

**TRAFFIC IMPACT STUDY**  
**FOR THE**  
**McCLENNEN PROPERTY RESIDENTIAL DEVELOPMENT**

**EAST ROCKHILL TOWNSHIP**  
**BUCKS COUNTY, PENNSYLVANIA**

**PREPARED FOR:**  
**SELECT PROPERTIES, INC.**

**DECEMBER, 2010 (REVISED)**



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## INTRODUCTION

Select Properties, Inc. proposes to develop the McClennen Property Residential Development on an approximate 64.2 acre tract located along Old Bethlehem Pike and along Hill Road north of Three Mile Run Road in East Rockhill Township, Bucks County, Pennsylvania (Figure 1). The proposed development will be comprised of 90 single family detached houses and 103 townhouses. Access to the site will be provided via a roadway that will intersect Old Bethlehem Pike at a point approximately 650 feet north of Park Avenue, and a roadway that will intersect Hill Road at a point directly opposite Stone Edge Road.

The purpose of this report is to present the results of an analysis of the potential traffic impact of the proposed McClennen Property Residential Development on area roads and intersections. The study includes:

- Evaluation of existing conditions on roadways in the area, including completion of peak period Intersection Turning Movement counts and conduct of a volume/capacity analysis of the following intersections:
  - Park Avenue/Three Mile Run Road
  - Old Bethlehem Pike/Three Mile Run Road
  - Old Bethlehem Pike/Park Avenue
  - Old Bethlehem Pike/Rockhill Road/Weikel Road
  - Three Mile Run Road/Hill Road
  - Rockhill Road/Hill Road
  - Hill Road/Stone Edge Road
  - Ridge Road/Park Avenue
  - Ridge Road/Old Bethlehem Pike
  - Old Bethlehem Pike/Rich Hill Road
- Determination of future travel characteristics of the proposed residential development including vehicular trip generation by direction in the respective peak hours, distribution of generated traffic to the area roadways and intersections, and assignment of generated traffic to the various access locations and intersections. Generated traffic is added to existing traffic which has been adjusted upward to reflect background traffic growth and traffic due to other new development in the area to produce total future peak hour traffic volumes.
- Analysis of future traffic conditions including conduct of volume/capacity analyses at the intersections in the area of influence of the proposed development without and with development of the proposed residential development.
- Provision of conclusions and recommendations to facilitate safe and efficient access to the proposed McClennen Property Residential Development.

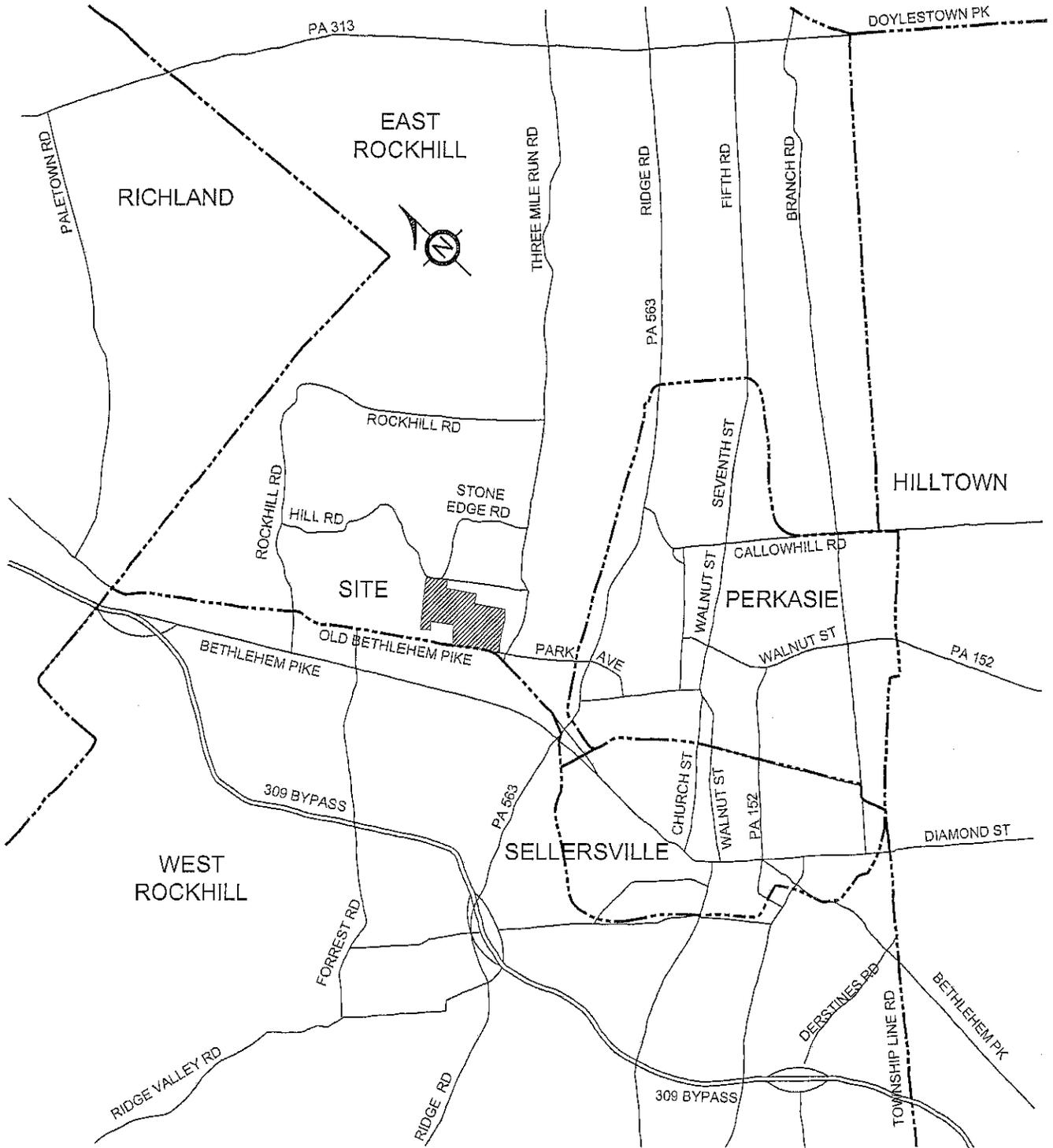


FIGURE 1  
SITE LOCATION MAP

McCLENNEN PROPERTY RESIDENTIAL DEVELOPMENT  
EAST ROCKHILL TOWNSHIP, PA



## EXISTING TRAFFIC CONDITIONS

Select Properties, Inc. proposes to develop the McClennen Property Residential Development on an approximate 64.2 acre tract located along Old Bethlehem Pike and along Hill Road north of Three Mile Run Road in East Rockhill Township, Bucks County, Pennsylvania. Access to the site will be provided via a roadway that will intersect Old Bethlehem Pike at a point north of Park Avenue, and a roadway that will intersect Hill Road at a point directly opposite Stone Edge Road.

### Roadway Characteristics

Old Bethlehem Pike is a two-way, two-lane local road. Old Bethlehem Pike provides one travel lane in both directions within a cartway width of 18 to 22 feet. Traffic on Old Bethlehem Pike is Stop-sign controlled on the approach to the unsignalized intersection with Park Avenue. The posted speed limit along Old Bethlehem Pike is 35 miles per hour.

Park Avenue is a two-way, two-lane local road in East Rockhill Township. Park Avenue is generally about 22 feet wide, but has been widened for a short distance up to 31 feet immediately south of Three Mile Run Road. The posted speed limit along Park Avenue is 35 miles per hour.

Three Mile Run Road is a two-way, two-lane local road. Three Mile Run Road is generally about 20 to 24 feet wide, but has been widened for a short distance up to 28 feet immediately west of Park Avenue. Traffic on Three Mile Run Road is Stop-sign controlled on the approaches to the unsignalized intersections with Park Avenue and with Old Bethlehem Pike. The posted speed limit along Three Mile Run Road is 35 miles per hour.

