Retn to Vill. Admin

ROCKVILLE CENTRE TRAFFIC STUDY

SOUTHWEST SECTION

MAY, 1985

prepared by

STORCH ASSOCIATES

RECEIVED
ROCKVILLE CENTRE POLICE
COMMISSIONER'S OFFICE

JUL 14 1986

OFFICE OF THE MAYOR

VILLAGE OF ROCKVILLE CENTRE, NY 11571

DONALD F. BROWNE
MAYOR

(516) 766-0300

July 10, 1986.

Chief Thomas A. Glynn
Rockville Centre Fire Dept.
58 N. Centre Avenue
Rockville Centre, N.Y. 11570

Dear Tom:

Your letter on traffic problems has been received and the following has occurred or soon will be addressed. The Village Board has a meeting today with the Nassau County Planning Commission to discuss a traffic flow study to be made for the entire village. Warren Brenner and Commissioner Alfred Shull also will be present to list some of the traffic problems that we have throughout the village. Your problem concerning traffic on South Centre Avenue will be proposed to the Commission for study.

The problem of parking on the west side of Forest Avenue north of Maple has been addressed and implemented. And, No Standing or No Parking signs have been installed as of Thursday, July 3rd from Maple Avenue north. I will ask the Planning Commission to address the South Centre Avenue problem and give it their priority to suggest relief. As this study proceeds I will keep you informed.

Today I also discussed with Warren Brenner the pre-emptors at the corner of Maple and Forest and Maple and Morris. The Village has just received the wiring diagrams after the replacement of these signals by Boiden Electric. Warren has indicated to me that he will proceed now that we have the proper diagrams before us and implement the pre-emptor operation that we had in the past at these two corners.

Sincerely,

Donald F. Browne

Donald F. Browne
Mayor

DFB/bd
cc: Board of Trustees
Warren Brenner
Commissioner Shull
Fire Council

COPY

THOMAS D. KANE
1st Ass't. Chief

THOMAS A. GLYNN
Chief of Department

JOHN J. MURRAY, JR.
2nd Ass't. Chief

ROCKVILLE CENTRE FIRE DEPARTMENT

58 NORTH CENTRE AVENUE
ROCKVILLE CENTRE, N. Y. 11570

JOHN J. MURRAY, SR.
Secretary

JOSEPH D. FLYNN
Treasurer

RECEIVED
THE VILLAGE
OF
ROCKVILLE CENTRE
JUL 10 3 01 PM '86
MAYOR'S OFFICE

June 30,1986

Honorable Donald F.Browne
Mayor of Rockville Centre
Board of Trustees
Municipal Building
Rockville Centre, N.Y. 11571-1105

letter has been given to be sent
cc S. Schell
+ Brenner

Dear Mayor Browne;

On two previous occasions the Fire Council has sent communications to you concerning the One-way street traffic on South Centre Ave.; the pre-emptors at Maple & Morris Aves and Maple & Forest Aves and the possibility of no parking in certain areas at the intersections of Forest and Maple Avenues.

The only answer that the Council has receives so far is that the matters were going to be looked into by Mr. Brenner of the Department of Public Works. We have received no further communications on these matters.

Now that the Pearl Street bridge in Oceanside is completely rebuilt and the flow of traffic from Oceanside is using it daily to detour from the streets in Rockville Centre, maybe the Village of Rockville Centre will give some consideration to opening up So. Centre Ave. to two way traffic which would be a big asset to the Rockville Centre Fire Department.

The Fire Council sincerely hopes that the Village Board will open up this matter and give it their immediate attention and some consideration to the Fire Department.

Very truly yours,

Thomas A. Glynn

Thomas A.Glynn
Chief of Department

cc Board
cc V. Albanese
cc A Schell
W Brenner

COPY

cc: A. L. Shell

STORCH ASSOCIATES
ENGINEERS • ARCHITECTS • PLANNERS
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ENVIRONMENTAL CONSULTANTS

HERBERT STORCH
GEORGE KIRGIS
JOSEPH F. LIBUDA
ROBERT M. ESCHBACHER
JOSEPH F. MERLUZZO
MICHAEL D. D'ALTILIO
WILLIAM L. DEANE
DONALD J. VIGNEAU

900 ELLISON AVENUE
WESTBURY, NEW YORK 11590
(516) 832-8222

May 22, 1985

Hon. Donald F. Brown
Village of Rockville Centre
Village Hall
Rockville Centre, NY 11571

Re: Rockville Centre Traffic Study
Southwest Section

Dear Mayor Brown:

Storch Associates is pleased to submit herewith ten copies of the Final Report for the above referenced project. We trust the information contained herein will be useful to the Village in its effort to provide a safe and efficient roadway system.

On behalf of our project manager, Mr. A. Peter Russillo, and others on our staff, we want to express our appreciation to you and the Village Board, as well as to Mr. Warren Brenner, for the cooperation received during the course of this study. It has been a pleasure to be of assistance to the Village and we look forward to being of further service in the future.

Very truly yours,

STORCH ASSOCIATES

Robert M. Eschbacher

Robert M. Eschbacher, P.E.

RME/APR/cob/LI
8120
Enclosure
cc: Peter F. Brady, Trustee
Eugene A. Yourch, Trustee
Eugene A. Murray, Trustee
Matthew Kakis, Trustee
Warren Brenner, Supt. Department of Public Works

ROCKVILLE CENTRE TRAFFIC STUDY

SOUTHWEST SECTION

MAY, 1985

prepared by

STORCH ASSOCIATES

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INTRODUCTION

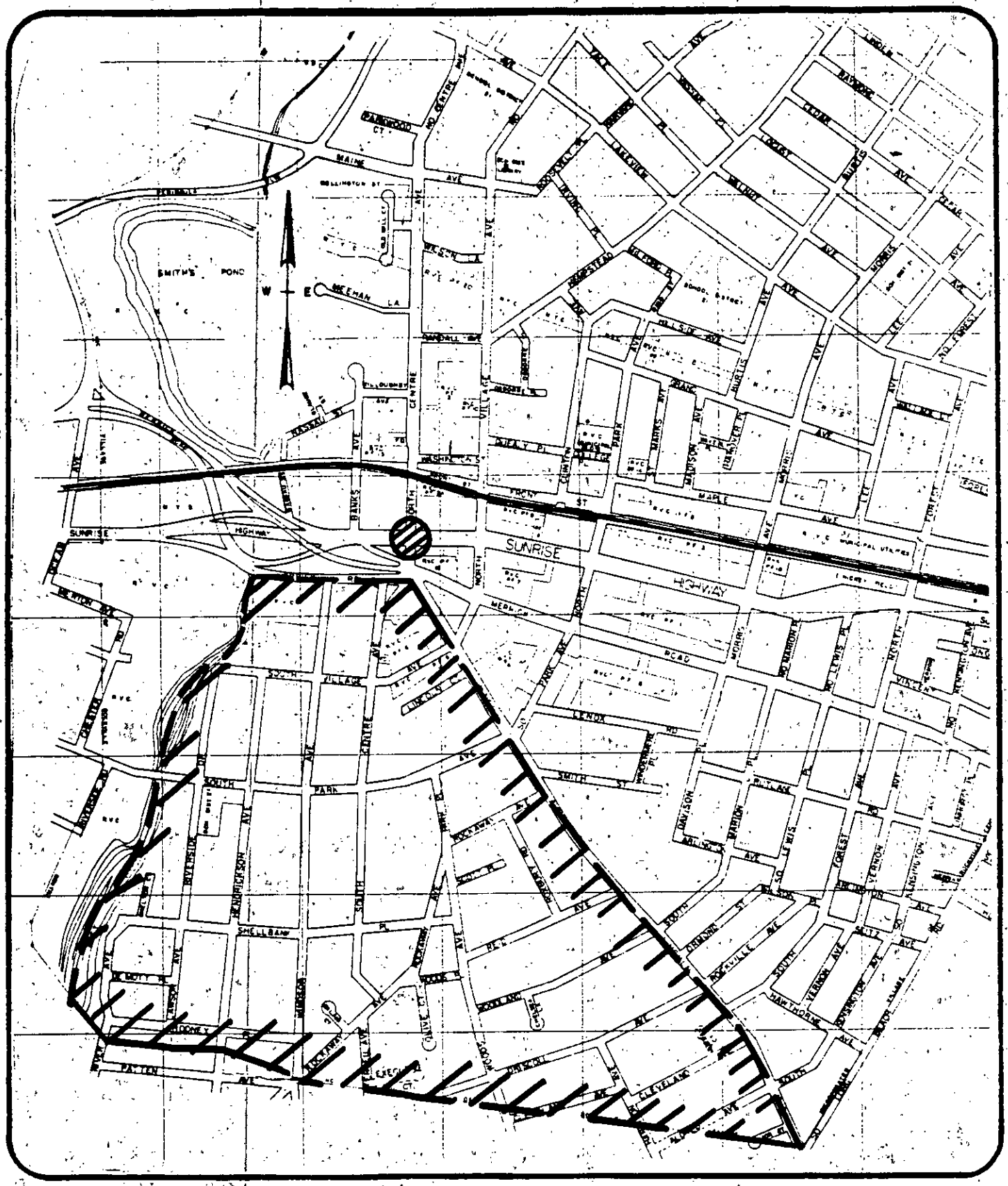
The purpose of this study has been to examine the extent of an apparent continued increase in the use of local roadways in the southwest section of the Village by commuter traffic. This investigation has been prompted by the concern expressed by area residents about the safety, welfare and general reduction in quality of life within that area due to traffic.

This study has included numerous field surveys, including the recording of traffic volumes over a twelve hour period at various locations, and the collection of afternoon peak hour turning movement volumes at key intersections. Additionally, an investigation as to the need for signal installation at two intersection locations was made, as was a review of traffic accident data. Intersection capacity analyses was performed and spot speed data collection and examination was made.

Recommendations are based upon results of our investigations in combination with concerns expressed by representatives of the Village.

Study Area

The study area is bounded in the north by Merrick Road, on the east by Lincoln Avenue, on the south by the Rockville Centre/Oceanside Village line, and on the west by Mill River. Also included is the intersection of Sunrise Highway with North Centre Avenue, to the north. (See Figure 1).



STUDY AREA

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ENVIRONMENTAL CONSULTANTS

ROCKVILLE CENTRE TRAFFIC STUDY	
SOUTHWEST SECTION	FIGURE 1

The roadway system within the study area consists primarily of two lane local roadways adjacent to which the development is predominantly single family residents. Commercial development does exist in the north-eastern portion of the study area in the vicinity of the intersection of Lincoln Avenue with Merrick Road and, to some extent, along the eastern and western rights-of-way of Lincoln Avenue.

Some multi-family residential units are also located within the study area, in the vicinity of Park Place.

EXISTING TRAFFIC VOLUME CONDITIONS

To determine the traffic activity within the study area, Storch Associates undertook a variety of traffic volume surveys. These surveys would help identify not only volume levels, roadway utilization and directional volume distributions, but also peak hours of traffic activity. Surveys included recording of twelve hour traffic volumes, evening peak hour turning movement volumes at nine locations and the collection of eight hour turning movement volumes at two locations for a signal warrant analysis. Supplemental traffic data information was furnished by the Nassau County Department of Public Works Division of Traffic Engineering.

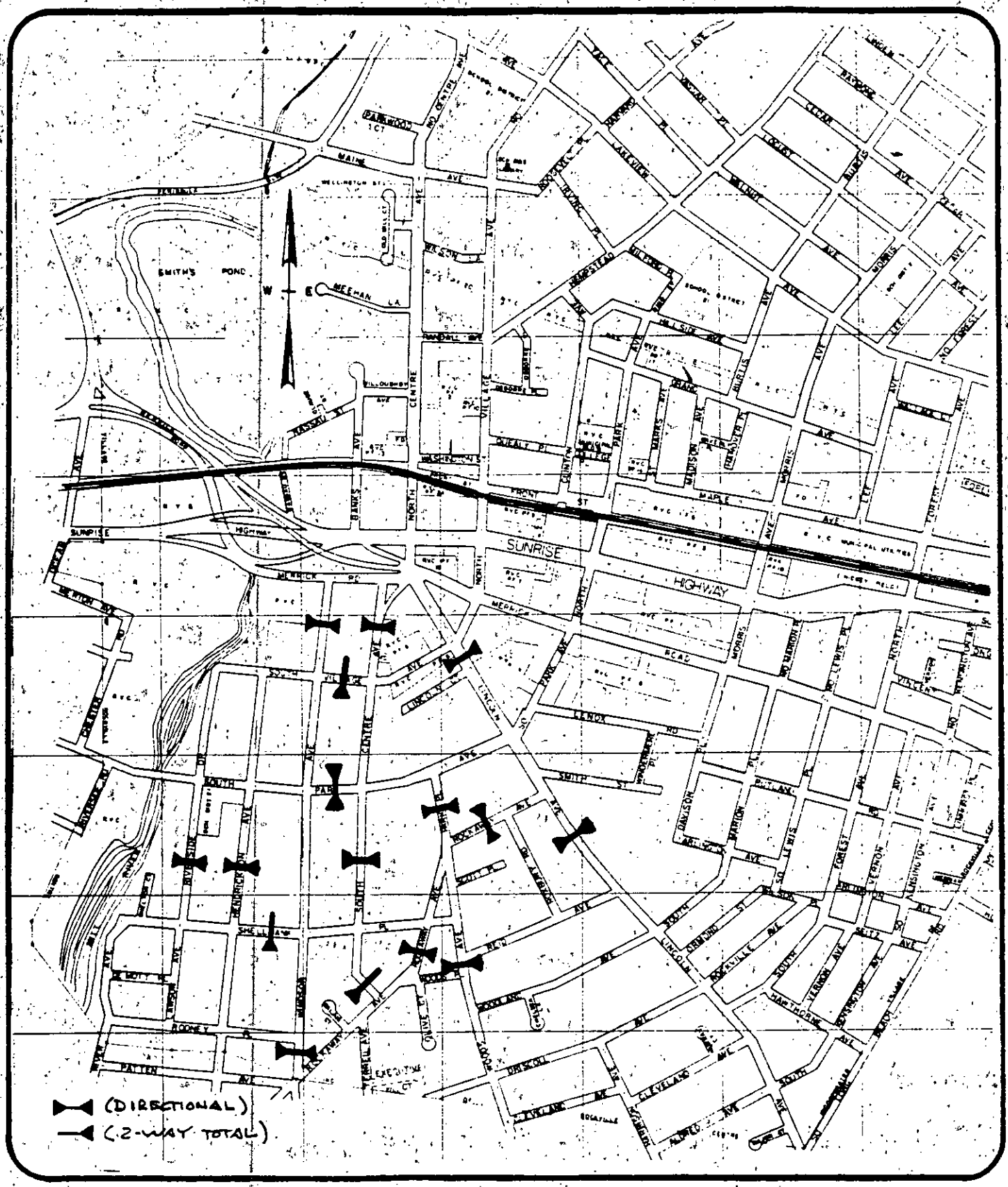
Average Daily Traffic

Automatic traffic counters were set up midblock at the locations shown in Figure 2. These sites were selected after review of vehicular travel patterns to facilitate quantification of through, entering and departing area traffic.

Twelve-hour traffic volume data were obtained during a weekday period in late November and early December, 1984 and are shown in Figure 3. Except where indicated, all volumes are unidirectional. No counts were performed during Thanksgiving week.

Traffic volumes were recorded from 7:00 a.m. to 7:00 p.m. at each location. The results of the survey are shown on Tables 1 thru 8 and graphically on Figures 4 thru 19. Review of these tables and graphs indicates that the morning peak hour generally occurs between 8:00 a.m. and 9:00 a.m., while the evening peak hour occurs between 5:00 p.m. and 6:00 p.m. Volumes decline sharply after each of the peak hours, with evening peak hour volumes generally higher than the morning, a typical pattern.

As expected, a majority of the drivers during the morning peak hour are traveling in a northbound direction while during the afternoon peak hour, the reverse is true, with the majority of the traffic destined to points south. There is evidence of the expected utilization of the local streets, particularly Windsor



AUTOMATIC TRAFFIC RECORDER COUNT LOCATIONS

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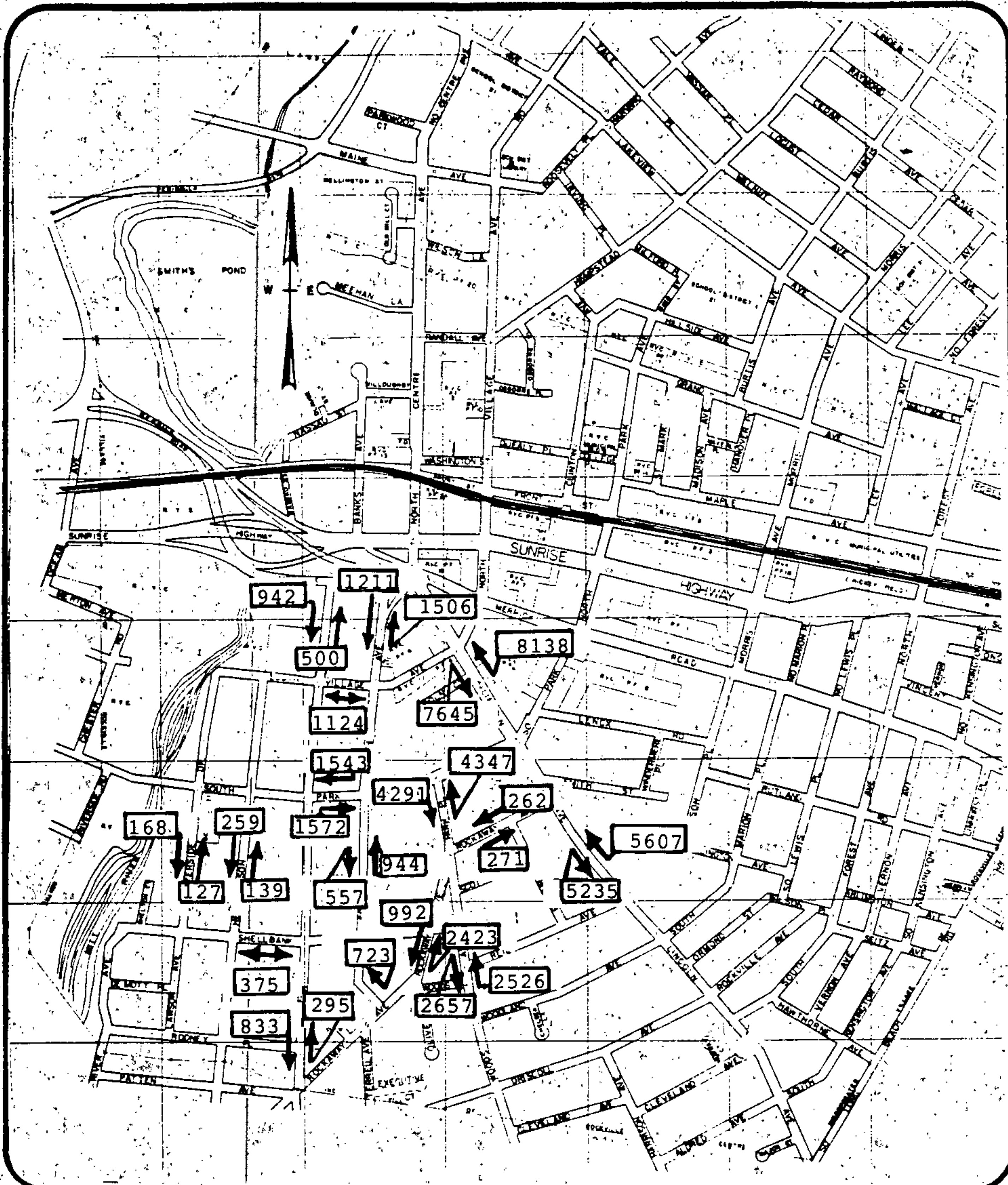
ENVIRONMENTAL CONSULTANTS

ROCKVILLE CENTRE TRAFFIC STUDY	
SOUTHWEST SECTION	FIGURE 2



12-HOUR TRAFFIC VOLUMES

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ENVIRONMENTAL CONSULTANTS

ROCKVILLE CENTRE TRAFFIC STUDY	
SOUTHWEST SECTION	FIGURE 3

Avenue southbound, during the afternoon peak hour and South Center Avenue northbound during the morning peak hour. A review of Tables 5 and 6 as well as Figures 12 and 13 indicates that the majority of the traffic, approximately 65 to 75 percent, recorded during the twelve hour survey period, was travelling in a southbound direction. A peak of approximately 108 vehicles headed southbound on Windsor Avenue between 5:00 and 6:00 p.m. Examination of Figure 12 shows that approximately 180 vehicles were recorded headed southbound between 5:00 and 6:00 p.m. between Merrick Road and South Village Avenue. Further to the south, at a count station located between Rodney Place and Rockaway Avenue, approximately 160 vehicles were recorded as heading southbound during the hours of 5:00 to 6:00 PM. Hence, all but approximately 15 vehicles appear to use Windsor Avenue as a through route between Merrick Road and Rockaway Avenue during this period. This essentially confirms suspicions of the residents within that area.

If we examine the northbound travel on Windsor Avenue during the morning and afternoon periods we note that overall the volumes headed northbound during the twelve-hour period are significantly below those destined in the southbound direction.

Of all the north/south roadways examined, Windsor Avenue showed the most significant inbalance in travel patterns. Generally, for the other area north/south roadways, the travel patterns shown graphically and listed in tabular form are representative

of what would typically be expected. A review of Table 1 indicates that on Lincoln Avenue, south of South Village Avenue, the traffic volumes illustrate a typical reversal from morning peak to afternoon peak hour. During the morning peak period a majority of the traffic is headed in the northbound direction, while the afternoon it is headed in the southbound direction. On an overall 12-hour basis, the directional distribution equals approximately 50/50.

A similar pattern was exhibited on Lincoln Avenue at a location south of Rockaway Avenue. Volumes at this location were recorded as approximately 5,000 vehicles less (on a twelve-hour basis) than those recorded on Lincoln Avenue just south of South Village Avenue. This of course shows the effect that South Park Avenue has on travel on Lincoln Avenue to the south. A second north/south roadway in the study area (from east to west) is Park Place. This short section of roadway, between South Park Avenue and Rockaway Avenue, also shows a typical traffic volume distribution pattern for morning and afternoon peak hours. A majority of the traffic is destined to the north during the morning peak period while during the afternoon period the reverse is true, with the majority directed to the south. On a daily basis the traffic is again split approximately 50/50. (See Table 2, Figure 6).

Woods Avenue, essentially an extension of Park Place, south of Shellbank Place, also has a typical distribution with a majority of the traffic headed northbound during the morning peak period

and southbound during the afternoon. The distribution of the northbound/southbound traffic over the twelve hour period was again recorded as approximately 50/50. (See Table 2, Figure 7).

Rockaway Avenue, between Woods Avenue and Shellbank Place, was another exception to the rule. Review of this data, contained on Table 3 and on Figure 8, has shown that over the twelve-hour period 71 percent of the traffic was headed northbound and 29 percent southbound. Therefore, a significant number of the traveling public utilizing Rockaway Avenue for their trip to work choose a secondary route for the return trip. Keeping in mind the condition observed on Windsor Avenue, it is likely that Windsor Avenue is used for this return southbound trip.

The South Centre Avenue distribution pattern varies from count location. For example, South Centre Avenue between Merrick Road and South Village Avenue exhibits a typical distribution pattern with the majority of the traffic heading northbound during the morning peak period and the reverse, southbound during the afternoon peak. However, when examining the information for South Centre Avenue for the location between South Park Avenue and Shellbank Place (Table 4, Figure 10) a large portion of the traffic utilizes South Centre Avenue for the northbound travel but does not use South Centre Avenue for the southbound route in the afternoon. Of course, signing of South Centre Avenue between Shellbank Place and Rockaway Avenue as one-way northbound has

shown its effect in this case. Again, a large portion of southbound traffic has probably distributed itself to the Windsor Avenue route, between Merrick Road and Rockaway Avenue.

The other north/south roadways, namely Hendrickson Avenue and Riverside Drive, had traffic volumes recorded at only one location, i.e., between Shellbank Place and South Park Avenue. Both of these facilities showed a rather erratic travel pattern distribution. Hendrickson Avenue for example, showed a significant volume headed southbound during the 3:00 to 4:00 PM period (probably due to the effect of the school located to the north) while the northbound travel was essentially even throughout the day. Riverside Drive showed an even more erratic travel distribution, with afternoon volumes generally higher then the morning period volumes. Caution should be used, however when reviewing the Hendrickson and Riverside Drive tables and figures, since the volumes recorded on those two roadways were significantly lower, yielding a lower statistical base, then those recorded on the other roadways in this southwest section.

The major east/west cross routes had travel patterns which exhibited essentially three peak periods of travel. For example, on South Village Avenue between Windsor Avenue and South Centre Avenue, the two-way volume reaches its highest between 8:00 and 9:00 a.m., when 173 vehicles were recorded. A drop in traffic was experienced between 9:00 a.m. and noon and a second peak

occurred from 1:00 to 2:00 p.m. This was followed by a drop between 2:00 and 5:00 PM. A third peak occurred between 5:00 and 6:00 p.m. (see Figure 16).

Shellbank Place, whose volumes were recorded bidirectionally as well, showed a similar three peak pattern, with the morning peak occurring between 8:00 and 9:00 AM, the midday peak between 1:00 and 2:00 PM and the afternoon peak between 4:00 and 5:00 PM.

Rockaway Avenue, between Roxsbury Road and Park Place, had an erratic travel pattern, with a directional distribution equal to approximately 50/50 for the twelve-hour period. Again, in this case, the low traffic volumes utilizing Rockaway Avenue tend to accentuate the distributional pattern.

South Park Avenue, which is significantly a more heavily used east/west roadway, had traffic volumes recorded between South Centre Avenue and Windsor Avenue generally exhibiting a 50/50 split over the twelve hour period including the peak hours. However, traffic throughout the day tended to increase from 7:00 AM to 7:00 PM, with highest volumes occurring between 5:00 and 6:00 PM. This data is shown on Table 8 and in Figure 17.

Generally, drivers tend to utilize the same roadways in the evening as they did in the morning, however, as stated, exceptions to this case are evident, i.e., use of Windsor Avenue

southbound predominantly during the afternoon peak hour, the use of Rockaway Avenue primarily for northbound traffic throughout the day and, the use of South Centre Avenue (south of S. Park Avenue) for northbound travel during the morning peak period.

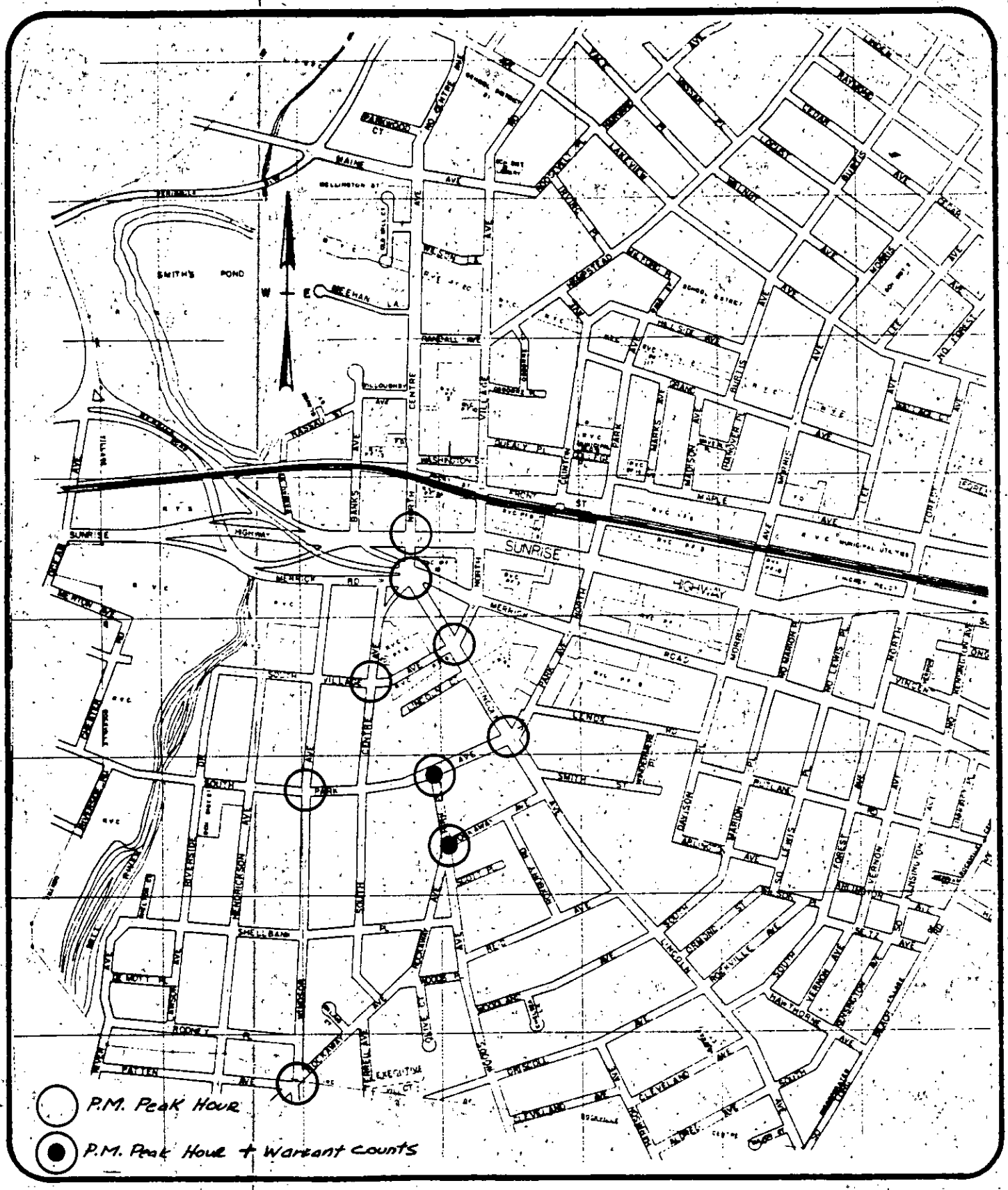
Afternoon Peak Hour Volumes

To corroborate ATR evening peak hour data and analyze traffic flows within the study area, manual turning movement counts were performed at nine intersections. The counts were recorded concurrently with the ATR counts. The locations surveyed are shown on Figure 20 and on Figure 20A (at end of report) are recorded the afternoon volumes rounded to the nearest five vehicles.

Data was collected in the study area at the following intersections:

1. Lincoln Avenue with Merrick Road
2. Lincoln Avenue with South Village Avenue
3. Lincoln Avenue with South Park Avenue
4. South Village Avenue and South Centre Avenue
5. South Park Avenue and Windsor Avenue
6. Windsor Avenue and Rockaway Avenue
7. Park Avenue and Park Place
8. Rockaway Avenue and Park Place/Woods Avenue
9. Sunrise Highway with North Centre Avenue

Data review revealed that the afternoon peak highway hour generally occurred between 5:00 and 6:00 PM. This generally concurred with that information collected during the ATR survey which, as stated above, was being conducted at the same time.



MANUAL TRAFFIC COUNT LOCATIONS

STORCH ASSOCIATES
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ENVIRONMENTAL CONSULTANTS

ROCKVILLE CENTRE TRAFFIC STUDY	
SOUTHWEST SECTION	FIGURE 20

SIGNAL WARRANT ANALYSIS

In accordance with the Village of Rockville Centre's request to examine the justification for traffic signal control at the intersections of Park Place with South Park Avenue and Park Place with Rockaway Avenue (see Figure 20), Storch Associates performed signal warrant analyses.

Warrant analysis consists of comparing existing hourly traffic volumes, accident data and other traffic information with established signal warrant criteria. A warrant is satisfied if its criterion is met. The warrants are guides to be used in conjunction with professional judgement and with consideration to related geometric and traffic control factors. There are presently eleven warrants under which traffic signal installation maybe deemed appropriate, namely:

Warrant 1 - Minimum vehicular volume
Warrant 2 - Interruption of continuous traffic
Warrant 3 - Minimum pedestrian volume
Warrant 4 - School crossing
Warrant 5 - Progressive movement
Warrant 6 - Accident experience
Warrant 7 - Systems
Warrant 8 - Combination of warrants
Warrant 9 - Peak Four-Hour Volumes
Warrant 10 - Peak Hour delay
Warrant 11 - Peak Hour volumes

A complete definition of each of these can be found in the appendix of this study.

Those warrants deemed appropriate and most likely to be fulfilled in Rockville Centre's case are Warrant 1, Warrant 2, Warrant 8, Warrants 9, 10 and 11. Shown on Table 9 and 10 are the warrant analyses for the two above mentioned intersections for warrants 1, 2, 8, 9 and 11, and the results of analysis for 1, 2, 8, 9 and 11. Shown on Table 11 and 12 are the analyses for the peak hour delay warrants (Warrant 10). Analysis (use of graphics in appendix) has shown that the intersection of Park Place with South Park Avenue does meet Warrant 11 and therefore, consideration of installing a traffic signal at that location should more closely evaluated by the appropriate governmental agency.

STORCH ENGINEERS

Table 9

TRAFFIC SIGNAL WARRANTS

Major Street WOODS AVE & PARK R. Minor Street ROCKAWAY AVE.

Enter the field count volumes below, and check if they exceed the warranted volumes from Sheet 1.

	TIME		VEHICULAR TRAFFIC COUNTS					PEDESTRIAN COUNTS Crosswalk Across Major Street		Warrant No. Satisfied (Check)				
			Major Street Approach			Minor Street Approach								
	From	To	WOODS	PARK	Total	ROCKAWAY	ROCKAWAY (E-W)			1	2	3	6	8
A.M.														
	7:00	8:00	157	131	288	164	11							
	8:00	9:00	262	208	470	257	7							
	9:00	10:00	201	163	364	178	3							
	11:00	12:00	143	239	382	125	12							
P.M.	12:00	1:00	141	298	439	163	13							
	1:00	2:00	143	271	414	148	12							
	3:30	4:30	153	455	608	169	18			✓				✓
	4:30	5:30	153	685	838	244	17			✓				✓
	5:30	6:30	113	430	543	149	9							✓

Check if at least 8 hours meet the warrant ☐

Warrant Investigated by: WAYNE RENDELY Date: 1-15-85

Checked by: R.R. Date: 1-16-85 Check if other warrant is satisfied

Warrant		
4	5	7
9		11

TRAFFIC SIGNAL WARRANTED: YES ☐ NO ☐

STORCH ENGINEERS

Table 10

TRAFFIC SIGNAL WARRANTS

Major Street SOUTH PARK AVE Minor Street PARK PLACE

Enter the field count volumes below, and check if they exceed the warranted volumes from Sheet 1.

