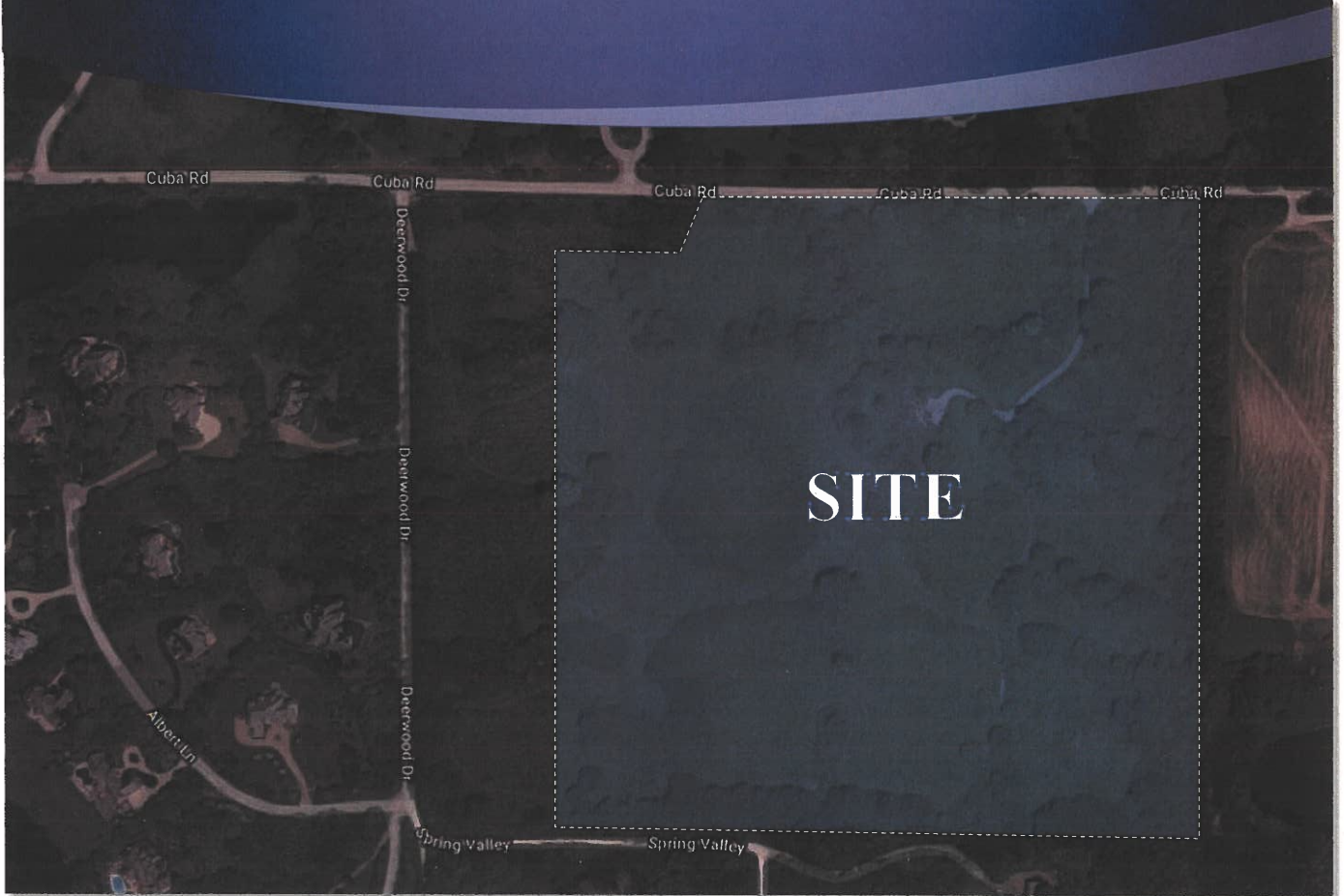


# Traffic Impact Study Proposed Residential Development

Long Grove, Illinois



Prepared For:

**Philip Estates, LLC**



May 20, 2019

# 1. Introduction

This report summarizes the methodologies, results, and findings of a traffic impact study conducted by Kenig, Lindgren, O'Hara, Aboona, Inc. (KLOA, Inc.) for the proposed residential development to be located on the south side of Cuba Road east of Nottingham Drive in Long Grove, Illinois. As proposed the site, which is currently vacant, will be developed to provide a single-family subdivision with 19 lots. Access to the site will be provided via a full movement access drive at the approximate location of the existing curb cut off Cuba Road located approximately 960 feet east of Nottingham Drive.

The purpose of this study was to examine background traffic conditions, assess the impact that the proposed development will have on traffic conditions in the area, and determine if any roadway or access improvements are necessary to accommodate traffic generated by the proposed residential development.

**Figure 1** shows the location of the site in relation to the area roadway system. **Figure 2** shows an aerial view of the site.

The sections of this report present the following:

- Existing roadway conditions
- A description of the proposed development
- Directional distribution of the development traffic
- Vehicle trip generation for the development
- Future traffic conditions including access to the development
- Traffic analyses for the weekday morning and weekday evening peak hours
- Recommendations with respect to adequacy of the site access and adjacent roadway system

Traffic capacity analyses were conducted for the weekday morning and weekday evening peak hours for the following conditions:

1. Existing Conditions - Analyzes the capacity of the existing roadway system using existing peak hour traffic volumes in the surrounding area.
2. Future Conditions – Analyzes the projected traffic volumes which include the existing traffic volumes increased by an ambient area growth factor (growth not attributable to any particular development) and the traffic estimated to be generated by the proposed subject development.



Site Location

Figure 1





**Aerial View of Site**

**Figure 2**

## 2. Existing Conditions

Existing transportation conditions in the vicinity of the site were documented based on field visits conducted by KLOA, Inc. in order to obtain a database for projecting future conditions. The following provides a description of the geographical location of the site, physical characteristics of the area roadway system including lane usage and traffic control devices, and existing peak hour traffic volumes.

### Site Location

The site, which is currently vacant, is located on the south side of East Cuba Road east of Nottingham Drive. Land uses in the vicinity of the site are primarily residential.

### Existing Roadway System Characteristics

The characteristics of the existing roadways near the development are described below. **Figure 3** illustrates the existing roadway characteristics.

*Cuba Road* is an east-west local road that provides one lane in each direction in the vicinity of the site. At its unsignalized intersection with Deerwood Drive, Cuba Drive provides a combined through/right-turn lane on the eastbound approach and a combined through/left-turn lane on the westbound approach. At its unsignalized intersection with Nottingham Drive, Cuba Drive provides a combined through/left-turn lane on the eastbound approach and a combined through/right-turn lane on the westbound approach. Cuba Road is under the jurisdiction of the Village of Long Grove, carries an annual average daily traffic (AADT) volume of 2,400 vehicles (IDOT 2015), and has a posted speed limit of 30 miles per hour.

*Deerwood Drive* is a private road that provides one lane in each direction and extends from Cuba Road to its terminus as a cul-de-sac south of Cuba Road. At its unsignalized intersection with Cuba Road, Deerwood Drive provides a combined left-turn/right-turn lane on the northbound approach that is under stop sign control.

*Nottingham Drive* is a private road that provides one lane in each direction and extends from Cuba Road to its terminus as a cul-de-sac north of Cuba Road. At its unsignalized intersection with Cuba Road, Nottingham Drive provides a combined left-turn/right-turn lane on the southbound approach. It should be noted that Nottingham Drive serves the Glenstone neighborhood.



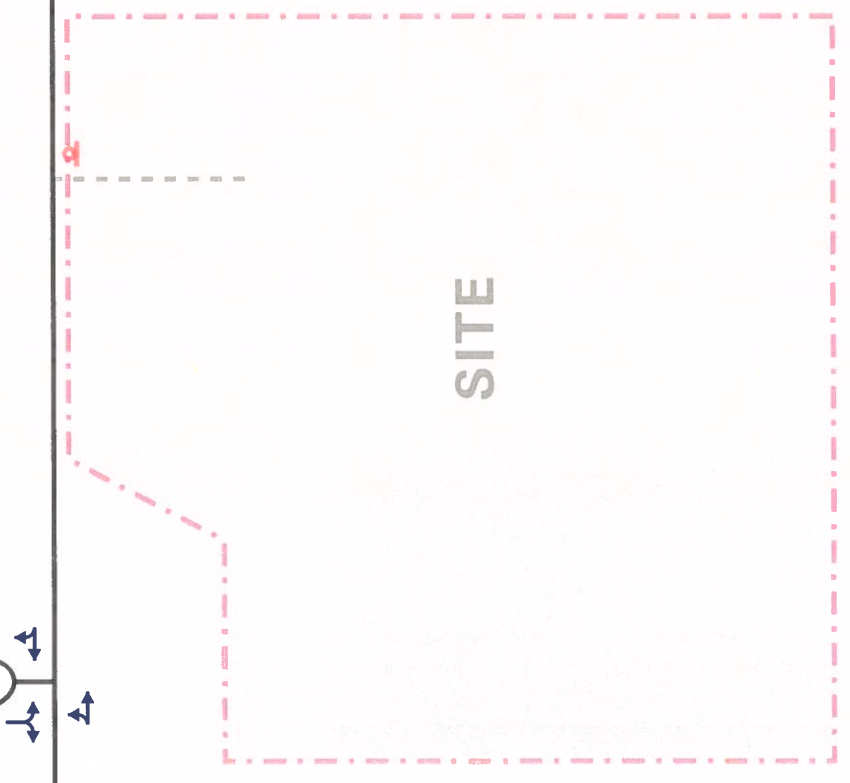
CUBA ROAD

NOTTINGHAM DRIVE

SITE

DEERWOOD DRIVE

- LEGEND**
- - TRAVEL LANE
  - ⬮ - STOP SIGN



Existing Roadway Characteristics

Proposed Residential  
 Development  
 Long Grove, Illinois

## Existing Traffic Volumes

In order to determine current traffic conditions in the vicinity of the site, KLOA, Inc. conducted peak period traffic counts using manual traffic counts on Wednesday, May 1, 2019, during the weekday morning (6:30 A.M. to 9:00 A.M.) and weekday evening (4:00 P.M. to 6:30 P.M.) peak periods at the following intersections:

