

**TRAFFIC IMPACT ANALYSIS**

**FOR**

**MAGNOLIA RECREATION  
COMPLEX**

Prepared for:

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## **Appendices**

- A Supplemental Info, Traffic Volumes, Condition Diagrams
- B Critical Lane Volume (CLV) Worksheets
- C Trip Generation Worksheets
- D Highway Capacity Manual Worksheets

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# **Section 1 Introduction**

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## **1.1 Project Description**

This Traffic Impact Analysis was prepared for the Magnolia Recreation Complex located adjacent to the Magnolia Elementary and Middle Schools in Harford County, Maryland as shown on Exhibit 1.

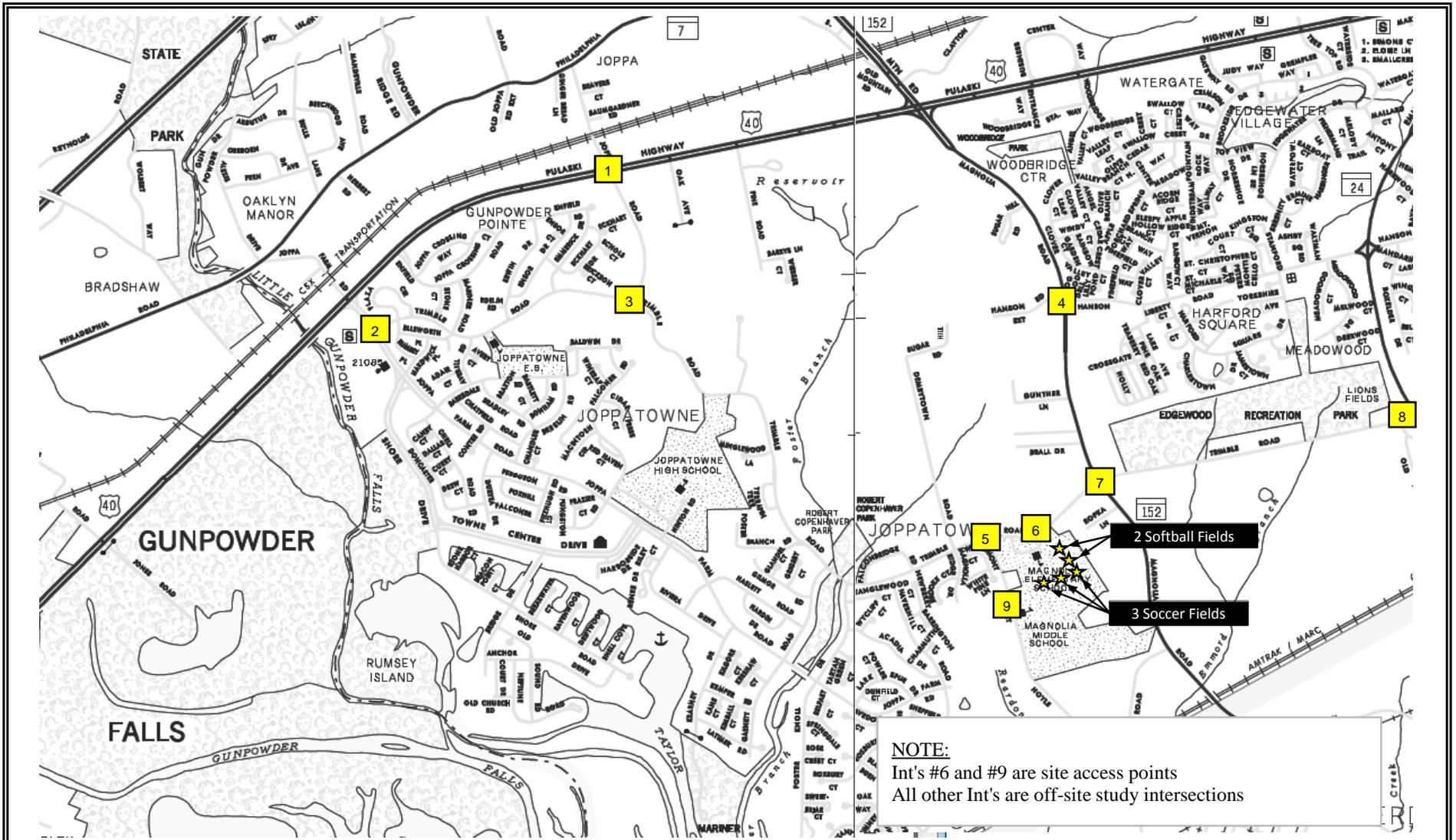
Magnolia Elementary School is located along the south side of Trimble Road with existing access directly onto Trimble Road. The Magnolia Middle School is located to the south of the Elementary School with existing access to the east side of Fort Hoyle Road.

The Magnolia Recreation Complex is proposed to be developed with three (3) soccer fields and two (2) softball fields. The fields will be accessible from either school, and the project includes expanded parking areas adjacent to the Middle School and Elementary School.

The results of this study indicate that all of the study intersections are will operate within acceptable County thresholds and that the proposed recreation center will have a negligible impact on the study intersections.

## **1.2 Scope of Study**

A scoping agreement for the Magnolia Recreation Complex was approved by Harford County Planning & Zoning. A copy of the Scoping Agreement and related correspondence is included in Appendix A.



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### Site Location Map

**Exhibit**  
**1**

## **Section 2 Existing Conditions**

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### **2.1 Description of Road Network**

The key roads in the study area are Trimble Road and Fort Hoyle Road.

Trimble Road is a two lane road with an east-west orientation. The posted speed limit in the vicinity of the site is 30 MPH. Fort Hoyle Road is a two lane road with a north-south orientation. There are a very limited number of residential homes (+-12 homes) to the south of Magnolia Middle School.

MD 152 is a state roadway with a north south orientation that terminates at the base entrance roughly one (1) mile south of the site. The MD 152 entrance to the base is a gated entrance that is a secondary entrance that is primarily closed.