	TIME From	TIME To	VEHICULAR TRAFFIC COUNTS Major Street Approach E/B	W/B	Total	Minor Street Approach		PEDESTRIAN COUNTS Crosswalk Across Major Street		Warrant No. Satisfied (Check) 1	2	3	6	8
A.M.														
	7:00	8:00	86	167	253	312								
	8:00	9:00	145	235	380	506								
	9:00	10:00	133	181	314	363								
	11:00	12:00	109	271	380	256								
P.M.	12:00	1:00	143	330	473	282								
	1:00	2:00	111	289	400	281								
	3:30	4:30	166	447	613	319				✓				✓
	4:30	5:30	246	683	929	376				✓	✓			✓
	5:30	6:30	140	446	586	251								✓

Check if at least 8 hours meet the warrant ☐

Warrant Investigated by: WAYNE RENDELY Date: 1-15-85

Checked by: R.R Date: 1-16-85 Check if other warrant is satisfied

Warrant 4	5	7
9		11
		✓

TRAFFIC SIGNAL WARRANTED: YES ☐ NO ☐

STORCH ENGINEERS/STORCH ASSOCIATES
Engineers - Landscape Architects - Architects
Planners - Environmental Consultants

JOB
SHEET NO OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

Table 11

INTERSECTION DELAY STUDY

FIELD SHEET N.B.

Location ROCKAWAY & WOODS AVE Approach ROCKAWAY Movement ALL

Date 1-14-65 Weather SUNNY Study No. Observer WAYNE

Time (minute starting at)	Total Number of Vehicles Stopped in the Approach at Time:				Approach Volume	
	+ 0 sec.	+ 15 sec	+ 30 sec	+ 45 sec	Number Stopped	Number Not Stopping
4:00 P.M.	0	0	0	1	1	
4:01	0	0	0	0	1	
4:02	0	0	0	0	2	
4:03	1	0	0	0	3	
4:04	0	0	1	2	3	
4:05	0	0	0	0	1	
4:06	0	0	0	0	1	
4:07	0	0	0	1	1	
4:08	1	1	0	0	3	
4:09	2	0	0	3	5	
4:10	3	0	0	0	4	
4:11	1	0	1	2	4	
4:12	1	1	0	0	4	
4:13	0	0	0	0	2	
4:14	2	0	0	1	3	
4:15	0	1	1	0	6	
4:16-4:18	1	0	3	1	8	
Subtotal	12	3	6	11	52	0
Total	32				52	

Total Delay = Total Number Stopped × Sampling Interval

= 32 × 15 = 480 veh-sec

Average Delay per Stopped Vehicle = $\frac{\text{Total Delay}}{\text{Number of Stopped Vehicles}}$

= $\frac{480}{52}$ = 9.2 sec

Average Delay per Approach Vehicle = $\frac{\text{Total Delay}}{\text{Approach Volume}}$

= $\frac{480}{52}$ = 9.2 sec

Percent of Vehicles Stopped = $\frac{\text{Number of Stopped Vehicles}}{\text{Approach Volume}}$ = $\frac{52 \times 100}{52}$ = 100 percent

PEAK HOUR DELAY: $60 \frac{\text{MIN}}{\text{HR}} \times \frac{52 \text{ VEH}}{19 \text{ MIN}}$ = 164 VPH

164 VEH × 9.2 SECS × $\frac{1 \text{ HR}}{3600 \text{ SEC}}$ = 0.42 VHRS

STORCH ENGINEERS/STORCH ASSOCIATES
Engineers - Landscape Architects - Architects
Planners - Environmental Consultants

JOB
SHEET NO. OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

TABLE 12

INTERSECTION DELAY STUDY

FIELD SHEET

Location PARK PLACE & So. PARK AVE Approach PARK PLACE Movement R & LT

Date 1-14-85 Weather SUNNY Study No. Observer WAYNE

Time (minute starting at)	Total Number of Vehicles Stopped in the Approach at Time:				Approach Volume	
	+ 0 sec	+ 15 sec	+ 30 sec	+ 45 sec	Number Stopped	Number Not Stopping
4:25 P.M.	1	0	0	0	7	
4:26	1	0	1	2	4	
4:27	2	0	0	1	3	
4:28	4	4	2	1	11	
4:29	1	1	0	0	7	
4:30	0	2	2	0	11	
4:31	0	1	1	1	7	
4:32	0	0	0	3	3	
4:33	3	0	0	0	4	
4:34	0	1	2	0	6	
4:35	1	1	0	0	6	
4:36	1	0	0	0	3	
4:37	0	0	1	0	3	
4:38	0	0	0	0	3	
4:39	0	0	1	1	2	
4:40	3	3	5	1	12	
4:41	1	2	2	0	7	
Subtotal	18	15	17	10	99	0
Total	60				99	

Total Delay = Total Number Stopped × Sampling Interval

= 60 × 15 = 900 veh-sec

Average Delay per Stopped Vehicle = $\frac{\text{Total Delay}}{\text{Number of Stopped Vehicles}}$

= $\frac{900}{99}$ = 9.1 sec

Average Delay per Approach Vehicle = $\frac{\text{Total Delay}}{\text{Approach Volume}}$

= $\frac{900}{99}$ = 9.1 sec

Percent of Vehicles Stopped = $\frac{\text{Number of Stopped Vehicles}}{\text{Approach Volume}}$ = $\frac{99 \times 100}{99}$ = 100 percent

PEAK HOUR DELAY $\frac{60 \text{ MIN}}{\text{HR}} \times \frac{99 \text{ VEH}}{17 \text{ MIN}}$ = 349 VPH

349 VEH × 9.1 SECS × $\frac{1 \text{ HR}}{3600 \text{ SEC}}$ = 0.88 VHRS

INTERSECTION CAPACITY ANALYSIS

To determine the existing operating levels of the nine intersections for which the afternoon peak highway hour volumes were recorded, signalized and unsignalized intersection capacity analyses were performed.

Methodology

Capacity analysis is a means by which traffic volumes are compared to intersection capacities to provide a technical definition of existing or projected traffic conditions. The volumes utilized in these analyses are as shown on Figure 21. The methodology used is described in the 1965 "Highway Capacity Manual" published by the Highway Research Board and "Interim Materials on Highway Capacity" published by Transportation Research Board Circular 212 and Circular 281, dated January 1980 and June 1984, respectively.

The qualitative measure of an intersection's operating condition is given by its "Level of Service", with a service range from "A" to "F", with Levels of Service "A" representing best or free flow conditions and Level of Service "F" worst or highly congested conditions. Level of Service "C" is usually desirable in urban areas. Level of Service "E" represents the intersection's theorectical capacity. A more complete definition of each level is described in detail in Appendix A.

As described in the 1965 Highway Capacity Manual, a signalized intersection's capacity is influenced by:

1. One or two-way operation on the approach roadways
2. Parking conditions
3. Location within a metropolitan area
4. Approach pavement width
5. Percentage of trucks and buses in traffic stream
6. Number of local transit buses/hour and bus stop locations
7. Metropolitan size and peak hour factor
8. Percentage of right and left turns
9. Signal timing

Values of each of these parameters were obtained during field surveys.

Location

Those intersections for which signalized intersection capacity analysis were performed are:

1. Lincoln Avenue/Merrick Road
2. Lincoln Avenue/South Village Avenue
3. Lincoln Avenue/South Park Avenue
4. Sunrise Highway/North Centre Avenue

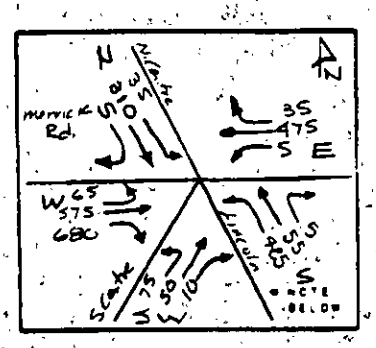
Lincoln Avenue - Merrick Road - this intersection which has a rather unique geometric configuration is presently controlled by a three-phase traffic signal. The eastbound Merrick Road approach contains one separate right turn lane for traffic destined to Lincoln Avenue southbound. One through lane and one through and left turn lane is provided for traffic destined to Merrick Road to the east as well as to North Centre Avenue. The Merrick Road westbound approach is comprised of one through and right turn lane, one through lane and one through and left turn lane. The Lincoln Avenue approach has a separate nine-foot wide right turn lane, one through lane, one through and left turn lane and a separate, ten-foot wide left turn lane. The left turn lane has a storage capacity for approximately five vehicles. The South Centre Avenue approach to the intersection is essentially a single, seventeen-foot wide lane allowing for all turning movements. The North Centre Avenue approach is twenty feet in width with one through and right turn lane and one through and left turn lane.

Capacity analysis at this location has indicated that the intersection is presently operating at Levels of Service "C" or better during the afternoon peak highway hour. This is primarily the result of the extensive approach pavement area provided at this location (see Table 13).

Lincoln Avenue - South Village Avenue - this intersection features two through lanes on each of the northbound and

Table 13

SIGNALIZED INTERSECTION CAPACITY ANALYSIS



PROJECT *Rockville Centre Traffic Study*

INTERSECTION *Merrick Rd / Lincoln Ave / S. Centre Ave*

BASIC CONDITIONS

METRO POPULATION *1,000,000+* PMF *.91*

AREA: RESID. (CBD) RURAL FRINGE DBD (Circle One)

C = SIGNAL CYCLE = *120* SEC. A/C = 12/120 = .10

PHASE 1	AMBER	PHASE 2	AMBER	PHASE 3	AMBER	PHASE	AMBER
G/C = .25 G = 30 SEC	4 SEC	G/C = .42 G = 50 SEC	4 SEC	G/C = .23 G = 28 SEC	4 SEC	G/C = G = SEC	SEC

APPROACH N T = 5 % R = 1 % L = 10 % BUS STOP

MOVEMENT	W_A FEET	CHART REFERENCE	G/C REQ'D	G/C USED	CAPACITY C_D	CAPACITY C_p	DHV*	REMARKS*
Right +								LOS "C+"
Thru +	20'	4		.28	500	600	350	
Left								

APPROACH S T = 5 % R = 0 % L = 0 % BUS STOP –

MOVEMENT	W_A FEET	CHART REFERENCE	G/C REQ'D	G/C USED	CAPACITY C_D	CAPACITY C_p	DHV*	REMARKS*
Right +	9'	18		Yield	–	–	5	LOS "C+"
Thru+Left +	24'	4		.25	670		255	
SLTL	10'	18		.25	225		225	

APPROACH E T = 5 % R = 7 % L = 1 % BUS STOP –

MOVEMENT	W_A FEET	CHART REFERENCE	G/C REQ'D	G/C USED	CAPACITY C_D	CAPACITY C_p	DHV*	REMARKS*
Right +								LOS "C+"
Thru +	32'	4		.42	1250	1515	515	
Left								

APPROACH W T = 5 % R = 0 % L = 10 % BUS STOP –

MOVEMENT	W_A FEET	CHART REFERENCE	G/C REQ'D	G/C USED	CAPACITY C_D	CAPACITY C_p	DHV*	REMARKS*
Right + (as Thru)	12'	4		.67	800	895	680	LOS "C+"
Thru + Left	25'	4		.42	980	1175	640	

APPROACH SW T = 5 % R = 7 % L = 30+ % BUS STOP –

MOVEMENT	W_A FEET	CHART REFERENCE	G/C REQ'D	G/C USED	CAPACITY C_D	CAPACITY C_p	DHV*	REMARKS*
Right +								LOS "C+"
Thru +	17'	4		.28	360	435	135	
Left								

* DESIGNATE EACH APPROACH BY LETTER: 1-W OR 2-W (1- OR 2-WAY); PRC. OR N.P. (NO PRC.); ENTER DHV'S
* NARA A.M., OR COMP. (COMPOSITE PEAK.)
* TURN LANE LENGTHS — D_2, D_3; TRUCKS — T_2, T_3; WIDENED APPROACH LENGTHS — D_a, D_b, ETC.

BY *[illegible]*

CHECKED *[illegible] 4/15/80*

operates @ LOS "C" or better

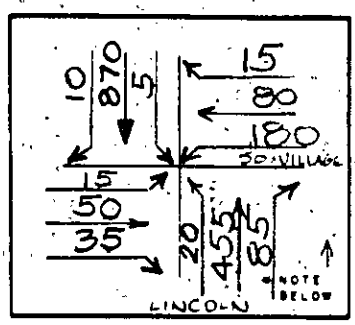
southbound Lincoln Avenue approaches. However, the northbound approach also has a provision for parking. The South Village Avenue eastbound and westbound approaches contain a single through, right and left turn lane. The intersection is presently controlled by a two-phase traffic signal which has a cycle length of approximately 70 seconds.

The intersection geometrics accommodate the relatively light volume of traffic during the afternoon peak hour. Accordingly, capacity analysis (shown on Table 14) has indicated that this intersection is estimated to operate at Level of Service "C" or better during this period.

Lincoln Avenue - South Park Avenue - located approximately 600 feet south of the Lincoln Avenue/South Village Avenue intersection, the southbound Lincoln Avenue approach contains an exclusive left turn lane, one through lane, one through and right turn lane, as well as provisions for parking. The northbound Lincoln Avenue approach consists of one through and right turn lane and one through lane and a separate left turn lane. The eastbound South Park Avenue approach contains one separate left turn lane and one through and right turn lane while the westbound approach has a separate left turn lane and a through and right turn lane as well. The intersection is presently controlled by a two-phase traffic signal which has a cycle length of approximately 80 seconds.

Table 14

SIGNALIZED INTERSECTION
CAPACITY ANALYSIS



PROJECT ROCKVILLE CENTRE

INTERSECTION LINCOLN AVE - SOUTH VILLAGE

BASIC CONDITIONS:
METRO POPULATION 71,000,000 PHF .91
AREA: RESID. CBD, RURAL FRINGE OBD (Circle One)

C = SIGNAL CYCLE = 70 SEC. A/C = 8/70 = .11

PHASE 1	AMBER	PHASE 2	AMBER	PHASE	AMBER	PHASE	AMBER
G/C = .66 G = 46 SEC	4 SEC	G/C = .23 G = 16 SEC.	4 SEC.	G/C = G = SEC.	SEC.	G/C = G = SEC.	SEC.

APPROACH S T = 5 % R = 15 % L = 4 % BUS STOP –

MOVEMENT	W_A FEET	CHART REFERENCE	G/C REQ'D	G/C USED	CAPACITY C_D	CAPACITY C_p	DHV'	REMARKS*
LT +								
THRU + RT	31.5	.6		.66	1640	1952	560	C +

APPROACH N T = 5 % R = 1 % L = 0 % BUS STOP –

MOVEMENT	W_A FEET	CHART REFERENCE	G/C REQ'D	G/C USED	CAPACITY C_D	CAPACITY C_p	DHV'	REMARKS*
LT +								
THRU + RT	23	4		.66	1775	2112	885	C +
					2031 FORM			

APPROACH E T = 5 % R = 6 % L = 30 % BUS STOP –

MOVEMENT	W_A FEET	CHART REFERENCE	G/C REQ'D	G/C USED	CAPACITY C_D	CAPACITY C_p	DHV'	REMARKS*
LT +								
THRU + RT	17	.6		.23	355	426	275	C +
					FORMULA			

APPROACH W T = 5 % R = 30 % L = 15 % BUS STOP

MOVEMENT	W_A FEET	CHART REFERENCE	G/C REQ'D	G/C USED	CAPACITY C_D	CAPACITY C_p	DHV'	REMARKS*
LT +								
THRU + RT	18	4		.23	360	432	100	C +
					FORMULA			

* DESIGNATE EACH APPROACH BY LETTER; 1-W OR 2-W (1- OR 2-WAY); PKG., N.P. (NO PKG.); ENTER DHV's
* MARK A.M., OR COMP. (COMPOSITE PEAK.)
* TURN LANE LENGTHS — D_2, D_3; TRUCKS — T_2, T_3; WIDENED APPROACH LENGTHS — D_a, D_b, ETC.

BY R.R.
CHECKED

operates @ LOS "C" or better

As evidenced by the volumes recorded at this location, the heavy right turns from Lincoln Avenue southbound to South Park Avenue westbound reduces the operating level of that particular approach to near capacity. Nevertheless, the existing geometrics and signal timing enable the overall intersection to operate at a Level of Service "C-" during the afternoon peak period. (See Table 15)

Sunrise Highway - North Centre Avenue - This intersection features two through and one through and right turn lane on each of the eastbound and westbound Sunrise Highway approaches with provision for parking. However, no left turns are permitted from either direction. The northbound and southbound North Centre Avenue approaches each consist of one through and right turn lane and one through and left turn lane. The intersection is controlled by a two-phase traffic signal which has a cycle length of approximately 120 seconds.

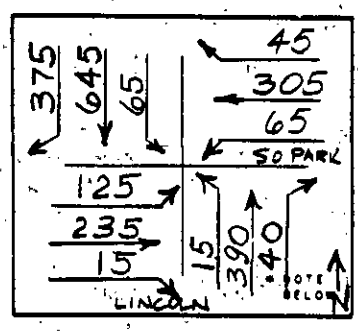
The heavy through volumes on Sunrise Highway minimize the amount of "green time" that can be allotted to the minor approaches (North Centre Avenue). Hence, frequent delays are experienced, particularily on the southbound approach which has the heavier volume of the two minor approaches. Capacity analysis, utilizing existing signal timing, has shown this to be the case. The eastbound approach is operating at Level of Service "C-D" and the southbound

Table 15

SIGNALIZED INTERSECTION CAPACITY ANALYSIS

PROJECT: ROCKVILLE CENTRE

INTERSECTION: LINCOLN AVE — SOUTH PARK



BASIC CONDITIONS:

METRO POPULATION >1,000,000 PHF .91

AREA: RESID. CBD RURAL (FRINGE) OBD (Circle One)

C = SIGNAL CYCLE = 80 SEC. A/C = 10/80 = .12

PHASE 1	AMBER	PHASE 2	AMBER	PHASE	AMBER	PHASE	AMBER
G/C = .44 G = 35 SEC.	5 SEC.	G/C = .44 G = 35 SEC.	5 SEC.	G/C = G = SEC.	SEC.	G/C = G = SEC.	SEC.

APPROACH S T = 5 % R = 9 % L = 0 % BUS STOP

MOVEMENT	W_A FEET	CHART REFERENCE	G/C REQ'D	G/C USED	CAPACITY C_D	CAPACITY C_p	DHV'	REMARKS*
LT	10'	17B		.44	72	94	15	"C"+
THRU+RT	31'	4		.44	1560	1888	430	

APPROACH N T = 5 % R = >30% L = 0 % BUS STOP

MOVEMENT	W_A FEET	CHART REFERENCE	G/C REQ'D	G/C USED	CAPACITY C_D	CAPACITY C_p	DHV'	REMARKS*
LT	10'	17A			120	156	65	"E"
THRU+RT	31'	6	.50	.44	900	1062	1020	

APPROACH E T = 5 % R = 13 % L = 0 % BUS STOP

MOVEMENT	W_A FEET	CHART REFERENCE	G/C REQ'D	G/C USED	CAPACITY C_D	CAPACITY C_p	DHV'	REMARKS*
LT	9'			.44	250	325	65	"C"+
THRU+RT	27'	4		.44	1350	1620	350	

APPROACH W T = 5 % R = 6 % L = 0 % BUS STOP

MOVEMENT	W_A FEET	CHART REFERENCE	G/C REQ'D	G/C USED	CAPACITY C_D	CAPACITY C_p	DHV'	REMARKS*
LT	12'	17A		.44	150	195	125	C+
THRU+RT	20'	4		.44	1050	1260	250	

* DESIGNATE EACH APPROACH BY LETTER; 1-W OR 2-W (1- OR 2-WAY); PKG., N.P. (NO PKG.); ENTER DHV'.
* MARK A.M., OR COMP. (COMPOSITE PEAK.)
♦ TURN LANE LENGTHS — D_2, D_3; TRUCKS — T_2, T_3; WIDENED APPROACH LENGTHS — D_a, D_b, ETC.

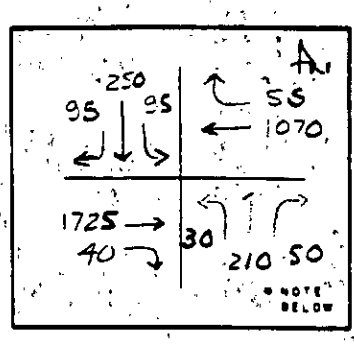
BY R.R

CHECKED

operates @ LOS "C" - some delays on southbound approach.

Table 16

SIGNALIZED INTERSECTION CAPACITY ANALYSIS



PROJECT Rockville Centre

INTERSECTION Sunrise Hwy - Centre Ave

BASIC CONDITIONS:

METRO POPULATION >1,000,000 PHF .90

AREA: RESID CBD RURAL FRINGE OBD (Circle One)

C = SIGNAL CYCLE = 120 SEC. A/C = / =

PHASE 1	AMBER	PHASE 2	AMBER	PHASE	AMBER	PHASE	AMBER
G/C = .67 G = 80 SEC.	5 SEC	G/C = .25 G = 30 SEC.	5 SEC.	G/C = G = SEC	SEC.	G/C = G = SEC	SEC.

APPROACH N T = 5 % R = 22 % L = 21 % BUS STOP —

MOVEMENT	W_A FEET	CHART REFERENCE	G/C REQ'D	G/C USED	CAPACITY C_D	CAPACITY C_D	DHV*	REMARKS*
Right +								C
Thru +	25' pkg	3		.25	450		440	
Left								L T ok w amber

APPROACH S T = 5 % R = 7 % L = 10 % BUS STOP —

MOVEMENT	W_A FEET	CHART REFERENCE	G/C REQ'D	G/C USED	CAPACITY C_D	CAPACITY C_D	DHV*	REMARKS*
Right +								C +
Thru +	26' pkg	3		.25	550		290	
Left								

APPROACH E T = 5 % R = 5 % L = 0 % BUS STOP —

MOVEMENT	W_A FEET	CHART REFERENCE	G/C REQ'D	G/C USED	CAPACITY C_D	CAPACITY C_D	DHV*	REMARKS*
Right +								C +
Thru	38' pkg	5		.67	1670		1125	

APPROACH W T = 5 % R = 2 % L = 0 % BUS STOP —

MOVEMENT	W_A FEET	CHART REFERENCE	G/C REQ'D	G/C USED	CAPACITY C_D	CAPACITY C_D C_D	DHV*	REMARKS*
Right +								C-D
Thru	38' pkg	5		.67	1680	1965	1765	

* DESIGNATE EACH APPROACH BY LETTER; 1-W OR 2-W (1- OR 2-WAY); PKG., N.P. (NO PKG.); ENTER DHV's
* MARK A.M., OR COMP. (COMPOSITE PEAK.)
* TURN LANE LENGTHS -- D_1, D_2; TRUCKS -- T_1, T_2; WIDENED APPROACH LENGTHS -- D_A, D_B, ETC.

BY AFL

CHECKED RR

Operate @ LOS C-D - delays on St approach
EB approach

STORCH ENGINEERS/STORCH ASSOCIATES
Engineers - Landscape Architects - Architects
Planners - Environmental Consultants

approach is close to the maximum service volume at Level of Service "C". Adjustment to signal timing may be necessary.

Unsignalized intersection capacity analyses were performed for the remaining five locations. The results of the capacity analysis for the unsignalized, stop-sign controlled, intersections are shown on Tables 17 through 21.

As shown on Table 17, it is estimated that the Park Avenue/Park Place intersection operates at a Level of Service "D+" with long delays experienced on the northbound left turn approach at this location. Table 18 represents the analysis for the Park Place/Woods Avenue/Rockaway Avenue intersection. Analysis has shown that this location will operate at a Level of Service "C" during the afternoon peak highway hour. Delays on the Rockaway Avenue northbound approach will be experienced, where a Level of Service "D" is anticipated during the peak period.

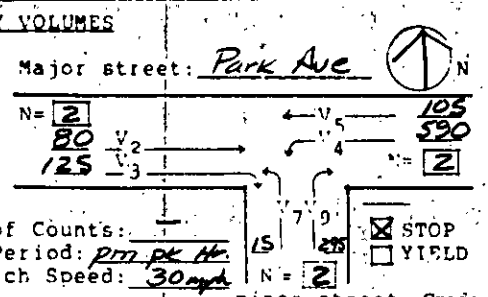
On Table 19 is represented the analysis for the South Park Avenue/Windsor Avenue intersection. As is indicated thereon, this intersection is estimated to operate at a Level of Service "C" overall, however, some delays in the southbound approach at this location may be experienced due to the relatively heavy southbound through movement. The Rockaway Avenue/Windsor Avenue intersection is estimated to operate at a Level of Service "A" with no delays experienced

Table 17

LOCATION: Park Ave / Park PL. **NAME:** Rockville Ctr. Traffic Study

HOURLY VOLUMES

Major street: Park Ave

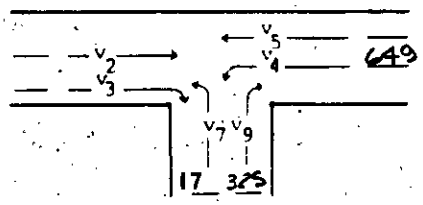


Date of Counts: —
Time Period: pm pk Hr.
Approach Speed: 30 mph
PHF: —

☒ STOP
☐ YIELD

minor street: Park PL Grade 0 %

VOLUMES IN PCPH



VOLUME ADJUSTMENTS

Movement no.	2	3	4	5	7	9
Volume (vph)	80	125	590	105	15	295
Vol. (pcph), see Table 10.1			649		17	325

STEP 1 : RT From Minor Street	V_9
Conflicting Flow, V_c	1/2 V_3+V_2 = 63 + 80 = 143 vph (V_{c9})
Critical Gap, T_c and Potential Capacity, c_p	T_c = 5.5 secs (Tab. 10.2) c_{p9} = 940 pcph (Fig. 10.3)
Actual Capacity, c_m	$c_{m9}=c_{p9}$ = 940 pcph
STEP 2 : LT From Major Street	V_4
Conflicting Flow, V_c	V_3+V_2 = 125 + 80 = 205 vph (V_{c4})
Critical Gap, T_c and Potential Capacity, c_p	T_c = 5.5 secs (Tab. 10.2) c_{p4} = 880 pcph (Fig. 10.3)
% of c_p utilized and Impedance Factor (Fig. 10.5)	(v_4/c_{p4})x100 = 74 P_4 = .30
Actual Capacity, c_m	$c_{m4}=c_{p4}$ = 880 pcph
STEP 3 : LT From Minor Street	V_7
Conflicting Flow, V_c	1/2 $V_3+V_2+V_5+V_4$ = 63 + 80 + 105 + 590 = 838 vph (V_{c7})
Critical Gap, T_c and Potential Capacity, c_p	T_c = 7.0 secs (Tab. 10.2) c_{p7} = 240 pcph (Fig. 10.3)
Actual Capacity, c_m	$c_{m7}=c_{p7}\times P_4$ = 240 x .30 = 72 pcph

SHARED-LANE CAPACITY

$$SH = \frac{v_7 + v_9}{(v_7/c_{m7}) + (v_9/c_{m9})}$$ if lane is shared

Movement no.	v (pcph)	c_m (pcph)	c_{SH} (pcph)	c_R	LOS
7	17	72	—	55	E
9	325	940	—	615	A
4	649	880	—	231	C

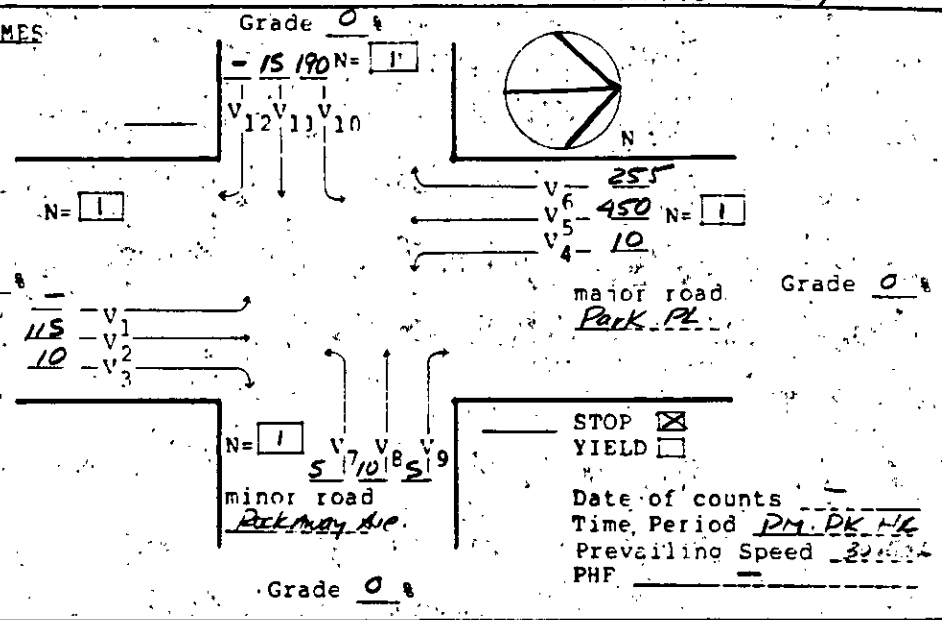
Worksheet for analysis of T-intersections.

operates @ LOS "D+" - Long delays on northbound left Turn

Table 18

LOCATION: Park Pl./Woods Av./Rockway NAME: Rockville CTR TRAFFIC STUDY

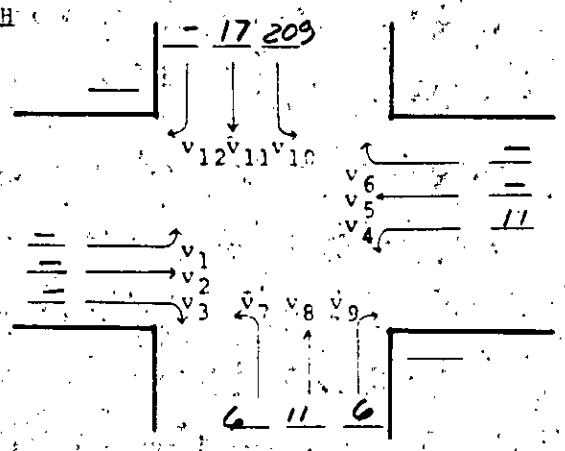
HOURLY VOLUMES



VOLUME ADJUSTMENTS

Movement no.	1	2	3	4	5	6	7	8	9	10	11	12
Volume (vph)	–	115	10	10	450	225	5	10	5	190	15	–
Vol. (pcph), see Table 10.1	–			11			6	11	6	209	17	–

VOLUMES IN PCPH



Worksheet for four-leg intersections

Table 18 cont'd.

STEP 1 : RT From Minor Street	V_9	V_{12}
Conflicting Flows, V_c	$1/2\ V_3+V_2=V_{c9}$ 5 + 115 = 117 vph	$1/2\ V_6+V_5=V_{c12}$ 113 + 450 = 563 vph
Critical Gap, T_c (Tab.10.2)	5.5 (secs.)	5.5 (secs.)
Potential Capacity, c_p (Fig.10.3)	c_{p9} = 975 pcph	c_{p12} = 600 pcph
% of c_p utilized	$(v_9/c_{p9})\times100$ = <1 %	$(v_{12}/c_{p12})\times100$ = — %
Impedance Factor, P (Fig.10.5)	P_9 = .99	P_{12} = 1.00
Actual Capacity, c_m	$c_{m9}=c_{p9}$ = 975 pcph	$c_{m12}=c_{p12}$ = 600 pcph
STEP 2 : LT From Major Street	V_4	V_1
Conflicting Flows, V_c	$V_3+V_2=V_{c4}$ 10 + 115 = 125 vph	$V_6+V_5=V_{c1}$ 225 + 450 = 675 vph
Critical Gap, T_c (Tab.10.2)	5.0 (secs.)	5.0 (secs.)
Potential Capacity, c_p (Fig.10.3)	c_{p4} = 1000 pcph	c_{p1} = 580 pcph
% of c_p utilized	$(v_4/c_{p4})\times100$ = <1 %	$(v_1/c_{p1})\times100$ = — %
Impedance Factor, P (Fig.10.5)	P_4 = .99	P_1 = 1.00
Actual Capacity, c_m	$c_{m4}=c_{p4}$ = 1000 pcph	$c_{m1}=c_{p1}$ = 580 pcph
STEP 3 : TH From Minor Street	V_8	V_{11}
Conflicting Flows, V_c	$1/2V_3+V_2+V_1+V_6+V_5+V_4=V_{c8}$ 5 + 115 + — + 225 + 450 + 11 = 806 vph	$1/2V_6+V_5+V_4+V_3+V_2+V_1=V_{c11}$ 113 + 450 + 11 + 10 + 115 + — = 699 vph
Critical Gap, T_c (Tab.10.2)	6.0 (secs.)	6.0 (secs.)
Potential Capacity, c_p (Fig.10.3)	c_{p8} = 370 pcph	c_{p11} = 425 pcph
% of c_p utilized	$(v_8/c_{p8})\times100$ = 3 %	$(v_{11}/c_{p11})\times100$ = 4 %
Impedance Factor, P (Fig.10.5)	P_8 = .97	P_{11} = .96
Actual Capacity, c_m	$c_{m8}=c_{p8}\times P_1\times P_4$ 366 = 370 x 1.00 x .99 (pcph)	$c_{m11}=c_{p11}\times P_1\times P_4$ 421 = 425 x 1.00 x .99 (pcph)
STEP 4 : LT From Minor Street	V_7	V_{10}
Conflicting Flows, V_c	V_{c8} (step3) $+V_{11}+V_{12}=V_{c7}$ 806 + 11 + — = 817 vph	V_{c11} (step3) $+V_7+V_8=V_{c10}$ 699 + 6 + 11 = 716 vph
Critical Gap, T_c (Tab.10.2)	6.5 (secs.)	6.5 (secs.)
Potential Capacity, c_p (Fig.10.3)	c_{p7} = 300 pcph	c_{p10} = 360 pcph
Actual Capacity, c_m	$c_{m7}=c_{p7}\times P_1\times P_4\times P_{11}\times P_{12}$ 285 = 300 x 1.0 x .99 x .96 x 1.0 (pcph)	$c_{m10}=c_{p10}\times P_4\times P_1\times P_8\times P_9$ 342 = 360 x .99 x 1.0 x .97 x .99 (pcph)

Worksheet for four-leg intersections (page 2).