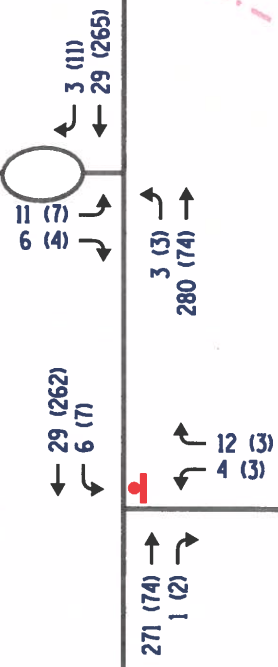
- Cuba Road with Deerwood Drive
- Cuba Road with Nottingham Drive

The results of the traffic counts showed that the weekday morning peak hour of traffic occurs from 7:15 A.M. to 8:15 A.M. and the weekday evening peak hour of traffic occurs from 5:15 P.M. to 6:15 P.M. **Figure 4** illustrates the existing peak hour traffic volumes. Copies of the traffic count summary sheets are included in the Appendix.

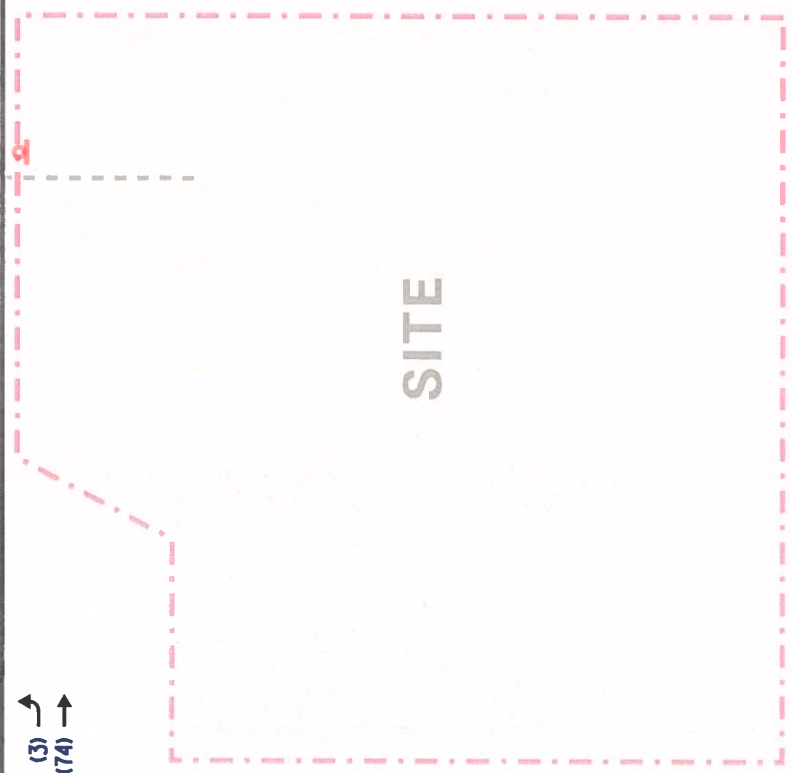


NOT TO SCALE

NOTTINGHAM DRIVE



CUBA ROAD



SITE

DEERWOOD DRIVE

**LEGEND**

- 00 - AM PEAK HOUR (7:15-8:15 AM)
- (00) - PM PEAK HOUR (5:15-6:15 PM)

Proposed Residential  
Development  
Long Grove, Illinois

Existing Traffic Volumes



Job No: 19-112 Figure: 4



### 3. Traffic Characteristics of the Proposed Development

In order to properly evaluate future traffic conditions in the surrounding area, it was necessary to determine the traffic characteristics of the proposed development, including the directional distribution and volumes of traffic that it will generate.

#### Proposed Site and Development Plan

As proposed, the plans call for developing a single-family subdivision with 19 lots. Access to the site will be provided via a full movement access drive off Cuba Road. This access road will be at the approximate location of the existing curb cut located approximately 960 feet east of Nottingham Drive. This access road will provide one inbound lane and one outbound lane and outbound movements should be under stop sign control. A copy of the preliminary site plan depicting the proposed development and access is included in the Appendix.

#### Directional Distribution

The directions from which residents of the proposed development will approach and depart the site were estimated based on existing travel patterns, as determined from the traffic counts. **Figure 5** illustrates the directional distribution of the development-generated traffic.

#### Estimated Site Traffic Generation

The volume of traffic generated by the proposed residential development was estimated using data published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 10<sup>th</sup> Edition. The “Single-Family Homes Detached Housing” (Land-Use Code 210) was used. **Table 2** tabulates the vehicle trips anticipated for this development. The ITE trip rate graphs are included in the Appendix.

Table 1  
ESTIMATED SITE-GENERATED TRAFFIC VOLUMES

ITE Land Use Code	Type/Size	Weekday Morning Peak Hour			Weekday Evening Peak Hour			Daily Two-Way Trips
		In	Out	Total	In	Out	Total	
210	Single-Family Homes (19 Units)	5	13	18	13	8	21	226



NOT TO SCALE

NOTTINGHAM DRIVE

25%

960'

75%

CUBA ROAD



DEERWOOD DRIVE

SITE

**LEGEND**

- 00% - PERCENT DISTRIBUTION
- 00' - DISTANCE IN FEET
-  - PROPOSED STOP SIGN

Proposed Residential Development  
Long Grove, Illinois

Estimated Directional Distribution



Job No: 19-112 Figure: 5

## 4. Projected Traffic Conditions

The total projected traffic volumes include the existing traffic volumes, increase in background traffic due to growth, and the traffic estimated to be generated by the proposed subject development.

### Development Traffic Assignment

The estimated weekday morning and evening peak hour traffic volumes that will be generated by the proposed residential development were assigned to the roadway system in accordance with the previously described directional distribution (Figure 5). The total new traffic assignment for the development is illustrated in **Figure 6**.

### Background Traffic Conditions

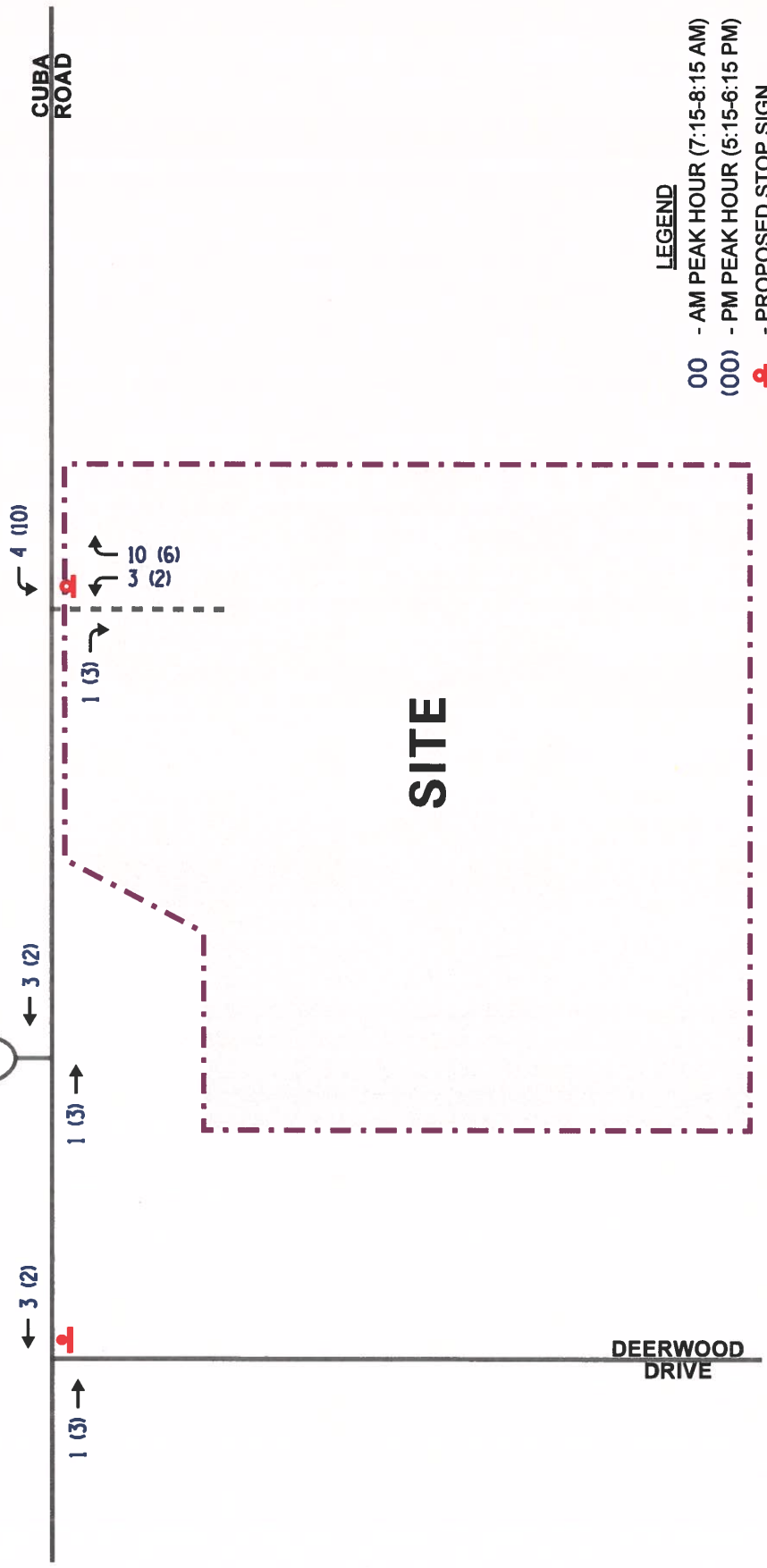
The existing traffic volumes (Figure 4) were increased by a regional growth factor to account for the increase in existing traffic related to regional growth in the area (i.e., not attributable to any particular planned development). Based on 2050 Average Daily Traffic (ADT) projections provided by the Chicago Metropolitan Agency for Planning (CMAP) in a letter dated May 3, 2019, the existing traffic volume were increased by an annually compounded growth rate for five years (one-year buildout plus five years) totaling four percent to represent Year 2025 total projected conditions. A copy of the CMAP 2050 projections letter is included in the Appendix.