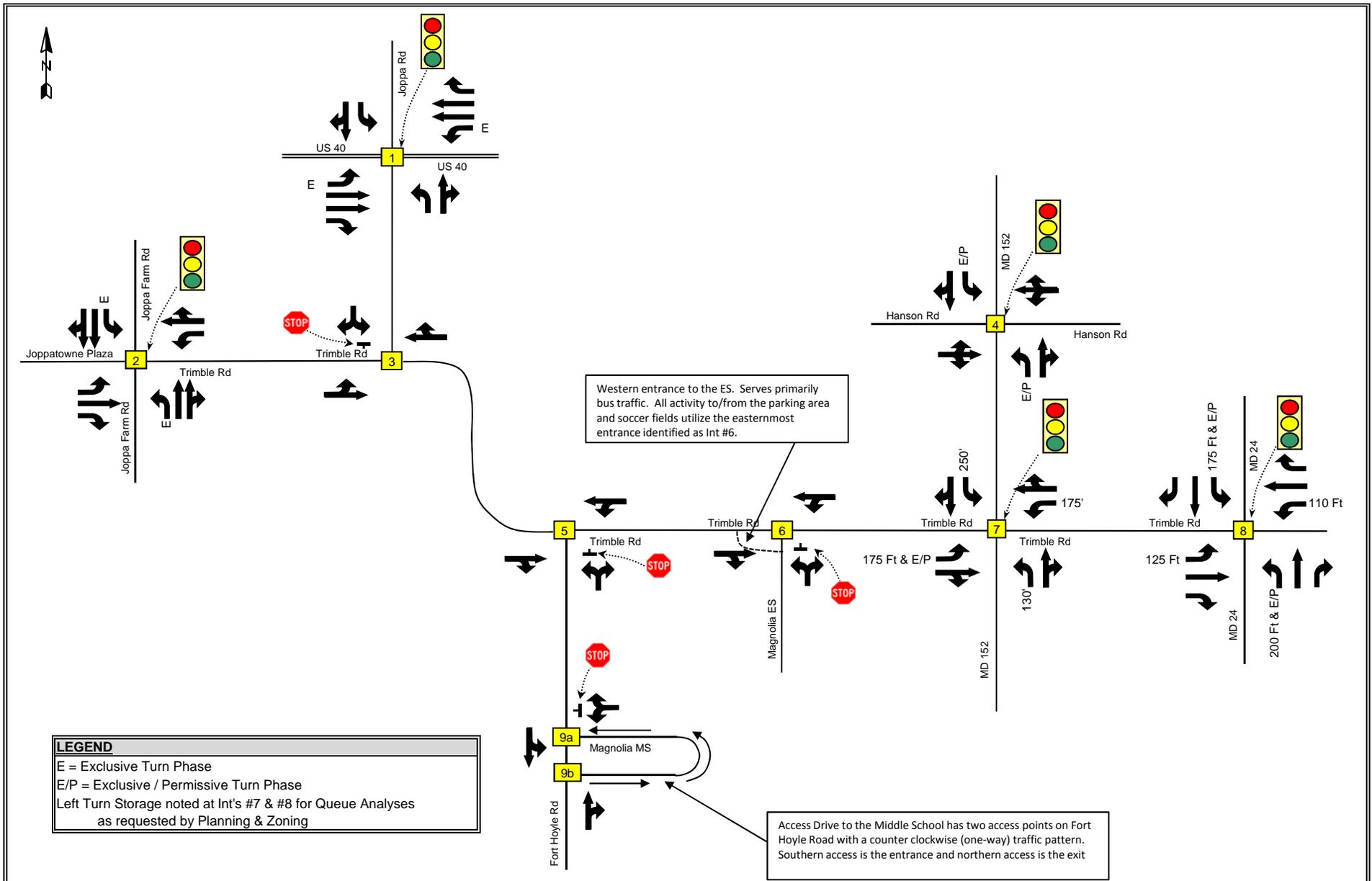
MD 24 also runs in a north south direction and terminates at the base entrance to the south. MD 24 is a primary entrance and exit to and from the base.

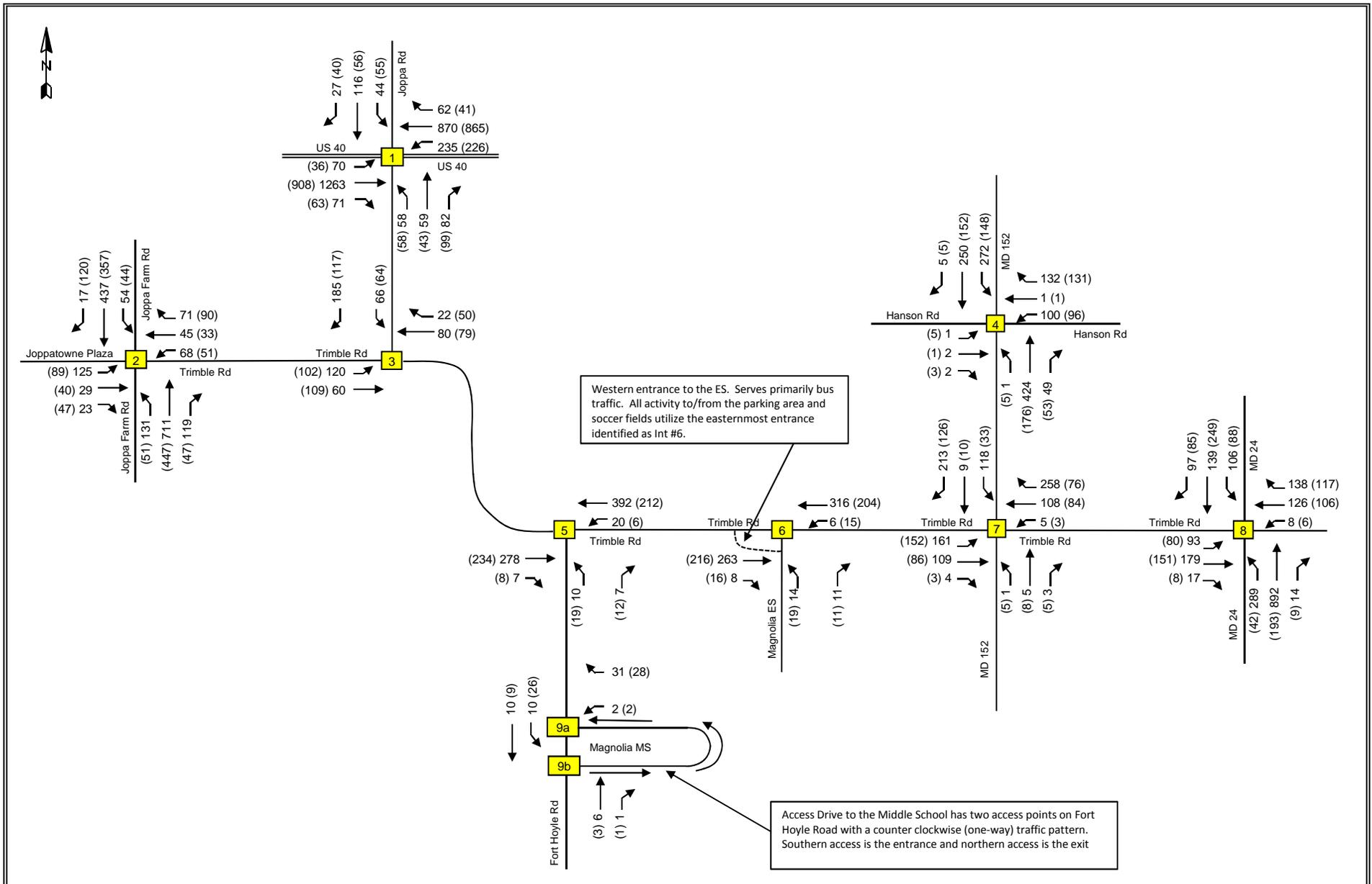
### **2.2 Existing Lane Configurations**

The Existing Lane Use & Traffic Control Devices are shown on Exhibit 2.

### **2.3 Existing Traffic Counts**

Peak Hour Traffic counts were conducted during the evening peak hour and the Saturday mid-day peak hour, and the results are provided on Exhibit 3. The recreation fields are not expected to generate traffic during the morning peak hour, therefore a morning peak hour analyses was not required.





