lane LOS	A		A	B	A											
Approach Delay (s)	1.0		0.2	11.2	10.0											
Approach LOS				B	A											
Intersection Summary																
Average Delay			2.2													
Intersection Capacity Utilization			30.7%		ICU Level of Service				A							
Analysis Period (min)			15													













Lanes, Volumes, Timings  
52: N. Keller Dr. & Damron Ct.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	5	20	340	5	15	15	655	340	25	1160	15
Future Volume (vph)	20	5	20	340	5	15	15	655	340	25	1160	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		0	100		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.878			0.988				0.850		0.998	
Flt Protected	0.950			0.950	0.957		0.950			0.950		
Satd. Flow (prot)	1770	1635	0	1681	1673	0	1770	3438	1583	1770	3432	0
Flt Permitted	0.950			0.950	0.957		0.150			0.336		
Satd. Flow (perm)	1770	1635	0	1681	1673	0	279	3438	1583	626	3432	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			4				370		1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		247			739			468			578	
Travel Time (s)		5.6			16.8			10.6			13.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	5%	2%
Adj. Flow (vph)	22	5	22	370	5	16	16	712	370	27	1261	16
Shared Lane Traffic (%)				47%								
Lane Group Flow (vph)	22	27	0	196	195	0	16	712	370	27	1277	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		8	8		5	2	8	1	6	

Lanes, Volumes, Timings  
52: N. Keller Dr. & Damron Ct.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							2		2	6		
Detector Phase	4	4		8	8		5	2	8	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	23.5	22.5	9.5	23.5	
Total Split (s)	22.6	22.6		23.2	23.2		9.6	54.6	23.2	9.6	54.6	
Total Split (%)	20.5%	20.5%		21.1%	21.1%		8.7%	49.6%	21.1%	8.7%	49.6%	
Maximum Green (s)	18.6	18.6		19.2	19.2		5.6	49.1	19.2	5.6	49.1	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.9	3.0	3.0	3.9	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.6	1.0	1.0	1.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	5.5	4.0	4.0	5.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max	None	None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	
Act Effct Green (s)	6.9	6.9		20.1	20.1		72.3	67.3	92.1	73.3	69.4	
Actuated g/C Ratio	0.06	0.06		0.18	0.18		0.66	0.61	0.84	0.67	0.63	
v/c Ratio	0.20	0.22		0.64	0.63		0.06	0.34	0.27	0.06	0.59	
Control Delay	52.5	26.8		35.9	34.7		6.5	12.4	1.3	2.4	7.4	
Queue Delay	0.0	0.0		14.6	13.2		0.0	0.0	0.1	0.0	0.1	
Total Delay	52.5	26.8		50.5	47.9		6.5	12.4	1.3	2.4	7.5	
LOS	D	C		D	D		A	B	A	A	A	
Approach Delay		38.3			49.2			8.6			7.4	
Approach LOS		D			D			A			A	
90th %ile Green (s)	8.8	8.8		29.0	29.0		5.6	49.1	29.0	5.6	49.1	
90th %ile Term Code	Gap	Gap		Max	Max		Max	Coord	Max	Max	Coord	
70th %ile Green (s)	7.6	7.6		24.0	24.0		6.2	54.4	24.0	6.5	54.7	
70th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord	Gap	Gap	Coord	
50th %ile Green (s)	6.8	6.8		19.8	19.8		0.0	59.9	19.8	6.0	69.9	
50th %ile Term Code	Gap	Gap		Gap	Gap		Skip	Coord	Gap	Gap	Coord	
30th %ile Green (s)	0.0	0.0		16.3	16.3		0.0	84.2	16.3	0.0	84.2	
30th %ile Term Code	Skip	Skip		Gap	Gap		Skip	Coord	Gap	Skip	Coord	
10th %ile Green (s)	0.0	0.0		11.5	11.5		0.0	89.0	11.5	0.0	89.0	
10th %ile Term Code	Skip	Skip		Gap	Gap		Skip	Coord	Gap	Skip	Coord	
Stops (vph)	20	12		92	88		8	366	24	3	522	
Fuel Used(gal)	0	0		3	3		0	6	1	0	10	
CO Emissions (g/hr)	25	18		224	218		8	424	102	10	696	
NOx Emissions (g/hr)	5	3		44	42		2	83	20	2	135	
VOC Emissions (g/hr)	6	4		52	51		2	98	24	2	161	
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0	
Queue Length 50th (ft)	15	3		41	37		4	168	0	1	43	
Queue Length 95th (ft)	40	31		77	74		m11	266	55	m4	530	
Internal Link Dist (ft)		167			659			388			498	
Turn Bay Length (ft)	100			100			100			100		
Base Capacity (vph)	299	294		339	341		261	2104	1383	478	2165	

Lanes, Volumes, Timings  
 52: N. Keller Dr. & Damron Ct.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	228	0	12	
Spillback Cap Reductn	0	7		122	122		0	0	0	0	126	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.07	0.09		0.90	0.89		0.06	0.34	0.32	0.06	0.63	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.64  
 Intersection Signal Delay: 14.2 Intersection LOS: B  
 Intersection Capacity Utilization 57.1% ICU Level of Service B  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.













Splits and Phases: 52: N. Keller Dr. & Damron Ct.





Lanes, Volumes, Timings  
49: N. 4th Street & Ford Ave.

10/12/2018

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	215	110	95	20	95	250
Future Volume (vph)	215	110	95	20	95	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150	0	0			0
Storage Lanes	1	1	1			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583
Flt Permitted	0.950		0.648			
Satd. Flow (perm)	1770	1583	1207	1863	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		120				272
Link Speed (mph)	30			45	30	
Link Distance (ft)	1428			1362	1063	
Travel Time (s)	32.5			20.6	24.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	120	103	22	103	272
Shared Lane Traffic (%)						
Lane Group Flow (vph)	234	120	103	22	103	272
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes					
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (ft)	20	20	20	100	100	20
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	20	20	20	6	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)				94	94	
Detector 2 Size(ft)				6	6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	pm+ov
Protected Phases	4		5	2	6	4
Permitted Phases		4	2			6

Lanes, Volumes, Timings  
49: N. 4th Street & Ford Ave.

10/12/2018



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	52.0	52.0	21.0	58.0	37.0	52.0
Total Split (%)	47.3%	47.3%	19.1%	52.7%	33.6%	47.3%
Maximum Green (s)	47.5	47.5	16.5	53.5	32.5	47.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	C-Max	C-Max	None
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	20.6	20.6	80.4	80.4	68.4	93.5
Actuated g/C Ratio	0.19	0.19	0.73	0.73	0.62	0.85
v/c Ratio	0.71	0.31	0.11	0.02	0.09	0.20
Control Delay	47.3	7.8	5.5	5.5	10.2	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.3	7.8	5.5	5.5	10.2	0.5
LOS	D	A	A	A	B	A
Approach Delay	33.9			5.5	3.2	
Approach LOS	C			A	A	
90th %ile Green (s)	28.4	28.4	9.6	72.6	58.5	28.4
90th %ile Term Code	Gap	Gap	Gap	Coord	Coord	Gap
70th %ile Green (s)	24.1	24.1	8.1	76.9	64.3	24.1
70th %ile Term Code	Gap	Gap	Gap	Coord	Coord	Gap
50th %ile Green (s)	20.2	20.2	7.3	80.8	69.0	20.2
50th %ile Term Code	Gap	Gap	Gap	Coord	Coord	Gap
30th %ile Green (s)	17.3	17.3	6.6	83.7	72.6	17.3
30th %ile Term Code	Gap	Gap	Gap	Coord	Coord	Gap
10th %ile Green (s)	13.0	13.0	5.8	88.0	77.7	13.0
10th %ile Term Code	Gap	Gap	Gap	Coord	Coord	Gap
Stops (vph)	199	43	27	6	40	5
Fuel Used(gal)	11	4	1	0	1	2
CO Emissions (g/hr)	748	298	90	19	84	149
NOx Emissions (g/hr)	146	58	17	4	16	29
VOC Emissions (g/hr)	173	69	21	4	20	34
Dilemma Vehicles (#)	0	0	0	1	0	0
Queue Length 50th (ft)	163	20	18	4	27	0
Queue Length 95th (ft)	226	60	43	13	63	11
Internal Link Dist (ft)	1348			1282	983	
Turn Bay Length (ft)	150					
Base Capacity (vph)	764	751	966	1361	1158	1583
Starvation Cap Reductn	0	0	0	0	0	0

Lanes, Volumes, Timings  
 49: N. 4th Street & Ford Ave.

10/12/2018



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.16	0.11	0.02	0.09	0.17

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 21 (19%), Referenced to phase 2:NBTL and 6:SBT, Start of Green  
 Natural Cycle: 55  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.71  
 Intersection Signal Delay: 16.3  
 Intersection Capacity Utilization 31.3%  
 Analysis Period (min) 15






















Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 49: N. 4th Street & Ford Ave.

