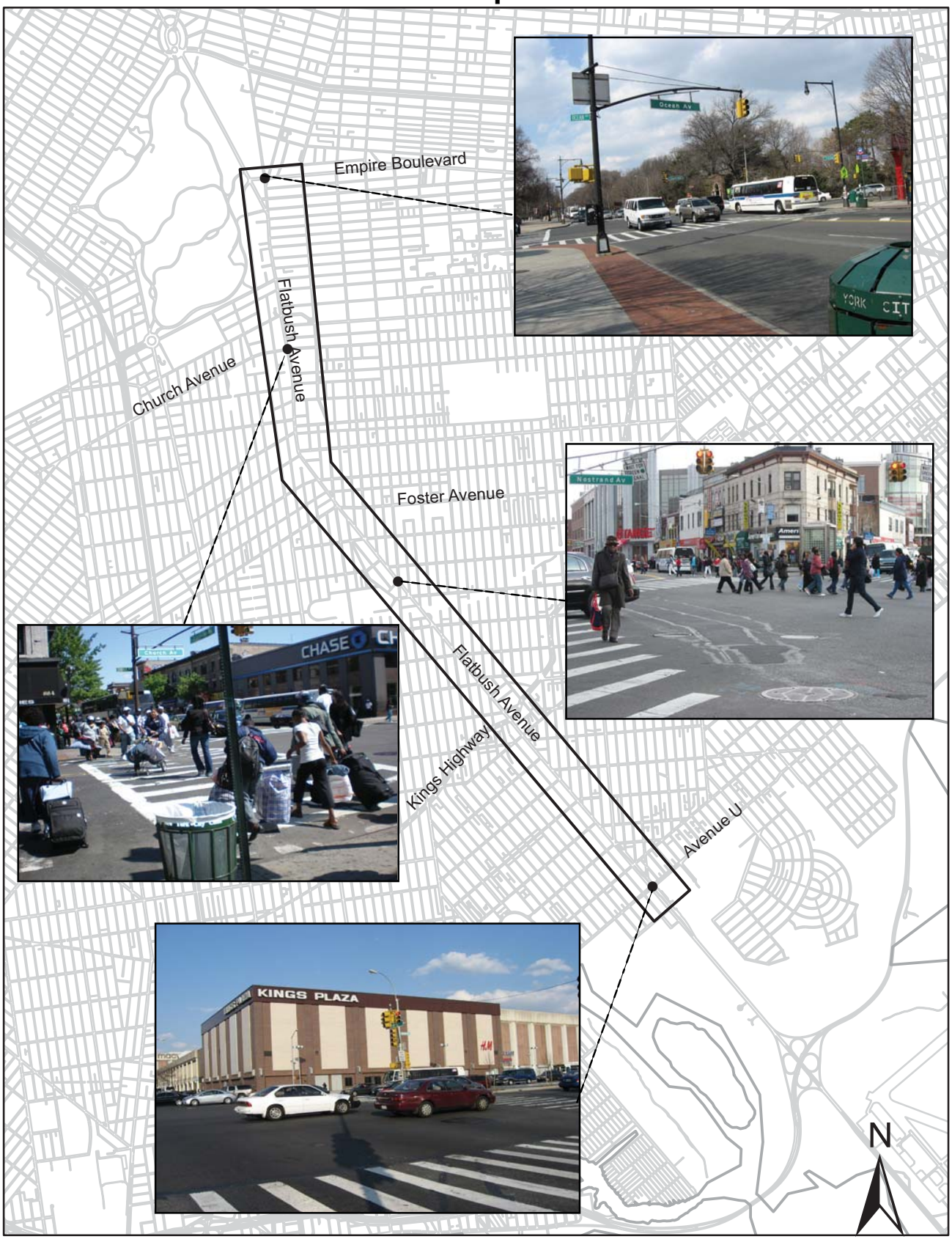
Flatbush Avenue Pedestrian Study
Final Report



New York City Department of City Planning, Transportation Division
Member of New York Metropolitan Transportation Council

May 2008

Flatbush Avenue Pedestrian Study

Michael R. Bloomberg, Mayor
City of New York

Amanda M. Burden, AICP, Director
New York City Department of City Planning

FINAL REPORT
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Executive Summary

The New York City Department of City Planning has undertaken the Flatbush Avenue Pedestrian Study. The purpose of this study is to improve pedestrian mobility and enhance safety at critical points along this important corridor.

