TRAFFIC IMPACT STUDY

FOR THE

DIMARCO CANANDAIGUA PROPERTIES HOUSING PROJECT

CANANDAIGUA, ONTARIO COUNTY, NEW YORK

MARCH 14, 2017

PREPARED FOR:

DIMARCO GROUP

1950 Brighton Henrietta Town Line Rd
Rochester, NY 14623

PREPARED BY:

McFarland Johnson

2525 SR 332, BOX 6, SUITE 101
CANANDAIGUA, NY 14424
PH: 585-905-0970
FX: 585-905-0882

MJ Project No. 18261.00

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INTRODUCTION

McFarland Johnson, Inc. (MJ) has prepared the following Traffic Impact Study (TIS) for the proposed Housing Project in the Town of Canandaigua, Ontario County, New York. The proposed mixed use development will be constructed along the west side of County Road 10 immediately south of the County Road 46 Roundabout. See Figure 1 for a Project Location Map.

The development consists of 384-apartment housing units with additional onsite amenities within the site. The proposed development will be constructed in four phases each consisting of 96 units; three phases of affordable housing units and one phase of market rate units; however, the proposed traffic analysis will only analyze the full build scenario. The Conceptual Site Plan shows two points of access to the site, consisting of a new town dedicated 2-lane road that will loop to/from County Road 10 which is depicted in Figure 2.

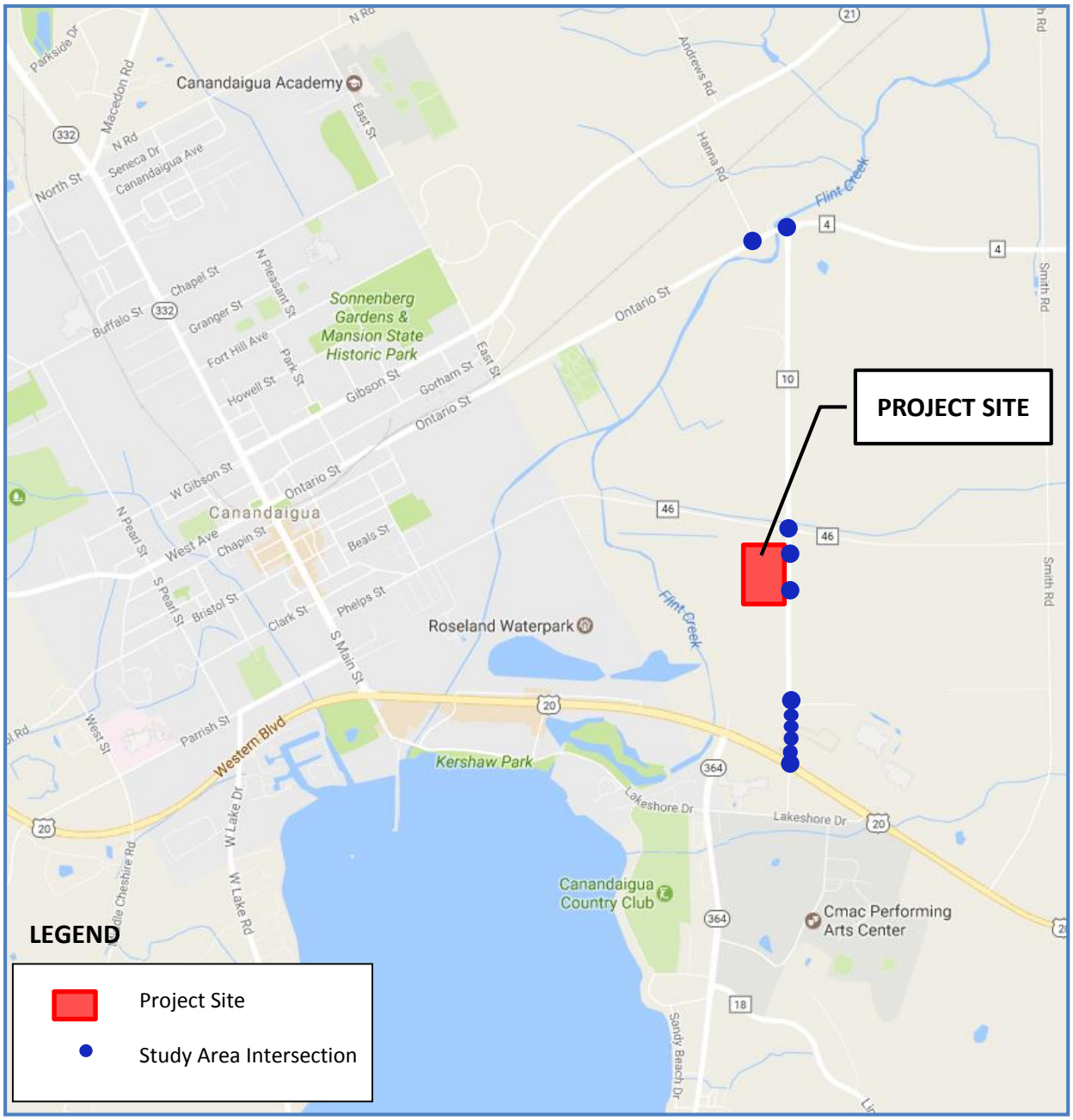
Scope of the Study

The purpose of this study is to evaluate existing and future traffic operations within the study area. The analysis completed by MJ evaluated traffic operations within the Study Area during weekday morning and evening peak hours for 2017 Existing Conditions as well as the 2025 Build and No-Build Conditions.

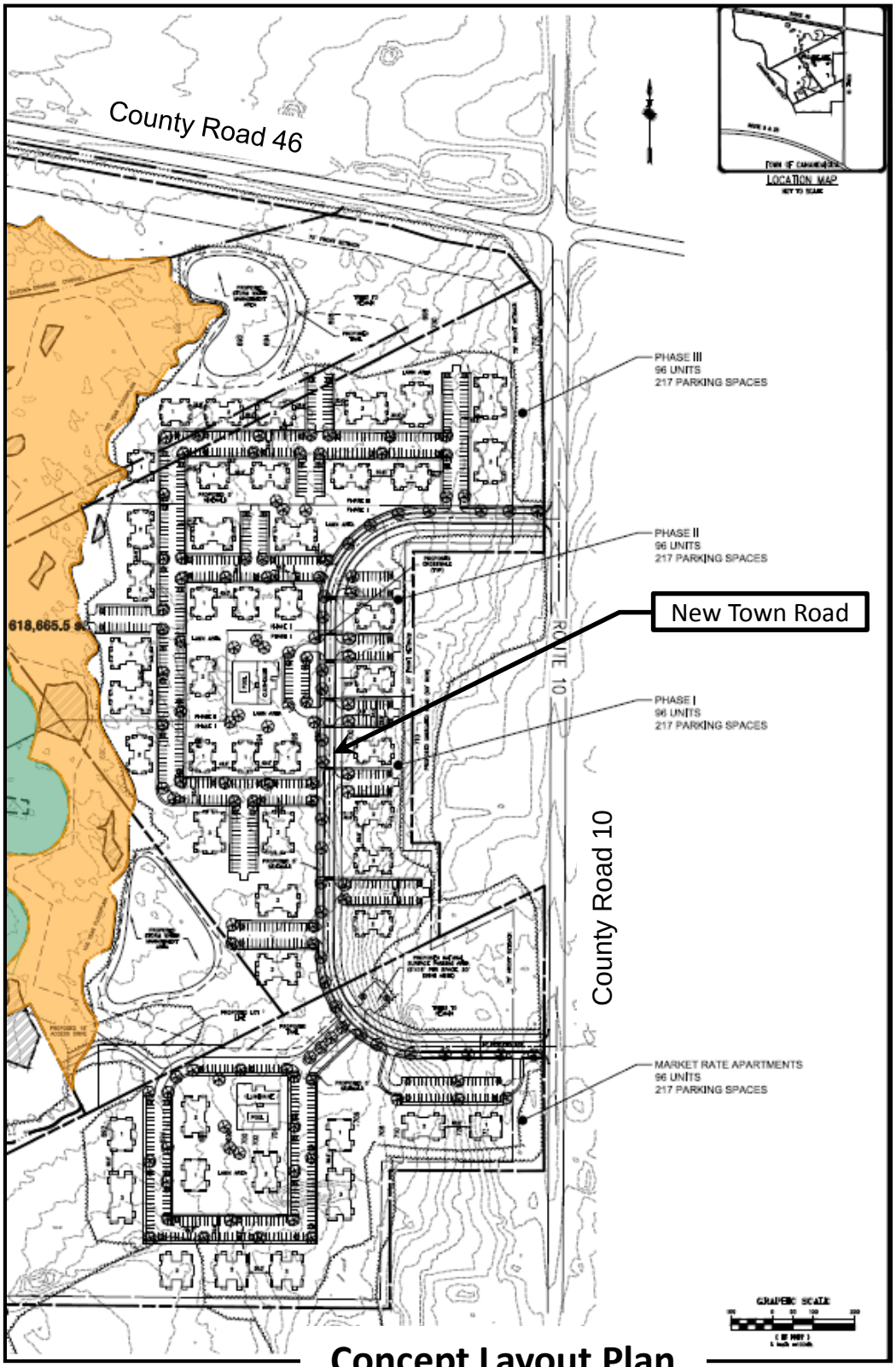
Build Conditions were analyzed to determine the impacts, if any, associated with the proposed housing development. Based on responses from the New York State Department of Transportation and Ontario County Department of Public Works regarding the initial project Traffic Letter of Findings dated January 27, 2017, the expanded study area includes the following intersections:

- County Road 10/Morgan Road at NYS 5&20 *(Signalized)*
- County Road 10 at Runnings Plaza Southern Entrance/Community Bank *(Un-signalized)*
- County Road 10 at Runnings Plaza Middle Entrance/Aldi's *(Un-signalized)*
- County Road 10 at Runnings Plaza Northern Entrance *(Un-signalized)*
- County Road 10 at Aldi's/Raymour & Flanigan Delivery Entrance *(Un-signalized)*
- County Road 10 at Recreation Drive *(Signalized)*
- County Road 10/County Road 46 *(Roundabout)*
- County Road 10/County Road 4 *(Roundabout)*
- County Road 4/County Road 22 *(Un-signalized)*

Descriptions of the existing physical conditions within the roadway corridor are presented in the following narratives.



Project Location Map



Concept Layout Plan

EXISTING CONDITIONS

Evaluation of the existing and future traffic conditions within the Study Area requires an understanding of the existing transportation system. Data such as roadway geometrics, traffic signal timings and peak hour traffic volumes provide the basis for a thorough understanding of existing conditions, and the requisite data necessary to provide projections of future traffic conditions typical under the Build scenario.

Existing Roadway Network

The project is located on the west side of County Road 10, which is an north-south Urban Major Collector two lane highway. County Road 10 is a moderately utilized travel route to access the Routes 5 & 20 corridor from the north and bypass the heavily traveled NYS Route 332/Main Street in Canandaigua. The road has been upgraded recently with the installation of Roundabouts at two of the study area intersections. The posted speed limit is 45/55 mph within the project study area. Figures 3A & 3B show the geometry and traffic control type for the existing study area intersections and descriptions of these intersections are below.

