

## **7.0 PEDESTRIAN AND BICYCLE ANALYSIS**

### **7.1 Introduction**

Pedestrian activity is an important element in the capacity analysis of urban streets and in the design and operation of transportation systems. The concentration of pedestrian activity occurs at major transit stops or terminals and in high density areas. Hence we tend to see pedestrian concentration near transit terminals, high-rise building, stores, and other major traffic generators. The concentration of pedestrians at corners and crosswalks at intersection affect pedestrian themselves but can also impede turning vehicles and reduce the capacity of the intersection.

In the study area there are corridors where significant pedestrian activity occurs due to the land use patterns. Corridors such as Myrtle Avenue, Forest Avenue, Fresh Pond Road, Seneca and sections of Metropolitan Avenue experience significant pedestrian volumes. This is due to the concentration of commercial, retail activity, offices, banks, cleaning stores, printing, medical services, and other such uses. The study area also has many schools and institutional places that generate pedestrian trips. The two subway lines (M and L train) with stops contribute to high pedestrian concentration. Myrtle Avenue/Palmetto Street @ Wyckoff Avenue is a major transit hub with some commercial retail that experiences very concentrated pedestrian volume during the various peak hours.

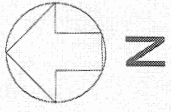
### **7.2 Existing Pedestrian Analysis**

The analysis examines existing pedestrian volumes, pedestrian flow patterns and level of service by focusing on the capacity of intersections, corners, and crosswalks.

To assess pedestrian activity in the study area, pedestrian counts were conducted during the AM (7:45-8:45 am), midday (11:45- 12:45 pm), and PM (5:15-6:15pm) peak hours during weekdays and the weekend Saturday peak hour (12-1pm).

Pedestrian counts were conducted during October/November of 2005 and February 2006 at the following thirteen locations which are also shown in Figure 7-1.

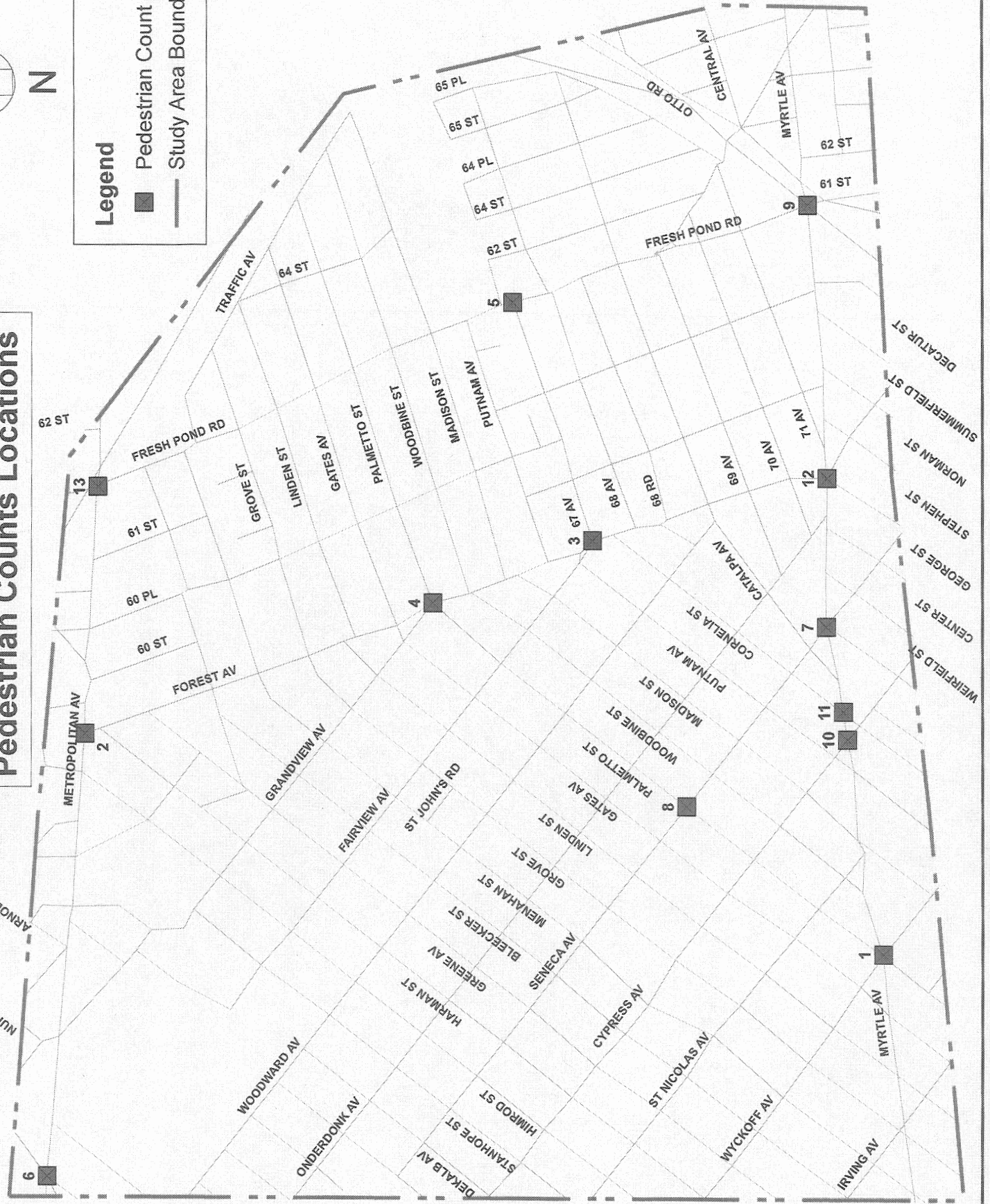
1. Myrtle Avenue & Wyckoff Avenue / Palmetto Street
2. Metropolitan Avenue and Forest Avenue
3. Forest Avenue & 67<sup>th</sup> Avenue / Fairview Avenue
4. Forest Avenue & Palmetto Street / Grandview Avenue
5. Fresh Pond Road & 67<sup>th</sup> Avenue
6. Metropolitan Avenue & Flushing Avenue
7. Myrtle Avenue & Seneca Avenue
8. Seneca Avenue & Palmetto Street
9. Myrtle Avenue & Fresh Pond Road
10. Myrtle Avenue & Cypress Avenue
11. Myrtle Avenue & Cornelia Street
12. Myrtle Avenue & Forest Avenue/George Street
13. Metropolitan Avenue & Fresh Pond Road



**Legend**

- Pedestrian Count Locations
- Study Area Boundary

**Figure 7-1  
Pedestrian Counts Locations**





The corridors with heavy pedestrian volumes can generally be linked to subway stations and/or major bus transfer points, employment centers, retail/commercial centers and high density residential areas. By this criteria and the pedestrian counts, the following corridors emerge as the ones with significant pedestrian traffic.

- 1) Metropolitan Avenue (east-west)
- 2) Myrtle Avenue (east-west)
- 3) Fresh Pond Road (north-south)
- 4) Forest Avenue (north-south)
- 5) Palmetto St (east-west )
- 6) Seneca Avenue (north-south)

The survey reveals that Myrtle Ave from Wyckoff Avenue to Fresh Pond Road carries heavy pedestrian traffic, with the highest crosswalk pedestrian volumes per hour (699). The highest one hour crosswalk pedestrian volumes were observed at Myrtle Avenue/Palmetto Street @ Wyckoff Avenue with 615, 569, 699 and 584 during the AM, midday, PM and Saturday midday peak hours.

Along Forest Avenue between Palmetto Avenue and Catalpa Avenue, the average crosswalk pedestrian volumes per hour range between 28 and 325 pedestrians during weekdays and Saturday.

Along Fresh Pond Road, pedestrian activity is similar to that observed on Forest Avenue with similar land uses. Pedestrian crosswalk volumes range from 57 to 430 during weekday and Saturday peak hours. Along Metropolitan Avenue, however the lowest pedestrian activity was observed, with crosswalk volumes of 165 pedestrian per hour or less during the weekday and Saturday peak hours.

The following locations had the highest crosswalk pedestrian volumes during the AM, MD, PM and MD SAT peak hour:

1. Myrtle Avenue & Wyckoff Avenue / Palmetto Street (615, 569, 699, 584)

2. Myrtle Avenue & Cypress Avenue (170, 308, 498, 547)
3. Myrtle Avenue & Cornelia Street (104, 376, 338, 482)
4. Myrtle Avenue & Seneca Avenue (132, 332, 394, 373)
5. Forest Avenue & Palmetto Street / Grandview Avenue (325, 151, 209, 129)
6. Fresh Pond Road & 67<sup>th</sup> Avenue (330, 191, 257, 430)

Figures 7-2, 7-3, 7-4, and 7-5 show the existing weekday and weekend hourly pedestrian volumes during the AM, MD, PM, and Saturday midday peak hours at the selected intersections. The pictures below show the pedestrian activity observed during the peak hours at different locations.