Hill Road is a two-way, two-lane local road. Hill Road is generally about 18 to 20 feet wide, but has been widened for a short distance to 30 feet immediately south of Stone Edge Road. Traffic on Hill Road is Stop-sign controlled on the approaches to the unsignalized intersections with Three Mile Run Road and with Rockhill Road. There is no posted speed limit along Hill Road.

Rockhill Road is a two-way, two-lane local road. Rockhill Road is generally about 21 to 22 feet wide. Traffic on Rockhill Road is Stop-sign controlled on the approach to the unsignalized intersection with Old Bethlehem Pike. The posted speed limit along Rockhill Road is 35 miles per hour.

Stone Edge Road is a two-way, two-lane residential street. Stone Edge Road is about 20 feet wide. Traffic on Stone Edge Road is Stop-sign controlled on the approach to the unsignalized intersection with Hill Road. The posted speed limit along Stone Edge Road is 25 miles per hour.

Ridge Road (S.R. 0563) is a two-way, two-lane State Highway. Ridge Road is generally about 22 feet wide with variable width paved shoulders along one or both sides of the highway. The posted speed limit along Ridge Road is 40 miles per hour.

Rich Hill Road is a two-way, two-lane local road. Rich Hill Road is generally about 17 to 18 feet wide. Traffic on Rich Hill Road is Stop-sign controlled on the approach to the unsignalized intersection with Old Bethlehem Pike. The posted speed limit along Rich Hill Road is 35 miles per hour.

The nearest signalized intersection to the site is at the intersection of Ridge Road and Park Avenue in the Borough of Perkasié. Traffic traveling through the intersection is regulated by a two-phased, traffic actuated traffic signal controller that operates on a variable cycle length of up to 90 seconds per cycle during peak periods.

### **Existing Traffic Volume**

To establish existing traffic patterns in the vicinity of the proposed hotel development, a series of Intersection Turning Movement Counts were completed in the vicinity of the site. A copy of the Traffic Volume Summary sheets is provided in Appendix A.

A review of the data indicates that traffic demand peaks during two periods of the day -- in the morning between 7:00 AM and 9:00 AM when many people are traveling to work and again in the late afternoon between 4:00 PM and 6:00 PM when most people are traveling home from work. Traffic volumes are lower during the middle of the day and are substantially reduced later in the evening through the late night and early morning

hours. To reflect peak traffic periods, intersection turning movement counts were completed for the morning (7:00 AM to 9:00 AM) and the afternoon (4:00 PM to 6:00 PM) peak periods at the following intersections:

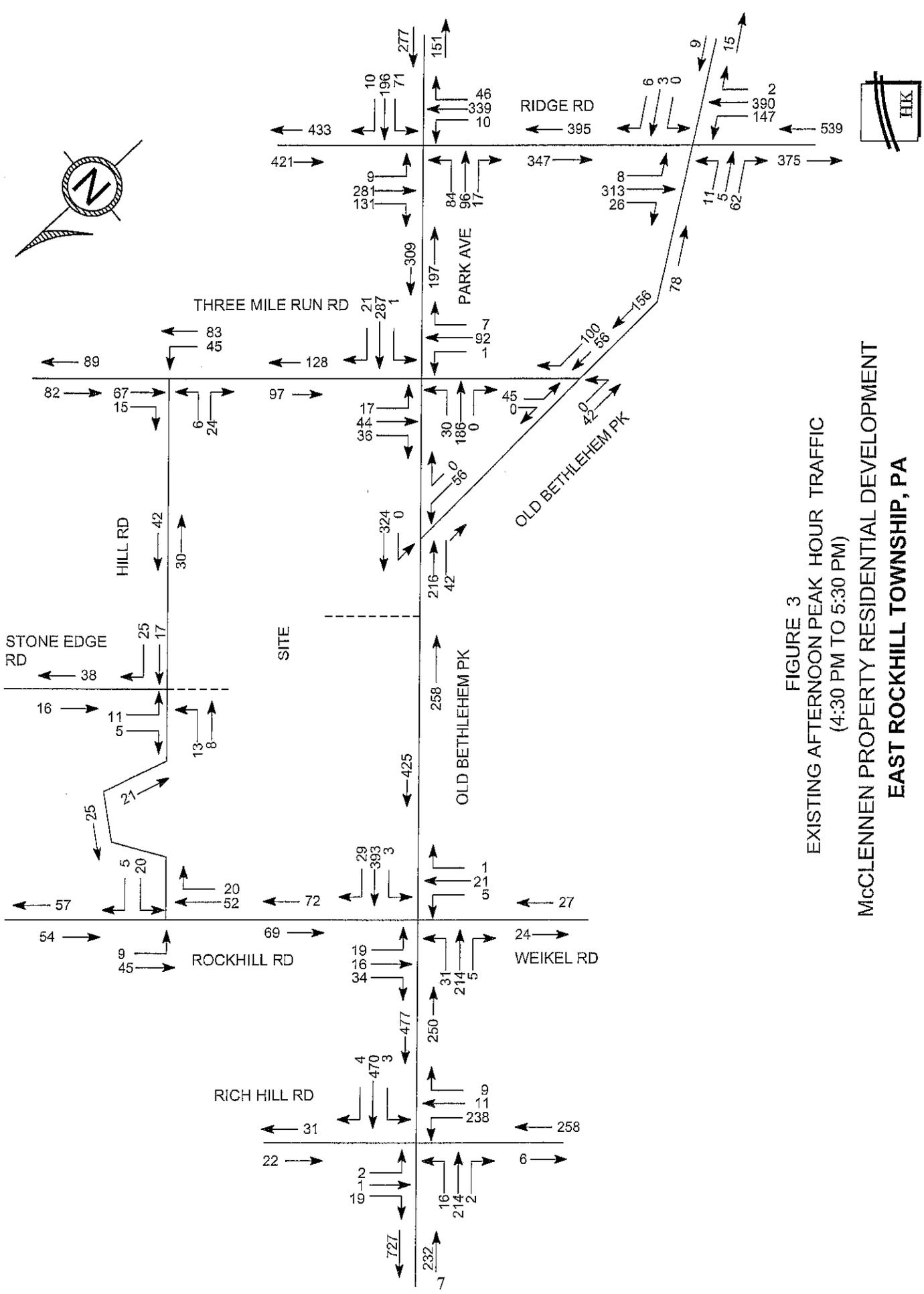
- Park Avenue/Three Mile Run Road
- Old Bethlehem Pike/Three Mile Run Road
- Old Bethlehem Pike/Park Avenue
- Old Bethlehem Pike/Rockhill Road/Weikel Road
- Three Mile Run Road/Hill Road
- Rockhill Road/Hill Road
- Hill Road/Stone Edge Road
- Ridge Road/Park Avenue
- Ridge Road/Old Bethlehem Pike
- Old Bethlehem Pike/Rich Hill Road

The four highest consecutive 15 minute periods during the morning and afternoon count periods constitute the peak hours, which are the basis of this Traffic Impact Study. The resulting morning and afternoon peak hour traffic flows are illustrated in the Figures 2 and 3, respectively, for the intersections listed above. The following table summarizes the existing peak hour traffic volumes at each of the intersections listed.

**EXISTING TOTAL INTERSECTION VOLUMES  
(June/December, 2010)**

<u>Intersection</u>	<u>Morning Peak Hour (7:15AM-8:15AM)</u>	<u>Afternoon Peak Hour (4:30PM-5:30PM)</u>
Park Avenue/Three Mile Run Road	473	722
Old Bethlehem Pike/Three Mile Run Road	186	243
Old Bethlehem Pike/Park Avenue	376	638
Old Bethlehem Pike/Rockhill Road/Weikel Road	474	771
Three Mile Run Road/Hill Road	197	240
Rockhill Road/Hill Road	112	151
Hill Road/Stone Edge Road	80	79
Ridge Road/Park Avenue	1,114	1,290
Ridge Road/Old Bethlehem Pike	925	973
Old Bethlehem Pike/Rich Hill Road	500	989





**FIGURE 3**  
**EXISTING AFTERNOON PEAK HOUR TRAFFIC**  
**(4:30 PM TO 5:30 PM)**  
**McCLENNEN PROPERTY RESIDENTIAL DEVELOPMENT**  
**EAST ROCKHILL TOWNSHIP, PA**

### Existing Volume/Capacity Analysis

While traffic volumes provide a measure of activity on the area road system, it is also important to calculate the ability of the road system to adequately accommodate the traffic demand. This involves a comparison of peak hour traffic demand with available roadway or intersection capacity. Intersections are usually the critical points in any road network. At intersections, conflicts occur between through, crossing and turning traffic. It is at intersections where congestion is most likely to occur.

