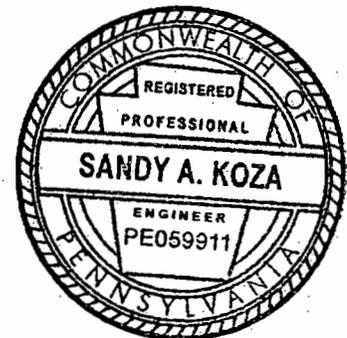
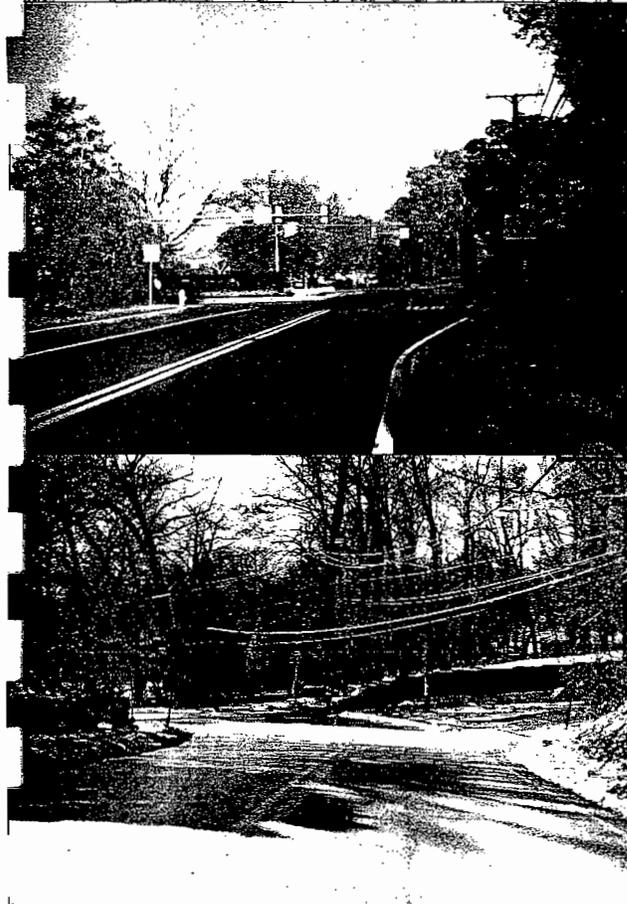
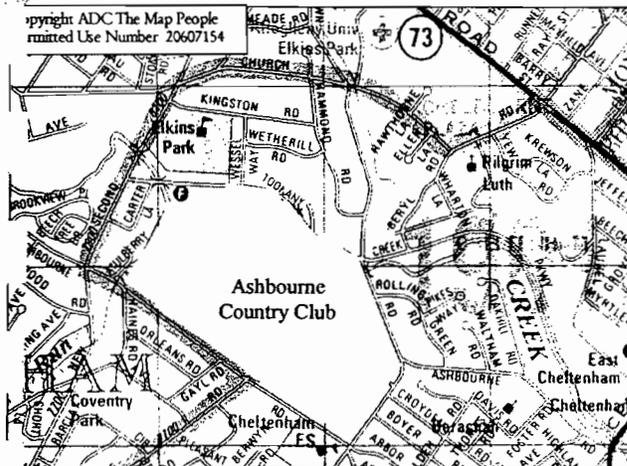


# Traffic Impact Study for the Ashbourne Country Club

*Cheltenham Township, Montgomery County, PA*



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Prepared for  
Matrix Development Group

Prepared by



June 11, 2009

McMahon Project Number 809015.11

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## Executive Summary

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The Matrix Development Group proposes to redevelop the existing Ashbourne Country Club by proposing to construct 309 age-qualified dwelling units and 176 apartment units. The existing country club facility, which provided an 18-hole golf course and clubhouse/lockers for member golfers, has recently closed, and will be replaced by the residential units. The Ashbourne Country Club is bordered by Ashbourne Road (S.R. 2025) to the south and east, and Tookany Creek Parkway and Jenkintown Road to the north in Cheltenham Township, Montgomery County, Pennsylvania. The existing signalized access located along Ashbourne Road (S.R. 2025), opposite Oak Lane Road, will serve the proposed age-qualified residential units. A new, unsignalized access will be provided to serve the proposed apartment units along Ashbourne Road (S.R. 2025) directly opposite Croyden Road, which is approximately 700 feet to the north of the Arbor Road/Front Street intersection.

The scope of this traffic impact study includes an evaluation of the existing (2009) and future build-out year (2011) and PennDOT design year (2016) conditions both without and with the proposed development for the weekday morning and weekday afternoon peak hour at the following study intersections:

- Ashbourne Road (S.R. 2025)/New Second Street (S.R. 2060),
- Ashbourne Road (S.R. 2025)/Oak Lane Road (S.R. 2062)/Ashbourne Country Club Access, and
- Ashbourne Road (S.R. 2025)/Front Street/Ashmead Road/Arbor Road.

The trip generation characteristics for both the age-restricted dwelling units and the apartment complex are based on data from the Institute of Transportation Engineers Publication, entitled *Trip Generation, 8<sup>th</sup> Edition*. The entire site is anticipated to generate approximately 172 total (inbound and outbound) trips during the weekday morning peak hour, and 219 total (inbound and outbound) trips during the weekday afternoon peak hour.

At the intersection of Ashbourne Road (S.R. 2025)/New Second Street (S.R. 2060), the intersection will continue to operate at acceptable levels of service (LOS C) during both the build-out year (2011) and the PennDOT design year (2016). Therefore, no improvements are planned at this intersection.

It is recommended that the access be reconfigured to provide a minimum 12-foot-wide egress lane and a minimum 12-foot-wide ingress lane. In addition, the construction of a separate 14-foot-wide right-turn lane with a minimum 75 feet of storage and a 75-foot bay taper is also recommended since the existing signalized access serving the site will be used by the age-qualified units along with minor signal timing modifications. As a result, the intersection of Ashbourne Road (S.R. 2025)/Oak Lane/Access will operate at acceptable levels of service overall (LOS B) during both peak hours during the build-out (2011) and PennDOT (2016) design years.

To improve operating conditions at the intersection of Ashbourne Road (S.R. 2025)/Front Street/ Ashmead Road/Arbor Road, it is recommended that a 14-foot-wide right-turn lane with a minimum 150 feet of storage and a 75-foot bay taper be provided along the southbound approach of Ashbourne Road (S.R. 2025). The eastbound leg of Ashbourne Road (S.R. 2025) should also be restriped to provide a 14-foot departure lane and an 11-foot approach lane, with a 7-foot striped shoulder on the south side to accommodate on-street parking for the adjacent school. With these improvements, along with modifications to the signal timings, the development impacts can be mitigated.

The access for the apartment complex will be located along Ashbourne Road (S.R. 2025), which will be designed to provide a single ingress lane and a single egress lane, which will both be at least 12 feet wide. With this configuration, the stop-controlled access approach will operate at acceptable levels of service (LOS B) during both peak hours for the build-out (2011) and PennDOT design (2016) years.

The traffic analysis, which is described in further detail herein, reveals that safe and efficient access can be provided for the proposed age-qualified and apartment units and that the recommended improvements will mitigate the development's impact. Matrix tables have been provided for the study area intersections and site accesses summarizing the capacity/level-of-service queuing analyses.

Level of Service Matrix Tables  
 Ashbourne Road (S.R. 2025) and New Second Street (S.R. 2060)

Time Period	Design Year	Development Condition	Weekday Morning Peak Hour						Weekday Afternoon Peak Hour					
			2009		2011		2016		2009		2011		2016	
			Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev		
Ashbourne Road (S.R. 2025)	EB	Left	C	C	D	C	C	C	D	C	C	D		
		Thru	B	B	B	B	B	B	B	B	B	B		
		Right	B	B	B	B	B	B	B	B	B	B		
Ashbourne Road (S.R. 2025)	WB	Left	B	B	C	B	B	B	B	C	C	C		
		Thru	B	B	C	B	B	B	B	C	C	C		
		Right	B	B	C	B	B	B	B	C	C	C		
New Second Street (S.R. 2060)	NB	Left	B	B	D	B	B	B	B	B	B	B		
		Thru	B	B	D	B	B	B	B	B	B	B		
		Right	B	B	D	B	B	B	B	B	B	B		
New Second Street (S.R. 2060)	SB	Left	C	C	C	C	C	C	C	D	C	E		
		Thru	C	C	C	C	C	C	C	D	C	E		
		Right	C	C	C	C	C	C	C	D	C	E		
Overall			C	C	C	C	C	C	C	C	C	C		

Queue Matrix Tables

Ashbourne Road (S.R. 2025) and New Second Street (S.R. 2060)

Time Period	Design Year	Development Condition	Current Storage		Future Storage		Weekday Morning Peak Hour						Weekday Afternoon Peak Hour											
			Ashbourne Road (S.R. 2025)		New Second Street (S.R. 2060)		2009			2011			2016			2009			2011			2016		
			Left	Thru	Right	Left	Thru	Right	Existing	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	
Ashbourne Road (S.R. 2025)	EB	Left			≥ 1,000	≥ 1,000	145	148	180	164	196	175	200	226	245	131	134	162	172	187	192	204	217	
		Thru			≥ 1,000	≥ 1,000	12	12	12	12	12	15	15	15	15	131	134	162	172	187	192	204	217	
		Right			110	110																		
New Second Street (S.R. 2060)	WB	Left			2250	2250	131	135	177	142	186	131	134	162	172	131	134	162	172	187	192	204	217	
		Thru			2250	2250																		
		Right			2250	2250																		
New Second Street (S.R. 2060)	NB	Left			1200	1200	153	156	160	166	169	187	192	204	217	187	192	204	217	187	192	204	217	
		Thru			1200	1200																		
		Right			1200	1200																		
New Second Street (S.R. 2060)	SB	Left			2400	2400	427	441	463	478	501	275	301	409	445	275	301	409	445	275	301	409	445	
		Thru			2400	2400																		
		Right			2400	2400																		

Level of Service Matrix Tables

Ashbourne Road (S.R. 2025)/Oak Lane Road (S.R. 2062)/Site Access

Time Period		Weekday Morning Peak Hour						Weekday Afternoon Peak Hour					
Design Year		2011			2016			2011			2016		
Development Condition		Existing	w/n Dev	w/Dev	Existing	w/o Dev	w/Dev	Existing	w/n Dev	w/Dev	Existing	w/n Dev	w/Dev
Ashbourne Road (S.R. 2025)	Left	A	A	A	A	A	A	A	A	A	A	A	A
	Thru	B	B	A	B	B	A	B	B	B	B	B	A
	Right	B	B	B	B	B	B	B	B	B	B	B	B
Oak Lane Road (S.R. 2062)	Left	B	B	B	B	B	B	B	B	B	B	B	B
	Thru	B	B	B	B	B	B	B	B	B	B	B	B
	Right	B	B	B	B	B	B	B	B	B	B	B	B
Site Access	Left	B	B	B	B	B	B	B	B	B	B	B	C
	Thru	B	B	B	B	B	B	B	B	B	B	B	C
	Right	B	B	B	B	B	B	B	B	B	B	B	B
Overall		B	B	B	B	B	B	B	B	B	B	B	B

Queue Matrix Tables

Ashbourne Road (S.R. 2025)/Oak Lane Road (S.R. 2062)/Site Access

Time Period		Current Storage		Future Storage		Weekly Morning Peaks Hour						Weekly Afternoon Peak Hour																									
Design Year		Development Condition		Development Condition		2009		2011		2016		2009		2011		2016																					
Left	Thru	Right	Left	Thru	Right	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev																					
																	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right												
Ashbourne Road (S.R. 2025)						0	81	149	0	82	154	0	82	154	0	87										168	0	10	76	150	0	10	10	0	21	126	145
Ashbourne Road (S.R. 2025)						81	82	91	82	80	92	87	80	92	87	80	92	87	80	92	87	80	96	96	80	106	116	111	105	126	111	112	112				
Ashbourne Road (S.R. 2025)						149	154	149	154	150	150	168	150	150	168	150	150	150	168	150	150	150	150	150	150	106	116	111	106	126	111	8	8				
Ashbourne Road (S.R. 2025)						91	92	91	92	100	100	97	100	100	97	100	100	97	100	100	97	100	96	96	100	106	116	111	106	126	111	8	8				
Ashbourne Road (S.R. 2025)						0	81	149	0	82	154	0	82	154	0	87	168	0	10	76	150	0	10	76	150	0	10	76	150	0	21	126	145	0	20	121	145
Oak Lane Road (S.R. 2062)						31	33	33	33	37	37	35	37	35	37	35	37	35	37	35	37	35	37	35	37	35	32	36	32	32	36	32	39	39	39		
Oak Lane Road (S.R. 2062)						33	33	33	33	37	37	35	37	35	37	35	37	35	37	35	37	35	37	35	37	35	32	36	32	32	36	32	39	39	39		
Oak Lane Road (S.R. 2062)						33	33	33	33	37	37	35	37	35	37	35	37	35	37	35	37	35	37	35	37	35	32	36	32	32	36	32	39	39	39		
Oak Lane Road (S.R. 2062)						29	29	29	29	31	31	30	31	30	31	30	31	30	31	30	31	30	31	30	31	30	39	39	39	39	39	42	42	42	42		
Oak Lane Road (S.R. 2062)						29	29	29	29	31	31	30	31	30	31	30	31	30	31	30	31	30	31	30	31	30	39	39	39	39	39	42	42	42	42		
Site Access						2	2	2	2	0	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	0	0		
Site Access						2	2	2	2	0	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	0	0
Site Access						2	2	2	2	0	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	0	0

Level of Service Matrix Tables

Ashbourne Road (S.R. 2025)/Front Street/Ashmead Road/Arbor Road

Time Period		Weekday Morning Peak Hour						Weekday Afternoon Peak Hour					
Design Year	Development Condition	2011		2016		2016		2011		2016		2016	
Development Condition	Development Condition	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	w/o Dev	w/Dev
Ashbourne Road (S.R. 2025)	EB	E	E	D	F (65.0)	D	F (95.9)	F (101.9)	D	F (123.8)	E		E
Arbor Road	WB	E	E	D	E	D	E	E	D	E	D		D
Front Street	NB	D	D	C	D	D	D	D	D	D	D		D
Ashbourne Road (S.R. 2025)	SB	D	D	D	D	D	D	D	D	D	D	B	D
Ashmead Road	NWB	E	E	D	E	D	E	E	E	E	E		E
Overall	Overall	E	E	C	E	C	E	E	D	F (81.6)	E		E

Queue Matrix Tables

Ashbourne Road (S.R. 2025)/Front Street/Ashmead Road/Arbor Road

Time Period	Design Year	Development Condition	Future Storage		Current Storage		Weekday Morning Peak Hour				Weekday Afternoon Peak Hour						
			≥ 1,000	≥ 1,000	≥ 1,000	≥ 1,000	2009	2011		2016		2009	2011		2016		
								Existing	w/n Dev	w/Dev	w/n Dev	w/Dev	Existing	w/n Dev	w/Dev	w/n Dev	w/Dev
Ashbourne Road (S.R. 2025)	EB	Left					541	554	154	600	294	813	834	547	894	596	
		Thru															
		Right															
		Hard Right															
Arbor Road	WB	Hard Left					49	49	8	50	30	0	0	0	0	0	
		Left															
		Thru															
		Right															
Front Street	NB	Left					109	111	34	115	87	160	163	134	169	138	
		Thru															
		Right															
		Hard Right															
Ashbourne Road (S.R. 2025)	SB	Hard Left					394	402	136	428	155	342	349	172	369	172	
		Left															
		Thru															
		Right															
Ashmead Road	NWB	Hard Left					400	406	292	430	312	465	473	389	501	416	
		Left															
		Right															
		Hard Right															

Level of Service Matrix Tables

Ashbourne Road (S.R. 2025)/Site Access

Time Period		Weekday Morning Peak Hour						Weekday Afternoon Peak Hour						Overall	
Design Year		2011		2016		2009		2011		2016		2009		Overall	
Development/Condition		w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev	Existing	w/o Dev	w/Dev	w/o Dev	w/Dev
Site Access	Left	.	B	.	B	.	.	B	.	B	.	.	B	.	B
	Thru	.	A	.	A	.	.	A	.	A	.	.	A	.	A
	Right	.	(1)	.	(1)	.	.	(1)	.	(1)	.	.	(1)	.	(1)
Ashbourne Road (S.R. 2025)	Left	.	A	.	A	.	.	A	.	A	.	.	A	.	A
	Thru	.	(1)	.	(1)	.	.	(1)	.	(1)	.	.	(1)	.	(1)
	Right	.	(1)	.	(1)	.	.	(1)	.	(1)	.	.	(1)	.	(1)
Overall		.	A	.	A	.	.	A	.	A	.	.	A	.	A

(1) These movements operate at free-flow conditions.