No. 1 – County Road 10/Morgan Road at Routes 5&20
This is a 4-legged, actuated, coordinated, signalized intersection with permissive/protected left turn movements for the eastbound and westbound approaches. The northbound/southbound approaches have single through lanes with dedicated left turn lanes while the southbound approach also has a dedicated right turn lane. The eastbound/westbound approached have dual through lanes with dedicated left turn only lanes and a curbed median to separate the opposing traffic and a stripped median between the left turn lanes and the through lanes. Routes 5 & 20 is a Principal Arterial 4-lane divided highway with a posted speed limit of 40 mph.

No. 2 – County Road 10 at Runnings Plaza Southern Entrance/Community Bank Drives
This intersection consists of stop sign controlled driveways opposite and slightly offset from each other onto County Road 10. The driveways are within the southbound left and right dedicated turn lanes for intersection #1. The eastbound driveways are the Community Banks exit only, bank driveway through entrance only and a two-way customer parking lot entrance. The westbound leg is the southern access to the Runnings Plaza which is also connected to the Walmart/Lowes Plaza and serves as an auxiliary access point. The driveway approaches have limited to no striping and do not have a posted speed limits.

No. 3 – County Road 10 at Runnings Plaza Middle Entrance/Aldi's
This intersection consists of stop sign controlled driveways opposite from each other onto County Road 10. County Road 10 has a single lane in each direction with a two way left turn lane in the median at the driveway intersections. The eastbound driveway is the Aldi/Charlies Restaurant access drive while the westbound approach is the middle access drive to the Runnings Plaza which is also connected to the Walmart/Lowes Plaza. The driveway approaches are two way and do not have a posted speed limit or striping.

No. 4 – County Road 10 at Runnings Plaza Northern Entrance
This is a 'T' driveway intersection consisting of a stop sign controlled westbound approach which is the service/northern access to the Runnings Plaza and is also connected to the Walmart/Lowes Plaza. County Road 10 has a single lane in each direction with a two-way left turn lane within the median at the driveway intersection. The driveway approach is two way and does not have a posted speed limit or striping.

No. 5 – County Road 10 at Aldi's/Raymour & Flanigan Delivery Entrance
This is a 'T' driveway intersection consisting of a stop sign controlled eastbound approach which provides access to Aldi and the backside of the Raymour & Flanigan Plaza. County Road 10 has a single lane in each direction with a two-way left turn lane within the median at the driveway intersection. The driveway approach is two way and does not have a posted speed limit or striping.

No. 6 – County Road 10 at Recreation Drive
This is a 3-legged, actuated, coordinated, 3-phase intersection with a permissive/protected southbound left turn phase. The northbound approach has a through lane with a dedicated right turn lane while the southbound approach has a through lane with a dedicated left turn lane. The westbound Recreation Drive approach has separate left and right turn lanes. Recreation Drive is a local road providing access to retail businesses including access to the Walmart/Lowes Plaza with a posted speed limit of 35 mph.

No. 7 – County Road 10 at County Road 46
This intersection is a 4-leg single lane roundabout with single lanes for all approaches. The roundabout has an inside diameter of 45' and an outside diameter of 63'. County Road 46 is a Urban Major Collector to the west and a Rural Minor Collector to the east with a posted speed limit of 55 mph.

No. 8 – County Road 10 at County Road 4 (Ontario Street Extension)
This intersection is a 3-leg single lane roundabout with single lanes for all approaches. The roundabout has an inside diameter of 45' and an outside diameter of 63'. County Road 4 is a Urban Major Collector to the west and a Rural Minor Collector to the east with a posted speed limit of 50 mph.

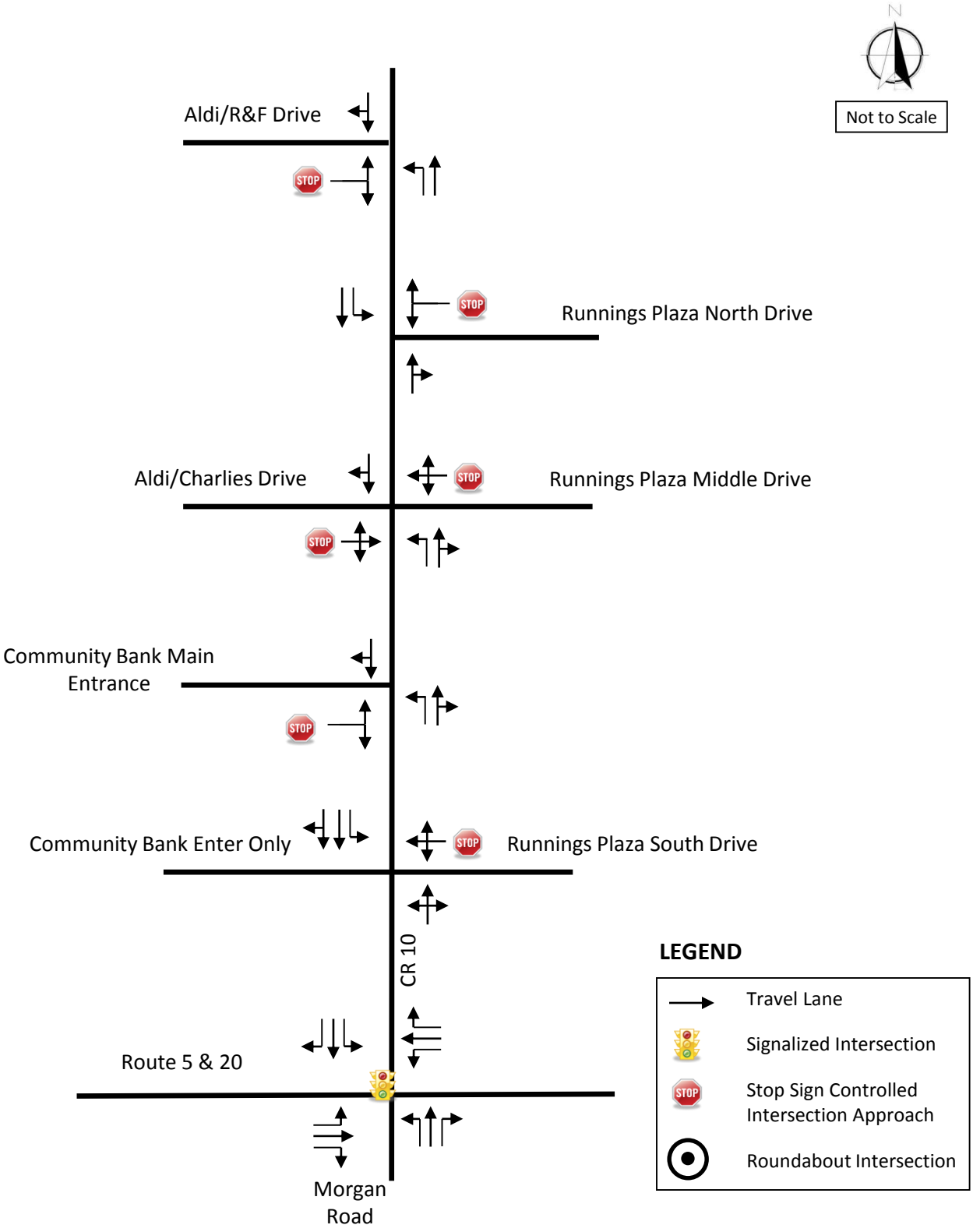
No. 9 – County Road 22 (Hanna Road) at County Road 4 (Ontario Street Extension)
This intersection is a 3-leg unsignalized intersection with stop sign control for the southbound approach. All approaches are single lane. County Road 4 is an Urban Major Collector with a posted speed limit of 50 mph while County Road 22 is an Urban Major Collector with an assumed 55 mph speed limit as no speed limit sign was observed.

Traffic Data Collection

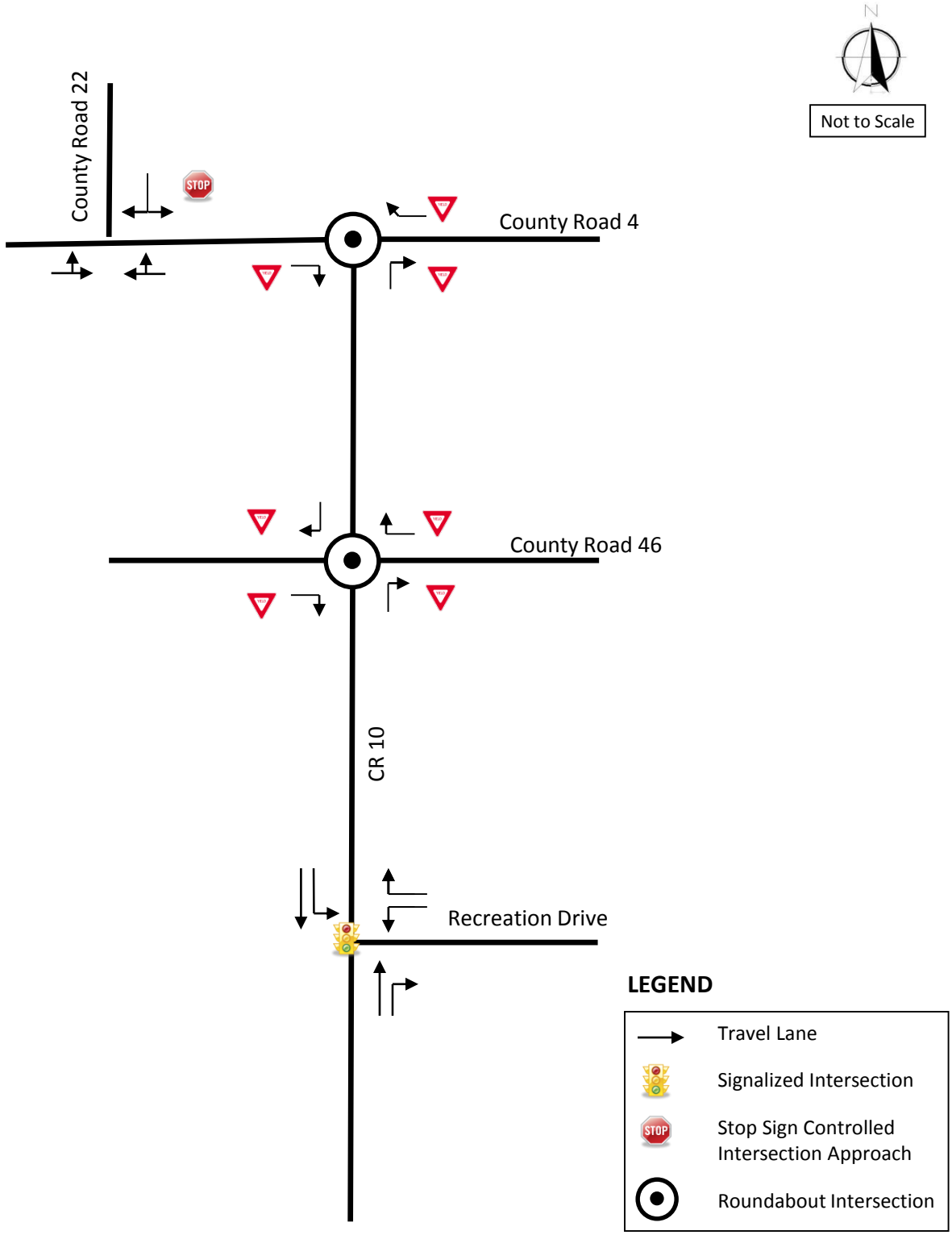
Existing traffic volumes were established for this project by performing manual turning movement counts (TMC). Traffic counts were recorded from 7:00 to 9:00 AM and 4:00 to 6:00 PM on Wednesday, February 15, 2017 and some smaller miscellaneous driveway counts were completed on Tuesday March 7, 2017. The 2017 traffic count data was compared and balanced to ensure consistency and accuracy. The TMC data shows that the weekday traffic in the study area peaks between 7:15-8:15 AM in the morning and 4:00-5:00 PM in the evening. These volumes were used to compute the 2017 Existing Conditions for the traffic study and the TMC summary data sheets are included in Appendix A.