The objectives of this study are:

- To examine existing pedestrian traffic flow and circulation within the Flatbush Avenue study area with a focus on problematic intersections.
- To develop recommendations which address issues associated with existing pedestrian conditions.

The study focuses on specific intersections as determined by an analysis of problematic locations based on pedestrian safety, circulation and mobility. This report presents detailed observations based on fieldwork, an analysis of existing land use and zoning, demographic and socioeconomic profiles, literature search; field data such as inventory of street and intersection geometry, conditions of sidewalks and streets, pedestrian circulation, pedestrian environment and accident data. In addition vehicle traffic volumes and classification counts were conducted at three intersections within the study area. Also pedestrian volumes were collected at three intersections and at five midblock locations.

Based on the results of the existing conditions analysis, the following improvements have been recommended:

Address Pedestrian – Vehicular Conflicts

- To install a Lead Pedestrian Interval (LPI) at two intersections
- To install "Yield to Pedestrian" signs at several intersections
- Increase enforcement

Address Pedestrian Safety

- Reduce illegal midblock crossings with signage, fencing, relocation of a bus stop
- To install "Stop Bars" 15 feet from crosswalk
- Install curb extensions to reduce crossing distance
- New crosswalk

Enhance Pedestrian Environment

- Put in landscaping/trees/planters on sidewalks and medians at several locations
- Install a raised concrete island for additional protection from vehicular traffic
- Install bus shelters at bus stops
- Repair sidewalks/curb cuts/ roadway in poor condition

Recommendations for future consideration:

- To install a "Countdown Signal" as a pilot program at two intersections
- Restrict left turns at one intersection

The recommendations made in this report are predicated upon further study and feasibility analyses prior to implementation.

Part A

Study Area and Socioeconomic Characteristics

Introduction

Flatbush Avenue is an important corridor that serves many transportation needs for Brooklyn residents and businesses. As population and employment grow, the city explores options to improve pedestrian mobility and enhance safety at critical points along this corridor, including Church Avenue, Brooklyn College and Kings Plaza.

The Department of City Planning Transportation Division has conducted the Flatbush Avenue Pedestrian Study to examine and analyze pedestrian conditions at selected intersections along Flatbush Avenue and recommend specific street treatments, operational and policy changes to improve pedestrian mobility and enhance safety along this major corridor.

Along Flatbush Avenue intersections/locations were identified and analyzed if they presented five or more pedestrian accidents from 2004 - 2006, had safety issues for pedestrians, demonstrated problematic trends affecting pedestrian traffic, and/or presented opportunities for improvement in terms of the pedestrians' environment. Additionally one-way streets intersecting this major arterial at an angle were also analyzed since they presented potential problems for pedestrians crossing and turning vehicles.

This report is divided into four parts:

- Part A - Study Area and Socioeconomic Characteristics which contains a description of the study area and its population;
- Part B - Zoning and Land Use which explains in detail the zoning districts and the land uses within the area of study;
- Part C - Study Locations Analysis, includes a detailed analysis of several intersections in terms of pedestrian safety, mobility, circulation and recommendations;
- Part D, Appendices, contains the methodology used for the level of service analysis; traffic volume diagrams; standards for signage, bus shelters and trees; summary of literature search completed for this report.

Study Area

The study area is located geographically in the heart of Brooklyn and is bounded to the north by Empire Boulevard/ Ocean Avenue to the south by Avenue U and runs on Flatbush Avenue, a major arterial.

This main avenue touches many neighborhoods such as Flatbush, Midwood, Marine Park with one and two-family houses on tree lined streets and areas of apartment buildings. It is one of the city's longest commercial corridors and is home to many small and medium sized businesses.