### Total Projected Traffic Volumes

The development-generated traffic (Figure 6) was added to the existing traffic volumes increased by a regional growth factor to determine the Year 2025 total projected traffic volumes, as illustrated in **Figure 7**.



NOTTINGHAM DRIVE



**LEGEND**

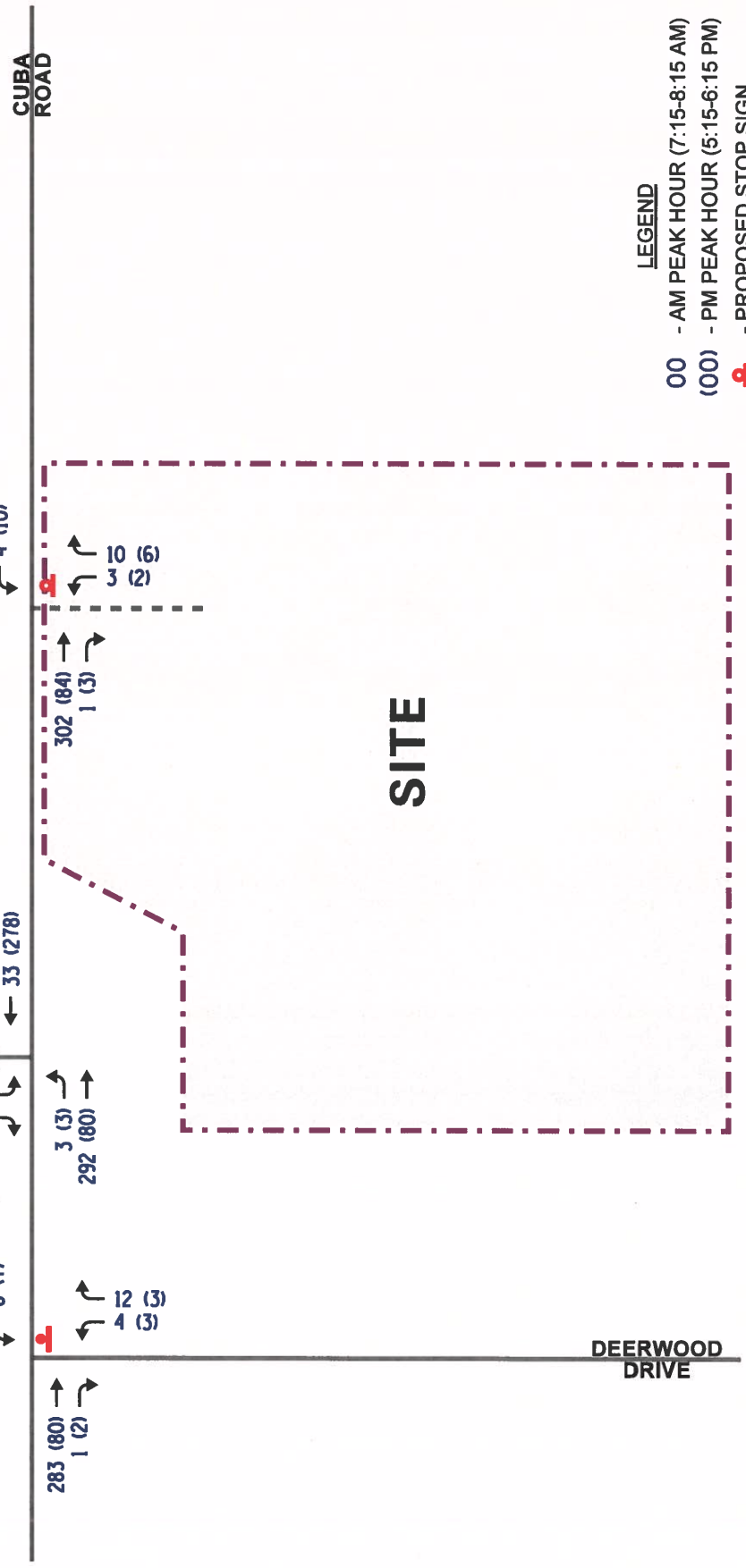
- 00 - AM PEAK HOUR (7:15-8:15 AM)
- (00) - PM PEAK HOUR (5:15-6:15 PM)
- - PROPOSED STOP SIGN

Proposed Residential  
Development  
Long Grove, Illinois

Estimated Site-Generated Traffic Volumes



Job No: 19-112 Figure: 6



- LEGEND**
- 00 - AM PEAK HOUR (7:15-8:15 AM)
  - (00) - PM PEAK HOUR (5:15-6:15 PM)
  - - PROPOSED STOP SIGN

Proposed Residential  
Development  
Long Grove, Illinois

Total Projected Traffic Volumes



Job No: 19-112 Figure: 7



## 5. Traffic Analysis and Recommendations

The following provides an evaluation conducted for the weekday morning and weekday evening peak hours. The analysis includes conducting capacity analyses to determine how well the roadway system and access drives are projected to operate and whether any roadway improvements or modification are required.

### Traffic Analyses

Roadway and adjacent or nearby intersection analyses were performed for the weekday morning, and weekday evening peak hours for the existing (Year 2019) and future projected (Year 2025) traffic volumes.

The traffic analyses were performed using the methodologies outlined in the Transportation Research Board's *Highway Capacity Manual (HCM)*, 6<sup>th</sup> Edition and analyzed using the Synchro/SimTraffic 10 computer software.

The analyses for the unsignalized intersections determine the average control delay to vehicles at an intersection. Control delay is the elapsed time from a vehicle joining the queue at a stop sign (includes the time required to decelerate to a stop) until its departure from the stop sign and resumption of free flow speed. The methodology analyzes each intersection approach controlled by a stop sign and considers traffic volumes on all approaches and lane characteristics.

The ability of an intersection to accommodate traffic flow is expressed in terms of level of service, which is assigned a letter from A to F based on the average control delay experienced by vehicles passing through the intersection. The *Highway Capacity Manual* definitions for levels of service and the corresponding control delay for signalized intersections and unsignalized intersections are included in the Appendix of this report.

Summaries of the traffic analysis results showing the level of service and overall intersection delay (measured in seconds) for the existing and Year 2025 total projected conditions are presented in **Tables 2** and **3**. A discussion of the intersections follows. Summary sheets for the capacity analyses are included in the Appendix.

Table 2  
CAPACITY ANALYSIS RESULTS – YEAR 2019 EXISTING CONDITIONS

Intersection	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
	LOS	Delay	LOS	Delay
<b>Cuba Road with Deerwood Drive</b>				
• Westbound Approach	A	7.9	A	7.4
• Northbound Approach	B	10.4	B	10.0
<b>Cuba Road with Nottingham Drive</b>				
• Eastbound Approach	A	7.3	A	8.0
• Southbound Approach	B	10.2	B	10.9
LOS = Level of Service Delay is measured in seconds				

Table 3  
CAPACITY ANALYSIS RESULTS – YEAR 2025 PROJECTED CONDITIONS

Intersection	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
	LOS	Delay	LOS	Delay
<b>Cuba Road with Deerwood Drive</b>				
• Westbound Approach	A	8.0	A	7.4
• Northbound Approach	B	10.5	B	10.1
<b>Cuba Road with Nottingham Drive</b>				
• Eastbound Approach	A	7.3	A	8.0
• Southbound Approach	B	10.3	B	11.1
<b>Cuba Road with Proposed Access Drive</b>				
• Westbound Approach	A	8.0	A	7.4
• Northbound Approach	B	10.6	A	9.6
LOS = Level of Service Delay is measured in seconds				

## Discussion and Recommendations

The following summarizes how the intersections are projected to operate and identifies any roadway and traffic control improvements necessary to accommodate the development traffic.