A volume/capacity analysis was completed for the four intersections in the study area based on the peak hour traffic volumes illustrated in Figures 2 and 3. The volume/capacity analysis was completed in accordance with the procedures contained in the "Highway Capacity Manual"<sup>(1)</sup>. By definition, capacity represents "the maximum rate of flow that can reasonably be expected to pass a point on a uniform section of a lane or a functioning of an intersection or a uniform section of lane or roadway can be expressed in terms of levels of service. A Level of Service is defined as "a qualitative measure describing operational conditions within a traffic stream, or the perception by motorists and/or passengers . . . Such measures include speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

In calculating the capacity of an unsignalized intersection, it is assumed that the through movements on the major street and the right turns from the major street are unimpeded and have the right-of-way over all minor street traffic and left turns from the major street. All other movements in the intersection cross, merge with, or are affected by other flows. For each movement, all conflicting flows are summed and a "critical gap" is determined. The control delay of a critical movement includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay.

Since operation at capacity is usually unsatisfactory to most drivers, a descriptive mechanism has been developed which relates capacity with the expected traffic delay. This is known as Level of Service (LOS). Level of service for a two-way stop-controlled intersection is determined by the computed or measured control delay and is defined for

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(1) *"Highway Capacity Manual", Transportation Research Board, National Research Council, Washington, D.C., 2000.*

each minor movement. A description of the levels of service concept is provided in Appendix C. Appendix C also provides the correlation between levels of service and the average total delay per vehicle at unsignalized intersections.

A volume/capacity analysis was completed for the existing morning and afternoon peak hour traffic volumes at the intersections in the study area. The resultant peak hour levels of service are summarized and illustrated for existing peak hour traffic conditions in Figure 4.

As shown in Figure 4, the results of the analysis reveal that all movements at the signalized intersection of Ridge Road and Park Road are currently operating at an acceptable LOS C or better during both the morning and afternoon peak hours. The results of the analysis also reveal that, with but one exception, all critical movements at all of the unsignalized intersections in the study area are currently operating at an acceptable LOS D or better during both the morning and afternoon peak hours.

The eastbound Stop-sign controlled approach of Rich Hill Road at the intersection with Old Bethlehem Pike is operating at LOS F during the afternoon peak hour. Observations reveal that eastbound Rich Hill Road from Bethlehem Pike (PA Route 309) to Old Bethlehem Pike is used by traffic short-cutting to avoid Tollgate Road in Richland Township, particularly during the afternoon peak period. This situation can be partially alleviated by installation of a new traffic control signal, or similar improvement, at the intersection of Old Bethlehem Pike and Tollgate Road in Richland Township. Due to sight distance limitations caused by existing occupied structures in close proximity to the edge of road on three of the four corners of the intersection, as well as the vertical and horizontal alignment of Old Bethlehem Pike, it is recommended that the three municipalities of East and West Rockhill Townships and Richland Township consider installation of multi-way Stop-signs at the intersection of Old Bethlehem Pike and Rich Hill Road. It should be noted, however, that without installation of a new traffic control signal at the intersection Old Bethlehem Pike and Tollgate Road in Richland Township, and a diversion of traffic from Rich Hill Road to Tollgate Road, the northbound approach of Old Bethlehem Pike at Rich Hill Road will operate at LOS E during the afternoon peak hour under multi-way Stop conditions.

In summary, the results of the existing conditions analysis indicate that the roadways and intersections in the vicinity of the site are currently subject to low to

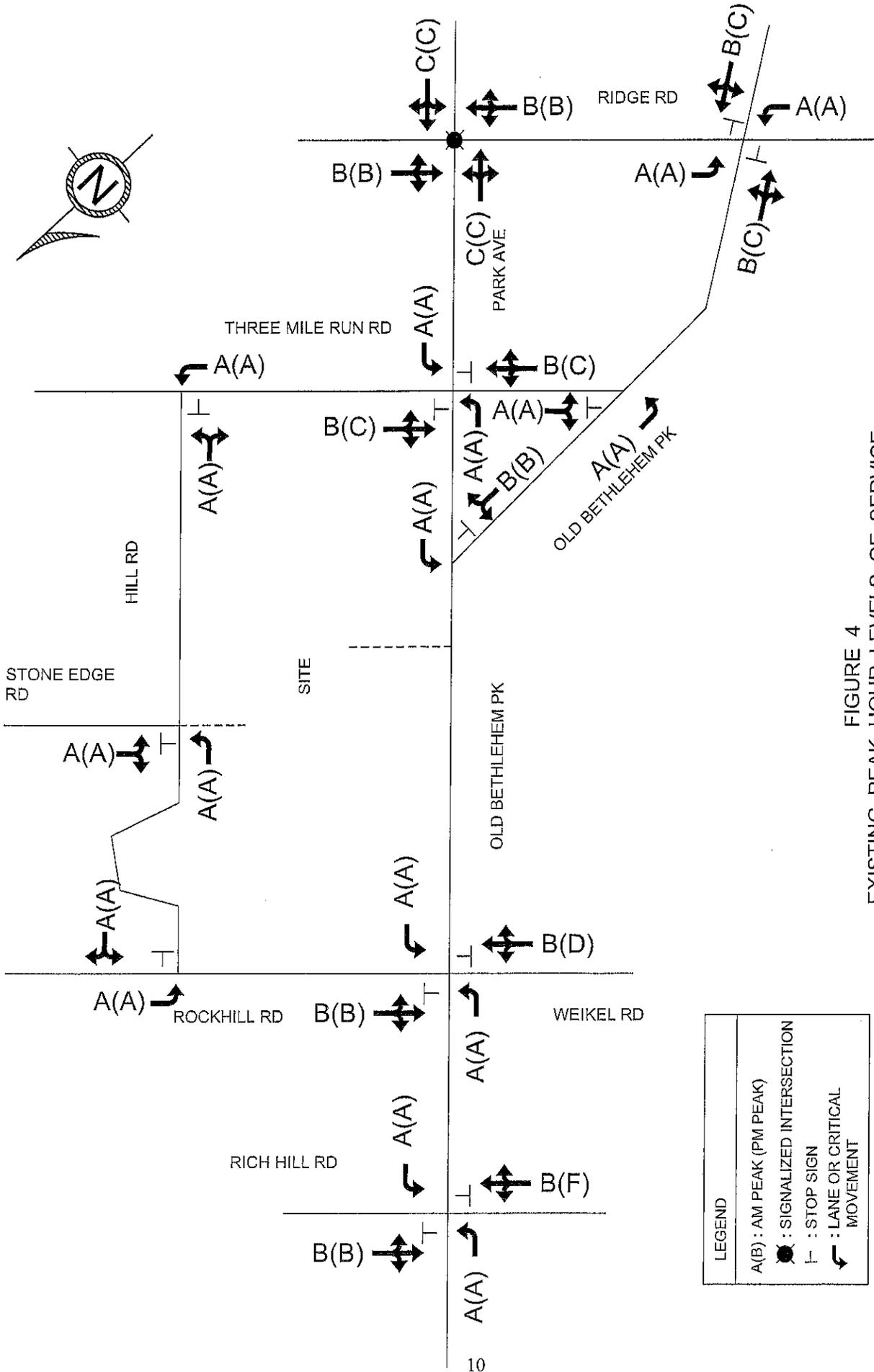
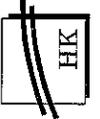


FIGURE 4  
 EXISTING PEAK HOUR LEVELS OF SERVICE  
 (JUNE / DECEMBER 2010)  
 McCLENNEN PROPERTY RESIDENTIAL DEVELOPMENT  
 EAST ROCKHILL TOWNSHIP, PA

LEGEND	
A(B)	: AM PEAK (PM PEAK)
●	: SIGNALIZED INTERSECTION
⊥	: STOP SIGN
↔	: LANE OR CRITICAL MOVEMENT



moderate peak hour traffic demands. With the exception of traffic on the extreme periphery of the study area at the unsignalized intersection of Old Bethlehem Pike and Rich Hill Road, the results of the volume/capacity analysis for existing peak hour traffic indicate that traffic is generally operating with very little traffic delay and congestion during weekday peak periods. The three municipalities of East and West Rockhill Townships and Richland Township should investigate installation of multi-way Stop-signs at the unsignalized intersection of Old Bethlehem Pike and Rich Hill Road together with installation of a new traffic control signal, or similar improvement, at the intersection of Old Bethlehem Pike and Tollgate Road in Richland Township.