## Introduction

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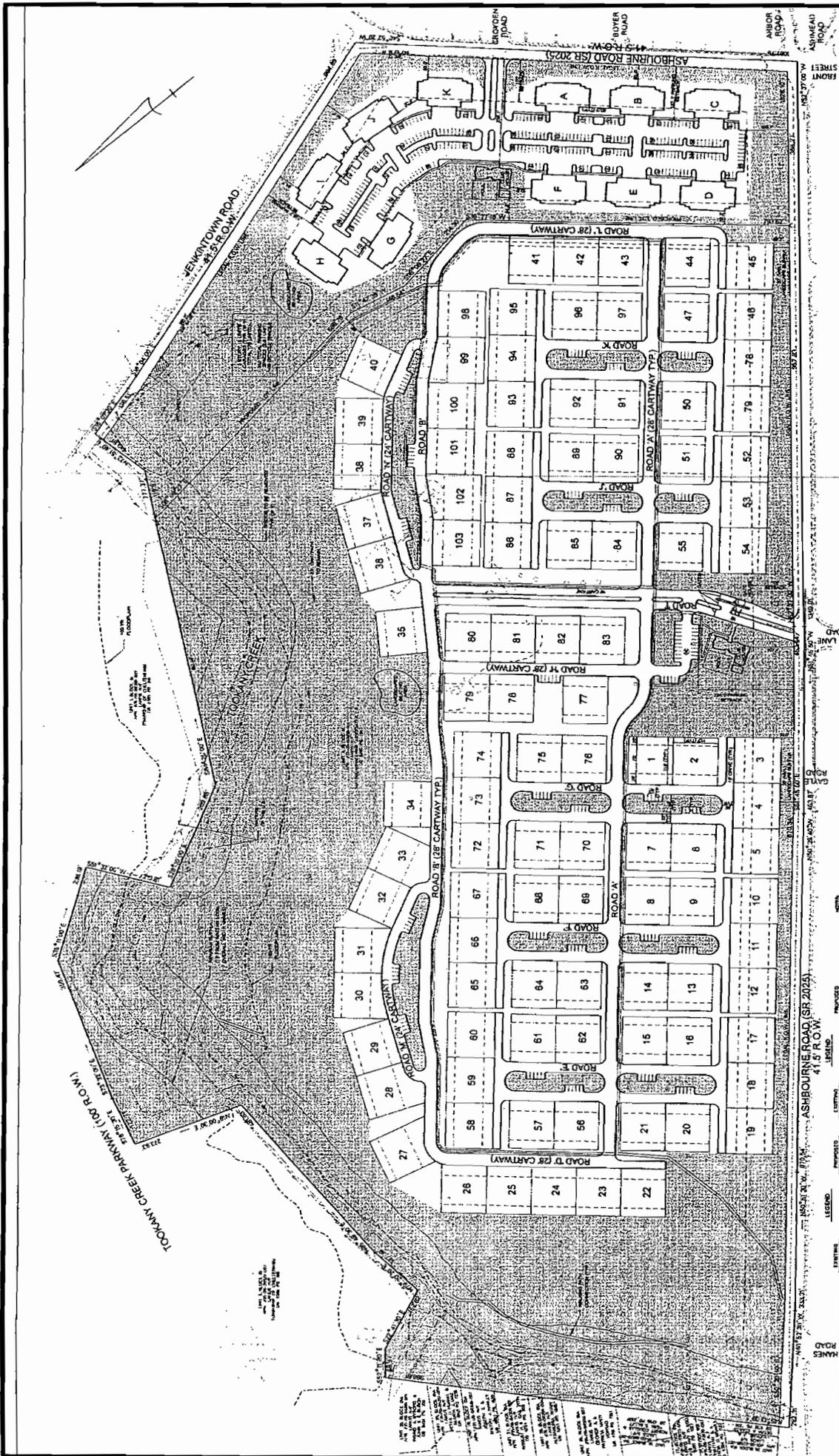
The Matrix Development Group proposes to redevelop the Ashbourne Country Club to construct 309 age-qualified, as well as 176 apartment units. The existing country club facility is currently closed and will be replaced by the residential units. The Ashbourne Country Club is bordered by Ashbourne Road (S.R. 2025) to the south and east, and Tookany Creek Parkway and Jenkintown Road to the north in Cheltenham Township, Montgomery County, Pennsylvania. The site access for the age-qualified portion of the project will be at the existing signalized intersection along Ashbourne Road (S.R. 2025), opposite Oak Lane Road, while a new unsignalized access to the north of the Arbor Road/Front Street intersection will be provided for the apartment complex opposite Croyden Road. The conceptual site plan of the proposed residential development is shown in **Figure 1**.

The purpose of this traffic study is to present an evaluation of the incremental traffic impacts of the proposed development within the study area in Cheltenham Township, as well as provide recommendations regarding the site access design in order to provide efficient access to the site for the anticipated increase in traffic volumes associated with the development.

Manual turning movement traffic counts were completed at three intersections during the weekday morning peak period (7:00 AM to 9:00 AM) and the weekday afternoon peak period (4:00 PM to 6:00 PM). In order to assess the existing traffic conditions, these existing traffic volumes were subjected to detailed capacity/level-of-service analysis, in accordance with accepted methodologies, for the highest peak hour during each peak period, which serves as the basis for this evaluation.

Next, future traffic volumes without the redevelopment of the Ashbourne Country Club were projected utilizing an annual traffic growth rate to account for regional traffic growth. Based on conversations with the Township, it was determined that there are no other area developments in the vicinity of the site that would impact the study area intersections or roadways. The future traffic volumes were projected to the build-out year (2011) and PennDOT design year (2016) at each of the study intersections. The future traffic volumes without development were then subjected to detailed capacity/level-of-service analysis.

Finally, the traffic generated by the redevelopment of the Ashbourne Country Club to include 309 age-qualified units and 176 apartment units was established based on accepted methodologies and assigned to the roadway network and site accesses. The site-generated traffic volumes were added to future without-development traffic volumes, and subjected to detailed capacity/level-of-service analysis to assess the future traffic conditions with the development.



**FIGURE 1**  
 Site Plan (Prepared by Taylor Wiseman & Taylor, dated May 15, 2009)  
**ASHBOURNE COUNTRY CLUB**  
 CHELTENHAM TOWNSHIP, MONTGOMERY COUNTY, PA

## Existing Transportation Setting

The Ashbourne Country Club is bordered by Ashbourne Road (S.R. 2025) to the south and east, Tookany Creek Parkway and Jenkintown Road to the north in Cheltenham Township, Montgomery County, Pennsylvania (Figure 2). The existing roadways and intersections in the vicinity of the site, which comprise the study area roadway network, are described in this section.

### Roadway Characteristics

The study area roadway network and characteristics are summarized below in Table 1.

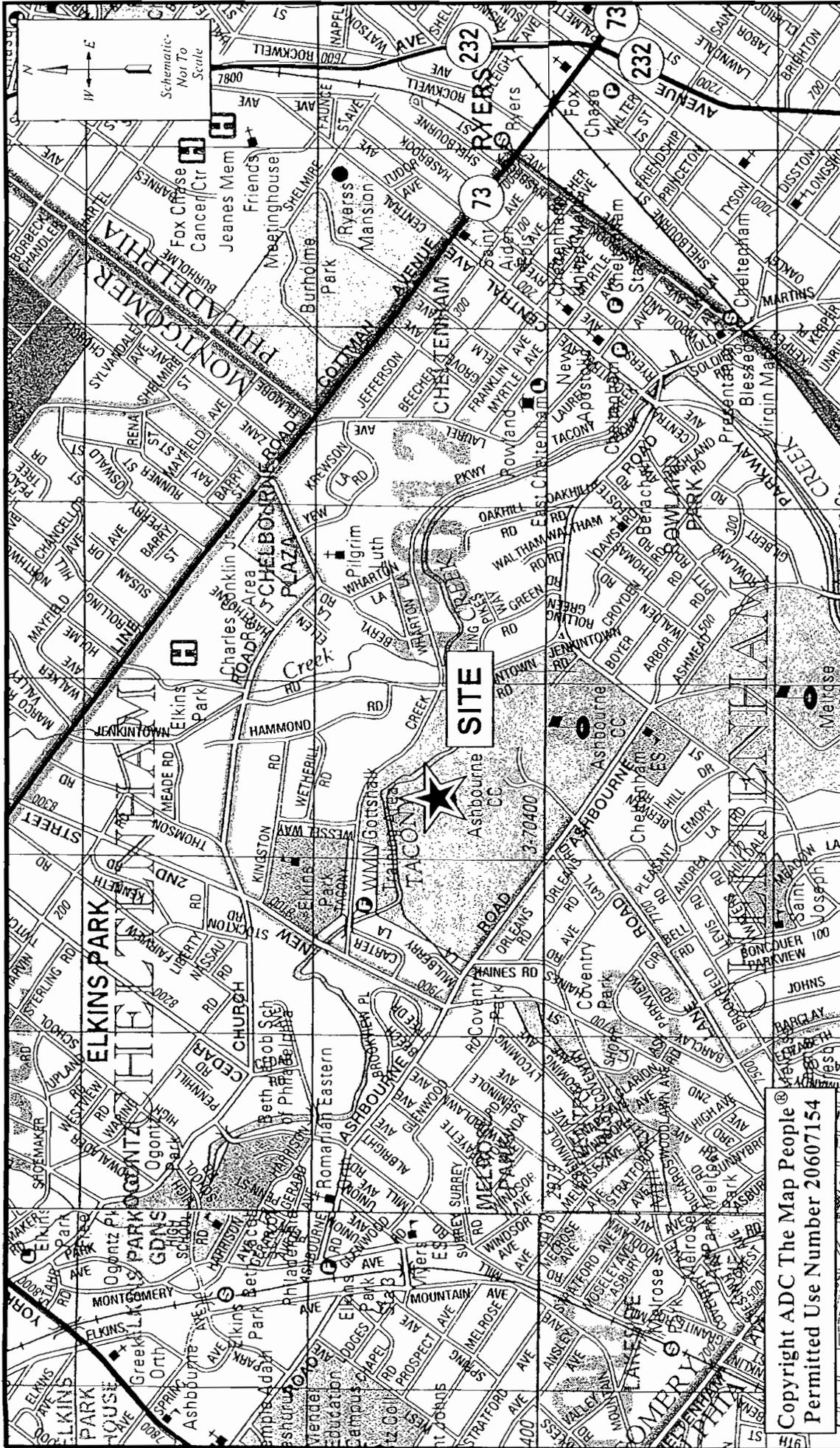
Table 1. Existing Roadway Characteristics

Roadway	Roadway Jurisdiction	Approximate Cartway Width	Travel Lanes (per direction)	Speed Limit
Ashbourne Road (S.R. 2025)	State	22 to 34 feet	One	35 mph
Oak Lane Road (S.R. 2062)	State	36 to 40 feet	One	35 mph
New Second Street (S.R. 2060)	State	32 to 36 feet	One	35 mph
Front Street	Township	32 to 34 feet	One	15 mph
Ashmead Road	Township	34 feet	One	25 mph
Arbor Road	Township	24 feet	One	25 mph

The following key intersections in the vicinity of the site comprise the study area:

- Ashbourne Road (S.R. 2025)/New Second Street (S.R. 2060),
- Ashbourne Road (S.R. 2025)/Oak Lane Road (S.R. 2062)/Ashbourne Country Club Access, and
- Ashbourne Road (S.R. 2025)/Front Street/Ashmead Road/Arbor Road.

The existing characteristics of the study intersections, including field sketches and photographs, are provided in Appendix A.