AM (Fresh Pond Road @ Myrtle Avenue)



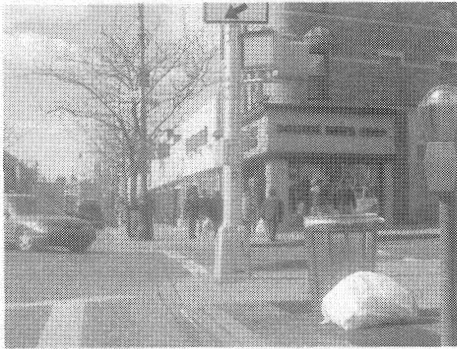
MD (Seneca Avenue @ Myrtle Avenue)



MD (Palmetto St/ Wyckoff Ave @ Myrtle Avenue)



PM (Myrtle Ave @ Cypress Avenue)



PM (Forest Avenue @ Myrtle Avenue)



SAT (Myrtle Ave @ Cypress Avenue)

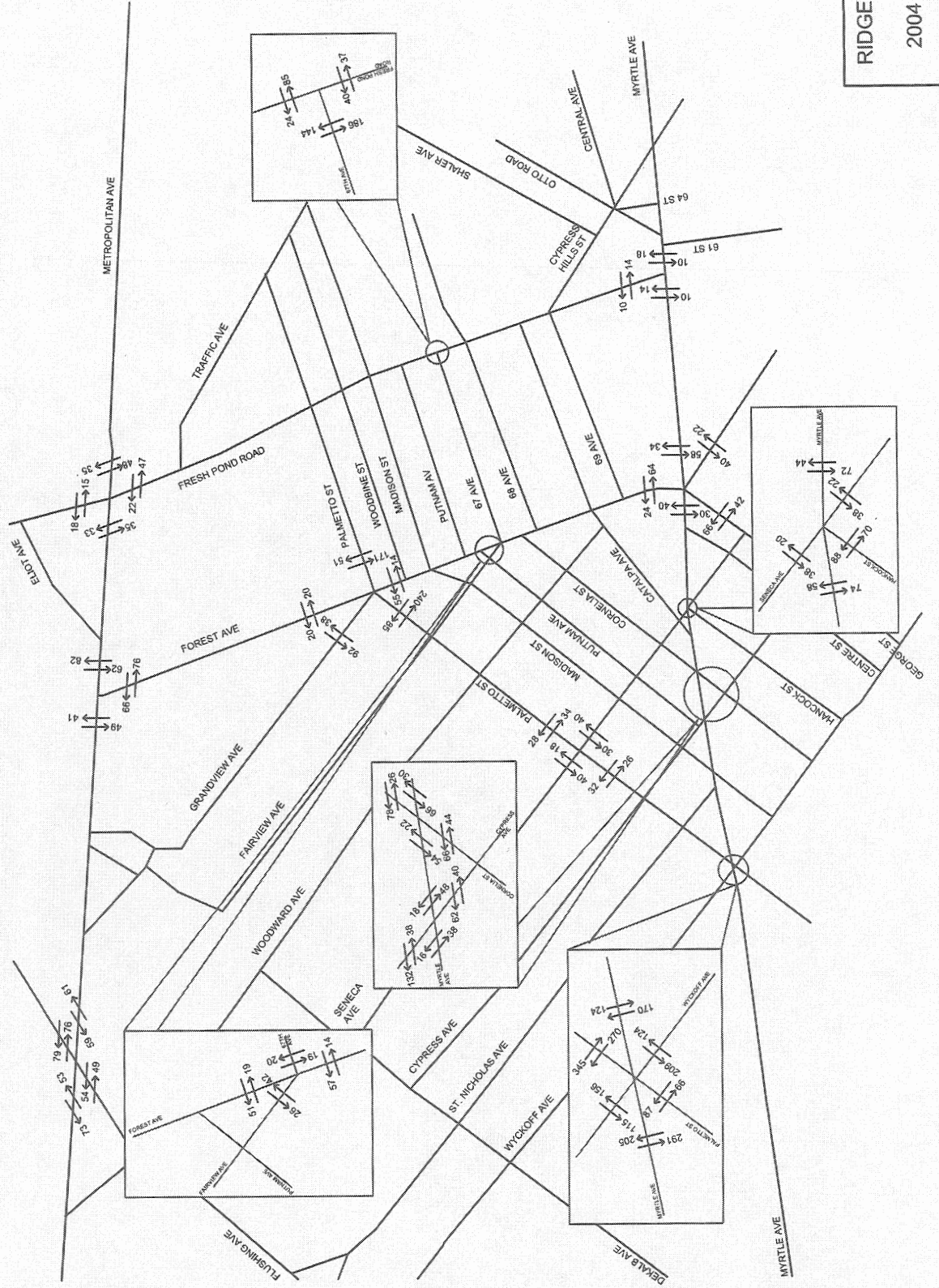
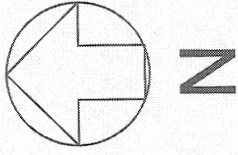


SAT (Palmetto St/ Wyckoff Ave @ Myrtle Avenue)



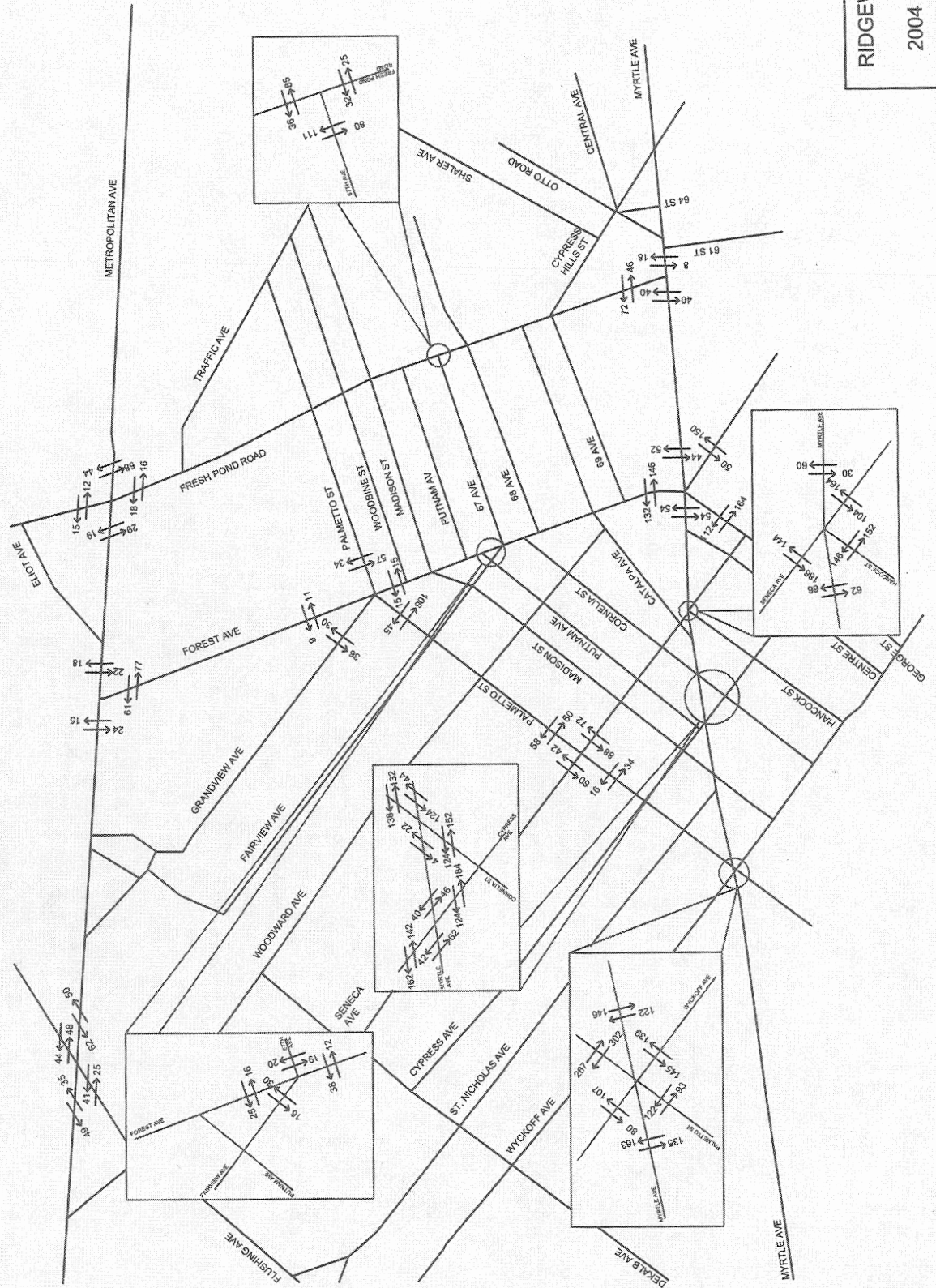
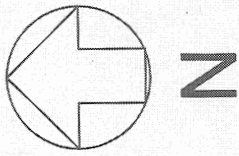