## FUTURE TRAFFIC VOLUME

Select Properties, Inc. proposes to develop the McClennen Property Residential Development on an approximate 64.2 acre tract located along Old Bethlehem Pike and along Hill Road north of Three Mile Run Road in East Rockhill Township, Bucks County, Pennsylvania. The proposed development will be comprised of 90 single family detached houses and 103 townhouses.

The overall impact of new traffic generated by the proposed residential development is established from an estimate of the daily and peak hourly traffic generated by the proposed development in comparison with total future traffic which includes existing base traffic volume data, background traffic growth and traffic activity due to other new developments in close proximity to the site, and traffic generation from the proposed new development. Each of the analysis steps taken to project total future peak hour traffic volume after development of the proposed residential development is discussed below.

### Site Generated Traffic

Development of the McClennen Property Residential Development will obviously add some traffic to the roads serving the site -- as would any new development of the property. Estimates of the traffic demand that will be generated by the proposed development were prepared on the basis of trip generation data compiled and evaluated from numerous studies across the country by the Institute of Transportation Engineers<sup>(2)</sup>.

Table 1 presents the vehicular trip generation rates calculated for the proposed residential development. Application of these rates to the size of the proposed development produces the daily and peak hourly traffic volumes presented in the bottom of Table 1. As shown, it is anticipated that the proposed residential development will generate about 1,610 vehicular trips per day (total inbound and outbound). Peak hourly traffic is expected to occur coincident with the normal commuter rush hours of the

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(2) Trip Generation, 8th Edition, Institute of Transportation Engineers, Washington, D.C., 2008.

TABLE 1

**TRAFFIC GENERATION CHARACTERISTICS  
McCLENNEN PROPERTY RESIDENTIAL DEVELOPMENT  
EAST ROCKHILL TOWNSHIP, BUCKS COUNTY, PENNSYLVANIA**

TRIP RATES<sup>(1)</sup>

<u>Description</u>	<u>Daily</u>	<u>Morning Peak Hour</u>			<u>Afternoon Peak Hour</u>		
		<u>In</u>	<u>Out</u>	<u>Total</u>	<u>In</u>	<u>Out</u>	<u>Total</u>
Single Family Detached Houses (90 DU) <sup>(2)</sup>	10.49	0.20	0.61	0.81	0.67	0.39	1.06
Townhouses (103 DU) <sup>(2)</sup>	6.41	0.09	0.42	0.51	0.40	0.20	0.60

TRAFFIC VOLUMES

Single Family Detached Houses (90 DU)	950	18	55	73	60	36	96
Townhouses (103 DU)	660	9	44	53	41	21	62
<b>TOTAL TRIPS</b>	<b>1,610</b>	<b>27</b>	<b>99</b>	<b>126</b>	<b>101</b>	<b>57</b>	<b>158</b>

(1) *Trip Generation, 8th Edition, Institute of Transportation Engineers, Washington, D.C., 2008.*

(2) *Trips per Dwelling Unit (ITE Land Use Codes 210 and 230).*

adjacent roadway network. During these time periods, peak hourly traffic generation is expected to total 126 trips per hour during the morning peak hour and 158 trips per hour during afternoon peak hour.

### **Traffic Distribution**

It is anticipated that traffic generated by the proposed residential development will approach and depart the site according to existing traffic patterns along the roadways in the vicinity of the site. It is, therefore, anticipated that the distribution of new development-generated traffic will be as follows:

- 33% to/from the south on Park Avenue
- 26% to/from the north on Old Bethlehem Pike
- 20% to/from the south on Old Bethlehem Pike
- 8% to/from the east on Three Mile Run Road
- 6% to/from the east on Rockhill Road
- 5% to/from the west on Weikel Road
- 2% to/from the east on Stone Edge Road

Figure 5 shows the results of distributing the traffic generation characteristics listed in Table 1 to the surrounding roadway network based upon the percentages listed above.

### **Other Traffic**

Development of the McClennen Property Residential Development will occur over the next two years or more. During the period of construction and occupancy of the proposed residential development, other development activity can be expected to occur in the area resulting in an additional increase in traffic volumes on the roadways in the vicinity of the site regardless of development of the McClennen Property.

The analysis of future peak hour traffic conditions without development of the proposed McClennen Property considers traffic growth over a seven year period to account for background traffic growth. Existing peak hourly traffic through the intersections in the study area was factored at a rate of 0.89% per year compounded for seven years (i.e., 6.25%) to account for background traffic growth. In addition,



projections of future peak hour traffic include the specific traffic generation characteristics of a potential assisted living development comprised of about 40 dwelling units located at a site along Hill Road between Three Mile Run Road and Stone Edge Road.

## **FUTURE TRAFFIC CONDITIONS**

Evaluation of the performance of the key intersections in the study area under future conditions without and after development of the proposed McClennen Property Residential Development requires a comparison of the available roadway and intersection capacity with projected future traffic demands. Projected future levels of service are determined from these comparisons which, in turn, may indicate the need for improvements to the area roadway network. It should be noted that the analysis of future conditions is based on peak hour traffic conditions. Traffic demand at other times of the day will be reduced relative to peak hour traffic.

### **Future (2017) Volume/Capacity Analysis Without Development**

Future (2017) morning and afternoon peak hour traffic volumes without development of the McClennen Property are presented in Figures 6 and 7, respectively. A volume/capacity analysis was completed for the traffic projections illustrated in Figures 6 and 7. The results of the analysis are summarized in terms of levels of service in Figure 8 for future (2017) peak hour traffic conditions without development of the McClennen Property.

Obviously, as traffic volume increases, traffic delay will also increase and level of service can be expected to worsen in some locations, regardless of development of the McClennen Property. As shown in Figure 8, the results of the analysis reveal that all movements at the signalized intersection of Ridge Road and Park Road will operate at an acceptable LOS D or better during both the morning and afternoon peak hours. Extension of the signal green time for the Park Avenue approaches can be considered to maintain LOS C or better for all movements in the intersection.

The results of the analysis also reveal that, with but one continuing exception, all critical movements at all of the unsignalized intersections in the study area will continue to operate at an acceptable LOS D or better during both the morning and afternoon peak hours. The eastbound Stop-sign controlled approach of Rich Hill Road at the intersection with Old Bethlehem Pike will continue to operate at LOS F during the afternoon peak hour. As described under existing conditions, this situation can be partially alleviated by installation of a new traffic control signal, or similar improvement, at the intersection of