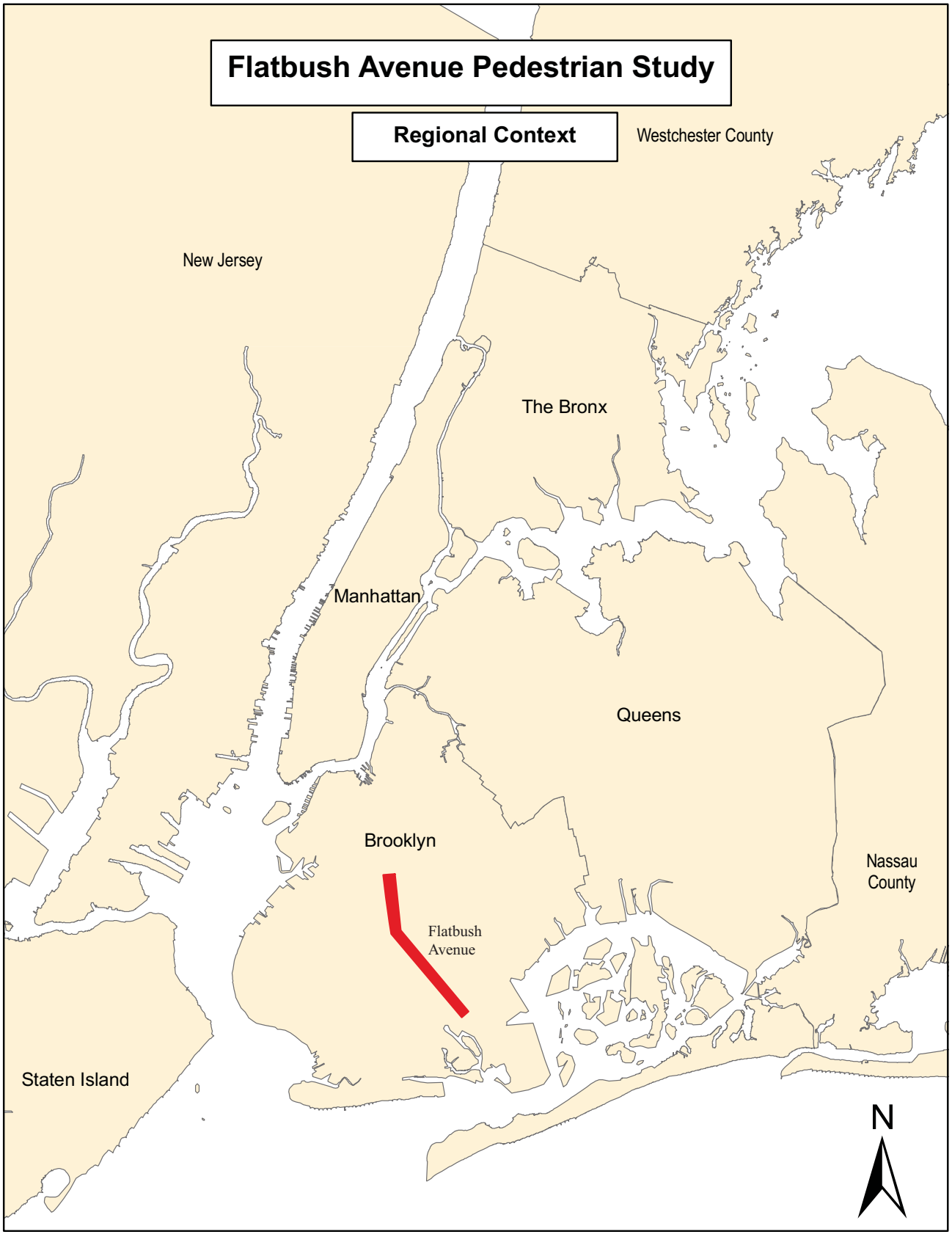


Figure A-1 - Regional Context

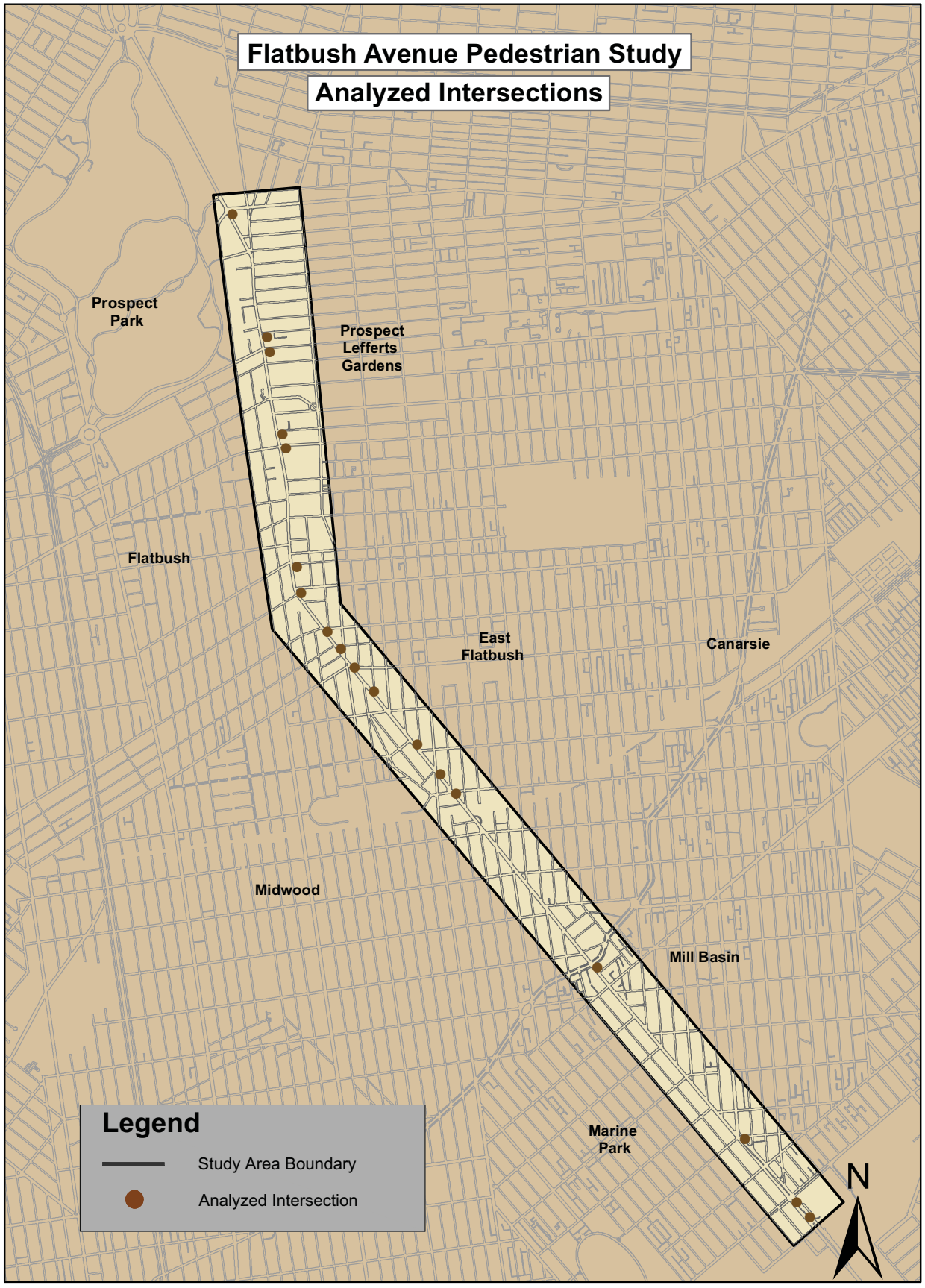


Figure A-2 - Study Area

Socioeconomic Characteristics

Over the past five decades, the middle-class community in this central part of Brooklyn has undergone demographic changes. The current ethnic make-up of the community has people of American, Caribbean, Hispanic, European and Asian descent. It is an area of continued population growth. The population residing within the study area increased from 166,481 in the year 1990 to 171,442 in 2000 indicating a population increase of 3%.

The study area consists of 41 census tracts along Flatbush Avenue. In order to calculate the estimated population for 1990 and 2000 using the U.S. Census Data, the geographic percentage of each tract located within the area of study was multiplied by the total population of that tract. The population obtained per tract was then added to get the total population for the study area.