# Figure 7-2 - Existing Pedestrian Peak Hour Volumes (AM) (7:45 - 8:45 am)





# Figure 7-3 - Existing Pedestrian Peak Hour Volumes (MD) (11:45 - 12:45 pm)

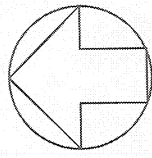


RIDGEWOOD TRAFFIC STUDY  
2004 EXISTING CONDITION

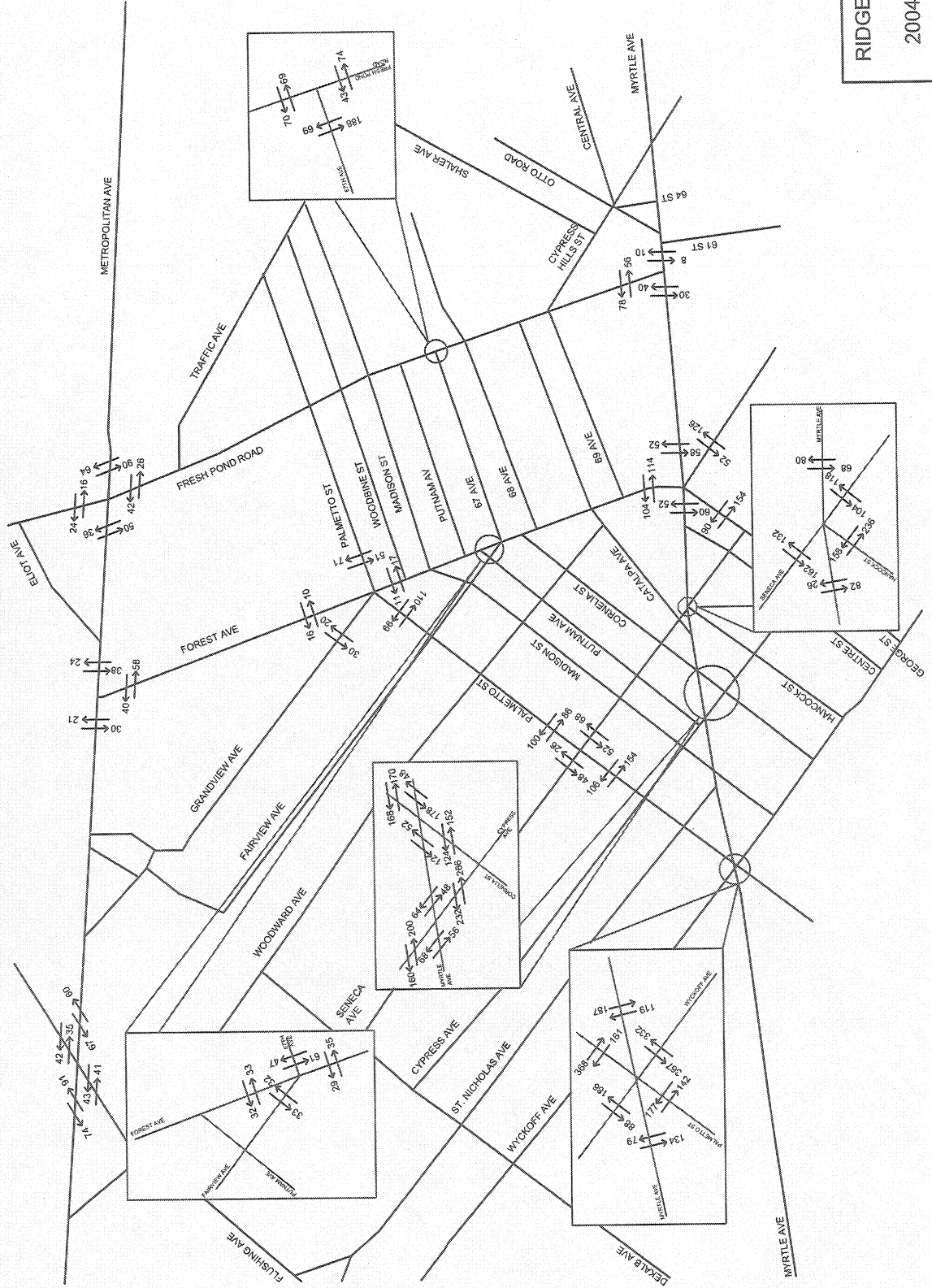


# Figure 7-4 - Existing Pedestrian Peak Hour Volumes (PM)

(5:15 - 6:15 pm)



N



RIDGEWOOD TRAFFIC STUDY  
2004 EXISTING CONDITION









### **7.3 Level of Service Analysis and Methodology**

Pedestrian volumes for the LOS analysis were collected in 15-minute increments during the peak hours of the day.

The Highway Capacity Manual methodology was used to determine pedestrian level of service at the crosswalks and corners for the thirteen intersections selected. The analysis examined the level of service (LOS) for the AM, Midday, PM and SAT peak hours of crosswalk and corners for the 2005 existing condition. The pedestrian LOS is measured in terms of square feet of space per pedestrian (SF/P), as indicated in Figure 7-6 which also shows the criteria for analyzing pedestrian level of service as define by the highway capacity manual.

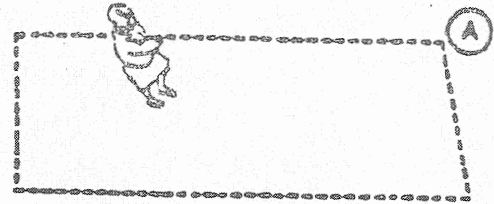
The analysis shows that most locations have a pedestrian LOS of A during all peak periods. Approximately 15% of the locations have a pedestrian LOS B for all peak period. There are two locations with pedestrian LOS C. Table 7-1 and Table 7-2 how the results of crosswalk and corner LOS analysis.

Figure 7-6: Pedestrian Level of Service (LOS)

LEVEL OF SERVICE A

Pedestrian Space:  $\geq 130$  sq ft/ped Flow Rate:  $\leq 2$  ped/min/ft

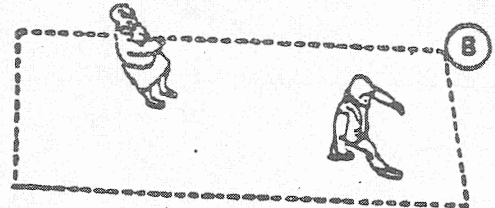
At walkway LOS A, pedestrians basically move in desired paths without altering their movements in response to other pedestrians. Walking speeds are freely selected, and conflicts between pedestrians are unlikely.



LEVEL OF SERVICE B

Pedestrian Space:  $\geq 40$  sq ft/ped Flow Rate:  $\leq 7$  ped/min/ft

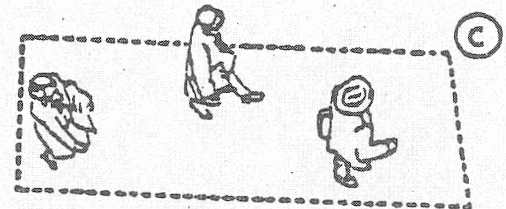
At LOS B, sufficient area is provided to allow pedestrians to freely select walking speeds, to bypass other pedestrians, and to avoid crossing conflicts with others. At this level, pedestrians begin to be aware of other pedestrians, and to respond to their presence in the selection of walking path.



LEVEL OF SERVICE C

Pedestrian Space:  $\geq 24$  sq ft/ped Flow Rate:  $\leq 10$  ped/min/ft

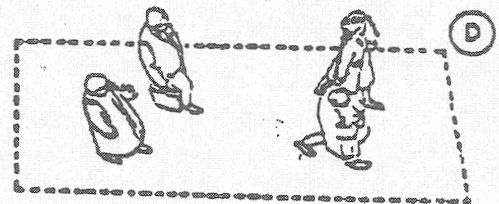
At LOS C, sufficient space is available to select normal walking speeds, and to bypass other pedestrians in primarily unidirectional streams. Where reverse-direction or crossing movements exist, minor conflicts will occur, and speeds and volume will be somewhat lower.