Table 18 cont'd.

SHARED LANE CAPACITY

$$c_{SH} = \frac{v_i + v_j}{(v_i / c_{mi}) + (v_j / c_{mj})}$$ where 2 movements share a lane

$$c_{SH} = \frac{v_i + v_j + v_k}{(v_i / c_{mi}) + (v_j / c_{mj}) + (v_k / c_{mk})}$$ where 3 movements share a lane

APPROACH MOVEMENTS 7, 8, 9

Movement	v (pcph)	c_m (pcph)	c_{SH} (pcph)	$c_R = c_{SH} - v$	LOS
7	6	285			
8	11	366	402	379	B
9	6	975			

APPROACH MOVEMENTS 10, 11, 12

Movement	v (pcph)	c_m (pcph)	c_{SH} (pcph)	$c_R = c_{SH} - v$	LOS
10	209	342			
11	17	421	348	121	D
12	1*	600			

MAJOR STREET LEFT TURNS 1, 4

Movement	v (pcph)	c_m (pcph)	$c_R = c_m - v$	LOS
1	1*	580	579	A
4	11	1000	989	A

COMMENTS: operates @ LOS "C" - delays on Rockaway avenue N.B. approach —

Analysis assumes no stop on woods ave approach (worst case)

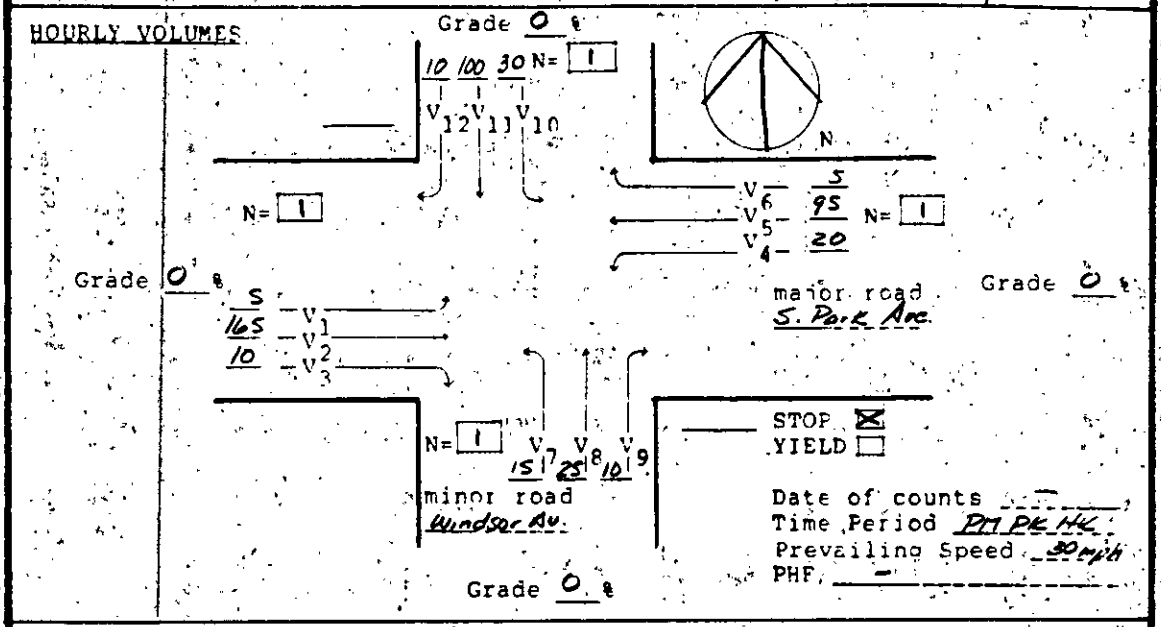
* I used for calculation purposes

Worksheet for four-leg intersections (page 3).

Table 19

LOCATION: South Park Av / Windsor Ave NAME: Rockville Center Traffic Study

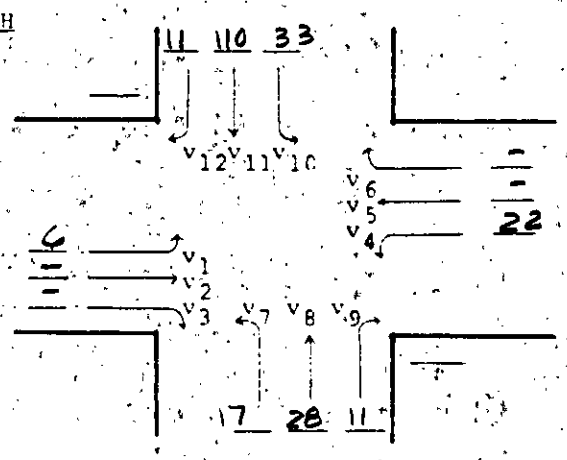
HOURLY VOLUMES



VOLUME ADJUSTMENTS

Movement no.	1	2	3	4	5	6	7	8	9	10	11	12
Volume (vph)	5	165	10	20	95	5	15	25	10	30	100	10
Vol. (pcph), see Table 10.1	6			22			17	28	11	33	110	11

VOLUMES IN PCPH



Worksheet for four-leg intersections

Table 19 cont'd.

STEP 1 : RT From Minor Street	V_9	V_{12}
Conflicting Flows, V_c	$1/2\ V_3+V_2=V_{c9}$ 5 + 165 = 170 vph	$1/2\ V_6+V_5=V_{c12}$ 3 + 95 = 98 vph
Critical Gap, T_c (Tab.10.2)	5.5 (secs.)	5.5 (secs.)
Potential Capacity, c_p (Fig.10.3)	c_{p9}= 920 pcph	c_{p12}= 1000 pcph
% of c_p utilized	(v_9/c_{p9})x100= 1 %	(v_{12}/c_{p12})x100= <1 %
Impedance Factor, P (Fig.10.5)	P_9= .99	P_{12}= .99
Actual Capacity, c_m	$c_{m9}=c_{p9}$= 920 pcph	$c_{m12}=c_{p12}$= 1000 pcph
STEP 2 : LT From Major Street	V_4	V_1
Conflicting Flows, V_c	$V_3+V_2=V_{c4}$ 10 + 165 = 175 vph	$V_6+V_5=V_{c1}$ 5 + 95 = 100 vph
Critical Gap, T_c (Tab.10.2)	5.0 (secs.)	5.0 (secs.)
Potential Capacity, c_p (Fig.10.3)	c_{p4}= 1000 pcph	c_{p1}= 1000 pcph
% of c_p utilized	(v_4/c_{p4})x100= <1 %	(v_1/c_{p1})x100= <1 %
Impedance Factor, P (Fig.10.5)	P_4= .99	P_1= .99
Actual Capacity, c_m	$c_{m4}=c_{p4}$= 1000 pcph	$c_{m1}=c_{p1}$= 1000 pcph
STEP 3 : TH From Minor Street	V_8	V_{11}
Conflicting Flows, V_c	$1/2V_3+V_2+V_1+V_6+V_5+V_4=V_{c8}$ 5 + 165 + 6 + 5 + 95 + 22 = 298 vph	$1/2V_6+V_5+V_4+V_3+V_2+V_1=V_{c11}$ 5 + 95 + 22 + 10 + 165 + 6 = 303 vph
Critical Gap, T_c (Tab.10.2)	6.0 (secs.)	6.0 (secs.)
Potential Capacity, c_p (Fig.10.3)	c_{p8}= 730 pcph	c_{p11}= 303 pcph
% of c_p utilized	(v_8/c_{p8})x100= 4 %	(v_{11}/c_{p11})x100= 36 %
Impedance Factor, P (Fig.10.5)	P_8= .96	P_{11}= .73
Actual Capacity, c_m	$c_{m8}=c_{p8}xP_1xP_4$ 715 = 730 x .99 x .99 (pcph)	$c_{m11}=c_{p11}xP_1xP_4$ 297 = 303 x .99 x .99 (pcph)
STEP 4 : LT From Minor Street	V_7	V_{10}
Conflicting Flows, V_c	V_8 (step3) $+V_{11}+V_{12}=V_{c7}$ 298 + 110 + 11 = 419 vph	V_{c11} (step3) $+V_7+V_8=V_{c10}$ 303 + 17 + 28 = 348 vph
Critical Gap, T_c (Tab.10.2)	6.5 (secs.)	6.5 (secs.)
Potential Capacity, c_p (Fig.10.3)	c_{p7}= 550 pcph	c_{p10}= 580 pcph
Actual Capacity, c_m	$c_{m7}=c_{p7}xP_1xP_4xP_{11}xP_{12}$ 390 = 550 x .99 x .99 x .73 x .99 (pcph)	$c_{m10}=c_{p10}xP_4xP_1xP_8xP_9$ 540 = 580 x .99 x .99 x .96 x .99 (pcph)

Worksheet for four-leg intersections (page 2).

Table 19 cont'd

SHARED LANE CAPACITY

$$c_{SH} = \frac{v_i + v_j}{(v_i / c_{mi}) + (v_j / c_{mj})}$$ where 2 movements share a lane

$$c_{SH} = \frac{v_i + v_j + v_k}{(v_i / c_{mi}) + (v_j / c_{mj}) + (v_k / c_{mk})}$$ where 3 movements share a lane

APPROACH MOVEMENTS 7, 8, 9

Movement	v (pcph)	c_m (pcph)	c_{SH} (pcph)	$c_R = c_{SH} - v$	LOS
7	17	390			
8	28	715	591	535	A
9	11	920			

APPROACH MOVEMENTS 10, 11, 12

Movement	v (pcph)	c_m (pcph)	c_{SH} (pcph)	$c_R = c_{SH} - v$	LOS
10	33	540			
11	110	297	348	194	C-D
12	11	1000			

MAJOR STREET LEFT-TURNS 1, 4

Movement	v (pcph)	c_m (pcph)	$c_R = c_m - v$	LOS
1	6	1000	996	A
4	22	1000	978	A

COMMENTS: Operates @ LOS C overall - some delays on southbound approach

Worksheet for four-leg intersections (page 3).

during the afternoon peak highway hour. This analysis is shown on Table 20.

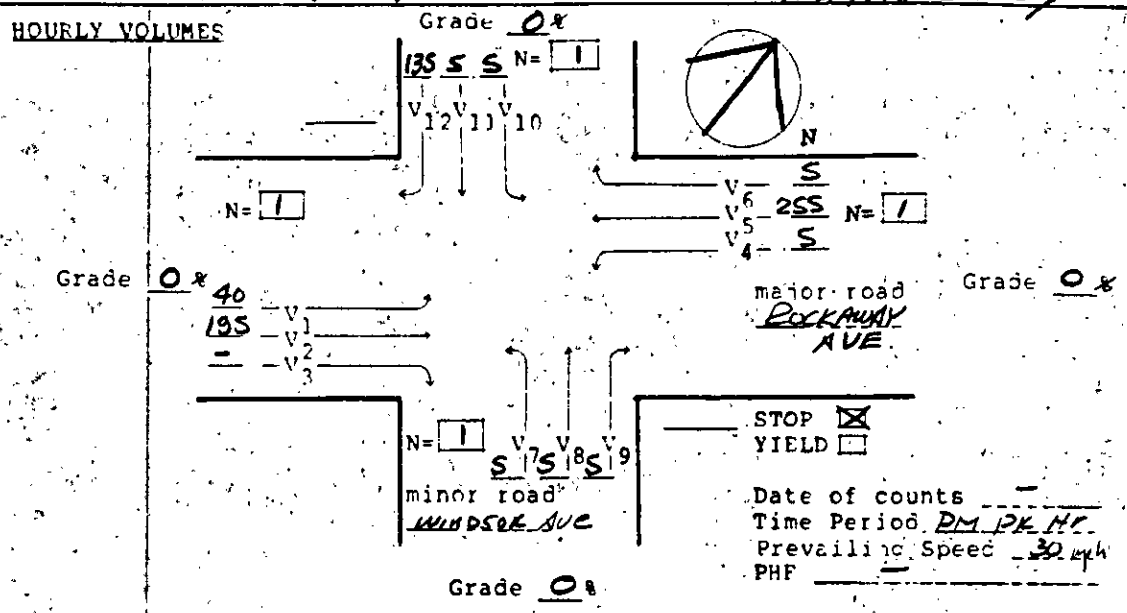
Unsignalized intersection capacity analysis, considering four-way stop control, was utilized for the examination of the intersection of South Centre Avenue with South Village Avenue. Shown on Table 21 are the results of this analysis. The intersection is estimated to be operating at a Level of Service "C" or better during the afternoon peak hour.

Generally, all nine intersections analyzed are operating within design levels. Some minor delays will be experienced on certain intersection approaches, however, at this time no undue delay is anticipated except for perhaps on the Lincoln Avenue southbound approach to Park Avenue.

Table 20

LOCATION: Rockaway Ave / Windsor Ave NAME: Rockville Center Traffic Study

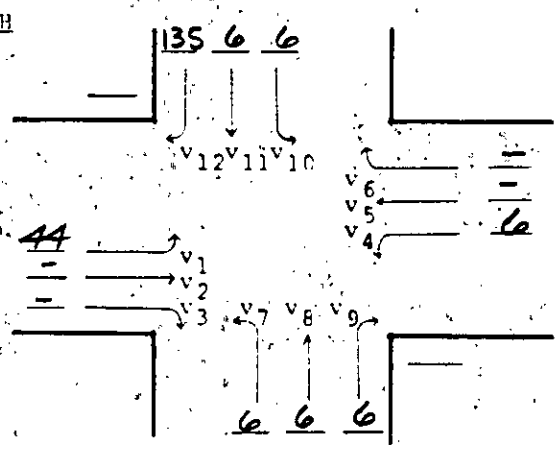
HOURLY VOLUMES



VOLUME ADJUSTMENTS

Movement no.	1	2	3	4	5	6	7	8	9	10	11	12
Volume (vph)	40	195	—	5	255	5	5	5	5	5	5	135
Vol. (pcph), see Table 10.1	44			6			6	6	6	6	6	149

VOLUMES IN PCPH



Worksheet for four-leg intersections

Table 20 cont'd.

STEP 1 : RT From Minor Street	V_9	V_{12}
Conflicting Flows, V_c	$1/2\ V_3+V_2=V_{c9}$ — + 195 = 195 vph	$1/2\ V_6+V_5=V_{c12}$ 3 + 255 = 258 vph
Critical Gap, T_c (Tab.10.2)	5.5 (secs.)	5.5 (secs.)
Potential Capacity, c_p (Fig.10.3)	c_{p9} = 890 pcph	c_{p12} = 850 pcph
% of c_p utilized	$(v_9/c_{p9})\times100$ = 1.0 %	$(v_{12}/c_{p12})\times100$ = 18 %
Impedance Factor, P (Fig.10.5)	P_9 = .99	P_{12} = .86
Actual Capacity, c_m	$c_{m9}=c_{p9}$ = 890 pcph	$c_{m12}=c_{p12}$ = 850 pcph
STEP 2 : LT From Major Street	V_4	V_1
Conflicting Flows, V_c	$V_3+V_2=V_{c4}$ — + 195 = 195 vph	$V_6+V_5=V_{c1}$ 5 + 255 = 260 vph
Critical Gap, T_c (Tab.10.2)	5.0 (secs.)	5.0 (secs.)
Potential Capacity, c_p (Fig.10.3)	c_{p4} = 980 pcph	c_{p1} = 940 pcph
% of c_p utilized	$(v_4/c_{p4})\times100$ = 1.0 %	$(v_1/c_{p1})\times100$ = 1.0 %
Impedance Factor, P (Fig.10.5)	P_4 = .99	P_1 = .99
Actual Capacity, c_m	$c_{m4}=c_{p4}$ = 980 pcph	$c_{m1}=c_{p1}$ = 940 pcph
STEP 3 : TH From Minor Street	V_8	V_{11}
Conflicting Flows, V_c	$1/2V_3+V_2+V_1+V_6+V_5+V_4=V_{c8}$ — + 195 + 44 + 5 + 255 + 6 = 505 vph	$1/2V_6+V_5+V_4+V_3+V_2+V_1=V_{c11}$ 3 + 255 + 5 + — + 195 + 40 = 498 vph
Critical Gap, T_c (Tab.10.2)	6.0 (secs.)	6.0 (secs.)
Potential Capacity, c_p (Fig.10.3)	c_{p8} = 540 pcph	c_{p11} = 550 pcph
% of c_p utilized	$(v_8/c_{p8})\times100$ = 1.0 %	$(v_{11}/c_{p11})\times100$ = 1 %
Impedance Factor, P (Fig.10.5)	P_8 = .99	P_{11} = .99
Actual Capacity, c_m	$c_{m8}=c_{p8}\times P_1\times P_4$ 529 = 540 x .99 x .99 (pcph)	$c_{m11}=c_{p11}\times P_1\times P_4$ 539 = 550 x .99 x .99 (pcph)
STEP 4 : LT From Minor Street	V_7	V_{10}
Conflicting Flows, V_c	V_8 (step3) $+V_{11}+V_{12}=V_{c7}$ 505 + 6 + 149 = 660 vph	V_{c11} (step3) $+V_7+V_8=V_{c10}$ 498 + 6 + 6 = 510 vph
Critical Gap, T_c (Tab.10.2)	6.5 (secs.)	6.5 (secs.)
Potential Capacity, c_p (Fig.10.3)	c_{p7} = 380 pcph	c_{p10} = 480 pcph
Actual Capacity, c_m	$c_{m7}=c_{p7}\times P_1\times P_4\times P_{11}\times P_{12}$ 317 = 380 x .99 x .99 x .99 x .86 (pcph)	$c_{m10}=c_{p10}\times P_4\times P_1\times P_8\times P_9$ 461 = 480 x .99 x .99 x .99 x .99 (pcph)

Worksheet for four-leg intersections (page 2).

Table 20 cont'd.

SHARED LANE CAPACITY

$$c_{SH} = \frac{v_i + v_j}{(v_i / c_{mi}) + (v_j / c_{mj})}$$ where 2 movements share a lane

$$c_{SH} = \frac{v_i + v_j + v_k}{(v_i / c_{mi}) + (v_j / c_{mj}) + (v_k / c_{mk})}$$ where 3 movements share a lane

APPROACH MOVEMENTS 7, 8, 9

Movement	v (pcph)	c_m (pcph)	c_{SH} (pcph)	$c_R = c_{SH} - v$	LOS
7	6	317			
8	6	529	486	468	A
9	6	890			

APPROACH MOVEMENTS 10, 11, 12

Movement	v (pcph)	c_m (pcph)	c_{SH} (pcph)	$c_R = c_{SH} - v$	LOS
10	6	461			
11	6	539	807	646	A
12	149	850			

MAJOR STREET LEFT TURNS 1, 4

Movement	v (pcph)	c_m (pcph)	$c_R = c_m - v$	LOS
1	44	940	896	A
4	6	980	974	A

COMMENTS: Operates @ LOS "A" - No delays

Worksheet for four-leg intersections (page 3).

Table 21

UNSIGNALIZED INTERSECTION CAPACITY ANALYSIS
FOUR-WAY STOP CONTROL

DEVELOPMENT CONDITION *EXISTING*

TIME PERIOD *P.M. Peak Highway Hour*

INTERSECTION GEOMETRY

North/South Cross Street *SOUTH CENTER AVE.*

Number of Approach Lanes — Northbound *1* / Southbound *1*

East/West Cross Street *SOUTH VILLAGE AVE.*

Number of Approach Lanes — Eastbound *1* / Westbound *1*

INTERSECTION TYPE

Two-Lane	X Two-Lane	X
Two-Lane	X Four-Lane	
Four-Lane	X Four-Lane	

TRAFFIC DEMAND

Approach	Demand Volume	Total Cross Street Volume	Traffic Demand Split
Northbound	115	360	66 %
Southbound	245		
Eastbound	75	185	34 %
Westbound	110		

Total Demand *545* Demand Split *65/35* Capacity* *1600*

$$\frac{\text{Demand (V)}}{\text{Capacity (C)}} = \frac{545}{1600} = .34 \quad \angle OS \text{ "C"}^{+}$$

* Total Capacity, all approaches

operates @ LOS "C" + or better

STORCH ASSOCIATES
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LANDSCAPE ARCHITECTS
ENVIRONMENTAL CONSULTANTS

TRAFFIC ACCIDENT STUDY

Traffic accident data were obtained from the Village Department of Public Works and Police Department. All accidents occurring between January, 1981 and December, 1984 were summarized by accident type, lighting conditions, weather, roadway conditions and grouped by intersection. Only intersections with an average of 5 or more accidents per year, however, were examined in detail. Below this value it is usually not possible to ascertain any significant accident patterns.

The intersection of Lincoln and South Park Avenue was the only location exceeding 5 accidents per year. There were 21 accidents at or within 250' of this location.

Seventy six percent of the accidents occurred in daylight, 5 percent at dawn/dusk and 19 percent under lighted conditions. Fifty two percent of the accidents occurred in clear weather, 29 percent under cloudy skies, 14 percent in the rain and 5 percent in the snow. Seventy six percent of the accidents occurred on dry pavement, 19 percent on wet pavement and 5 percent on icy roads. In the 21 accidents, 8 persons were injured, none fatally.

Right angle collisions were the most common type of accident representing (29 percent) of all accidents. Remaining accidents were evenly divided among fixed object, pedestrian, turning

vehicles, sideswipe and rear end collisions. The most frequently cited contributing factors were failure to yield right-of-way, driver inattention and disregard of traffic control devices. Inadequate signal clearance at the intersections and possible restricted sight distances seem to be responsible for many of the accidents. Weather does not appear to play a contributing role.

Frequent concern was expressed by Village representatives as well as neighbors in the area with respect to the operation of the intersection of Rockaway Avenue with Woods Avenue and Park Place. This skewed intersection, which has not shown a significant number of accidents through report review, has a number of features which contribute to its continued perception as an unsafe location. Namely, the skewed angle of the intersection limits the visibility of Rockaway Avenue northbound drivers view of Woods Avenue to the south. Additionally, the horizontal curvature of Park Place to the north limits the visibility of traffic originating in north by the Rockaway Avenue vehicle operators as well. It appears that the lack of use of automobile directional indicators for Park Place southbound traffic, indicating a choice of Rockaway Avenue or Woods Avenue, also contributes to hesitation on the part of the Rockaway Avenue northbound drivers to proceed.

The low number of recorded accidents at this location unfortunately does not indicate the number of near misses which may have occurred. The higher level of attention required at

this location certainly contributes to the minimizing of actual collisions experienced. In any case, an improvement to the geometrics is in order. Such improvements will be addressed in a subsequent section of this study.

SPOT SPEED STUDY

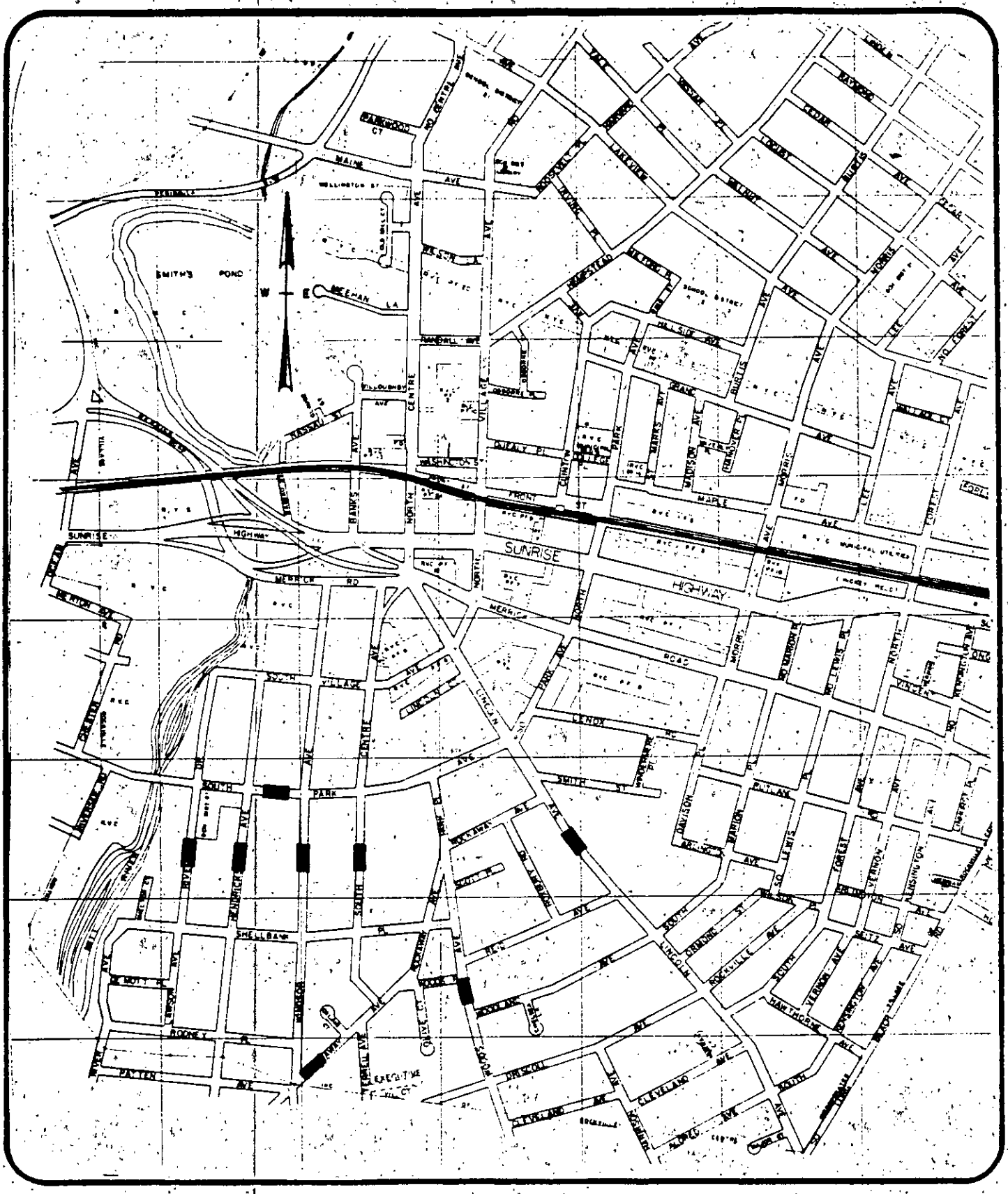
Introduction

On high speed roads travel speed is often a surrogate for quality of traffic flow. On Rockville Centre's residential roads, however, speed has more important safety implications. Residents' perception of a speeding problem in an area inhabited by elderly persons and small children is a strong inducement for assessing the nature of this condition. A spot speed examination can, to some extent, confirm or mollify residents' concerns.

Location

For an evaluation of the roadways travel speed in the southwest section, spot speeds were recorded along: (See Figure 21)

- Lincoln Ave. between Rockaway Ave. and Reid Ave.
- South Centre Ave. between South Park Ave. and Shellbank Place.
- Woods Ave. south of Shellbank Place.
- Windsor Ave. between South Park Ave. and Shellbank Place.
- Hendrickson Ave. between South Park Ave. and Shellbank Place.
- Riverside Ave. between South Park Ave. and Shellbank Place.
- South Park Ave. between Hendrickson Ave. and Windsor Ave.
- Rockaway Ave. between Patten Ave. and Windsor Ave.



SPOT SPEED STUDY LOCATIONS

STORCH ASSOCIATES
ENGINEERS • ARCHITECTS • PLANNERS
LANDSCAPE ARCHITECTS
ENVIRONMENTAL CONSULTANTS

ROCKVILLE CENTRE TRAFFIC STUDY	
SOUTHWEST SECTION	FIGURE 21

Vehicle speeds were recorded on each of the above listed roadways where geometric/operational characteristics were deemed typical. Mid-block locations were selected to minimize recording of low speeds resulting from vehicles accelerating from or decelerating to stop signs and traffic signals. No measurements were taken along South Village Ave. and Shellbank Ave. due to the short block lengths and frequent traffic control devices which prevented vehicles from attaining uniform speeds.

Methodology

A manual method was used to collect spot speed data. From a permanent reference point (utility pole, pavement crack, etc.) at each location field personnel established a 176-foot long course. This length was chosen to facilitate conversion of travel times into vehicle speeds.

Observers at both ends of the course recorded passing vehicular travel times on a spot speed study field sheet. Where traffic volumes were light each vehicle passing through the course was recorded. On high volume roads randomly selected cars, trucks and buses were timed.

Spot speeds were recorded during morning off-peak and afternoon peak periods. Vehicle speeds were recorded until an adequate sample size was obtained. Weather conditions were favorable, i.e., clear or cloudy skies with no precipitation. There were no adverse roadway or traffic related conditions.

To insure statistical significance a large (greater than 80 observations) data base is desirable. The relatively low sample size available on many streets precluded recording more than approximately 30 vehicles per direction within the study interval. Accordingly, all recorded directional volumes were combined and one speed distribution curve for each time interval was created (Figs. 23 thru 37). The larger data base provides a more accurate description of the range of travel speeds irrespective of any directional tendencies.

As a rule of thumb, roadway posted speed limits should generally reflect the actual use of a facility. For example, if the 85 percentile speed (85 percent of the vehicles traveling at or below a given speed) travel at 40 mph, then that particular facility should be posted for 40 mph. The reasoning herein is that the facility can support such a speed, however, there are exceptions to this rule. In a residential area such as that under examination, speeds at such levels should not be permitted. A review of the figures for the speeds recorded in this area as part of the study has indicated that generally the 85 percentile speed falls within a reasonable range of the posted 30 mph speed limit. For example, Rockaway Avenue between Patten Avenue and Windsor Avenue, during the afternoon peak hour had an 85 percentile speed recorded at 38.4 mph. During the same period on Woods Avenue, south of Shellbank Avenue, the 85 percentile speed was recorded at 39.5 mph. The highest recorded 85 percentile speed was recorded on Woods Avenue during the off-peak period where an 85 percentile speed of 42 mph was recorded. Only one

location had an 85 percentile speed less than the posted 30 mph; this was at South Park Avenue, between Hendrickson Avenue and Windsor Avenue during the off-peak period.

It becomes apparent from above that generally the travel speeds within the travel area are in compliance with the posted speed regulations. However, an increase in enforcement may be required on Rockaway Avenue and Woods Avenue where the 85 percentile speed exceeds the posted speed limit by 8 to 12 mph. It appears that the speeds on Woods Avenue are somewhat more critical since the average speed exceeds the posted speed limit by 6 mph, while on Rockaway Avenue the average speed exceeds the speed limit by only 2.5 mph.

To further assess travel speeds in the Village, police radar records were reviewed. In the past three years the Department has made a concerted effort to enforce speed restrictions at the following three locations.

(1) South Park Avenue between Mill River Bridge and Hendrickson Avenue

Riverside School is located at the southeast corner of Riverside Drive and South Park Avenue. The speed limit in this area is 15 mph (School zone). The mean speed of motorists ticketed for speeding was 36.3 mph.

(2) Rockaway Avenue between Windsor Avenue and Shellbank Place

The speed limit along Rockaway Avenue is 30 mph A 20 M.P.H. advisory speed and curve warning sign west of Woods Place advises northbound motorists of a curve to the left.

The mean speed of motorists ticketed for speeding was 46.8 M.P.H. Not surprisingly, 17 percent of the accidents in the vicinity of Rockaway Avenue and Shellbank Place were attributed to "Unsafe Speed."

(3) Merrick Road from Windsor to South Centre Avenue.

Sixteen tickets with a mean speed of 48.2 mph were issued in this 30 mph zone.

STUDY AREA ROADWAY INVENTORY

To aid in identifying significant roadway geometrics, signing, pavement striping or other features which may effect traffic operations, Storch Associates inventoried each of the roadways within the study area.

Data collected during the inventory included pavement width on each intersection approach, traffic control signs, posted parking restrictions, speed limit signs, warning signs and regulatory signs.

This data, shown on Figure 38, at the end of this report, is an accurate, up-to-date, representation of existing conditions within the area.

No significant deficiencies were found except perhaps, the redundancy of stop sign control on the Windsor Avenue northbound approach to South Park Avenue, where two "stop" signs have been posted. The need for two signs is not readily apparent. Additionally, although not identified on Figure 38, many of the stop bar pavement markings are excessively warn or totally absent at stop-sign controlled intersection locations.

Generally, all signs in the study are in serviceable condition and readily legible.

RECOMMENDATIONS

As evidenced by the enclosed tables and figures, Windsor Avenue is used extensively during the afternoon peak highway hour for through southbound traffic. Likewise, South Centre Avenue shows a high utilization for northbound traffic during the morning peak highway hour. To reduce the use of both of these facilities by through vehicles, a number of different alternatives are recommended. Of course, each alternative while having some positive affects on the local roadway use reduction, will also have paired with it some disadvantages. Outlined below are three alternatives for the reduction of traffic on the local roadways in the southwest section:

Alternate A - this alternate will require the placement of a "Do Not Enter" sign on the Windsor Avenue and on the South Centre Avenue approaches south of South Park Avenue. Do Not Enter prohibition should be a provisional regulation to be enforced between the hours of 4:00 PM and 6:30 PM. In conjunction with the above posting, the posting of No Left Turns on Rockaway Avenue northbound at Windsor Avenue and at South Centre Avenue should be completed. This provision should be enforced between the hours of 7:00 AM and 9:30 AM. The above alternative will eliminate the use of the local roadways by through southbound vehicles during the afternoon peak hour and the use of both facilities during the morning peak hour for northbound vehicles. The results of this

signing will require former through traffic patterns to be changed, perhaps incorporating the utilization of South Park Avenue (a heavily traveled roadway through this region). For the traffic that would normally utilize South Center Avenue or Windsor Avenue for northbound travel during the morning period, the use of Rockaway Avenue to Park Place might result as being more advantageous.