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**Existing (PM/Sat)  
Peak Hour Volumes**

Key: xx = PM Peak Vol's (xx) = Sat Peak Vol's

**Exhibit  
3**

## **2.4 Results of Existing Level of Service Analysis**

Harford County's Traffic Impact Study Guidelines require that all intersections are to be analyzed using the Highway Capacity Manual (HCM). The Maryland Highway Administration requests the use of Critical Lane Volume (CLV) methodology at state controlled intersections for review purposes.

The results of the existing level of service analyses are shown on Exhibit 11. The CLV worksheets are contained in Appendix B. and the HCM worksheets are contained in Appendix D.

## **Section 3      Background Conditions**

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### **3.1    Annual Growth**

The growth in regional traffic is considered for the purposes of developing the base traffic volumes in the projected build year for the opening of the site. A 2.2% annual growth rate was applied to the existing traffic to account for the growth in regional traffic volumes for the estimated three year build-out of the site.

### **3.2    Base Traffic Volumes**

Three (3) years of growth were applied to the traffic counts at 2.2% per year, and the resulting 2010 Base Peak Hour Volumes are shown on Exhibit 4.

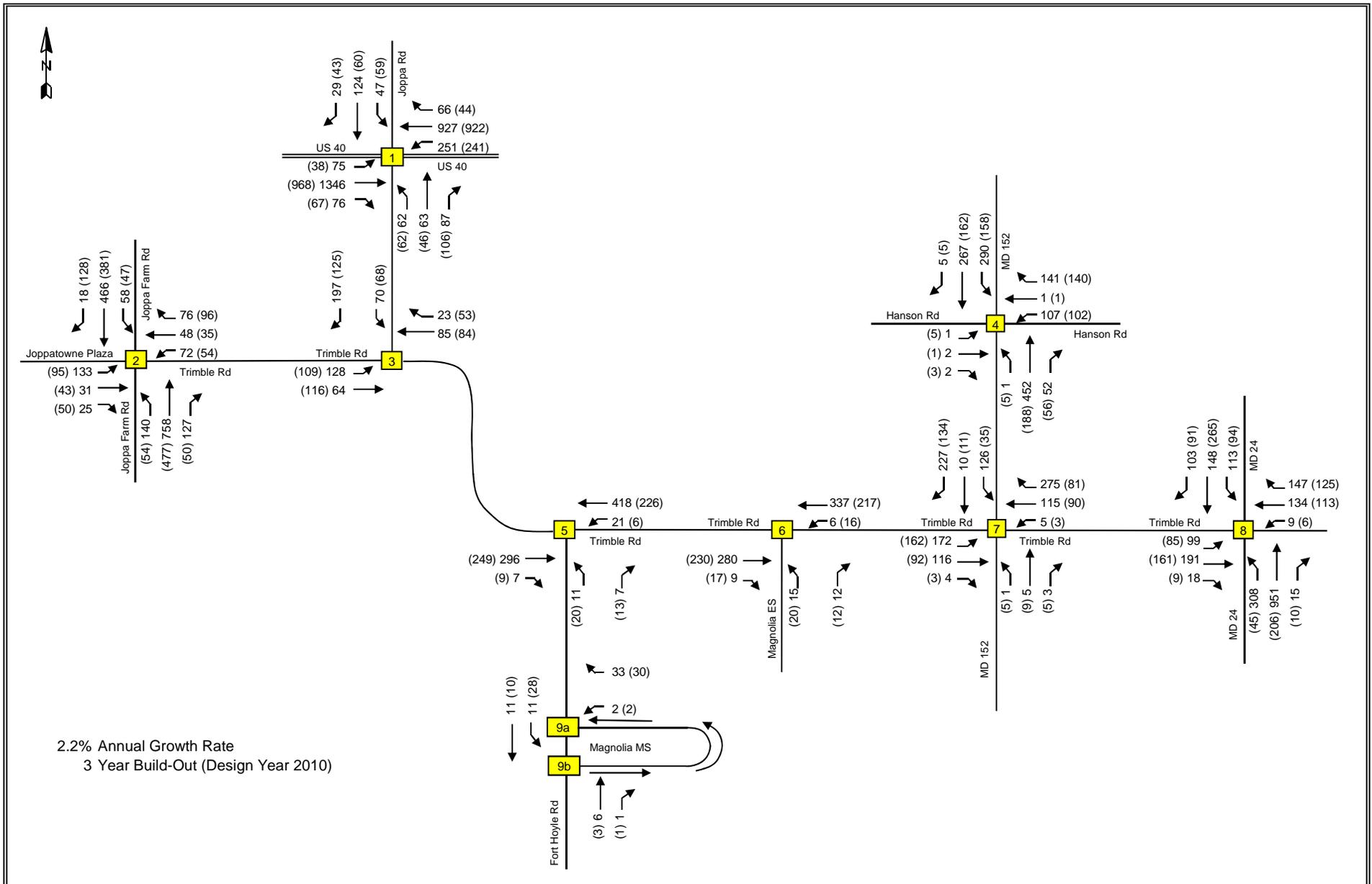
### **3.3.   Approved Background Developments**

A list of approved background developments is shown in Appendix C. The trip generation rates, totals, and assignments for each of the approved background developments are included in Appendix C to this report.

The Combined Trips Generated by Approved Developments is shown on Exhibit 5. The Trip Generation Rates were obtained from the ITE Trip Generation Manual, 7<sup>th</sup> Edition. A location map of the background developments is included in Appendix C along with trip generation tables and trip assignment exhibits for each of the projects.

### **3.4    Background Traffic Volumes**

The 2010 Base Peak Hour Volumes were combined with the Trips Generated by the Background Developments to obtain the 2010 Background Peak Hour Volumes shown on Exhibit 6.