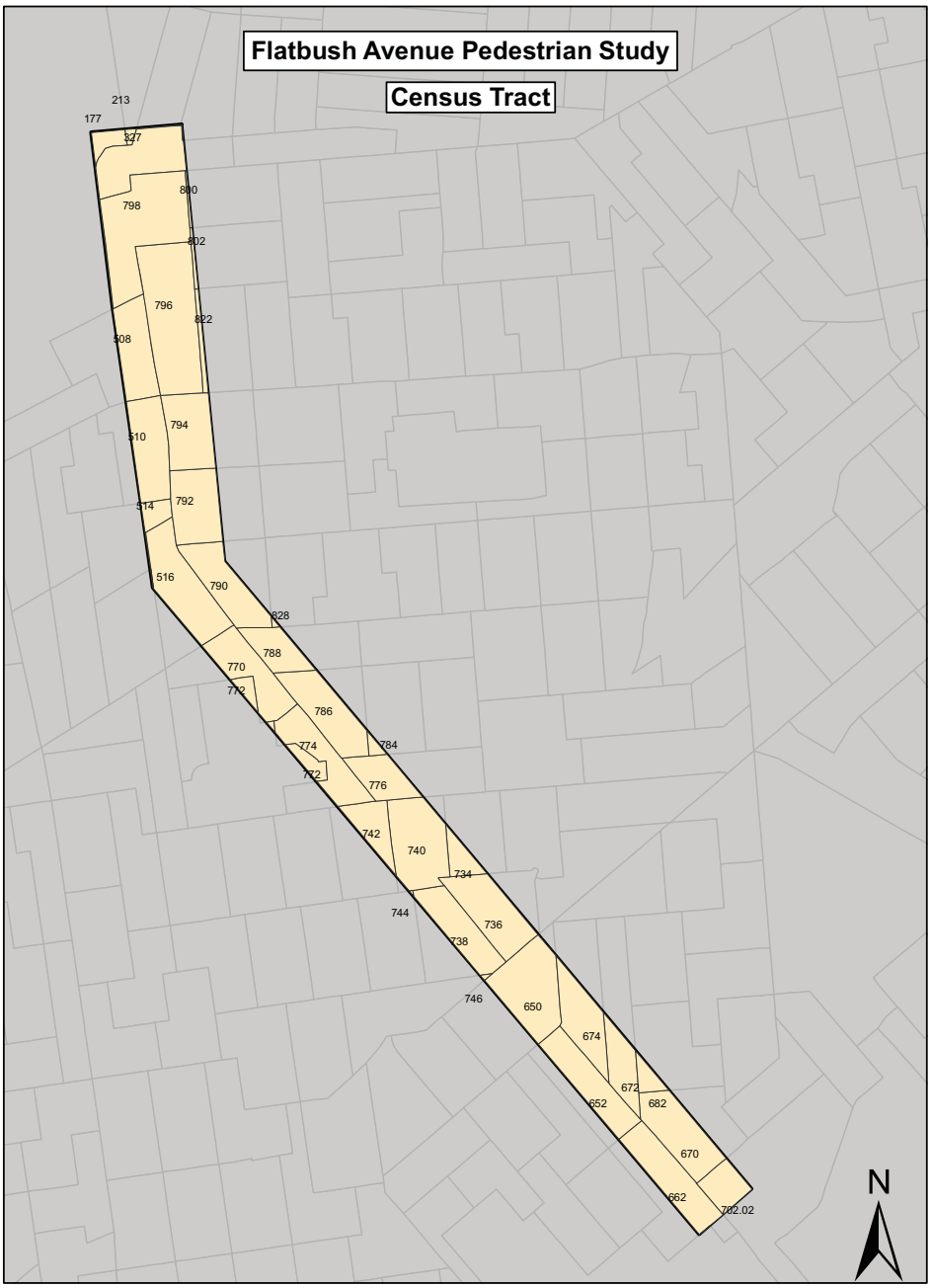


Figure A-3 - Census Tracts Map of Study Area

A journey-to-work modal split analysis was also done for this study using data from the census tracts that make up the study area. Journey-to-work modal split analyses were performed for both the local resident labor force and the people who traveled into the study area to work.

2000 census data indicates that the study area had a local resident labor force (16 years or older) of 66,591 workers who either worked at home or commuted to work. Of the total local resident labor force, 27 percent (18,197) used car, truck or van, and either drove alone or carpooled (see Table A-1). The majority of the car, truck or van usage occurred by those who drove alone (72.8 percent). Of the remaining local resident labor force, 65 percent (43,297) used public transit, 5 percent (3,190) walked to work, and 2 percent (1,277) worked at home. For those workers who commuted using public transportation, 70.5 percent (30,535) were by subways, 25 percent (10,812) by bus, 3.1 percent (1,360) by railroad, 1 percent (530) by taxicab, And 1 percent (367) by other means.