LEVEL OF SERVICE D

Pedestrian Space:  $\geq 15$  sq ft/ped Flow Rate:  $\leq 15$  ped/min/ft

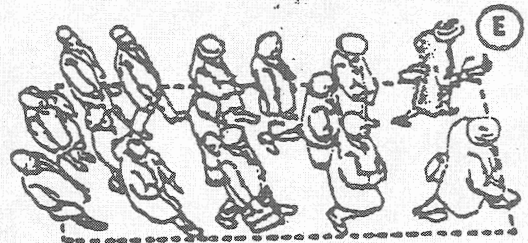
At LOS D, freedom to select individual walking speed and to bypass other pedestrians is restricted. Where crossing or reverse-flow movements exist, the probability of conflict is high, and its avoidance requires frequent changes in speed and position. The LOS provides reasonably fluid flow; however, considerable friction and interaction between pedestrians is likely to occur.



LEVEL OF SERVICE E

Pedestrian Space:  $\geq 6$  sq ft/ped Flow Rate:  $\leq 25$  ped/min/ft

At LOS E, virtually all pedestrians would have their normal walking speed restricted, requiring frequent adjustment of gait. At the lower range of this LOS, forward movement is possible only by "shuffling." Insufficient space is provided for passing of slower pedestrians. Cross- or reverse-flow movements are possible only with extreme difficulties. Design volumes approach the limit of walkway capacity, with resulting stoppages and interruptions to flow.



LEVEL OF SERVICE F

Pedestrian Space:  $\leq 6$  sq ft/ped Flow Rate: variable

At LOS F, all walking speeds are severely restricted, and forward progress is made only by "shuffling." There is frequent, unavoidable contact with other pedestrians. Cross- and reverse-flow movements are virtually impossible. Flow is sporadic and unstable. Space is more characteristic of queued pedestrians than of moving pedestrian streams.



**Table 7-1 Existing Conditions  
Crosswalk Level of Service**

Loc #	Intersection	Crosswalk	AM		MD		PM		SAT MD	
			Crosswalk Space							
			SF/P	LOS	SF/P	LOS	SF/P	LOS	SF/P	LOS
1	Myrtle Avenue @ Wyckoff Avenue/Palmetto Street	North (Wyckoff)	73	B	81	B	81	B	62	B
		North (Palmetto)	50	B	45	B	54	B	47	B
		East(Myrtle)	70	B	64	B	70	B	46	B
		South ( Wyckoff)	78	B	91	B	48	B	50	B
		South (Palmetto)	162	A	69	B	69	B	31	C
		West ( Myrtle)	26	C	78	B	78	B	64	B
2	Metropolitan Avenue @ Forest Avenue	East	141	A	311	A	227	A	455	A
		South	159	A	125	B	243	A	435	A
		West	192	A	209	A	238	A	417	A
3	Forest Avenue @ 67 th Avenue/Fairview Avenue	North	154	A	285	A	182	A	363	A
		East	591	A	591	A	203	A	373	A
		South	208	A	342	A	184	A	369	A
		West	197	A	422	A	144	A	204	A
4	Forest Avenue @ Palmetto Street/Grandview Avenue	North (Forest)	140	A	562	A	262	A	328	A
		North (Grandview)	78	B	202	A	231	A	243	A
		East	61	B	184	A	130	A	184	A
		South	136	A	272	A	236	A	236	A
5	Fresh Pond Road @ 67 th Avenue	North	159	A	139	A	133	A	139	A
		South	195	A	253	A	130	A	94	B
		West	70	B	166	A	91	B	79	B
		North	100	B	222	A	231	A	643	A
6	Metropolitan Avenue @ Flushing Avenue	East	106	B	135	A	185	A	674	A
		South	152	A	241	A	208	A	2893	A
		West	111	B	171	A	125	B	780	A
		North	368	A	62	B	73	B	49	B
7	Myrtle Avenue @ Seneca Avenue	East	173	A	230	A	127	B	164	A
		South (Seneca)	389	A	95	B	100	B	76	B
		South (Hancock)	160	A	81	B	74	B	55	B
		West	177	A	193	A	193	A	98	B
8	Seneca Avenue@ Palmetto Street	North	501	A	361	A	475	A	501	A
		East	431	A	234	A	160	A	303	A
		South	429	A	180	A	215	A	564	A
		West	413	A	530	A	109	B	195	A
9	Myrtle Avenue @ Fresh Pond Road	North	1122	A	281	A	273	A	171	A
		East	517	A	466	A	776	A	245	A
		West	840	A	315	A	378	A	108	B
10	Cypress Avenue @ Myrtle Avenue	North	200	A	107	B	93	B	70	B
		East	243	A	227	A	227	A	188	A
		South	342	A	129	B	89	B	59	B
		West	438	A	243	A	146	A	199	A
11	Cornelia Street @ Myrtle Avenue	North	275	A	116	B	102	B	72	B
		East	176	A	227	A	154	A	144	A
		South	173	A	80	B	55	B	75	B
		West	208	A	346	A	306	A	306	A
12	Forest Avenue @ Myrtle Avenue	North	327	A	102	B	130	A	88	B
		East	180	A	170	A	155	A	132	A
		South (Forest)	307	A	80	B	103	B	49	B
		South (George)	157	A	66	B	85	B	123	B
13	Metropolitan Avenue@ Fresh Pond Rd	West	218	A	160	A	150	A	123	B
		North	653	A	711	A	599	A	599	A
		East	248	A	202	A	165	A	331	A
		South	270	A	615	A	282	A	239	A
		West	247	A	351	A	247	A	229	A

**Table 7-2 Existing Conditions  
Corner Level of Service**

Loc #	Intersection	Corner	AM		MD		PM		SAT MD	
			SF/P	LOS	SF/P	LOS	SF/P	LOS	SF/P	LOS
1	Myrtle Avenue @ Wyckoff Avenue/Palmetto Street	Northeast	82	B	87	B	81	B	76	B
		North-center	77	B	112	B	83	B	101	B
		Northwest	Under construction		Under construction		Under construction		Under construction	
		Southeast	145	A	177	A	106	B	93	B
		South-center	130	A	143	A	74	B	67	B
		Southwest	73	B	107	B	113	B	66	B
2	Metropolitan Avenue @ Forest Avenue	Southeast	252	A	269	A	340	A	628	A
		Southwest	204	A	181	A	277	A	537	A
3	Forest Avenue @ 67 th Avenue/Fairview Avenue	Northeast	403	A	502	A	259	A	431	A
		Southeast	249	A	341	A	140	A	250	A
		Southwest	161	A	240	A	161	A	264	A
		Northwest	516	A	1038	A	1038	A	1038	A
4	Forest Avenue@ Pаметto Street/Grandview Avenue	Northwest	52	B	115	B	122	B	191	A
		North-center	408	A	1162	A	940	A	1068	A
		Northeast	208	A	650	A	450	A	561	A
		Southwest	154	A	314	A	280	A	394	A
		Southeast	117	B	355	A	243	A	312	A
5	Fresh Pond Road @ 67 th Avenue	Southwest	205	A	410	A	213	A	204	A
		Northwest	191	A	326	A	213	A	213	A
6	Metropolitan Avenue @ Flushing Avenue	Northeast	151	A	251	A	312	A	654	A
		Southeast	150	A	205	A	216	A	898	A
		Southwest	275	A	431	A	317	A	3055	A
		Northwest	171	A	321	A	243	A	243	A
7	Myrtle Avenue @ Seneca Avenue	Northwest	407	A	159	A	159	A	100	B
		Northeast	410	A	162	A	173	A	151	A
		Southeast	119	B	59	B	49	B	43	B
		South-center	201	A	93	B	99	B	63	B
		Southwest	231	A	146	A	129	B	91	B
8	Seneca Avenue@ Palmetto Street	Northeast	241	A	132	A	123	B	226	A
		Southeast	387	A	198	A	143	A	369	A
		Southwest	361	A	240	A	137	A	290	A
		Northwest	401	A	401	A	143	A	235	A
9	Myrtle Avenue @ Fresh Pond Road	Northeast	2145	A	1107	A	1146	A	703	A
		Northwest	2529	A	2529	A	517	A	315	A
10	Cypress Avenue @ Myrtle Avenue	Northeast	578	A	347	A	318	A	229	A
		Southeast	101	B	51	B	36	C	24	C
		Southwest	441	A	186	A	116	B	92	B
		Northwest	290	A	367	A	290	A	290	A
11	Cornelia Street @ Myrtle Avenue	Northeast	432	A	279	A	215	A	163	A
		Southeast	555	A	373	A	243	A	218	A
		Southwest	442	A	340	A	239	A	316	A
		Northwest	290	A	362	A	330	A	200	A
12	Forest Avenue @ Myrtle Avenue	Northwest	1128	A	482	A	593	A	402	A
		Northeast	741	A	360	A	417	A	286	A
		Southeast	1108	A	602	A	701	A	390	A
		South-center	459	A	177	A	233	A	121	B
		Southwest	499	A	261	A	309	A	209	A
13	Metropolitan Avenue@Fresh Pond Rd	Northeast	891	A	800	A	658	A	1077	A
		Southeast	714	A	854	A	501	A	691	A
		Southwest	767	A	1372	A	769	A	650	A
		Northwest	762	A	873	A	761	A	658	A

In general, crosswalks and corners in the study area are adequate for the pedestrian demand observed. Appendix B shows the summary of the crosswalks and corners results. Some jaywalking was observed, particularly on Myrtle Avenue.