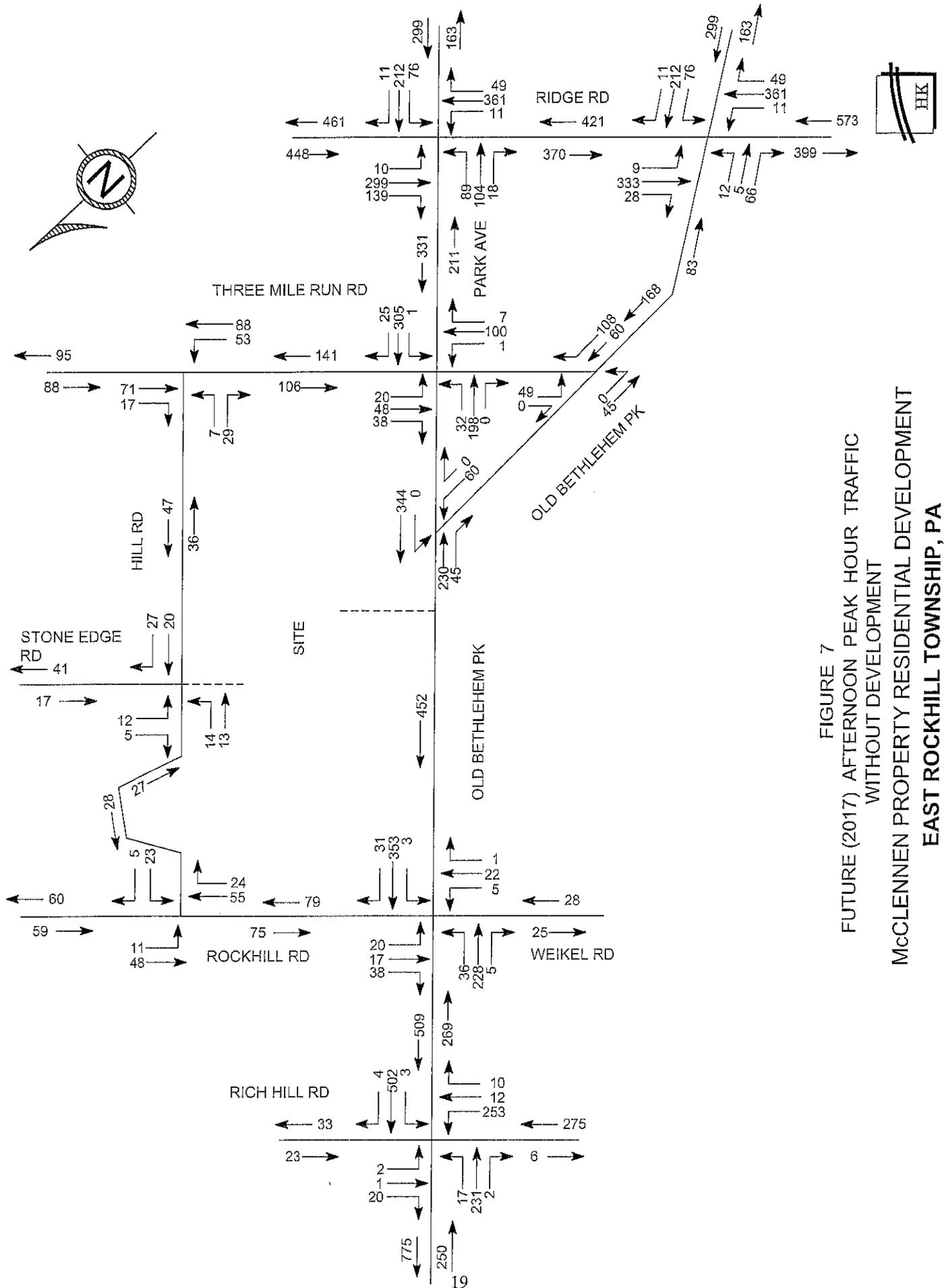


FIGURE 7  
 FUTURE (2017) AFTERNOON PEAK HOUR TRAFFIC  
 WITHOUT DEVELOPMENT  
 McCLENNEN PROPERTY RESIDENTIAL DEVELOPMENT  
 EAST ROCKHILL TOWNSHIP, PA

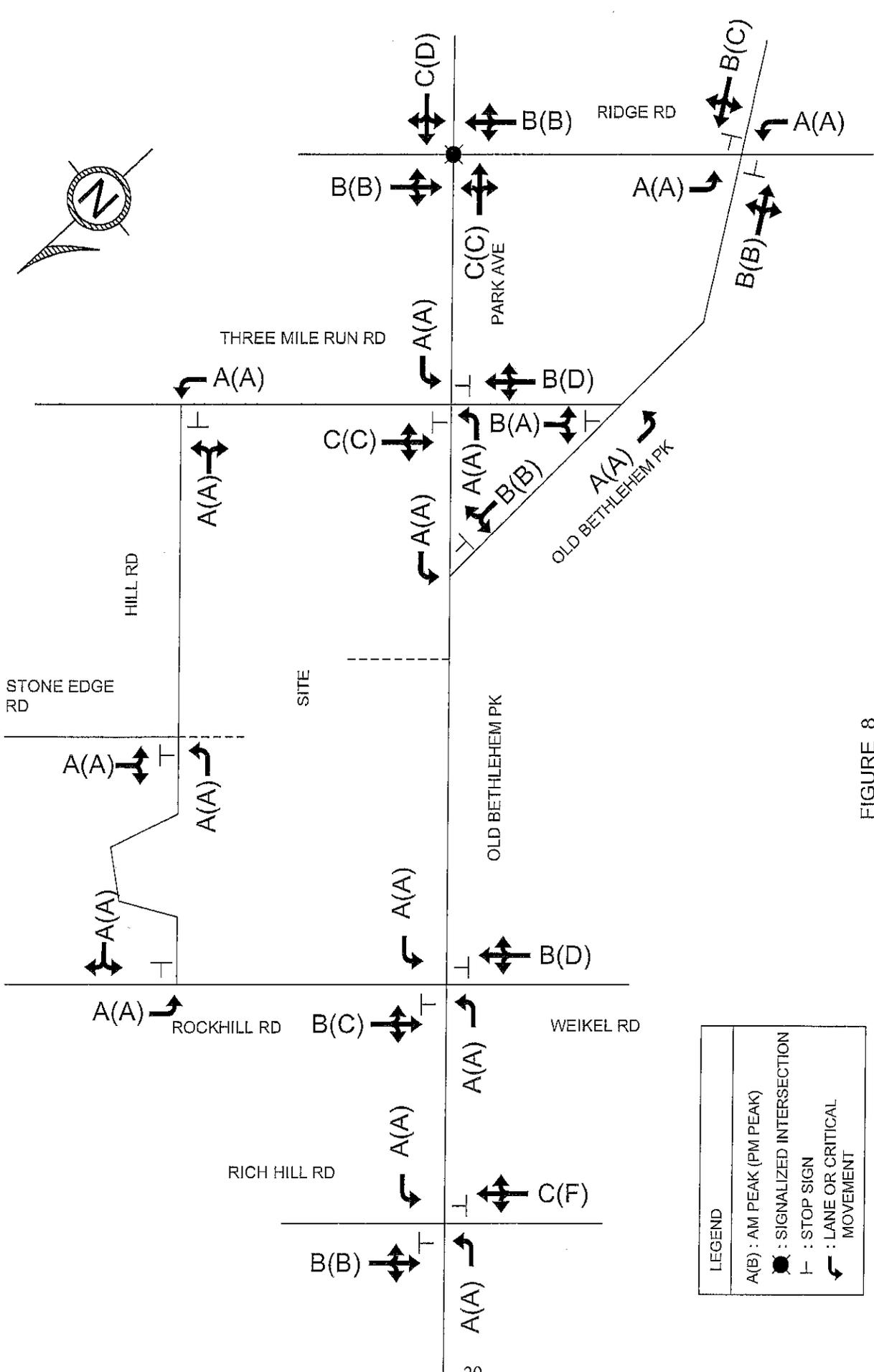
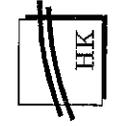


FIGURE 8  
 FUTURE (2017) PEAK HOUR LEVELS OF SERVICE  
 WITHOUT DEVELOPMENT  
 McCLENNEN PROPERTY RESIDENTIAL DEVELOPMENT  
 EAST ROCKHILL TOWNSHIP, PA

LEGEND	
A(B)	: AM PEAK (PM PEAK)
●	: SIGNALIZED INTERSECTION
┌	: STOP SIGN
↩	: LANE OR CRITICAL MOVEMENT



Old Bethlehem Pike and Tollgate Road in Richland Township; and, the three municipalities of East and West Rockhill Townships and Richland Township should consider installation of multi-way Stop-signs at the intersection of Old Bethlehem Pike and Rich Hill Road. Further, as also described under existing conditions, without installation of a new traffic control signal at the intersection Old Bethlehem Pike and Tollgate Road in Richland Township, and a diversion of traffic from Rich Hill Road to Tollgate Road, the northbound approach of Old Bethlehem Pike at Rich Hill Road will operate at LOS F during the afternoon peak hour under multi-way Stop conditions.