### *Cuba Road with Deerwood Drive*

The results of the capacity analysis indicate that all the turning movements currently operate at Level of Service (LOS) B or better during the weekday morning and evening peak hours. Under future conditions, all the turning movements are projected to continue to operate at LOS B or better during the weekday morning and evening peak hours with increases in delay of less than one second and 95<sup>th</sup> percentile queues of one to two vehicles for both peak hours.

### *Cuba Road with Nottingham Drive*

The results of the capacity analysis indicate that all the turning movements currently operate at LOS B or better during the weekday morning and evening peak hours. Under future conditions, all the turning movements are projected to continue to operate at LOS B or better during the weekday morning and evening peak hours with increases in delay of less than one second and 95<sup>th</sup> percentile queues of one to two vehicles for both peak hours.

### *Cuba Road with the Proposed Access Drive*

The results of the capacity analysis indicate that all the turning movements will operate at LOS B or better during the weekday morning and evening peak hours with 95<sup>th</sup> percentile queues of one to two vehicles during both peak hours. Inspection of the projected traffic volumes and the requirements for right-turn and left-turn lanes found in IDOT's *Bureau of Design and Environment Manual (BDE) Manual*, Chapter 36, Figure 36-3.A and Section 36-3.01(b) indicates that an exclusive eastbound right-turn lane and an exclusive westbound left-turn lane on Cuba Road at this access drive will not be necessary due to a low volume of right and left turns. A copy of Figure 36-3.A and Section 36-3.01(b) are included in the Appendix.

## 6. Conclusion

Based on the preceding analyses and recommendations, the following conclusions have been made:

- The residential development will generate a low volume of traffic during the weekday morning and evening peak hours and will have a low traffic impact on the surrounding roadway network.
- The results of the capacity analysis indicate that the proposed residential development will not have a significant impact on the operations of Cuba Road with Deerwood Drive and Cuba Road with Nottingham Drive.
- The proposed access system will be adequate and efficient in serving the proposed residential development traffic.
- Based on the projected traffic volumes, an eastbound right-turn lane and a westbound left-turn will not be warranted on Cuba Road at the proposed access drive.

# Appendix

Traffic Count Summary Sheets  
Preliminary Site Plan  
CMAP Projections Letter  
Level of Service Criteria  
Capacity Analysis Summary Sheets  
Turn Lane Warrants  
ITE Trip Generation Sheets



# Traffic Count Summary Sheets

Long Grove, IL Weather: Cool and Morning Rain  
 Cuba Rd and Nottingham Dr  
 Wednesday May 1, 2019

05/02/19  
 10:09:01

TURN/TEAPAC[Ver 3.61.12] - 15-Minute Counts: All Vehicles - by Mvmt

Intersection # 5 cuba/nottingham													
Begin Time	N-Approach			E-Approach			S-Approach			W-Approach			Int Total
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	
630	0	0	0	0	0	0	0	0	0	0	0	0	0
645	3	0	0	2	0	0	0	0	0	0	0	1	6
700	0	0	0	1	0	0	0	0	0	0	0	0	1
715	1	0	1	0	0	0	0	0	0	0	0	1	3
730	3	0	4	1	0	0	0	0	0	0	0	1	9
745	1	0	3	0	0	0	0	0	0	0	0	1	5
800	1	0	3	2	0	0	0	0	0	0	0	0	6
815	1	0	3	0	0	0	0	0	0	0	0	1	5
830	1	0	2	1	0	0	0	0	0	0	0	0	4
845	0	0	0	0	0	0	0	0	0	0	0	0	0
1600	2	0	0	0	0	0	0	0	0	0	0	1	3
1615	0	0	0	1	0	0	0	0	0	0	0	2	3
1630	1	0	1	1	0	0	0	0	0	0	0	0	3
1645	0	0	3	1	0	0	0	0	0	0	0	1	5
1700	0	0	0	1	0	0	0	0	0	0	0	1	2
1715	1	0	2	1	0	0	0	0	0	0	0	0	4
1730	0	0	1	4	0	0	0	0	0	0	0	1	6
1745	2	0	3	3	0	0	0	0	0	0	0	0	8
1800	1	0	1	3	0	0	0	0	0	0	0	2	7
1815	0	0	1	1	0	0	0	0	0	0	0	0	2
<b>Total</b>	<b>18</b>	<b>0</b>	<b>28</b>	<b>23</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>13</b>	<b>82</b>

Long Grove, IL Weather: Cool and Morning Rain  
 Cuba Rd and Nottingham Dr  
 Wednesday May 1, 2019

05/02/19  
 10:09:01

URNS/TEAPAC[Ver 3.61.12] - 15-Minute Counts: All Vehicles - Totals

Intersection # 5 cuba/nottingham

Begin Time	Approach Totals				Exit Totals				Int Total
	N	E	S	W	N	E	S	W	
630	0	0	0	0	0	0	0	0	0
645	3	2	0	1	3	0	0	3	6
700	0	1	0	0	1	0	0	0	1
715	2	0	0	1	1	1	0	1	3
730	7	1	0	1	2	4	0	3	9
745	4	0	0	1	1	3	0	1	5
800	4	2	0	0	2	3	0	1	6
815	4	0	0	1	1	3	0	1	5
830	3	1	0	0	1	2	0	1	4
845	0	0	0	0	0	0	0	0	0
1600	2	0	0	1	1	0	0	2	3
1615	0	1	0	2	3	0	0	0	3
1630	2	1	0	0	1	1	0	1	3
1645	3	1	0	1	2	3	0	0	5
1700	0	1	0	1	2	0	0	0	2
1715	3	1	0	0	1	2	0	1	4
1730	1	4	0	1	5	1	0	0	6
1745	5	3	0	0	3	3	0	2	8
1800	2	3	0	2	5	1	0	1	7
1815	1	1	0	0	1	1	0	0	2
<b>Total</b>	<b>46</b>	<b>23</b>	<b>0</b>	<b>13</b>	<b>36</b>	<b>28</b>	<b>0</b>	<b>18</b>	<b>82</b>



Long Grove, IL Weather: Cool and Morning Rain  
 Cuba Rd and Nottingham Dr  
 Wednesday May 1, 2019

05/02/19  
 10:09:01

URNS/TEAPAC[Ver 3.61.12] - 15-Minute Flow Rates: Appr/Exit Totals

Intersection # 5 cuba/nottingham

Begin Time	Approach Totals				Exit Totals				Int Total
	N	E	S	W	N	E	S	W	
630	0	0	0	0	0	0	0	0	0
645	12	8	0	4	12	0	0	12	24
700	0	4	0	0	4	0	0	0	4
715	8	0	0	4	4	4	0	4	12
730	28	4	0	4	8	16	0	12	36
745	16	0	0	4	4	12	0	4	20
800	16	8	0	0	8	12	0	4	24
815	16	0	0	4	4	12	0	4	20
830	12	4	0	0	4	8	0	4	16
845	0	0	0	0	0	0	0	0	0
1600	8	0	0	4	4	0	0	8	12
1615	0	4	0	8	12	0	0	0	12
1630	8	4	0	0	4	4	0	4	12
1645	12	4	0	4	8	12	0	0	20
1700	0	4	0	4	8	0	0	0	8
1715	12	4	0	0	4	8	0	4	16
1730	4	16	0	4	20	4	0	0	24
1745	20	12	0	0	12	12	0	8	32
1800	8	12	0	8	20	4	0	4	28
1815	4	4	0	0	4	4	0	0	8





Long Grove, IL Weather: Cool and Morning Rain  
 Cuba Rd and Nottingham Dr  
 Wednesday May 1, 2019

05/02/19  
 10:09:01

URNS/TEAPAC[Ver 3.61.12] - 60-Minute Volumes: Appr/Exit Totals

Intersection # 5 cuba/nottingham

Begin Time	Approach Totals				Exit Totals				Int Total
	N	E	S	W	N	E	S	W	
630	5	3	0	2	5	1	0	4	10
645	12	4	0	3	7	5	0	7	19
700	13	2	0	3	5	8	0	5	18
715	17	3	0	3	6	11	0	6	23
730	19	3	0	3	6	13	0	6	25
745	15	3	0	2	5	11	0	4	20
800	11	3	0	1	4	8	0	3	15
815	7	1	0	1	2	5	0	2	9*
830	3	1	0	0	1	2	0	1	4*
845	0	0	0	0	0	0	0	0	0*
1600	7	3	0	4	7	4	0	3	14
1615	5	4	0	4	8	4	0	1	13
1630	8	4	0	2	6	6	0	2	14
1645	7	7	0	3	10	6	0	1	17
1700	9	9	0	2	11	6	0	3	20
1715	11	11	0	3	14	7	0	4	25
1730	9	11	0	3	14	6	0	3	23
1745	8	7	0	2	9	5	0	3	17*
1800	3	4	0	2	6	2	0	1	9*
1815	1	1	0	0	1	1	0	0	2*

Long Grove, IL Weather: Cool and Morning Rain  
 Cuba Rd and Deerwood Dr  
 Wednesday May 1, 2019