The disadvantage of the Do Not Enter signing on Windsor Avenue and South Centre is such that it will allow through southbound travel on a portion of the residential areas (north of South Park Avenue). Additionally, it may be difficult to enforce and therefore the use of "horses" with the signs attach thereto and placed in the center of each roadway by police or traffic officers maybe necessary. Finally, a rerouting of some of the residents located on Windsor Avenue and South Centre Avenue south of South Park Avenue will be necessary.

<u>Alternate B</u> - under this alternative it is suggested that "Do Not Enter" signs be located on Windsor Avenue permanently at Merrick Road. Additionally, "Do Not Enter" signs on Windsor Avenue and South Center Avenue at South Park Avenue for southbound traffic should be posted and be in effect between 4:00 and 6:30 PM. Additionally, "No Left Turn signs on Rockaway Avenue northbound at Windsor Avenue and at South Centre Avenue should be posted and effect between 7:00 and 9:30 AM.

The advantages of this signing will eliminate through southbound traffic on Windsor Avenue between Merrick Road and South Park Avenue at all times. It will also discourage southbound traffic from using South Centre Avenue and Windsor Avenue, south of South Park Avenue during the afternoon peak period. This alternative will encourage the use of alternate routing, ie., Lincoln Avenue, South Park Avenue and Park Place.

As under Alternate A, the signing on Rockaway Avenue will eliminate northbound through traffic from utilizing Windsor Avenue and South Centre Avenue during the morning peak hour.

The disadvantages associated with this alternative include the permanent rerouting of Windsor Avenue residents (north of South Village Avenue). Additionally, it also may require the use of "horses" on Windsor Avenue and South Center Avenue at points immediately south of South Park Avenue for positive enforcement and, it will require some rerouting of Windsor Avenue and South Center Avenue residents for a short period of the day.

<u>Alternate C</u> - the posting of "Do Not Enter" signs on Windsor Avenue and on South Centre Avenue at Merrick Road, to be in effect between 4:00 and 6:30 PM. Additionally, the placement of "No Left Turns" signs on the Rockaway Avenue northbound approach to Windsor Avenue and South Centre

Avenue for the 7:00 - 9:00 a.m. period and the designation of the South Centre Avenue northbound approach to Merrick Road as one-way northbound.

In order to be effective, the Lincoln Avenue southbound approach to South Park Avenue will have to be restriped to provide a separate right turn lane. As indicated by the capacity analysis in a earlier section of this study, the high right-turn turning volumes recorded (approximately 375), which occurred during the afternoon peak hour, forces this intersections' approach to operate at near capacity during the afternoon peak hour. The addition of a separate right turn lane, which will require the elimination of approximately half of the parking along that section of roadway, would raise the level of service of the intersection.

In order for South Centre Avenue northbound approach to Merrick Road to be converted to one-way northbound, the traffic destined from North Centre Avenue southbound to South Centre Avenue would be directed south on Lincoln Avenue and to utilize the separate right turn lane for right turns to South Park Avenue westbound.

Although not easily measured, some portion of the traffic now utilizing South Centre Avenue and Windsor Avenue for southbound travel in the afternoon peak hour are probably discouraged from Lincoln Avenue because of the congestion

which exists at its intersection with South Park Avenue during the afternoon hour. Once the improvement is implemented, the reserve capacity would allow for the "freeing up" of right turns at that location. This reserve, in combination with the provisional signing at South Center and Windsor Avenues will, in our estimation, make the Lincoln Avenue routing more attractive.

There are some disadvantages to this alternative namely, that residents between Merrick Road and South Village Avenue on Windsor Avenue or South Centre Avenue will have to be rerouted to Lincoln Avenue. Additionally, the Fire Department has expressed some concern with the travel pattern of South Centre Avenue if its northbound approach to Merrick Road is designated as one-way. Since the most critical period for fire operations is in its response to a call, calls to the north and south could still be accomplished using the proposed scheme. The return trip would however, require fire apparatus utilizing North Centre Avenue as its approach from the north, to use Lincoln Avenue southbound where it would then proceed west on South Village Avenue then, turn north onto South Centre Avenue to the station. Additionally, since the Rockville Centre Fire Department is a volunteer company, the arrival of a volunteer to the station house when responding to a call would be delayed that amount of time required to travel the additional distance along the alternate route. We do not

feel that the amount of time required to travel that distance however, would be of major significance, in particular since it would only effect those respondents utilizing North Centre Avenue as an approach to the station house.

The alternates mentioned above and their effect on travel patterns are shown on Figures 39 through 41. Other improvements which should be considered to aid traffic operations within the southwest section are as follows: (See Figure 42 at end of report)

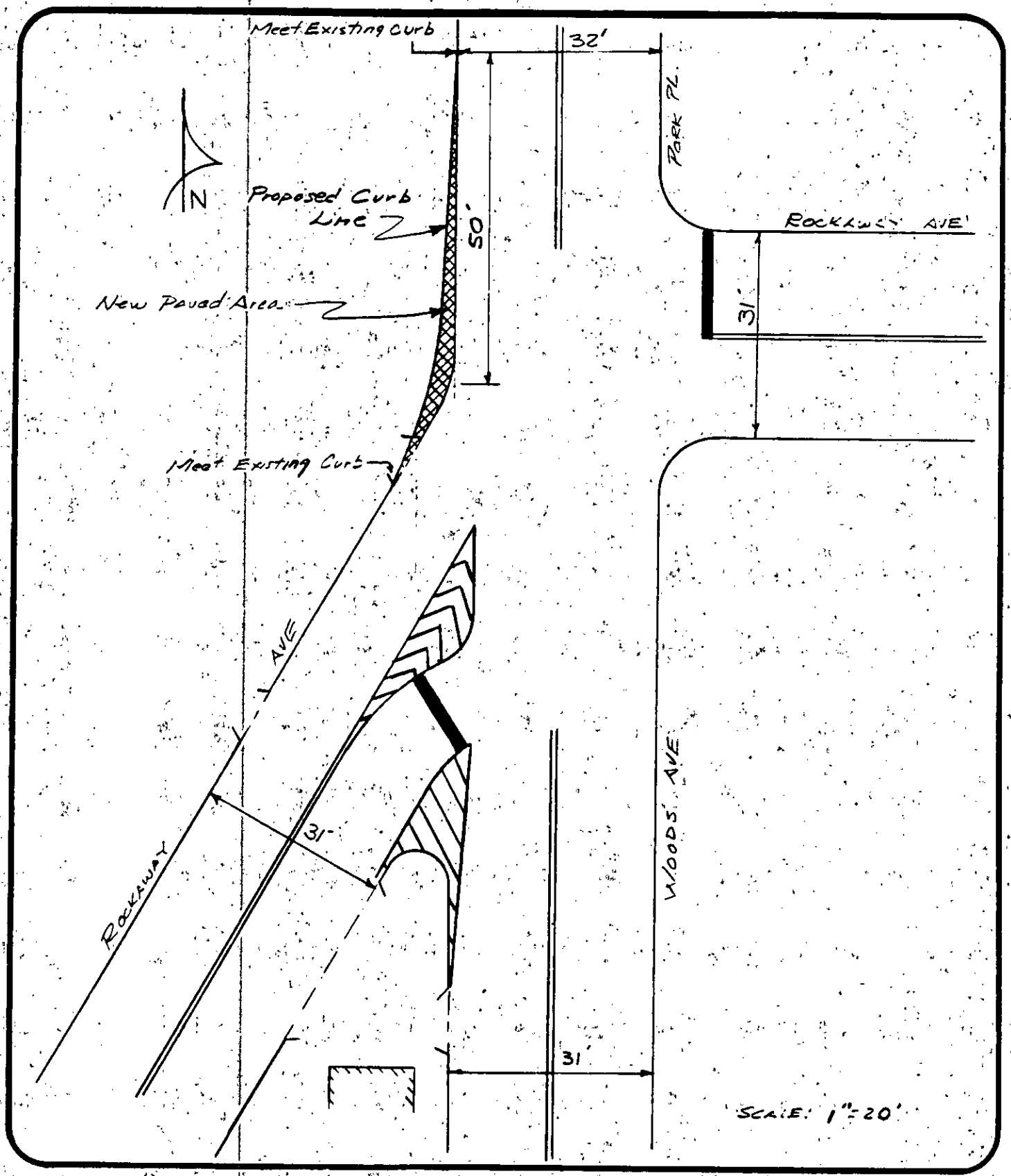
1. As mentioned above, the addition of a separate right turn lane on the Lincoln Avenue southbound approach to South Park Avenue. Because of the limited capacity which presently exists on this approach it tends to discourage the use of Lincoln Avenue for traffic destined to the south via Woods Avenue or Rockaway Avenue. The separate right turn lane, once developed, would increase the capacity at this location, and, therefore, potentially increase its utilization for southbound travel. As stated, this development in connection with any of the alternates mentioned above will reduce the local roadway use (Windsor Avenue and South Centre Avenue) by southbound through traffic. As stated earlier, the development of the separate right turn lane will

result in a loss of approximately half of the parking spaces along the western curb line of Lincoln Avenue between South Village Avenue and South Park Avenue.

To insure a satisfactory intersection operation once completed, a retiming of the traffic signal at that location will be required as will the restriping of the pavement in the intersection area.

2. At the intersection of Rockaway Avenue with Rockaway Place and Woods Avenue, with some taking along the western right-of-way of Park Place, an increase to the site distance to the north could be accomplished. Additionally, channelization of this intersection is suggested with the Rockaway Avenue northbound approach as "stop" sign controlled. Left turns from Woods Avenue to Rockaway Avenue southbound should be prohibited at this location as should the right turns from Rockaway Avenue to Wood Avenue southbound. Furthermore, the northbound Woods Avenue approach should have the stop sign on its intersection approach removed. (See Figure 22)

As a review of the signal warrant analysis indicates, signal installation at this location is



CONCEPTUAL CHANNELIZATION

STORCH ASSOCIATES
ENGINEERS • ARCHITECTS • PLANNERS
LANDSCAPE ARCHITECTS
ENVIRONMENTAL CONSULTANTS

ROCKVILLE CENTRE TRAFFIC STUDY	
SOUTHWEST SECTION	FIGURE 22

not required at this time, even though delays will be experienced for the Rockaway Avenue northbound left turn traffic. It is suggested that monitoring of the traffic by the Village be conducted periodically (six month intervals) to determine if volumes have increased to levels warranting signal installation. This may be found true, particularly if one of the alternates for the reduction of traffic on Windsor Avenue and South Centre Avenue is employed and a redistribution of traffic to the county roadways results.

3. We suggest that the installation of a traffic signal be made at the Park Place/South Park Avenue intersection since it does meet peak hour traffic volume warrants.

4. Our review of spot speeds and enforcement in the area indicates that continued enforcement of posted speeds on Rockaway Avenue and Woods Avenue is essential and that more conspicuous signing of speed limits be employed in the area of the intersection of Rockaway Avenue and Woods Avenue with Woods Place.

5. All pavement markings within the southwest section of the Village should be re-established where

absent and improved where worn to better identify crosswalks, travelways and locations of stop control.

6. Signal timing at the intersection of Sunrise Highway and North Centre Avenue should be modified to decrease delay to the southbound traffic. New timings should consider the inclusion of advance phases on the heaviest used approaches.

Finally, should any of the alternates be employed, advance notice in local newspapers of the implementation of such regulations should be completed. A probationary period having a duration of approximately one month, during which time motorists would be issued warning summons, should be employed prior to any measurement of actual effectiveness.

APPENDIX A

12-HOUR TRAFFIC VOLUME

VARIATIONS

Table 1

12 - HOUR TRAFFIC VOLUME VARIATIONS
ROCKVILLE CENTRE, NEW YORK

TIME OF DAY	LINCOLN AVE. SOUTH OF SOUTH VILLAGE AVE. NB	LINCOLN AVE. SOUTH OF SOUTH VILLAGE AVE. SB	LINCOLN AVE. SOUTH OF ROCKAWAY AVE. NB	LINCOLN AVE. SOUTH OF ROCKAWAY AVE. SB
7:00-8:00 AM	880	306	698	189
8:00-9:00	1176	426	783	330
9:00-10:00	876	397	557	301
10:00-11:00	631	456	422	301
11:00-12:00	574	499	370	354
12:00-1:00	527	572	366	380
1:00-2:00	629	617	367	376
2:00-3:00	594	660	391	428
3:00-4:00	596	793	425	531
4:00-5:00	597	942	377	647
5:00-6:00	559	1088	495	727
6:00-7:00 PM	499	889	356	671
DIRECTIONAL TOTAL	8138	7645	5607	5235
2-WAY TOTAL	15783		10842	
DIRECTIONAL SPLIT %	51.6%	48.4%	51.7%	48.3%

NON-ADJUSTED

Table 2

12 - HOUR TRAFFIC VOLUME VARIATIONS
ROCKVILLE CENTRE, NEW YORK

TIME OF DAY	PARK PL BETWEEN SOUTH PARK AVE. & ROCKAWAY AVE.		WOODS AVE. SOUTH OF SHELLBANK PLACE	
	NB	SB	NB	SB
7:00-8:00 AM	456	168	303	114
8:00-9:00	613	213	375	135
9:00-10:00	402	206	222	117
10:00-11:00	312	226	178	146
11:00-12:00	302	261	172	160
12:00-1:00	292	265	174	164
1:00-2:00	332	322	190	189
2:00-3:00	361	374	190	206
3:00-4:00	291	444	202	277
4:00-5:00	382	564	190	374
5:00-6:00	304	770	171	476
6:00-7:00 PM	300	478	159	299
DIRECTIONAL TOTAL	4347	4291	2526	2657
2-WAY TOTAL	8638		5183	
DIRECTIONAL SPLIT % NON-ADJUSTED	50.3%	49.7%	48.7%	51.3%

Table 3

12 - HOUR TRAFFIC VOLUME VARIATIONS
ROCKVILLE CENTRE, NEW YORK

TIME OF DAY	ROCKAWAY AVE. BETWEEN WOODS AVE. & SHELLBANK PLACE		ROCKAWAY AVE. BETWEEN ROXBURY ROAD & PARK PLACE	
	NB	SB	WB	EB
7:00-8:00 AM	187	37	24	24
8:00-9:00	281	79	22	36
9:00-10:00	189	47	12	23
10:00-11:00	172	64	19	18
11:00-12:00	157	75	16	19
12:00-1:00	154	92	26	21
1:00-2:00	162	71	11	16
2:00-3:00	176	86	25	25
3:00-4:00	206	109	26	20
4:00-5:00	277	100	33	25
5:00-6:00	278	139	26	22
6:00-7:00 PM	184	93	22	22
DIRECTIONAL TOTAL	2423	992	262	271
2-WAY TOTAL	3415		533	
DIRECTIONAL SPLIT % NON-ADJUSTED	71.0%	29.0%	49.2%	50.8%

Table 4

12 - HOUR TRAFFIC VOLUME VARIATIONS
ROCKVILLE CENTRE, NEW YORK

TIME OF DAY	SOUTH CENTRE AVE. BETWEEN SOUTH PARK AVE. & SHELLBANK PLACE		SOUTH CENTRE AVE. BETWEEN MERRICK ROAD & SOUTH VILLAGE AVE.	
	NB	SB	NB	SB
7:00-8:00 AM	152	31	249	55
8:00-9:00	196	26	286	80
9:00-10:00	92	28	158	55
10:00-11:00	42	32	97	62
11:00-12:00	42	32	59	75
12:00-1:00	64	33	74	68
1:00-2:00	54	56	70	62
2:00-3:00	46	45	78	86
3:00-4:00	53	66	89	105
4:00-5:00	70	75	109	159
5:00-6:00	78	93	135	254
6:00-7:00 PM	55	40	102	150
DIRECTIONAL TOTAL	944	557	1506	1211
2-WAY TOTAL	1501		2717	
DIRECTIONAL SPLIT %	62.9%	37.1%	55.4%	44.6%
NON-ADJUSTED				

Table 5

12 - HOUR TRAFFIC VOLUME VARIATIONS
ROCKVILLE CENTRE, NEW YORK

TIME OF DAY	SOUTH VILLAGE AVE. BETWEEN WINDSOR AVE. & SOUTH CENTRE AVE.	WINDSOR AVE. BETWEEN RODNEY PLACE & ROCKAWAY AVE.	
	EB&WB	NB	SB
7:00-8:00 AM	70	45	36
8:00-9:00	173	34	39
9:00-10:00	71	21	39
10:00-11:00	58	9	28
11:00-12:00	70	12	43
12:00-1:00	93	16	51
1:00-2:00	116	20	60
2:00-3:00	86	21	64
3:00-4:00	93	31	95
4:00-5:00	82	35	118
5:00-6:00	137	33	153
6:00-7:00 PM	75	18	97
DIRECTIONAL TOTAL	1124	295	833
2-WAY TOTAL	1124	1128	
DIRECTIONAL SPLIT %	100.0%	26.2%	73.8%

NON-ADJUSTED

Table 6

12 - HOUR TRAFFIC VOLUME VARIATIONS
ROCKVILLE CENTRE, NEW YORK

TIME OF DAY	WINDSOR AVE. BETWEEN MERRICK ROAD & SOUTH VILLAGE AVE. NB	WINDSOR AVE. BETWEEN MERRICK ROAD & SOUTH VILLAGE AVE. SB	SOUTH CENTRE AVE. BETWEEN SHELLBANK PLACE & ROCKAWAY AVE. NB&SB
7:00-8:00 AM	65	60	106
8:00-9:00	76	54	165
9:00-10:00	39	33	101
10:00-11:00	31	50	35
11:00-12:00	19	56	32
12:00-1:00	25	63	41
1:00-2:00	23	79	38
2:00-3:00	29	72	37
3:00-4:00	33	77	38
4:00-5:00	35	113	42
5:00-6:00	85	180	49
6:00-7:00 PM	40	105	39
DIRECTIONAL TOTAL	500	942	723
2-WAY TOTAL	1442		723
DIRECTIONAL SPLIT %	34.7%	65.3%	100.0%
NON-ADJUSTED			

Table 7

12 - HOUR TRAFFIC VOLUME VARIATIONS
ROCKVILLE CENTRE, NEW YORK

TIME OF DAY	RIVERSIDE DRIVE BETWEEN SHELLBANK PLACE & SOUTH PARK AVE.		HENDRICKSON AVE. BETWEEN SHELLBANK PLACE & SOUTH PARK AVE.	
	NB	SB	NB	SB
7:00-8:00 AM	13	9	16	8
8:00-9:00	12	10	7	15
9:00-10:00	15	8	15	21
10:00-11:00	7	7	13	19
11:00-12:00	8	9	13	23
12:00-1:00	11	10	13	24
1:00-2:00	9	8	9	19
2:00-3:00	7	11	10	27
3:00-4:00	17	23	11	46
4:00-5:00	8	20	12	23
5:00-6:00	13	28	11	10
6:00-7:00 PM	7	25	9	24
DIRECTIONAL TOTAL	127	168	139	259
2-WAY TOTAL	295		398	
DIRECTIONAL SPLIT % NON-ADJUSTED	43.1%	56.9%	34.9%	65.1%

Table 8

12 - HOUR TRAFFIC VOLUME VARIATIONS
ROCKVILLE CENTRE, NEW YORK

TIME OF DAY	SOUTH PARK AVE. BETWEEN SOUTH CENTRE AVE. & WINDSOR AVE.		SHELLBANK PLACE BETWEEN HENDRICKSON AVE. & WINDSOR AVE.
	WB	EB	EB&WB
7:00-8:00 AM	131	45	16
8:00-9:00	112	118	41
9:00-10:00	77	137	30
10:00-11:00	104	99	14
11:00-12:00	134	129	16
12:00-1:00	105	99	32
1:00-2:00	107	119	41
2:00-3:00	115	91	28
3:00-4:00	124	120	34
4:00-5:00	144	159	48
5:00-6:00	208	219	34
6:00-7:00 PM	182	237	41
DIRECTIONAL TOTAL	1543	1572	375
2-WAY TOTAL	3115		375
DIRECTIONAL SPLIT %	49.5%	50.5%	100.0%
NON-ADJUSTED			

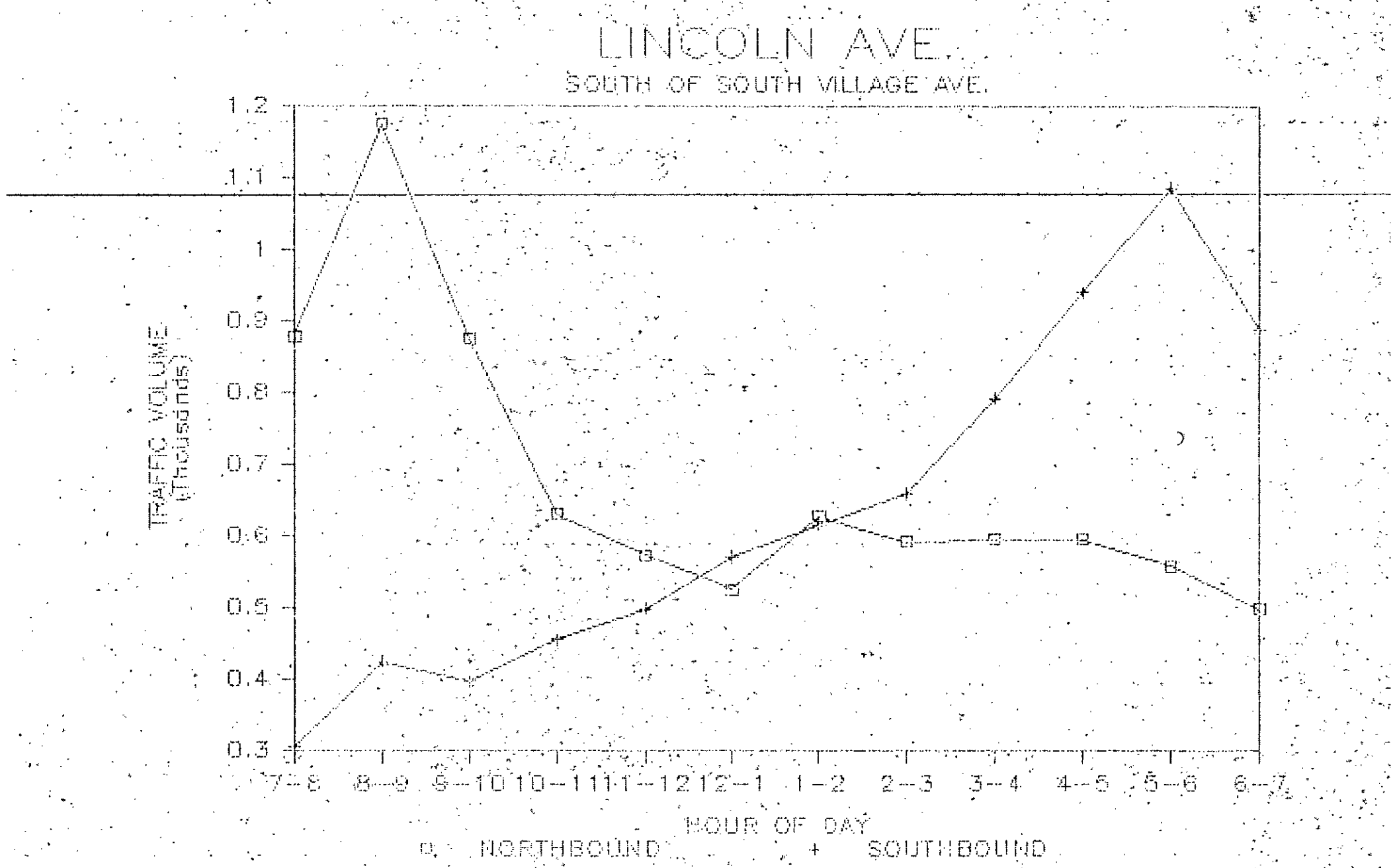

LINCOLN AVE.
SOUTH OF SOUTH VILLAGE AVE.
TRAFFIC VOLUME (Thousands)
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
7-8
8-9
9-10
10-11
11-12
12-1
1-2
2-3
3-4
4-5
5-6
6-7
HOUR OF DAY
NORTHBOUND
SOUTHBOUND

FIGURE 4

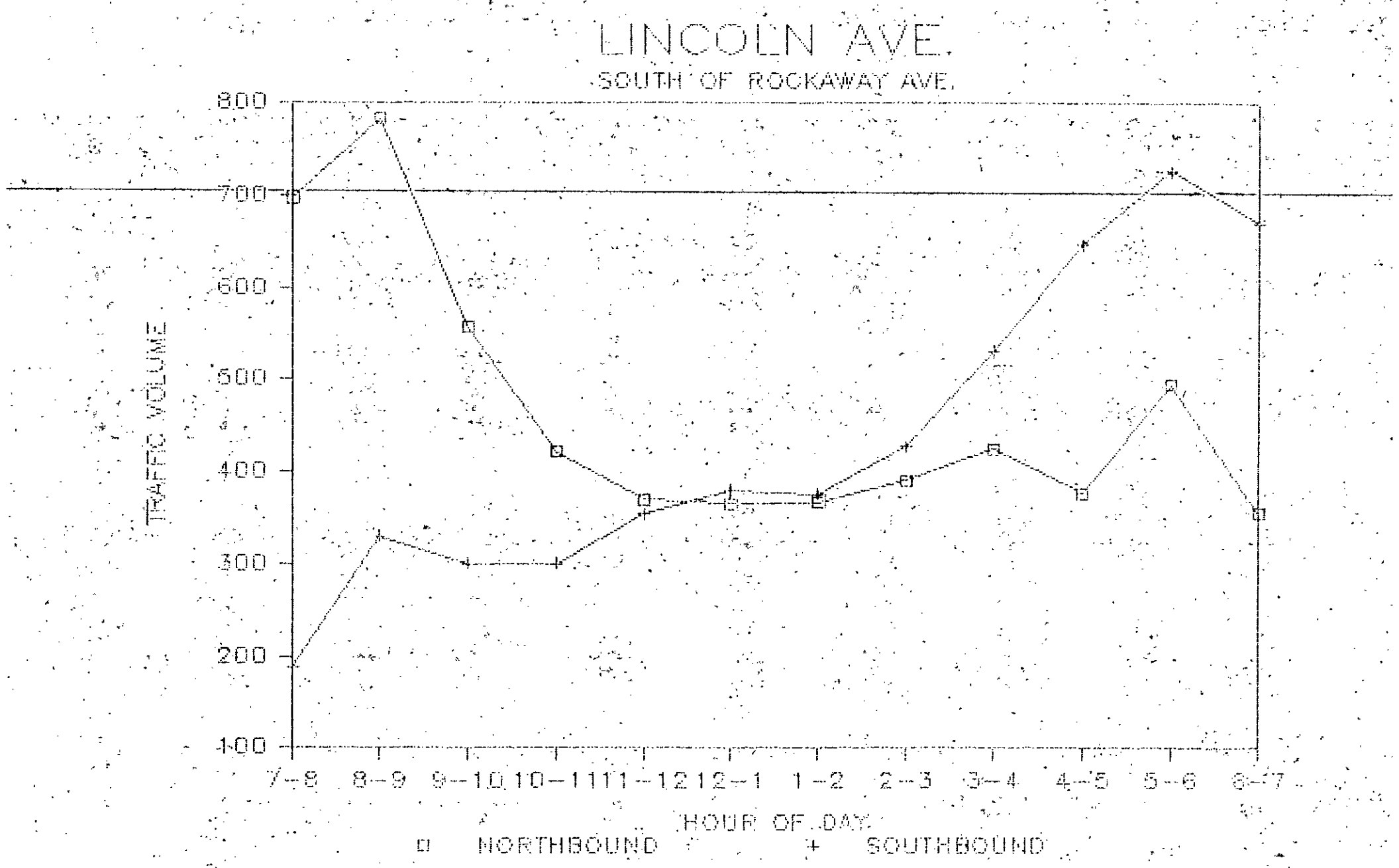

LINCOLN AVE.
SOUTH OF ROCKAWAY AVE.
800
700
600
500
400
300
200
100
TRAFFIC VOLUME
7-8
8-9
9-10
10-11
11-12
12-1
1-2
2-3
3-4
4-5
5-6
6-7
HOUR OF DAY
NORTHBOUND
SOUTHBOUND

FIGURE 5

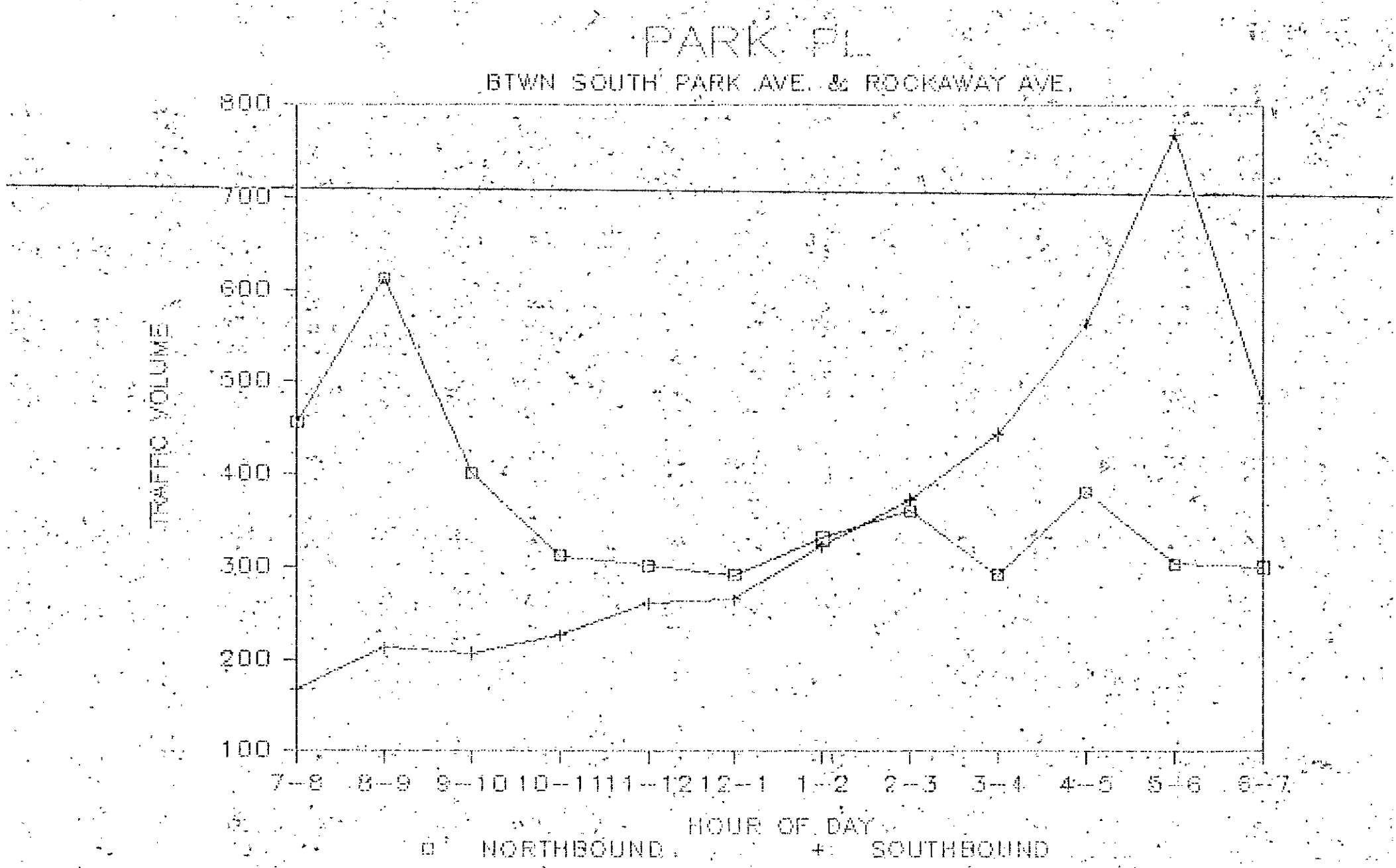

PARK PL
BTWN SOUTH PARK AVE. & ROCKAWAY AVE.
TRAFFIC VOLUME
800
700
600
500
400
300
200
100
7-8
8-9
9-10
10-11
11-12
12-1
1-2
2-3
3-4
4-5
5-6
6-7
HOUR OF DAY
NORTHBOUND
SOUTHBOUND