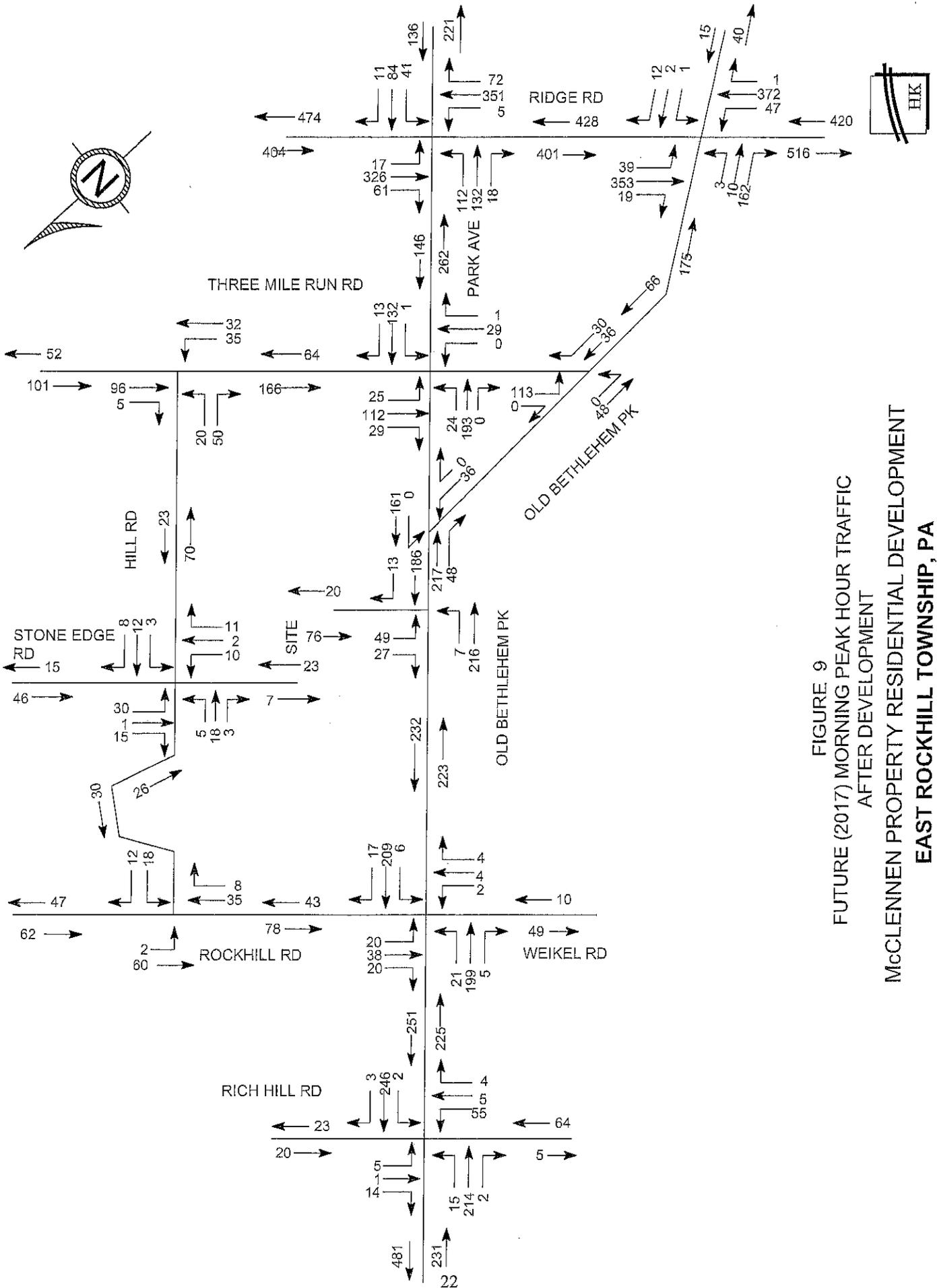
#### **Future (2017) Volume/Capacity Analysis After Development**

The volumes illustrated in Figure 5 were added to the future (2017) peak hour traffic volumes without development as previously presented in Figures 6 and 7. Figures 9 and 10 illustrate total future (2017) morning and afternoon peak hourly traffic volumes after development of the proposed McClennen Property Residential Development.

A volume/capacity analysis was completed at the intersections in the study area based on the peak hour traffic volumes illustrated in Figures 9 and 10. Figure 11 presents the results of the volume/capacity analysis for future peak hour traffic conditions after development of the McClennen Property Residential Development.

As shown in Figure 11, the results of the analysis reveal that all movements at the signalized intersection of Ridge Road and Park Road will continue to operate at an acceptable LOS D or better during both the morning and afternoon peak hours. As described for future conditions without development, extension of the signal green time for the Park Avenue approaches can be considered to maintain LOS C or better for all movements in the intersection.

The results of the analysis also reveal that, with but one continuing exception, all critical movements at all of the unsignalized intersections in the study area will continue to operate at an acceptable LOS D or better during both the morning and afternoon peak hours. The eastbound Stop-sign controlled approach of Rich Hill Road at the intersection with Old Bethlehem Pike will continue to operate at LOS F during the afternoon peak hour. As described under existing conditions, this situation can be partially alleviated by installation of a new traffic control signal, or similar improvement, at the intersection of Old Bethlehem Pike and Tollgate Road in Richland Township; and, the three



**FIGURE 9**  
**FUTURE (2017) MORNING PEAK HOUR TRAFFIC**  
**AFTER DEVELOPMENT**  
**McCLENNEN PROPERTY RESIDENTIAL DEVELOPMENT**  
**EAST ROCKHILL TOWNSHIP, PA**