2017 Existing Traffic Volumes

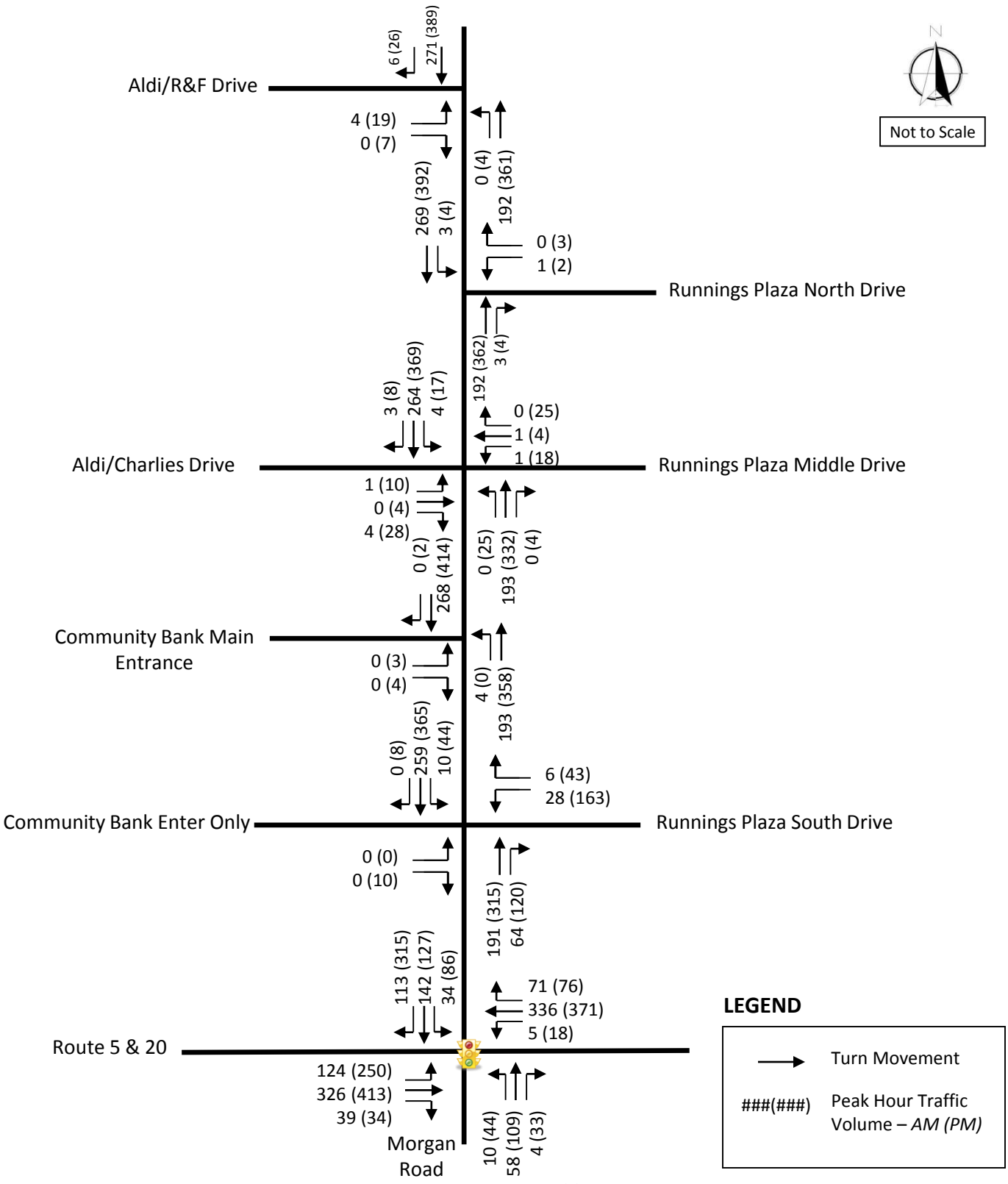
The 2017 traffic volumes are shown in Figures 4A & 4B. These volumes were adjusted by a seasonal adjustment factor of +5% as the counts were recorded in the month of February. This adjustment was based on the NYSDOT issued seasonal adjustment factors and is used to adjust the count data to more accurately represent the typical traffic conditions within the study area throughout the year. Analysis of the existing traffic condition allows the TIS to develop a comparison to future traffic conditions and enables the study to calibrate the traffic model to mimic the present real life operations that are observed.