The sidewalks and corners in general are very clear with very few newspaper boxes or any other street furniture except for trash cans. There are no vending activities on the sidewalks.

#### **7.4 Pedestrian activity near school locations**

There are a total of 16 schools in the study area, of which eight are elementary, four public schools and four private schools.

Elementary schools serve the community needs of the residents surrounding them, where kids from kindergarten up to 6 grade attend. Trips attracted by these schools are mostly done by walking during the morning and early afternoon.

The School Safety Division (SSD) of the Department of Transportation is in the process of developing school safety plans for schools throughout the city. The safety plans include the designation of official school crosswalks, identified by prominent warning signs and roadway markings, it also designates curbside locations for school bus loading and unloading and other parking controls to improve safety for the students. In the study area, the SSD has prepared plans for 4 schools in the area.

#### **7.5 Bicycle Lanes and Paths - Network System and Use**

A network of bicycle lanes and greenway paths does not exist within the study area. According to the 2000 census data, the use of bicycle as an alternative mode of transportation in the study area was less than 1% of the total mode share. Very few people were observed using bicycles in the study area.

## 8.0 ACCIDENTS/SAFETY ANALYSIS

### 8.1 Introduction

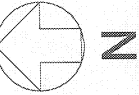
The loss of life and property damage due to traffic and other transportation related accidents bring safety issues into the center of the traffic and transportation planning debate.

To identify safety issues and address traffic accidents problems, it was necessary first to examine the accident history in the study area to see if there are any patterns. Consequently, all existing accident data for a three year period (1998-2000) was assembled and analyzed. These records were collected from the NYSDMV and NYSDOT. This data provide information such us location, severity type, accident type, collision type, time of the accident, and weather conditions among other factors. The data was used to identify critical locations with high accident frequency and or severity for further study.

After screening all intersections on the main corridors in the study area those where the average annual total accidents are 20 or more were subjected to a detailed accident analysis, however this study also examine the following listed nine location. See Table 8-1 and Figure 8-1 for locations of all accidents.

**Table 8-1: Three Year Accident History**

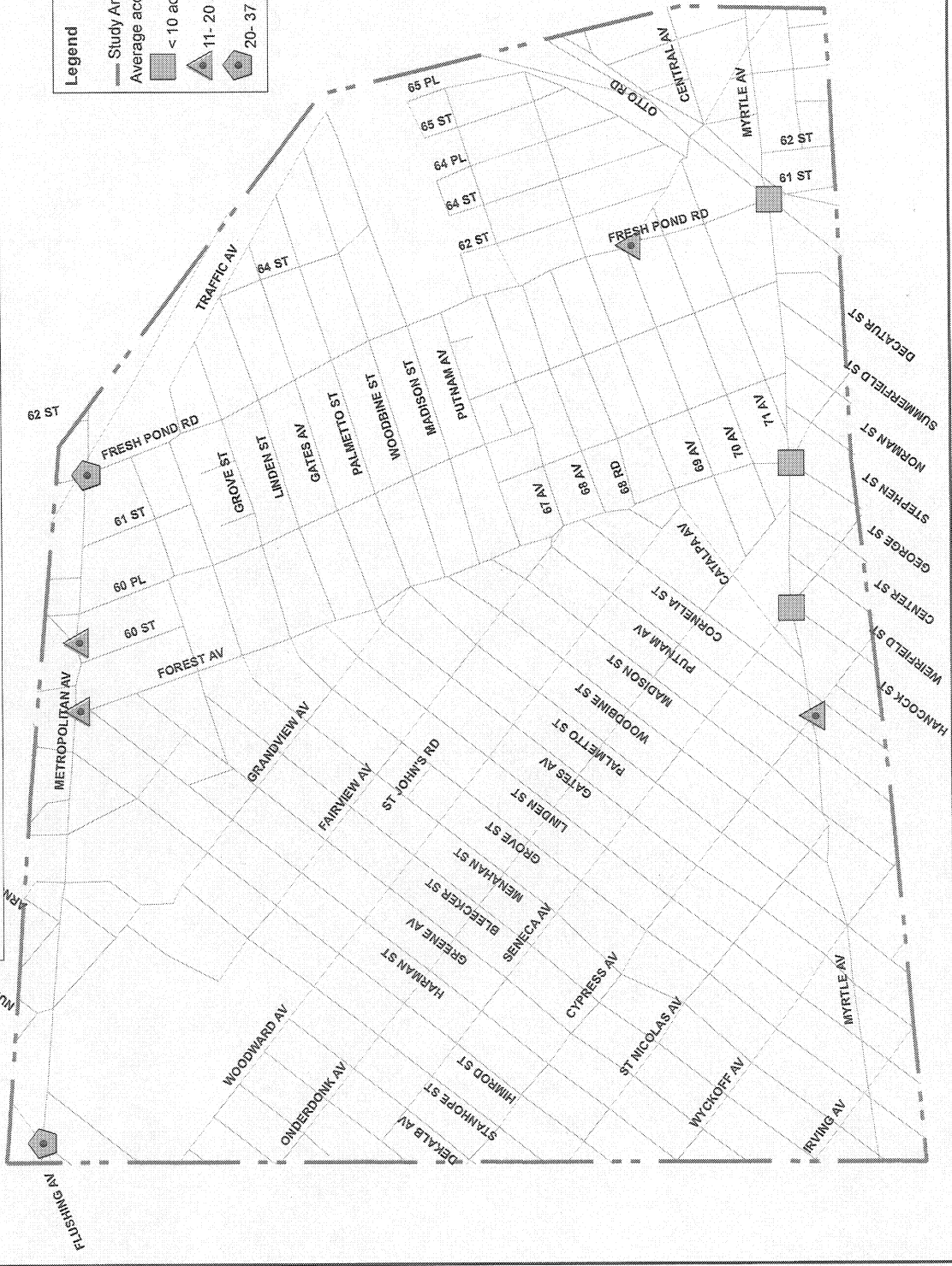
No	Node #	Main St	Cross St	1998	1999	2000	Total	Average
1	22891	Metropolitan Ave	Fresh Pond Rd	35	27	49	110	37
2	23022	Metropolitan Ave	Flushing Ave	21	26	22	70	23
3	19598	Fresh Pond Rd	Cypress Hills St	20	15	23	58	19
4	22902	Metropolitan Ave	Forest Ave	17	6	11	34	11
5	23144	Myrtle Ave	Cypress Ave	14	14	6	34	11
6	22895	Metropolitan Ave	Eliot Ave	8	7	18	33	11
7	23142	Myrtle Ave	Seneca Ave	7	5	12	24	8
8	23139	Myrtle Ave	George St	12	1	11	24	8
9	22811	Myrtle Ave	Fresh Pond Rd	10	5	9	24	8



**Legend**

- Study Area Boundary (dashed line)
- Average accidents Three Year (shaded square)
- < 10 acc (triangle)
- 11- 20 acc (square)
- 20- 37 acc (pentagon)

**Figure 8-1**  
**Accidents Location in The Study Area (1998-2000)**







The data showed that the two intersections with more than 20 accidents average per year are located along Metropolitan Avenue. They are Metropolitan Avenue and Fresh Pond Road with the highest frequency average of 37 accidents per year over the three years, followed by Metropolitan Avenue and Flushing Avenue with 23 accidents average per year.

Over the three year period (1998-2000) a total of 411 accidents occurred at the 9 locations. This translates into an average of 15.2 total accidents per year per location, with the average for reportable accidents being 6.6 suggesting issues are not as high. The total accidents include both reportable (177) and non-reportable (234). Of the total reportable accidents, 190 were injuries and 1 fatality. There were 24 pedestrians and 2 bicyclists involved in the accidents during the three year period. The highest number of accidents involving pedestrians was observed at Myrtle Avenue and George Street and Metropolitan Avenue and Fresh Pond Road with 7 and 6 accidents respectively. Table 8-2 summaries the accident history by years for the study area.

**Table 8-2: Summary of the Accidents History by Year**

Year	Total Acc	Reportable	Non-Reportable	Fatalities	Injuries	Pedestrian	Bicyclist
1998	144	44	100	0	64	7	1
1999	106	47	59	0	45	4	1
2000	161	86	75	1	90	13	0
<b>Total</b>	<b>411</b>	<b>177</b>	<b>234</b>	<b>1</b>	<b>199</b>	<b>24</b>	<b>2</b>

## 8.2 Cost Analysis of Accidents

Accidents are classified as either reportable or non-reportable. According to New York State Vehicle and Traffic Law, all accidents involving death, injury or resulting in property damage in excess of \$1,000 must be report to the NYS Department of Motor Vehicle (DMV) by police agencies, hence they are reportable accidents.