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**FIGURE 2**  
 Site Location Map  
**ASHBOURNE COUNTRY CLUB**  
 CHELTENHAM TOWNSHIP, MONTGOMERY COUNTY, PA



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## Existing Traffic Volumes

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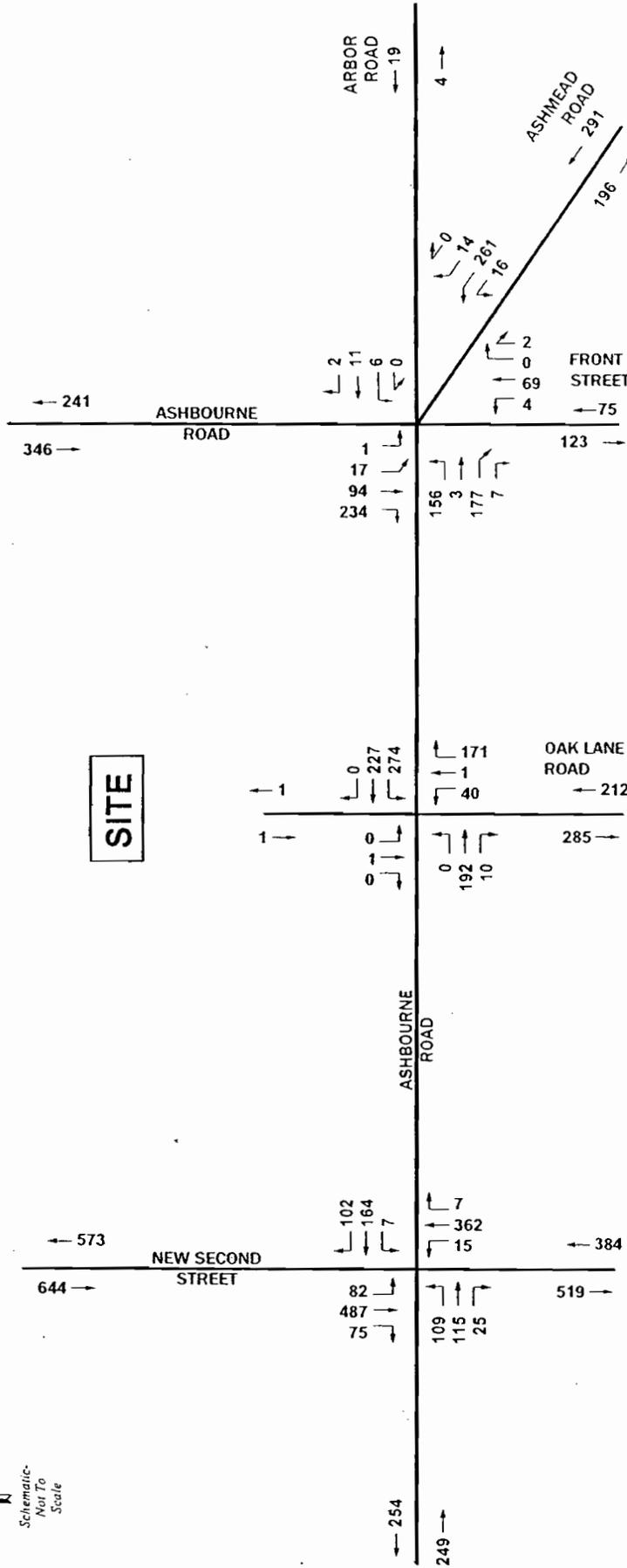
Daily traffic counts were conducted along Ashbourne Road (S.R. 2025) in the vicinity of the site, near its intersection with Oak Lane, in March 2009 and are provided in **Appendix B**. Based on the counts, the two-way daily traffic volume along Ashbourne Road (S.R. 2025) is approximately 8,350 vehicles per day (vpd) on a typical weekday.

Manual turning movement traffic counts were conducted in February 2009 during the weekday morning peak period (7:00 AM to 9:00 AM) and the weekday afternoon peak period (4:00 PM to 6:00 PM) at each of the study intersections. The results of these traffic counts are tabulated by 15-minute intervals in **Appendix C**. The four highest consecutive 15-minute peak intervals during these traffic count periods constitute the peak hours that are the basis of this traffic analysis.

Seasonal adjustment factors contained in the PennDOT's *2007 Pennsylvania Traffic Data Handbook*, were also reviewed to ensure the collected counts reflect typical conditions. The collected traffic data reflects lower than average data. As a result, the weekday morning and weekday afternoon peak hour traffic volumes were increased by a seasonal adjustment factor of 1.084. The resultant peak hour traffic volumes are depicted in **Figures 3 and 4** for the weekday morning and weekday afternoon peak hours, respectively.

### *Planned Roadway Improvements*

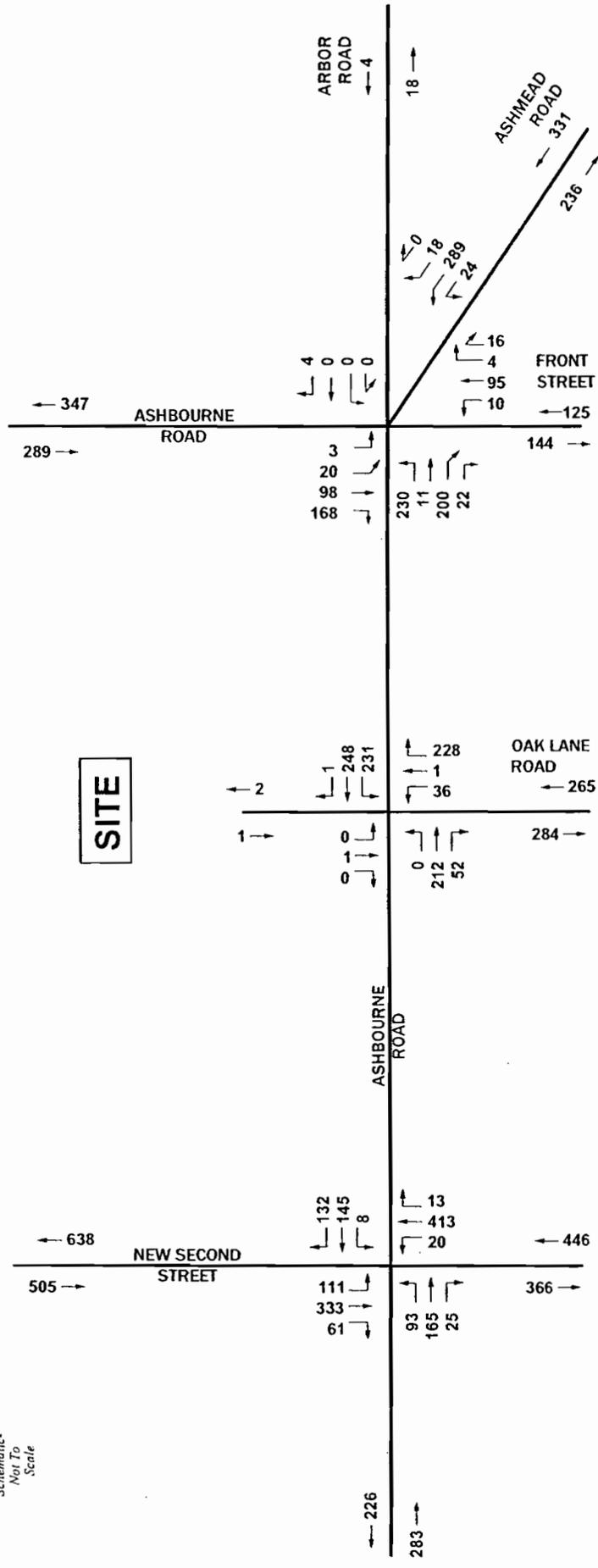
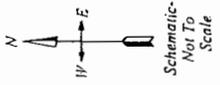
Through discussions with the Township and review of PennDOT's *Twelve Year Transportation Program*, there are no planned or proposed improvements on the study area roadways by the Township, PennDOT, or other area developers that would have a significant effect on the traffic operations.



**FIGURE 3**  
 2009 Existing Weekday Morning Peak Hour Traffic Volumes  
**ASHBOURNE COUNTRY CLUB**  
 CHELTENHAM TOWNSHIP, MONTGOMERY COUNTY, PA



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**FIGURE 4**  
 2009 Existing Weekday Afternoon Peak Hour Traffic Volumes  
**ASHBOURNE COUNTRY CLUB**  
 CHELTENHAM TOWNSHIP, MONTGOMERY COUNTY, PA

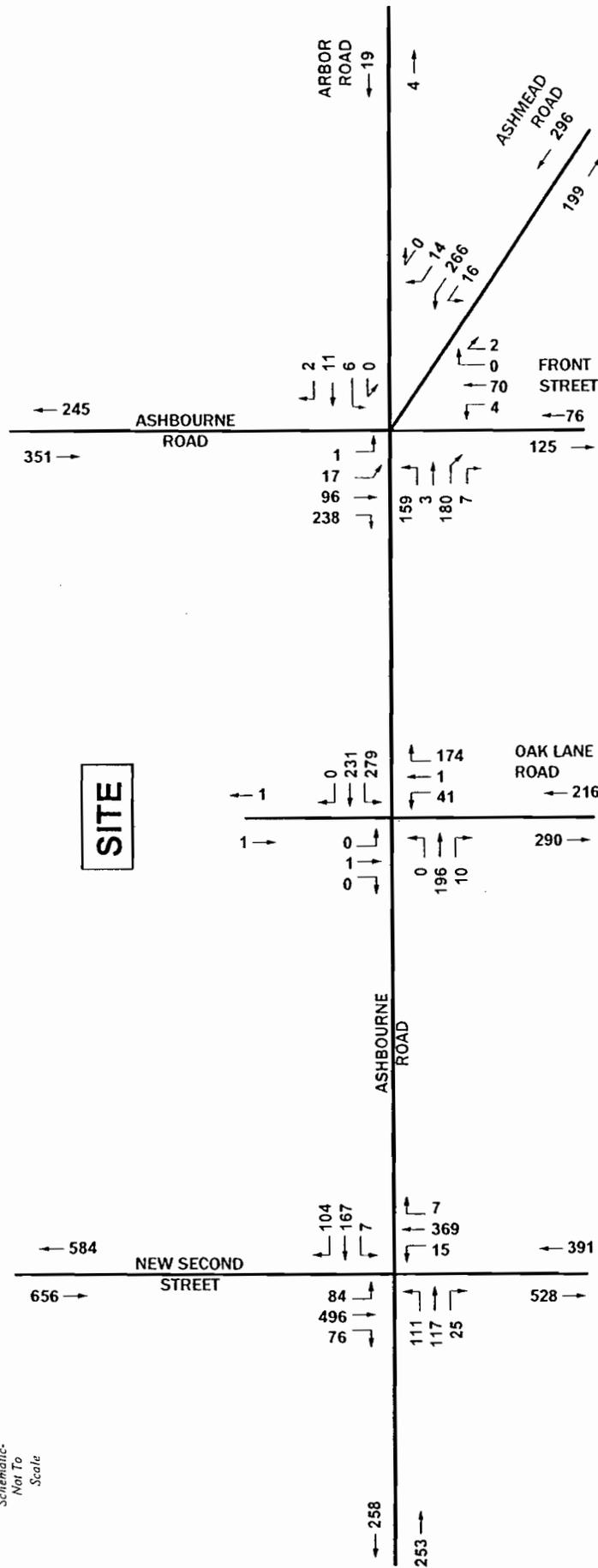
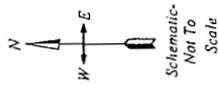
## **Future Traffic Volumes without Development**

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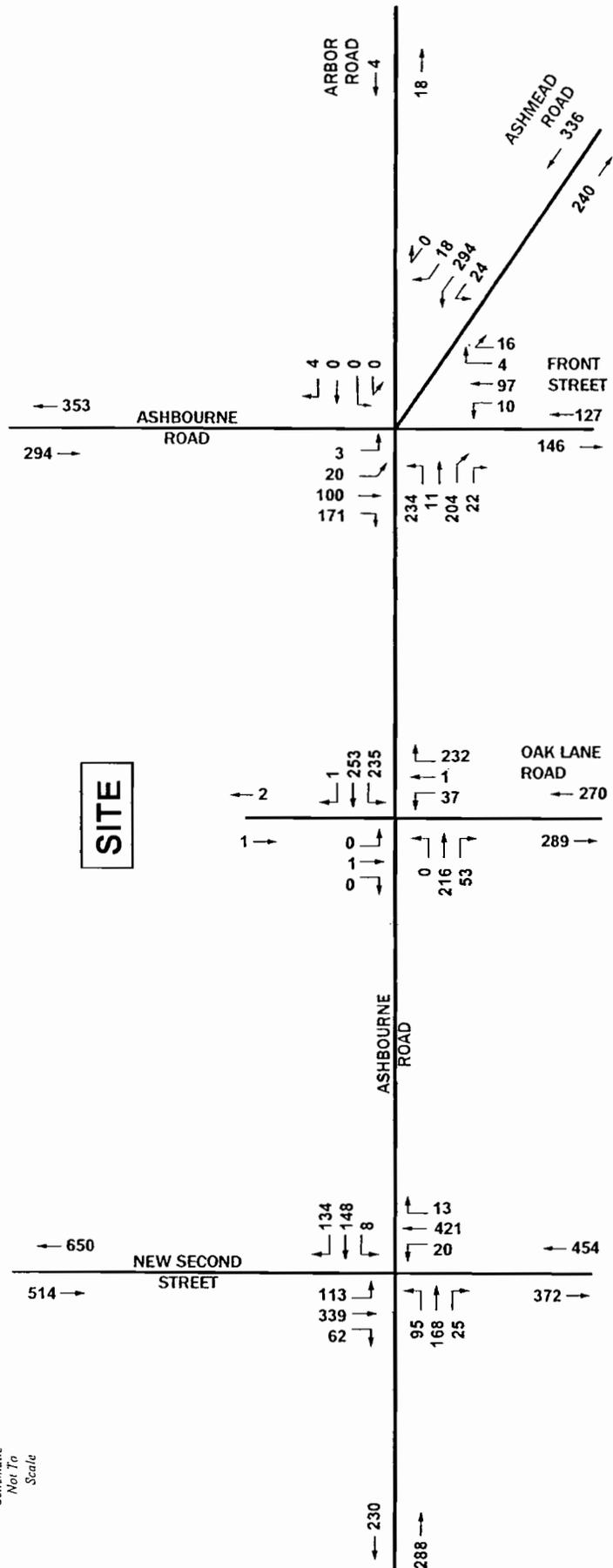
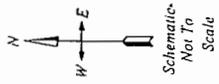
This section presents projected traffic volumes without the redevelopment of the Ashbourne Country Club for the future opening year (2011) and PennDOT design year (2016). The future year 2011 and 2016 without-development traffic volumes were estimated by increasing the existing 2009 peak hour traffic volumes to account for regional and local traffic growth, as described below. The future year 2011 without-development traffic volumes for the weekday morning and weekday afternoon peak hours are illustrated in **Figures 5 and 6**, respectively, while the future year 2016 without-development traffic volumes for the weekday morning and weekday afternoon peak hours are illustrated in **Figures 7 and 8**, respectively .

### ***Regional and Local Traffic Growth***

To account for background traffic growth, the existing traffic volumes were increased by a compounded annual traffic growth rate of 0.94 percent. This regional traffic growth rate is consistent with the recommendations by PennDOT's Bureau of Planning and Research for similar roadways in Montgomery County. According to the Township, there are no other area developments within the study area that will impact traffic conditions. Therefore, the existing 2009 peak hour traffic volumes were increased by a total of 1.9 percent to obtain the base build-out year (2011) and 6.8 percent to obtain the PennDOT design year (2016).