Ø2 (R) 58 s	Ø4 52 s
Ø5 21 s	Ø6 (R) 37 s














Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	125	45	325	115	275	55	720	340	190	415	45
Future Volume (vph)	105	125	45	325	115	275	55	720	340	190	415	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	215		0	115		0	145		0	160		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.960			0.894			0.952			0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1641	1750	0	1641	1651	0	1770	3273	0	1770	3460	0
Flt Permitted	0.244			0.373			0.469			0.085		
Satd. Flow (perm)	421	1750	0	644	1651	0	874	3273	0	158	3460	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			107			79			13	
Link Speed (mph)		40			40			40			40	
Link Distance (ft)		1647			457			671			405	
Travel Time (s)		28.1			7.8			11.4			6.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	10%	5%	2%	10%	5%	2%	2%	5%	5%	2%	2%	10%
Adj. Flow (vph)	114	136	49	353	125	299	60	783	370	207	451	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	114	185	0	353	424	0	60	1153	0	207	500	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane								Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/12/2018

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases	4			8			2			6			
Detector Phase	7	4		3	8		5	2		1	6		
Switch Phase													
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0		
Minimum Split (s)	9.5	24.2		9.9	24.2		9.9	24.1		9.9	24.1		
Total Split (s)	13.0	26.0		23.0	36.0		10.0	45.0		16.0	51.0		
Total Split (%)	11.8%	23.6%		20.9%	32.7%		9.1%	40.9%		14.5%	46.4%		
Maximum Green (s)	9.0	19.8		19.0	29.8		5.6	38.9		11.6	44.9		
Yellow Time (s)	3.0	3.5		3.0	3.5		3.9	3.9		3.9	3.9		
All-Red Time (s)	1.0	2.7		1.0	2.7		0.5	2.2		0.5	2.2		
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.0	6.2		4.0	6.2		4.4	6.1		4.4	6.1		
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Recall Mode	None	None		None	None		None	C-Max		None	C-Max		
Walk Time (s)		7.0			7.0			7.0			7.0		
Flash Dont Walk (s)		11.0			11.0			11.0			11.0		
Pedestrian Calls (#/hr)		0			0			0			0		
Act Effct Green (s)	27.2	16.4		41.4	26.6		50.4	42.7		60.2	50.0		
Actuated g/C Ratio	0.25	0.15		0.38	0.24		0.46	0.39		0.55	0.45		
v/c Ratio	0.57	0.68		0.86	0.89		0.13	0.88		0.81	0.32		
Control Delay	34.8	53.1		48.0	50.5		5.5	21.4		48.8	20.6		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	34.8	53.1		48.0	50.5		5.5	21.4		48.8	20.6		
LOS	C	D		D	D		A	C		D	C		
Approach Delay		46.2			49.4			20.6			28.8		
Approach LOS		D			D			C			C		
90th %ile Green (s)	9.0	19.8		19.0	29.8		5.6	38.9		11.6	44.9		
90th %ile Term Code	Max	Max		Max	Max		Max	Coord		Max	Coord		
70th %ile Green (s)	9.0	19.8		19.0	29.8		5.6	38.9		11.6	44.9		
70th %ile Term Code	Max	Hold		Max	Max		Max	Coord		Max	Coord		
50th %ile Green (s)	9.0	18.4		19.0	28.4		7.0	38.9		13.0	44.9		
50th %ile Term Code	Max	Hold		Max	Gap		Max	Coord		Max	Coord		
30th %ile Green (s)	9.0	14.2		19.0	24.2		6.5	44.2		11.9	49.6		
30th %ile Term Code	Max	Hold		Max	Gap		Gap	Coord		Gap	Coord		
10th %ile Green (s)	7.2	9.8		18.0	20.6		0.0	52.4		9.1	65.9		
10th %ile Term Code	Gap	Gap		Gap	Hold		Skip	Coord		Gap	Coord		
Stops (vph)	79	146		240	279		10	623		111	282		
Fuel Used(gal)	3	6		11	13		0	16		3	6		
CO Emissions (g/hr)	218	407		736	893		29	1088		245	417		
NOx Emissions (g/hr)	42	79		143	174		6	212		48	81		
VOC Emissions (g/hr)	51	94		171	207		7	252		57	97		
Dilemma Vehicles (#)	0	6		0	15		0	69		0	21		
Queue Length 50th (ft)	51	113		189	218		7	100		92	122		
Queue Length 95th (ft)	90	186		#267	#373		15	#516		#221	165		
Internal Link Dist (ft)		1567			377			591			325		
Turn Bay Length (ft)	215			115			145			160			
Base Capacity (vph)	205	326		414	525		449	1317		261	1581		

Lanes, Volumes, Timings  
 21: N. Keller Dr. & Outer Belt W/Ford Ave.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.56	0.57		0.85	0.81		0.13	0.88		0.79	0.32	

Intersection Summary














Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 34 (31%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.89  
 Intersection Signal Delay: 32.6  
 Intersection Capacity Utilization 87.3%  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 21: N. Keller Dr. & Outer Belt W/Ford Ave.



HCM Unsignalized Intersection Capacity Analysis  
 41: N. Keller Dr. & Thelma Keller Ave.

10/12/2018

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			 			 	
Traffic Volume (veh/h)	80	85	1045	145	25	780	
Future Volume (Veh/h)	80	85	1045	145	25	780	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	87	92	1136	158	27	848	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			TWLTL		TWLTL		
Median storage (veh)			2		2		
Upstream signal (ft)			567		671		
pX, platoon unblocked	0.88	0.85			0.85		
vC, conflicting volume	1693	647			1294		
vC1, stage 1 conf vol	1215						
vC2, stage 2 conf vol	478						
vCu, unblocked vol	1182	223			987		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3			2.2		
p0 queue free %	70	86			95		
cM capacity (veh/h)	288	661			590		
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	87	92	757	537	27	424	424
Volume Left	87	0	0	0	27	0	0
Volume Right	0	92	0	158	0	0	0
cSH	288	661	1700	1700	590	1700	1700
Volume to Capacity	0.30	0.14	0.45	0.32	0.05	0.25	0.25
Queue Length 95th (ft)	31	12	0	0	4	0	0
Control Delay (s)	22.8	11.3	0.0	0.0	11.4	0.0	0.0
Lane LOS	C	B			B		
Approach Delay (s)	16.9		0.0		0.4		
Approach LOS	C						
Intersection Summary							
Average Delay			1.4				
Intersection Capacity Utilization			45.4%		ICU Level of Service		A
Analysis Period (min)			15				

Lanes, Volumes, Timings  
 22: Ave. of Mid-America & N. Keller Dr.













10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	80	120	20	95	35	105	1075	100	30	815	30
Future Volume (vph)	65	80	120	20	95	35	105	1075	100	30	815	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	160		100	160		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.910			0.960				0.850		0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1695	0	1770	1788	0	1770	3438	1583	1770	3424	0
Flt Permitted	0.667			0.444			0.237			0.197		
Satd. Flow (perm)	1242	1695	0	827	1788	0	441	3438	1583	367	3424	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		70			14				93		4	
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		230			205			578		567		
Travel Time (s)		5.2			4.7			13.1		12.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	5%	2%
Adj. Flow (vph)	71	87	130	22	103	38	114	1168	109	33	886	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	217	0	22	141	0	114	1168	109	33	919	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12		12		
Link Offset(ft)		0			0			0		0		
Crosswalk Width(ft)		16			16			16		16		
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	



Lanes, Volumes, Timings  
 22: Ave. of Mid-America & N. Keller Dr.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		5	2	3	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		9.5	23.9		9.5	22.5	9.5	9.5	23.4	
Total Split (s)	22.5	36.5		10.0	24.0		11.0	53.5	10.0	10.0	52.5	
Total Split (%)	20.5%	33.2%		9.1%	21.8%		10.0%	48.6%	9.1%	9.1%	47.7%	
Maximum Green (s)	19.5	33.5		5.5	18.1		6.5	49.0	5.5	6.5	47.1	
Yellow Time (s)	3.0	3.0		3.5	3.5		3.5	3.5	3.5	3.0	3.9	
All-Red Time (s)	0.0	0.0		1.0	2.4		1.0	1.0	1.0	0.5	1.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	3.0		4.5	5.9		4.5	4.5	4.5	3.5	5.4	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lag	Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max	None	None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)	15.5	15.3		15.9	14.5		76.5	71.2	81.2	72.0	63.9	
Actuated g/C Ratio	0.14	0.14		0.14	0.13		0.70	0.65	0.74	0.65	0.58	
v/c Ratio	0.34	0.74		0.13	0.57		0.28	0.53	0.09	0.10	0.46	
Control Delay	46.0	44.5		39.0	46.4		3.0	3.3	0.1	4.5	10.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.5	0.0	0.0	0.0	
Total Delay	46.0	44.5		39.0	46.4		3.0	3.9	0.1	4.5	10.3	
LOS	D	D		D	D		A	A	A	A	B	
Approach Delay		44.9			45.4			3.5			10.1	
Approach LOS		D			D			A			B	
90th %ile Green (s)	8.6	22.6		5.5	18.1		10.3	59.2	5.5	7.2	54.2	
90th %ile Term Code	Hold	Gap		Max	Max		Gap	Coord	Max	Gap	Coord	
70th %ile Green (s)	7.0	18.2		5.5	15.3		8.7	64.3	5.5	6.5	60.2	
70th %ile Term Code	Hold	Gap		Max	Gap		Gap	Coord	Max	Gap	Coord	
50th %ile Green (s)	6.2	15.2		5.5	13.1		7.7	67.7	5.5	6.1	64.2	
50th %ile Term Code	Hold	Gap		Max	Gap		Gap	Coord	Max	Gap	Coord	
30th %ile Green (s)	5.5	12.4		5.5	11.0		6.9	80.1	5.5	0.0	67.8	
30th %ile Term Code	Gap	Hold		Max	Gap		Gap	Coord	Max	Skip	Coord	
10th %ile Green (s)	0.0	8.0		5.5	15.1		6.0	84.5	5.5	0.0	73.1	
10th %ile Term Code	Skip	Gap		Max	Hold		Gap	Coord	Max	Skip	Coord	
Stops (vph)	55	128		16	107		10	306	0	7	408	
Fuel Used(gal)	2	6		0	3		1	7	0	0	8	
CO Emissions (g/hr)	150	441		28	195		41	508	32	14	542	
NOx Emissions (g/hr)	29	86		5	38		8	99	6	3	106	
VOC Emissions (g/hr)	35	102		6	45		10	118	7	3	126	
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0	
Queue Length 50th (ft)	46	101		13	91		4	29	0	3	166	
Queue Length 95th (ft)	83	171		33	121		m7	40	m0	m8	m235	
Internal Link Dist (ft)		150			125			498			487	
Turn Bay Length (ft)							160		100	160		
Base Capacity (vph)	414	564		166	305		403	2224	1192	326	1990	

Lanes, Volumes, Timings  
 22: Ave. of Mid-America & N. Keller Dr.