With regard to place of work data for the 2000 Census, 95 percent (61,690) of the local resident labor force (16 years or older) worked in New York City, while the remaining 5 percent (3,111) worked in various places outside of New York City. Of the local resident labor force who worked in New York City, 50.3 percent (31,060) worked in Kings County, 38.6 percent (23,811) worked in New York County, 7.8 percent (4,802) worked in Queens County, 2.1 percent (1,305) worked in Bronx County, and 1.2 percent (712) worked in Richmond County. The remaining local resident labor force worked in New York State outside of New York City (2.7 percent), New Jersey (1.6 percent), Connecticut (0.1 percent), and elsewhere (0.4 percent). See Table A-2.

Due to rounding in the CTPP and Census policies, there are differences between the total workers for the Modal Split (66,591) and for the Place of Work (64,801), the difference is only 1,790 people or 3% .

Table A -1

Modal Split for Workers 16 Years and Older Who Reside Within the Study Area

	Means of Transportation														
Census Tract	Car, Truck, or Van:	Drove Alone	Carpooled	Public Transportation	Bus, Streetcar, or Trolley	Subway	Railroad	Ferryboat	Taxicab	Motorcycle	Bicycle	Walked	Other means	Worked at Home	Total
177	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
213	395	255	140	1,285	120	1,090	40	25	10	20	10	115	25	50	1,900
323	364	220	144	1,110	230	830	30	-	20	-	-	155	-	10	1,639
325	500	435	65	1,510	315	1,090	90	-	15	-	15	145	-	30	2,200
327	275	195	80	1,215	135	975	90	15	-	4	20	25	-	10	1,549
508	889	590	299	3,225	660	2,465	30	-	70	-	15	250	4	105	4,488
510	785	465	320	2,314	494	1,705	60	10	45	-	20	165	25	70	3,379
514	680	405	275	2,355	325	1,965	40	-	25	-	30	100	10	35	3,210
516	725	560	165	2,435	890	1,485	40	-	20	-	35	130	25	60	3,410
518	400	330	70	1,090	100	930	25	-	35	-	-	50	10	90	1,640
650	285	255	30	265	100	165	-	-	-	-	-	85	15	15	665
652	270	235	35	170	35	135	-	-	-	-	-	50	-	4	494
662	335	260	75	150	55	95	-	-	-	-	-	40	-	10	535
670	685	570	115	424	270	150	4	-	-	-	-	40	10	4	1,163
672	310	200	110	235	110	125	-	-	-	-	-	40	-	10	595
674	325	255	70	459	160	280	15	-	4	-	-	55	-	4	843
682	584	490	94	284	105	175	4	-	-	20	-	65	-	15	968
702.02	104	80	24	10	-	10	-	-	-	-	-	-	-	-	114
734	339	210	129	435	210	185	40	-	-	-	-	15	15	30	834
736	570	395	175	780	295	485	-	-	-	-	4	55	35	55	1,499
738	534	435	99	620	295	295	20	-	10	-	-	55	15	45	1,269
740	525	435	90	859	380	475	4	-	-	-	-	85	15	45	1,529
742	455	405	50	744	120	620	-	-	4	-	15	30	-	35	1,279
744	530	395	135	278	79	195	-	-	4	-	4	55	-	25	892
746	369	265	104	375	90	250	35	-	-	-	4	40	4	10	802
770	460	320	140	865	240	625	-	-	-	-	-	50	-	15	1,390
772	499	310	189	740	210	500	30	-	-	-	-	90	20	15	1,364
774	365	320	45	769	140	600	25	-	4	-	-	50	15	55	1,254
776	605	435	170	1,155	330	760	55	-	10	-	4	70	4	45	1,883
784	409	325	84	635	180	415	40	-	-	-	-	40	-	25	1,109
786	434	320	114	1,178	300	870	4	-	4	-	-	60	-	70	1,742
788	319	225	94	1,020	305	600	70	-	45	-	-	70	-	10	1,419
790	425	330	95	1,695	525	1,065	50	-	55	-	-	125	35	10	2,290
792	395	295	100	725	180	515	20	-	10	-	4	30	-	20	1,174
794	164	130	34	478	169	305	4	-	-	-	4	25	10	-	681
796	645	375	270	2,985	640	2,150	175	-	20	-	25	150	10	50	3,865
798	615	330	285	2,685	565	1,990	85	-	45	-	-	145	20	70	3,535
800	445	335	110	1,120	230	790	55	-	45	-	-	75	15	25	1,680
802	414	310	104	1,535	255	1,225	45	-	10	-	10	50	10	15	2,034
822	400	240	160	2,215	705	1,395	115	-	-	-	-	230	20	70	2,935
828	370	305	65	870	265	555	20	10	20	-	-	85	-	15	1,340
	-			-											-
Total	18,197	13,245	4,952	43,297	10,812	30,535	1,360	60	530	44	219	3,190	367	1,277	66,591
Percent	27%			65%						0%	0%	5%	1%	2%	100%