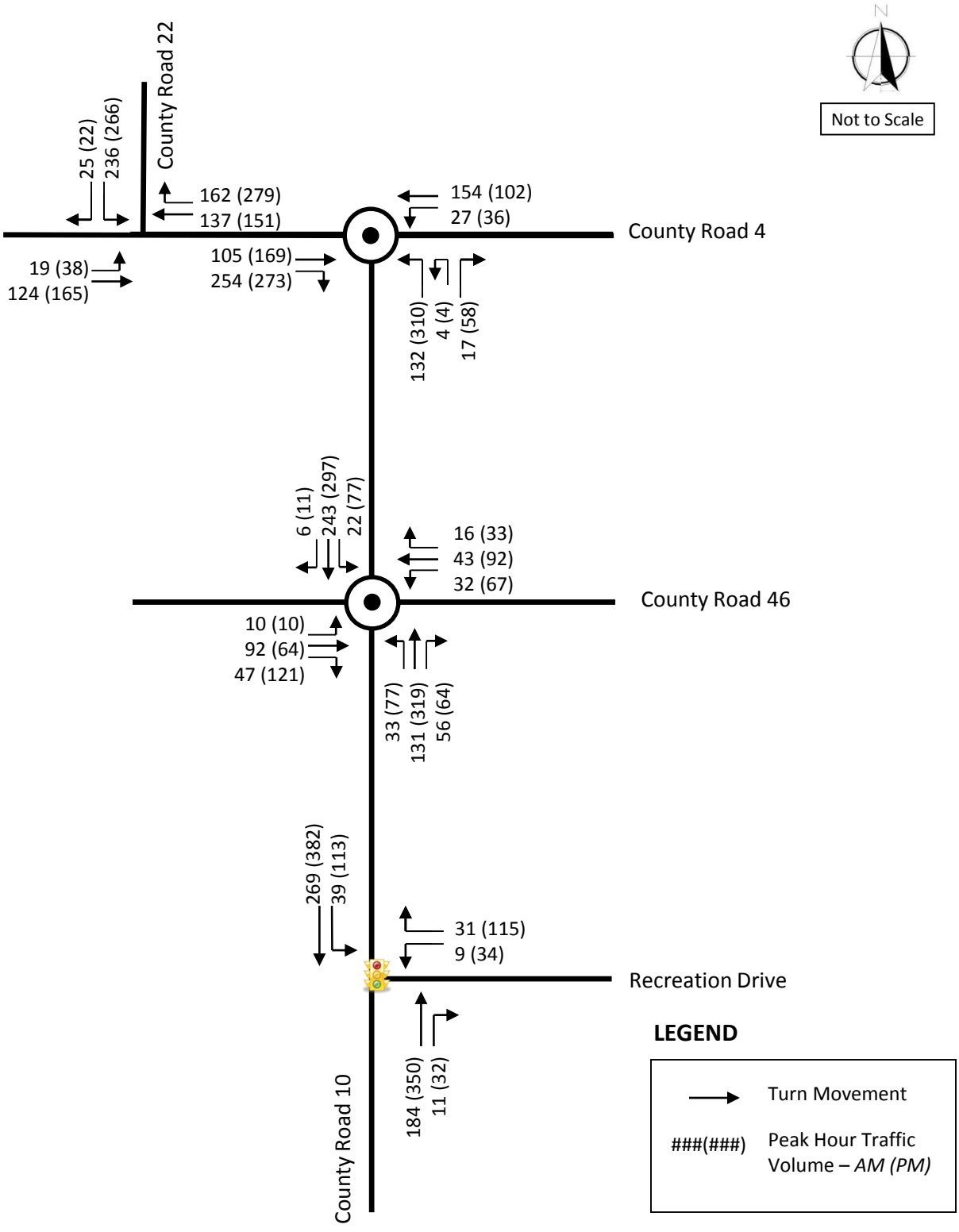
Existing Intersection Geometry



Existing Intersection Geometry



2017 Existing Traffic Volumes



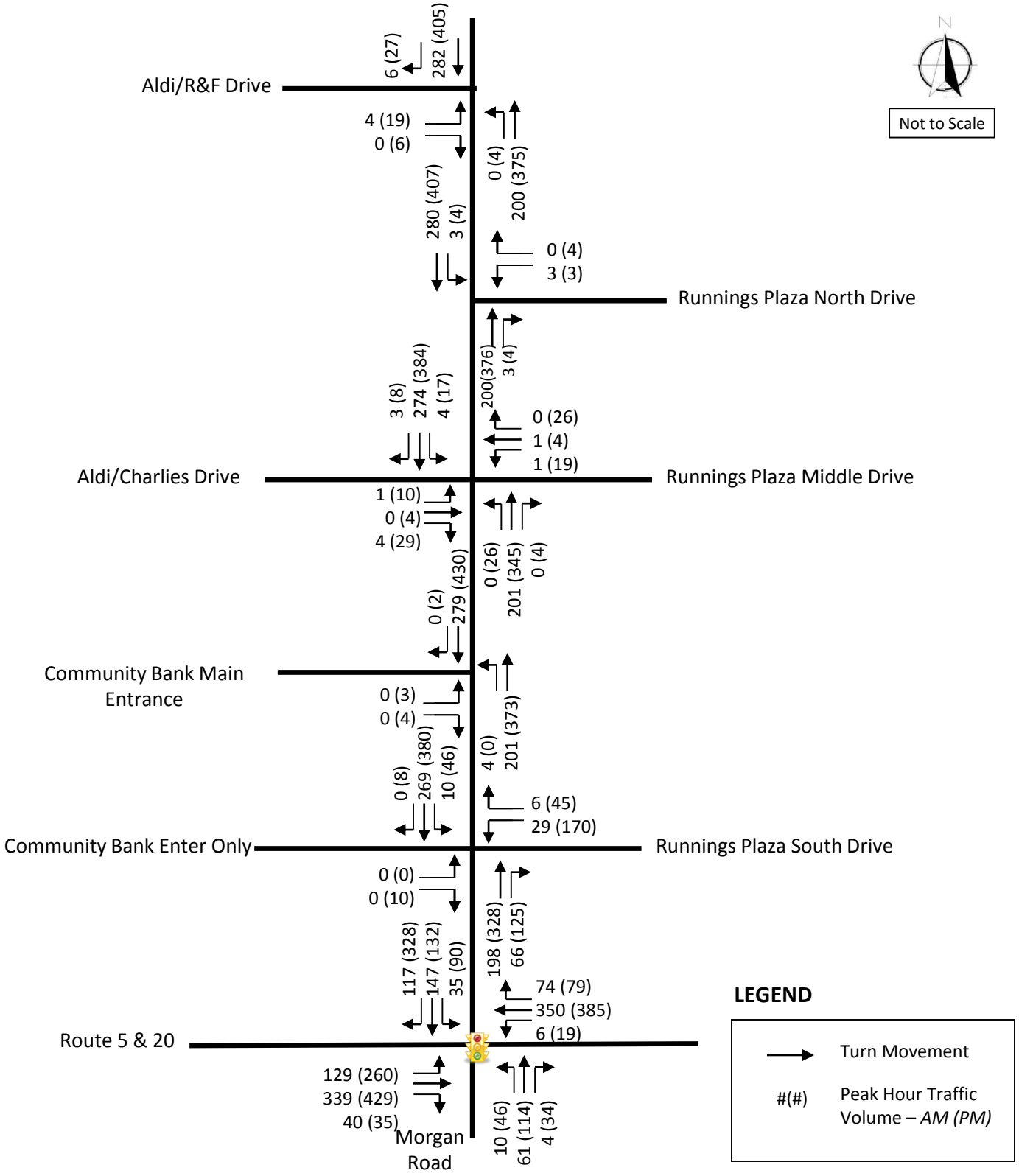
2017 Existing Traffic Volumes

NO-BUILD CONDITIONS

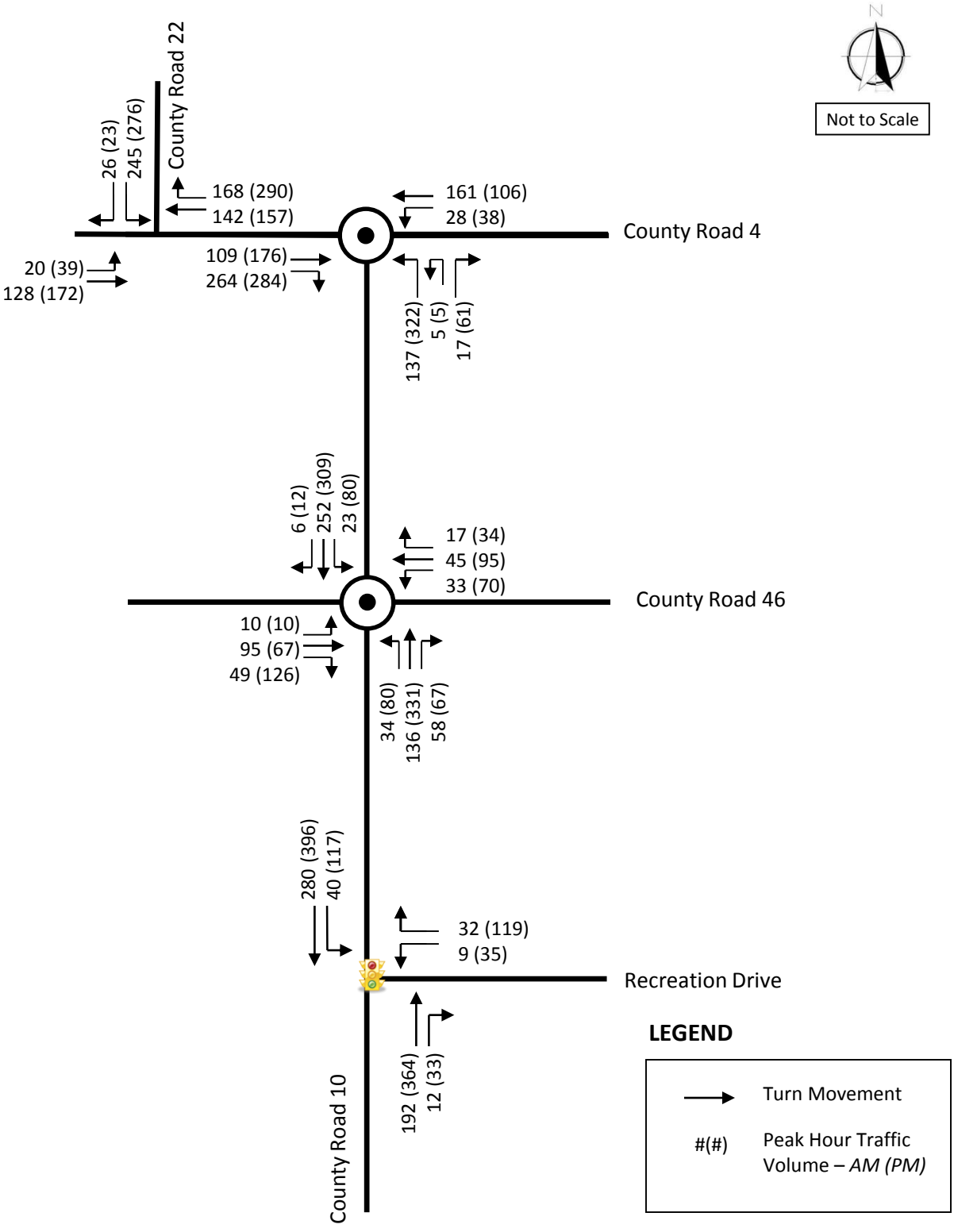
The 2017 existing traffic volumes were grown by an annual background growth rate of 0.5% per year to create the 2025 No-Build traffic volumes. The growth rate was established by comparing average annual daily traffic data published by NYSDOT for various years within the project study area. This analysis showed that a 0.25% per year has occurred on NYS Route 5 & 20 over the last 5-10 years; however, to be conservative a 0.5% annual growth rate was applied.

The Town of Canandaigua was contacted to determine if additional background traffic from any other developments, and/or roadway projects within the study area currently under review or approved should be included in the traffic model. No identifiable projects are anticipated within the study area.

The 2025 background traffic volumes shown in Figure 5 include existing traffic data and annual background traffic growth. These "No-Build" traffic volumes are used as a base upon which to add the proposed development's traffic.



2025 No Build Traffic Volumes



2025 No Build Traffic Volumes

BUILD CONDITIONS

Trip Distribution

The projected trip distribution model for this proposed project is based on existing traffic volume patterns along County Road 10 and County Road 46. The distribution also assumes there is roughly a 50/50 split for traffic utilizing the two driveways with a slight bias for the north driveway when heading to/from the north and south driveway when headed to/from the south. Figures 6A & 6B show the calculated trip distribution percentages for the proposed housing development's loop access road onto County Road 10 during the weekday morning and evening peak hours. These trip distribution percentages were used to assign the trips generated by the proposed project.

Trip Generation

The proposed development will be completed in a four phases but the traffic study only analyzed the overall full build out scenario. For analysis purposes, site generated traffic was estimated using trip generation rates provided in the Institute of Transportation Engineers' (ITE) Trip Generation manual, 8th edition as shown in the table below. Based on the nature of the development no multi-use trips or pass-by trips were assumed in this study.

This development is not considered student housing as a household of students would not qualify for the affordable housing based on government restrictions; however, it is possible that a small number of tenants could attend FLCC. For example, should a single mother working full time have a son/daughter attending college their family would qualify; however, a part time working FLCC student would not qualify. For these reason the ITE Low-Rise Apartment was chosen as the most appropriate land use for calculating the anticipated site generated traffic.

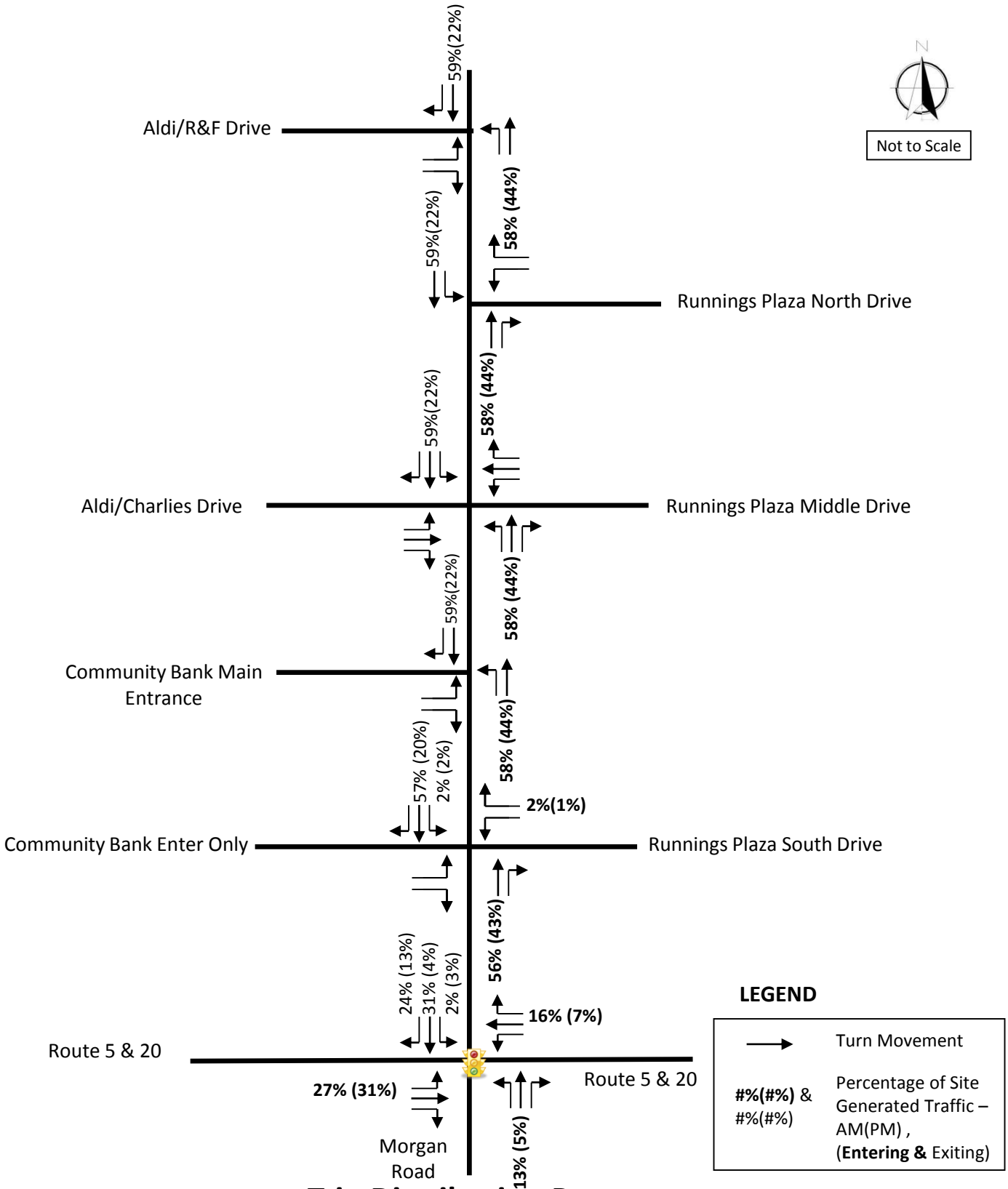
Shown in Table 1 are the resulting trip generation volumes calculated for the proposed project.