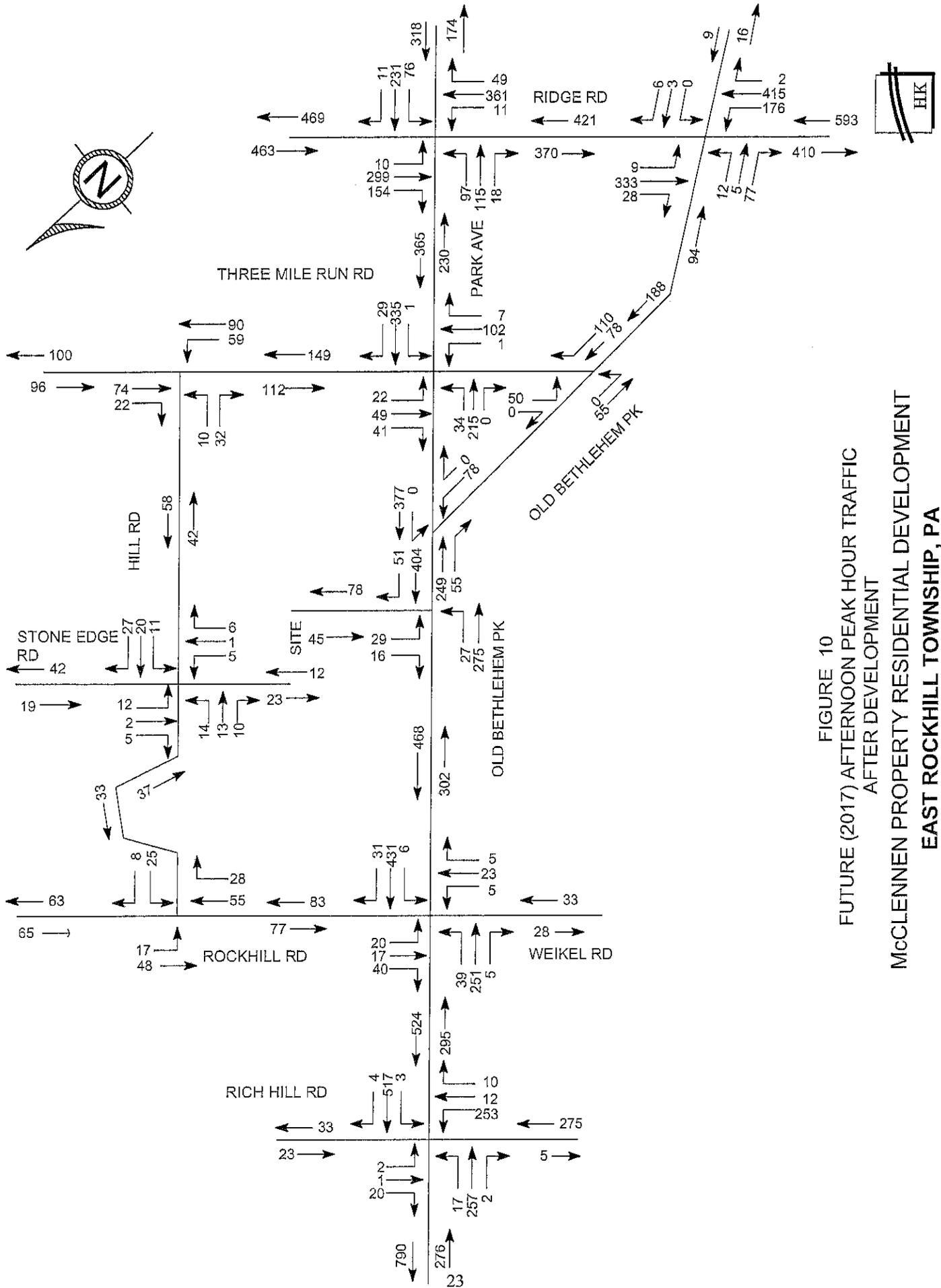


FIGURE 10  
 FUTURE (2017) AFTERNOON PEAK HOUR TRAFFIC  
 AFTER DEVELOPMENT  
 McCLENNEN PROPERTY RESIDENTIAL DEVELOPMENT  
 EAST ROCKHILL TOWNSHIP, PA

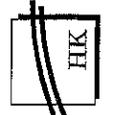
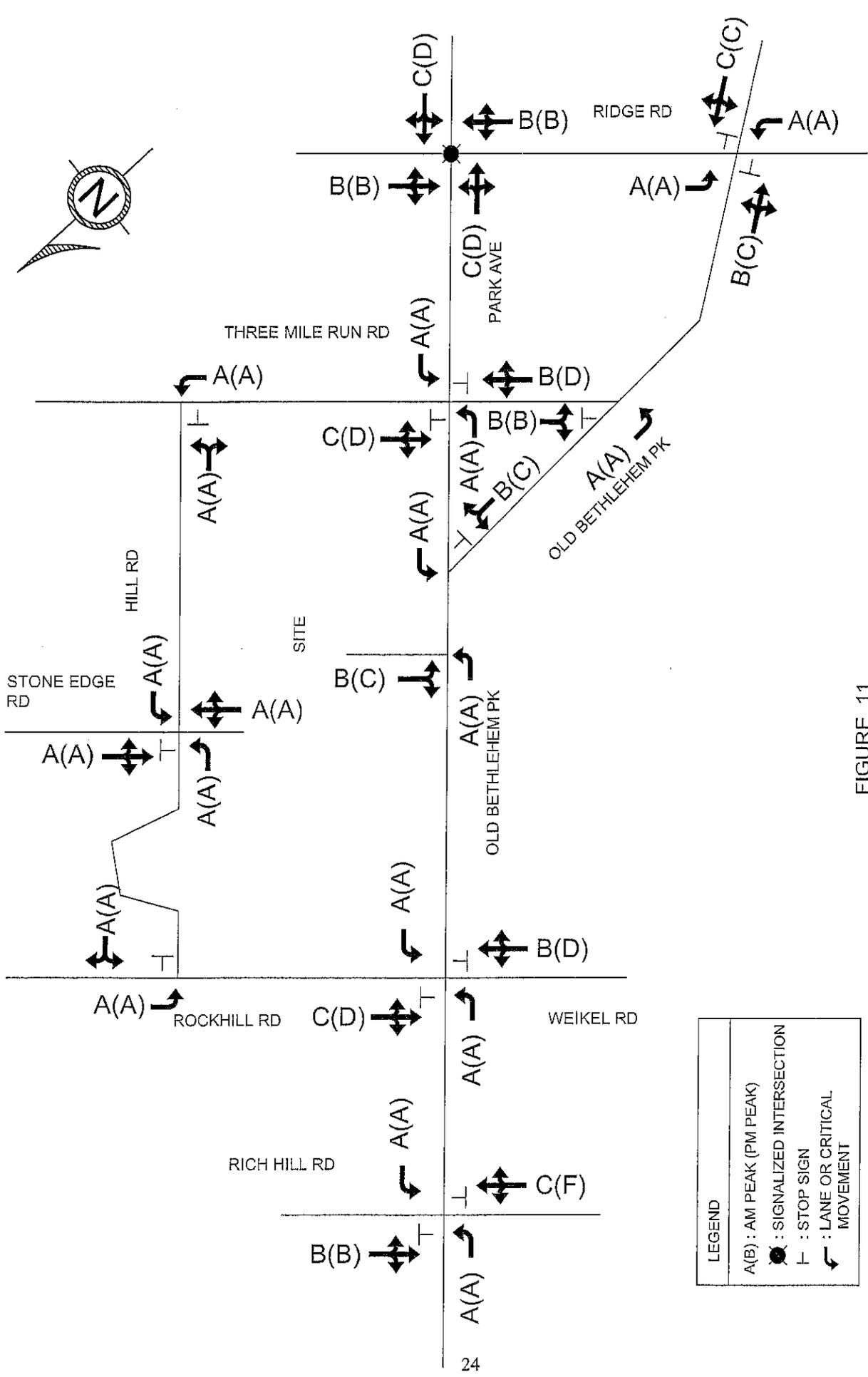


FIGURE 11  
 FUTURE (2017) PEAK HOUR LEVELS OF SERVICE  
 AFTER DEVELOPMENT  
 McCLENNEN PROPERTY RESIDENTIAL DEVELOPMENT  
 EAST ROCKHILL TOWNSHIP, PA

LEGEND	
A(B)	: AM PEAK (PM PEAK)
●	: SIGNALIZED INTERSECTION
⊥	: STOP SIGN
↩	: LANE OR CRITICAL MOVEMENT

municipalities of East and West Rockhill Townships and Richland Township should consider installation of multi-way Stop-signs at the intersection of Old Bethlehem Pike and Rich Hill Road. Further, as also described under existing conditions, without installation of a new traffic control signal at the intersection Old Bethlehem Pike and Tollgate Road in Richland Township, and a diversion of traffic from Rich Hill Road to Tollgate Road, the northbound approach of Old Bethlehem Pike at Rich Hill Road will continue to operate at LOS F during the afternoon peak hour under multi-way Stop conditions.

### Site Access

As described previously, access to the site will be provided via a roadway that will intersect Old Bethlehem Pike at a point approximately 650 feet north of Park Avenue, and a roadway that will intersect Hill Road at a point directly opposite Stone Edge Road. Both access roads will be constructed to provide one entry lane and one exit lane.

Review of warrants for widening to provide separate turning lanes at either access location reveals that Old Bethlehem Pike should be widened to provide a separate left turn lane 75 feet long with a bay taper 100 feet long with the appropriate through lane transition tapers. Otherwise, warrants are not satisfied for widening for a right turn deceleration lane for access along Old Bethlehem Pike; and, warrants are not satisfied for widening for a separate left turn lane or a right turn deceleration lane for access along Hill Road.

Based on the posted speed limit of 35 miles per hour along Old Bethlehem Pike, it is desirable to provide adequate safe sight distance of 440 feet to the left and 350 feet to the right of the proposed access location. Observations indicate, however, that adequate sight distance well in excess of 500 feet is available in both directions along Old Bethlehem Pike for traffic exiting and entering to/from the proposed site access roadway. It should be noted that adequate Safe Stopping Sight Distance (SSSD) is available in both directions along Old Bethlehem Pike for 85<sup>th</sup> vehicular operating speeds well in excess of 50 miles per hour.