Source: U.S. Census 2000 CTPP

Table A - 2

Place of Work for Workers 16 Years and Older Who Reside Within the Study Area

	Place of Work													
Census Tract	**New York City (all counties)**	New York County	Kings County	Queens County	Bronx County	Richmond County	**New York State (Outside NYC)**	Long Island	Westchester	New York Upstate	Connecticut State	New Jersey State	Elsewhere	**Total**
177	**-**	-	-	-	-	-	**-**	-	-	-	-	-	-	**-**
213	**1,775**	728	892	126	-	29	**39**	19	10	10	-	33	-	**1,847**
323	**1,509**	647	652	192	14	4	**40**	10	30	-	-	-	-	**1,549**
325	**2,088**	790	1,102	131	55	10	**54**	39	15	-	10	39	4	**2,195**
327	**1,442**	619	609	136	39	39	**44**	24	20	-	-	22	-	**1,508**
508	**4,259**	1,788	1,970	360	103	38	**77**	28	25	24	-	86	19	**4,441**
510	**3,130**	1,194	1,587	252	83	14	**57**	47	-	10	29	94	20	**3,330**
514	**3,065**	1,321	1,425	200	107	12	**48**	44	4	-	-	18	10	**3,141**
516	**3,217**	1,276	1,556	338	43	4	**112**	68	10	34	-	30	25	**3,384**
518	**1,497**	702	672	95	18	10	**49**	41	-	8	-	28	4	**1,578**
650	**617**	198	337	62	10	10	**18**	14	-	4	-	-	-	**635**
652	**417**	141	260	8	4	4	**16**	12	4	-	-	-	-	**433**
662	**485**	142	298	10	10	25	**22**	22	-	-	15	-	-	**522**
670	**1,030**	278	686	62	-	4	**36**	36	-	-	-	-	-	**1,066**
672	**537**	207	286	34	10	-	**15**	15	-	-	-	10	-	**562**
674	**800**	320	387	89	4	-	**-**	-	-	-	-	8	-	**808**
682	**881**	244	506	75	19	37	**29**	29	-	-	-	4	-	**914**
702.02	**110**	44	56	10	-	-	**-**	-	-	-	-	-	-	**110**
734	**744**	241	437	44	18	4	**46**	46	-	-	-	10	-	**800**
736	**1,411**	490	742	140	14	25	**10**	10	-	-	-	18	4	**1,443**
738	**1,184**	402	648	120	4	10	**57**	32	25	-	-	8	-	**1,249**
740	**1,409**	498	692	181	34	4	**38**	38	-	-	-	42	10	**1,499**
742	**1,162**	414	623	81	40	4	**39**	29	10	-	-	22	-	**1,223**
744	**770**	240	502	28	-	-	**8**	4	-	4	-	43	-	**821**
746	**711**	277	370	36	4	24	**34**	34	-	-	-	20	10	**775**
770	**1,304**	488	704	79	-	33	**30**	30	-	-	-	30	10	**1,374**
772	**1,265**	474	625	98	54	14	**28**	18	10	-	-	8	10	**1,311**
774	**1,118**	416	566	76	45	15	**38**	14	24	-	-	42	-	**1,198**
776	**1,643**	652	790	138	49	14	**84**	80	-	4	4	22	4	**1,757**
784	**997**	372	476	99	20	30	**86**	43	43	-	-	-	4	**1,087**
786	**1,623**	692	824	38	59	10	**63**	43	10	10	-	20	-	**1,706**
788	**1,245**	443	653	102	28	19	**60**	60	-	-	8	-	-	**1,313**
790	**2,139**	843	1,063	170	34	29	**55**	55	-	-	-	44	8	**2,246**
792	**1,080**	426	502	103	20	29	**-**	-	-	-	-	36	4	**1,120**
794	**650**	219	310	91	20	10	**4**	4	-	-	-	10	-	**664**
796	**3,602**	1,533	1,684	227	64	94	**143**	104	35	4	-	72	-	**3,817**
798	**3,313**	1,367	1,672	210	50	14	**84**	25	44	15	-	55	65	**3,517**
800	**1,564**	601	861	58	44	-	**28**	18	-	10	-	18	4	**1,614**
802	**1,825**	831	783	143	54	14	**77**	69	8	-	-	127	-	**2,029**
822	**2,806**	867	1,586	197	102	54	**57**	47	10	-	-	8	10	**2,881**
828	**1,266**	386	666	163	29	22	**41**	41	-	-	-	23	4	**1,334**
Total	**61,690**	**23,811**	**31,060**	**4,802**	**1,305**	**712**	**1,766**	**1,292**	**337**	**137**	**66**	**1,050**	**229**	**64,801**
Percent	**95.2%**						**2.7%**				**0.1%**	**1.6%**	**0.4%**	**100%**