Non-Reportable accidents are defined as any accident that costs under \$1,000 in property damage.

There is a cost associated with all accidents, reportable and non-reportable. For reportable accidents, a cost is assigned based on the severity of personal injury and the amount of property damage sustained in the accident. There are three classifications for personal injury, Type A, Type B, and Type C; Type C being the least severe and Type A being the most severe form of injury.

Property damage is considered only when public or private properties such as buildings, houses, business stores or other assets are damaged due the accident but do not include damage or injuries to the cars, pedestrians or bicyclists involved in the accident. Table 8-3 shows average cost of accidents by class.

**Table 8-3: Average Cost of Accidents by Class**

Accidents Class	Average Cost	Relative Weight
Non-Reportable (NR)	\$1,000	1
Property Damage (PD)	\$3,800	4
Injury-Class C (IC)	\$96,000	96
Injury-Class B (IB)	\$385,000	385
Injury-Class A (IA)	\$1,548,000	1,548
Fatal Accidents (FA)	\$3,468,000	3,468

Table 8-4 shows the total cost for accidents occurring at Metropolitan Avenue @ Fresh Pond Road for the year 1998.

**Table 8-4: Total Cost of Accidents at Metropolitan Avenue @ Fresh Pond Road (1998)**

No. of Accidents by type	Accidents Class	Average Cost	Total Cost
28	Non-Reportable	\$1,000	\$28,000
1	Property Damage	\$3,800	\$3,800
11	Injury-Class C	\$96,000	\$1,056,000
2	Injury-Class B	\$385,000	\$770,000
1	Injury-Class A	\$1,548,000	\$1,548,000
0	Fatal Accident	\$3,468,000	\$0
<b>Total Cost:</b>			<b>\$3,405,800</b>

The analysis shows that the total cost for the 35 accidents that occurred at this intersection in 1998 was approximately \$3.4 million with the highest cumulative cost resulting from one Class A injury.

### 8.3 Frequency and Severity of Accidents

Frequency and severity are two critical factors in the analysis of accidents. These two factors allow for a better understanding of the problems at the study locations. The NYCDOT Safety Division developed a set of equations to help determine the severity and frequency of accidents at a location.

#### *Severity Factor*

The severity factor (SF) indicates whether or not a location tends to have accident with significant levels of damage. A value can be assigned between 0 and 10, ten being the highest level of severity and zero the lowest level. Various levels of severity can be determined from the relative weight assigned to each accident class based on the accident cost. Table 8-5 shows the severity factor calculation for Metropolitan Avenue @ Fresh Pond Road for 1998.

**Table 8-5: Severity Factor at Metropolitan Avenue @ Fresh Pond Rd (1998)**

Accidents Class	Relative Weight	Frequency (1998)	Total Relative Weight
Non-Reportable (NR)	1	28	28
Property Damage (PD)	4	1	4
Injury-Class C (IC)	96	11	1056
Injury-Class B (IB)	385	2	770
Injury-Class A (IA)	1,548	1	1,548
Fatal accidents (FA)	3,468	0	0
		Total	3,406
		SF=Ln (Total)	8.13

The severity factor of 8.13 indicates that this location tends to have accident with significant levels of damage with the likelihood of accidents resulting in Class C injuries.

### ***Frequency Factor***

The frequency at which accidents occur at a location (frequency factor (FF)) is an additional tool to help understand accidents at a location. The frequency factor is based in part on the accident records supplied by NYSDMV and NYSDOT Centralized Local Accident Surveillance System (CLASS). This value assigned ranges from 0 to 10, representing 10 the highest level of frequency accidents for the intersection. For example the frequency factor for this location Metropolitan Avenue @ Fresh Pond Road for 1998 is 7.11.

The critical factors (frequency and severity), based on Index Equations developed by the NYCDOT Safety Division, is helpful for determining the frequency or likelihood, and severity of traffic accidents.

### ***Composite Index***

The composite index represents the ratio of the severity factor to the frequency factor  $CI = SF/FF$ . If the complexity index is greater than 1.0 then the location's accidents will be skewed toward severity; if the factor is less than 1.0 then accidents will be skewed toward frequency. With a severity factor greater than 7.0, a frequency factor greater than 6.0, and a composite index greater than 1.0, accidents with a fatality or Type A injuries are likely to happen at that location. Table 8-6 shows an interpretation summary of the severity factors, frequency factors, and composite index values that correspond to the type of injury and damage that is sustained in an accident.

**Table 8-6: Interpretation of the Critical Factors in Accidents**

Severity Factor 7-10	Frequency Factor 7-10	Composite Index >1.0
This scenario indicates the likelihood of fatal accidents or Type A injuries, or random accidents.		
Severity Factor 7-10	Frequency Factor 7-10	Composite Index <1.0
This scenario indicates Type A and B injuries, no fatalities, but significant damages.		
Severity Factor 7-10	Frequency Factor 7-10	Composite Index =1.0
This scenario illustrates fatal accidents or Type A or B injuries; there is both frequency and severity.		
Severity Factor 4-7	Frequency Factor 4-7	Composite Index <1.0
This scenario illustrates Type C injuries and non-reportable accidents.		
Severity Factor 4-7	Frequency Factor 4-7	Composite Index >1.0
This scenario illustrates Type C injuries and non-reportable accidents.		

## 8.4 Annual Accident Analysis

### Year 1998

During 1998 there were a total of 144 accidents, of which were 100 non-reportable and 44 reportable. Of the 44 reportable accidents, 2 resulted in Class A injuries, 8 Class B injuries and 54 Class C injuries. No fatality was reported for this year. Table 8-7 shows the total number of accidents by location, fatalities and class with corresponding frequency and severity factors and composite index. Table 8-8 shows the break down of accidents by collision types with pedestrians and bicyclist involved.

The *Metropolitan Avenue and Fresh Pond Road* intersection had 35 accidents, the highest number for that year. There were 7 reportable accidents and 28 non-reportable. From the 7 reportable accidents one resulted in a class A injury, two class B and eleven class C injuries. Twenty-four percent of the total annual accidents in the study area occurred at this intersection. This intersection also had the highest frequency factor (FF) of 7.11 and severity factor (SF) of 7.84.

The intersection of *Metropolitan Avenue and Flushing Avenue* was ranked second in the frequency of accidents accounting for approximately 15% of the annual accidents. This intersection has the highest number of injuries (16) which comprise injury Class B and C.

### Accidents Involving Pedestrians and Bicyclists

In 1998 there were 7 accidents involving pedestrians at various locations throughout the study area. The highest pedestrian accident location was *Myrtle Avenue/George Street* where three occurred. There was 1 accident involving a bicyclist at *Fresh Pond Road and Cypress Hills Street*.

### Accidents by Collision Type and driving Conditions

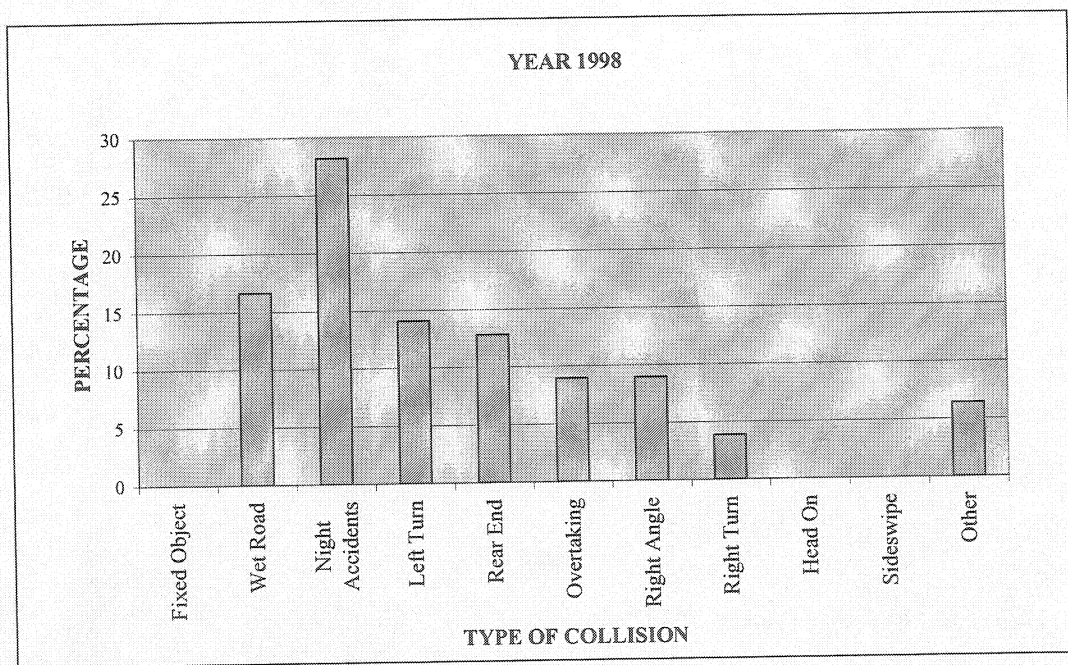
As shown in Figure 8-2, during 1998, 28% of the accidents occurred during night time and about 17% occurred under wet roadway conditions. The distribution of accidents by collision type showed that 14% were left turn, 13% rear end and 9% right angle. The location with the highest

frequency of accident with left turn collision type was *Fresh Pond Road/ Cypress Hills Street* with 33% of the total.