Table 1 – Trip Generation Table

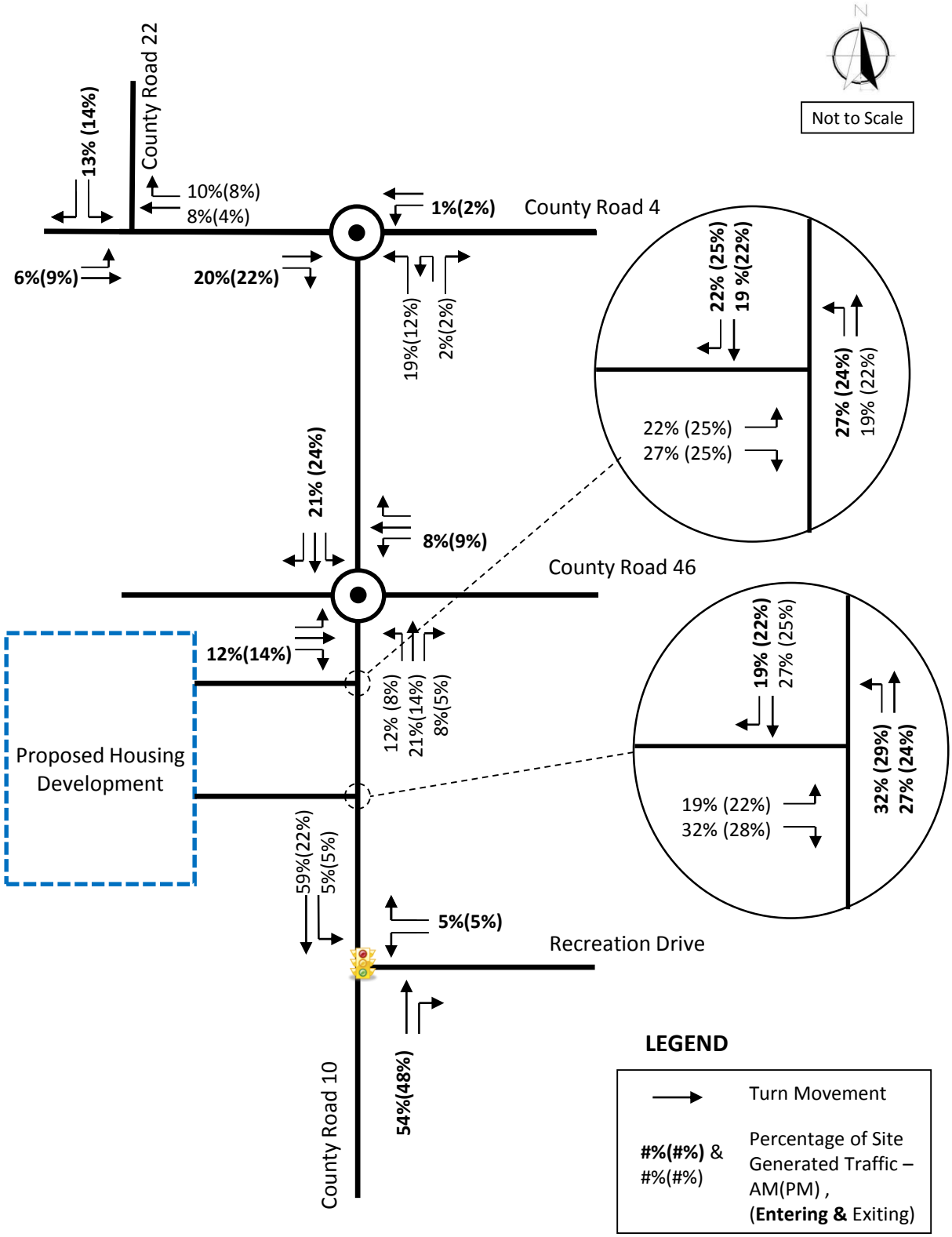
Type of Land Use	ITE Code	Size	Weekday Morning Peak			Weekday Evening Peak		
			Enter	Exit	Total	Enter	Exit	Total
Low-Rise Apartment	221	384 units	37	140	177	145	79	223
Total Projected Trips			**37**	**140**	**177**	**145**	**79**	**223**

* Trip generation rates is based on ITE Trip Generation Manual 8th Edition for Trips Generated during the existing morning and evening peak hours at the study area intersection.

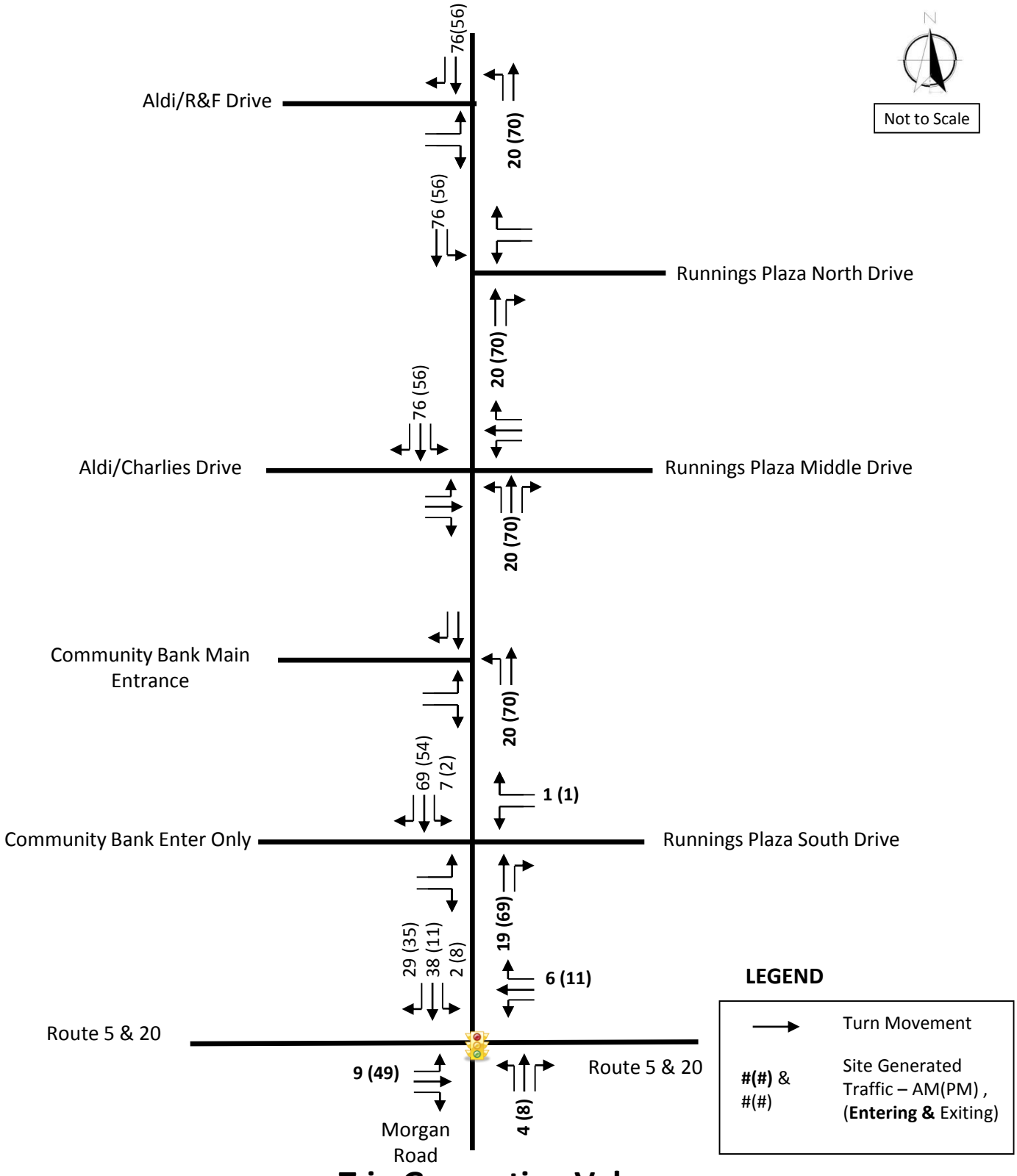
Figures 7A & 7B show the trips generated by the proposed development distributed within the study area intersection.