05/02/19  
 10:07:09

URNS/TEAPAC[Ver 3.61.12] - 15-Minute Counts: All Vehicles - by Mvmt

Intersection # 4 cuba/deerwood													
Begin Time	N-Approach			E-Approach			S-Approach			W-Approach			Int Total
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	
630	0	0	0	0	3	0	4	0	2	0	28	0	37
645	0	0	0	0	6	1	3	0	0	0	33	0	43
700	0	0	0	0	2	0	2	0	0	0	50	0	54
715	0	0	0	0	3	0	2	0	1	0	76	0	82
730	0	0	0	0	10	4	5	0	1	0	79	0	99
745	0	0	0	0	8	1	3	0	1	1	53	0	67
800	0	0	0	0	8	1	2	0	1	0	63	0	75
815	0	0	0	0	10	0	0	0	0	0	30	0	40
830	0	0	0	0	7	0	0	0	2	0	20	0	29
845	0	0	0	0	4	0	3	0	2	1	32	0	42
1600	0	0	0	0	35	3	1	0	0	0	11	0	50
1615	0	0	0	0	56	2	1	0	0	0	14	0	73
1630	0	0	0	0	48	1	0	0	0	0	4	0	53
1645	0	0	0	0	66	0	2	0	0	0	6	0	74
1700	0	0	0	0	59	0	1	0	3	0	8	0	71
1715	0	0	0	0	83	2	1	0	0	0	8	0	94
1730	0	0	0	0	62	0	0	0	2	1	15	0	80
1745	0	0	0	0	75	1	0	0	0	1	31	0	108
1800	0	0	0	0	42	4	2	0	1	0	20	0	69
1815	0	0	0	0	20	3	2	0	0	0	12	0	37
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>607</b>	<b>23</b>	<b>34</b>	<b>0</b>	<b>16</b>	<b>4</b>	<b>593</b>	<b>0</b>	<b>1277</b>

Long Grove, IL Weather: Cool and Morning Rain  
 Cuba Rd and Deerwood Dr  
 Wednesday May 1, 2019

05/02/19  
 10:07:09

URNS/TEAPAC[Ver 3.61.12] - 15-Minute Counts: All Vehicles - Totals

Intersection # 4 cuba/deerwood

Begin Time	Approach Totals				Exit Totals				Int Total
	N	E	S	W	N	E	S	W	
630	0	3	6	28	0	32	0	5	37
645	0	7	3	33	0	36	1	6	43
700	0	2	2	50	0	52	0	2	54
715	0	3	3	76	0	78	0	4	82
730	0	14	6	79	0	84	4	11	99
745	0	9	4	54	0	56	2	9	67
800	0	9	3	63	0	65	1	9	75
815	0	10	0	30	0	30	0	10	40
830	0	7	2	20	0	20	0	9	29
845	0	4	5	33	0	35	1	6	42
1600	0	38	1	11	0	12	3	35	50
1615	0	58	1	14	0	15	2	56	73
1630	0	49	0	4	0	4	1	48	53
1645	0	66	2	6	0	8	0	66	74
1700	0	59	4	8	0	9	0	62	71
1715	0	85	1	8	0	9	2	83	94
1730	0	62	2	16	0	15	1	64	80
1745	0	76	0	32	0	31	2	75	108
1800	0	46	3	20	0	22	4	43	69
1815	0	23	2	12	0	14	3	20	37
<b>Total</b>	<b>0</b>	<b>630</b>	<b>50</b>	<b>597</b>	<b>0</b>	<b>627</b>	<b>27</b>	<b>623</b>	<b>1277</b>

Long Grove, IL Weather: Cool and Morning Rain  
 Cuba Rd and Deerwood Dr  
 Wednesday May 1, 2019

05/02/19  
 10:07:09

URNS/TEAPAC[Ver 3.61.12] - 15-Minute Flow Rates: by Movement

Intersection # 4 cuba/deerwood

Begin Time	N-Approach			E-Approach			S-Approach			W-Approach			Int Total
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	
630	0	0	0	0	12	0	16	0	8	0	112	0	148
645	0	0	0	0	24	4	12	0	0	0	132	0	172
700	0	0	0	0	8	0	8	0	0	0	200	0	216
715	0	0	0	0	12	0	8	0	4	0	304	0	328
730	0	0	0	0	40	16	20	0	4	0	316	0	396
745	0	0	0	0	32	4	12	0	4	4	212	0	268
800	0	0	0	0	32	4	8	0	4	0	252	0	300
815	0	0	0	0	40	0	0	0	0	0	120	0	160
830	0	0	0	0	28	0	0	0	8	0	80	0	116
845	0	0	0	0	16	0	12	0	8	4	128	0	168
1600	0	0	0	0	140	12	4	0	0	0	44	0	200
1615	0	0	0	0	224	8	4	0	0	0	56	0	292
1630	0	0	0	0	192	4	0	0	0	0	16	0	212
1645	0	0	0	0	264	0	8	0	0	0	24	0	296
1700	0	0	0	0	236	0	4	0	12	0	32	0	284
1715	0	0	0	0	332	8	4	0	0	0	32	0	376
1730	0	0	0	0	248	0	0	0	8	4	60	0	320
1745	0	0	0	0	300	4	0	0	0	4	124	0	432
1800	0	0	0	0	168	16	8	0	4	0	80	0	276
1815	0	0	0	0	80	12	8	0	0	0	48	0	148



Long Grove, IL Weather: Cool and Morning Rain  
 Cuba Rd and Deerwood Dr  
 Wednesday May 1, 2019

05/02/19  
 10:07:09

URNS/TEAPAC[Ver 3.61.12] - 15-Minute Flow Rates: Appr/Exit Totals

Intersection # 4 cuba/deerwood

Begin Time	Approach Totals				Exit Totals				Int Total
	N	E	S	W	N	E	S	W	
630	0	12	24	112	0	128	0	20	148
645	0	28	12	132	0	144	4	24	172
700	0	8	8	200	0	208	0	8	216
715	0	12	12	304	0	312	0	16	328
730	0	56	24	316	0	336	16	44	396
745	0	36	16	216	0	224	8	36	268
800	0	36	12	252	0	260	4	36	300
815	0	40	0	120	0	120	0	40	160
830	0	28	8	80	0	80	0	36	116
845	0	16	20	132	0	140	4	24	168
1600	0	152	4	44	0	48	12	140	200
1615	0	232	4	56	0	60	8	224	292
1630	0	196	0	16	0	16	4	192	212
1645	0	264	8	24	0	32	0	264	296
1700	0	236	16	32	0	36	0	248	284
1715	0	340	4	32	0	36	8	332	376
1730	0	248	8	64	0	60	4	256	320
1745	0	304	0	128	0	124	8	300	432
1800	0	184	12	80	0	88	16	172	276
1815	0	92	8	48	0	56	12	80	148

Long Grove, IL Weather: Cool and Morning Rain  
 Cuba Rd and Deerwood Dr  
 Wednesday May 1, 2019

05/02/19  
 10:07:09

URNS/TEAPAC[Ver 3.61.12] - 60-Minute Volumes: by Movement

Intersection # 4 cuba/deerwood													
Begin Time	N-Approach			E-Approach			S-Approach			W-Approach			Int Total
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	
630	0	0	0	0	14	1	11	0	3	0	187	0	216
645	0	0	0	0	21	5	12	0	2	0	238	0	278
700	0	0	0	0	23	5	12	0	3	1	258	0	302
715	0	0	0	0	29	6	12	0	4	1	271	0	323
730	0	0	0	0	36	6	10	0	3	1	225	0	281
745	0	0	0	0	33	2	5	0	4	1	166	0	211
800	0	0	0	0	29	1	5	0	5	1	145	0	186
815	0	0	0	0	21	0	3	0	4	1	82	0	111*
830	0	0	0	0	11	0	3	0	4	1	52	0	71*
845	0	0	0	0	4	0	3	0	2	1	32	0	42*
1600	0	0	0	0	205	6	4	0	0	0	35	0	250
1615	0	0	0	0	229	3	4	0	3	0	32	0	271
1630	0	0	0	0	256	3	4	0	3	0	26	0	292
1645	0	0	0	0	270	2	4	0	5	1	37	0	319
1700	0	0	0	0	279	3	2	0	5	2	62	0	353
1715	0	0	0	0	262	7	3	0	3	2	74	0	351
1730	0	0	0	0	199	8	4	0	3	2	78	0	294
1745	0	0	0	0	137	8	4	0	1	1	63	0	214*
1800	0	0	0	0	62	7	4	0	1	0	32	0	106*
1815	0	0	0	0	20	3	2	0	0	0	12	0	37*

Long Grove, IL Weather: Cool and Morning Rain  
 Cuba Rd and Deerwood Dr  
 Wednesday May 1, 2019