10/12/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	578	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.17	0.38		0.13	0.46		0.28	0.71	0.09	0.10	0.46	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 24 (22%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.74  
 Intersection Signal Delay: 12.5  
 Intersection Capacity Utilization 63.8%  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 22: Ave. of Mid-America & N. Keller Dr.

Ø1 10 s	Ø2 (R) 53.5 s	Ø3 10 s	Ø4 36.5 s
Ø5 11 s	Ø6 (R) 52.5 s	Ø8 24 s	Ø7 22.5 s

Lanes, Volumes, Timings  
 23: N. Keller Dr. & Evergreen Ave./I-57/70 Exit Ramp














10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	0	370	30	155	260	310	2040	0	0	1650	155
Future Volume (vph)	35	0	370	30	155	260	310	2040	0	0	1650	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		165	185		220	250		0	0		75
Storage Lanes	1		1	1		1	1		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850						0.850
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1770	0	1468	1770	1727	1583	1641	3539	0	0	3539	1583
Flt Permitted	0.950			0.950			0.069					
Satd. Flow (perm)	1770	0	1468	1770	1727	1583	119	3539	0	0	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			238			109						94
Link Speed (mph)		30			30			30				30
Link Distance (ft)		949			862			437				468
Travel Time (s)		21.6			19.6			9.9				10.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	10%	2%	10%	2%	10%	2%	2%	2%	2%	2%
Adj. Flow (vph)	38	0	402	33	168	283	337	2217	0	0	1793	168
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	0	402	33	168	283	337	2217	0	0	1793	168
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												Yes
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1		1	1	2	1	1	2			2	1
Detector Template	Left		Right	Left	Thru	Right	Left	Thru			Thru	Right
Leading Detector (ft)	20		20	20	100	20	20	100			100	20
Trailing Detector (ft)	0		0	0	0	0	0	0			0	0
Detector 1 Position(ft)	0		0	0	0	0	0	0			0	0
Detector 1 Size(ft)	20		20	20	6	20	20	6			6	20
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type	Prot		pm+ov	Prot	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases	7		5	3	8		5	2			6	

Lanes, Volumes, Timings

23: N. Keller Dr. & Evergreen Ave./I-57/70 Exit Ramp

10/12/2018

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases			7			8	2					6	
Detector Phase	7		5	3	8	8	5	2			6	6	
Switch Phase													
Minimum Initial (s)	5.0		5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0	
Minimum Split (s)	9.5		9.5	9.5	22.5	22.5	9.5	23.5			22.5	22.5	
Total Split (s)	9.5		17.0	32.0	22.5	22.5	17.0	78.0			61.0	61.0	
Total Split (%)	8.6%		15.5%	29.1%	20.5%	20.5%	15.5%	70.9%			55.5%	55.5%	
Maximum Green (s)	5.0		13.0	28.0	18.5	18.5	13.0	72.5			56.5	56.5	
Yellow Time (s)	3.5		3.0	3.0	3.0	3.0	3.0	3.9			3.5	3.5	
All-Red Time (s)	1.0		1.0	1.0	1.0	1.0	1.0	1.6			1.0	1.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	
Total Lost Time (s)	4.5		4.0	4.0	4.0	4.0	4.0	5.5			4.5	4.5	
Lead/Lag	Lead		Lead		Lag	Lag	Lead				Lag	Lag	
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes				Yes	Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0	
Recall Mode	None		None	None	None	None	None	C-Max			C-Max	C-Max	
Walk Time (s)					7.0	7.0		7.0			7.0	7.0	
Flash Dont Walk (s)					11.0	11.0		11.0			11.0	11.0	
Pedestrian Calls (#/hr)					0	0		0			0	0	
Act Effct Green (s)	5.0		22.4	19.2	16.2	16.2	80.1	78.6			56.5	56.5	
Actuated g/C Ratio	0.05		0.20	0.17	0.15	0.15	0.73	0.71			0.51	0.51	
v/c Ratio	0.47		0.82	0.11	0.66	0.87	0.96	0.88			0.99	0.20	
Control Delay	70.8		30.8	33.9	56.9	53.9	73.7	19.2			39.3	5.0	
Queue Delay	0.0		0.0	0.0	0.0	0.9	0.0	12.9			9.4	0.0	
Total Delay	70.8		30.8	33.9	56.9	54.8	73.7	32.2			48.7	5.0	
LOS	E		C	C	E	D	E	C			D	A	
Approach Delay		34.3			54.1			37.7			44.9		
Approach LOS		C			D			D			D		
90th %ile Green (s)	5.0		13.0	28.0	18.5	18.5	13.0	72.5			56.5	56.5	
90th %ile Term Code	Max		Max	Hold	Max	Max	Max	Coord			Coord	Coord	
70th %ile Green (s)	5.0		13.0	28.0	18.5	18.5	13.0	72.5			56.5	56.5	
70th %ile Term Code	Max		Max	Hold	Max	Max	Max	Coord			Coord	Coord	
50th %ile Green (s)	5.0		13.0	28.0	18.5	18.5	13.0	72.5			56.5	56.5	
50th %ile Term Code	Max		Max	Hold	Max	Max	Max	Coord			Coord	Coord	
30th %ile Green (s)	0.0		25.7	0.0	15.3	15.3	25.7	85.2			56.5	56.5	
30th %ile Term Code	Skip		Max	Skip	Gap	Gap	Max	Coord			Coord	Coord	
10th %ile Green (s)	0.0		30.9	0.0	10.1	10.1	30.9	90.4			56.5	56.5	
10th %ile Term Code	Skip		Max	Skip	Gap	Gap	Max	Coord			Coord	Coord	
Stops (vph)	35		178	24	143	152	154	1434			1430	45	
Fuel Used(gal)	1		12	1	4	5	7	23			27	1	
CO Emissions (g/hr)	104		817	38	253	380	458	1598			1896	68	
NOx Emissions (g/hr)	20		159	7	49	74	89	311			369	13	
VOC Emissions (g/hr)	24		189	9	59	88	106	370			439	16	
Dilemma Vehicles (#)	0		0	0	0	0	0	0			0	0	
Queue Length 50th (ft)	27		79	18	111	120	~257	684			505	22	
Queue Length 95th (ft)	#67		#278	43	183	#254	#440	#951			#820	m45	
Internal Link Dist (ft)		869			782			357			388		
Turn Bay Length (ft)			165	185		220	250					75	
Base Capacity (vph)	80		488	450	290	356	350	2529			1817	858	

Lanes, Volumes, Timings  
 23: N. Keller Dr. & Evergreen Ave./I-57/70 Exit Ramp

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0		0	0	0	0	0	0			65	0
Spillback Cap Reductn	0		0	0	0	10	0	344			0	0
Storage Cap Reductn	0		0	0	0	0	0	0			0	0
Reduced v/c Ratio	0.47		0.82	0.07	0.58	0.82	0.96	1.01			1.02	0.20

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 97 (88%), Referenced to phase 2:NBTL and 6:SBT, Start of Green  
 Natural Cycle: 130  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.99  
 Intersection Signal Delay: 41.5  
 Intersection Capacity Utilization 88.0%  
 Analysis Period (min) 15  
 Intersection LOS: D  
 ICU Level of Service E

~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.


