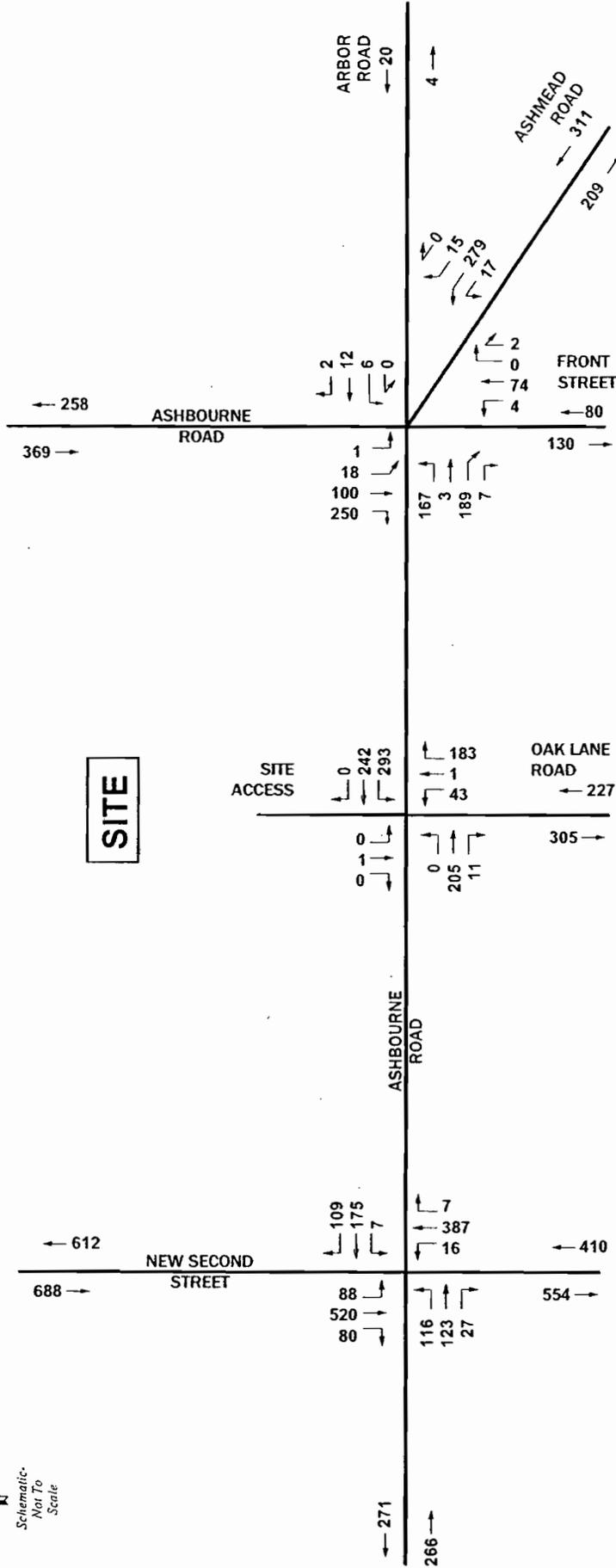
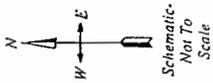


**FIGURE 5**  
 2011 Future Weekday Morning Peak Hour Traffic Volumes without Development  
**ASHBOURNE COUNTRY CLUB**  
 CHELTENHAM TOWNSHIP, MONTGOMERY COUNTY, PA



**FIGURE 6**  
 2011 Future Weekday Afternoon Peak Hour Traffic Volumes without Development

**ASHBOURNE COUNTRY CLUB**  
**CHELtenham TOWNSHIP, MONTGOMERY COUNTY, PA**

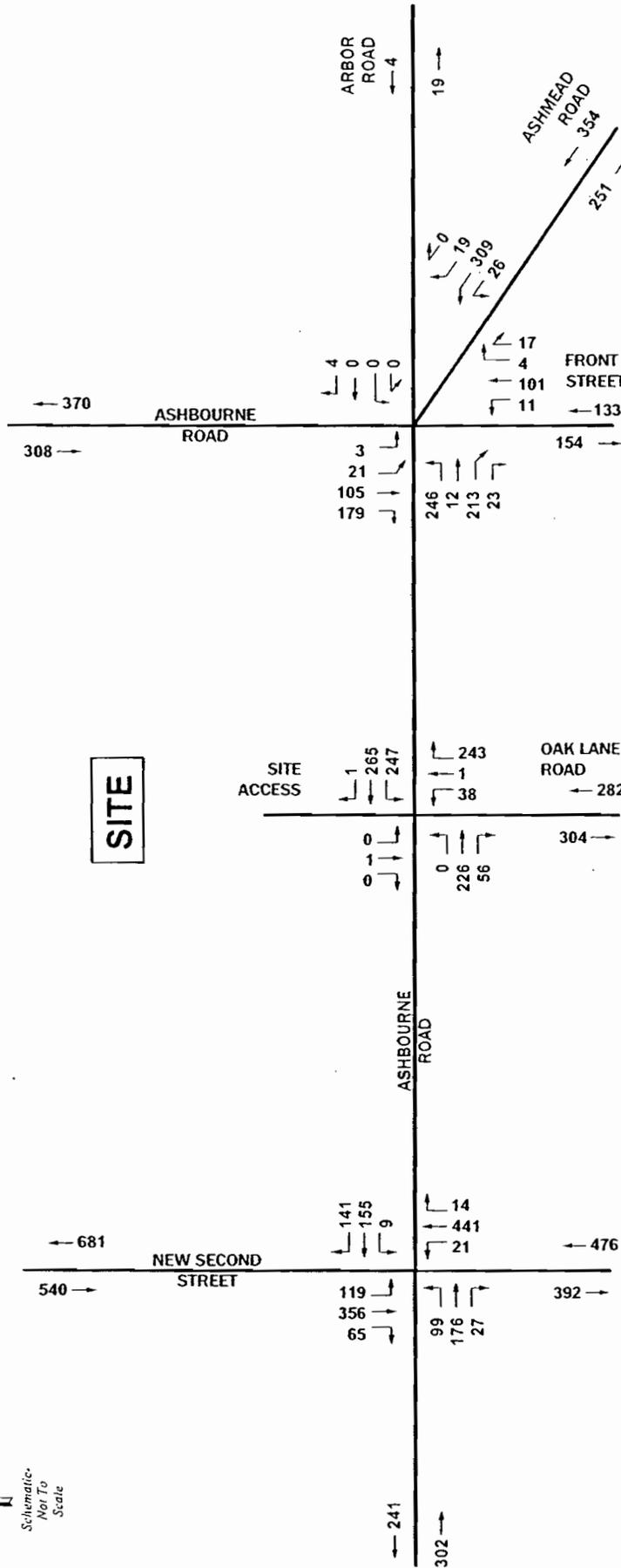
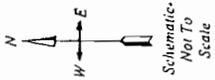


**SITE**

**FIGURE 7**  
 2016 Future Weekday Morning Peak Hour Traffic Volumes without Development  
**ASHBOURNE COUNTRY CLUB**  
 CHELTENHAM TOWNSHIP, MONTGOMERY COUNTY, PA



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**FIGURE 8**  
 2016 Future Weekday Afternoon Peak Hour Traffic Volumes without Development  
**ASHBOURNE COUNTRY CLUB**  
 CHELTENHAM TOWNSHIP, MONTGOMERY COUNTY, PA

## Future Opening Year Traffic Volumes with Development

Evaluation of the redevelopment of the existing Ashbourne Country Club is based upon the incremental increase in traffic volumes generated by the development during the peak hours, as described below.

### *Trip Generation*

Traffic volumes generated by the existing land use and proposed development were prepared based on data compiled in the Institute of Transportation Engineers' publication, *Trip Generation, 8<sup>th</sup> Edition*, for Land Use Code 430 (Golf Course), Land Use Code 251 (Elderly Housing-Detached) and Land Use Code 220 (Apartments). Table 2 presents the anticipated vehicular trip generation for the proposed development. As can be seen from the table, the proposed age-qualified homes will generate more trips compared to the existing golf course.

**Table 2. Vehicular Trip Generation**

Land Use	Size (units)	Daily	Weekday Morning Peak Hour			Weekday Afternoon Peak Hour		
			In	Out	Total	In	Out	Total
Existing: Golf Course	18-Hole	643	32	8	40	23	28	51
Proposed: Age-Qualified	309	1,413	29	53	82	64	41	105
Apartments	176	1,190	18	72	90	74	40	114
Total	485	2,603	47	125	172	138	81	219

### *Trip Distribution and Assignment*

Site-generated traffic will approach and depart the site via different routes depending on factors such as the existing traffic patterns, location of major roadways, and the location of the development's site access. The detailed distribution percentages for the anticipated directions of approach and departure are illustrated in Figures 9A and 9B for the age-qualified and apartment unit components, respectively. Application of the percentages illustrated in Figures 9A and 9B to the new peak hour trips contained in Table 2, provides an estimate of site traffic to be added to the study area. The trip assignment for each component has been illustrated Figures 10A and 10B for the age-qualified and apartment components, respectively.

The site-generated traffic volumes were added to the future without-development traffic volumes to result in total future peak hour traffic volumes with development for each peak hour. The 2011 future traffic volumes with development are illustrated in Figures 11 and 12 for the weekday

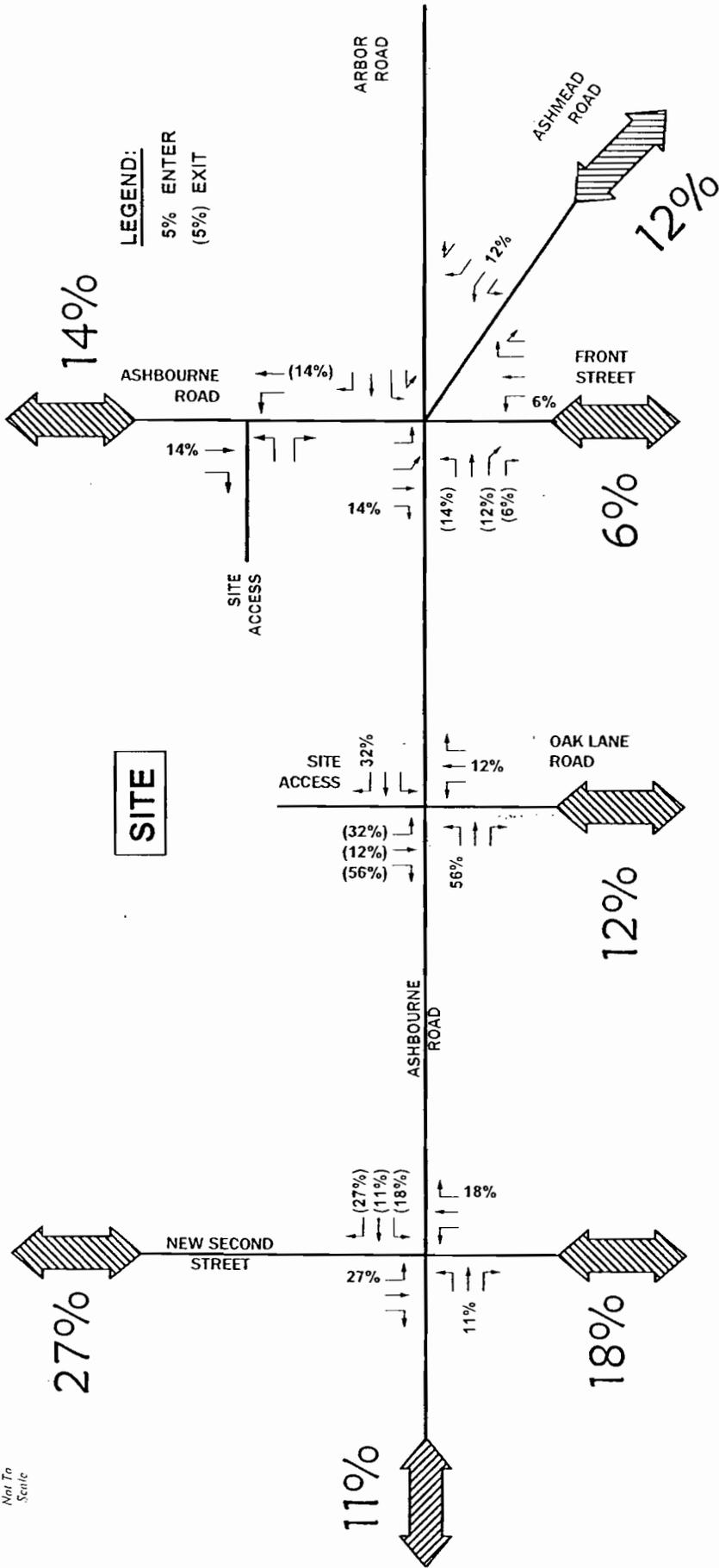
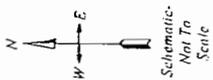


FIGURE 9A

Directions of Approach and Departure - Age Qualified

# ASHBOURNE COUNTRY CLUB

CHELTENHAM TOWNSHIP, MONTGOMERY COUNTY, PA



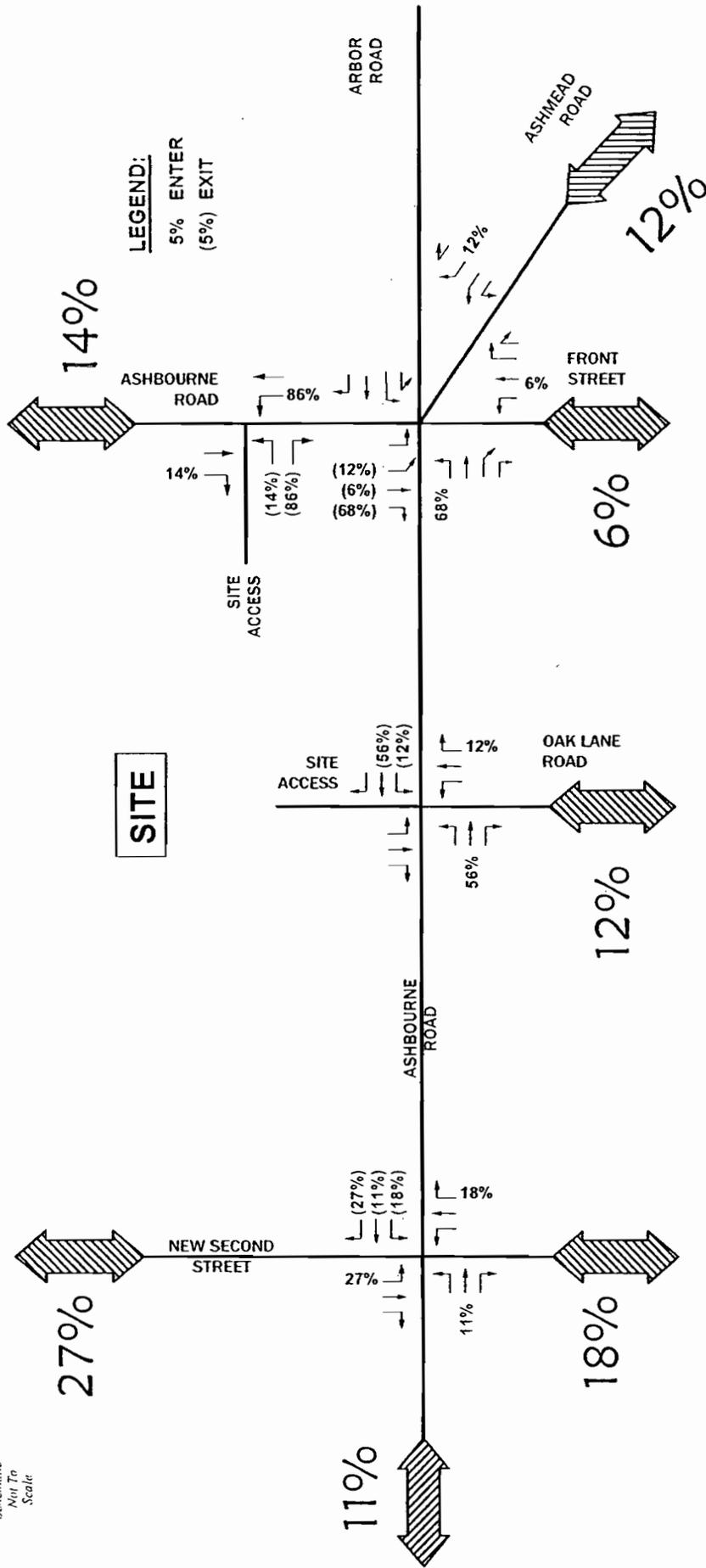
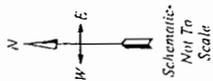
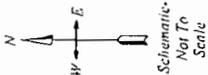