FIGURE 6

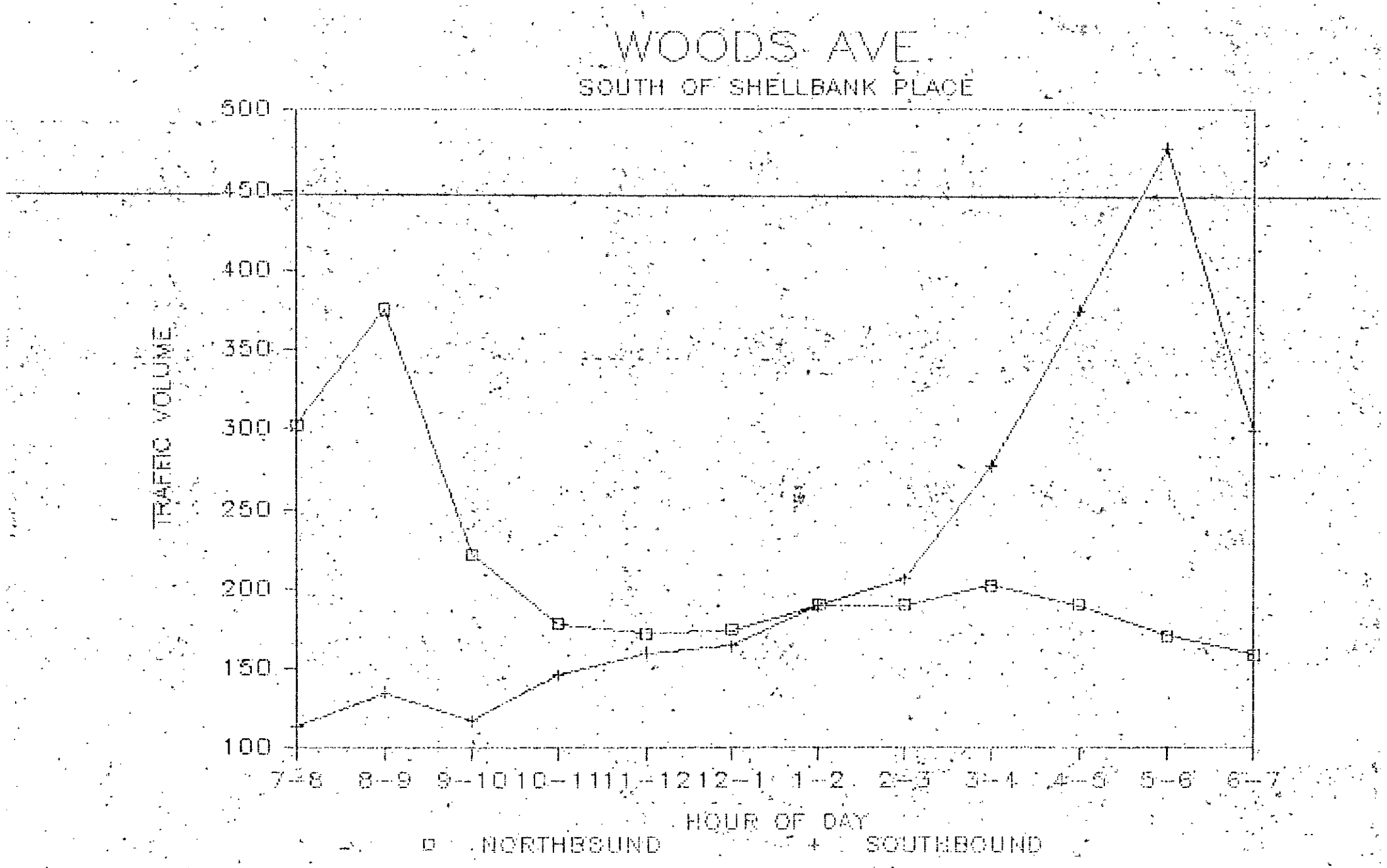

WOODS AVE.
SOUTH OF SHELLBANK PLACE
TRAFFIC VOLUME
500
450
400
350
300
250
200
150
100
7-8
8-9
9-10
10-11
11-12
12-1
1-2
2-3
3-4
4-5
5-6
6-7
HOUR OF DAY
NORTHBOUND
SOUTHBOUND

FIGURE 7

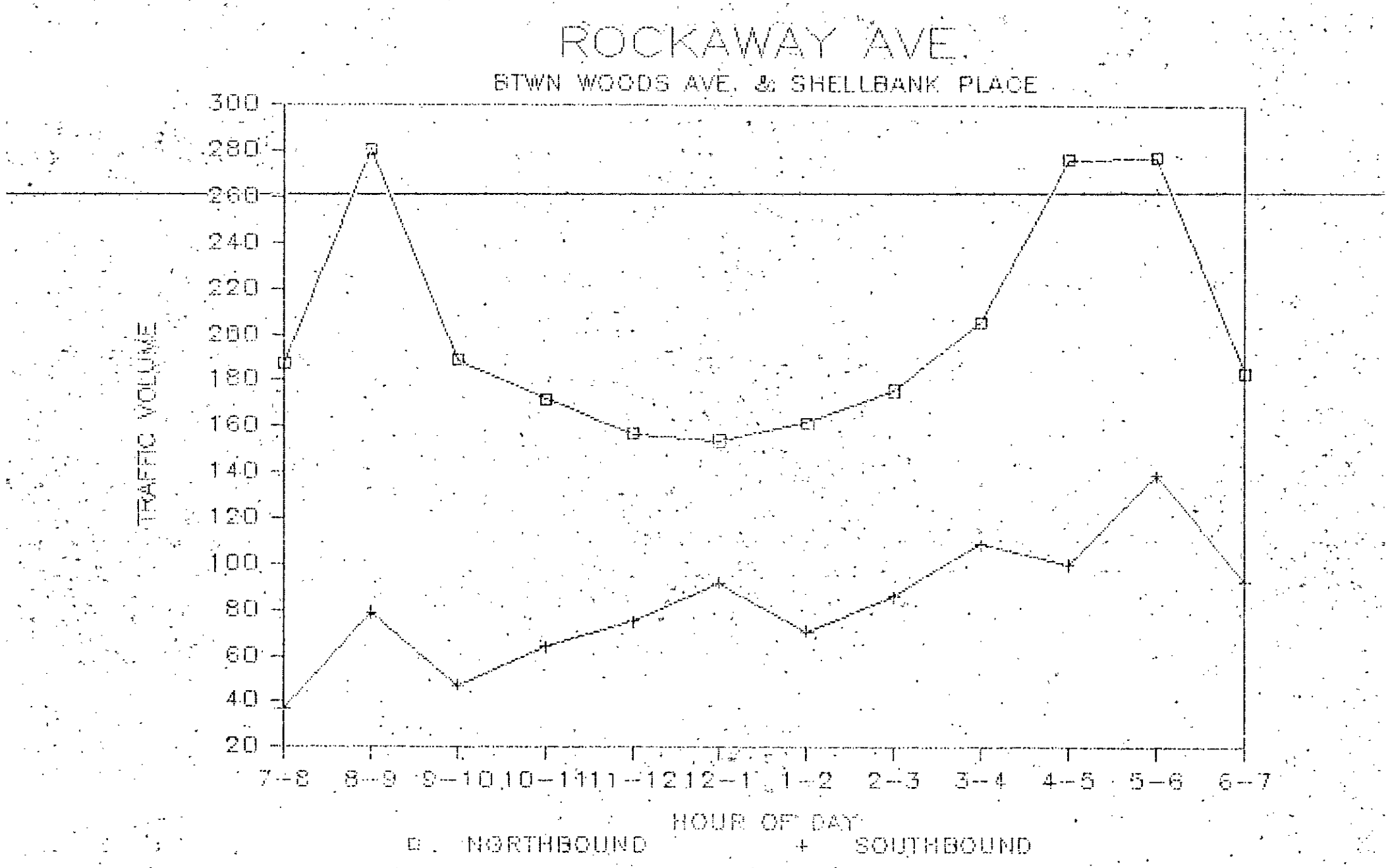

ROCKAWAY AVE.
BTWN WOODS AVE. & SHELLBANK PLACE
TRAFFIC VOLUME
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
7-8
8-9
9-10
10-11
11-12
12-1
1-2
2-3
3-4
4-5
5-6
6-7
HOUR OF DAY
NORTHBOUND
SOUTHBOUND

FIGURE 8

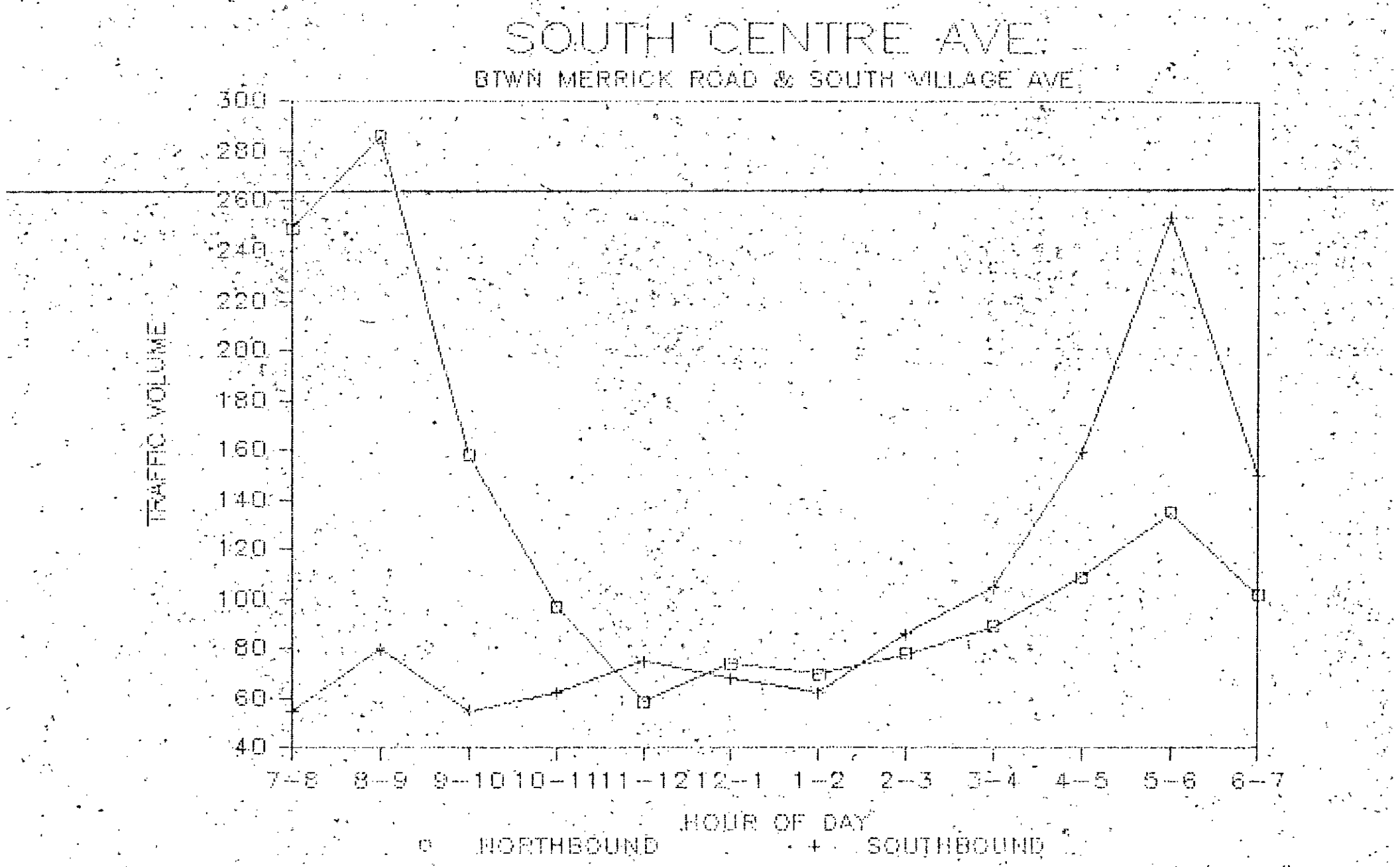

SOUTH CENTRE AVE.
BTWN MERRICK ROAD & SOUTH VILLAGE AVE.
TRAFFIC VOLUME
300
280
260
240
220
200
180
160
140
120
100
80
60
40
7-8
8-9
9-10
10-11
11-12
12-1
1-2
2-3
3-4
4-5
5-6
6-7
HOUR OF DAY
NORTHBOUND
SOUTHBOUND

FIGURE 9

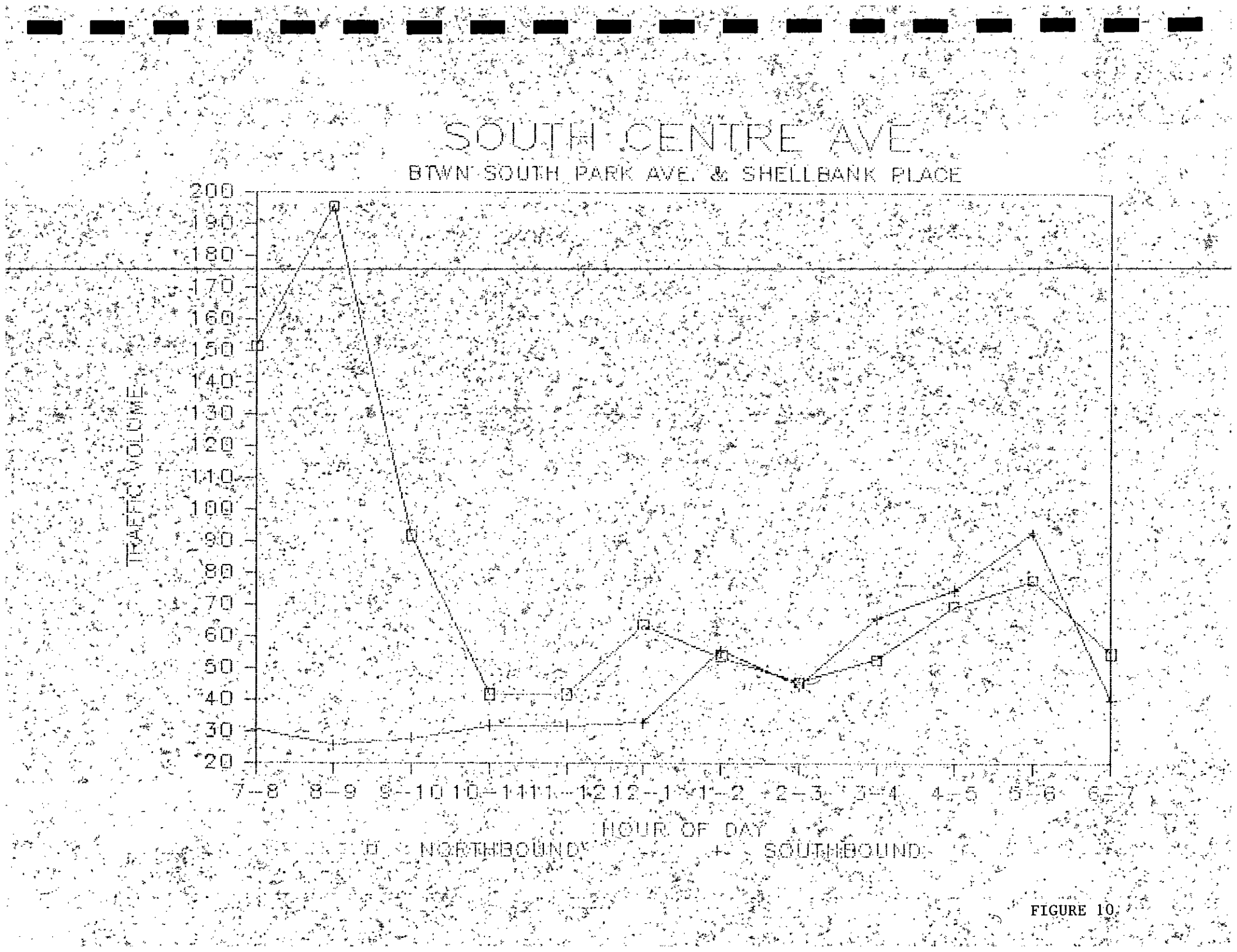

SOUTH CENTRE AVE.
BTWN SOUTH PARK AVE. & SHELLBANK PLACE
TRAFFIC VOLUME
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
7-8
8-9
9-10
10-11
11-12
12-1
1-2
2-3
3-4
4-5
5-6
6-7
HOUR OF DAY
NORTHBOUND
SOUTHBOUND

FIGURE 10

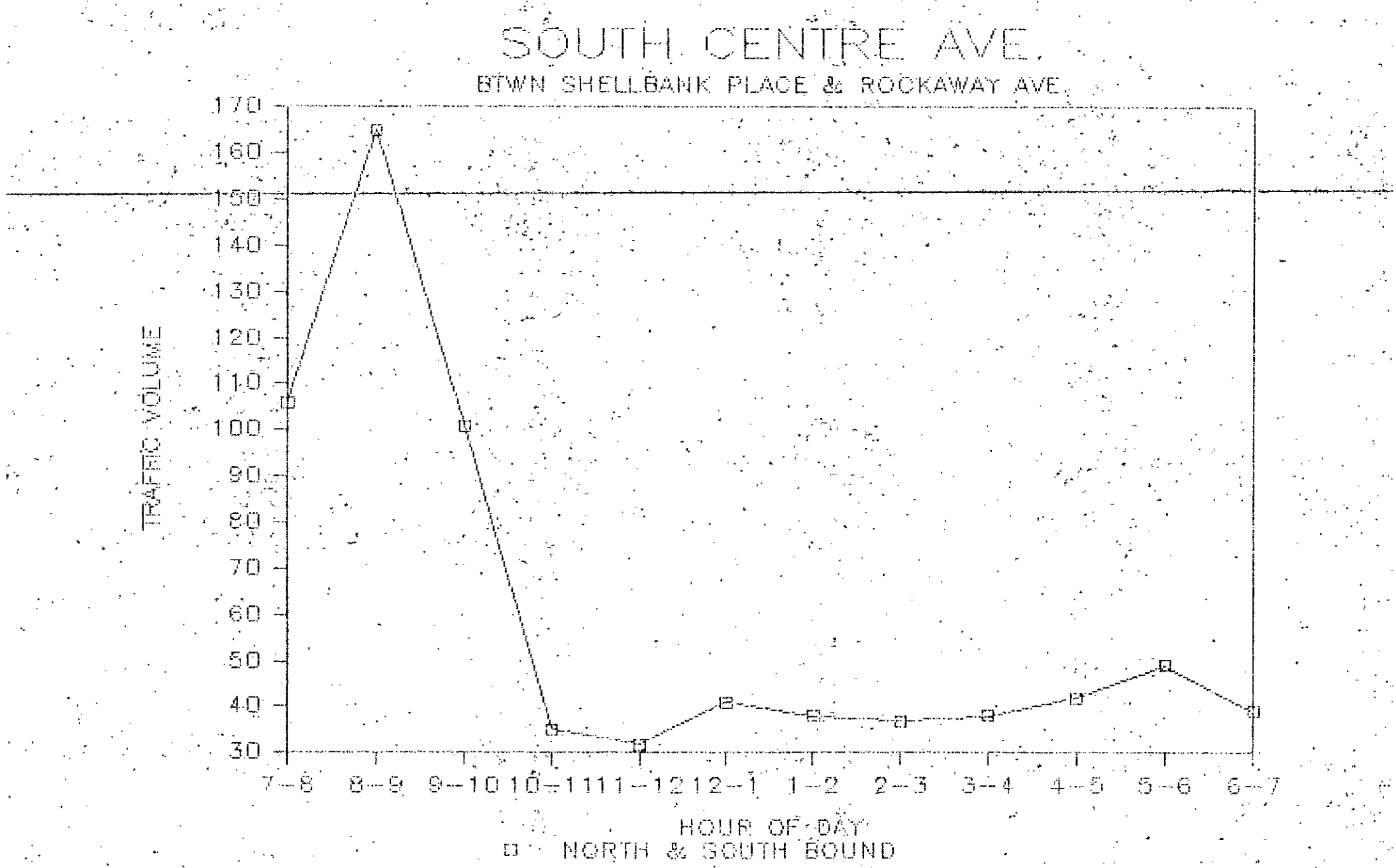

SOUTH CENTRE AVE.
BTWN SHELLBANK PLACE & ROCKAWAY AVE.
TRAFFIC VOLUME
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
7-8
8-9
9-10
10-11
11-12
12-1
1-2
2-3
3-4
4-5
5-6
6-7
HOUR OF DAY
NORTH & SOUTH BOUND

FIGURE 11

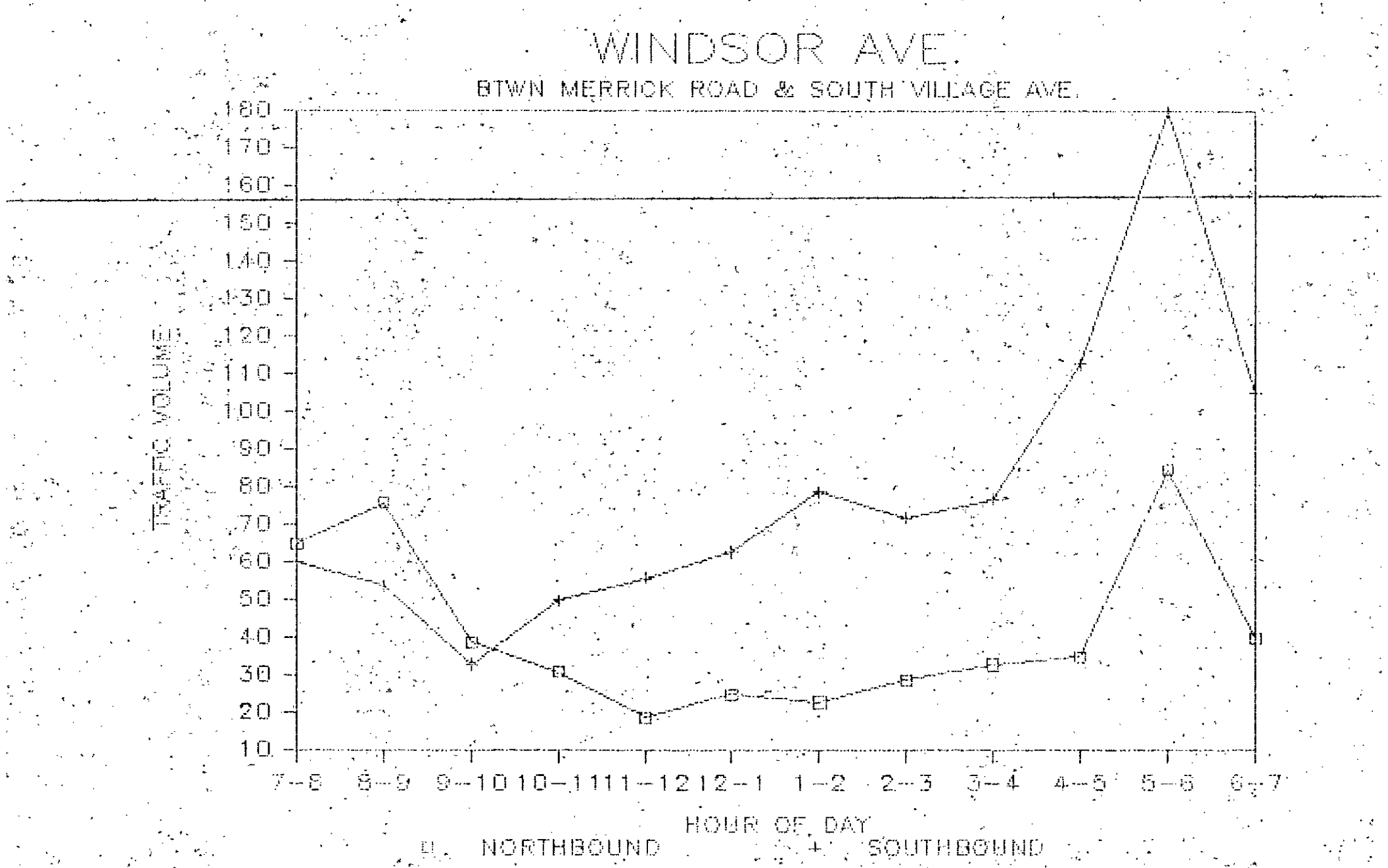

WINDSOR AVE.
BTWN MERRICK ROAD & SOUTH VILLAGE AVE.
TRAFFIC VOLUME
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
7-8
8-9
9-10
10-11
11-12
12-1
1-2
2-3
3-4
4-5
5-6
6-7
HOUR OF DAY
NORTHBOUND
SOUTHBOUND

FIGURE 12

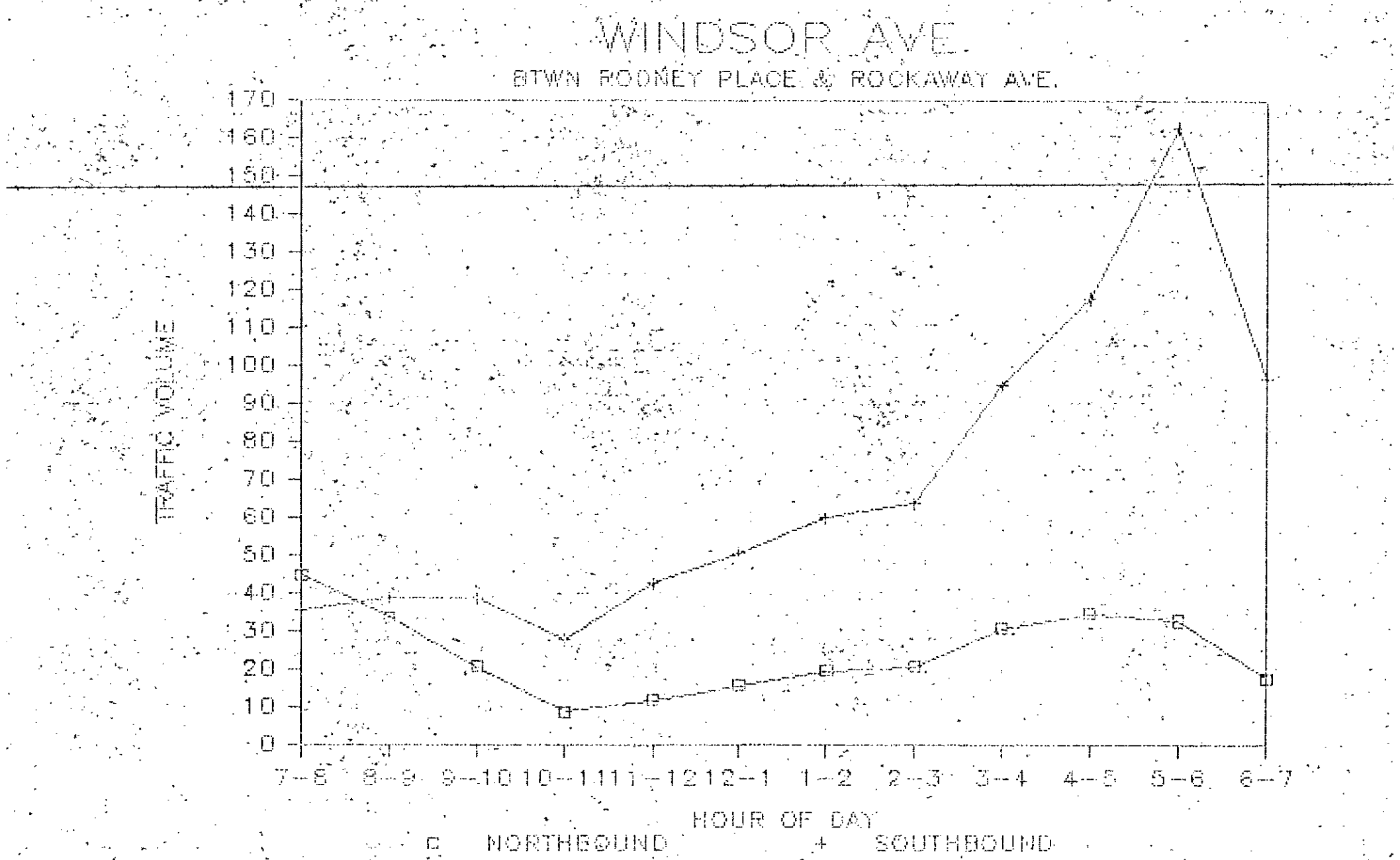

WINDSOR AVE.
BTWN ROONEY PLACE & ROCKAWAY AVE.
TRAFFIC VOLUME
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
7-8
8-9
9-10
10-11
11-12
12-1
1-2
2-3
3-4
4-5
5-6
6-7
HOUR OF DAY
NORTHBOUND
SOUTHBOUND

FIGURE 13

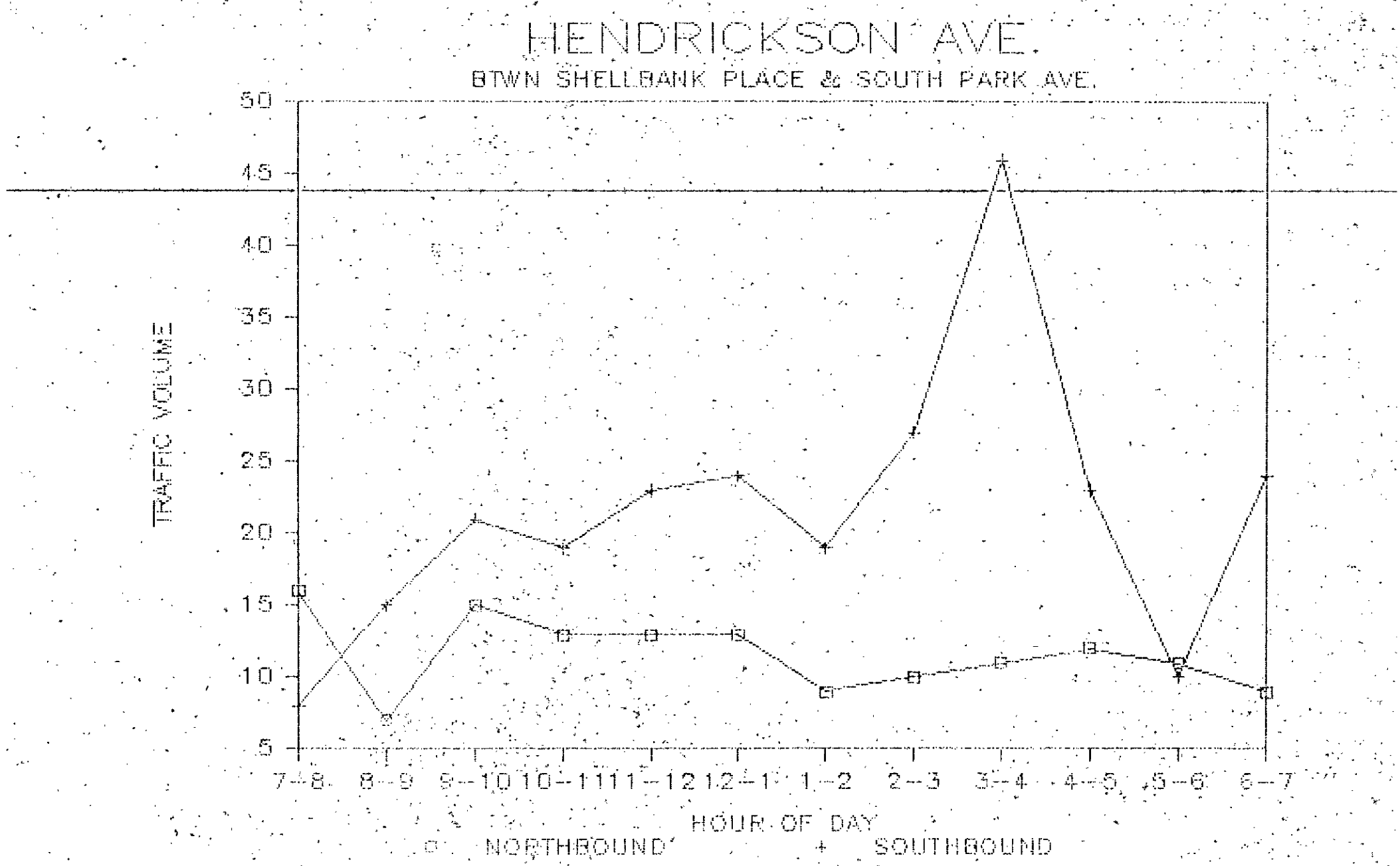

HENDRICKSON AVE.
BTWN SHELLBANK PLACE & SOUTH PARK AVE.
TRAFFIC VOLUME
50
45
40
35
30
25
20
15
10
5
7-8
8-9
9-10
10-11
11-12
12-1
1-2
2-3
3-4
4-5
5-6
6-7
HOUR OF DAY
NORTHBOUND
SOUTHBOUND

FIGURE 14

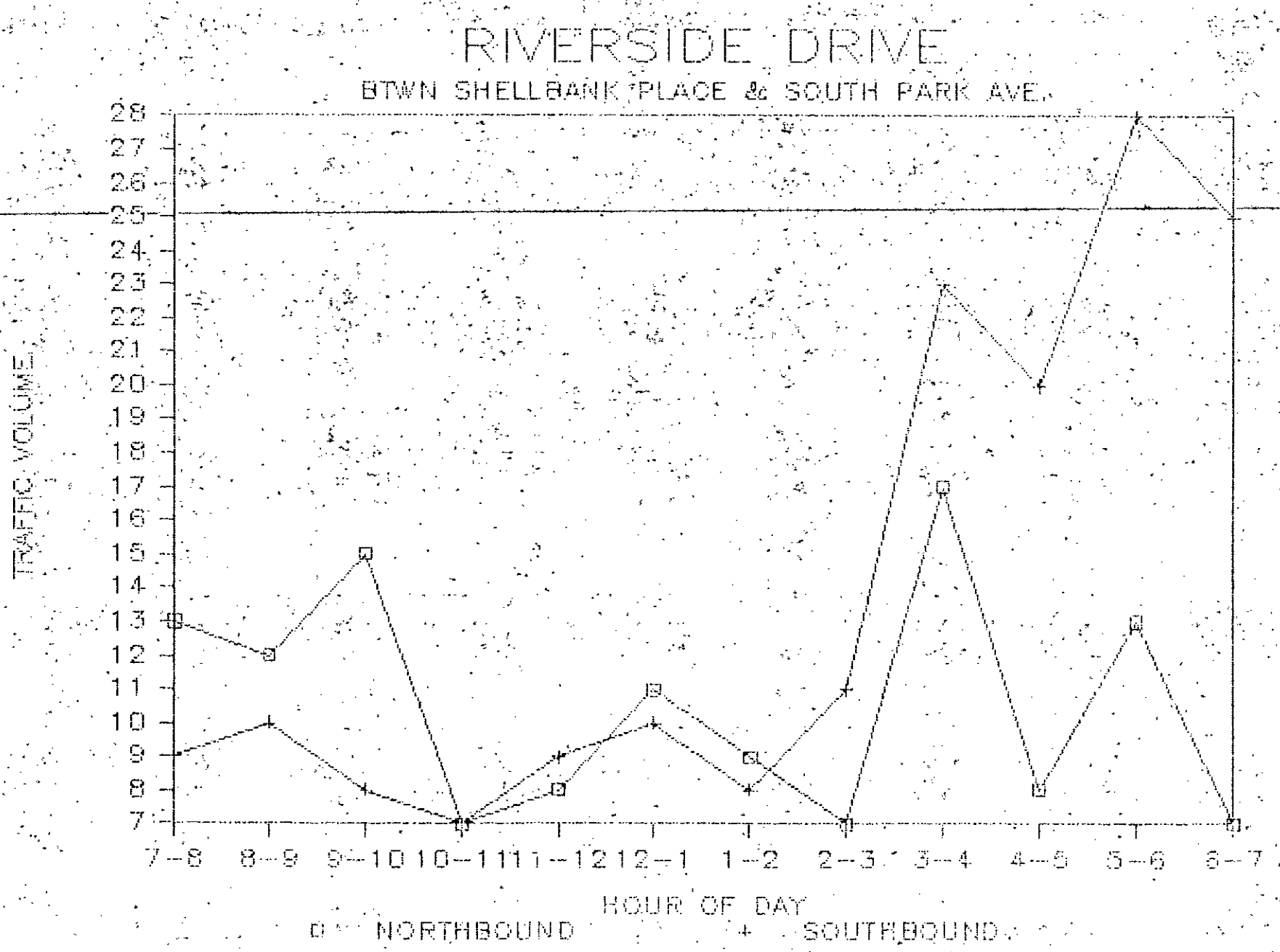

RIVERSIDE DRIVE
BTWN SHELLBANK PLACE & SOUTH PARK AVE.
TRAFFIC VOLUME
28
27
26
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
7-8
8-9
9-10
10-11
11-12
12-1
1-2
2-3
3-4
4-5
5-6
6-7
HOUR OF DAY
NORTHBOUND
SOUTHBOUND