Splits and Phases: 23: N. Keller Dr. & Evergreen Ave./I-57/70 Exit Ramp

Ø2 (R) 78 s	Ø3 32 s
Ø5 17 s	Ø6 (R) 61 s
Ø7 9.5 s	Ø8 22.5 s

# HCM Unsignalized Intersection Capacity Analysis













## 27: Outer Belt W & Ave. of Mid-America

10/12/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	5	5	5	75	5	15	5	230	50	45	255	5	
Future Volume (Veh/h)	5	5	5	75	5	15	5	230	50	45	255	5	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	5	5	5	82	5	16	5	250	54	49	277	5	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type													
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	683	692	280	672	667	277	282			304			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	683	692	280	672	667	277	282			304			
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	99	99	99	76	99	98	100			96			
cM capacity (veh/h)	340	352	759	349	363	762	1280			1257			
Direction, Lane #													
	EB 1	WB 1	NB 1	SB 1									
Volume Total	15	103	309	331									
Volume Left	5	82	5	49									
Volume Right	5	16	54	5									
cSH	423	382	1280	1257									
Volume to Capacity	0.04	0.27	0.00	0.04									
Queue Length 95th (ft)	3	27	0	3									
Control Delay (s)	13.8	17.9	0.2	1.5									
Lane LOS	B	C	A	A									
Approach Delay (s)	13.8	17.9	0.2	1.5									
Approach LOS	B	C											
Intersection Summary													
Average Delay			3.4										
Intersection Capacity Utilization			52.9%		ICU Level of Service					A			
Analysis Period (min)			15										

HCM Unsignalized Intersection Capacity Analysis  
 29: Evergreen Ave. & Outer Belt W

10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	45	30	70	20	50	55	140	200	45	95	185	55
Future Volume (vph)	45	30	70	20	50	55	140	200	45	95	185	55
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	49	33	76	22	54	60	152	217	49	103	201	60
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	158	136	418	364								
Volume Left (vph)	49	22	152	103								
Volume Right (vph)	76	60	49	60								
Hadj (s)	-0.18	-0.20	0.08	0.03								
Departure Headway (s)	6.2	6.2	5.5	5.6								
Degree Utilization, x	0.27	0.24	0.64	0.56								
Capacity (veh/h)	495	482	622	614								
Control Delay (s)	11.5	11.1	17.8	15.5								
Approach Delay (s)	11.5	11.1	17.8	15.5								
Approach LOS	B	B	C	C								
Intersection Summary												
Delay			15.3									
Level of Service			C									
Intersection Capacity Utilization			52.4%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis  
 1: N. Raney St. & Rickelman Ave.

10/12/2018













	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↖	↖	
Traffic Volume (veh/h)	10	25	20	10	40	10
Future Volume (Veh/h)	10	25	20	10	40	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	27	22	11	43	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			38		80	24
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			38		80	24
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		95	99
cM capacity (veh/h)			1572		910	1052
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	38	33	54			
Volume Left	0	22	43			
Volume Right	27	0	11			
cSH	1700	1572	936			
Volume to Capacity	0.02	0.01	0.06			
Queue Length 95th (ft)	0	1	5			
Control Delay (s)	0.0	4.9	9.1			
Lane LOS		A	A			
Approach Delay (s)	0.0	4.9	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			5.2			
Intersection Capacity Utilization			18.3%	ICU Level of Service	A	
Analysis Period (min)			15			



# HCM Unsignalized Intersection Capacity Analysis

## 11: Charlotte St. & Rickelman Ave.

10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	5	10	5	50	35	5	5	5	60	5	5	5
Future Volume (Veh/h)	5	10	5	50	35	5	5	5	60	5	5	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	11	5	54	38	5	5	5	65	5	5	5
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None					None						
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	43			16			180	174	14	240	174	40
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	43			16			180	174	14	240	174	40
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			97			99	99	94	99	99	100
cM capacity (veh/h)	1566			1602			752	692	1067	649	692	1031
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	21	97	75	15								
Volume Left	5	54	5	5								
Volume Right	5	5	65	5								
cSH	1566	1602	1003	758								
Volume to Capacity	0.00	0.03	0.07	0.02								
Queue Length 95th (ft)	0	3	6	2								
Control Delay (s)	1.8	4.2	8.9	9.8								
Lane LOS	A	A	A	A								
Approach Delay (s)	1.8	4.2	8.9	9.8								
Approach LOS			A	A								
Intersection Summary												
Average Delay			6.0									
Intersection Capacity Utilization			20.9%	ICU Level of Service	A							
Analysis Period (min)			15									

# HCS7 Roundabouts Report

## General Information

Analyst	RMM
Agency or Co.	FGI
Date Performed	10/12/2018
Analysis Year	2040
Time Analyzed	PM Peak
Project Description	2040 - Proposed Conditions

## Site Information

Intersection	Rickelman & N. 4th St.
E/W Street Name	Rickelman Ave.
N/S Street Name	N. 4th St.
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.92
Jurisdiction	

## Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment	LTR				LTR				LTR				LTR			
Volume (V), veh/h	0	15	50	10	0	540	85	5	0	20	85	405	0	5	20	20
Percent Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Flow Rate (v <sub>pce</sub> ), pc/h	0	17	56	11	0	605	95	6	0	22	95	453	0	6	22	22
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

## Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

## Flow Computations, Capacity and v/c Ratios























Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v <sub>e</sub> ), pc/h		84			706			570			50	
Entry Volume veh/h		82			685			553			49	
Circulating Flow (v <sub>c</sub> ), pc/h	633			134			79			722		
Exiting Flow (v <sub>ex</sub> ), pc/h	515			139			118			638		
Capacity (c <sub>pce</sub> ), pc/h		724			1204			1273			661	
Capacity (c), veh/h		702			1169			1236			642	
v/c Ratio (x)		0.12			0.59			0.45			0.08	

## Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		6.4			10.3			7.5			6.4	
Lane LOS		A			B			A			A	
95% Queue, veh		0.4			4.0			2.4			0.2	
Approach Delay, s/veh	6.4			10.3			7.5			6.4		
Approach LOS	A			B			A			A		
Intersection Delay, s/veh   LOS	8.8						A					














Lanes, Volumes, Timings  
3: US Route 45 & Rickelman Ave.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	10	240	105	25	5	310	265	130	5	180	195
Future Volume (vph)	225	10	240	105	25	5	310	265	130	5	180	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	270		0	200		0	220		295	165		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.856			0.977				0.850		0.922	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1595	0	1770	1820	0	1770	1810	1583	1770	1694	0
Flt Permitted	0.950			0.950			0.283			0.583		
Satd. Flow (perm)	1770	1595	0	1770	1820	0	527	1810	1583	1086	1694	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		261			5				141		50	
Link Speed (mph)		30			30			30		30		30
Link Distance (ft)		2780			357			1797			1266	
Travel Time (s)		63.2			8.1			40.8			28.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	5%	2%
Adj. Flow (vph)	245	11	261	114	27	5	337	288	141	5	196	212
Shared Lane Traffic (%)												
Lane Group Flow (vph)	245	272	0	114	32	0	337	288	141	5	408	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		pm+pt	NA	pm+ov	Perm	NA	
Protected Phases	4	4		8	8		5	2	8		6	

Lanes, Volumes, Timings  
3: US Route 45 & Rickelman Ave.

10/12/2018

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases							2		2	6			
Detector Phase	4	4		8	8		5	2	8	6	6		
Switch Phase													
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0		
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5	22.5	22.5	22.5		
Total Split (s)	28.0	28.0		20.3	20.3		25.7	61.7	20.3	36.0	36.0		
Total Split (%)	25.5%	25.5%		18.5%	18.5%		23.4%	56.1%	18.5%	32.7%	32.7%		
Maximum Green (s)	23.5	23.5		15.8	15.8		21.2	57.2	15.8	31.5	31.5		
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5		
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0		
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5		
Lead/Lag							Lead			Lag	Lag		
Lead-Lag Optimize?							Yes			Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0		
Recall Mode	None	None		None	None		None	Max	None	Max	Max		
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0	7.0	7.0		
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0	11.0	11.0	11.0		
Pedestrian Calls (#/hr)	0	0		0	0			0	0	0	0		
Act Effct Green (s)	18.7	18.7		11.6	11.6		57.5	57.5	73.6	36.7	36.7		
Actuated g/C Ratio	0.18	0.18		0.11	0.11		0.57	0.57	0.73	0.36	0.36		
v/c Ratio	0.75	0.54		0.56	0.15		0.68	0.28	0.12	0.01	0.63		
Control Delay	54.4	9.6		54.6	38.1		20.6	13.6	1.1	27.4	31.6		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0		
Total Delay	54.4	9.6		54.6	38.1		20.6	13.6	1.1	27.4	31.6		
LOS	D	A		D	D		C	B	A	C	C		
Approach Delay		30.8			51.0			14.4			31.6		
Approach LOS		C			D			B			C		
90th %ile Green (s)	23.5	23.5		15.8	15.8		21.2	57.2	15.8	31.5	31.5		
90th %ile Term Code	Max	Max		Max	Max		Max	MaxR	Max	MaxR	MaxR		
70th %ile Green (s)	23.5	23.5		14.1	14.1		21.2	57.2	14.1	31.5	31.5		
70th %ile Term Code	Max	Max		Gap	Gap		Max	MaxR	Gap	MaxR	MaxR		
50th %ile Green (s)	20.2	20.2		11.9	11.9		16.6	57.2	11.9	36.1	36.1		
50th %ile Term Code	Gap	Gap		Gap	Gap		Gap	MaxR	Gap	Hold	Hold		
30th %ile Green (s)	15.9	15.9		9.8	9.8		13.4	57.2	9.8	39.3	39.3		
30th %ile Term Code	Gap	Gap		Gap	Gap		Gap	MaxR	Gap	Hold	Hold		
10th %ile Green (s)	11.8	11.8		7.2	7.2		10.0	57.2	7.2	42.7	42.7		
10th %ile Term Code	Gap	Gap		Gap	Gap		Gap	MaxR	Gap	Hold	Hold		
Stops (vph)	206	34		97	24		164	133	6	6	270		
Fuel Used(gal)	9	6		2	0		7	5	2	0	8		
CO Emissions (g/hr)	595	426		139	31		458	362	132	8	532		
NOx Emissions (g/hr)	116	83		27	6		89	70	26	2	103		
VOC Emissions (g/hr)	138	99		32	7		106	84	31	2	123		
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0		
Queue Length 50th (ft)	151	6		72	16		115	94	0	2	196		
Queue Length 95th (ft)	247	76		133	46		201	169	17	12	#382		
Internal Link Dist (ft)		2700			277			1717			1186		
Turn Bay Length (ft)	270			200			220		295	165			
Base Capacity (vph)	412	571		277	289		560	1026	1178	393	645		

Lanes, Volumes, Timings  
 3: US Route 45 & Rickelman Ave.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.59	0.48		0.41	0.11		0.60	0.28	0.12	0.01	0.63	

Intersection Summary






















Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 101.4  
 Natural Cycle: 90  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.75  
 Intersection Signal Delay: 25.8  
 Intersection Capacity Utilization 74.8%  
 Analysis Period (min) 15  
 90th %ile Actuated Cycle: 110  
 70th %ile Actuated Cycle: 108.3  
 50th %ile Actuated Cycle: 102.8  
 30th %ile Actuated Cycle: 96.4  
 10th %ile Actuated Cycle: 89.7  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 3: US Route 45 & Rickelman Ave.