FIGURE 9B

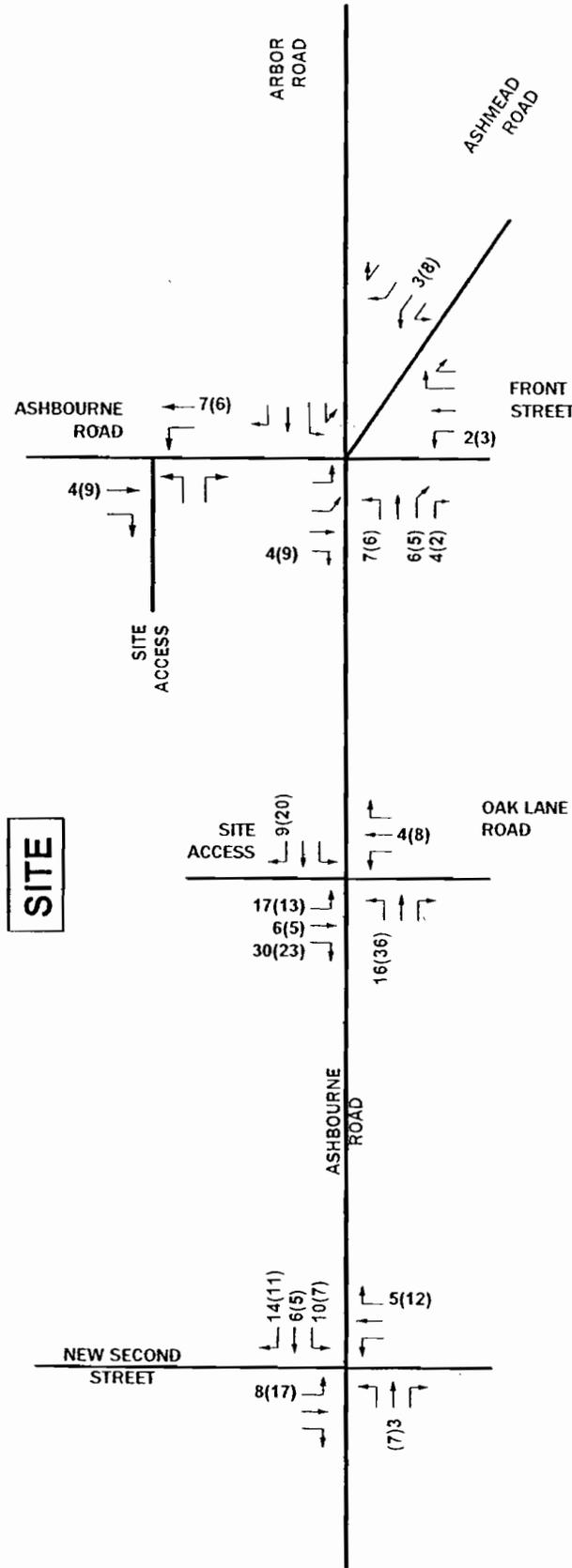
Directions of Approach and Departure - Apartments

# ASHBOURNE COUNTRY CLUB

CHELtenham TOWNSHIP, MONTGOMERY COUNTY, PA



Peak Hour	In	Out
AM	29	53
(PM)	64	41



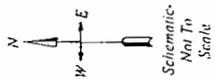
**FIGURE 10A**

New Trip Assignment - Age Qualified

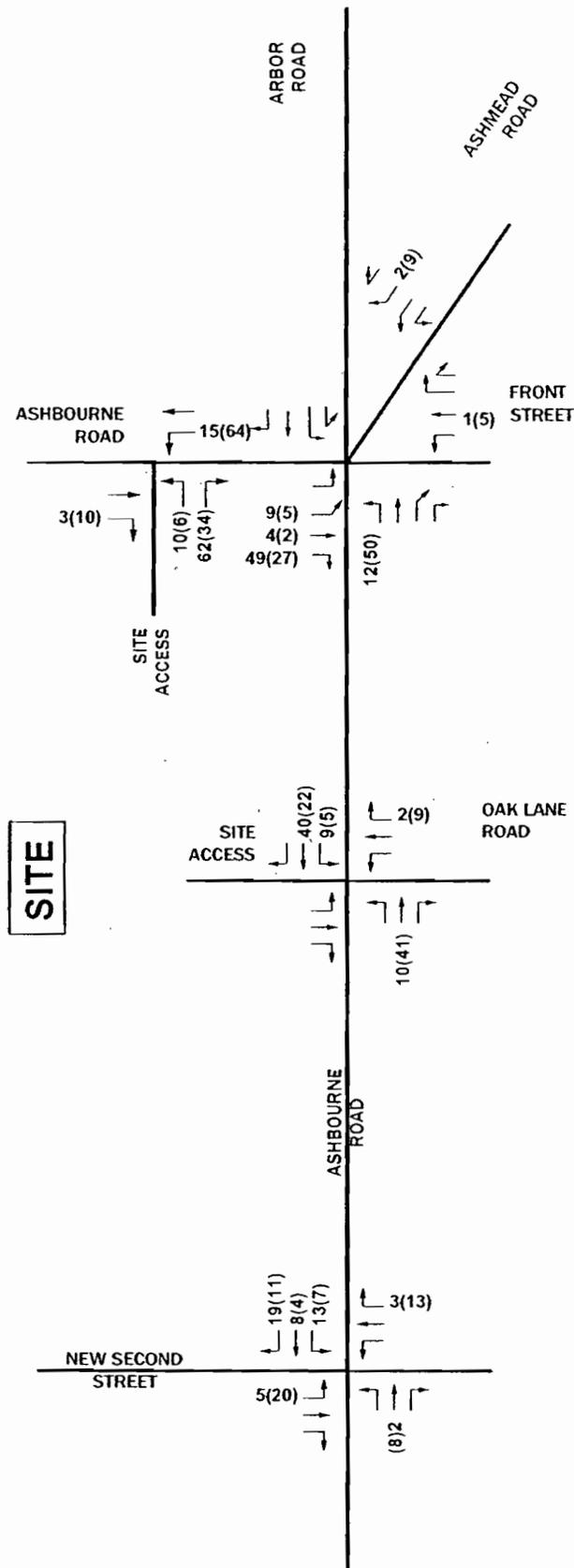
# ASHBOURNE COUNTRY CLUB

CHELTENHAM TOWNSHIP, MONTGOMERY COUNTY, PA

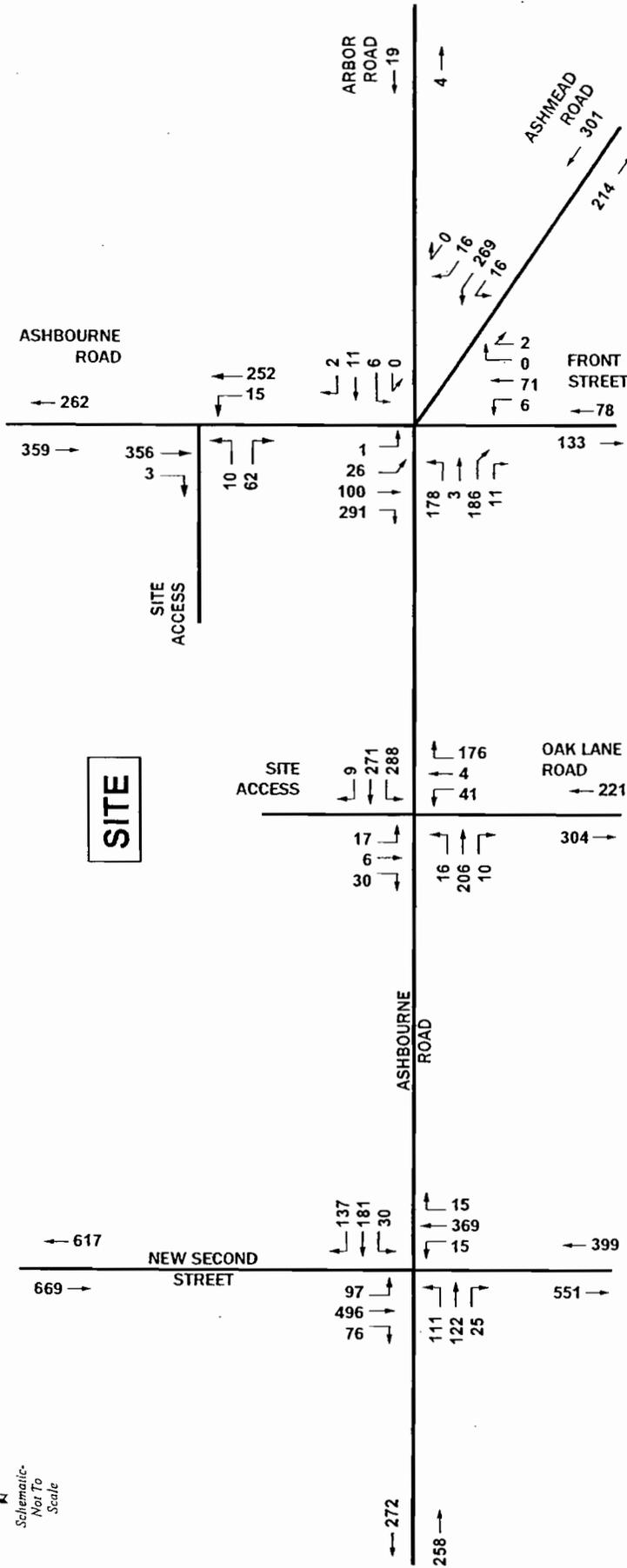
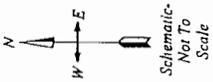




Peak Hour	In	Out
AM	18	72
(PM)	74	40

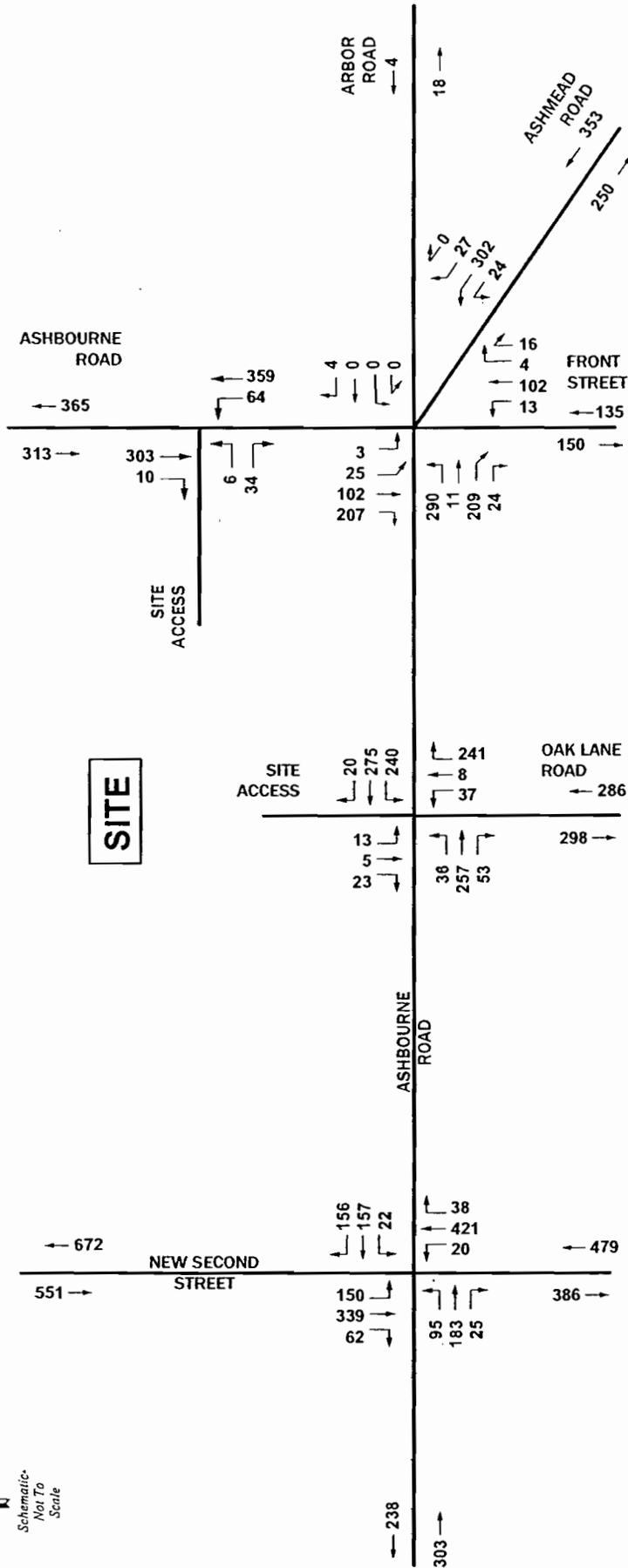
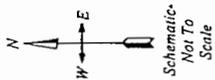


**FIGURE 10B**  
 New Trip Assignment - Apartments  
**ASHBOURNE COUNTRY CLUB**  
 CHELTENHAM TOWNSHIP, MONTGOMERY COUNTY, PA