FIGURE 15

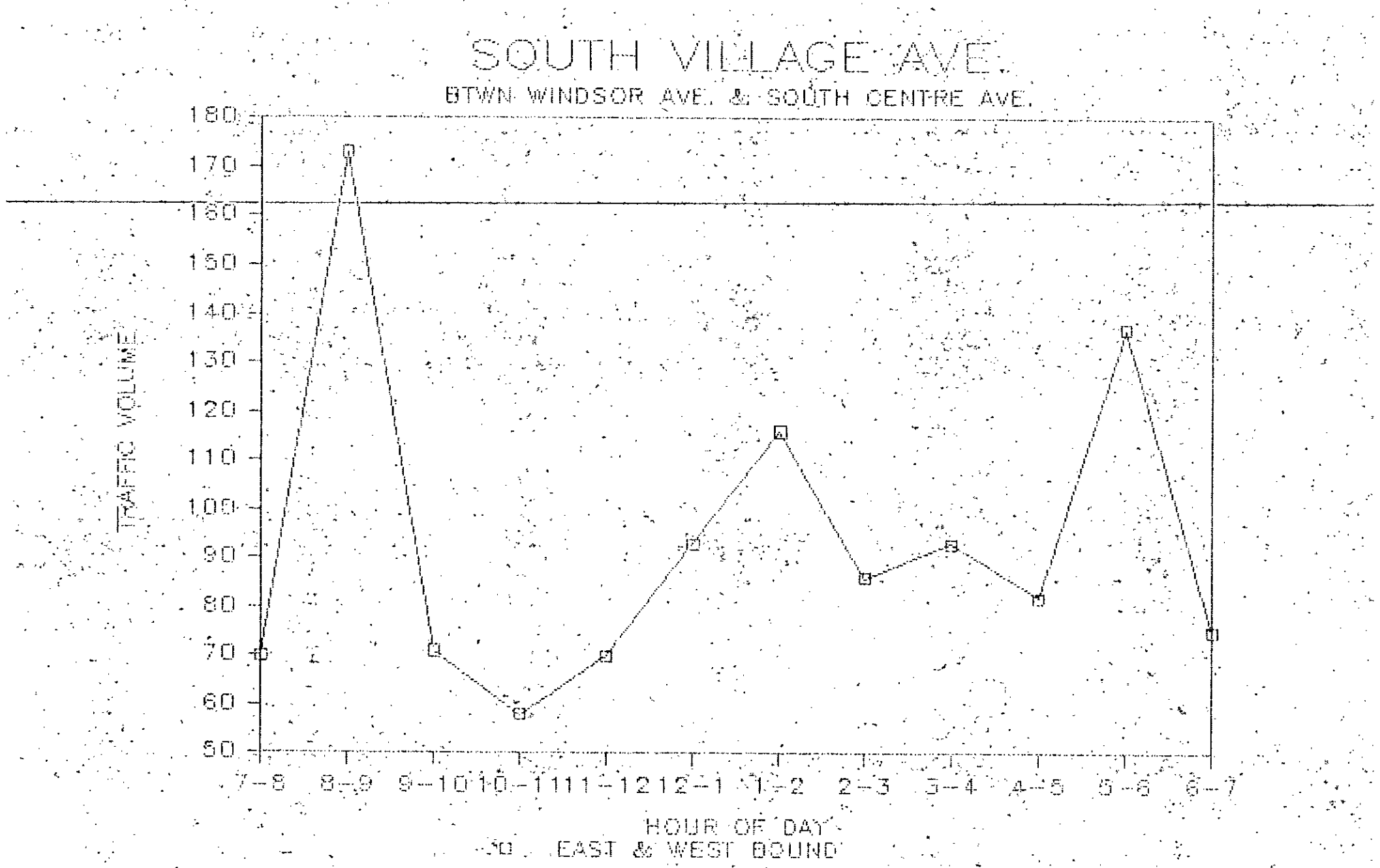

SOUTH VILLAGE AVE.
BTWN WINDSOR AVE. & SOUTH CENTRE AVE.
TRAFFIC VOLUME
180
170
160
150
140
130
120
110
100
90
80
70
60
50
7-8
8-9
9-10
10-11
11-12
12-1
1-2
2-3
3-4
4-5
5-6
6-7
HOUR OF DAY
EAST & WEST BOUND

FIGURE 16

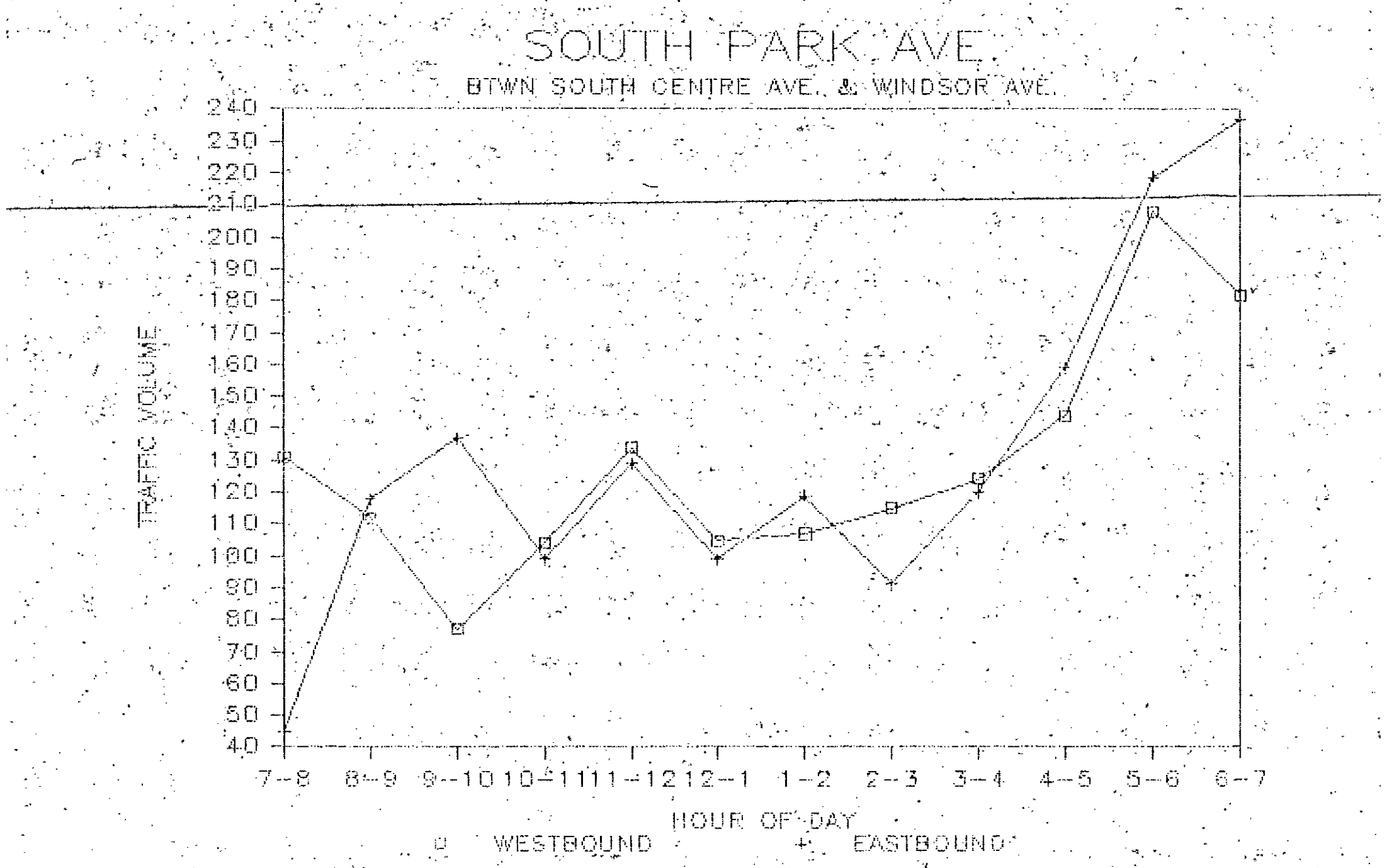

SOUTH PARK AVE.
BTWN SOUTH CENTRE AVE. & WINDSOR AVE.
TRAFFIC VOLUME
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
7--8
8--9
9--10
10--11
11--12
12--1
1--2
2--3
3--4
4--5
5--6
6--7
HOUR OF DAY
WESTBOUND
EASTBOUND

FIGURE 17

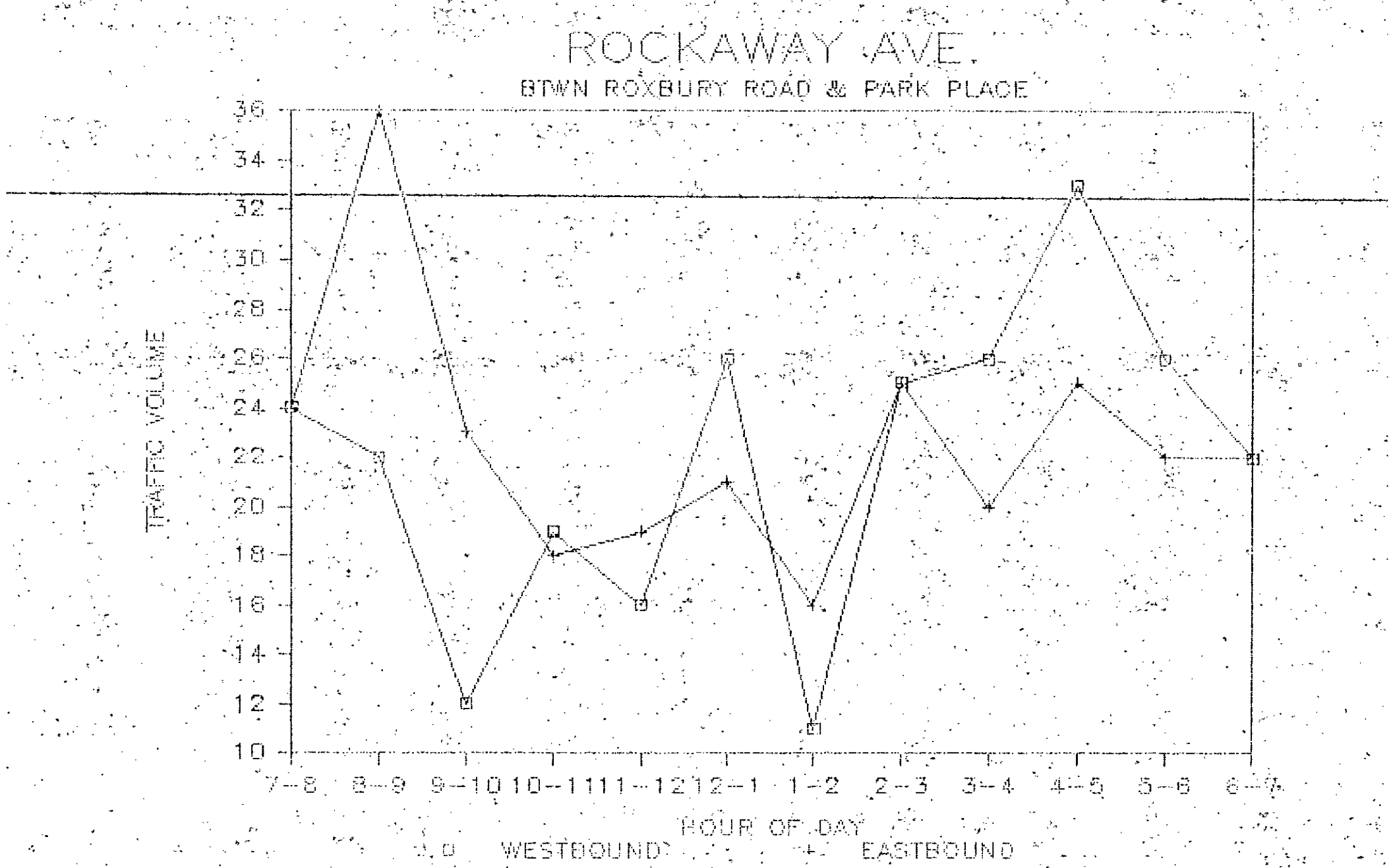

ROCKAWAY AVE.
BTWN ROXBURY ROAD & PARK PLACE
TRAFFIC VOLUME
36
34
32
30
28
26
24
22
20
18
16
14
12
10
7-8
8-9
9-10
10-11
11-12
12-1
1-2
2-3
3-4
4-5
5-6
6-7
HOUR OF DAY
WESTBOUND
EASTBOUND

FIGURE 18

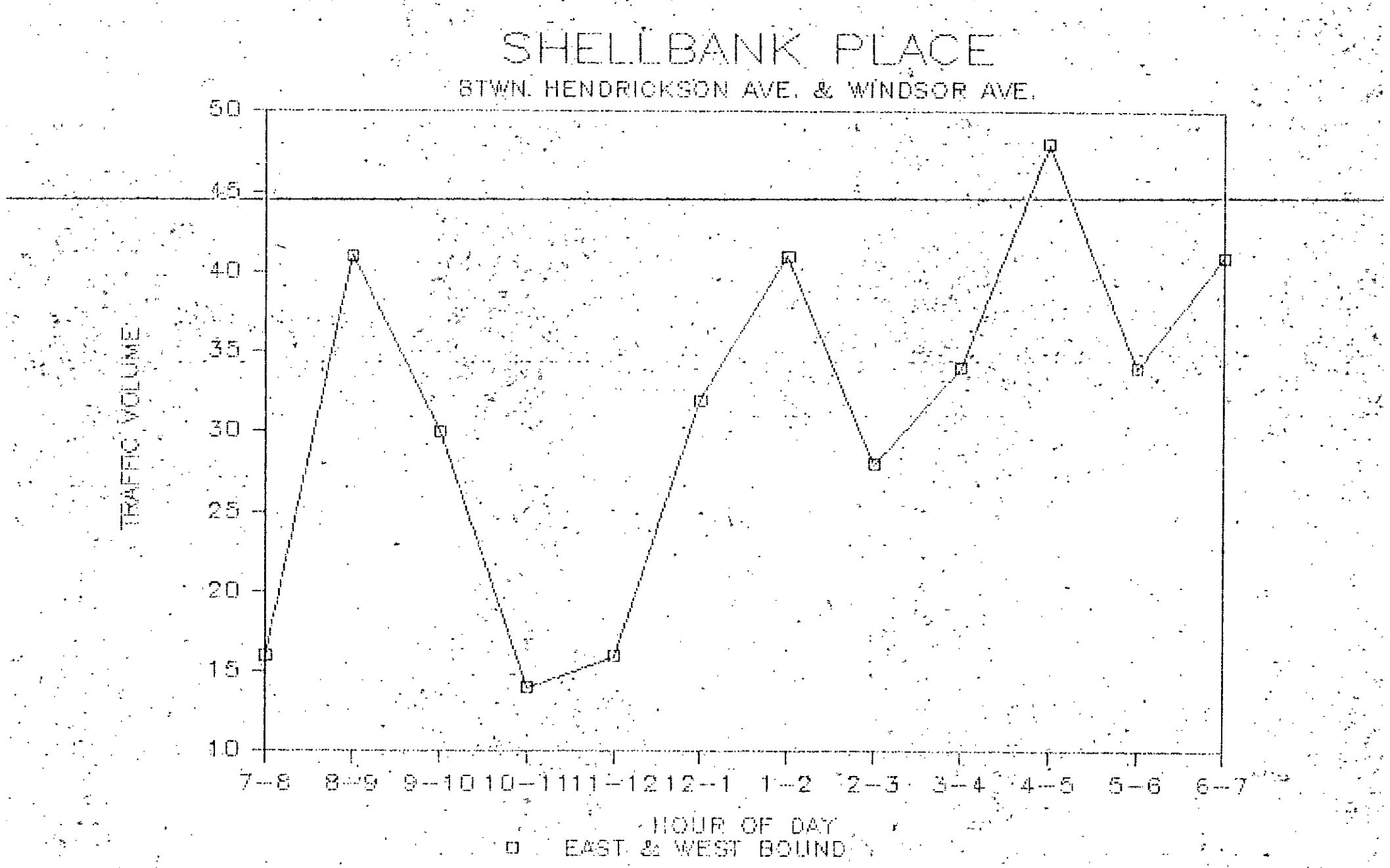
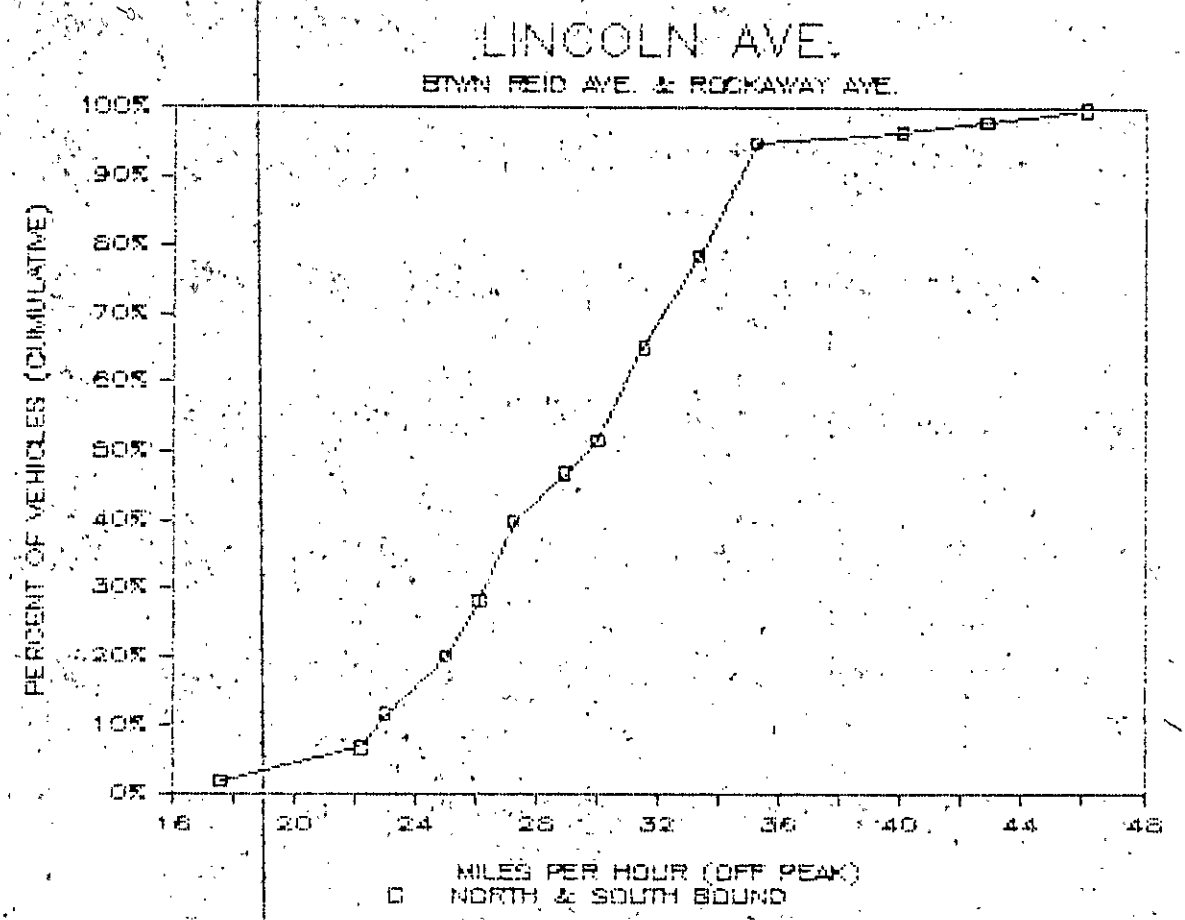

SHELLBANK PLACE
BTWN. HENDRICKSON AVE. & WINDSOR AVE.
TRAFFIC VOLUME
50
45
40
35
30
25
20
15
10
7-8
8-9
9-10
10-11
11-12
12-1
1-2
2-3
3-4
4-5
5-6
6-7
HOUR OF DAY
EAST & WEST BOUND

FIGURE 19

SPOT SPEED DATA

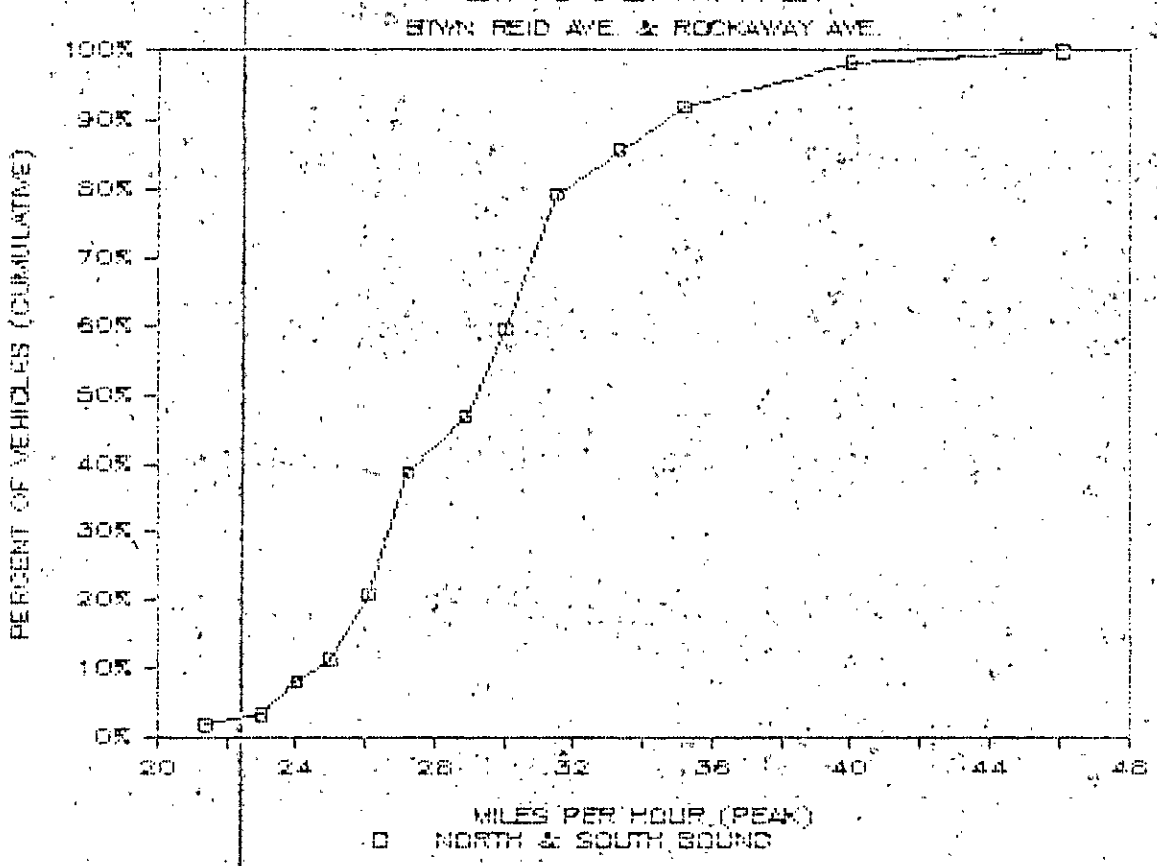


DATE: 11-19-84
TIME: 10:30 AM

# VEHS.	SPEED (MPH)	PERCENTILE
1	46.1	100.00%
1	42.8	98.33%
1	40.0	96.67%
10	35.2	95.00%
8	33.3	78.33%
8	31.5	65.00%
3	30.0	51.67%
4	28.9	46.67%
7	27.2	40.00%
5	26.1	28.33%
5	25.0	20.00%
3	23.0	11.67%
3	22.2	6.67%
1	17.6	1.67%

SUM = 60 MIN SPEED = 17.6 STD = 5.2
AVG = 30.1 MAX SPEED = 46.1 VAR = 27.4

FIGURE 23

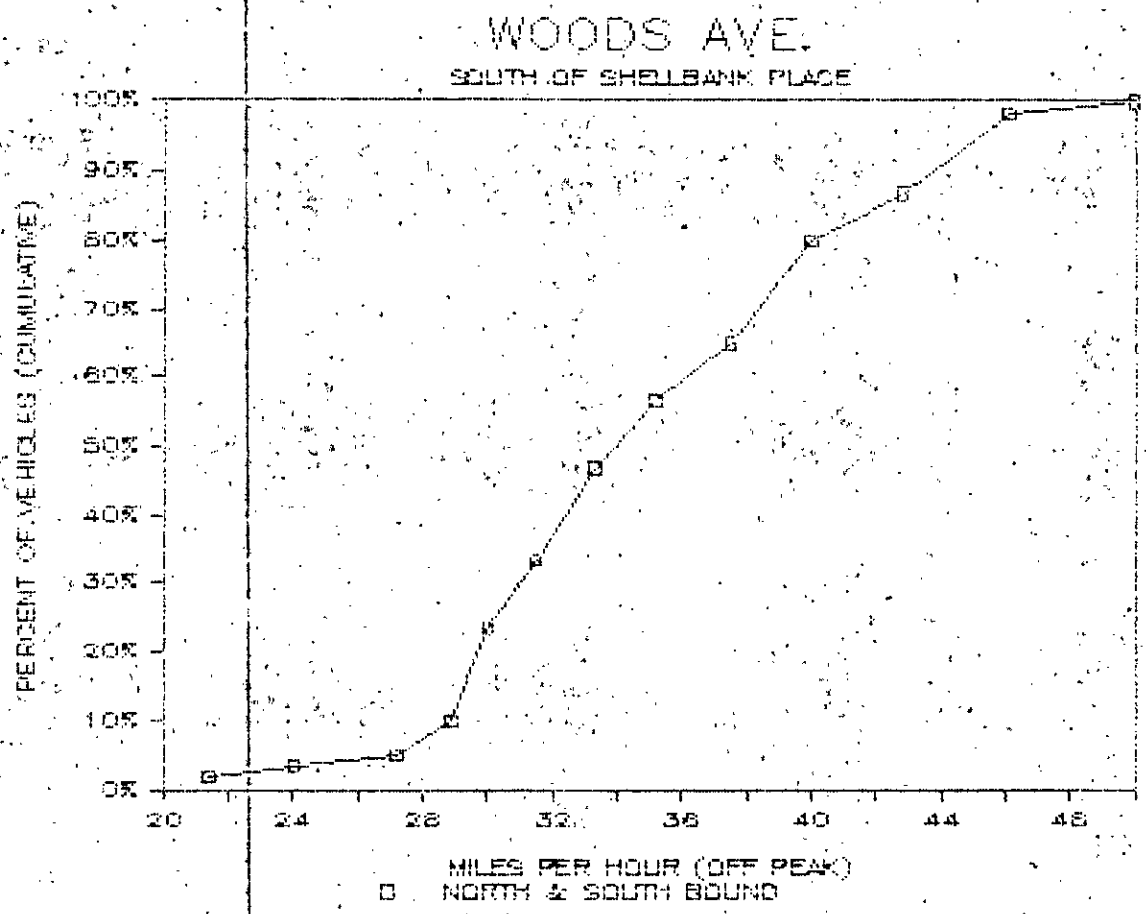


DATE: 11-19-84
TIME: 3:40 PM

# VEHS.	SPEED (MPH)	PERCENTILE
1	46.1	100.00%
4	40.0	98.39%
4	35.2	91.94%
4	33.3	85.48%
12	31.5	79.03%
8	30.0	59.68%
5	28.9	46.77%
11	27.2	38.71%
6	26.1	20.97%
2	25.0	11.29%
3	24.0	8.06%
1	23.0	3.23%
1	21.4	1.61%

SUM = 62 MIN SPEED = 21.4 STD = 4.6
AVG = 30.1 MAX SPEED = 46.1 VAR = 21.0

FIGURE 24

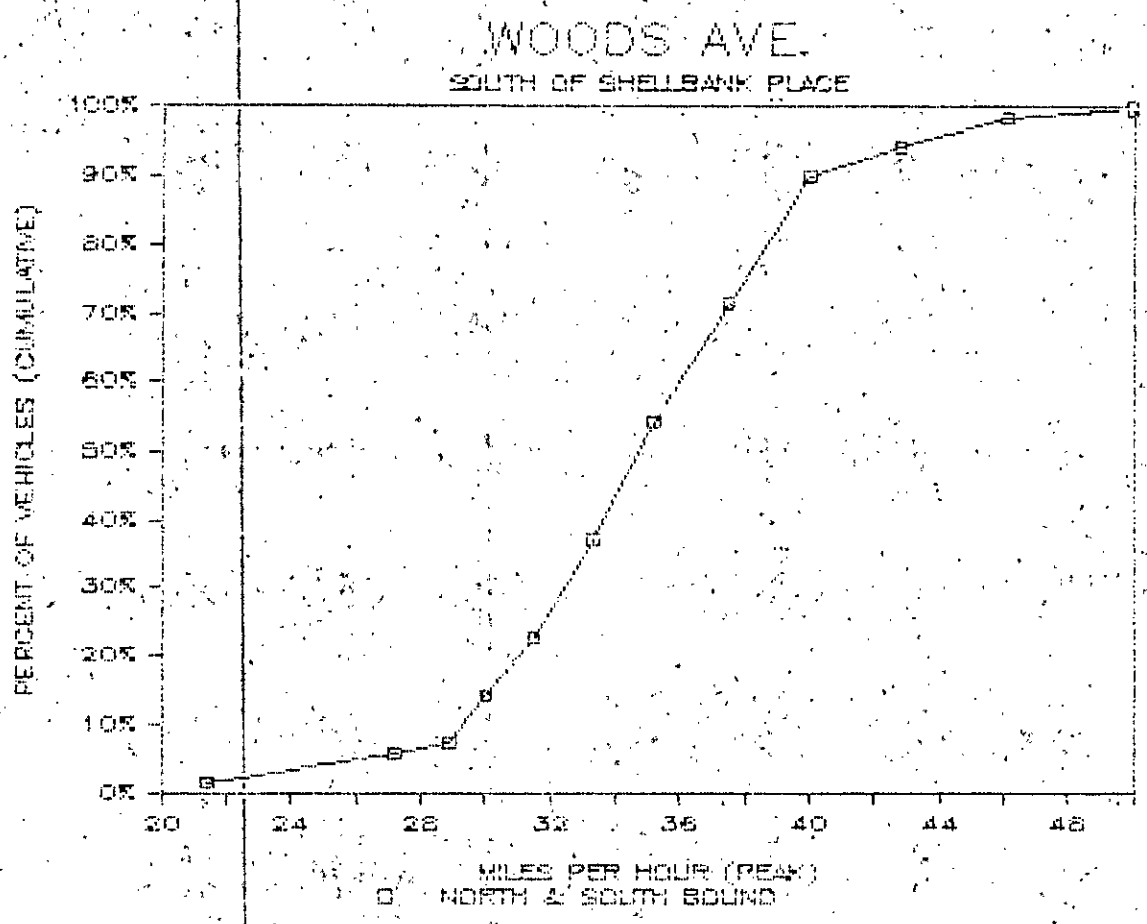


DATE: 11-20-84
TIME: 11:30 AM

# VEHS.	SPEED (MPH)	PERCENTILE
1	50.0	100.00%
7	46.1	98.33%
4	42.8	86.67%
9	40.0	80.00%
5	37.5	65.00%
6	35.2	56.67%
8	33.3	46.67%
6	31.5	33.33%
8	30.0	23.33%
3	28.9	10.00%
1	27.2	5.00%
1	24.0	3.33%
1	21.4	1.67%

SUM = 60 MIN SPEED = 21.4 STD = 6.2
AVG = 36.0 MAX SPEED = 50.0 VAR = 38.5

FIGURE 25.