Ø2 61.7 s	Ø4 28 s	Ø8 20.3 s
Ø5 25.7 s	Ø6 36 s	




















HCM Unsignalized Intersection Capacity Analysis  
 18: N. Raney St. & Ford Ave.

10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	440	35	30	465	45	20	25	40	50	20	45
Future Volume (Veh/h)	40	440	35	30	465	45	20	25	40	50	20	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	478	38	33	505	49	22	27	43	54	22	49
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	554			516			1214	1203	497	1216	1198	530
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	554			516			1214	1203	497	1216	1198	530
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			97			82	84	92	55	87	91
cM capacity (veh/h)	1001			1050			123	171	573	121	170	549
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	43	516	33	554	22	70	54	71				
Volume Left	43	0	33	0	22	0	54	0				
Volume Right	0	38	0	49	0	43	0	49				
cSH	1001	1700	1050	1700	123	300	121	325				
Volume to Capacity	0.04	0.30	0.03	0.33	0.18	0.23	0.45	0.22				
Queue Length 95th (ft)	3	0	2	0	16	22	49	20				
Control Delay (s)	8.8	0.0	8.5	0.0	40.6	20.6	56.5	19.2				
Lane LOS	A		A		E	C	F	C				
Approach Delay (s)	0.7		0.5		25.4		35.3					
Approach LOS					D		E					
<b>Intersection Summary</b>												
Average Delay			5.4									
Intersection Capacity Utilization			49.3%		ICU Level of Service				A			
Analysis Period (min)			15									













Lanes, Volumes, Timings  
20: Ford Ave. & Charlotte St.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	445	35	185	500	35	30	105	180	5	95	50
Future Volume (vph)	50	445	35	185	500	35	30	105	180	5	95	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	205		0	135		0	0		0
Storage Lanes	1		0	1		0	1		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989			0.990			0.905			0.955	
Flt Protected	0.950			0.950			0.950				0.998	
Satd. Flow (prot)	1770	1842	0	1770	1844	0	1770	1668	0	0	1754	0
Flt Permitted	0.273			0.161			0.629				0.991	
Satd. Flow (perm)	509	1842	0	300	1844	0	1172	1668	0	0	1741	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			5			81			24	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1368			302			265			2637	
Travel Time (s)		31.1			6.9			6.0			59.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	4%	2%
Adj. Flow (vph)	54	484	38	201	543	38	33	114	196	5	103	54
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	522	0	201	581	0	33	310	0	0	162	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane					Yes			Yes				
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	

Lanes, Volumes, Timings  
20: Ford Ave. & Charlotte St.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5		22.5	22.5	
Total Split (s)	10.0	52.0		20.0	62.0		38.0	38.0		38.0	38.0	
Total Split (%)	9.1%	47.3%		18.2%	56.4%		34.5%	34.5%		34.5%	34.5%	
Maximum Green (s)	6.0	48.0		16.0	58.0		34.0	34.0		34.0	34.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	35.8	29.8		44.7	39.2		34.6	34.6			34.6	
Actuated g/C Ratio	0.41	0.34		0.51	0.45		0.40	0.40			0.40	
v/c Ratio	0.18	0.83		0.60	0.70		0.07	0.44			0.23	
Control Delay	11.8	37.9		19.1	24.9		21.5	18.6			18.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	
Total Delay	11.8	37.9		19.1	24.9		21.5	18.6			18.8	
LOS	B	D		B	C		C	B			B	
Approach Delay		35.4			23.4			18.8			18.8	
Approach LOS		D			C			B			B	
90th %ile Green (s)	6.0	44.7		14.2	52.9		34.0	34.0		34.0	34.0	
90th %ile Term Code	Max	Gap		Gap	Hold		MaxR	MaxR		MaxR	MaxR	
70th %ile Green (s)	6.0	34.9		12.2	41.1		34.0	34.0		34.0	34.0	
70th %ile Term Code	Max	Gap		Gap	Hold		MaxR	MaxR		MaxR	MaxR	
50th %ile Green (s)	6.0	29.7		10.8	34.5		34.0	34.0		34.0	34.0	
50th %ile Term Code	Max	Gap		Gap	Hold		MaxR	MaxR		MaxR	MaxR	
30th %ile Green (s)	0.0	24.2		9.6	37.8		34.0	34.0		34.0	34.0	
30th %ile Term Code	Skip	Gap		Gap	Hold		MaxR	MaxR		MaxR	MaxR	
10th %ile Green (s)	0.0	18.7		7.9	30.6		34.0	34.0		34.0	34.0	
10th %ile Term Code	Skip	Gap		Gap	Hold		MaxR	MaxR		MaxR	MaxR	
Stops (vph)	26	411		89	403		21	153			82	
Fuel Used(gal)	1	11		8	24		1	6			4	
CO Emissions (g/hr)	56	775		538	1655		50	448			286	
NOx Emissions (g/hr)	11	151		105	322		10	87			56	
VOC Emissions (g/hr)	13	180		125	384		12	104			66	
Dilemma Vehicles (#)	0	0		0	0		0	0			0	
Queue Length 50th (ft)	14	254		57	269		11	87			48	
Queue Length 95th (ft)	30	391		94	385		38	209			122	
Internal Link Dist (ft)		1288			222			185			2557	
Turn Bay Length (ft)	125			205			135					
Base Capacity (vph)	297	1030		427	1245		463	708			702	



Lanes, Volumes, Timings  
 20: Ford Ave. & Charlotte St.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0			0	
Spillback Cap Reductn	0	0		0	0		0	0			0	
Storage Cap Reductn	0	0		0	0		0	0			0	
Reduced v/c Ratio	0.18	0.51		0.47	0.47		0.07	0.44			0.23	

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	87.4
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.83
Intersection Signal Delay:	25.9
Intersection Capacity Utilization	62.4%
Analysis Period (min)	15
90th %ile Actuated Cycle:	104.9
70th %ile Actuated Cycle:	93.1
50th %ile Actuated Cycle:	86.5
30th %ile Actuated Cycle:	79.8
10th %ile Actuated Cycle:	72.6
Intersection LOS:	C
ICU Level of Service	B

Splits and Phases: 20: Ford Ave. & Charlotte St.

Ø2	Ø3	Ø4
38 s	20 s	52 s
Ø6	Ø7	Ø8
38 s	10 s	62 s













Lanes, Volumes, Timings  
42: Avenue of Mid-America & WalMart Ent.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	85	20	545	85	15	10	165	615	10	180	45
Future Volume (vph)	20	85	20	545	85	15	10	165	615	10	180	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		100	100		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.971			0.978				0.850		0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	3437	0	1770	3339	0	1770	1863	1468	1770	1803	0
Flt Permitted	0.684			0.509			0.525			0.598		
Satd. Flow (perm)	1262	3437	0	948	3339	0	978	1863	1468	1114	1803	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			16				561		12	
Link Speed (mph)		30			30			30		30		30
Link Distance (ft)		756			727			242		293		293
Travel Time (s)		17.2			16.5			5.5		6.7		6.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	2%	2%	2%	5%	10%	2%	2%	10%	2%	2%	3%
Adj. Flow (vph)	22	92	22	592	92	16	11	179	668	11	196	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	114	0	592	108	0	11	179	668	11	245	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12		12		12
Link Offset(ft)		0			0			0		0		0
Crosswalk Width(ft)		16			16			16		16		16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	7	4		3	8			2	3		6	