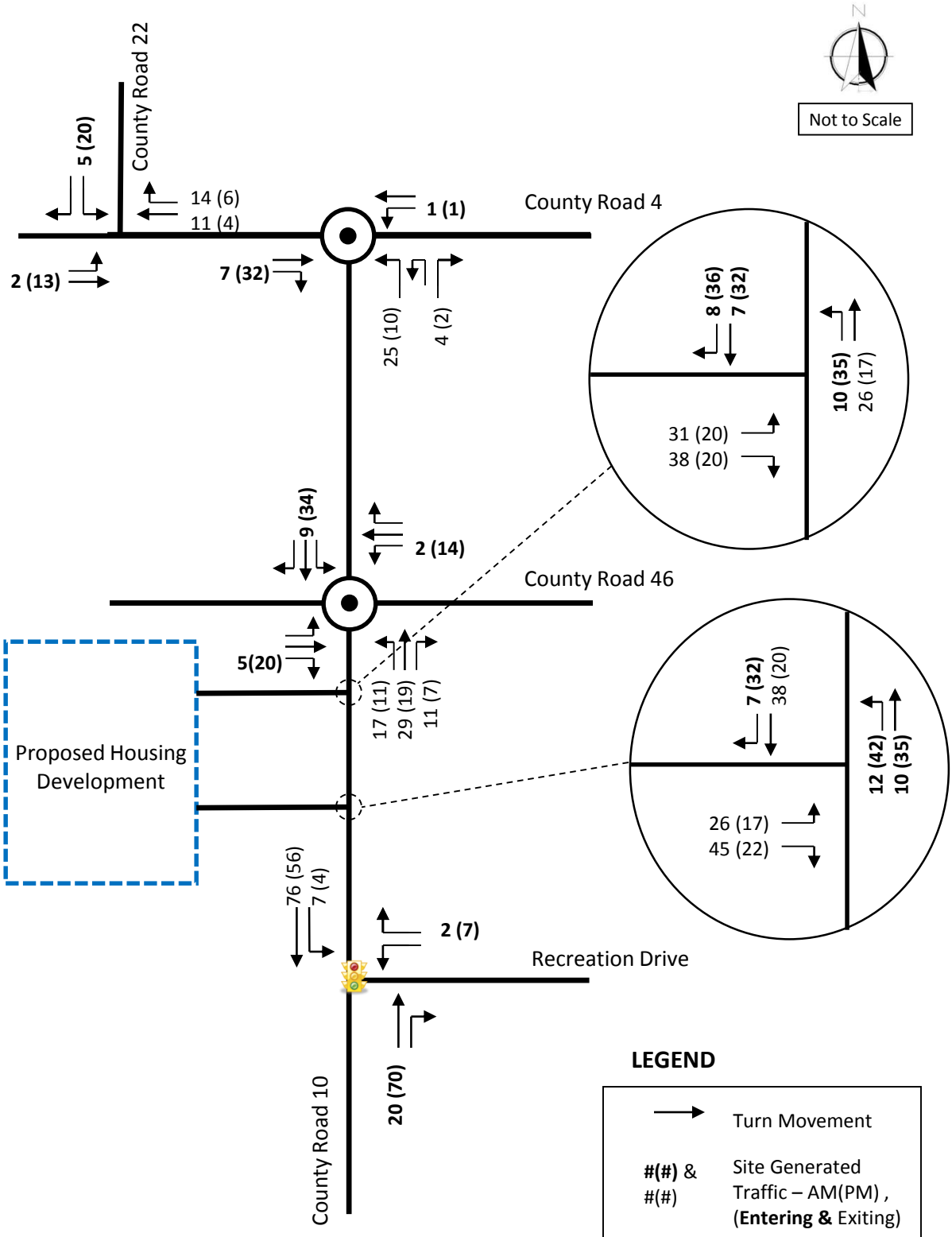
Trip Distribution Percentages



Trip Distribution Percentages



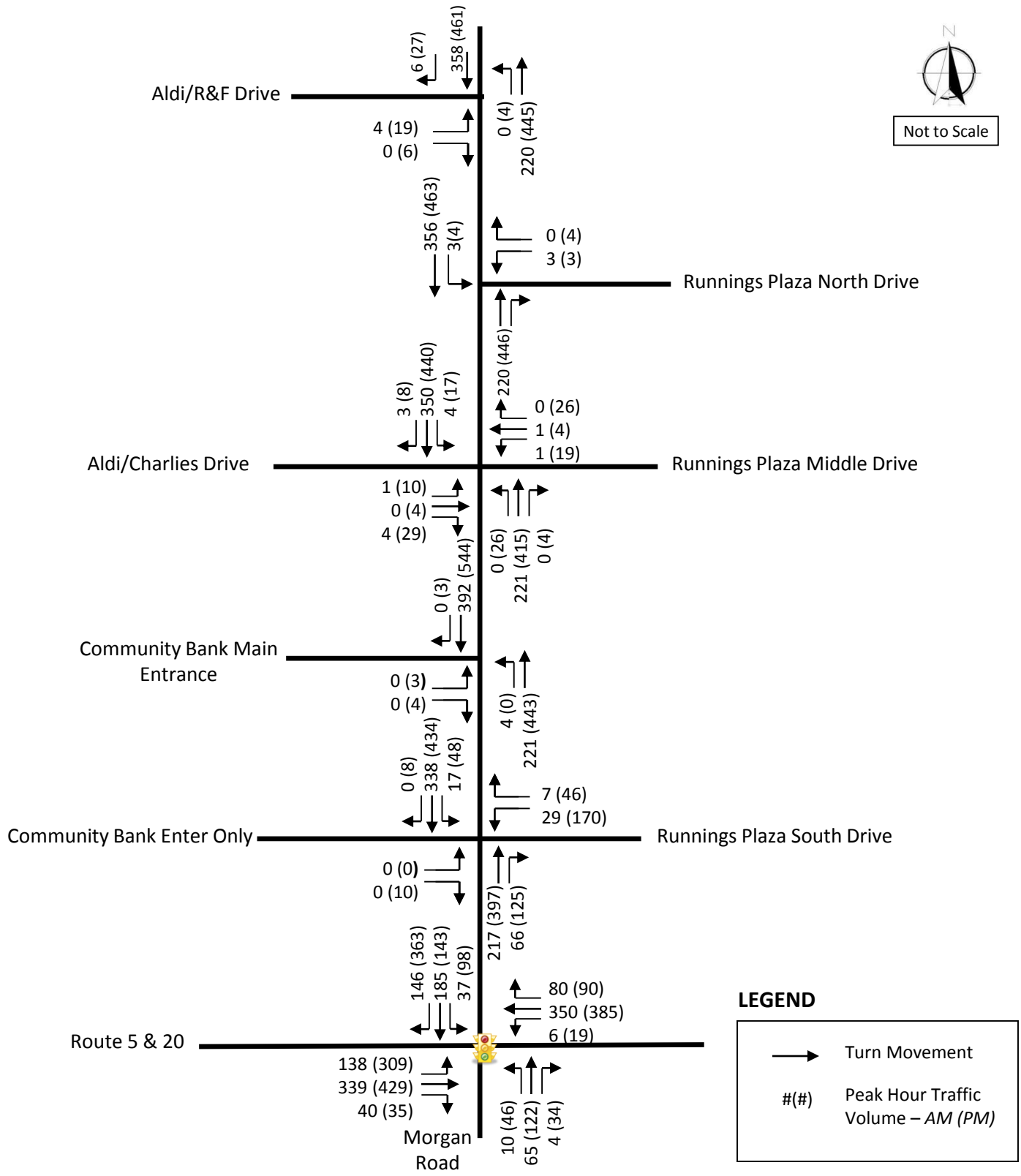
Trip Generation Volumes



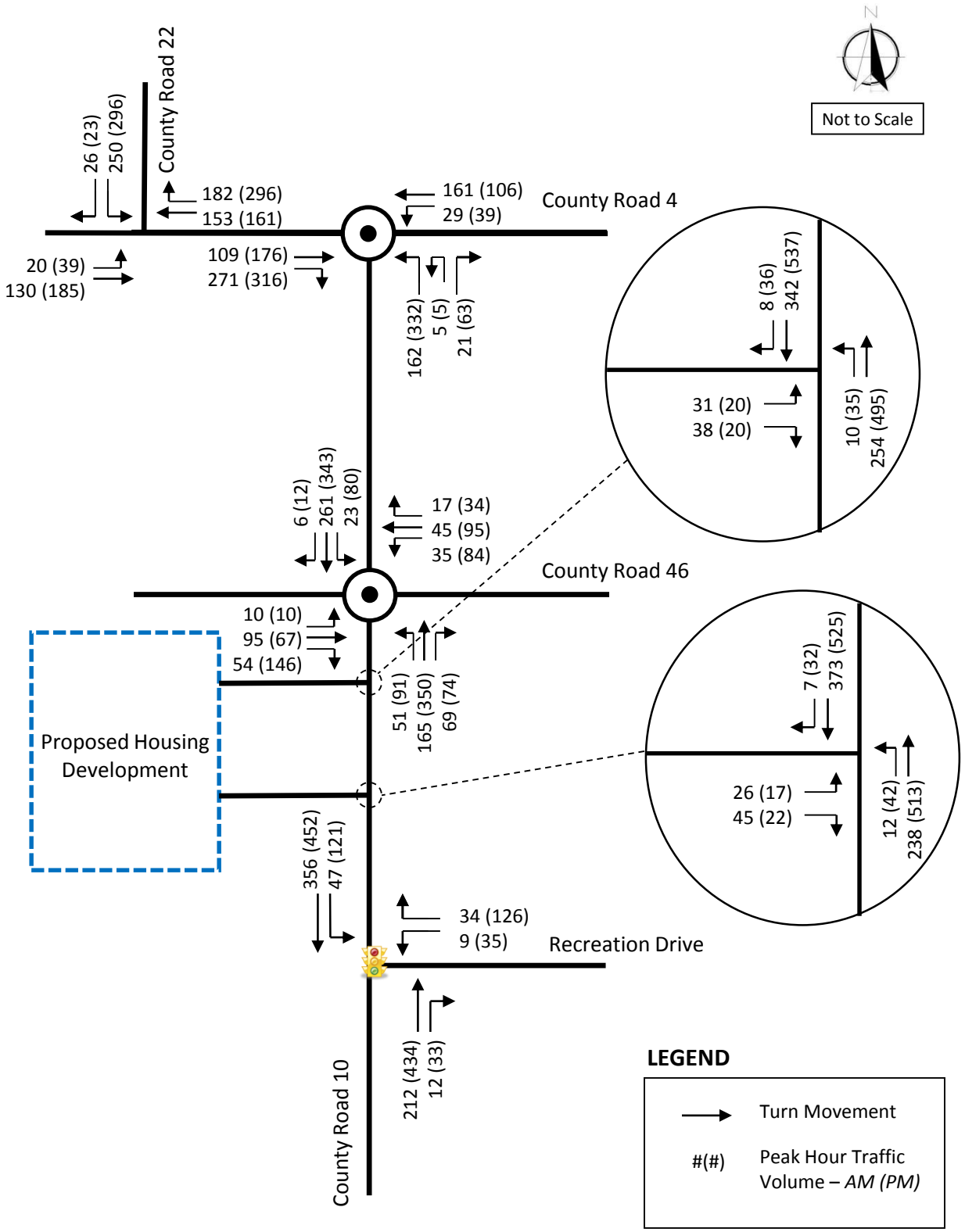
Trip Generation Volumes

2025 Build Traffic Volumes

Figures 8A & 8B show the weekday morning and evening proposed peak hour traffic volumes associated with the 2025 build conditions. These volumes represent the 2017 existing volumes combined with the background annual traffic growth and the addition of the estimated trips generated by the proposed project.



2025 Build Traffic Volumes



2025 Build Traffic Volumes

TRAFFIC OPERATIONS

Intersection Capacity – Unsignalized Intersections

Level of service (LOS) is a term used to characterize the operational conditions of a traffic facility at a particular point in time. Numerous factors contribute to a facility's LOS including travel delay and speed, congestion, driver discomfort, convenience, and safety based on a comparison of the facility's capacity to the facility's demand. Alphabetic designations A through F define the six levels of service. LOS A represents very good traffic operating conditions with minimal delays while LOS F depicts poor traffic operating conditions with excessive delays and queues.

Operating levels of service are calculated using the procedures defined in the 2010 Highway Capacity Manual, published by the Transportation Research Board. The operating LOS of two-way stop-controlled (TWSC), all-way stop-controlled (AWSC) and roundabout intersections is the computed or measured delay. The intersection delay is based upon the quality of service for the vehicles turning into and out of minor approaches, i.e.; approaches that are stop/yield controlled. The availability of sufficient gaps in the traffic stream on the major street/roundabout controls the capacity for movements to and from the minor approaches, thus resulting in delays for the minor approaches. The criteria, or the delays associated with corresponding levels of service for TWSC, AWSC and roundabout intersections, as specified by the 2010 Highway Capacity Manual and are shown in Table 2 below.

Table 2
Unsignalized/Roundabout Intersection Level of Service Criteria

Level of Service	Controlled Delay (sec/veh) TWSC, AWSC and Roundabout Intersections
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

Intersection Capacity – Signalized Intersections

The operating Level of Service (LOS) of a signalized intersection is based on the average control delay per vehicle. The control delay per vehicle is estimated for each lane group, combined for each approach and the intersection as a whole. The criteria, i.e., the delays associated with corresponding levels of service for signalized intersections, as specified by the 2010 Highway Capacity Manual are shown in Table 3.

Table 3
Signalized Intersection Level of Service Criteria

Level of Service	Controlled Delay (sec/veh) Signalized Intersections
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

Presented in Table 4 are the results of the analysis for the 2017 Existing, 2025 No-Build and 2025 Build conditions for the intersections located within the study area. The traffic modeling software Synchro, Ver. 8.0, which utilizes the methodologies of the 2010 Highway Capacity Manual for unsignalized and signalized intersection, was used for the analysis portion of this study. The full analysis results printouts from the Synchro software are available in Appendix C.

As shown in Table 4, the proposed development will not have any noticeable effects on the traffic operations within the study area. Described below is a detailed breakdown of the impacts, if any, on the study area intersections' operations as a result of traffic from the proposed development.

No. 1 – County Road 10/Morgan Road at Routes 5&20
This signalized semi-actuated, intersection operates efficiently today and will continue to operate efficiently with the proposed development. The southbound approach will see an increase in traffic but the infrastructure in place will allow this increase in traffic to be served with negligible effects on the traffic operations. No mitigation is recommended at this intersection.