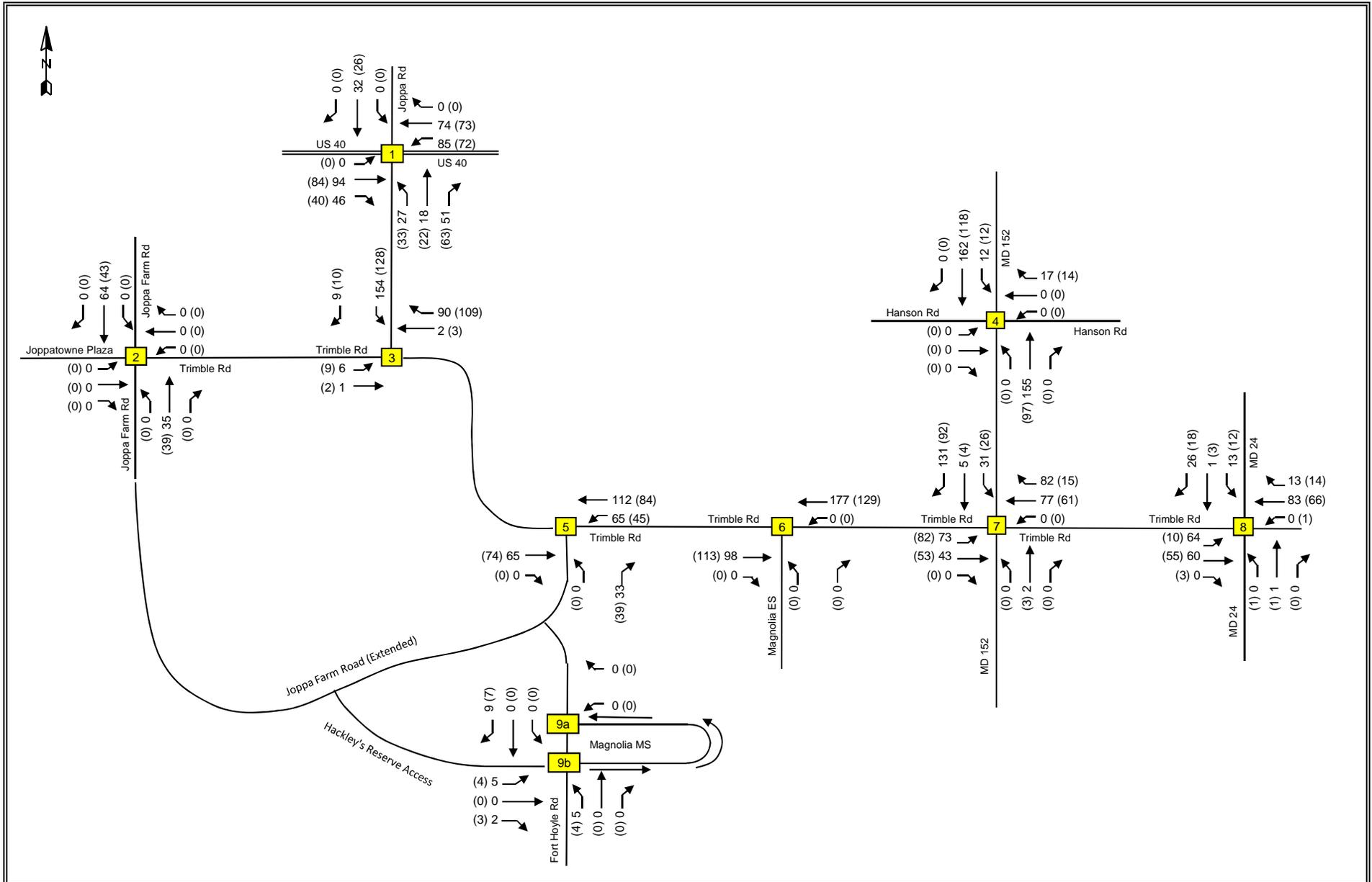
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Base - (PM/Sat)  
2010 Peak Hour Volumes

Key: xx = PM Peak Vol's (xx) = Sat Peak Vol's

Exhibit  
4



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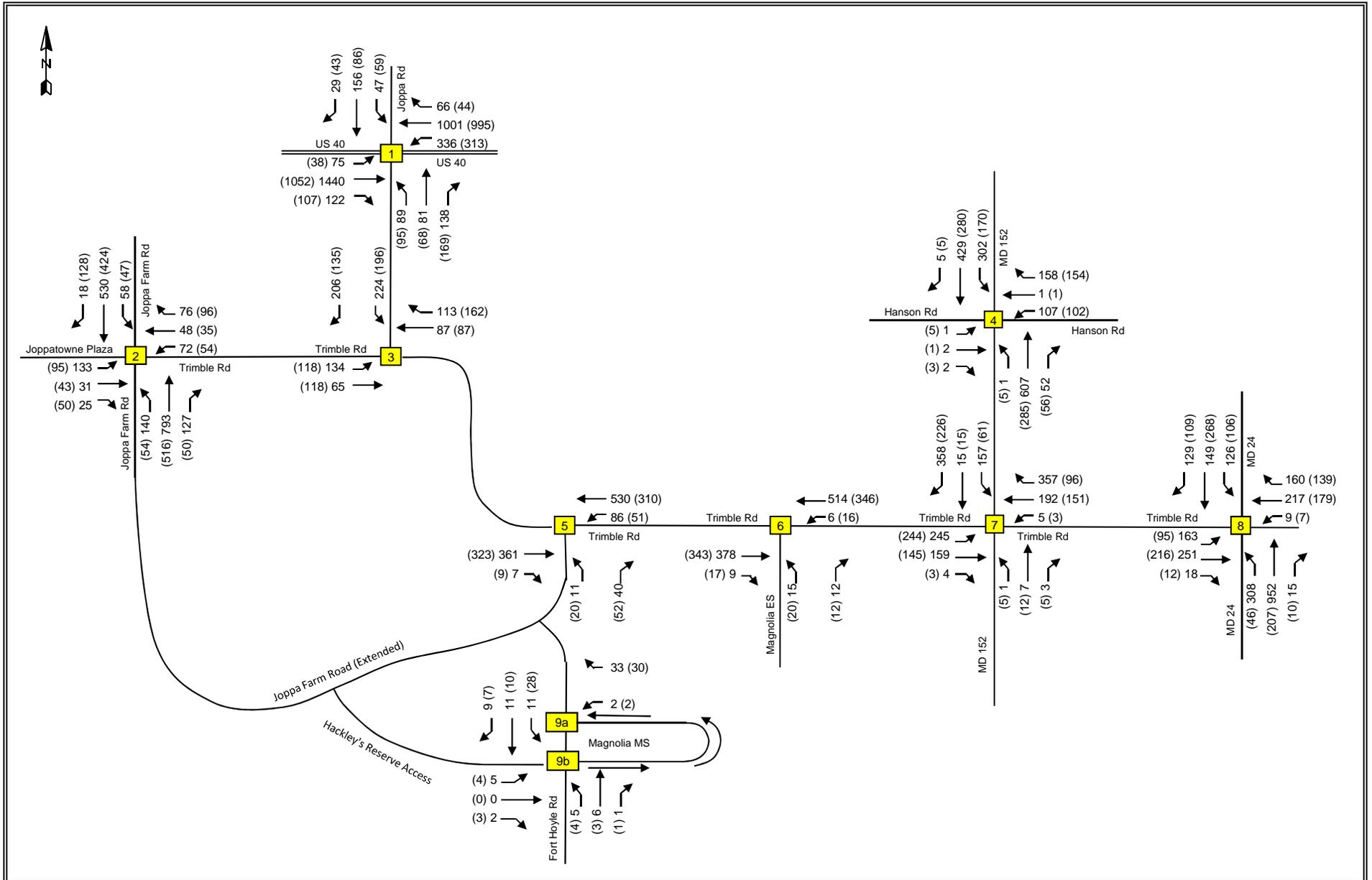
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### Combined trips for Approved Background Developments

Key: xx = PM Peak Vol's (xx) = Sat Peak Vol's

**Exhibit  
5**



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## Background - (PM/Sat) 2010 Peak Hour Volumes

Key: xx = PM Peak Vol's (xx) = Sat Peak Vol's

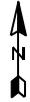
**Exhibit**

**6**

The proposed development of Hackley's Reserve is located to the west of Fort Hoyle Road. The recent approval of Hackley's Reserve included the extension of Joppa Farm Road to tie into Trimble Road. The traffic diversions associated with this extension were obtained from the Hackley's Reserve traffic study and applied to the study intersections as shown on Exhibit 7. The adjusted 2010 Background Peak Hour Volumes are shown on Exhibit 8, which includes the extension of Joppa Farm Road.