The highest frequency of rear end collision was observed at *Metropolitan Avenue/ Flushing Avenue* with 33% of the total. Right angle collision type was relatively low with a total of 5 for the year, with two accidents observed at *Metropolitan Avenue/ Flushing Avenue* and *Metropolitan Avenue/ Fresh Pond Road*.

Figure 8-2 shows the distribution of reportable accidents in 1998 and driving conditions.

**Figure 8-2: 1998 Accidents by Collision Type and Driving Conditions**



Severity and Frequency of Accidents

During 1998 of the 9 locations studied 3 intersections had a severity factor greater than 7.0, and 2 with frequency factor greater than 6.0. The composite index for 8 of the 9 intersections was greater than 1.0. This indicates that the majority of the accidents that occurred at these locations were skewed toward severity. Table 8-7 shows the severity factor, frequency factor and the composite index for all analyzed intersections in year 1998.

**Table 8-7**  
**1998 Traffic Accident Analysis**

Node #	Main St	Cross St	Fatal	Injury A	Injury B	Injury C	Property Damage	Non-Reportable	Total Accident	Severity Factor	Frequency Factor	Composite Index
22891	Metropiltan Av.	Fresh Pond Road	0	1	2	11	1	28	35	7.84	7.11	1.10
23022	Metropiltan Av.	Flusing Av.	0	0	3	13	0	13	21	7.55	6.09	1.24
19598	Fresh Pond Road	Cypress Hill St.	0	0	1	7	1	11	20	6.75	5.99	1.13
22902	Metropiltan Av.	Forest Av.	0	0	0	2	0	15	17	5.12	5.67	0.90
23144	Myrtle Av.	Cypress Av.	0	0	0	9	1	10	14	6.54	5.28	1.24
23139	Myrtle Av.	George St.	0	1	0	5	0	6	12	7.38	4.97	1.48
22811	Myrtle Av.	Fresh Pond Road	0	0	1	4	1	6	10	6.42	4.61	1.39
22895	Metropiltan Av.	Eliot Av.	0	0	1	2	0	5	8	6.13	4.46	1.37
23142	Myrtle Av.	Seneca Av.	0	0	0	1	0	6	7	4.41	3.89	1.13

Note: Calculation for Severity Factor, Frequency Factor, and Composite index is based on safety index equations developed by NYC DOT Safety Division utilizing NYC accidents records supplied by NYSDMV, NYSDOT Class System and accident cost research





## Year 1999

During 1999 there were a total of 106 accidents, of which 59 were non-reportable and 47 were reportable. Of the 47 reportable accidents, none resulted in Class A injuries, 7 resulted in Class B injuries and 38 resulted in Class C injuries. No fatality was reported for this year. Table 8-9 shows the total number of accidents by location, fatalities and injury class with corresponding frequency factor, severity factor and composite index. Table 8-10 shows the break down of accidents by collision types with pedestrians and bicyclist involved.

The intersection of *Metropolitan Avenue/Flushing Avenue* had the highest number of accidents with 27. There were 11 reportable accidents and 16 non-reportable. From the 11 reportable accidents, four were class B and twelve class C injury. Twenty-five percent of the total annual accidents occurred at this intersection, with the highest frequency factor (FF) of 6.59 and the highest severity factor (SF) of 7.67 from all the locations in the study area.

The intersection of *Metropolitan Avenue/Fresh Pond Road* was ranked second in frequency with 26 accidents, being approximately 24% of the total. Of the 26 accidents, 11 were reportable with four class C injury.

### Accidents Involving Pedestrians and Bicyclists

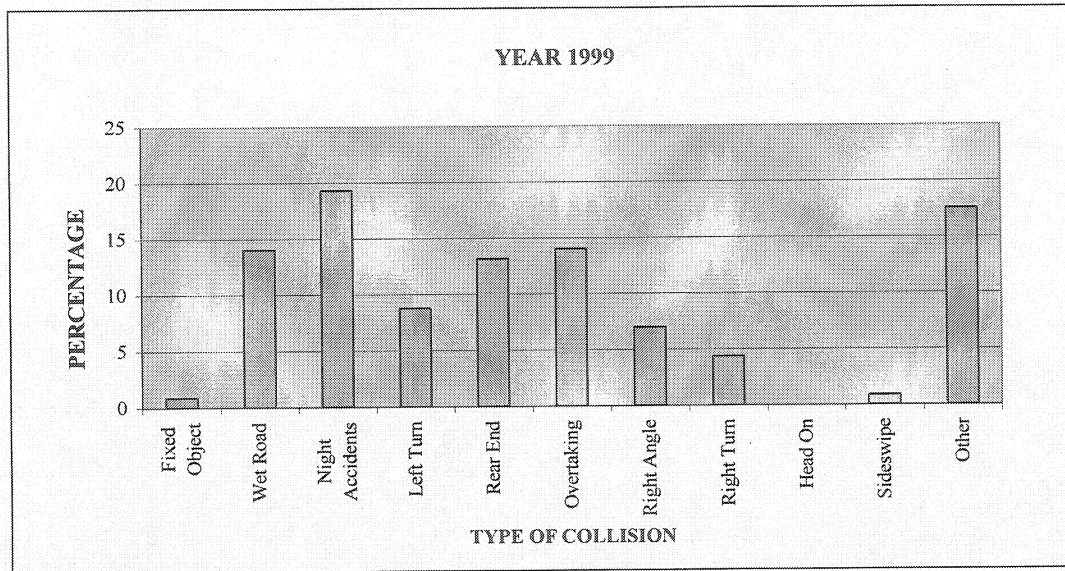
In 1999 there were 4 pedestrian accidents at three locations in the study area. The location with the highest pedestrian accident was *Metropolitan Avenue/Eliot Avenue* with two accidents. There was only one accident involving bicyclists in the study area at the intersection of *Metropolitan Avenue and Eliot Avenue*.

### Accidents by Collision Type and driving Conditions

As shown in Figure 8-3 during 1999, 19% of the accidents occurred during night time and 14% occurred under wet roadway conditions. The distribution of accidents by collision types showed that 14% were overtaking, 13% rear end, and 9% left turn. The locations with the highest frequency of overtaking collision type were *Metropolitan Avenue/ Fresh Pond Road* and *Metropolitan Avenue/ Flushing Avenue*.

The highest frequency of rear-end collision was observed at *Metropolitan Avenue/ Flushing Avenue* with 3 from a total of 8. Left turn collision type accident were distributed evenly throughout the area. Figure 8-3 shows the distribution of reportable accidents and driving conditions for 1999.

**Figure 8-3: 1999 Accidents by Collision Type and Driving Conditions**



Severity and Frequency of Accidents

During 1999 of the 9 locations studied one intersection had a severity factor greater than 7.0, and two intersections had a frequency factor greater than 6.0. The composite index for 7 of the intersections was greater than 1.0. This indicates that the majority of the accidents that occurred at these locations were skewed toward severity. Table 8-9 shows the severity factor, frequency factor and the composite index for all analyzed intersections for the year 1999.