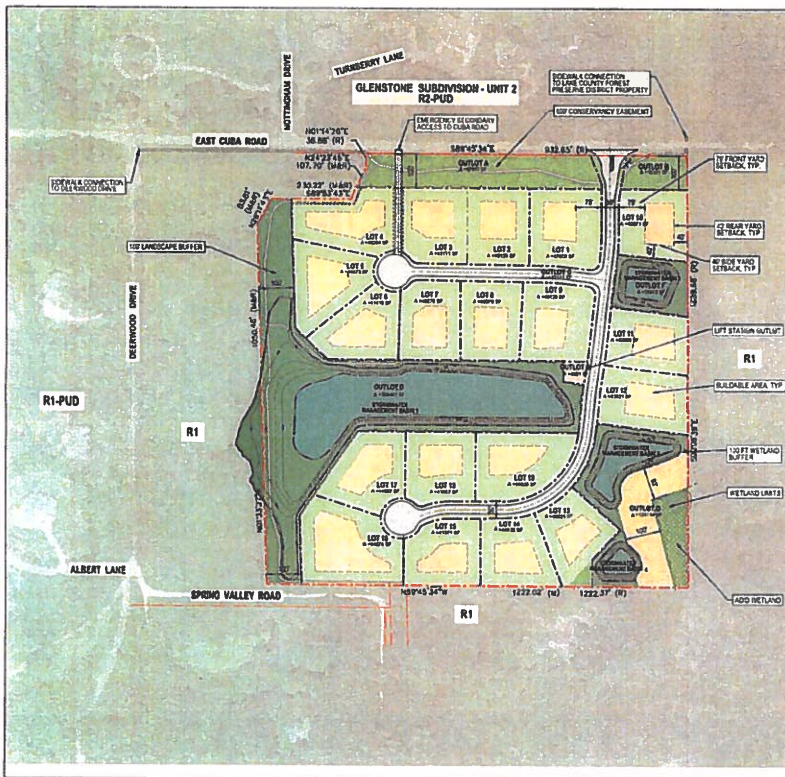
05/02/19  
 10:07:09

URNS/TEAPAC[Ver 3.61.12] - 60-Minute Volumes: Appr/Exit Totals

Intersection # 4 cuba/deerwood

Begin Time	Approach Totals				Exit Totals				Int Total
	N	E	S	W	N	E	S	W	
630	0	15	14	187	0	198	1	17	216
645	0	26	14	238	0	250	5	23	278
700	0	28	15	259	0	270	6	26	302
715	0	35	16	272	0	283	7	33	323
730	0	42	13	226	0	235	7	39	281
745	0	35	9	167	0	171	3	37	211
800	0	30	10	146	0	150	2	34	186
815	0	21	7	83	0	85	1	25	111*
830	0	11	7	53	0	55	1	15	71*
845	0	4	5	33	0	35	1	6	42*
1600	0	211	4	35	0	39	6	205	250
1615	0	232	7	32	0	36	3	232	271
1630	0	259	7	26	0	30	3	259	292
1645	0	272	9	38	0	41	3	275	319
1700	0	282	7	64	0	64	5	284	353
1715	0	269	6	76	0	77	9	265	351
1730	0	207	7	80	0	82	10	202	294
1745	0	145	5	64	0	67	9	138	214*
1800	0	69	5	32	0	36	7	63	106*
1815	0	23	2	12	0	14	3	20	37*

# Preliminary Site Plan



**NOTES**

1. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED.  
 2. THE DESIGNER HAS CONDUCTED VISUAL INSPECTIONS OF THE SITE AND HAS FOUND NO OBVIOUS OBSTRUCTIONS TO THE PROPOSED DEVELOPMENT.  
 3. THE DESIGNER HAS CONDUCTED VISUAL INSPECTIONS OF THE SITE AND HAS FOUND NO OBVIOUS OBSTRUCTIONS TO THE PROPOSED DEVELOPMENT.  
 4. THE DESIGNER HAS CONDUCTED VISUAL INSPECTIONS OF THE SITE AND HAS FOUND NO OBVIOUS OBSTRUCTIONS TO THE PROPOSED DEVELOPMENT.

SCALE: HORIZONTAL  
 1" = 100'

**SUBDIVISION DESIGN STANDARDS**

1. LOT AREA: 10,000 SQ FT  
 2. LOT WIDTH: 100 FT  
 3. LOT DEPTH: 100 FT  
 4. LOT SPACING: 10 FT  
 5. LOT COVER: 10%  
 6. LOT YIELD: 10 UNITS/AC

LOT #	Lot Area (SQ FT)	Lot Area (AC)
1	10,000	0.23
2	10,000	0.23
3	10,000	0.23
4	10,000	0.23
5	10,000	0.23
6	10,000	0.23
7	10,000	0.23
8	10,000	0.23
9	10,000	0.23
10	10,000	0.23
11	10,000	0.23
12	10,000	0.23
13	10,000	0.23
14	10,000	0.23
15	10,000	0.23
16	10,000	0.23
17	10,000	0.23
18	10,000	0.23
19	10,000	0.23
20	10,000	0.23
<b>Total Lot Area</b>	<b>200,000</b>	<b>4.61</b>

COMMON AREA	Area (SQ FT)	Area (AC)
OUTLET A	10,000	0.23
OUTLET B	10,000	0.23
OUTLET C	10,000	0.23
OUTLET D	10,000	0.23
OUTLET E	10,000	0.23
OUTLET F	10,000	0.23
OUTLET G	10,000	0.23
<b>COMMON</b>	<b>70,000</b>	<b>1.60</b>

AREA SUMMARY	Area (SQ FT)	Area (AC)
LOT AREA	200,000	4.61
COMMON AREA	70,000	1.60
<b>Total</b>	<b>270,000</b>	<b>6.21</b>

LOT SUMMARY	Area (SQ FT)	Area (AC)
Lot 1	10,000	0.23
Lot 2	10,000	0.23
Lot 3	10,000	0.23
Lot 4	10,000	0.23
Lot 5	10,000	0.23
Lot 6	10,000	0.23
Lot 7	10,000	0.23
Lot 8	10,000	0.23
Lot 9	10,000	0.23
Lot 10	10,000	0.23
Lot 11	10,000	0.23
Lot 12	10,000	0.23
Lot 13	10,000	0.23
Lot 14	10,000	0.23
Lot 15	10,000	0.23
Lot 16	10,000	0.23
Lot 17	10,000	0.23
Lot 18	10,000	0.23
Lot 19	10,000	0.23
Lot 20	10,000	0.23
<b>Total</b>	<b>200,000</b>	<b>4.61</b>

**Cross**  
 Civil Engineering & Surveying  
 1000 West 10th Street, Suite 100  
 Oklahoma City, Oklahoma 73106  
 Phone: (405) 521-1111  
 Fax: (405) 521-1112  
 Email: info@crossinc.com  
 Website: www.crossinc.com

PROJECT: GLENSTONE SUBDIVISION - UNIT 2  
 PREPARED BY: CAUTERBURY PARK, LLC  
 DATE: 10/1/2023

CONTRACT NUMBER: R2-PUD

# CMAP Projections Letter





# Chicago Metropolitan Agency for Planning

233 South Wacker Drive  
Suite 800  
Chicago, Illinois 60606  
312 454 0400  
www.cmap.illinois.gov

May 3, 2019

Elise Purguette  
Consultant  
Kenig, Lindgren, O'Hara and Aboona, Inc.  
9575 West Higgins Road  
Suite 400  
Rosemont, IL 60018

**Subject: Cuba Road east of Nottingham Drive**  
IDOT

Dear Ms. Purguette:

In response to a request made on your behalf and dated May 3, 2019, we have developed year 2050 average daily traffic (ADT) projections for the subject location.

ROAD SEGMENT	Current Volume	Year 2050 ADT
Cuba Rd east of Nottingham Rd	2,400	3,100

Traffic projections are developed using existing ADT data provided in the request letter and the results from the March 2019 CMAP Travel Demand Analysis. The regional travel model uses CMAP 2050 socioeconomic projections and assumes the implementation of the ON TO 2050 Comprehensive Regional Plan for the Northeastern Illinois area. The provision of this data in support of your request does not constitute a CMAP endorsement of the proposed development or any subsequent developments.

If you have any questions, please call me at (312) 386-8806.

Sincerely,

Jose Rodriguez, PTP, AICP  
Senior Planner, Research & Analysis

cc: Quigley (IDOT)  
S:\AdminGroups\ResearchAnalysis\2019\_ForecastsTraffic\LongGrove\la-21-19\la-21-19.docx

## Level of Service Criteria

## LEVEL OF SERVICE CRITERIA

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.	>80.0
Unsignalized Intersections		
Level of Service	Average Total Delay (SEC/VEH)	
A	0 - 10	
B	> 10 - 15	
C	> 15 - 25	
D	> 25 - 35	
E	> 35 - 50	
F	> 50	

Source: *Highway Capacity Manual*, 2010.