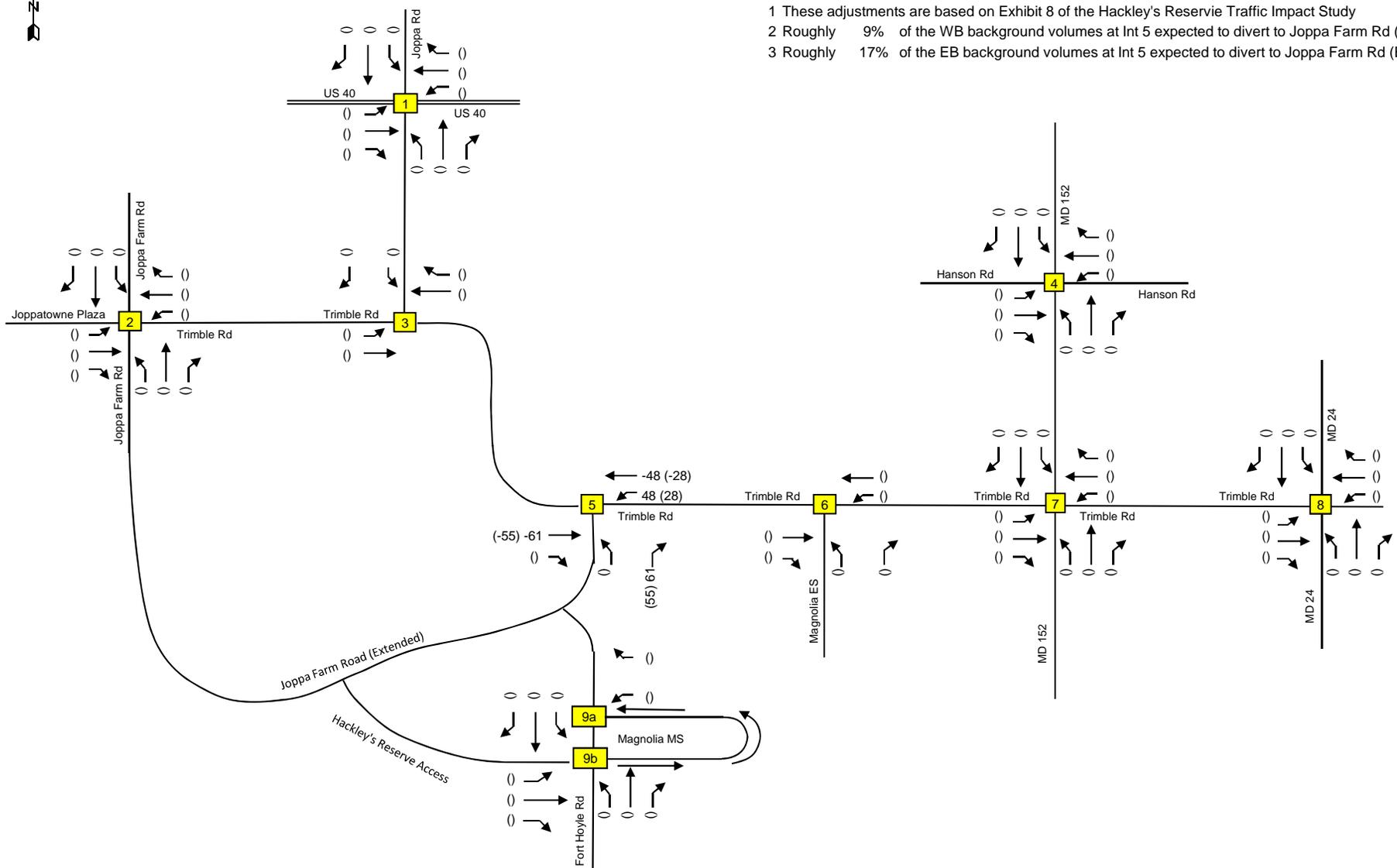
### **3.5 Results of Background Level of Service Analysis**

The background traffic volumes on Exhibit 8 were evaluated and the results of the study are detailed on Exhibit 11.



NOTE:

- 1 These adjustments are based on Exhibit 8 of the Hackley's Reserve Traffic Impact Study
- 2 Roughly 9% of the WB background volumes at Int 5 expected to divert to Joppa Farm Rd (Ext)
- 3 Roughly 17% of the EB background volumes at Int 5 expected to divert to Joppa Farm Rd (Ext)



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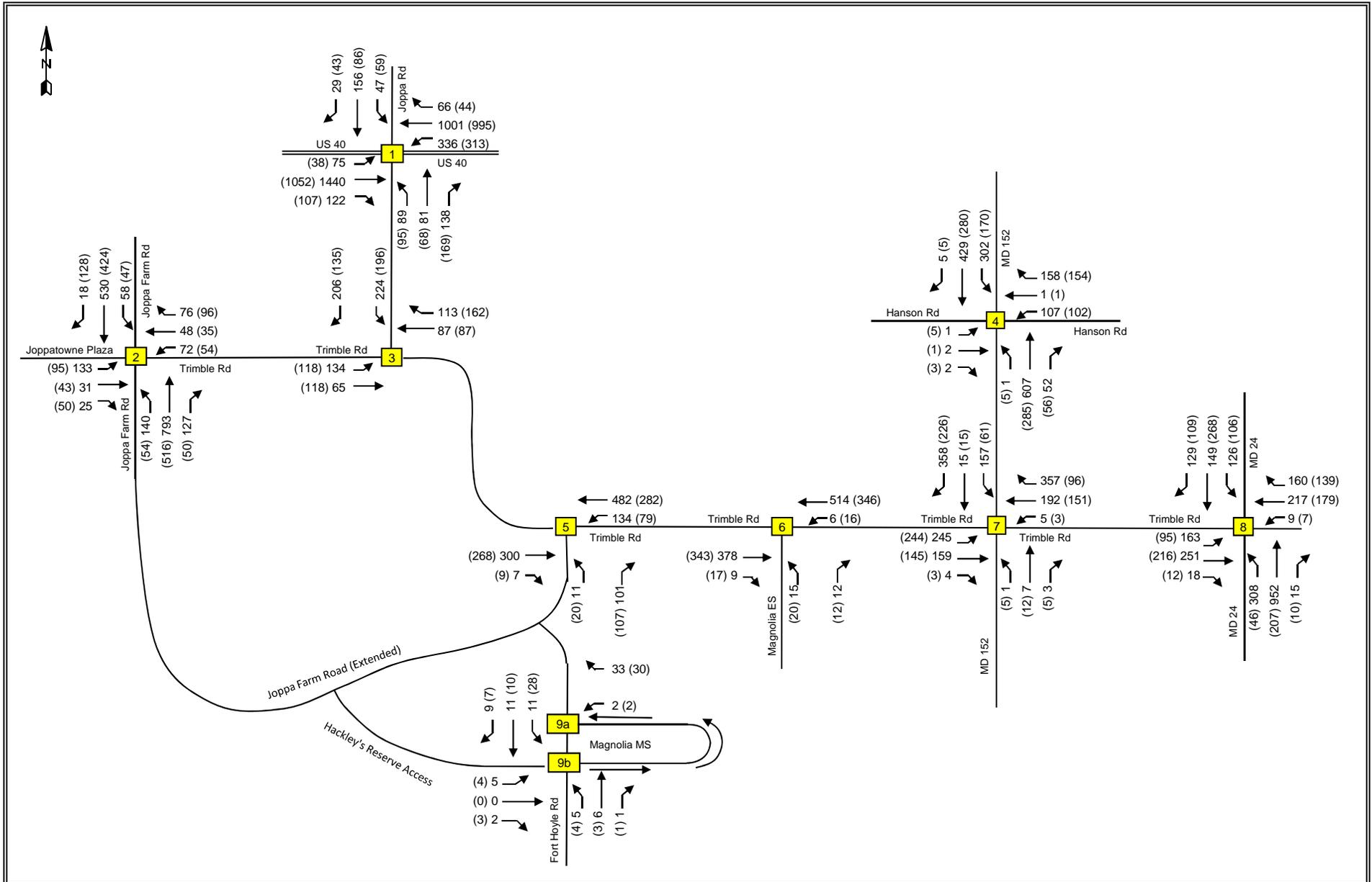
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### Adjustments to Background Traffic due to Extension of Joppa Farm Road