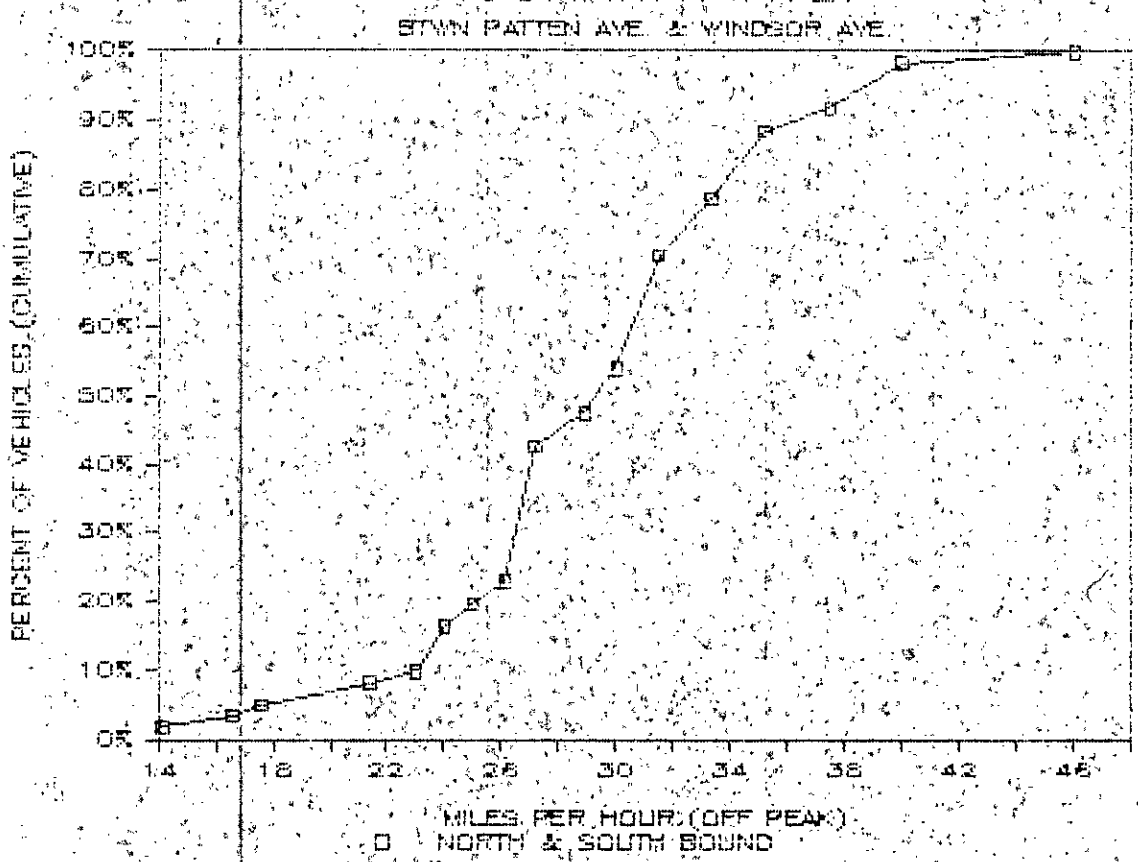


DATE: 11-20-84
TIME: 4:00 PM

# VEHS.	SPEED (MPH)	PERCENTILE
1	50.0	100.00%
3	46.1	98.57%
3	42.8	94.29%
13	40.0	90.00%
12	37.5	71.43%
12	35.2	54.29%
10	33.3	37.14%
6	31.5	22.86%
5	30.0	14.29%
1	28.9	7.14%
3	27.2	5.71%
1	21.4	1.43%

SUM = 70 MIN SPEED = 21.4 STD = 5.0
AVG = 35.9 MAX SPEED = 50.0 VAR = 25.0

FIGURE 26

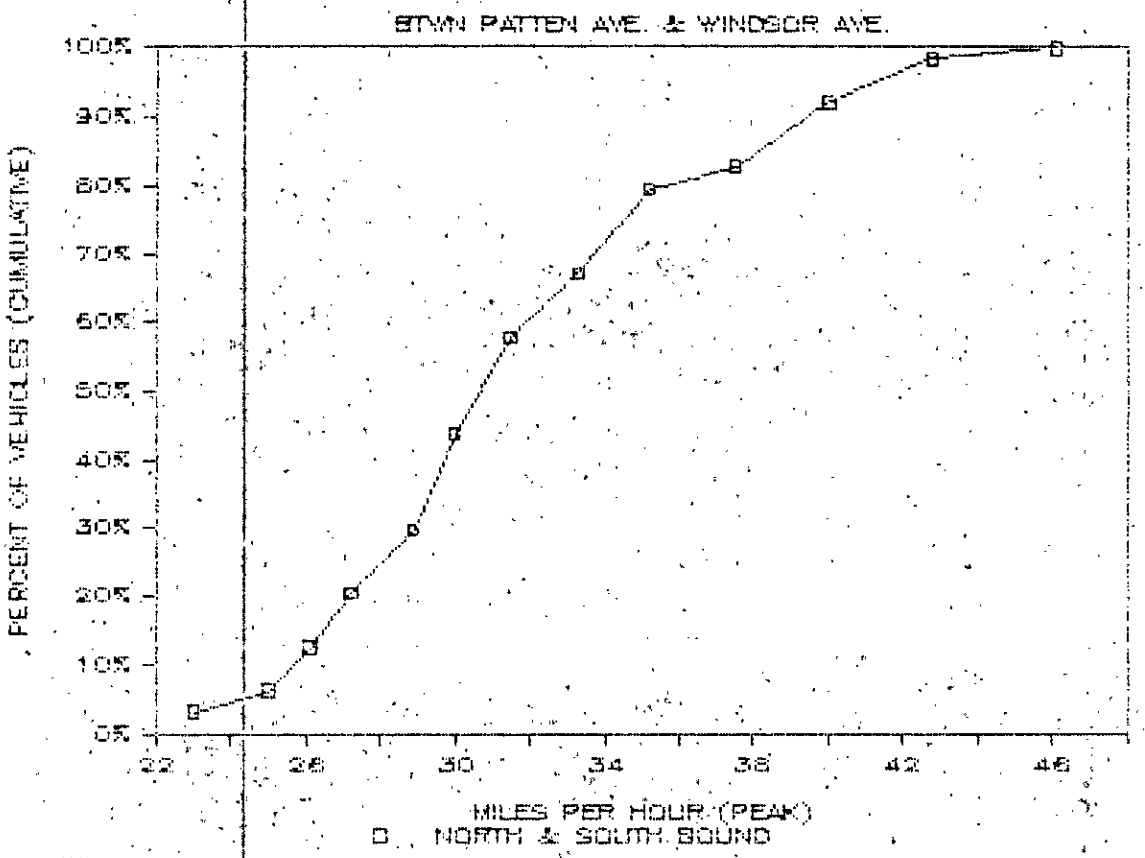


DATE: 11-19-84
TIME: 10:50 AM

# VEHS.	SPEED (MPH)	PERCENTILE
1	46.1	100.00%
4	40.0	98.36%
2	37.5	91.80%
6	35.2	88.52%
5	33.3	78.69%
10	31.5	70.49%
4	30.0	54.10%
3	28.9	47.54%
12	27.2	42.62%
2	26.1	22.95%
2	25.0	19.67%
4	24.0	16.39%
1	23.0	9.84%
2	21.4	8.20%
1	17.6	4.92%
2	16.6	3.28%
1	14.1	1.64%

SUM = 61 MIN SPEED = 14.1 STD = 5.9
AVG = 29.8 MAX SPEED = 46.1 VAR = 34.7

FIGURE 27

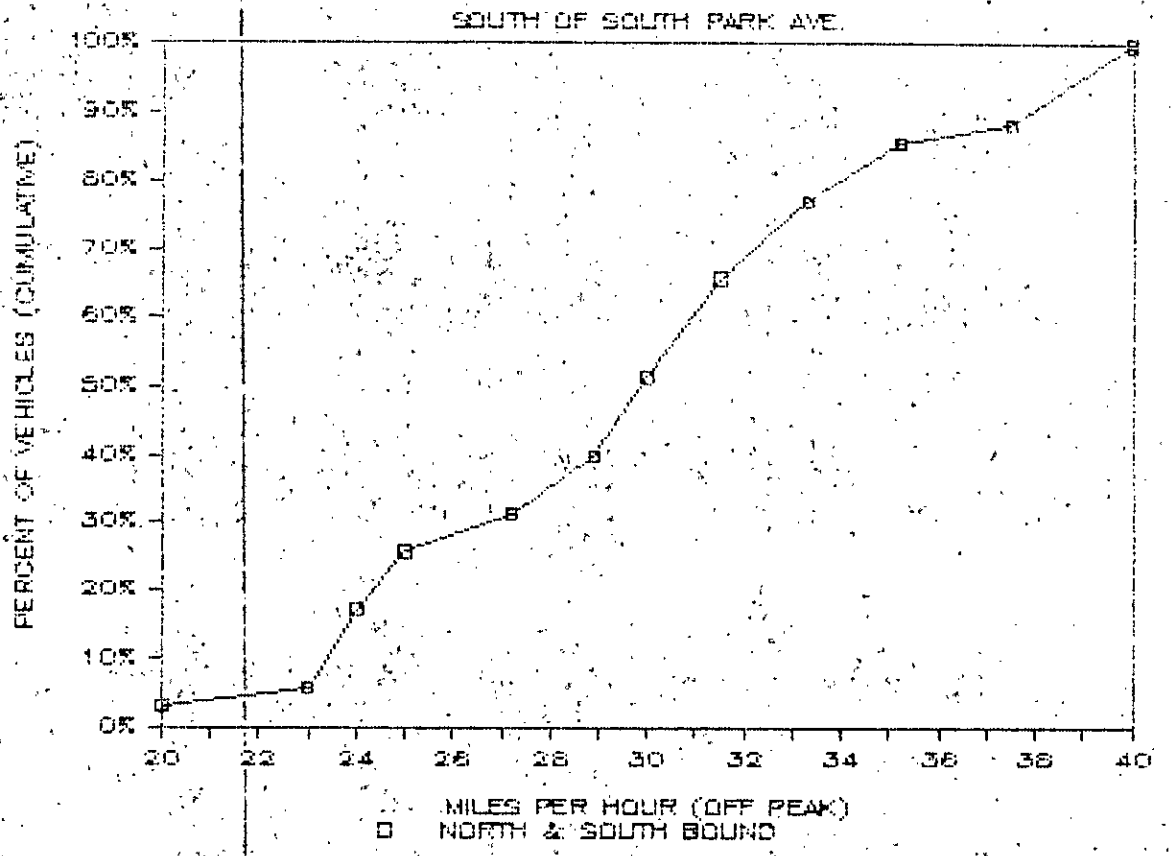


DATE: 11-19-84
TIME: 3:50 PM

# VEHS.	SPEED (MPH)	PERCENTILE
1	46.1	100.00%
4	42.8	98.44%
6	40.0	92.19%
2	37.5	82.81%
8	35.2	79.69%
6	33.3	67.19%
9	31.5	57.81%
9	30.0	43.75%
6	28.9	29.69%
5	27.2	20.31%
4	26.1	12.50%
2	25.0	6.25%
2	23.0	3.13%

SUM = 64 MIN SPEED = 23.0 STD = 5.3
AVG = 32.5 MAX SPEED = 46.1 VAR = 28.1

FIGURE 28

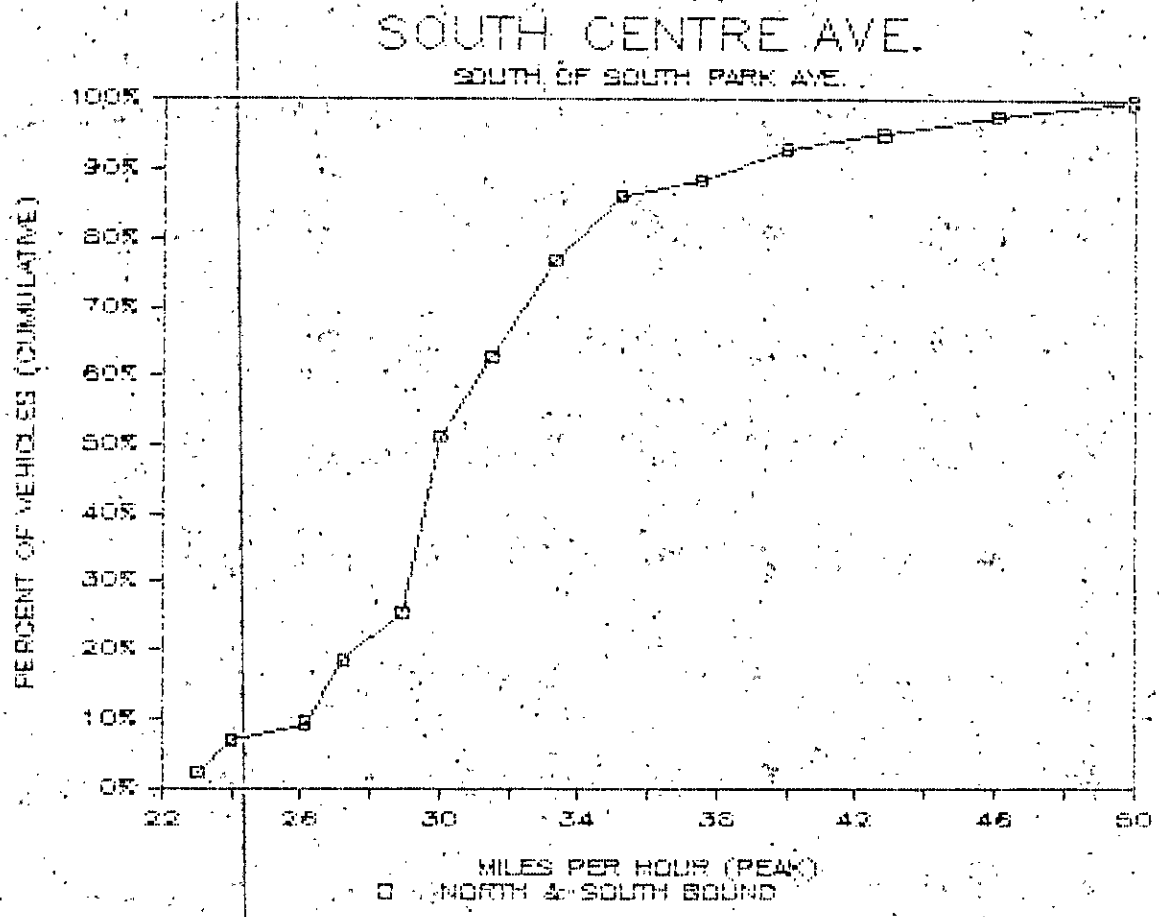


DATE: 11-20-84
TIME: 11:30 AM

# VEHS.	SPEED (MPH)	PERCENTILE
4	40.0	100.00%
1	37.5	88.57%
3	35.2	85.71%
4	33.3	77.14%
5	31.5	65.71%
4	30.0	51.43%
3	28.9	40.00%
2	27.2	31.43%
3	25.0	25.71%
4	24.0	17.14%
1	23.0	5.71%
1	20.0	2.86%

SUM = 35 MIN SPEED = 20.0 STD = 5.3
AVG = 30.5 MAX SPEED = 40.0 VAR = 27.7

FIGURE 29

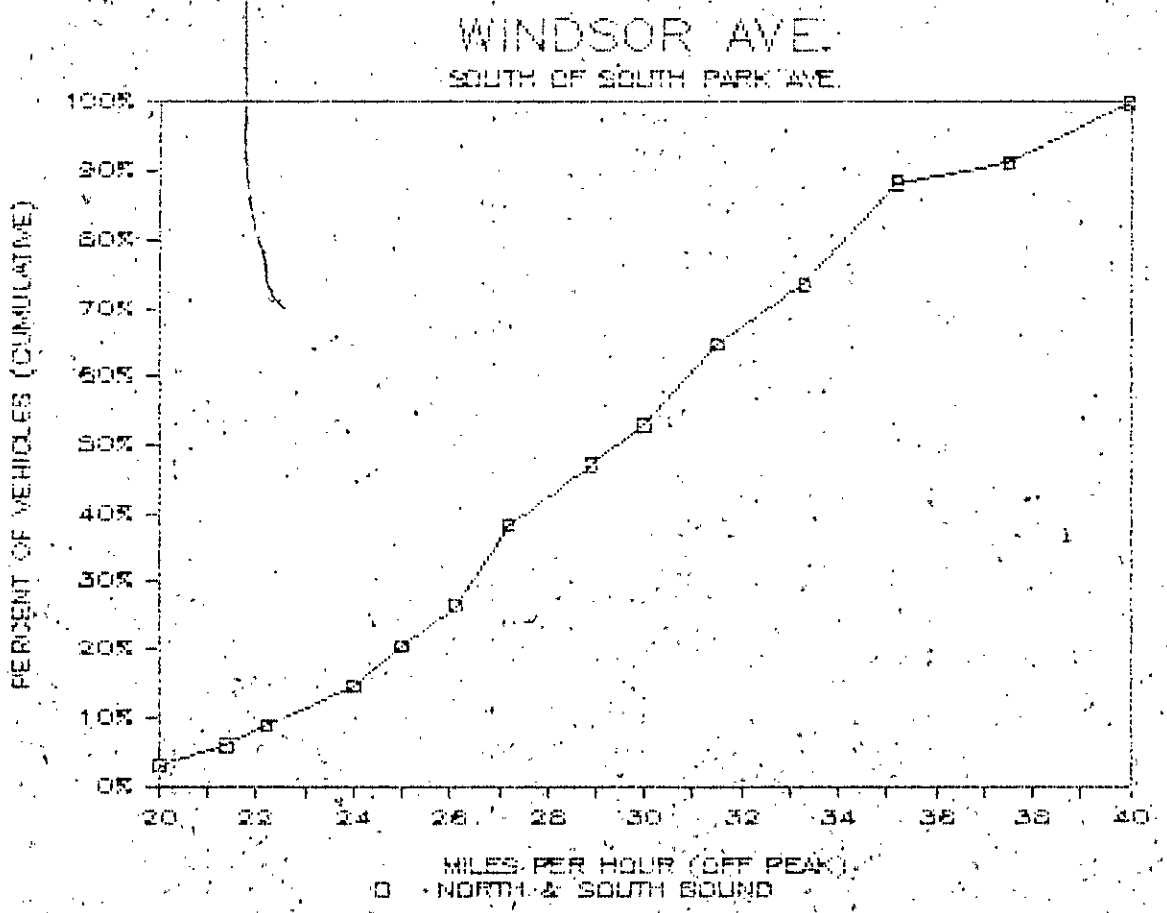


DATE: 11-20-84
TIME: 3:45 PM

# VEHS.	SPEED (MPH)	PERCENTILE
1	50.0	100.00%
1	46.1	97.67%
1	42.8	95.35%
2	40.0	93.02%
1	37.5	88.37%
4	35.2	86.05%
6	33.3	76.74%
5	31.5	62.79%
11	30.0	51.16%
3	28.9	25.58%
4	27.2	18.60%
1	26.1	9.30%
2	24.0	6.98%
1	23.0	2.33%

SUM = 43 MIN SPEED = 23.0 STD = 5.4
AVG = 32.0 MAX SPEED = 50.0 VAR = 29.3

FIGURE 30

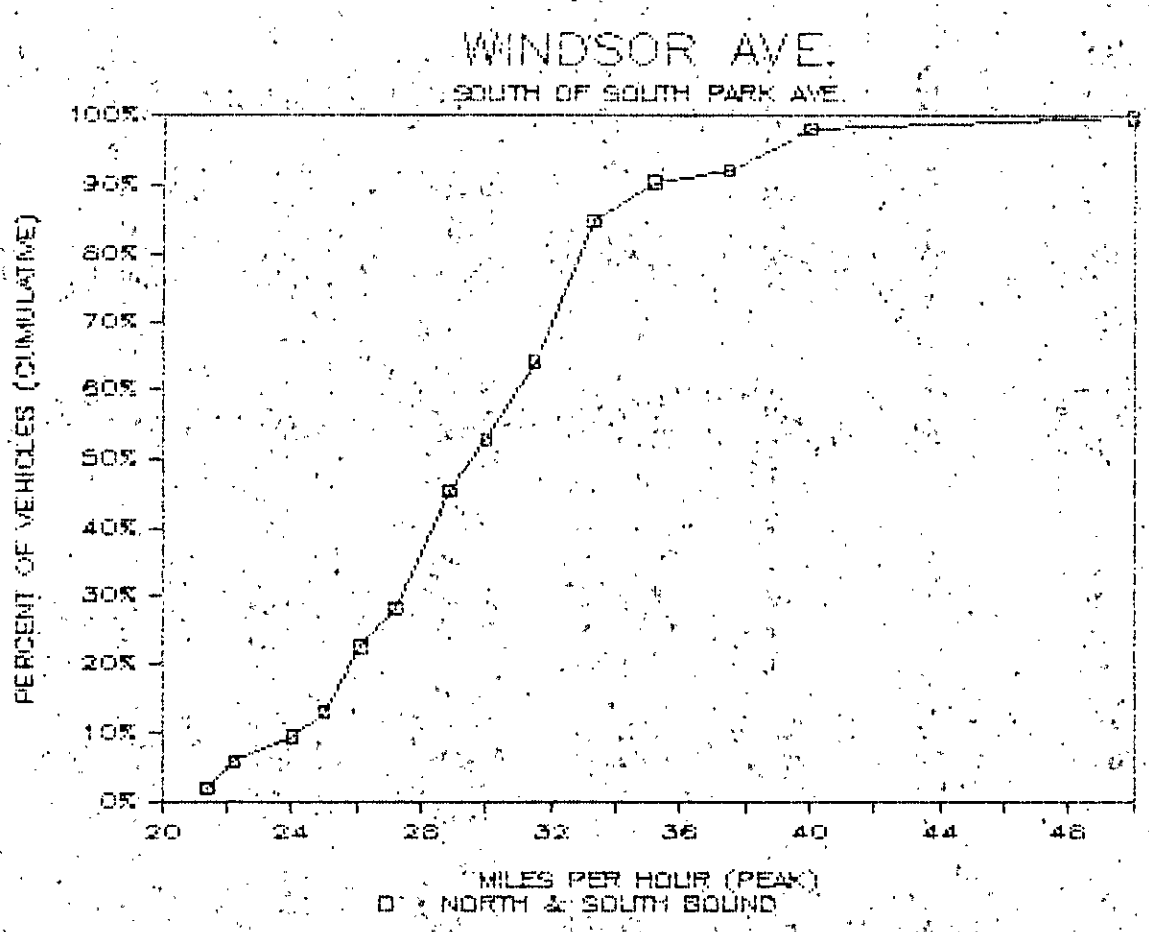


DATE: 11-20-84
TIME: 10:30 AM

# VEHS.	SPEED (MPH)	PERCENTILE
3	40.0	100.00%
1	37.5	91.18%
5	35.2	88.24%
3	33.3	73.53%
4	31.5	64.71%
2	30.0	52.94%
3	28.9	47.06%
4	27.2	38.24%
2	26.1	26.47%
2	25.0	20.59%
2	24.0	14.71%
1	22.2	8.82%
1	21.4	5.88%
1	20.0	2.94%

SUM = 34 MIN SPEED = 20.0 STD = 5.3
AVG = 30.3 MAX SPEED = 40.0 VAR = 28.0

FIGURE 31

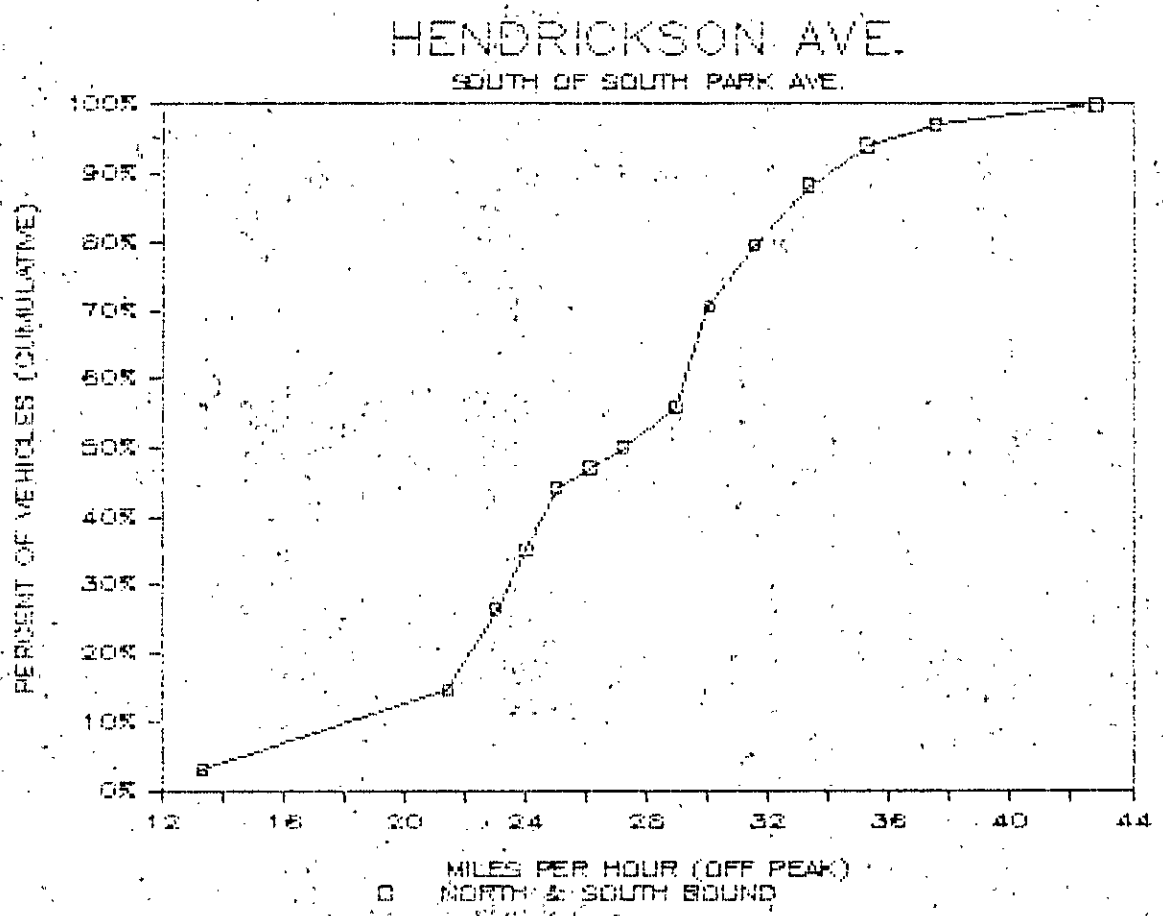


DATE: 11-20-84
TIME: 4:00 PM

# VEHS.	SPEED (MPH)	PERCENTILE
1	50.0	100.00%
3	40.0	98.11%
1	37.5	92.45%
3	35.2	90.57%
11	33.3	84.91%
6	31.5	64.15%
4	30.0	52.83%
9	28.9	45.28%
3	27.2	28.30%
5	26.1	22.64%
2	25.0	13.21%
2	24.0	9.43%
2	22.2	5.66%
1	21.4	1.89%

SUM = 53 MIN SPEED = 21.4 STD = 5.1
AVG = 30.6 MAX SPEED = 50.0 VAR = 26.0

FIGURE 32

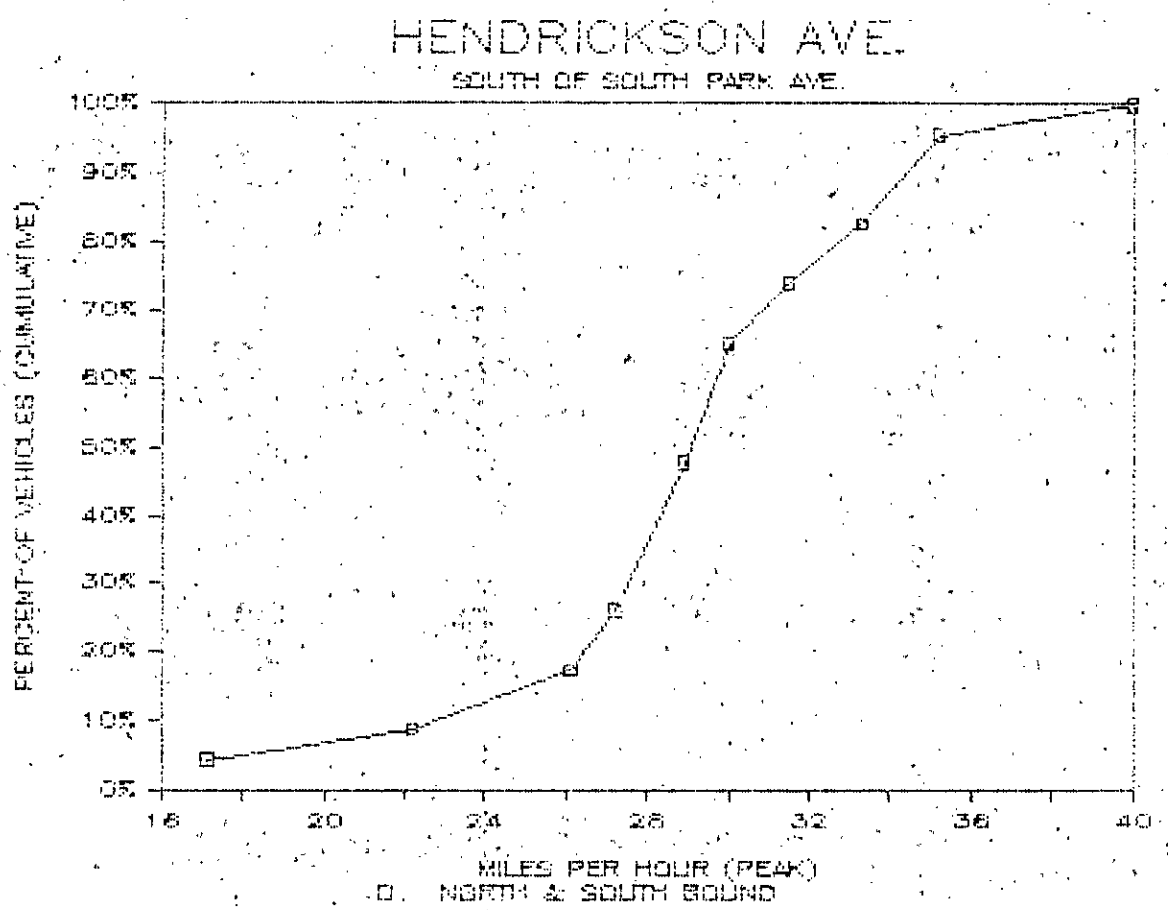


DATE: 11-21-84
TIME: 11:00 AM

# VEHS.	SPEED (MPH)	PERCENTILE
1	42.8	100.00%
1	37.5	97.06%
2	35.2	94.12%
3	33.3	88.24%
3	31.5	79.41%
5	30.0	70.59%
2	28.9	55.88%
1	27.2	50.00%
1	26.1	47.06%
3	25.0	44.12%
3	24.0	35.29%
4	23.0	26.47%
4	21.4	14.71%
1	13.3	2.94%

SUM = 34 MIN SPEED = 13.3 STD = 5.7
AVG = 27.8 MAX SPEED = 42.8 VAR = 33.0

FIGURE 33

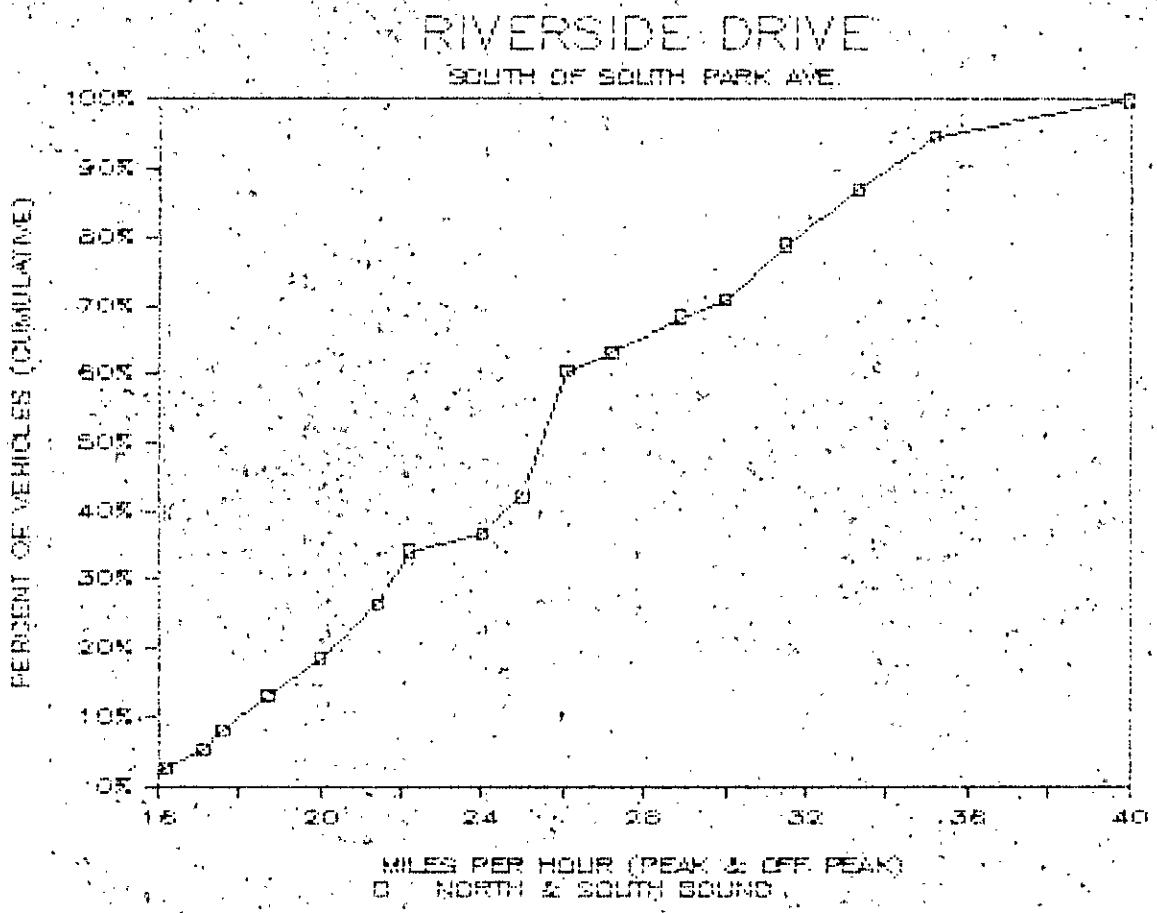


DATE: 11-21-84
TIME: 3:30 PM

# VEHS.	SPEED (MPH)	PERCENTILE
1	40.0	100.00%
3	35.2	95.65%
2	33.3	82.61%
2	31.5	73.91%
4	30.0	65.22%
5	28.9	47.83%
2	27.2	26.09%
2	26.1	17.39%
1	22.2	8.70%
1	17.1	4.35%