**Table 8-9**  
**1999 Traffic Accident Analysis**

Node #	Main St	Cross St	Fatal	Injury A	Injury B	Injury C	Property Damage	Non-Reportable	Total Accident	Severity Factor	Frequency Factor	Composite Index
23022	Metropolitan Av.	Flusing Av.	0	0	4	12	1	16	27	7.67	6.59	1.16
22891	Metropolitan Av.	Fresh Pond Road	0	0	0	4	0	15	26	5.79	6.52	0.89
19598	Fresh Pond Road	Cypress Hill St.	0	0	1	9	1	4	15	6.9	5.42	1.27
23144	Myrtle Av.	Cypress Av.	0	0	0	4	0	12	14	5.75	5.28	1.09
22895	Metropolitan Av.	Eliot Av.	0	0	0	2	0	4	7	5.06	3.89	1.30
22902	Metropolitan Av.	Forest Av.	0	0	0	1	0	3	6	4.39	3.58	1.23
23142	Myrtle Av.	Seneca Av.	0	0	0	4	0	3	5	5.44	3.22	1.69
22811	Myrtle Av.	Fresh Pond Road	0	0	2	2	0	1	5	6.63	3.22	2.06
23139	Myrtle Av.	George St.	0	0	0	0	0	1	1	0	0	-

Note: Calculation for Severity Factor, Frequency Factor, and Composite index is based on safety index equations developed by NYCDOT Safety Division utilizing NYC accidents records supplied by NYSDMV, NYSDOT Class System and accident cost research



## Year 2000

During 2000 there were a total of 161 accidents, of which 75 were non-reportable and 86 were reportable. Of the 86 reportable accidents, 2 resulted in Class A injuries, 11 resulted in Class B injuries and 77 resulted in Class C injuries. One fatality was reported for this year. Table 8-11 shows the total number of accidents by location, fatalities and injury class with corresponding frequency factor, severity factor and composite index. Table 8-12 shows the break down of accidents by collision types with pedestrians and bicyclist involved.

The location of *Metropolitan Avenue/Fresh Pond Road* had the highest number of accidents with 49 during the year. There were 30 reportable accidents and 19 non-reportable. From the 30 reportable accidents at this intersection, one resulted in class A injury, four resulted in class B injury and twenty four resulted in class C injury. Approximately 30% of the total annual accidents occurred at this intersection. This intersection had the highest frequency factor (FF) of 7.78 and the highest severity factor (SF) of 8.36 for the year.

The intersection of *Fresh Pond Road/Cypress Hills Street* was second in frequency with 23 accidents, which represented 14% of the annual total accidents. Of the 23 accidents, 13 were reportable with sixteen class C injury.

### Accidents Involving Pedestrians and Bicyclists

In 2000 there were 13 pedestrian accidents at various locations throughout the study area. The highest pedestrian accident location was *Metropolitan Avenue/Fresh Pond Road* with six accidents, followed by *Myrtle Avenue/Fresh Pond Road* with four accidents. There were no accidents involving bicyclists in the study area.

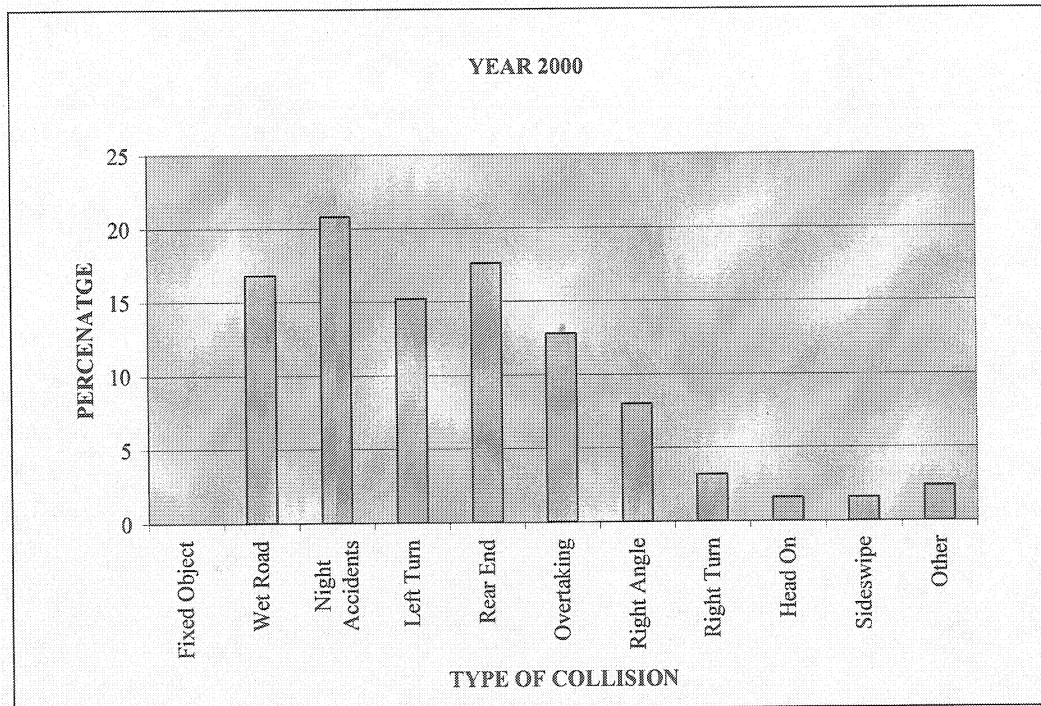
### Accidents by Collision Type and driving Conditions

As shown in Figure 8-4 during 2000, 21% of the accidents occurred during night time and 17% occurred under wet roadway condition. The distribution of accidents by collision types showed that 18% were rear end, 15% left turn, and 13% overtaking. The location with the most frequent rear end collision type was *Metropolitan Avenue/Fresh Pond Road* with seven accidents, representing 44% of the total in the study area. It was also observed that

*Metropolitan Avenue/ Fresh Pond Road* had the highest overtaking collision type accident with six.

The location of *Metropolitan Avenue/ Forest Avenue* had the highest left turn collision type accident with four. Figure 8-4 shows the distribution of reportable accidents and driving conditions for year 2000.

**Figure 8-4: 2000 Accidents by Collision Type and Driving Conditions**



#### Severity and Frequency of Accidents

During 2000, of the nine intersections studied five had a severity factor greater than 7.0, and three intersections had frequency factor greater than 6.0. The composite index for all nine intersections analyzed was greater than 1.0. This indicates that all of the accidents that occurred at these locations were skewed toward severity. Table 8-11 shows the severity factor, frequency factor and the composite index for all analyzed intersection in year 2000.

**Table 8-11  
2000 Traffic Accident Analysis**

Node #	Main St	Cross St	Fatal	Injury A	Injury B	Injury C	Property Damage	Non-Reportable	Total Accident	Severity Factor	Frequency Factor	Composite Index
22891	Metropiltan Av.	Fresh Pond Road	0	1	4	24	1	19	49	8.36	7.78	1.07
19598	Fresh Pond Road	Cypress Hill St.	0	0	0	16	1	10	23	7.05	6.27	1.12
23022	Metropiltan Av.	Flusing Av.	0	1	3	4	0	12	22	7.8	6.18	1.26
22895	Metropiltan Av.	Elfot Av.	0	0	1	11	0	7	18	7.04	5.78	1.22
23142	Myrtle Av.	Seneca Av.	0	0	0	2	0	10	12	5.09	4.97	1.02
22902	Metropiltan Av.	Forest Av.	0	0	0	9	0	5	11	6.53	4.8	1.36
23139	Myrtle Av.	George St.	0	0	1	5	0	5	11	6.53	4.8	1.36
22811	Myrtle Av.	Fresh Pond Road	1	0	1	5	1	4	9	8.14	4.39	1.85
23144	Myrtle Av.	Cypress Av.	0	0	1	1	10	3	6	5.95	3.58	1.66

Note: Calculation for Severity Factor, Frequency Factor, and Composite index is based on safety index equations developed by NYCDOT Safety Division utilizing NYC accidents records supplied by NYSDMV, NYSDOT Class System and accident cost research

**Table 8-12  
2000 Traffic Accident History**

Node #	Main St	Cross St	Total Acc	Reportable	Non-Reportable	Fatal	Injury	Pedestrian	Bicyclist	Fixed Object	Wet Road	Night	Left Turn	Rear End	Overtaking	Right Angle	Right Turn	Head On	Sideswipe	Other
22891	Metropolitan Av.	Fresh Pond Rd	49	30	19	0	29	6	0	0	5	6	3	7	6	2	3	0	1	1
23022	Metropolitan Av.	Flusing Av.	23	13	10	0	16	0	0	0	3	6	3	1	1	5	0	1	0	1
19598	Fresh Pond Rd	Cypress Hill St.	22	10	12	0	8	1	0	0	2	2	2	2	2	2	0	1	0	0
22902	Metropolitan Av.	Forest Av.	18	11	7	0	12	0	0	0	0	4	4	2	0	2	0	0	1	0
23144	Myrtle Av.	Cypress Av.	12	2	10	0	2	0	0	0	0	2	0	1	0	0	1	0	0	0
23139	Myrtle Av.	George St.	11	6	5	0	9	1	0	0	3	2	1	2	1	1	0	0	0	0
22811	Myrtle Av.	Fresh Pond Rd	11	6	5	0	6	4	0	0	2	0	2	0	1	0	0	0	0	0
22895	Metropolitan Av.	Elliot Av.	9	5	4	1	6	0	0	0	0	2	1	0	1	1	0	0	0	1
23142	Myrtle Av.	Seneca Av.	6	3	3	0	2	1	0	0	1	1	1	1	0	0	0	0	0	0