Key: xx = PM Peak Vol's (xx) = Sat Peak Vol's

**Exhibit**  
**7**



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## Adjusted Background - (PM/Sat) 2010 Peak Hour Volumes (With Joppa Farm Rd Ext)

Key: xx = PM Peak Vol's (xx) = Sat Peak Vol's

# Exhibit 8

## **Section 4      Projected Conditions with Site**

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### **4.1    Site Trip Generation**

This Traffic Impact Analysis was prepared for the Magnolia Recreation Complex located adjacent to the Magnolia Elementary and Middle Schools in Harford County, Maryland.

The Magnolia Recreation Complex is proposed to be developed with three (3) soccer fields and two (2) softball fields. The fields will be accessible from either school, and the project includes expanded parking areas adjacent to the Middle School and Elementary School.

The trip generation rates and totals are based on Land Use Code 488 of the ITE Trip Generation Manual.

### **4.2    Site Trip Distribution & Trip Assignment**

Magnolia Elementary School is located along the south side of Trimble Road with existing access directly onto Trimble Road. The Magnolia Middle School is located to the south of the Elementary School with existing access to the east side of Fort Hoyle Road.

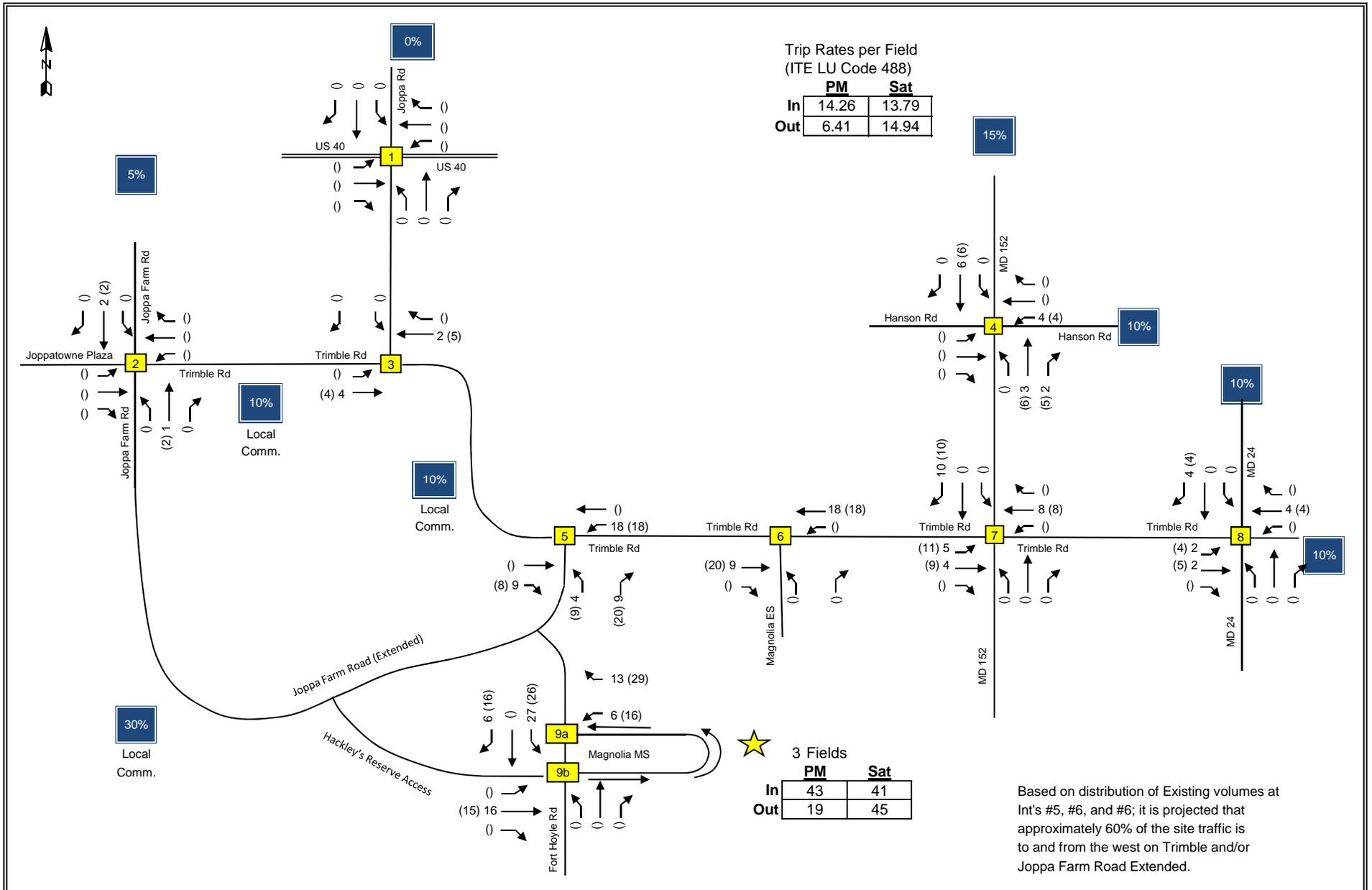
The vehicular trips were assigned to the road network based on the location of the fields on the recreation complex and the proximity of access and parking; however, it is important to note that visitors to the facility will be able to access any of the fields from either parking lot. Exhibit 9a shows the trip generation and trip assignment for the fields closest to the Middle School while Exhibit 9b shows the trip generation and trip assignment for the fields closest to the Elementary School.