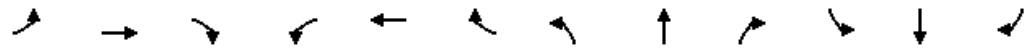
Lanes, Volumes, Timings  
42: Avenue of Mid-America & WalMart Ent.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2		2	6		
Detector Phase	7	4		3	8		2	2	3	6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		22.5	22.5	9.5	22.5	22.5	
Total Split (s)	11.0	23.0		51.0	63.0		36.0	36.0	51.0	36.0	36.0	
Total Split (%)	10.0%	20.9%		46.4%	57.3%		32.7%	32.7%	46.4%	32.7%	32.7%	
Maximum Green (s)	7.5	19.5		47.5	59.5		32.5	32.5	47.5	32.5	32.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5	0.5	0.5	0.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
Lead/Lag	Lead	Lag		Lead	Lag				Lead			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes				Yes			
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	None	Max	Max	
Walk Time (s)		7.0			7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	14.5	8.3		53.6	49.5		49.4	49.4	94.7	49.4	49.4	
Actuated g/C Ratio	0.13	0.08		0.49	0.45		0.45	0.45	0.86	0.45	0.45	
v/c Ratio	0.11	0.41		0.76	0.07		0.03	0.21	0.50	0.02	0.30	
Control Delay	17.6	33.8		28.1	14.0		23.2	20.9	1.1	21.1	21.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	17.6	33.8		28.1	14.0		23.2	20.9	1.1	21.1	21.5	
LOS	B	C		C	B		C	C	A	C	C	
Approach Delay		31.2			25.9			5.6			21.5	
Approach LOS		C			C			A			C	
90th %ile Green (s)	7.0	10.8		47.5	51.3		41.2	41.2	47.5	41.2	41.2	
90th %ile Term Code	Gap	Gap		Max	Hold		Coord	Coord	Max	Coord	Coord	
70th %ile Green (s)	6.5	9.3		47.5	50.3		42.7	42.7	47.5	42.7	42.7	
70th %ile Term Code	Gap	Gap		Max	Hold		Coord	Coord	Max	Coord	Coord	
50th %ile Green (s)	0.0	8.3		43.7	55.5		47.5	47.5	43.7	47.5	47.5	
50th %ile Term Code	Skip	Gap		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
30th %ile Green (s)	0.0	7.3		38.8	49.6		53.4	53.4	38.8	53.4	53.4	
30th %ile Term Code	Skip	Gap		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
10th %ile Green (s)	0.0	5.9		31.5	40.9		62.1	62.1	31.5	62.1	62.1	
10th %ile Term Code	Skip	Gap		Gap	Hold		Coord	Coord	Gap	Coord	Coord	
Stops (vph)	16	116		396	45		6	80	1	7	138	
Fuel Used(gal)	0	2		8	1		0	2	5	0	2	
CO Emissions (g/hr)	22	150		587	76		11	168	339	7	158	
NOx Emissions (g/hr)	4	29		114	15		2	33	66	1	31	
VOC Emissions (g/hr)	5	35		136	18		3	39	79	2	37	
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0	
Queue Length 50th (ft)	6	28		300	16		4	63	0	4	105	
Queue Length 95th (ft)	m17	57		372	34		m8	115	0	17	184	
Internal Link Dist (ft)		676			647			162			213	
Turn Bay Length (ft)	100			100			100		100	100		
Base Capacity (vph)	215	627		828	1813		439	836	1383	500	816	

Lanes, Volumes, Timings  
 42: Avenue of Mid-America & WalMart Ent.

10/12/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.10	0.18		0.71	0.06		0.03	0.21	0.48	0.02	0.30	

Intersection Summary


















Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 11 (10%), Referenced to phase 2:NBTL, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.76  
 Intersection Signal Delay: 16.8  
 Intersection Capacity Utilization 56.4%  
 Analysis Period (min) 15  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 42: Avenue of Mid-America & WalMart Ent.

Ø2 (R)	Ø3	Ø4
36 s	51 s	23 s
Ø6	Ø7	Ø8
36 s	11 s	63 s

HCM Unsignalized Intersection Capacity Analysis  
 9: Avenue of Mid-America & N. Raney St.

10/12/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	80	455	25	5	440	5	15	5	5	5	5	85
Future Volume (Veh/h)	80	455	25	5	440	5	15	5	5	5	5	85
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	495	27	5	478	5	16	5	5	5	5	92
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None				TWLTL							
Median storage (veh)					2							
Upstream signal (ft)	727											
pX, platoon unblocked												
vC, conflicting volume	483			522			1268	1176	508	1167	1186	480
vC1, stage 1 conf vol							682	682		490	490	
vC2, stage 2 conf vol							585	493		676	696	
vCu, unblocked vol	483			522			1268	1176	508	1167	1186	480
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			94	99	99	99	99	84
cM capacity (veh/h)	1080			1044			269	335	565	342	347	585
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total	87	522	488	26	102							
Volume Left	87	0	5	16	5							
Volume Right	0	27	5	5	92							
cSH	1080	1700	1044	313	548							
Volume to Capacity	0.08	0.31	0.00	0.08	0.19							
Queue Length 95th (ft)	7	0	0	7	17							
Control Delay (s)	8.6	0.0	0.1	17.6	13.1							
Lane LOS	A		A	C	B							
Approach Delay (s)	1.2		0.1	17.6	13.1							
Approach LOS			C	C	B							
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			66.7%		ICU Level of Service				C			
Analysis Period (min)			15									













Lanes, Volumes, Timings  
52: N. Keller Dr. & Damron Ct.

10/12/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	10	45	770	10	55	35	1195	790	40	875	35
Future Volume (vph)	45	10	45	770	10	55	35	1195	790	40	875	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	100		150	100		0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.877			0.980				0.850		0.994	
Flt Protected	0.950			0.950	0.960		0.950			0.950		
Satd. Flow (prot)	1770	1634	0	1681	1665	0	1770	3438	1583	1770	3421	0
Flt Permitted	0.950			0.950	0.960		0.132			0.097		
Satd. Flow (perm)	1770	1634	0	1681	1665	0	246	3438	1583	181	3421	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49			7				772		4	
Link Speed (mph)		30			30			30		30		30
Link Distance (ft)		247			739			468		578		
Travel Time (s)		5.6			16.8			10.6		13.1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	5%	2%	2%	5%	2%
Adj. Flow (vph)	49	11	49	837	11	60	38	1299	859	43	951	38
Shared Lane Traffic (%)				45%								
Lane Group Flow (vph)	49	60	0	460	448	0	38	1299	859	43	989	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12		12		12
Link Offset(ft)		0			0			0		0		0
Crosswalk Width(ft)		16			16			16		16		16
Two way Left Turn Lane								Yes			Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	4	4		8	8		5	2	8	1	6	

Lanes, Volumes, Timings  
52: N. Keller Dr. & Damron Ct.

10/12/2018

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases							2		2	6		
Detector Phase	4	4		8	8		5	2	8	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	23.5	22.5	9.5	23.5	
Total Split (s)	24.5	24.5		33.0	33.0		9.5	43.0	33.0	9.5	43.0	
Total Split (%)	22.3%	22.3%		30.0%	30.0%		8.6%	39.1%	30.0%	8.6%	39.1%	
Maximum Green (s)	21.0	21.0		29.5	29.5		5.5	37.5	29.5	5.5	37.5	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.9	3.0	3.0	3.9	
All-Red Time (s)	0.5	0.5		0.5	0.5		1.0	1.6	0.5	1.0	1.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.5	3.5		3.5	3.5		4.0	5.5	3.5	4.0	5.5	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max	None	None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0		7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0	0		0	0			0	0		0	
Act Effct Green (s)	8.4	8.4		41.6	41.6		48.4	43.6	89.3	48.4	43.6	
Actuated g/C Ratio	0.08	0.08		0.38	0.38		0.44	0.40	0.81	0.44	0.40	
v/c Ratio	0.36	0.35		0.72	0.71		0.21	0.95	0.60	0.27	0.73	
Control Delay	54.8	23.1		31.3	30.2		14.3	37.9	2.7	18.6	21.9	
Queue Delay	0.0	0.0		0.6	0.6		0.0	12.2	0.1	0.0	1.0	
Total Delay	54.8	23.1		32.0	30.8		14.3	50.1	2.8	18.6	22.9	
LOS	D	C		C	C		B	D	A	B	C	
Approach Delay		37.4			31.4			31.0			22.8	
Approach LOS		D			C			C			C	
90th %ile Green (s)	11.5	11.5		39.0	39.0		5.5	37.5	39.0	5.5	37.5	
90th %ile Term Code	Gap	Gap		Max	Max		Max	Coord	Max	Max	Coord	
70th %ile Green (s)	9.7	9.7		40.8	40.8		5.5	37.5	40.8	5.5	37.5	
70th %ile Term Code	Gap	Gap		Max	Max		Max	Coord	Max	Max	Coord	
50th %ile Green (s)	8.4	8.4		42.1	42.1		5.5	37.5	42.1	5.5	37.5	
50th %ile Term Code	Gap	Gap		Max	Max		Max	Coord	Max	Max	Coord	
30th %ile Green (s)	7.1	7.1		43.4	43.4		0.0	47.0	43.4	0.0	47.0	
30th %ile Term Code	Gap	Gap		Max	Max		Skip	Coord	Max	Skip	Coord	
10th %ile Green (s)	0.0	0.0		42.7	42.7		0.0	58.3	42.7	0.0	58.3	
10th %ile Term Code	Skip	Skip		Gap	Gap		Skip	Coord	Gap	Skip	Coord	
Stops (vph)	41	19		261	250		16	920	172	14	660	
Fuel Used(gal)	1	0		7	7		0	19	4	0	12	
CO Emissions (g/hr)	57	33		516	494		22	1305	298	29	826	
NOx Emissions (g/hr)	11	6		100	96		4	254	58	6	161	
VOC Emissions (g/hr)	13	8		120	115		5	303	69	7	191	
Dilemma Vehicles (#)	0	0		0	0		0	0	0	0	0	
Queue Length 50th (ft)	33	7		174	165		9	~547	32	9	318	
Queue Length 95th (ft)	71	48		#382	357		m12	#685	m47	m30	138	
Internal Link Dist (ft)		167			659			388			498	
Turn Bay Length (ft)	100			100			100		150	100		
Base Capacity (vph)	337	351		635	633		184	1361	1430	158	1356	

Lanes, Volumes, Timings  
52: N. Keller Dr. & Damron Ct.