Similarly, it is desirable to provide adequate safe sight distance of 440 feet to the left and 350 feet to the right of the proposed access location that will intersect Hill Road. Observations indicate that adequate sight distance in excess of 500 feet is available in

both directions along Hill Road for traffic exiting and entering to/from the proposed site access roadway.

Finally, all critical movements at the new access roadways that will provide access for the proposed residential development will operate at an acceptable LOS C or better after development.

## CONCLUSIONS

Select Properties, Inc. proposes to develop the McClennen Property Residential Development on an approximate 64.2 acre tract located along Old Bethlehem Pike and along Hill Road north of Three Mile Run Road in East Rockhill Township, Bucks County, Pennsylvania. The proposed development will be comprised of 90 single family detached houses and 103 townhouses. Access to the site will be provided via a roadway that will intersect Old Bethlehem Pike at a point approximately 650 feet north of Park Avenue, and a roadway that will intersect Hill Road at a point directly opposite Stone Edge Road.

In analyzing traffic conditions in the vicinity of the site, this Traffic Impact Study has resulted in the following conclusions and recommendations:

- The results of the existing conditions analysis indicate that the roadways and intersections in the vicinity of the site are currently subject to low to moderate peak hour traffic demands. With the exception of traffic on the extreme periphery of the study area at the unsignalized intersection of Old Bethlehem Pike and Rich Hill Road, the results of the volume/capacity analysis for existing peak hour traffic indicate that traffic is generally operating with very little traffic delay and congestion during weekday peak periods. The three municipalities of East and West Rockhill Townships and Richland Township should investigate installation of multi-way Stop-signs at the unsignalized intersection of Old Bethlehem Pike and Rich Hill Road together with installation of a new traffic control signal, or similar improvement, at the intersection of Old Bethlehem Pike and Tollgate Road in Richland Township.
- It is anticipated that the proposed McClennen Property Residential Development will generate about 1,610 vehicular trips per day (total inbound and outbound). Peak hourly traffic is expected to occur coincident with the normal commuter rush hours of the adjacent roadway network. During these time periods, peak hourly traffic generation is expected to total 126 trips per hour during the morning peak hour and 158 trips per hour during afternoon peak hour.
- This analysis of future peak hour traffic conditions without development of the proposed business hotel considers traffic growth over the next seven years or so to account for background traffic growth. Existing peak hourly traffic through the intersections in the study area was factored at a rate of 0.89% per year compounded for seven years (i.e., 6.25%) to account for background traffic growth. In addition, projections of future peak hour traffic include the specific

traffic generation characteristics of a potential assisted living development comprised of about 40 dwelling units located at a site along Hill Road between Three Mile Run Road and Stone Edge Road.

- As traffic volume increases, traffic delay will also increase. Regardless of development of the McClennen Property, the Borough of Perkasio may consider the potential need to extend the signal green time for the Park Avenue approaches at the signalized intersection with Ridge Road. as described under existing conditions, the three municipalities of East and West Rockhill Townships and Richland Township should investigate installation of multi-way Stop-signs at the unsignalized intersection of Old Bethlehem Pike and Rich Hill Road together with installation of a new traffic control signal, or similar improvement, at the intersection of Old Bethlehem Pike and Tollgate Road in Richland Township.
- With development of the McClennen Property as proposed, the additional traffic generated by the proposed development will not alter the potential need to optimize the signal green time at the signalized intersection of Ridge Road and Park Avenue in the Borough of Perkasio; nor will the additional traffic alter the recommendation for the three municipalities of East and West Rockhill Townships and Richland Township to investigate installation of multi-way Stop-signs at the unsignalized intersection of Old Bethlehem Pike and Rich Hill Road together with installation of a new traffic control signal, or similar improvement, at the intersection of Old Bethlehem Pike and Tollgate Road in Richland Township.
- Both access roadways will be constructed to provide one entry lane and one exit lane. Review of warrants for widening to provide separate turning lanes at either access location reveals that Old Bethlehem Pike should be widened to provide a separate left turn lane 75 feet long with a bay taper 100 feet long with the appropriate through lane transition tapers. Otherwise, warrants are not satisfied for widening for a right turn deceleration lane for access along Old Bethlehem Pike; and, warrants are not satisfied for widening for a separate left turn lane or a right turn deceleration lane for access along Hill Road.
- Based on the posted speed limit of 35 miles per hour along Old Bethlehem Pike, it is desirable to provide adequate safe sight distance of 440 feet to the left and 350 feet to the right of the proposed access location. Observations indicate, however, that adequate sight distance well in excess of 500 feet is available in both directions along Old Bethlehem Pike for traffic exiting and entering to/from the proposed site access roadway. Similarly, it is desirable to provide adequate safe sight distance of 440 feet to the left and 350 feet to the right of the proposed access location that will intersect Hill Road. Observations indicate that adequate sight distance in excess of 500 feet is available in both directions along Hill Road for traffic exiting and entering to/from the proposed site access roadway.

- Table 2 summarizes the results of the volume/capacity analysis for the existing, future without development, and future after development scenarios. As indicated, there is little change in the peak hour operating characteristics of the intersections included in the study area due to new traffic generated by the proposed McClennen Property Residential Development.

Based on results of the foregoing Traffic Impact Study, safe and efficient access will be provided to the proposed McClennen Property Residential Development.

**TABLE 2  
LEVEL OF SERVICE (DELAY) SUMMARY**

Intersection	Approach	AM Peak Hour LOS (Delay sec./veh.)			PM Peak Hour LOS (Delay sec./veh.)		
		Existing	Future W/O Development	Future After Development	Existing	Future W/O Development	Future After Development
Park Avenue & Three Mile Run Road	EB L/T/R	B	B	B	C	D	D
	WB L/T/R	B	C	C	C	C	D
	NB L	A	A	A	A	A	A
	SB L	A	A	A	A	A	A
Old Bethlehem Pike & Three Mile Run Road	WB L/R	A	B	B	A	A	B
	SB L	A	A	A	A	A	A
	EB L/R	B	B	B	B	B	C
Old Bethlehem Pike & Park Avenue	NB L	A	A	A	A	A	A
	EB L/T/R	B	B	B	D	D	D
Old Bethlehem Pike & Rockhill Road/Weikel Road	WB L/T/R	B	B	C	C	C	D
	NB L	A	A	A	A	A	A
	SB L	A	A	A	A	A	A
	EB L	A	A	A	A	A	A
Three Mile Run Road & Hill Road	SB L/R	A	A	A	A	A	A
	WB L	A	A	A	A	A	A
	NB L/R	A	A	A	A	A	A
	EB L/R or L/T/R	A	A	A	A	A	A
Hill Road & Stone Edge Road/Site Access	WB L/T/R	-	-	A	-	-	A
	NB L	-	-	A	-	-	A
	SB L	A	A	A	A	A	A
	WB L/R	-	-	B	-	-	C
Old Bethlehem Pike & Site Access	SB L	-	-	A	-	-	A
	EB L	-	-	A	-	-	A

**TABLE 2 (cont.)  
LEVEL OF SERVICE (DELAY) SUMMARY**

Intersection	Approach	AM Peak Hour LOS (Delay sec./veh.)			PM Peak Hour LOS (Delay sec./veh.)		
		Existing	Future W/O Development	Future After Development	Existing	Future W/O Development	Future After Development
Ridge Road & Park Avenue	EB L/T/R	B	B	B	B	B	B
	WB L/T/R	B	B	B	B	B	B
	NB L/T/R	C	C	C	C	D	D
	SB L/T/R	C	C	C	C	C	D
Ridge Road & Old Bethlehem Pike	INTERSECTION	B	B	B	C	C	C
	EB L	A	A	A	A	A	A
	WB L	A	A	A	A	A	A
	NB L/T/R	B	B	C	C	C	C
	SB L/T/R	B	B	B	C	C	C
	EB L/T/R	B	C	C	F(221.7)	F(319.9)	F(381.1)
Old Bethlehem Pike & Rich Hill Road	WB L/T/R	B	B	B	B	B	B
	NB L	A	A	A	A	A	A
	SB L	A	A	A	A	A	A