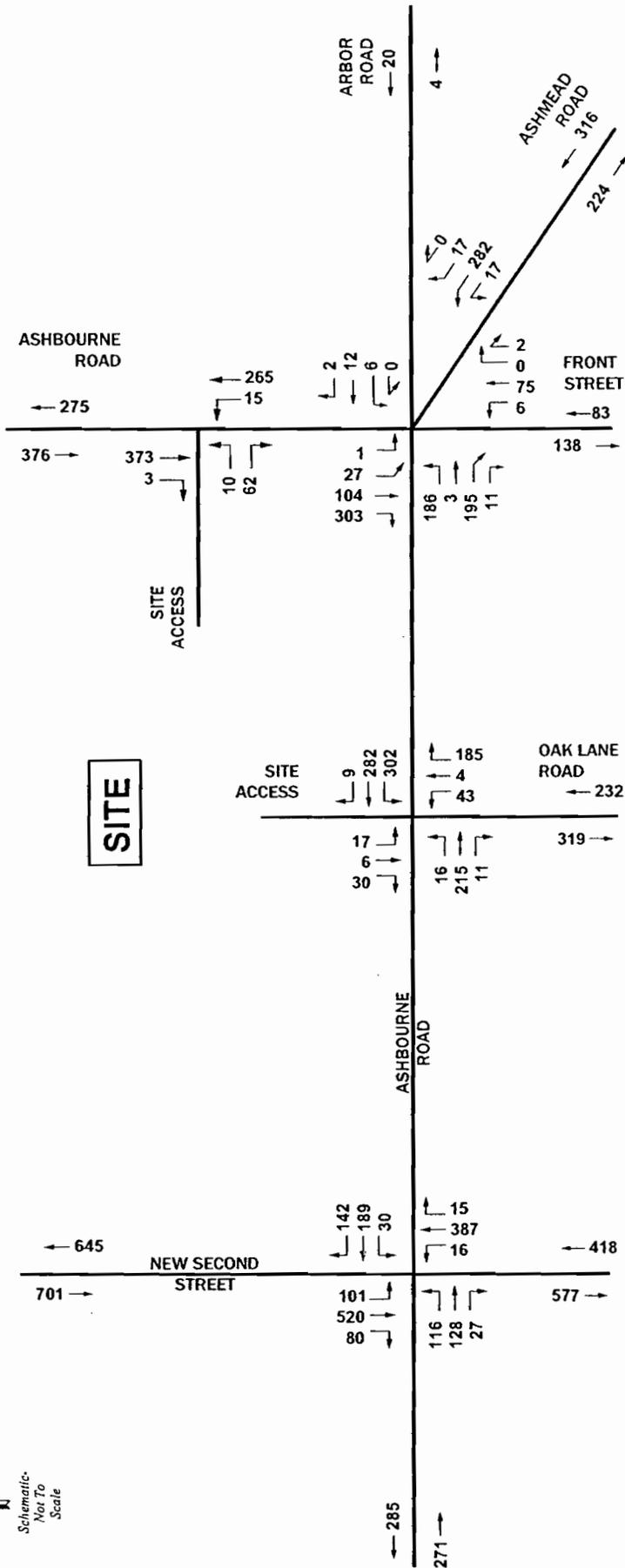
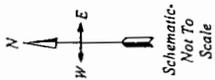
**SITE**

**FIGURE 11**  
2011 Future Weekday Morning Peak Hour Traffic Volumes with Development  
**ASHBOURNE COUNTRY CLUB**  
CHELTENHAM TOWNSHIP, MONTGOMERY COUNTY, PA



**FIGURE 12**  
2011 Future Weekday Afternoon Peak Hour Traffic Volumes with Development  
**ASHBOURNE COUNTRY CLUB**  
CHELTENHAM TOWNSHIP, MONTGOMERY COUNTY, PA

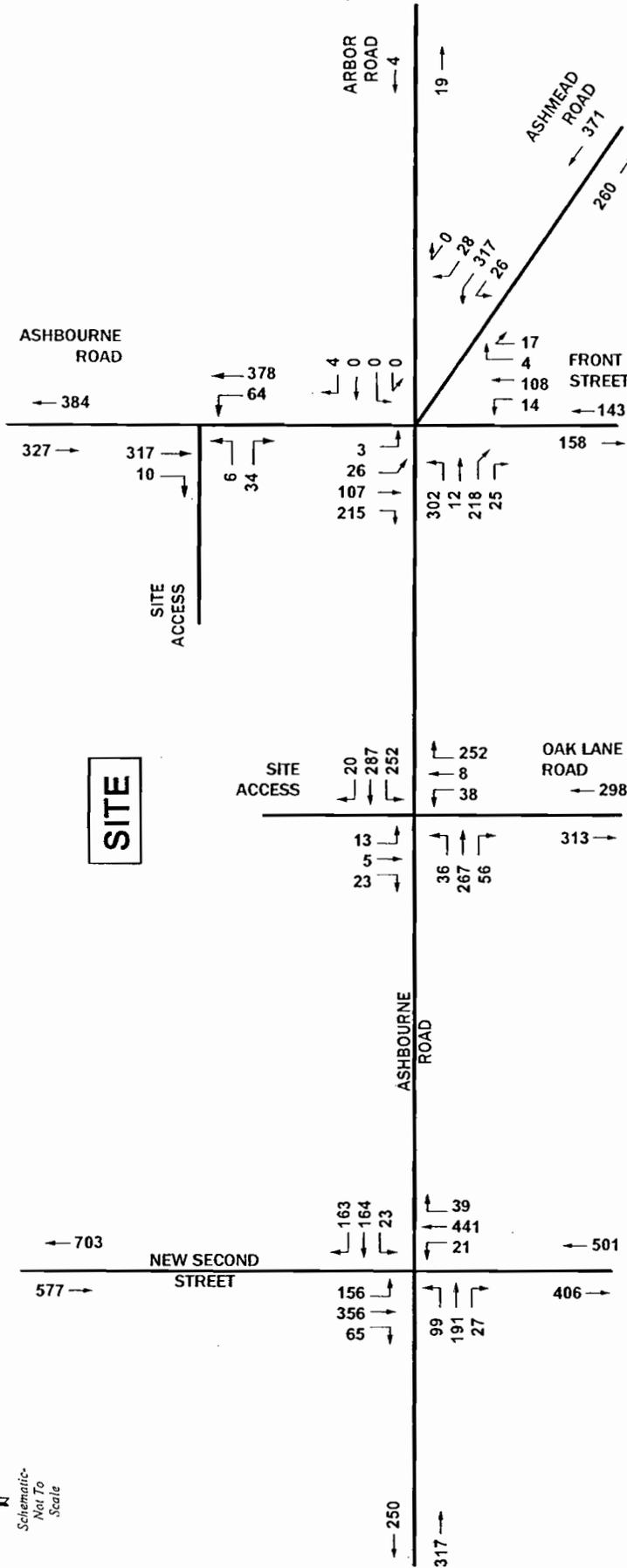
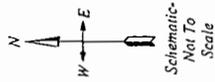
morning and weekday afternoon peak hours, respectively, while the 2016 future traffic volumes with development are illustrated in **Figures 13 and 14** for the weekday morning and weekday afternoon peak hours, respectively.



**FIGURE 13**  
 2016 Future Weekday Morning Peak Hour Traffic Volumes with Development  
**ASHBOURNE COUNTRY CLUB**  
 CHELTENHAM TOWNSHIP, MONTGOMERY COUNTY, PA



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**FIGURE 14**  
 2016 Future Weekday Afternoon Peak Hour Traffic Volumes with Development  
**ASHBOURNE COUNTRY CLUB**  
 CHELTENHAM TOWNSHIP, MONTGOMERY COUNTY, PA

## Site Access

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Access to the age-qualified component of the development project will be provided via the existing signalized intersection at Ashbourne Road (S.R. 2025) and Oak Lane Road (S.R. 2062), while a new unsignalized access along Ashbourne Road (S.R. 2025), located approximately 700 feet to the north of the Arbor Road/Front Street intersection opposite Croyden Road, will be provided for the apartment complex.

### *Design Criteria*

The proposed recommendations for the proposed access designs, including traffic control and geometric designs, were based on criteria and guidelines accepted by PennDOT contained in the *Pennsylvania Code, Chapter 441, Access to and Occupancy of Highways by Driveways and Local Roads*, PennDOT's *Publication 282 Highway Occupancy Permit Handbook*, as well as local PennDOT District policies. Since both accesses are on State highways, any modifications to the existing access servicing the Ashbourne Country Club, as well as the design of the new access for the apartment complex, will require the review and approval of the Department.

### Age-Qualified Access

According to the anticipated daily trip generation for the proposed 309 age-qualified dwellings, this existing access will continue to be classified as a low-volume driveway per PennDOT criteria. As a result, the following improvements are recommended:

- Provide a single minimum 12-foot-wide ingress lane, and a single minimum 12-foot-wide egress lane;
- Provide 30-foot curb radii (at a minimum);
- Provide a separate 14-foot-wide right-turn lane along Ashbourne Road (S.R. 2025), with a minimum of 75 feet of storage and 75-foot bay taper. Although this lane is not warranted based on volume, it is recommended based on the proposed access users.

### Apartment Unit Access

A second access for the site will be located along Ashbourne Road (S.R. 2025), approximately 700 feet to the north of the Ashmead Road/Front Street intersection opposite Croyden Road, and will be utilized by the apartment complex only. Based upon the anticipated daily traffic volumes for this driveway, it too would be classified as a low-volume driveway under PennDOT criteria. The following improvements are recommended for the design:

- Provide a single minimum 12-foot-wide ingress lane, and a single minimum 12-foot-wide egress lane;
- Provide 30-foot curb radii (at a minimum);

- Provide stop-control along the access approach;
- Separate left- and right-turn lanes are not recommended along Ashbourne Road for this access.

Sight distance field measurements were performed at the proposed new access on Ashbourne Road (S.R. 2025) that will serve the apartment complex. Generally, the posted speed limit, roadway grades and profiles, and the number of travel lanes play a role in determining the required safe sight distances for egress and ingress movements. The sight distances were measured in the field and compared to PennDOT's desirable and minimum safe stopping sight distance (SSSD) requirements for two-lane roads, which are contained in *Tables 3 and 6 of the Pennsylvania Code, Chapter 441, Access to and Occupancy of Highways by Driveways and Local Roads, and Pub 282, Highway Occupancy Permit Handbook.*

**Table 3** provides a summary of the field measured distances, along with the minimum and desirable distances, per current PennDOT policy. As can be seen, the minimum required safe sight distance can be provided for all of the ingress and egress movements for the proposed access driveway based upon the posted speed limit (35 miles per hour).

**Table 3. Sight Distance Criteria for  
Unsignalized Access Driveway and Ashbourne Road**

Movement	Direction	Grade	Sight Distance (feet)		
			Desirable <sup>(1)</sup>	Minimum Required <sup>(1)</sup>	Available
Exiting	Looking Left	+3	440	299	431 <sup>(2)</sup>
	Looking Right	-4	350	338	707
Left turn Entering	Looking Ahead	+3	300	299	345
	From the Rear	-4	300	338	680

(1) Based on posted speed limit of 35 miles per hour.

(2) The sight distance is restricted by an existing horizontal curve along Ashbourne Road.

## Capacity/Level-of-Service Analyses

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The peak hour traffic volumes were analyzed to determine the existing operating conditions and future operating conditions, both without and with redevelopment of the Ashbourne Country Club in accordance with the standard techniques contained in the current *Highway Capacity Manual (2000)*. These standard capacity/level-of-service analysis techniques, which calculate total control delay, are more thoroughly described in **Appendix D** for both signalized and unsignalized intersections, as well as the correlation between average total control delay and the respective level-of-service criteria for each intersection type.

The results of the capacity/level-of-service analyses are illustrated in **Figures 15 through 19** for the existing, future opening year (2011) without development and with-development, and future PennDOT design year (2016) without-development and with-development peak hour traffic conditions, respectively. Additionally, detailed capacity/level-of-service analysis worksheets are contained in **Appendix E, F, G, H, and I** for the existing, future opening year (2011) without- and with-development, and future PennDOT design year (2016) without- and with-development peak hour traffic conditions, respectively. The analysis results are summarized below for each study intersection.

### *Ashbourne Road (S.R. 2025) and New Second Street (S.R. 2060)*

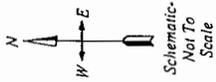
This signalized intersection operates at acceptable levels of service overall (LOS C or better) with all the movements operating acceptably (LOS C or better) during the weekday morning and weekday afternoon peak hours under current, as well as without-development conditions, for both future years (2011 and 2016).

The intersection will continue to operate at similar levels of service overall (LOS C), with the development of the site under the build-out year (2011) and PennDOT design year (2016) conditions. As a result, no modifications are proposed to the current signal timings.

### *Ashbourne Road (S.R. 2025) and Oak Lane Road/Access*

This signalized intersection operates at acceptable levels of service overall (LOS B or better) with all the movements operating acceptably (LOS B or better) during the weekday morning and weekday afternoon peak hours under current, as well as without-development conditions, for both future years (2011 and 2016).

With development of the site, it is recommended that the existing access driveway to the Ashbourne Country Club be widened to provide a 12-foot egress lane, and a 12-foot ingress lane, which is consistent with PennDOT's design standards for a medium-volume driveway. Additionally, a separate right-turn lane has been proposed for the westbound approach of



**LEGEND:**

- A WEEKDAY AM PEAK HOUR
- (A) WEEKDAY PM PEAK HOUR
- EXISTING LANE
- EXISTING TRAFFIC SIGNAL

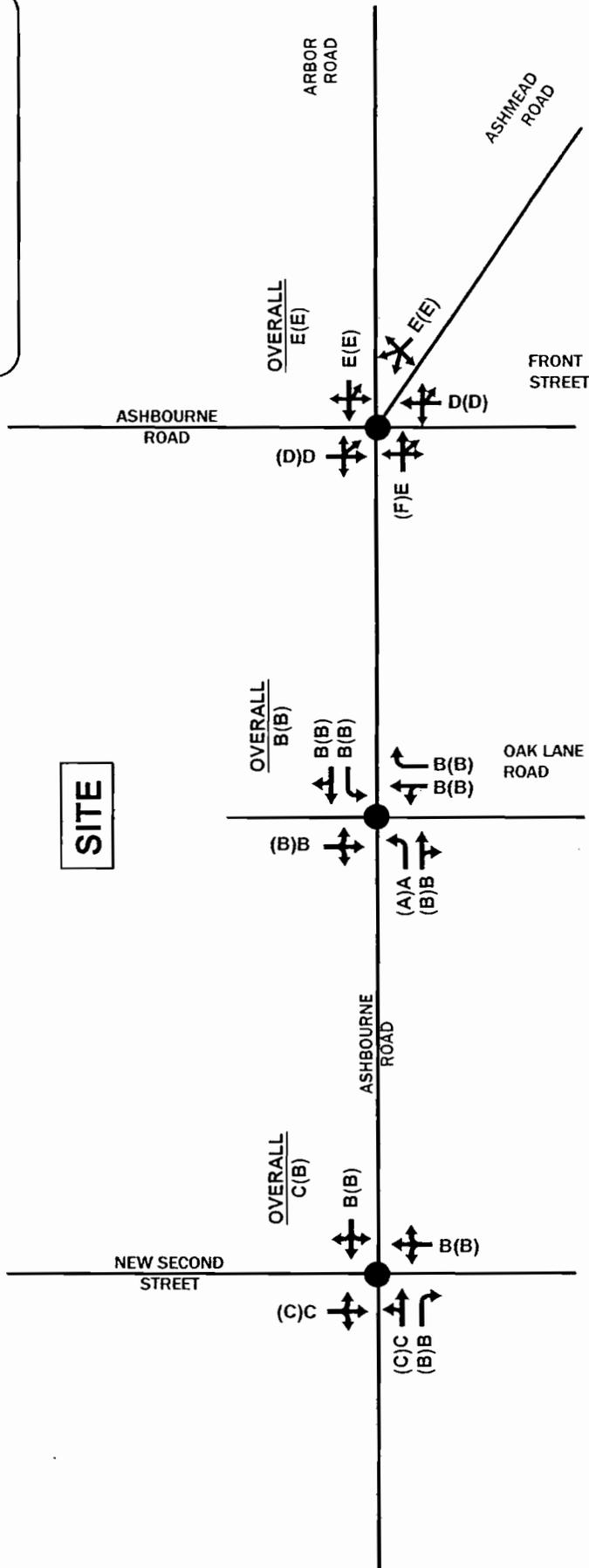


FIGURE 15

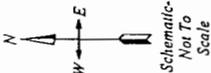
2009 Existing Levels of Service

# ASHBOURNE COUNTRY CLUB CHELTENHAM TOWNSHIP, MONTGOMERY COUNTY, PA



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Schematic-  
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Scale