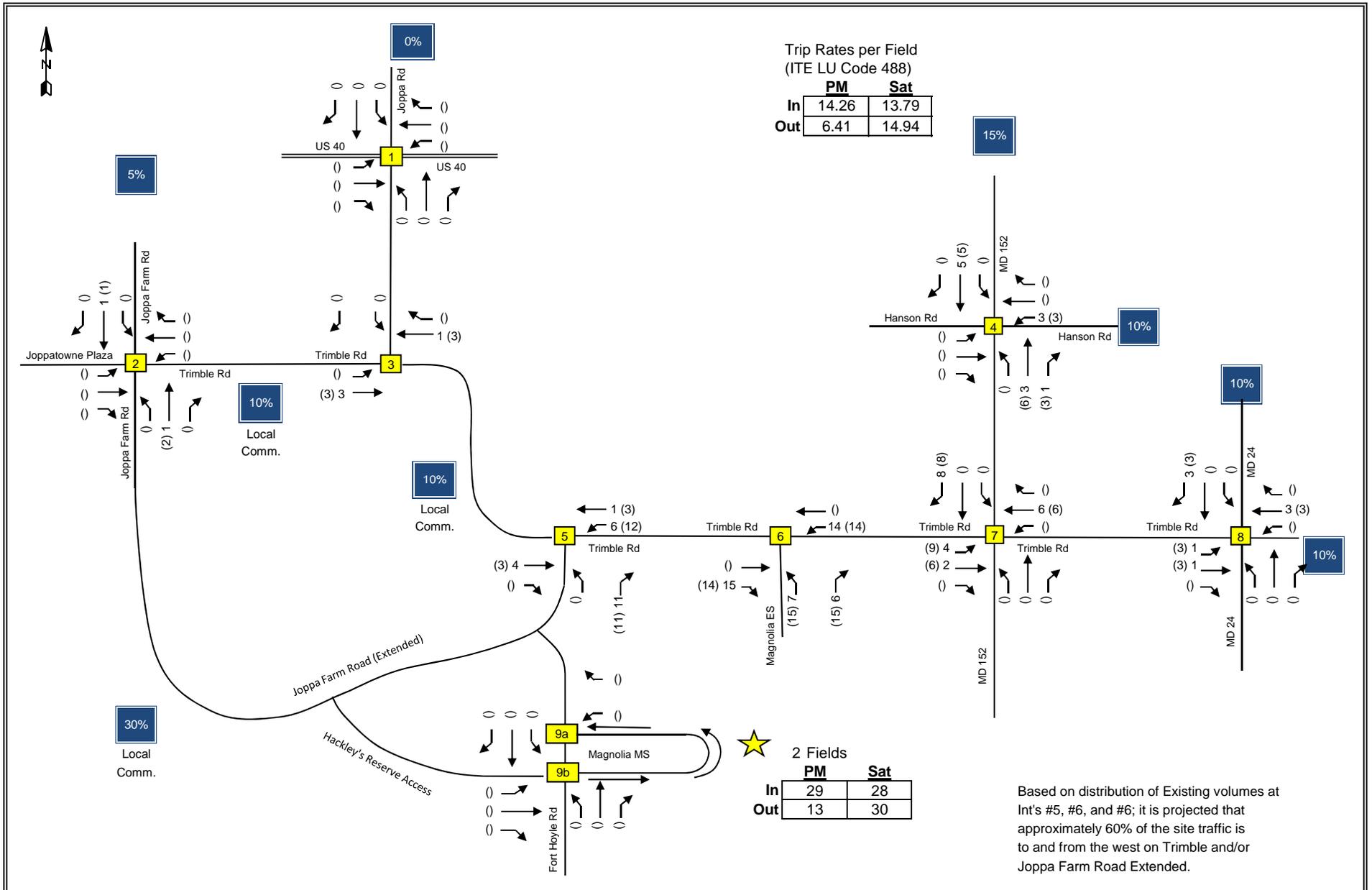
### **4.3    Total Traffic Volumes**

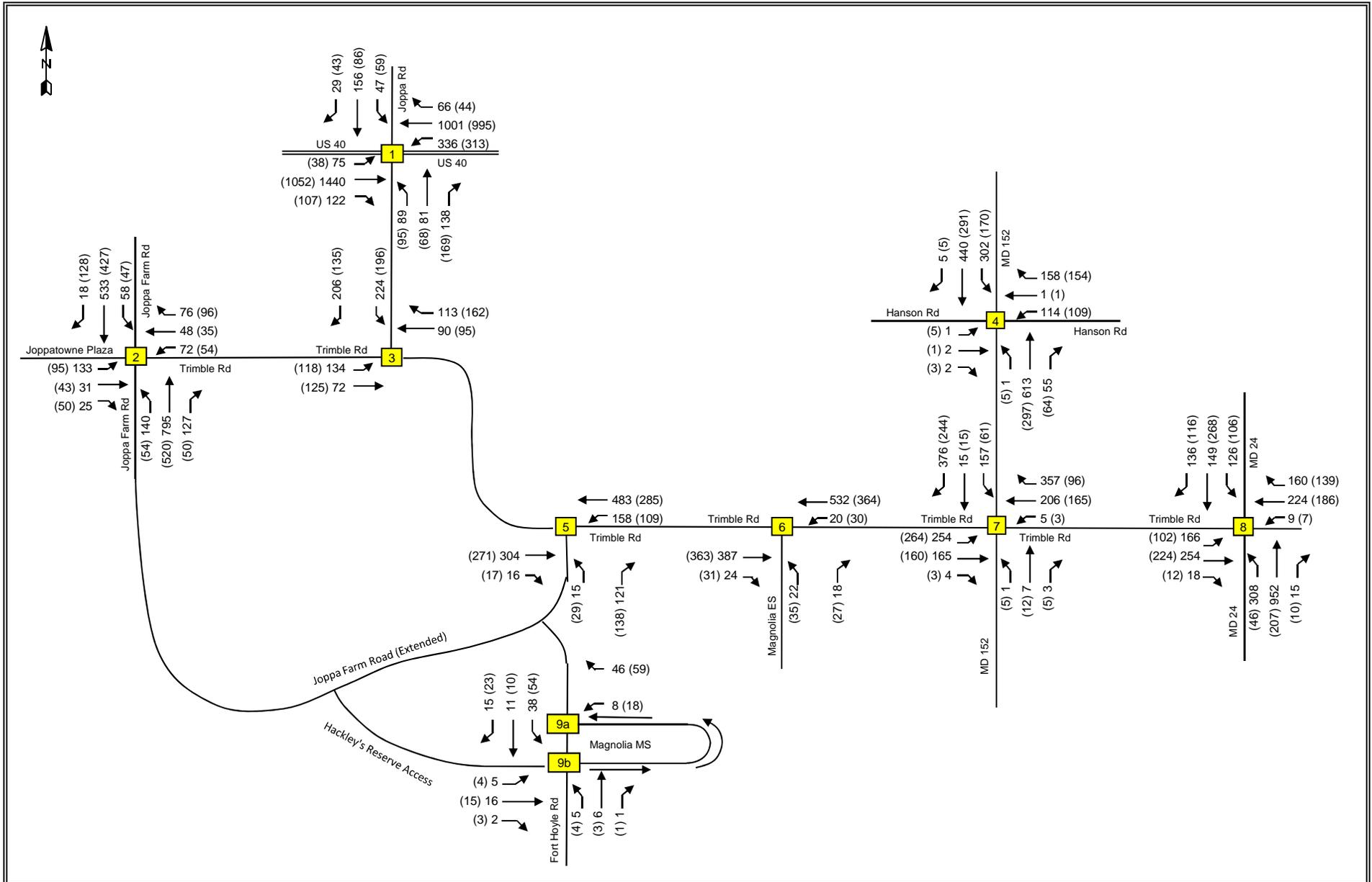
The 2010 Background Peak Hour Volumes were combined with the site generated trips to provide the 2010 Total Peak Hour Volumes shown on Exhibit 10.

### **4.4    Projected Level of Service**

The 2010 Total Peak Hour Volumes were evaluated and the results of the study are detailed on Exhibit 11.