No. 2 – County Road 10 at Running Plaza Southern Entrance/Community Bank
This retail access drive intersection will operate in a similar manner as is does today with the proposed development. The Runnings Plaza driveway sees a high volume in the evening peak as patrons of the Runnings Plaza as well as the Walmart and Lowes plazas use this drive as a cut through to get to County Road 10 and Routes 5 &20. This approach is projected to degrade from an 'e' LOS in the no build scenario to an 'f' LOS in the build scenario due to the overall increase in traffic on County Road 10. The potential future poor levels of operation are a result of traffic cutting though the Runnings Plaza from the Walmart/Lowes Plaza and as shown below in intersections 3 and 4, there are other alternatives for traffic to access County Road 10 that are currently underutilized. No mitigation is recommended at this intersection as this cut through traffic has various alternative routes and should not be encouraged, while any improvements to this intersection have the possibility of being detrimental to the County Road 10/Route 5 & 20 intersection.

No. 3, 4, 5, – Misc. Driveways onto County Road 10
These unsignalized access driveways onto County Road 10 operate well today and will continue to operate well in the future with the proposed housing development, all with LOS 'c' or better operations and no degradation in overall LOS with the additional traffic. The entrances have low volumes that are accommodated by the proposed driveway configurations. No mitigation is recommended at these intersections.

No. 6 – County Road 10 at Recreation Drive
This semi-actuated signalized intersection operates efficiently today and will continue to operate efficiently with the proposed development while maintaining an overall LOS 'A' in the morning peak and LOS 'B' in the evening peak. All individual movements are LOS 'C' or better. The proposed development will have a negligible impact on the traffic operations with only un-noticeable increases in delay during the PM peak hour. No mitigation is proposed at this intersection.

No. 7 – County Road 10 at County Road 46
This roundabout intersection operates well today with LOS 'A' in the morning peak and LOS 'C' during the evening peak. The proposed development will not have a negative impact on the operations of the roundabout as all the approach LOS remain consistent with the proposed development traffic.

No. 8 – County Road 10 at County Road 4 (Ontario Street Extension)
This roundabout intersection operates well today with LOS 'A' in the morning peak and LOS 'B' during the evening peak. The proposed development will have no impact on the operations of the roundabout as all the existing approach LOS remain consistent with the proposed development traffic.

No. 9 – County Road 22 (Hanna Road) at County Road 4 (Ontario Street Extension)
This intersection will begin to see increases in delay for the County Road 22 stop sign controlled approach in the future regardless of the proposed development traffic. The proposed development will add a minor amount of traffic to the movements going to/from County Road 22 from the east. This traffic will have a negligible effect during the morning peak; however, the evening peak is projected to see an overall average delay increase of around 15 seconds. Signal warrants were reviewed for this intersection in a later section of this study in more detail; however, to summarize, a signal is not recommended and is not warranted as a result of the proposed traffic generated by the development.

No. 10 – County Road 10 at Proposed Access Road (South)
The proposed access road to the new housing development will have adequate levels of operations with an overall 'a' LOS for both peak hours. The intersection is projected to have negligible impacts to the County Road 10 traffic and residents will have minimal exiting delay with LOS 'b' and LOS 'c' operations during the morning and evening peak hours respectively.

No. 11 – County Road 10 at Proposed Access Road (North)
The proposed access road to the new housing development will have adequate levels of operations with an overall 'a' LOS for both peak hours. The intersection is projected to have negligible impacts to the County Road 10 traffic and residents will have minimal exiting delay with LOS 'b' and LOS 'c' operations during the morning and evening peak hours respectively.

TABLE 4 - INTERSECTION LEVEL OF SERVICE TABLE

Study Intersection	Approach and Movement		MORNING PEAK HOUR						EVENING PEAK HOUR					
			2017 EXISTING		2025 NO BUILD		2025 BUILD		2017 EXISTING		2025 NO BUILD		2025 BUILD	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
No. 1 County Road 10/Morgan Road at Routes 5 & 20 *(Signalized)*	Eastbound	L	6.2	A	6.4	A	7.3	A	6.8	A	8.1	A	9.0	A
		T	7.6	A	7.8	A	8.5	A	7.4	A	9.7	A	9.8	A
	Westbound	L	6.2	A	6.3	A	7.0	A	7.2	A	7.5	A	8.0	A
		T	16.2	B	16.7	B	18.0	B	18.7	B	21.1	C	22.8	C
	Northbound	L	18.2	B	18.4	B	18.4	B	23.4	C	24.1	C	25.5	C
		T	18.7	B	19.0	B	18.8	B	25.4	C	25.1	C	26.6	C
	Southbound	L	19.9	B	20.2	C	19.8	B	27.2	C	32.2	C	36.5	D
		T	24.2	C	24.7	C	25.9	C	24.6	C	26.8	C	28.3	C
		R	2.4	A	2.4	A	2.2	A	4.1	A	7.2	A	8.2	A
	OVERALL		**12.9**	**B**	**13.2**	**B**	**14.1**	**B**	**13.4**	**B**	**15.8**	**B**	**16.8**	**B**
No. 2a County Road 10 at Runnings Plaza Southern Entrance/Community Bank *(Un-Signalized)*	Northbound	L	9.5	a	9.6	a	10.0	b	9.7	a	10.4	b	10.8	b
	Westbound	L-T-R	11.4	b	11.6	b	12.2	b	19.7	c	37.0	e	57.4	f
	Southbound	L	8.0	a	8.0	a	8.1	a	8.4	a	8.8	a	9.1	a
	OVERALL		**0.9**	**a**	**1.1**	**a**	**1.0**	**a**	**4.4**	**a**	**8.1**	**a**	**11.1**	**b**
No. 2b County Road 10 at Community Bank Main Entrance (*Un-Signalized*)	Northbound	L	7.8	a	7.9	a	8.1	a	8.2	a	8.3	a	8.5	a
	Eastbound	L-R	10.5	b	10.5	b	11.1	b	11.9	b	12.1	b	12.8	b
	OVERALL		**0.1**	**a**	**0.1**	**a**	**0.1**	**a**	**0.1**	**a**	**0.1**	**a**	**0.1**	**a**
No. 3 County Road 10 at Runnings Plaza Middle Entrance/Aldi's *(Un-Signalized)*	Northbound	L	7.8	a	7.9	a	8.1	a	8.2	a	8.3	a	8.4	a
	Eastbound	L-T-R	10.4	b	10.5	b	11.2	b	14.4	b	14.8	b	16.7	c
	Westbound	L-T-R	12.8	b	13.0	b	14.3	b	16.0	c	16.8	c	19.7	c
	Southbound	L	7.7	a	7.7	a	7.7	a	8.1	a	8.1	a	8.3	a
	OVERALL		**0.2**	**a**	**0.2**	**a**	**0.2**	**a**	**2.0**	**a**	**2.1**	**a**	**2.1**	**a**
No. 4 County Road 10 at Runnings Plaza Northern Entrance *(Un-Signalized)*	Westbound	L-R	11.1	b	11.2	b	11.8	b	11.5	b	11.8	b	12.5	b
	Southbound	L-T	7.7	a	7.7	a	7.7	a	8.1	a	8.2	a	8.4	a
	OVERALL		**0.1**	**a**	**0.1**	**a**	**0.1**	**a**	**0.1**	**a**	**0.2**	**a**	**0.1**	**a**
No. 5 County Road 10 at Aldi's / R&F Delivery Entrance *(Un-Signalized)*	Northbound	L	7.9	a	7.9	a	8.1	a	8.3	a	8.3	a	8.5	a
	Eastbound	L-R	11.1	b	11.2	b	11.8	b	12.8	b	13.1	b	14.0	b
	OVERALL		**0.1**	**a**	**0.1**	**a**	**0.1**	**a**	**0.4**	**a**	**0.4**	**a**	**0.4**	**a**
No. 6 County Road 10 at Recreation Drive *(Signalized)*	Westbound	L	29.4	C	29.4	C	29.4	C	30.7	C	31.2	C	28.7	C
		R	6.1	A	6.1	A	6.0	A	11.5	B	8.7	A	11.8	B
	Northbound	T	7.5	A	7.6	A	7.8	A	9.7	A	14.9	B	20.3	C
	Southbound	L	2.7	A	2.7	A	2.8	A	3.5	A	5.2	A	6.8	A
		T	3.1	A	3.2	A	3.5	A	3.8	A	5.7	A	7.3	A
	OVERALL		**5.8**	**A**	**5.8**	**A**	**5.8**	**A**	**7.8**	**A**	**10.9**	**B**	**13.8**	**B**
No. 7 County Road 10 at County Road 46 (*Roundabout*)	Eastbound	Yield	8.8	A	9.2	A	9.6	A	10.4	B	15.1	C	18.9	C
	Westbound	Yield	6.0	A	6.1	A	6.6	A	10.9	B	12.6	B	14.0	B
	Northbound	Yield	7.2	A	7.3	A	8.4	A	10.4	B	15.2	C	17.4	C
	Southbound	Yield	7.8	A	8.1	A	8.5	A	12.5	B	16.2	C	20.3	C
	OVERALL		**7.7**	**A**	**7.9**	**A**	**8.5**	**A**	**11.1**	**B**	**15.1**	**C**	**18.1**	**C**
No. 8 County Road 10 at County Road 4 (*Roundabout*)	Eastbound	Yield	9.1	A	9.5	A	9.6	A	8.4	A	12.3	B	13.8	B
	Westbound	Yield	5.7	A	5.9	A	6.1	A	7.0	A	6.8	A	6.9	A
	Northbound	Yield	5.6	A	5.6	A	6.0	A	8.7	A	10.8	B	11.1	B
	OVERALL		**7.7**	**A**	**7.9**	**A**	**8.1**	**A**	**8.3**	**A**	**11.1**	**B**	**12.1**	**B**
No. 9 Hanna Road (CR22) at County Road 4 (*Un-Signalized*)	Eastbound	L	8.1	a	8.1	a	8.2	a	8.4	a	8.7	a	8.8	a
	Southbound	T	23.6	c	26.3	d	29.4	d	31.2	d	91.4	f	130.3	f
	OVERALL		**9.8**	**a**	**10.9**	**b**	**11.9**	**b**	**10.8**	**b**	**31.8**	**d**	**46.0**	**e**
No. 10 County Road 10 at Proposed Access Road (South) (*Un-Signalized*)	Northbound	L					8.2	a					8.9	a
	Eastbound	L-R					13.0	b					19.9	c
	OVERALL						**1.5**	**a**					**1.0**	**a**
No. 11 County Road 10 at Proposed Access Road (North) *(Un-Signalized)*	Northbound	L					8.1	a					8.9	a
	Eastbound	L-R					13.0	b					20.6	c
	OVERALL						**1.4**	**a**					**1.0**	**a**

Site Distance Analysis

The sight distance at the proposed site entrances was field measures to determine if the available intersection sight distances meet the AASHTO recommended values. As shown in the follow Table 5, adequate site distance is available at the proposed road intersection locations.