**Capacity Analysis Summary Sheets**  
**Existing Weekday Morning Peak Hour Conditions**

HCM 6th TWSC  
1: Deerwood Drive & Cuba Road

05/03/2019

Intersection

Int Delay, s/veh 0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖	↘	↙
Traffic Vol, veh/h	271	1	6	29	4	12
Future Vol, veh/h	271	1	6	29	4	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	330	1	7	35	5	15

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	331
Stage 1	-	-	331
Stage 2	-	-	49
Critical Hdwy	-	4.12	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	2.218	3.518
Pot Cap-1 Maneuver	-	1228	622
Stage 1	-	-	728
Stage 2	-	-	973
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1228	618
Mov Cap-2 Maneuver	-	-	618
Stage 1	-	-	724
Stage 2	-	-	973

Approach	EB	WB	NB
HCM Control Delay, s	0	1.4	10.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	685	-	-	1228	-
HCM Lane V/C Ratio	0.028	-	-	0.006	-
HCM Control Delay (s)	10.4	-	-	7.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-



HCM 6th TWSC  
2: Cuba Road & Nottingham Drive

05/03/2019

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	3	280	29	3	11	6
Future Vol, veh/h	3	280	29	3	11	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	341	35	4	13	7

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	39	0	-	0	386 37
Stage 1	-	-	-	-	37 -
Stage 2	-	-	-	-	349 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1571	-	-	-	617 1035
Stage 1	-	-	-	-	985 -
Stage 2	-	-	-	-	714 -
Platoon blocked, %					
Mov Cap-1 Maneuver	1571	-	-	-	615 1035
Mov Cap-2 Maneuver	-	-	-	-	615 -
Stage 1	-	-	-	-	982 -
Stage 2	-	-	-	-	714 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1571	-	-	-	718
HCM Lane V/C Ratio	0.002	-	-	-	0.029
HCM Control Delay (s)	7.3	0	-	-	10.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

**Capacity Analysis Summary Sheets**  
Existing Weekday Evening Peak Hour Conditions



HCM 6th TWSC  
1: Deerwood Drive & Cuba Road

05/03/2019

**Intersection**

Int Delay, s/veh 0.3

**Movement** EBT EBR WBL WBT NBL NBR

Lane Configurations	↶			↷	↶	↷
Traffic Vol, veh/h	74	2	7	262	3	3
Future Vol, veh/h	74	2	7	262	3	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	90	2	9	320	4	4

**Major/Minor** Major1 Major2 Minor1

Conflicting Flow All	0	0	92	0	429	91
Stage 1	-	-	-	-	91	-
Stage 2	-	-	-	-	338	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1503	-	583	967
Stage 1	-	-	-	-	933	-
Stage 2	-	-	-	-	722	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1503	-	579	967
Mov Cap-2 Maneuver	-	-	-	-	579	-
Stage 1	-	-	-	-	926	-
Stage 2	-	-	-	-	722	-

**Approach** EB WB NB

HCM Control Delay, s	0	0.2	10
HCM LOS			B

**Minor Lane/Major Mvmt** NBLn1 EBT EBR WBL WBT

Capacity (veh/h)	724	-	-	1503	-
HCM Lane V/C Ratio	0.01	-	-	0.006	-
HCM Control Delay (s)	10	-	-	7.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

HCM 6th TWSC  
2: Cuba Road & Nottingham Drive

05/03/2019

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	3	74	265	11	7	4
Future Vol, veh/h	3	74	265	11	7	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	90	323	13	9	5

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	336	0	428
Stage 1	-	-	330
Stage 2	-	-	98
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.518
Pot Cap-1 Maneuver	1223	-	584
Stage 1	-	-	728
Stage 2	-	-	926
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1223	-	582
Mov Cap-2 Maneuver	-	-	582
Stage 1	-	-	726
Stage 2	-	-	926

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1223	-	-	-	623
HCM Lane V/C Ratio	0.003	-	-	-	0.022
HCM Control Delay (s)	8	0	-	-	10.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

**Capacity Analysis Summary Sheets**  
**Projected Weekday Morning Peak Hour Conditions**



HCM 6th TWSC  
1: Deerwood Drive & Cuba Road

05/09/2019

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↖		↘	
Traffic Vol, veh/h	283	1	6	33	4	12
Future Vol, veh/h	283	1	6	33	4	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	345	1	7	40	5	15

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	346	0	400
Stage 1	-	-	-	-	346
Stage 2	-	-	-	-	54
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1213	-	606
Stage 1	-	-	-	-	716
Stage 2	-	-	-	-	969
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1213	-	602
Mov Cap-2 Maneuver	-	-	-	-	602
Stage 1	-	-	-	-	712
Stage 2	-	-	-	-	969

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	671	-	-	1213	-
HCM Lane V/C Ratio	0.029	-	-	0.006	-
HCM Control Delay (s)	10.5	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

HCM 6th TWSC  
2: Cuba Road & Nottingham Drive

05/09/2019

Intersection

Int Delay, s/veh 0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↑	
Traffic Vol, veh/h	3	292	33	3	11	6
Future Vol, veh/h	3	292	33	3	11	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	356	40	4	13	7

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	44	0	0
Stage 1	-	-	42
Stage 2	-	-	364
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.518
Pot Cap-1 Maneuver	1564	-	601
Stage 1	-	-	980
Stage 2	-	-	703
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1564	-	599
Mov Cap-2 Maneuver	-	-	599
Stage 1	-	-	977
Stage 2	-	-	703

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1564	-	-	-	703
HCM Lane V/C Ratio	0.002	-	-	-	0.029
HCM Control Delay (s)	7.3	0	-	-	10.3
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1



HCM 6th TWSC  
 3: Proposed Access Drive & Cuba Road

05/09/2019

**Intersection**

Int Delay, s/veh 0.5

**Movement** EBT EBR WBL WBT NBL NBR

Lane Configurations	↗			↖	↘	
Traffic Vol, veh/h	302	1	4	33	3	10
Future Vol, veh/h	302	1	4	33	3	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	368	1	5	40	4	12

**Major/Minor** Major1 Major2 Minor1

Conflicting Flow All	0	0	369	0	419	369
Stage 1	-	-	-	-	369	-
Stage 2	-	-	-	-	50	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1190	-	591	677
Stage 1	-	-	-	-	699	-
Stage 2	-	-	-	-	972	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1190	-	589	677
Mov Cap-2 Maneuver	-	-	-	-	589	-
Stage 1	-	-	-	-	696	-
Stage 2	-	-	-	-	972	-

**Approach** EB WB NB

HCM Control Delay, s 0 0.9 10.6  
 HCM LOS B

**Minor Lane/Major Mvmt** NBLn1 EBT EBR WBL WBT

Capacity (veh/h)	654	-	-	1190	-
HCM Lane V/C Ratio	0.024	-	-	0.004	-
HCM Control Delay (s)	10.6	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Capacity Analysis Summary Sheets  
Projected Weekday Evening Peak Hour Conditions

HCM 6th TWSC  
1: Deerwood Drive & Cuba Road

05/09/2019

Intersection						
Int Delay, s/veh	0.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Vol, veh/h	80	2	7	275	3	3
Future Vol, veh/h	80	2	7	275	3	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	98	2	9	335	4	4

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	100	0	452 99
Stage 1	-	-	-	-	99 -
Stage 2	-	-	-	-	353 -
Critical Hdwy	-	-	4.12	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	-	-	2.218	-	3.518 3.318
Pot Cap-1 Maneuver	-	-	1493	-	565 957
Stage 1	-	-	-	-	925 -
Stage 2	-	-	-	-	711 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1493	-	561 957
Mov Cap-2 Maneuver	-	-	-	-	561 -
Stage 1	-	-	-	-	919 -
Stage 2	-	-	-	-	711 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	707	-	-	1493	-
HCM Lane V/C Ratio	0.01	-	-	0.006	-
HCM Control Delay (s)	10.1	-	-	7.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-



HCM 6th TWSC  
2: Cuba Road & Nottingham Drive

05/09/2019

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	3	80	278	11	7	4
Future Vol, veh/h	3	80	278	11	7	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	98	339	13	9	5

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	352	0	0
Stage 1	-	-	346
Stage 2	-	-	106
Critical Hdwy	4.12	-	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	2.218	-	3.518
Pot Cap-1 Maneuver	1207	-	565
Stage 1	-	-	716
Stage 2	-	-	918
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1207	-	563
Mov Cap-2 Maneuver	-	-	563
Stage 1	-	-	713
Stage 2	-	-	918

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	11.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1207	-	-	-	605
HCM Lane V/C Ratio	0.003	-	-	-	0.022
HCM Control Delay (s)	8	0	-	-	11.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 6th TWSC  
 3: Proposed Access Drive & Cuba Road

05/09/2019

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷		↷
Traffic Vol, veh/h	84	3	10	287	2	6
Future Vol, veh/h	84	3	10	287	2	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	102	4	12	350	2	7

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	106	0	478
Stage 1	-	-	-	-	104
Stage 2	-	-	-	-	374
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	1485	-	546
Stage 1	-	-	-	-	920
Stage 2	-	-	-	-	696
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1485	-	541
Mov Cap-2 Maneuver	-	-	-	-	541
Stage 1	-	-	-	-	911
Stage 2	-	-	-	-	696

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	800	-	-	1485	-
HCM Lane V/C Ratio	0.012	-	-	0.008	-
HCM Control Delay (s)	9.6	-	-	7.4	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

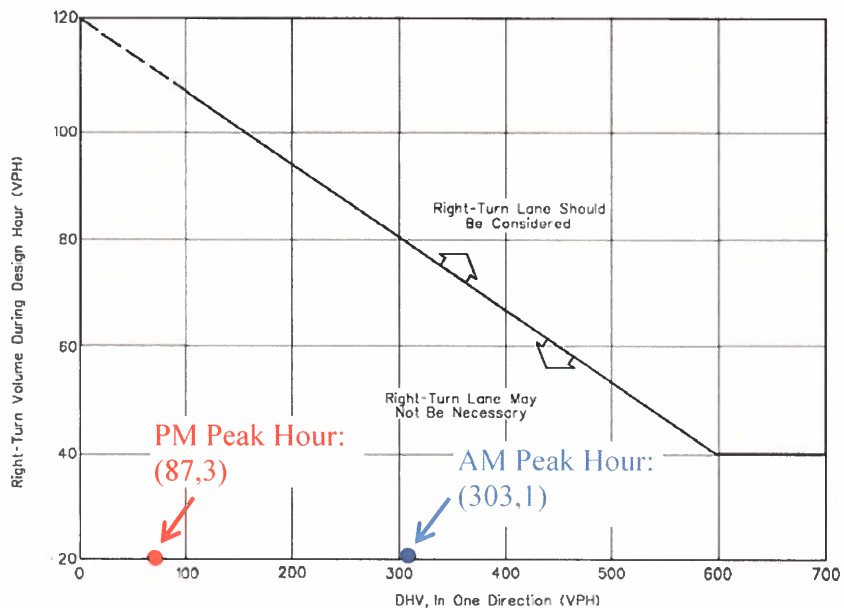
## Turn Lane Warrants

# Cuba Road and the Proposed Access Drive Year 2025 Right Turn Lane Warrant

Illinois

INTERSECTIONS

October 2015



**Note:** For highways with a design speed below 50 mph (80 km/hr), with a DHV in one direction of less than 300, and where right turns are greater than 40, an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

## Example

Given: Design Speed = 35 mph (60 km/hr)  
 DHV (in one direction) = 250 vph  
 Right Turns = 100 vph

Problem: Determine if a right-turn lane is warranted.