**LEGEND:**

- A WEEKDAY AM PEAK HOUR
- (A) WEEKDAY PM PEAK HOUR
- EXISTING LANE
- EXISTING TRAFFIC SIGNAL

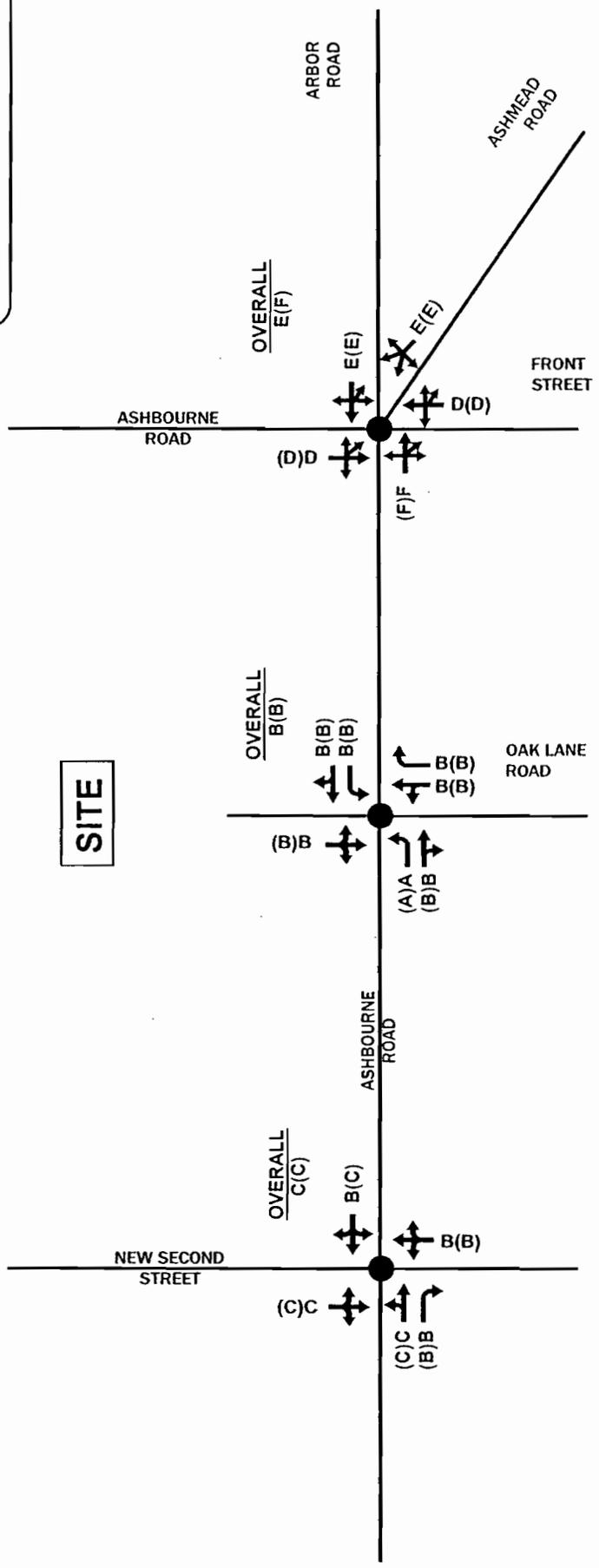
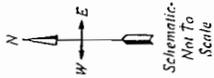


FIGURE 17

2016 Future Levels of Service without Development

# ASHBOURNE COUNTRY CLUB

CHELTENHAM TOWNSHIP, MONTGOMERY COUNTY, PA



**LEGEND:**

- A WEEKDAY AM PEAK HOUR
- (A) WEEKDAY PM PEAK HOUR
- EXISTING LANE
- PROPOSED LANE
- EXISTING TRAFFIC SIGNAL
- MODIFICATIONS TO EXISTING TRAFFIC SIGNAL
- PROPOSED STOP SIGN

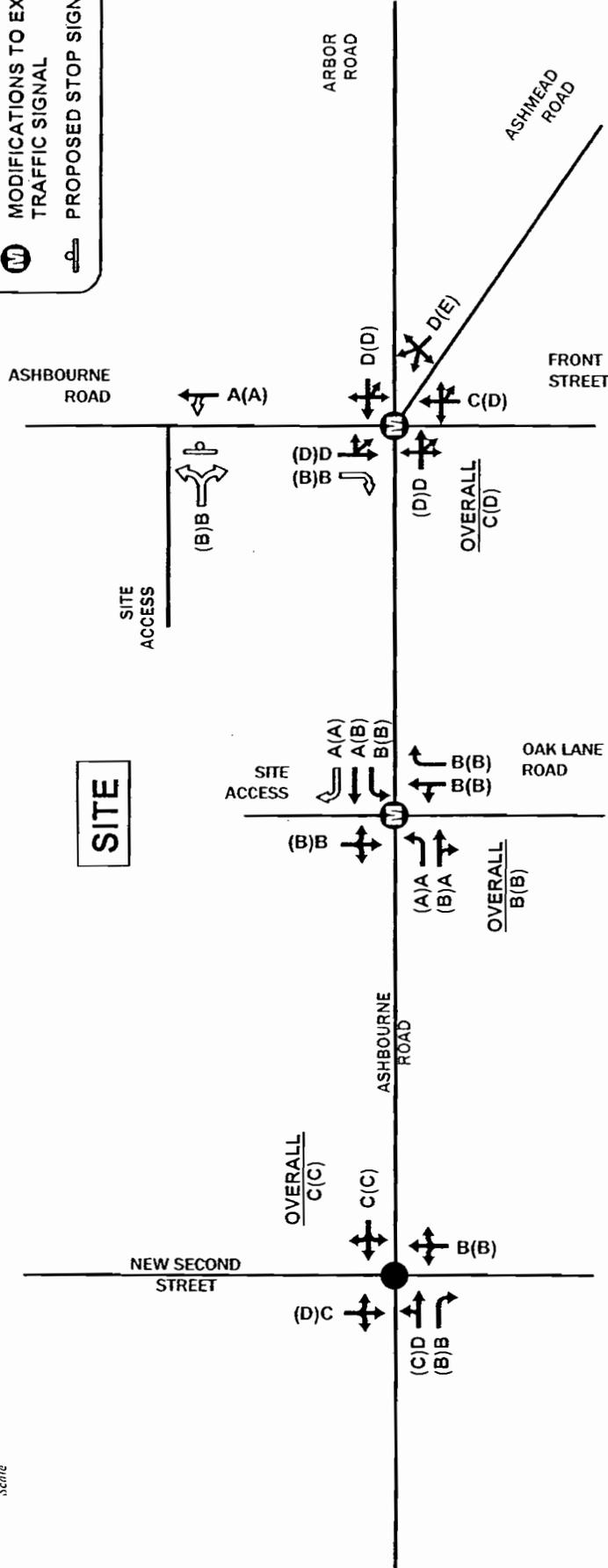


FIGURE 18

2011 Future Levels of Service with Development

# ASHBOURNE COUNTRY CLUB

CHELTENHAM TOWNSHIP, MONTGOMERY COUNTY, PA





Ashbourne Road (S.R. 2025) to serve the age-qualified residents of the development that will use this access. With these improvements, as well as minor signal timing modifications, the intersection will continue to operate at acceptable levels of service overall (LOS B) with all of the lane groups also operating acceptably (LOS C or better) for both design years (2011 and 2016) with full development of the site.

*Ashbourne Road (S.R. 2025) and Front Street/Ashmead Road/Arbor Road*

This signalized intersection operates at deficient levels of service (LOS E or F) with high delays also experienced along most of the approaches during both peak hours under existing and without-development conditions. The delays are primarily attributable to the multi-phase operation of the traffic signal and the long cycle length.

To improve the intersection operations, it is recommended that the southbound approach of Ashbourne Road (S.R. 2025) be widened to provide a separate right-turn lane. Additionally, it is recommended that the eastbound approach of Ashbourne Road (S.R. 2025) be restriped to provide a delineated shoulder area that would serve as a parking area on the south side for the adjacent school, which does currently utilize this area. With these geometric improvements, as well as timing modifications to the existing signal, the impact of the development will be mitigated overall and for each movement under the build-out year (2011) and PennDOT design year (2016).

*Ashbourne Road (S.R. 2025) and Site Access*

With development of the site, it is recommended that the access driveway be designed to provide a minimum 12-foot egress lane and a minimum 12-foot ingress lane, which is consistent with PennDOT's design standards for a low-volume driveway, with stop control provided along the access approach. With these improvements the stop-controlled access approach will operate at highly acceptable levels of service (LOS B) during both peak hours under the build-out year (2011) and PennDOT design year (2016).

## Conclusions and Recommendations

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In conjunction with the redevelopment of the Ashbourne Country Club that will result in 309 age-qualified and 176 apartment rental units, the following roadway/intersection improvements are proposed by the developer:

- **Ashbourne Road (S.R. 2025) and Oak Lane Road (S.R. 2062)/Access** – Widen the access to provide a 12-foot-wide (minimum) egress lane, and a 12-foot-wide (minimum) ingress lane to meet PennDOT design guidelines for a low-volume driveway. Provide a separate 14-foot-wide right-turn lane along the westbound approach of Ashbourne Road (S.R. 2025), with at least 75 feet of storage and a 75-foot bay taper. Minor signal timing modifications are also proposed.
- **Ashbourne Road (S.R. 2025)/Front Street/Ashmead Road/Arbor Road** – Widen the southbound approach of Ashbourne Road (S.R. 2025) to provide a 14-foot-wide separate right-turn lane with at least 150 feet of storage and a 75-foot bay taper, along with modifications to the existing signal permit timings. The western leg of Ashbourne Road (S.R. 2025) will be restriped to provide a 14-foot-wide departure lane and an 11-foot-wide approach lane with a delineated 7-foot shoulder area along the south side that can be used as a designated parking area for the adjacent school.
- **Ashbourne Road (S.R. 2025) and Access** – Provide a minimum 12-foot-wide egress lane and a minimum 12-foot-wide ingress lane to meet PennDOT design guidelines for a low-volume driveway, and provide stop control along the access approach.



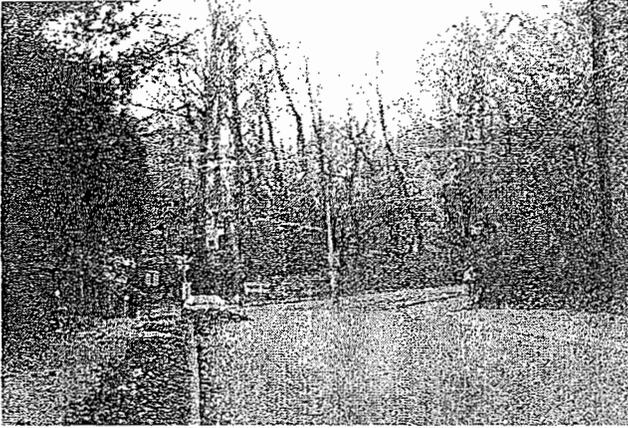
## **APPENDIX A**

### **Study Area Intersection Sketches and Photographs**





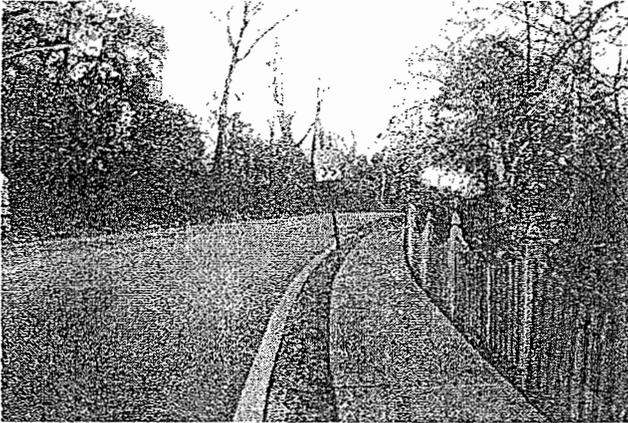
Intersection of Asbourne Road and New Second Street  
Ashbourne Country Club Redevelopment



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Figure 47: New Second Street - looking to the north, towards intersection



I:\eng\802454\Pictures\Nov2004\IMG\_0372.JPG  
Figure 48: New Second Street - looking to the north, channelized right turn lane



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Figure 49: New Second Street - looking to the south, away from intersection



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Figure 50: Ashbourne Road - looking to the west



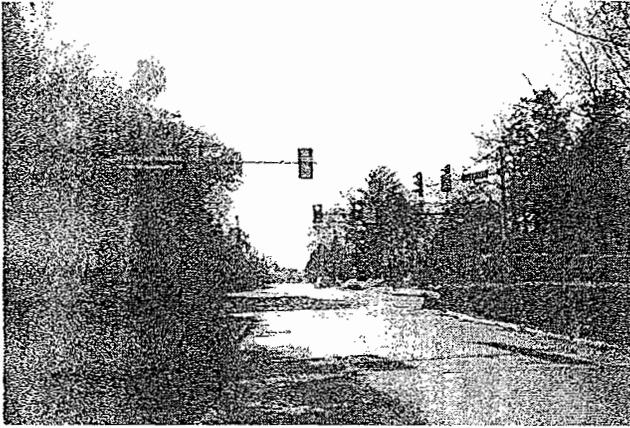
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Figure 51: Ashbourne Road, looking to the east, away from intersection



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Figure 52: New Second Street - looking to the north, away from intersection



Intersection of Ashbourne Road/Oak Lane/Ashbourne Country Club Access  
Ashbourne Country Club Redevelopment



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Figure 1: Ashbourne Access - Looking toward Ashbourne Road



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Figure 2: Ashbourne Access - Looking across at Oak Lane