10/12/2018

Starvation Cap Reductn	0	0		0	0		0	85	67	0	0	
Spillback Cap Reductn	0	4		33	33		0	0	0	0	158	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.15	0.17		0.76	0.75		0.21	1.02	0.63	0.27	0.83	

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 110  
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green  
 Natural Cycle: 120  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.95  
 Intersection Signal Delay: 29.2 Intersection LOS: C  
 Intersection Capacity Utilization 71.1% ICU Level of Service C  
 Analysis Period (min) 15  
 ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.













Splits and Phases: 52: N. Keller Dr. & Damron Ct.

9.5 s	43 s	24.5 s	33 s
9.5 s	43 s		



Lanes, Volumes, Timings  
49: N. 4th Street & Ford Ave.

10/12/2018

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	395	125	165	100	55	475
Future Volume (vph)	395	125	165	100	55	475
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150	0	0			0
Storage Lanes	1	1	1			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr <sub>t</sub>		0.850				0.850
Fl <sub>t</sub> Protected	0.950		0.950			
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583
Fl <sub>t</sub> Permitted	0.950		0.629			
Satd. Flow (perm)	1770	1583	1172	1863	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		136				516
Link Speed (mph)	30			45	30	
Link Distance (ft)	1428			1362	1063	
Travel Time (s)	32.5			20.6	24.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	429	136	179	109	60	516
Shared Lane Traffic (%)						
Lane Group Flow (vph)	429	136	179	109	60	516
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane	Yes					
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (ft)	20	20	20	100	100	20
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	20	20	20	6	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)				94	94	
Detector 2 Size(ft)				6	6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	pm+ov
Protected Phases	4		5	2	6	4
Permitted Phases		4	2			6

Lanes, Volumes, Timings  
49: N. 4th Street & Ford Ave.

10/12/2018



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	60.0	60.0	22.0	50.0	28.0	60.0
Total Split (%)	54.5%	54.5%	20.0%	45.5%	25.5%	54.5%
Maximum Green (s)	55.5	55.5	17.5	45.5	23.5	55.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Max	Max	None
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	25.7	25.7	45.9	45.9	31.7	61.9
Actuated g/C Ratio	0.32	0.32	0.57	0.57	0.39	0.77
v/c Ratio	0.76	0.23	0.24	0.10	0.08	0.39
Control Delay	33.8	4.4	11.0	10.2	19.8	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.8	4.4	11.0	10.2	19.8	1.2
LOS	C	A	B	B	B	A
Approach Delay	26.7			10.7	3.1	
Approach LOS	C			B	A	
90th %ile Green (s)	37.3	37.3	14.0	45.5	27.0	37.3
90th %ile Term Code	Gap	Gap	Gap	MaxR	Hold	Gap
70th %ile Green (s)	30.3	30.3	11.0	45.5	30.0	30.3
70th %ile Term Code	Gap	Gap	Gap	MaxR	Hold	Gap
50th %ile Green (s)	25.7	25.7	9.4	45.5	31.6	25.7
50th %ile Term Code	Gap	Gap	Gap	MaxR	Hold	Gap
30th %ile Green (s)	21.4	21.4	8.0	45.5	33.0	21.4
30th %ile Term Code	Gap	Gap	Gap	MaxR	Hold	Gap
10th %ile Green (s)	16.0	16.0	6.6	45.5	34.4	16.0
10th %ile Term Code	Gap	Gap	Gap	MaxR	Hold	Gap
Stops (vph)	332	16	77	44	36	14
Fuel Used(gal)	18	5	3	2	1	4
CO Emissions (g/hr)	1285	320	195	115	61	289
NOx Emissions (g/hr)	250	62	38	22	12	56
VOC Emissions (g/hr)	298	74	45	27	14	67
Dilemma Vehicles (#)	0	0	0	6	0	0
Queue Length 50th (ft)	191	0	40	23	18	0
Queue Length 95th (ft)	289	34	95	61	55	21
Internal Link Dist (ft)	1348			1282	983	
Turn Bay Length (ft)	150					
Base Capacity (vph)	1228	1140	797	1059	732	1572
Starvation Cap Reductn	0	0	0	0	0	0

Lanes, Volumes, Timings  
 49: N. 4th Street & Ford Ave.

10/12/2018



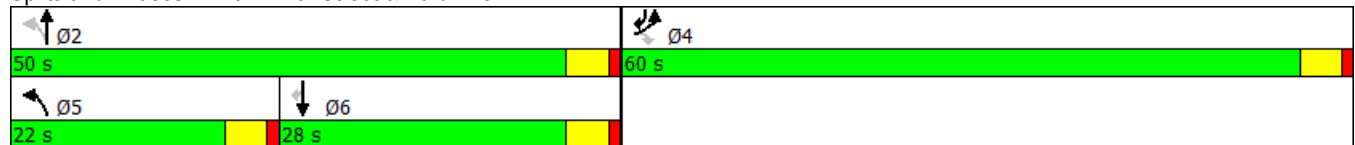
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.12	0.22	0.10	0.08	0.33

Intersection Summary

Area Type: Other  
 Cycle Length: 110  
 Actuated Cycle Length: 80.6  
 Natural Cycle: 60  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.76  
 Intersection Signal Delay: 14.0  
 Intersection Capacity Utilization 46.1%  
 Analysis Period (min) 15  
 90th %ile Actuated Cycle: 91.8  
 70th %ile Actuated Cycle: 84.8  
 50th %ile Actuated Cycle: 80.2  
 30th %ile Actuated Cycle: 75.9  
 10th %ile Actuated Cycle: 70.5

Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 49: N. 4th Street & Ford Ave.

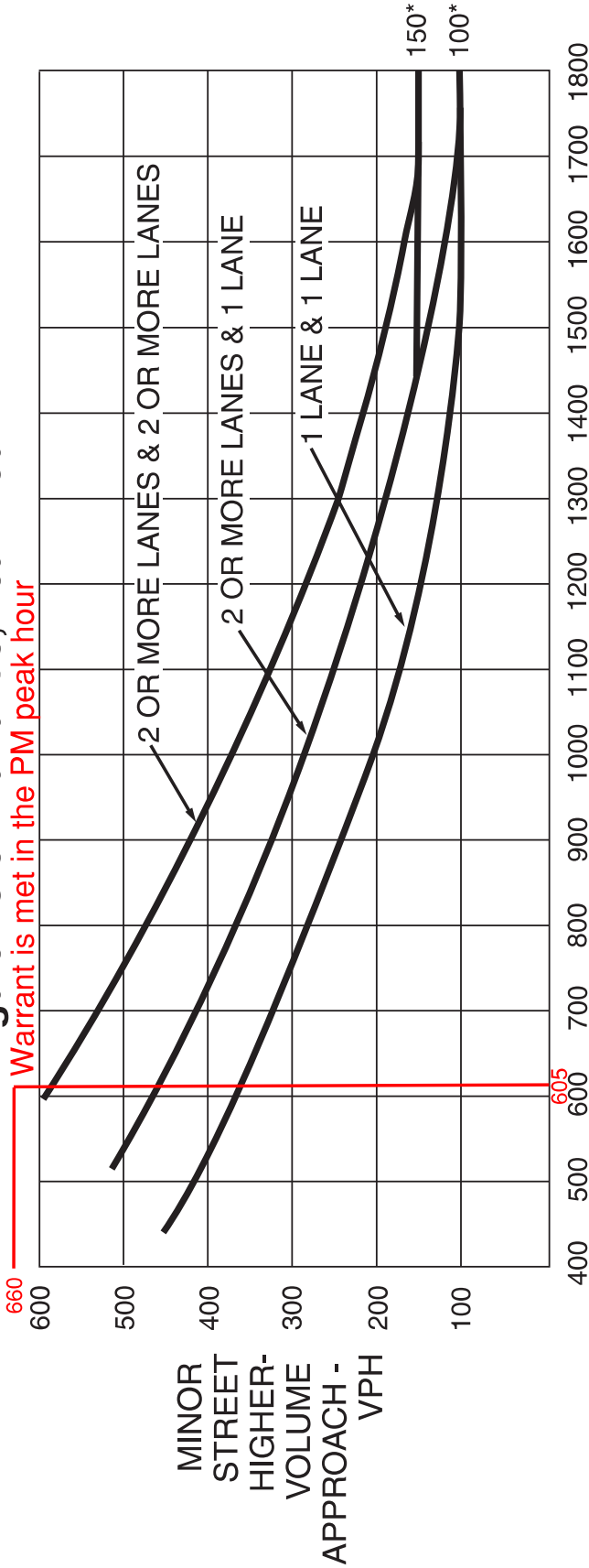


## **Appendix J**

### Traffic Signal Warrant Analysis

- Exhibit 1 - Peak Hour Signal Warrant – 2030 - Avenue of Mid-America & Damron Court
- Exhibit 2 - Peak Hour Signal Warrant – 2030 – N. Keller Drive & Damron Court
- Exhibit 3 - Peak Hour Signal Warrant – 2040 – Ford Avenue & Charlotte Street
- Exhibit 4 - Peak Hour Signal Warrant – 2040 – Ford Avenue & N. 4<sup>th</sup> Street