Solution: To read the vertical axis, use  $100 - 20 = 80$  vph. The figure indicates that right-turn lane is not necessary, unless other factors (e.g., high crash rate) indicate a lane is needed.

## GUIDELINES FOR RIGHT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON TWO-LANE HIGHWAYS

Figure 36-3.A



**36-3.01(b) Left-Turn Lanes**

The accommodation of left turns is often the critical factor in proper intersection design. Left-turn lanes can significantly improve both the level of service and intersection safety. Always use an exclusive left-turn lane at all intersections on divided urban and rural highways with a median wide enough to accommodate a left-turn lane, regardless of traffic volumes. Consider using an exclusive left-turn lane for the following:

- at any unsignalized intersection on a two-lane urban or rural highway that satisfies the criteria in Figures 36-3.C, D, E, F, or G;
- at any signalized intersection where the left-turning volume is equal to or greater than 75 vph for a single turn lane or 300 vph for a dual turn lane;
- any intersection where a capacity analysis determines a left-turn lane is necessary to meet the level-of-service criteria, including dual left-turn lanes;
- for uniformity of intersection design along the highway if other intersections have left-turn lanes (i.e., to satisfy driver expectancy); or
- any intersection where the crash experience, traffic operations, sight distance restrictions (e.g., intersection beyond a crest vertical curve), or engineering judgment indicates a significant conflict related to left-turning vehicles.

# ITE Trip Generation Sheets

# Single-Family Detached Housing (210)

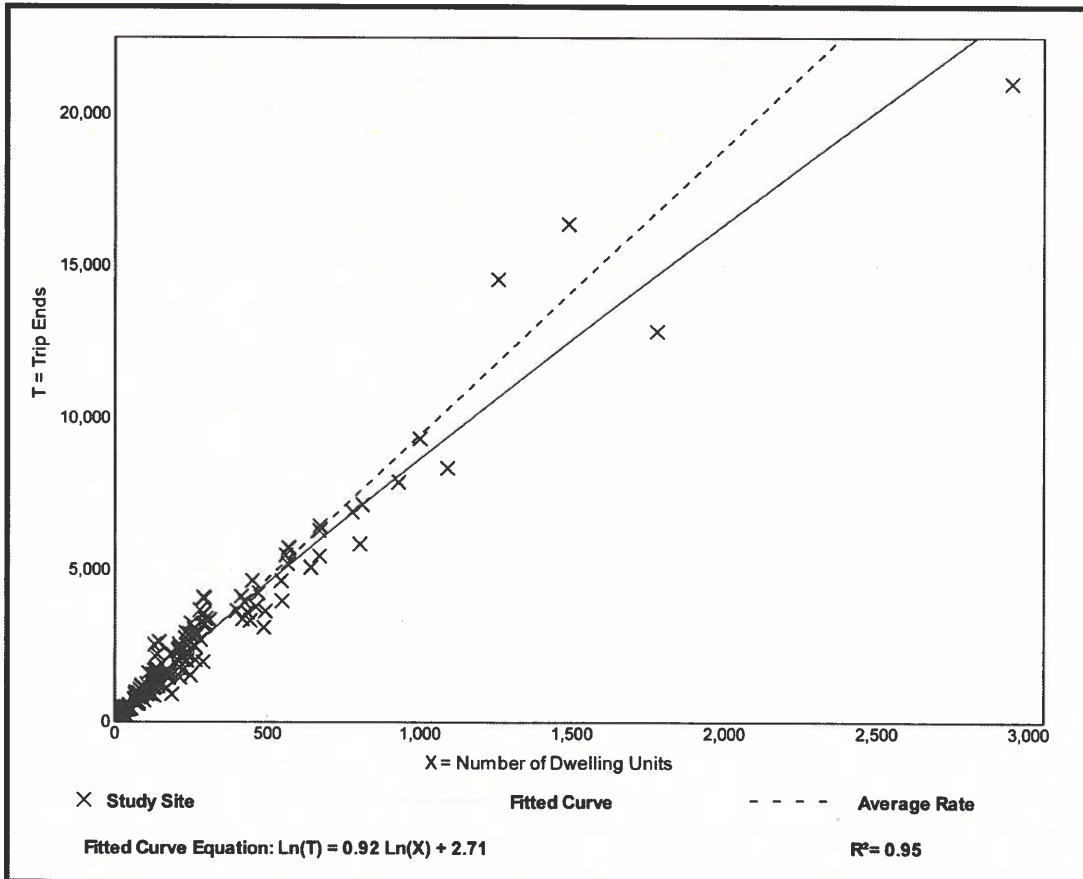
**Vehicle Trip Ends vs: Dwelling Units**  
**On a: Weekday**

**Setting/Location: General Urban/Suburban**  
Number of Studies: 159  
Avg. Num. of Dwelling Units: 264  
Directional Distribution: 50% entering, 50% exiting

### Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.44	4.81 - 19.39	2.10

### Data Plot and Equation





# Single-Family Detached Housing (210)

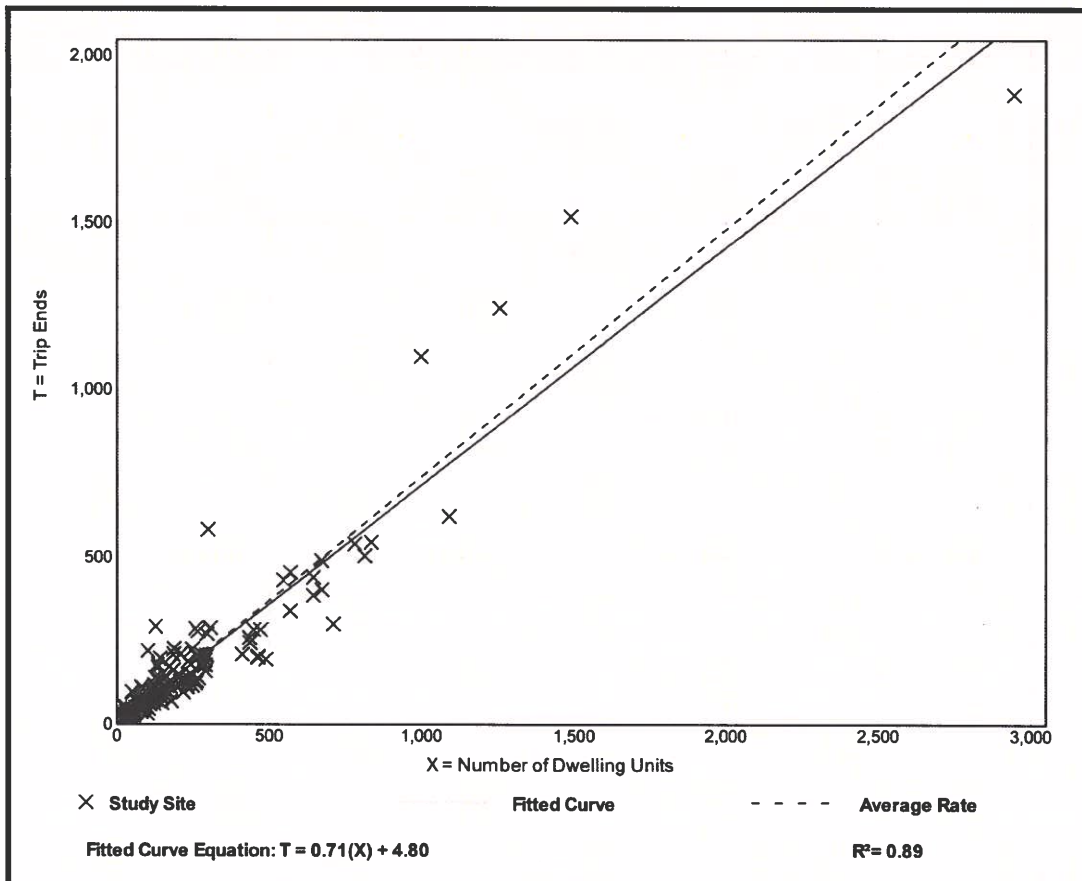
**Vehicle Trip Ends vs: Dwelling Units**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 173  
 Avg. Num. of Dwelling Units: 219  
 Directional Distribution: 25% entering, 75% exiting

### Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.74	0.33 - 2.27	0.27

### Data Plot and Equation



# Single-Family Detached Housing (210)

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

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 190  
 Avg. Num. of Dwelling Units: 242  
 Directional Distribution: 63% entering, 37% exiting

### Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.99	0.44 - 2.98	0.31

### Data Plot and Equation