Table 5 – Sight Distance Summary Table

SIGHT DISTANCE MEASUREMENTS					
Location	Speed Limit	Direction	AASHTO Recommended Sight Distance	Available Sight Distance	Visual Restrciction
Proposed North Intersection at County Road 10	55 mph	Looking Left	530 feet	650 feet	Roundabout
	55 mph	Looking Right	665 feet	>700 feet	None
Proposed South Intersection at County Road 10	55 mph	Looking Left	530 feet	>700 feet	None
	55 mph	Looking Right	665 feet	>700 feet	None

Signal Warrant Analysis

Signal warrants were reviewed for the study area unsignalized intersections in accordance with the Federal Highway Administrations; Manual of Uniform Traffic Control Devices, 2009 edition. None of the unsignalized intersections meet any signal warrants with the exception of the County Road 4/County Road 22 intersection. For the remaining intersections, the peak hour traffic data available still did not meet any of the side street volume thresholds. Eight hour tube count traffic data was utilized to project the turn movement traffic for the remaining hours of the day.

The signal warrant analysis worksheet for the County Road 4 at County Road 22 (Hanna Road) showed that this intersection has existing volumes that meet the following signal warrants: Warrants 1A and 1B (Eight Hour Vehicle Volume), Warrant 2 (Four Hour Vehicular Volume), and Warrants 3A and 3B (Peak Hour). These volume warrants are met for the existing traffic volumes observed in the field. Based on the minimal amount of traffic entering this intersection being generated by the proposed development (32 and 43 vehicles during the morning and evening peak hours respectively), no proposed improvements are recommended at this intersection from a capacity or safety improvements standpoint. A new three color traffic signal is not recommended, but traffic volumes and accident data should be monitored in the future to determine if any additional signage and/or control should be implemented.

HIGHWAY SAFETY ANALYSIS

Accident summary reports for the study area intersections and the roadway segments were obtained from the New York State Department of Transportation and Ontario County Records Archive for the three most recent years of available data (from January 1, 2014 through December 31, 2016). There were a total of 136 accidents recorded during the three-year period with a total of 24 accidents resulting in injuries and no fatalities.

Roadway Segments

The roughly 2 miles of roadway segments included in the study area accounted for 45 mainline/driveway related accidents, including 4 accidents resulting in injuries and no fatalities. It should be noted that 60% of these accidents (27) resulted from deer strikes, which heavily skews the

overall accident rate. For mainline related accidents, the roadway segment was near the statewide average with an accident rate of 2.36 accidents per million vehicle miles (ACC/MVM) compared to the statewide average rate of 2.29 ACC/MVM for a roadway of this nature. Details for the accidents are included in Table 6.

Study Area Intersections

The intersections included in the study area accounted for 91 intersection related accidents, which includes 20 accidents with injuries. All intersections analyzed have accident rates higher than the statewide average, and a breakdown of the accident data is included in Table 6. The series of commercial/retail driveways between Route 5 & 20 and Recreation Drive were are believed to be included within the roadway segment analysis and not broken down per driveway in the data obtained/recorded by the officers responding to the accidents. These are minor enough and closely spaced intersections that the officer likely either recorded them as the Routes 5 & 20 intersection or within the roadway segment. Therefore, the five primary intersections within the study area have been broken out in the following table.

Table 6
Accident Data Summary Table

ACCIDENT HISTORY SUMMARY January 1, 2014 to December 31, 2016						
	INTERSECTION					SEGMENT
	CR 4 / CR 22	CR 4 / CR 10	CR 10 / CR 46	CR10 / RECREATION DRIVE	CR 10 / SR 5 & 20	CR 10
TOTAL ACCIDENTS	**8**	**15**	**10**	**6**	**52**	**45**
Non-Reportable	2	5	5	1	24	20
Property Damage	3	9	5	3	14	21
Injuries	3	1	0	2	14	4
Fatalities	0	0	0	0	0	0
Intersection Accident Rate (ACC/MEV)	0.69	1.34	0.81	0.48	2.45	2.36
NYS Average Accident Rate	0.17	0.29	0.50	0.29	0.50	2.29
Accident Types						
Rear End	4	5		5	17	5
Right Angle	2	2	4		13	5
Overtaking			1		4	
Side Swipe					1	3
Deer			2			27
Left Turn	1				7	2
Right Turn			2		4	1
Fixed Object	1	8	1	1	4	2
Pedestrian					1	
Bicycle					1	

A review of each primary intersection is included below to determine if the proposed development will have any impact on the existing roadway safety.

No. 1 – County Road 10/Morgan Road at Routes 5&20

This intersection has an accident rate above the statewide average with 52 accidents recorded within the 3-year data period. Routes 5 & 20 in this area accommodates a wide range of use from commercial truck traffic to seasonal increases in the summer including daily peaks during CMAC events which can draw 15,000 people. As a result, the intersection has number of rear end and turning related accidents and it is believed that a number of these may be the result of visitors to the area not familiar with the Route 5 & 20 corridor. The project does not impact the operations at this intersection which already has auxiliary lanes with protected eastbound and westbound left turn lanes. The development is only projected to add 88 vehicles and 142 vehicles during the morning and evening peak hours, respectively; therefore, no safety improvements are recommended in conjunction with the proposed development.

No. 2, 3, 4, & 5 – Misc. Driveways onto County Road 10

The various unsignalized driveway 'T' intersections do not have specific accident rates associated with the various driveways and while data was not available, the overall County Road 10 corridor has an accident rate of 2.36 ACC/MVM. This accident rate was primarily due to deer strikes and was still near the statewide average of 2.29 ACC/MVM). There is already a two way left turn lane from recreation drive to the Route 5 & 20 approach which provides additional safety and capacity improvements for vehicles utilizing these driveways. No safety related improvements are recommended at these driveways.

No. 6 – County Road 10 at Recreation Drive

This intersection has an accident rate above the statewide average as a result of the 6 accidents reviewed, five of which were rear end collisions. The project does not impact the operations at this intersection as the intersection already has auxiliary lanes with a northbound right turn lane and a permissive/protected southbound left turn lane; therefore no safety improvements are recommended in conjunction with the proposed development.

No. 7 – County Road 10 at County Road 46

The recently constructed roundabout has an accident rate slightly greater than the statewide average based on the 10 accidents reviewed, noting that 2 accidents were deer strikes. The accidents reviewed were minor in nature primarily resulting in driver's inability to yield the right of ways resulting in fender benders. These results are consistent with the operations of roundabouts, particularly in their first years of operations. Based on the accident history and that this roundabout, as well as roundabouts in general, are still a relatively new traffic control devices to drivers, we believe the accident rate will continue to decrease over time and no safety improvements are recommended as a result of the proposed development.

No. 8 – County Road 10 at County Road 4 (Ontario Street Extension)

The recently constructed roundabout has an accident rate greater than the statewide average based on the 15 accidents reviewed, more than half from single vehicle accidents fixed objects. The cause of these accidents was driver inattention, high speeds, slippery roadway conditions or a combination of all three. The accidents reviewed were minor in nature with only one resulting in injury. Similar to intersection #7, these results are consistent with the operations of roundabouts, particularly in their first years of operations. Based on the accidents history and that this roundabout, as well as roundabouts in general, are still a relatively new traffic control devices to drivers, we believe the accident rate will continue to decrease over time and not safety improvements are recommended as a result of the proposed development.

No. 9 – County Road 22 (Hanna Road) at County Road 4 (Ontario Street Extension)
The existing unsignalized 'T' intersection has an accident rate above the statewide average as a result of the 8 accidents reviewed and has a very heavy southbound left turn movement and westbound right turn movement. These heavy movements are a result of drivers using this route to avoid NYS Route 332 and the associated delays of Main Street through the City of Canandaigua. As detailed in the previous section of this report, the existing traffic volumes were reviewed to determine if a signal was warranted; however, based on the minimal amount of traffic entering this intersection being generated by the proposed development (32 and 43 vehicles during the morning and evening peak hours respectively) no proposed safety improvements are recommended as a result of the proposed project.

CONCLUSIONS AND RECOMMENDATIONS

MJ has evaluated the traffic operations within the study area near the proposed Housing Development Project in Canandaigua, NY. Results from the 2025 Build conditions indicate that the proposed project will have negligible impacts with no noticeable increase in delay to the traveling public within the existing study area intersections. Access into and out of the proposed development can be provided in a safe and efficient manner at the proposed access drive's intersections with County Road 10.

Based on the traffic analysis results, MJ offers the following conclusion and recommendations:

- The proposed development is anticipated to generate 177 trips in the morning peak hour and 223 trips during the evening peak hour.

- The existing County Road 10 corridor has adequate capacity to accommodate the additional traffic generated by the proposed development.

- The proposed development's access drive intersections with County Road 10 shall consist of a stop sign controlled single exit lane and single entrance lane at both intersections.

- The existing intersection of County Road 4 and County Road 22 (Hanna Road) should be monitored as the existing traffic volumes are meeting signal warrants; however a three color signal is not recommended as a result of the traffic generated by the proposed development.

- The highway safety analysis revealed that the County Road 10 corridor's mainline accident rate is consistent with statewide accident rates; however the individual major intersections have accident rates above the statewide average. Much of this analysis is skewed due to the heavy number of deer strikes and drivers in-experience with the new roundabouts. The proposed traffic generated by the development is not anticipated to impact the operating conditions at the intersections and thus should not have a quantitative effect on the roadway accidents or highway safety within the study area.

REFERENCES:

- Trip Generation, Eighth Edition. Institute of Transportation Engineers. Washington, D.C. 2012.

- Trip Generation Handbook, Second Edition. Institute of Transportation Engineers. Washington, D.C. June 2004.

- Highway Capacity Manual 2010, Fifth Edition. Transportation Research Board. National Research Council, Washington, D.C. 2010.

- Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD). Federal Highway Administration. 2009.

- **APPENDICES**

APPENDIX A **TRAFFIC COUNT DATA**

APPENDIX B **TRAFFIC CALCULATIONS**

APPENDIX C **SYNCHRO ANALYSIS PRINTOUTS**

APPENDIX D **SIGNAL WARRANT WORKSHEET**

APPENDIX E **ACCIDENT DATA**

APPENDIX A

TRAFFIC COUNT DATA

- Intersection Turn Movement Counts
  - Wednesday (2/15/2017)

- NYSDOT Tube Count Data
  - CR 10 at Site Driveways (9/29/2014)
  - CR 10 Between CR 46 and CR 4 (4/27/2015)
  - CR 46 (10/16/2006)

APPENDIX B

TRAFFIC CALCULATIONS

- NYSDOT Seasonal Adjustment Table
- NYSDOT Traffic Volume Report – Historic Volumes

APPENDIX C

SYNCHRO MODEL CAPACITY ANALYSIS RESULTS

- 2017 Existing Conditions
  - Morning Peak
  - Evening Peak

- 2025 No-Build Conditions
  - Morning Peak
  - Evening Peak

- 2025 Build Conditions
  - Morning Peak
  - Evening Peak

APPENDIX D

SIGNAL WARRANT WORKSHEET

- County Road 4 & County Road 22 (Hanna Road)

APPENDIX E

ACCIDENT DATA

- Accident Rate Calculation Table

- NYSDOT Average Accident Rate Table

- Accident Verbal Description Reports
    - NYS Route 5 & 20 intersection with County Road 10
    - County Route 4 Intersection with County Road 10 to Intersection with County Road 22 (Hanna Road)
    - County Road 10 Corridor from NYS Route 5 & 20 to County Road 4