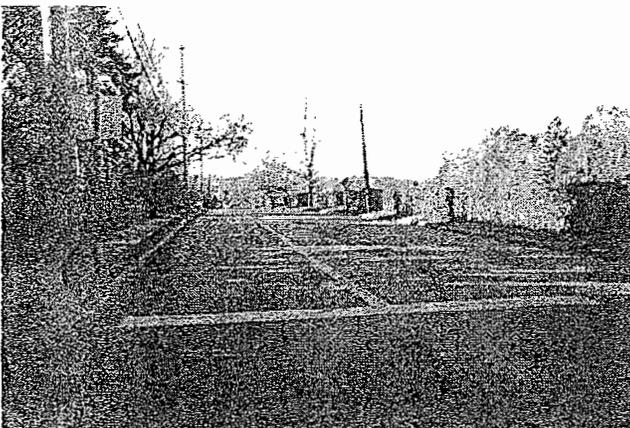
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Figure 3: Ashbourne Access - Looking across at Oak Lane



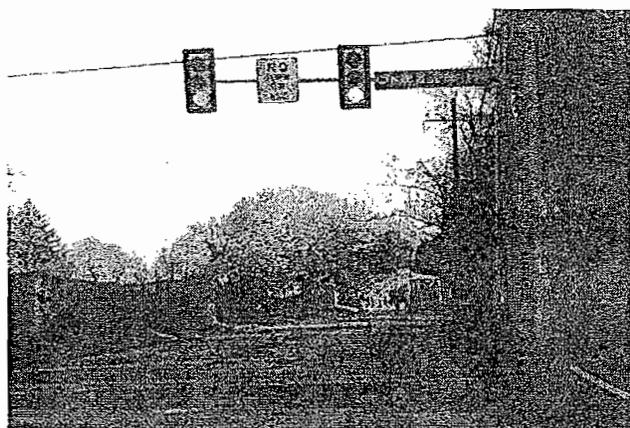
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Figure 4: Ashbourne Road - looking to the west



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Figure 5: Ashbourne Road - looking to the west

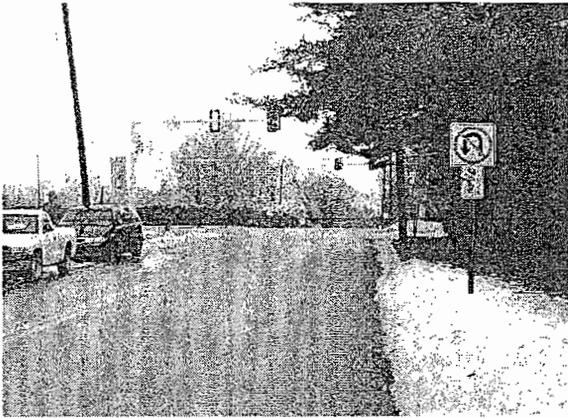


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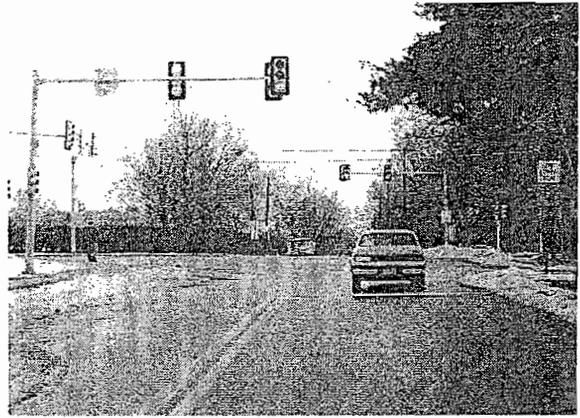
Figure 6: Ashbourne Road - looking to the east







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Front/Ashbourne/Ashmead/Arbor/Jenkintown - Front Road NB Approach



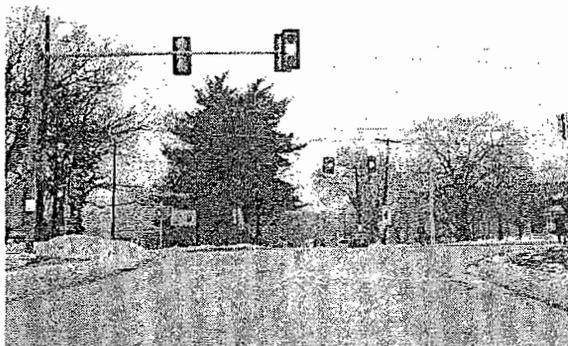
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Front/Ashbourne/Ashmead/Arbor/Jenkintown - Front Road Approach



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Front/Ashbourne/Ashmead/Arbor/Jenkintown - Ashbourne Approach



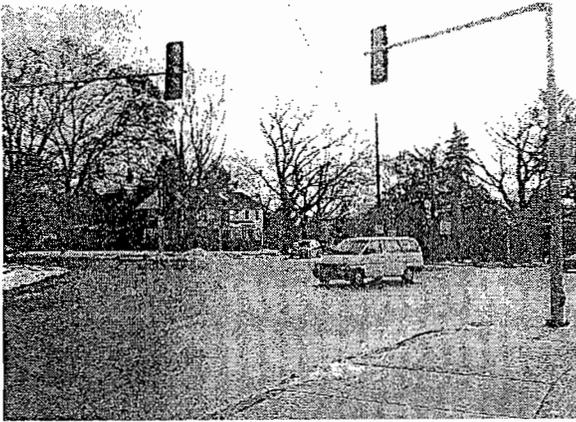
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Front/Ashbourne/Ashmead/Arbor/Jenkintown - Arbor Road Approach



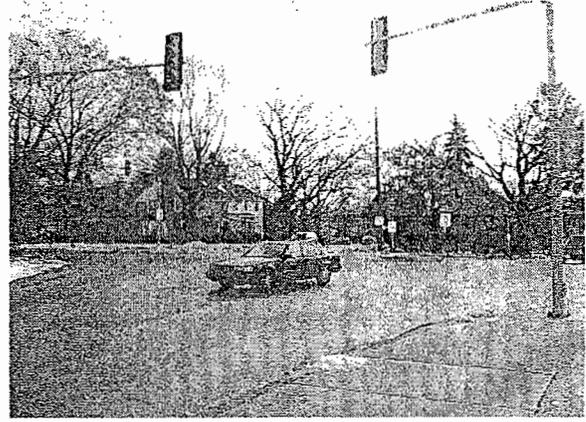
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Front/Ashbourne/Ashmead/Arbor/Jenkintown - Jenkintown Road Approach



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Front/Ashbourne/Ashmead/Arbor/Jenkintown - Ashbourne Rd Approach



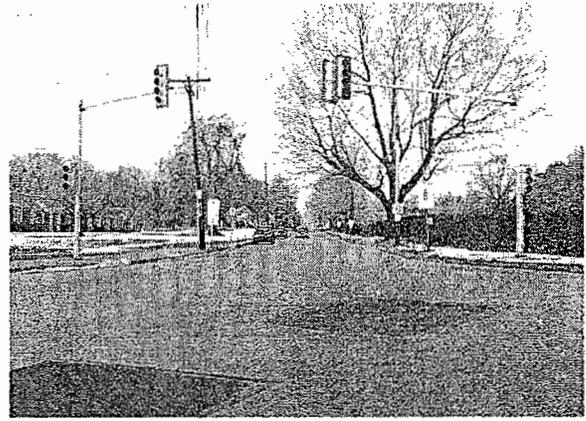
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From Ashbourne looking towards Arbor Road



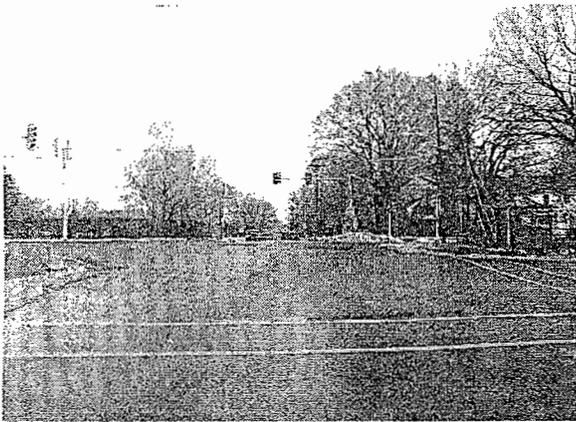
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From Ashbourne looking towards Arbor Road



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Front/Ashbourne/Ashmead/Arbor/Jenkintown - Jenkintown Rd Departure



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Front/Ashbourne/Ashmead/Arbor/Jenkintown - Arbor Rd Departure



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Front/Ashbourne/Ashmead/Arbor/Jenkintown - Front Rd Departure



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Front/Ashbourne/Ashmead/Arbor/Jenkintown - Ashmead Rd Departure



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Ashbourne Rd & Jenkintown Rd - Ashbourne Road Westbound Approach



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Ashbourne Rd & Jenkintown Rd - Ashbourne Road Westbound Departure



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Ashbourne Rd & Jenkintown Rd - Ashbourne Road Eastbound Approach



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Ashbourne Rd & Jenkintown Rd - Ashbourne Road Eastbound Departure



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Ashbourne Rd & Jenkintown Rd - Jenkintown Rd Approach (Back)



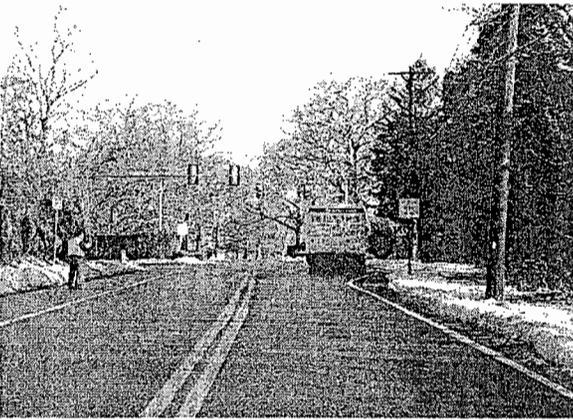
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Ashbourne Rd & Jenkintown Rd - Jenkintown Rd Approach



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Looking east on Ashbourne Rd From Jenkintown Rd



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Looking west on Ashbourne from Jenkintown Rd



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Ashbourne Rd & Oak Lane Rd/C.C. - Oak Lane Rd Approach



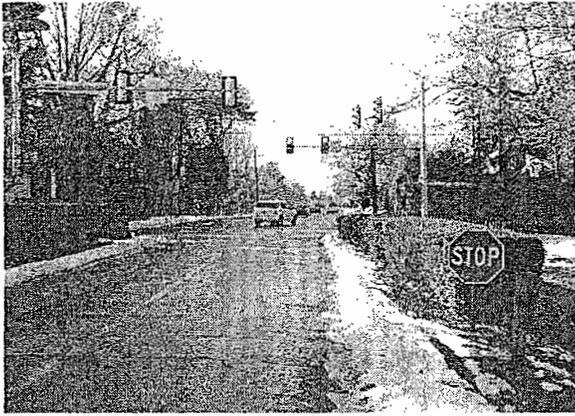
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Ashbourne Rd & Oak Lane Rd/C.C. - Oak Lane Rd Approach



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Ashbourne Rd & Oak Lane Rd/C.C. - Oak Lane Rd Departure



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Ashbourne Rd & Oak Lane Rd/C.C. - Ashbourne Rd Eastbound Approach



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 Ashbourne Rd & Oak Lane Rd/C.C. - Ashbourne C.C. Approach



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 Ashbourne Rd & Oak Lane Rd/C.C. - Ashbourne C.C. Departure



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 Ashbourne Rd & Oak Lane Rd/C.C. - Ashbourne Rd Westbound Approach



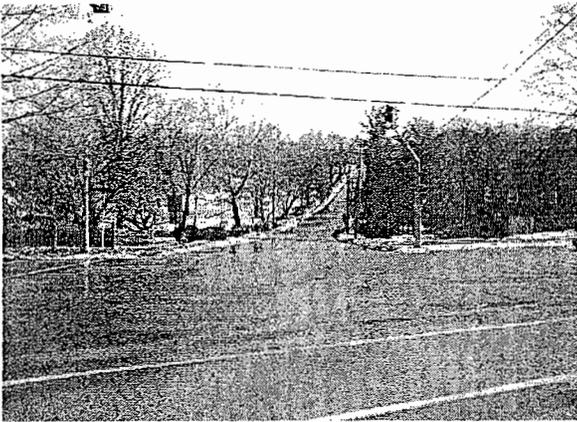
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 Ashbourne Rd & Oak Lane Rd/C.C. - Ashbourne Rd Westbound Departure



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 Ashbourne Rd & Oak Lane Rd/C.C. - Ashbourne Rd Eastbound Departure



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 New Second St & Ashbourne Rd - Ashbourne Road Eastbound Approach



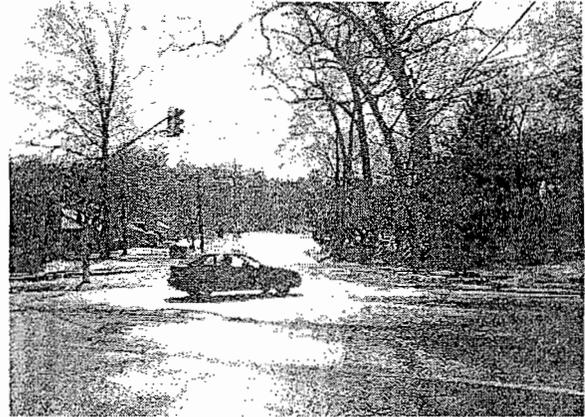
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New Second St & Ashbourne Rd - Ashbourne Rd Eastbound Departure



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New Second St & Ashbourne Rd - New Second Street Southbound Approach



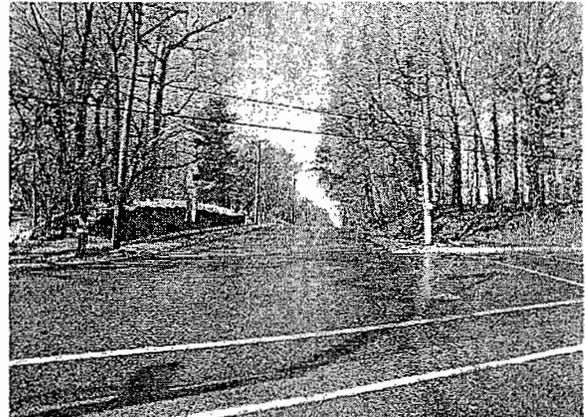
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New Second St & Ashbourne Rd - New Second Street Southbound Approach



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New Second St & Ashbourne Rd - New Second St Southbound Departure



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New Second St & Ashbourne Rd - Ashbourne Rd Westbound Approach



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New Second St & Ashbourne Rd - Ashbourne Rd Westbound Departure



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New Second St & Ashbourne Rd - New Second St Northbound Approach



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New Second St & Ashbourne Rd - New Second St Northbound Departure



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New Second St & Tookany Creek Pkwy - Tookany Creek Approach



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New Second St & Tookany Creek Pkwy - New Second St Southbound Approach



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New Second St & Tookany Creek Pkwy - New Second St Southbound Departure



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New Second St & Tookany Creek Pkwy - New Second St Northbound Approach



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New Second St & Tookany Creek Pkwy - New Second St Northbound Departure



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New Second St & Tookany Creek Pkwy - Tookany Creek Approach (Back)