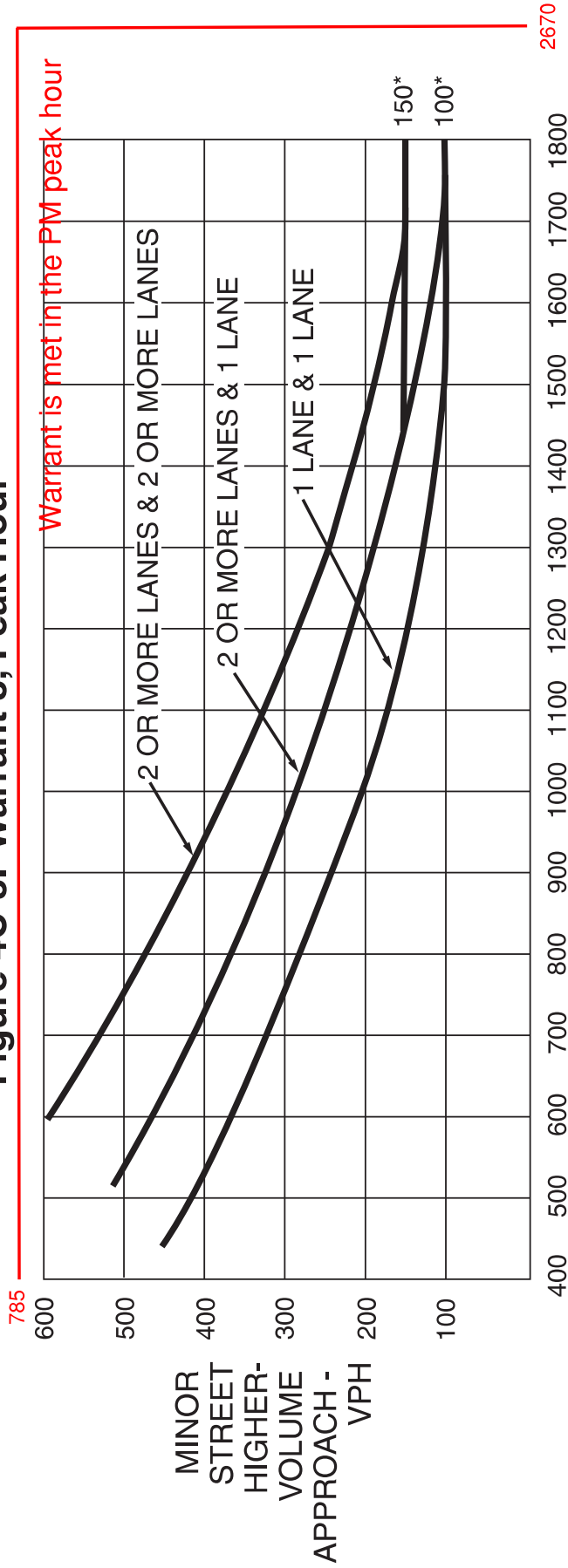
**Figure 4C-3. Warrant 3, Peak Hour**



**MAJOR STREET—TOTAL OF BOTH APPROACHES—  
VEHICLES PER HOUR (VPH)**

\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

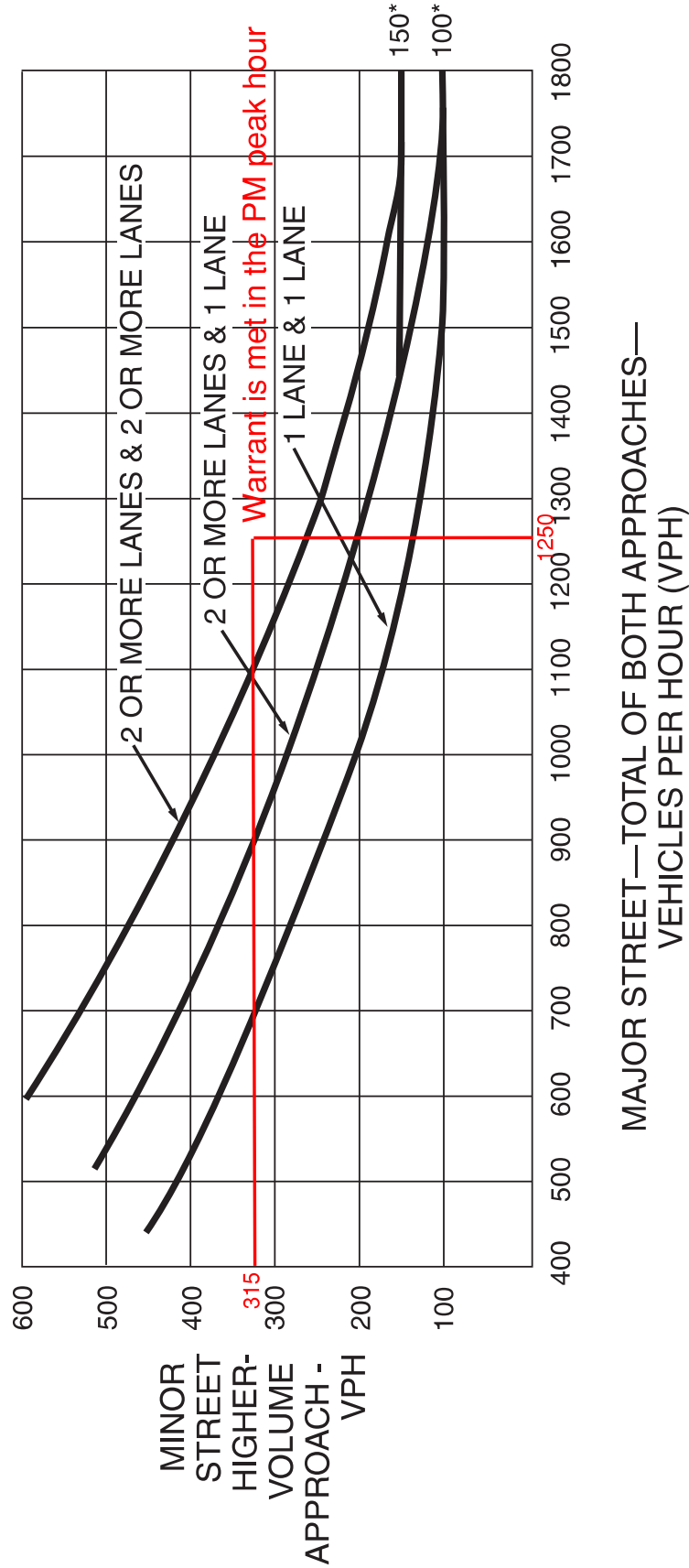
**Figure 4C-3. Warrant 3, Peak Hour**



**MAJOR STREET—TOTAL OF BOTH APPROACHES—  
VEHICLES PER HOUR (VPH)**

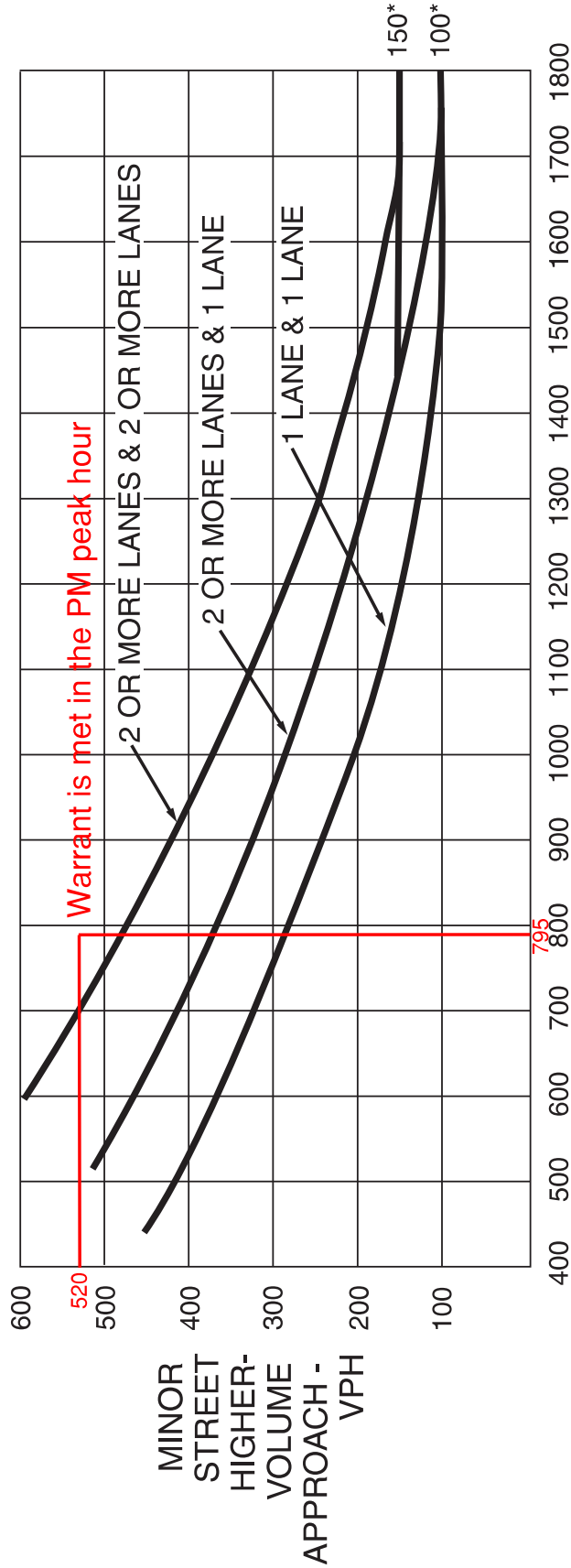
\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Figure 4C-3. Warrant 3, Peak Hour**



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Figure 4C-3. Warrant 3, Peak Hour**



**MAJOR STREET—TOTAL OF BOTH APPROACHES—  
VEHICLES PER HOUR (VPH)**

\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.