SUM = 23 MIN SPEED = 17.1 STD = 4.6
AVG = 29.8 MAX SPEED = 40.0 VAR = 21.1

FIGURE 34

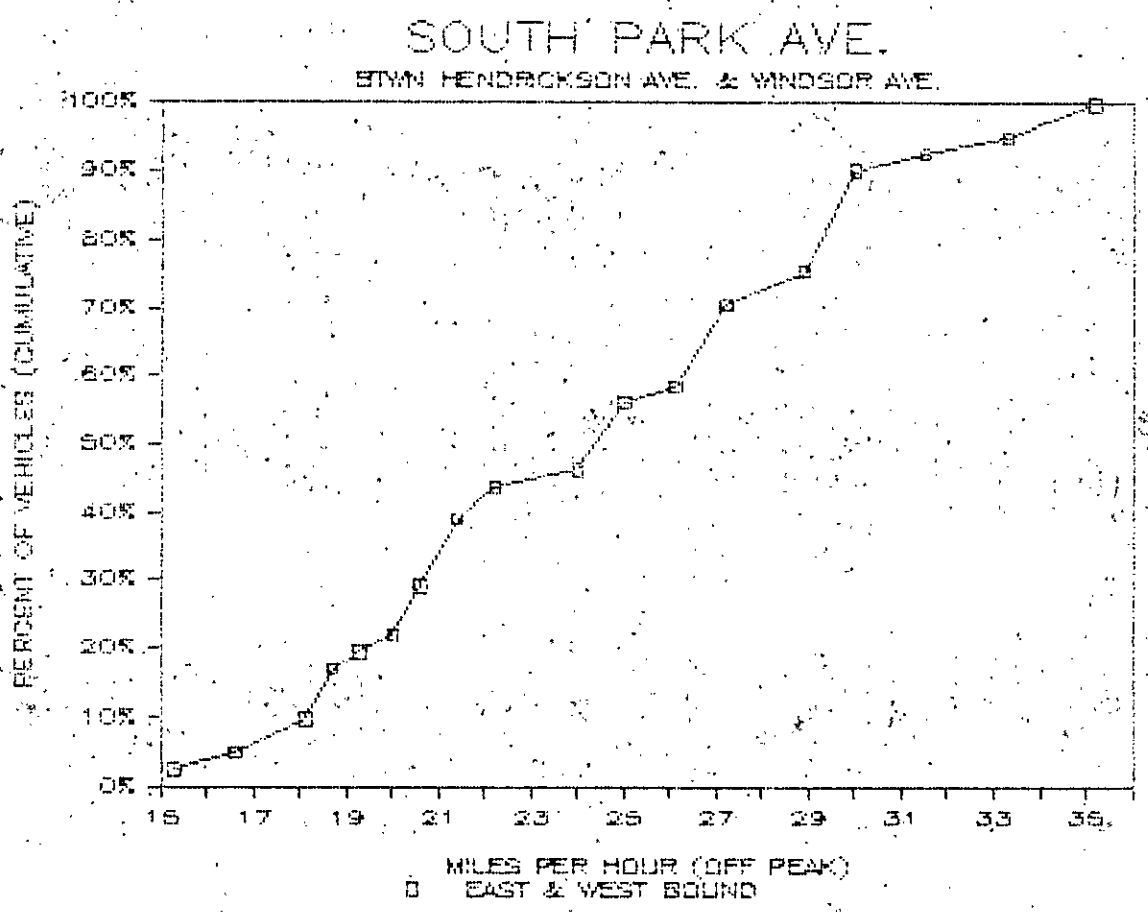


DATE: 11-21-84
TIME: 11:30 AM

# VEHS.	SPEED (MPH)	PERCENTILE
2	40.0	100.00%
3	35.2	94.74%
3	33.3	86.84%
3	31.5	78.95%
1	30.0	71.05%
2	28.9	68.42%
1	27.2	63.16%
7	26.1	60.53%
2	25.0	42.11%
1	24.0	36.84%
3	22.2	34.21%
3	21.4	26.32%
2	20.0	18.42%
2	18.7	13.16%
1	17.6	7.89%
1	17.1	5.26%
1	16.2	2.63%

SUM = 38 MIN SPEED = 16.2 STD = 6.2
AVG = 26.6 MAX SPEED = 40.0 VAR = 38.3

FIGURE 35

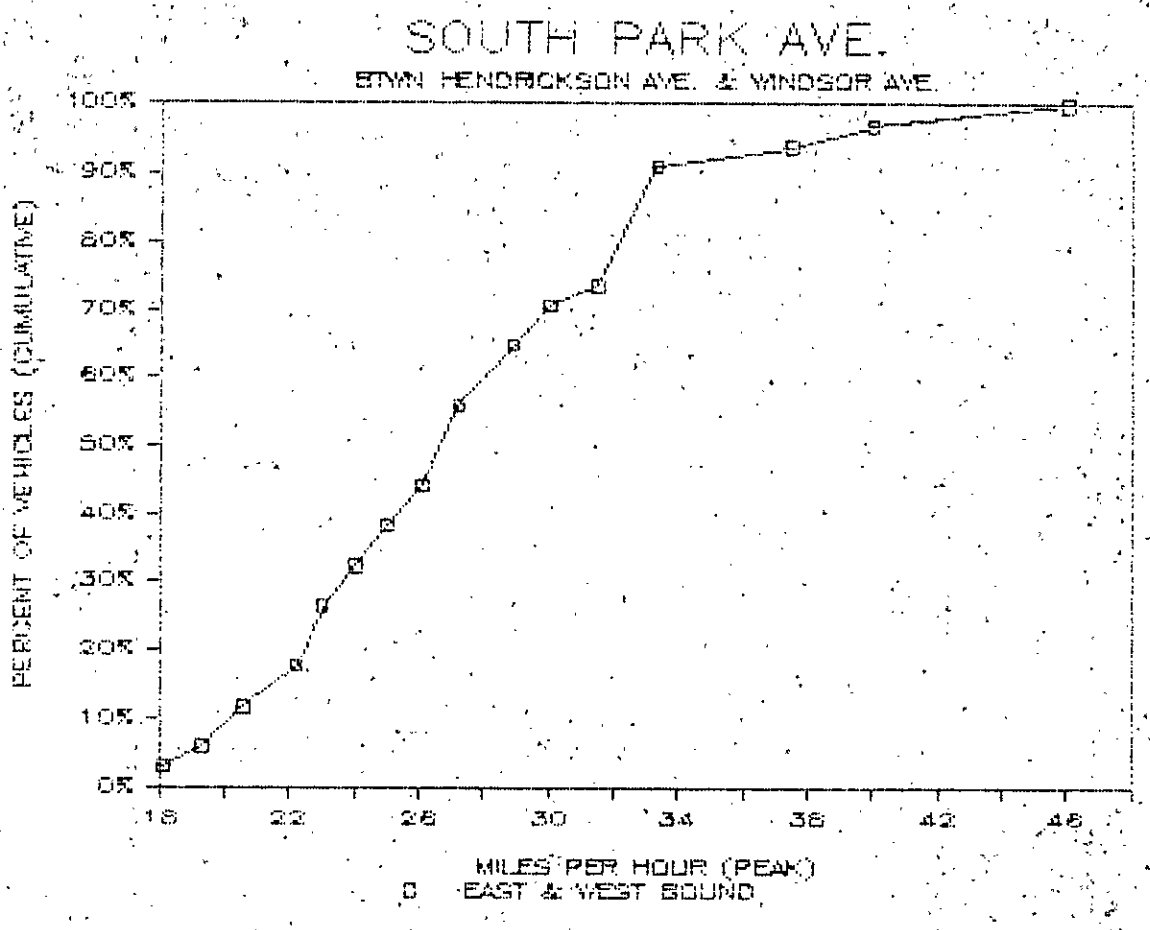


DATE: 11-19-84
TIME: 11:40 AM

# VEHS.	SPEED (MPH)	PERCENTILE
2	35.2	100.00%
1	33.3	95.12%
1	31.5	92.68%
6	30.0	90.24%
2	28.9	75.61%
5	27.2	70.73%
1	26.1	58.54%
4	25.0	56.10%
1	24.0	46.34%
2	22.2	43.90%
4	21.4	39.02%
3	20.6	29.27%
1	20.0	21.95%
1	19.3	19.51%
3	18.7	17.07%
2	18.1	9.76%
1	16.6	4.88%
1	15.3	2.44%

SUM = 41 MIN SPEED = 15.3 STD = 5.1
AVG = 24.7 MAX SPEED = 35.2 VAR = 26.5

FIGURE 36



DATE: 11-19-84
TIME: 4:15 PM

# VEHS.	SPEED (MPH)	PERCENTILE
1	46.1	100.00%
1	40.0	97.06%
1	37.5	94.12%
6	33.3	91.18%
1	31.5	73.53%
2	30.0	70.59%
3	28.9	64.71%
4	27.2	55.88%
2	26.1	44.12%
2	25.0	38.24%
2	24.0	32.35%
3	23.0	26.47%
2	22.2	17.65%
2	20.6	11.76%
1	19.3	5.88%
1	18.1	2.94%

SUM = 34 MIN SPEED = 18.1 STD = 6.0
AVG = 28.0 MAX SPEED = 46.1 VAR = 36.4

FIGURE 37

LEVELS OF SERVICE

At-Grade Intersections

At level of service A there are no loaded cycles (i.e., the load factor is 0.0) and few are even close to loaded. No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Typically the approach appears quite open, turning movements are easily made, and nearly all drivers find freedom of operation, their only concern being the chance that the light will be red, or turn red, when they approach.

Level of service B represents stable operation, with a load factor of not over 0.1; an occasional approach phase is fully utilized and a substantial number are approaching full use. Many drivers begin to feel somewhat restricted within platoons of vehicles. Under typical rural conditions this frequently will be suitable operation for rural design purposes.

In level of service C stable operation continues. Loading is still intermittent, but more frequent, with the load factor ranging from 0.1 to 0.3. Occasionally drivers may have to wait through more than one red signal indication, and back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted, but not objectionably so. In the absence of local conditions dictating otherwise this is the level typically associated with urban design practice.

Level of service D encompasses a zone of increasing restriction approaching instability in the limit when the load factor reaches 0.70. Delays to approaching vehicles may be substantial during short peaks within the peak period, but enough cycles with lower demand occur to permit periodic clearance of developing queues, thus preventing excessive back-ups.

Capacity occurs at level of service E. It represents the most vehicles that any particular intersection approach can accommodate. Although theoretically a load factor of 1.0 would represent capacity, in practice full utilization of every cycle is seldom attained, no matter how great the demand, unless the street is highly friction-free. A load factor range of 0.7 to 1.0 is more realistic. In the absence of a local determination use of 0.85 is recommended for isolated intersections. For interconnected signals a higher factor may be appropriate. At capacity, there may be long queues of vehicles waiting upstream of the intersection and delays may be great (up to several signal cycles).

Level of service F represents jammed conditions. Back-ups from locations downstream or on the cross street may restrict or prevent movement of vehicles out of the approach under consideration; hence, volumes carried are not predictable. No load factor can be established, because full utilization of the approach is prevented by outside conditions.

SOURCE: "Highway Capacity Manual", Highway Research Board, 1965

TRAFFIC SIGNAL WARRANTS

WARRANT 1. MINIMUM VEHICULAR VOLUME

The warrant is satisfied when, for each of any eight hours of an average day, the traffic volumes given in the table below exist on the major street and on the higher-volume minor street approach to the intersection.

Minimum Vehicular Volume Warrant

Number of Lanes for Moving Traffic on Each Approach		Vehicles per Hour on Main Street (Total of Both Approaches)	Vehicles per Hour on Higher-Volume Minor Street Approach (One Direction Only)
Major Street	Minor Street		
1	1	500	150
2 or more	1	600	150
2 or more	2 or more	600	200
1	2 or more	500	200

Source: Manual on Uniform Traffic Control Devices, U.S. Department of Transportation, Federal Highway Administration, U.S. Government Printing Office, Washington, D.C., 1971, p. 236.

When the 85 percentile speed of major street traffic exceeds 40 mph (64 kph) or when the intersection lies within the built-up area of an isolated community having a population less than 10,000, the minimum vehicular volume warrant is 70 percent of the requirements above.

WARRANT 2. INTERRUPTION OF CONTINUOUS TRAFFIC

The warrant is satisfied when, for each of any eight hours of an average day, the traffic volumes given in the table below exist on the major street and on the higher-volume minor street approach to the intersection and where the signal installation will not seriously disrupt progressive traffic flow.

Minimum Vehicular Volume Warrant 2

Number of Lanes for Moving Traffic on Each Approach		Vehicles per Hour on Main Street (Total of Both Approaches)	Vehicles per Hour on Higher-Volume Minor Street Approach (One Direction Only)
Major Street	Minor Street		
1	1	750	75
2 or more	1	900	75
2 or more	2 or more	900	100
1	2 or more	750	100

Source: Manual on Uniform Traffic Control Devices, p. 237.

A reduced volume, similar to that described under Warrant 1, can be used in place of those shown in the table on higher-speed roads or in smaller communities.

WARRANT 3. MINIMUM PEDESTRIAN VOLUME

The minimum pedestrian volume warrant is satisfied when, for each of any eight hours of an average day, the following traffic volumes exist:

1. On the major street, 600 or more vph enter the intersection (total of both approaches) or 1,000 or more vph enter the intersection (total of both approaches) on the major street where there is a raised median island 4 ft. or more in width, and

2. During the same eight hours as in paragraph (1) there are 150 or more pedestrians per hour on the highest-volume crosswalk crossing the major street (see table below).

Vehicles per Hour on Major Street (Total of Both Approaches)		Number of Pedestrians on Highest-Volume Crosswalk
With Median	Without Median	
1,000	600	150 150

These warrants may be reduced, as described under Warrant 1, when applied to higher speed roads or smaller communities.

WARRANT 4. SCHOOL CROSSINGS

A traffic control signal may be warranted at an established school crossing when a traffic engineering study of the frequency and adequacy of gaps in the vehicular traffic stream, as related to the number of groups of school children at the school crossing, shows that the number of adequate gaps in the traffic stream during the period when the children are using the crossing is less than the number of minutes in the same period.

WARRANT 5. PROGRESSIVE MOVEMENT

The progressive movement warrant is satisfied when:

1. On a one-way street or a street that has predominantly unidirectional traffic, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning and speed control.

2. On a two-way street, adjacent signals do not provide the necessary degree of platooning and speed control and the proposed and adjacent signals could constitute a progressive signal system.

The installation of a signal according to this warrant should be based on the 85 percentile speed unless an engineering study indicates that another speed is more desirable. According to this warrant, the installation of a signal should not be considered whenever the resultant signal spacing would be less than 1,000 ft (300 m).

WARRANT 6. ACCIDENT EXPERIENCE

The accident experience warrant is satisfied when:

1. An adequate trial of less restrictive remedies with satisfactory observance and enforcement has failed to reduce the accident frequency and

2. Five or more reported accidents of types susceptible to correction by traffic signal control have occurred within a twelve-month period, each accident involving personal injury or property damage to an apparent extent of $100.00 or more.

3. There exists a volume of vehicular traffic not less than 80 percent of the requirements specified in the minimum vehicular volume warrant; the interruption of continuous traffic warrant; or the minimum pedestrian volume warrant and

4. The signal installation will not seriously disrupt progressive traffic flows.

WARRANT 7. SYSTEMS

The system warrant is applicable when the common intersection of two or more major routes has a total existing or immediately projected entering volume of at least 800 vehicles during the peak hour of a typical weekday or each of any five hours of a Saturday and/or Sunday.

A major route as used in the above warrant has one or more of the following characteristics:

1. It is part of the street or highway system that serves as the principal network for through traffic flow.

2. It connects areas of principal traffic generation.

3. It includes rural or suburban highways outside of, entering, or traversing a city.

4. It has surface street freeway or expressway ramp terminals.

5. It appears as a major route on an official plan such as a major street plan in an urban area traffic transportation study.

WARRANT 8. COMBINATION OF WARRANTS

In exceptional cases, signals may occasionally be justified when no single warrant is satisfied but when any combination of Warrants 1, 2, and 3 is satisfied to the extent of 80 percent or more of the stated values. Adequate trial of other remedial measures which cause less delay and inconvenience to traffic should precede installation of signals under this warrant.

WARRANT 9. FOUR HOUR VOLUMES

The Four Hour Volume Warrant is satisfied when each of any four hours of an average day the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher volume minor street approach (one direction only) all fall above the curve in Figure 4-3 for the existing combination of approach lanes.

When the 85th percentile speed of the major street traffic exceeds 40 miles per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the four hour volume requirement is satisfied when the plotted points referred to fall above the curve in Figure 4-4 for the existing combination of approach lines.

WARRANT 10. PEAK HOUR DELAY

The peak hour delay warrant is intended for application where traffic conditions are such that for one hour of the day minor street traffic suffers undue delay in entering or crossing the main street. The peak hour delay warrant is satisfied when the conditions given below exist for 1 hour (any four consecutive 15-minute periods) of an average weekday.

The peak hour delay warrant is met when:

1. The total delay experienced by the traffic on a side street controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach.

2. The volume on the side street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four (or more) approaches or 650 for intersections with three approaches.

WARRANT 11. PEAK HOUR VOLUME

The peak hour volume warrant is also intended for application when traffic conditions are such that for 1 hour of the day minor street traffic suffers undue traffic delay in entering or crossing the main street.

FOUR HOUR VOLUME WARRANT

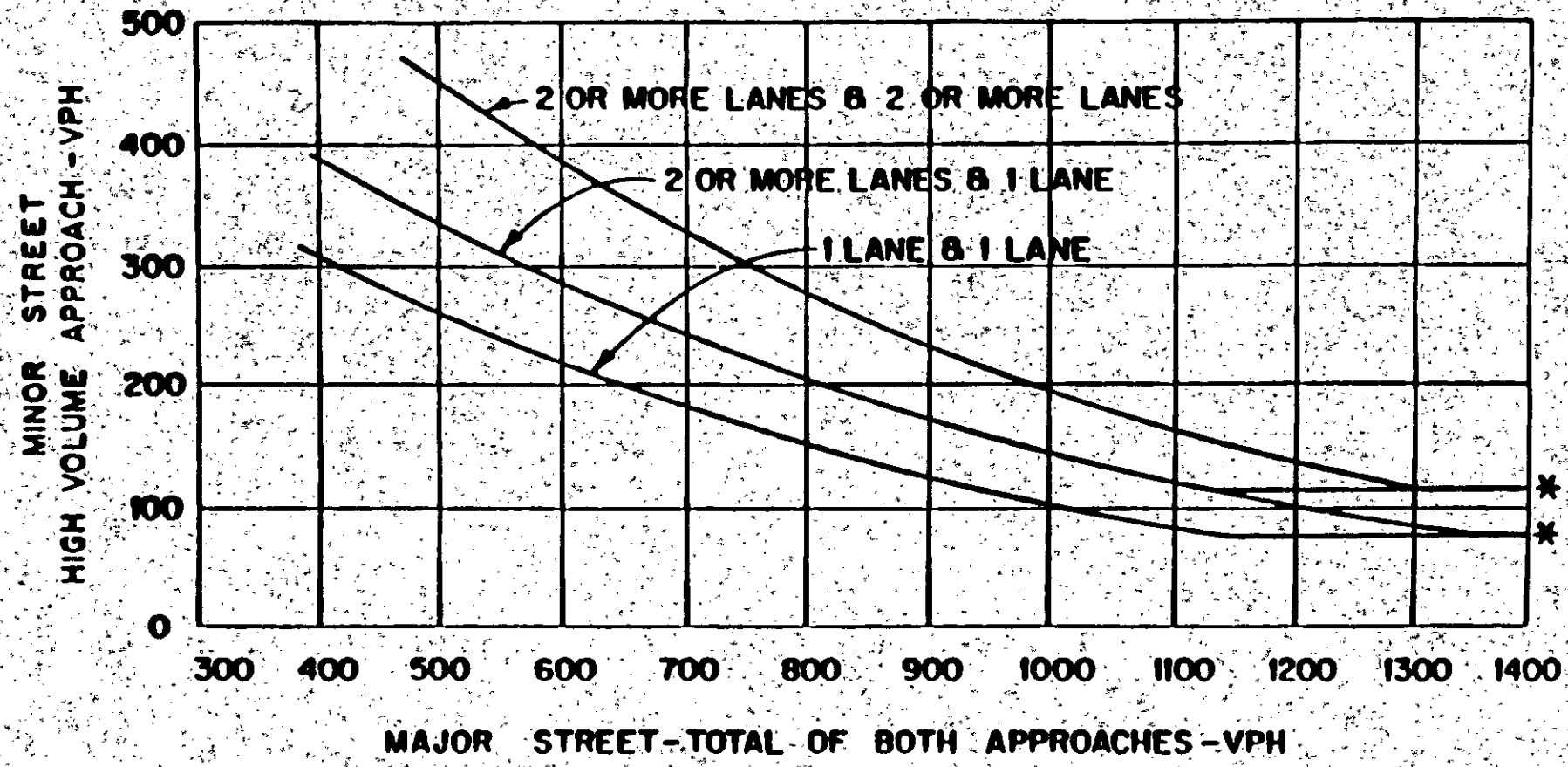


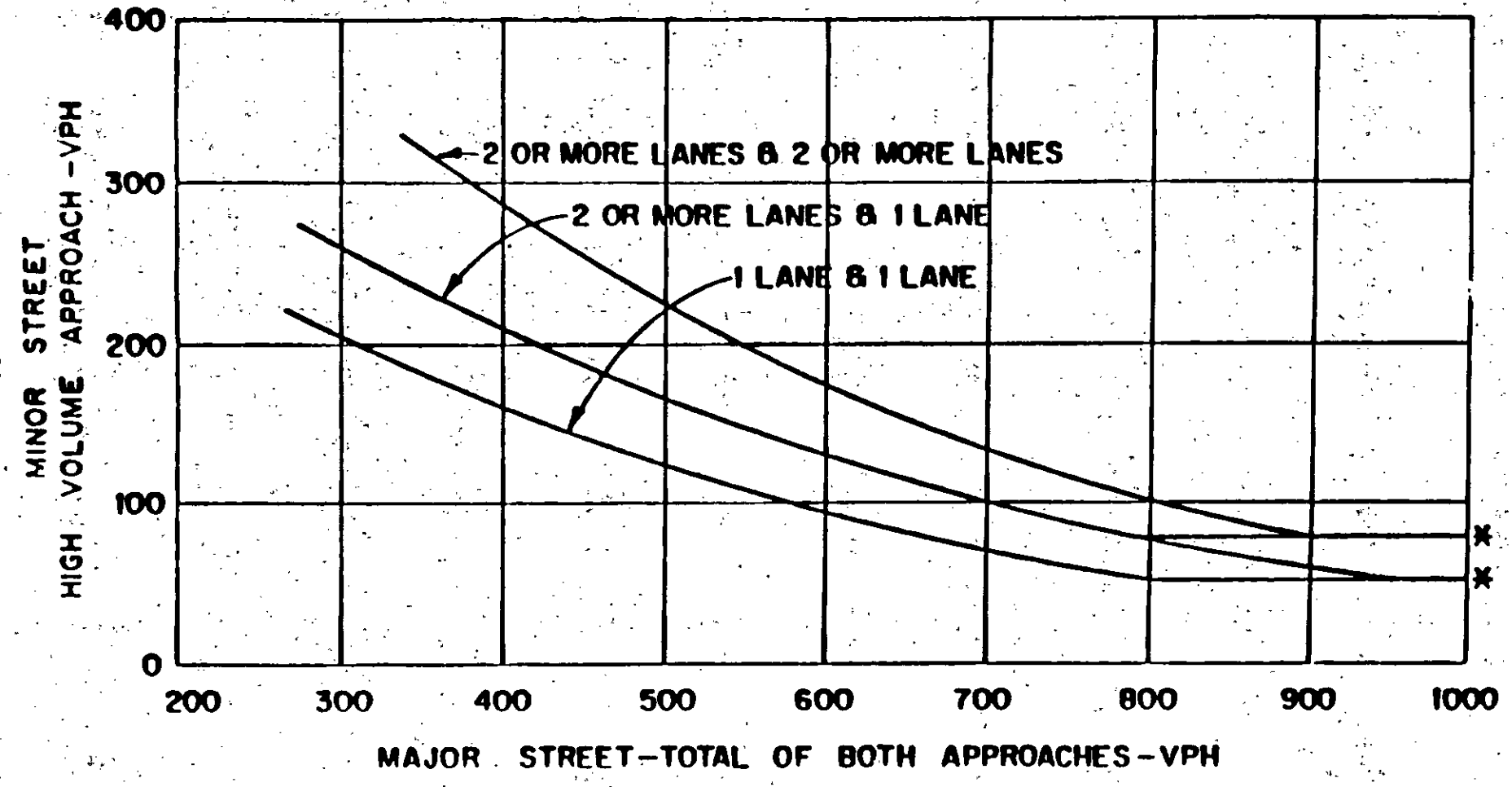
FIGURE 4-3

* NOTE: 115 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

(REVISED 7/81)

FOUR HOUR VOLUME WARRANT

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



* NOTE: 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 60 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

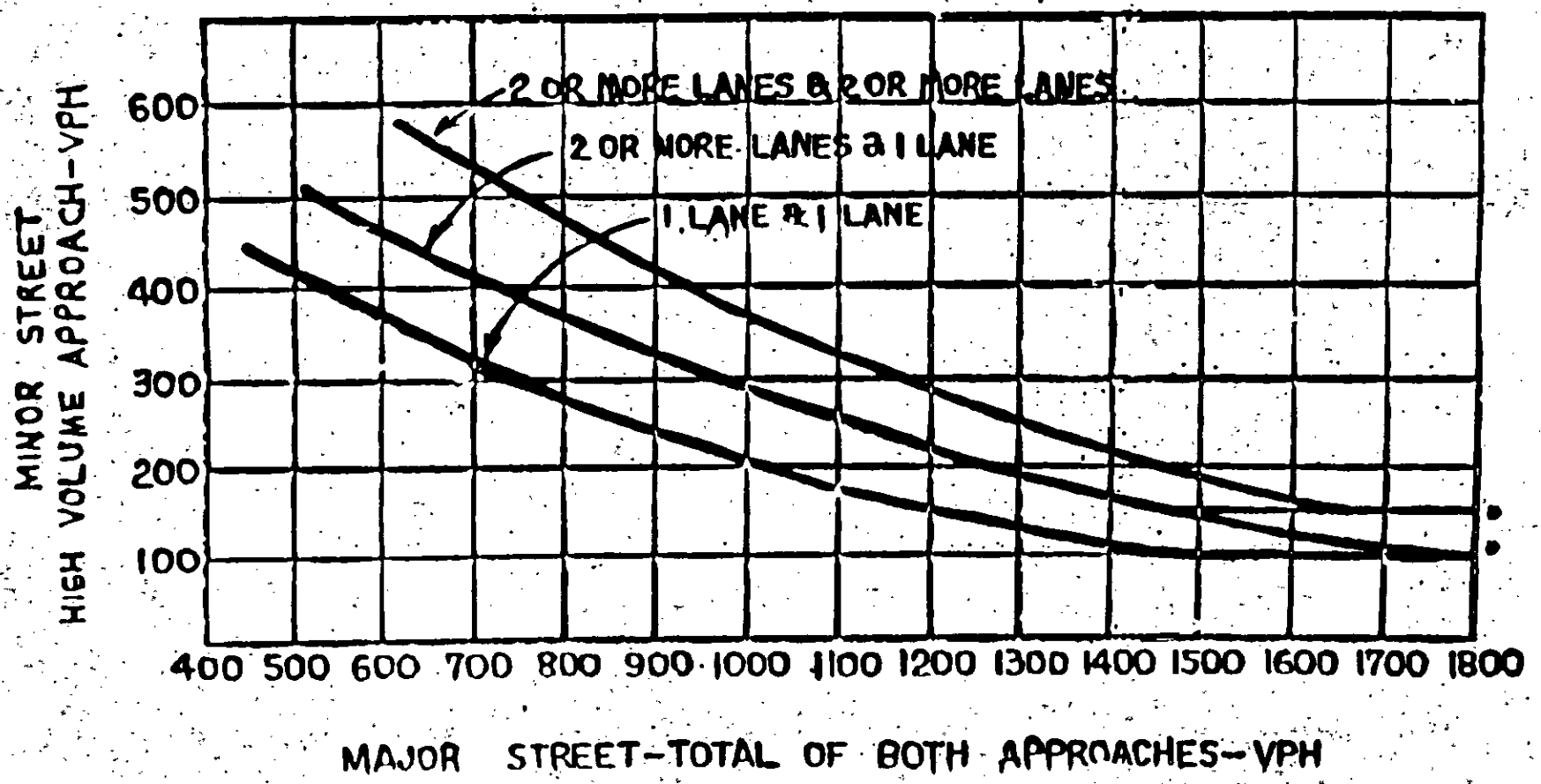
(REVISED 7/81)

FIGURE 4-4

The peak hour warrant is satisfied when the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicle per hour of the higher volume minor street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the curve in Figure 4-5 for the existing combination of approach lanes.

When the 85 percentile speed of major street traffic exceeds 40 miles per hour or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the peak hour volume requirements is satisfied when the plotted point referred to above falls above the curb in Figure 4-6 for the existing combination of approach lanes.

PEAK HOUR VOLUME WARRANT

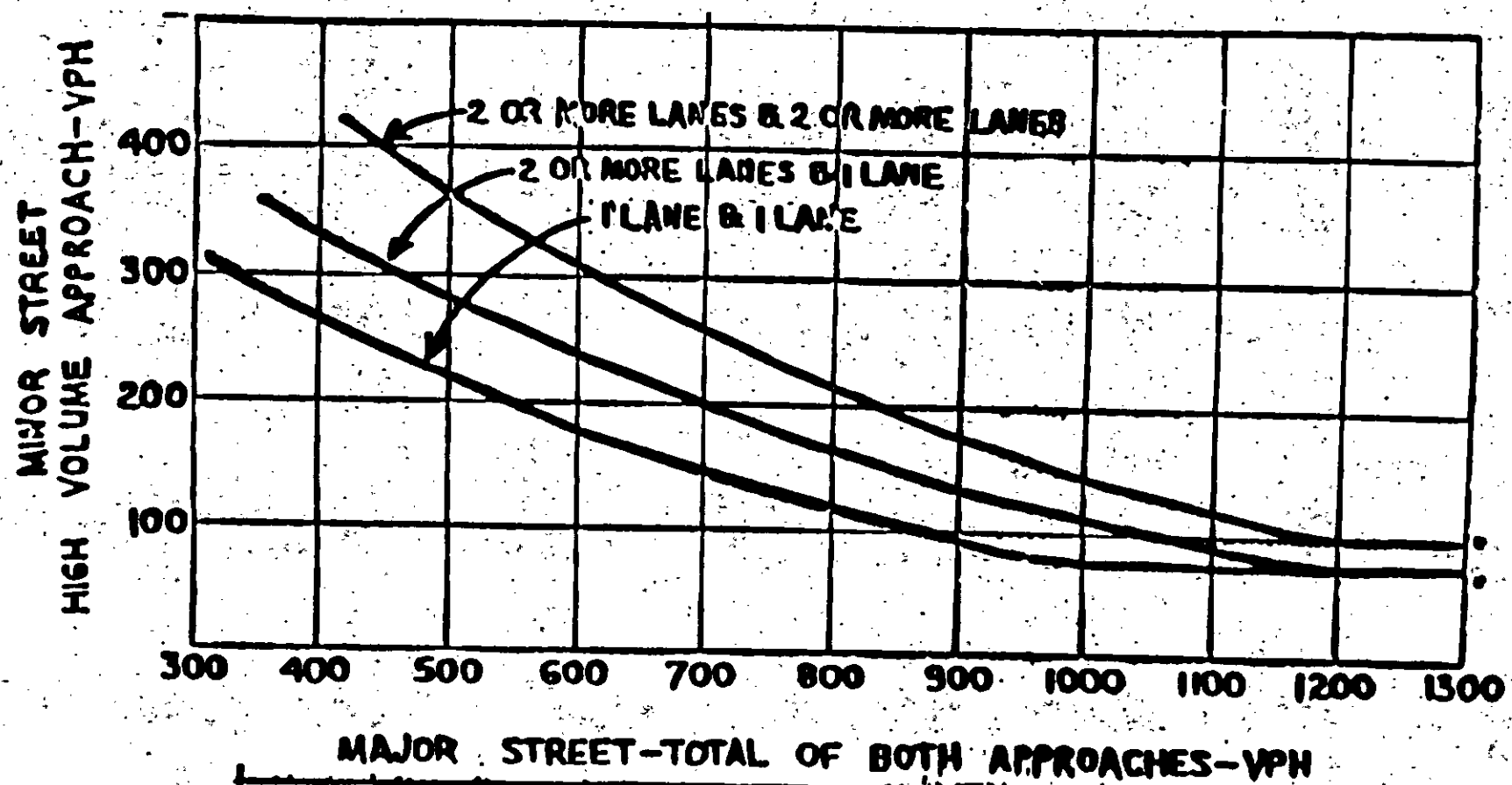


*NOTE: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

FIGURE 4-5

PEAK HOUR VOLUME WARRANT

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*NOTE: 300 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

FIGURE 4-6

APPENDIX "B"

ROCKVILLE CENTRE
STUDY AREA

REGULATORY SIGNS

1 - STOP
2 - ALLWAY
3 - VILLAGE SPEED LIMIT 30
4 - SPEED LIMIT I5
5 - END 15-MILE SPEED
6 - DO NOT ENTER
7 - WRONG WAY
8 - ONE WAY
9 - ONE WAY SCHOOL DAYS 8AM - 4PM →
10 - ONE WAY SCHOOL DAYS 8AM - 4PM ↓
11 - 8AM - 5PM WEEKDAYS
12 - 8AM - 5PM WEEKDAYS
13 - NO TURN ON RED
14 - LEFT LANE MUST TURN LEFT
15 - NO LEFT TURN
16 - NO RIGHT TURN
17 - NO U TURN
18 - NO TRUCKS OVER 8000 LBS.
19 - TRUCKS OVER 5 TONS EXCLUDED
20 - NO COMMERCIAL VEHICLES
21 - KEEP RIGHT
22 - 1-HR PKG 9AM - 6PM EXCEPT SUN-HOL
23 - 2-HR PKG 9AM - 5PM SUN-HOL
24 - 3-HR PKG 9AM - 5PM EXCEPT SUN-HOL
25 - NO STOPPING ANY TIME
26 - NO PARKING ANY TIME
27 - NO STOPPING HERE TO CORNER
28 - NO STOPPING 8AM - 5PM EXCEPT SUN-HOL
29 - NO PARKING HERE TO CORNER
30 - NO PKG LOADING ZONE
31 - DEAD END

WARNING SIGNS

32 - CURVE WARNING
33 - STOP AHEAD
34 - CROSSING
35 - FIRE HOUSE
36 - CURVE - 20 MPH
37 - SLOW
38 - HAZARD MARKER
39 - 15 MPH
40 - INTERSECTION SIGNAL
41 - ONE-WAY DIRECTIONAL ARROW
42 - TWO-WAY DIRECTIONAL ARROW
43 - VILLAGE DWI LAWS STRICTLY ENFORCED