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Total - (PM/Sat)  
2010 Peak Hour Vol's (With Joppa Farm Rd Ext)

Key: xx = PM Peak Vol's (xx) = Sat Peak Vol's

**Exhibit  
10**

## Level-of-Service Results

Evening Peak Hour	Existing	Background	Total
1). US 40 & Joppa Road *	C / 30.5	D / 40.1	D / 40.1
2). Joppa Farm Road & Trimble Road *	C / 23.8	C / 24.3	C / 24.3
3). Joppa Road & Trimble Road **	B / 11.7	C / 26.8	D / 27.7
4). MD 152 & Hanson Road *	C / 24.4	C / 32.6	C / 33.7
5). Trimble Road & Fort Hoyle Road **	B / 13.2	B / 13.1	B / 14.5
6). Trimble Road & Magnolia ES **	B / 11.8	B / 14.9	C / 16.1
7). MD 152 & Trimble Road *	C / 27.1	D / 35.7	D / 37.1
8). MD 24 & Trimble Road *	C / 29.9	D / 36.9	D / 37.1
9). Fort Hoyle Road & Magnolia MS **			
9a). North Access **	A / 8.5	A / 8.5	A / 8.7
9b). South Access **	A / 7.2	A / 8.8	B / 10.1

Saturday Peak Hour	Existing	Background	Total
1). US 40 & Joppa Road *	C / 27.5	C / 31.2	C / 31.2
2). Joppa Farm Road & Trimble Road *	C / 21.9	C / 22	C / 22
3). Joppa Road & Trimble Road **	B / 11.5	C / 22.1	C / 23
4). MD 152 & Hanson Road *	C / 24.5	C / 25.2	C / 25.8
5). Trimble Road & Fort Hoyle Road **	B / 11.6	B / 12.9	B / 14.9
6). Trimble Road & Magnolia ES **	B / 11.5	B / 14.6	C / 16.5
7). MD 152 & Trimble Road *	C / 23.9	C / 25.7	C / 26
8). MD 24 & Trimble Road *	C / 22.9	C / 23.2	C / 23.2
9). Fort Hoyle Road & Magnolia MS **			
9a). North Access **	A / 8.5	A / 8.5	A / 8.8
9b). South Access **	A / 7.2	A / 8.7	A / 9.9

\* Signalized Intersection ----> Use HCM Signalized Methodology

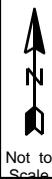
-Seconds of Delay reported for the overall intersection delay

\*\* Unsignalized Intersection ----> Use HCM Unsignalized Methodology

-Seconds of Delay reported for the minor street stop controlled approach.

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## Results of LOS Analyses

### HCM

## Exhibit 11

## Section 5      Conclusions / Recommendations

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### 5.1      Results of Analysis

This Traffic Impact Analysis was prepared for the Magnolia Recreation Complex located adjacent to the Magnolia Elementary and Middle Schools in Harford County, Maryland as shown on Exhibit 1.

Magnolia Elementary School is located along the south side of Trimble Road with existing access directly onto Trimble Road. The Magnolia Middle School is located to the south of the Elementary School with existing access to the east side of Fort Hoyle Road.

The Magnolia Recreation Complex is proposed to be developed with three (3) soccer fields and two (2) softball fields. The fields will be accessible from either school, and the project includes expanded parking areas adjacent to the Middle School and Elementary School.

The results of this study indicate that all of the study intersections are will operate within acceptable County thresholds and that the proposed recreation center will have a negligible impact on the study intersections.

As requested by Planning & Zoning, a queuing analysis was conducted at the offsite study intersections of MD 152 & Trimble Road and MD 24 & Trimble Road. The results of these queue analyses are shown on Exhibit 12. The results indicate that the left turn bays at these two intersections are adequate to handle the average queues during both study periods. The queue analysis indicated that two of the eight left turn lanes at these two study intersections do not have sufficient length to handle the 95<sup>th</sup> percentile queues with or without the development of the Magnolia Recreation Complex. This exhibit further confirms that the Magnolia Recreation Complex generates very little traffic and has a negligible impact on the 95<sup>th</sup> percentile queue lengths. Again, the turn bays are sufficient to handle the average queues even with this project, and the level of service analyses confirm that all study intersections are projected to operate at acceptable levels.

In conclusion, based upon the results and recommendations included in this report, the development of Magnolia Recreation Complex will have a negligible impact on the study intersections, and will satisfy the requirements of the Harford County Traffic Impact Study guidelines.

## 95<sup>th</sup> Percentile Queues

Evening Peak Hour	Available Storage	Background		Total		Increase	
	Ft	Veh's	Ft	Veh's	Ft	Veh's	Ft
7). MD 152 & Trimble Road							
EB Trimble Rd Left Turn	175	10.2	255	10.8	270	0.6	15
WB Trimble Rd Left Turn	175	0.2	5	0.2	5	0	0
NB MD 152 Left Turn	130	0.1	3	0.1	3	0	0
SB MD 152 Left Turn	250	8.9	223	8.9	223	0	0
8). MD 24 & Trimble Road							
EB Trimble Rd Left Turn	125	11.5	288	11.9	298	0.4	10
WB Trimble Rd Left Turn	110	0.5	13	0.5	13	0	0
NB MD 24 Left Turn	200	8.6	215	8.6	215	0	0
SB MD 24 Left Turn	175	5.8	145	5.8	145	0	0
Saturday Peak Hour	Available Storage	Background		Total		Increase	
	Ft	Veh's	Ft	Veh's	Ft	Veh's	Ft
7). MD 152 & Trimble Road							
EB Trimble Rd Left Turn	175	10.5	263	11.6	290	1.1	27.5
WB Trimble Rd Left Turn	175	0.2	5	0.2	5	0	0
NB MD 152 Left Turn	130	0.3	8	0.3	8	0	0
SB MD 152 Left Turn	250	3.5	88	3.5	88	0	0
8). MD 24 & Trimble Road							
EB Trimble Rd Left Turn	125	4.4	110	4.8	120	0.4	10
WB Trimble Rd Left Turn	110	0.3	8	0.3	8	0	0
NB MD 24 Left Turn	200	1.9	48	1.9	48	0	0
SB MD 24 Left Turn	175	4.3	108	4.3	108	0	0

- NOTES:
1. Information obtained from HCM Signalized Intersection Reports for 95th Percentile Queues
  2. As shown above, the site only affects the queues on eastbound Trimble at Int's #7 & #8.
  3. As shown on Exhibit 11, all intersections operate at acceptable LOS's.

## Average Queues

Evening Peak Hour	Available	Background		Total		Increase	
	Ft	Veh's	Ft	Veh's	Ft	Veh's	Ft
7). MD 152 & Trimble Road (EB Left)	175	5.2	130	5.6	140	0.4	10
8). MD 24 & Trimble Road (EB Left)	125	5.9	148	6.2	155	0.3	7.5
Saturday Peak Hour	Available	Background		Total		Increase	
	Ft	Veh's	Ft	Veh's	Ft	Veh's	Ft
7). MD 152 & Trimble Road (EB Left)	175	5.4	135	6	150	0.6	15
8). MD 24 & Trimble Road (EB Left)	125	2.2	55	2.4	60	0.2	5

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## Queue Analyses Int #7 and Int #8

**Exhibit  
12**