Source: U.S. Census 2000 CTPP

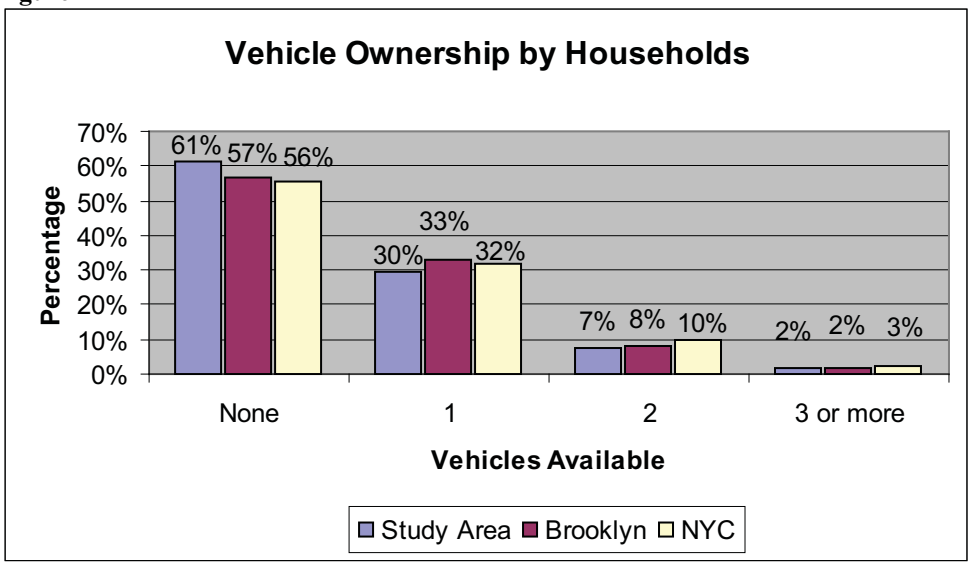
2000 census data indicates that the study area had a labor force (16 years or older) of 29,502 workers who traveled into the study area to work (inbound labor force) (see Table A-3). Of the total inbound labor force, 46 percent (13,522) used car, truck or van, either driving alone or carpooling. The bulk of the car, truck or van usage came from people who drove alone (76.7 percent). Of the remaining inbound labor force, 38 percent (11,144) used public transit, 11 percent (3,154) walked to work, 1 percent (197) bicycled, 1 percent (205) used other means of transportation, and 4 percent worked at home. For those workers who commuted using public transit, 43 percent (4,825) was on subways, 49 percent (5,441) on bus, 3 percent (343) on rail road, and 4 percent (447) on taxicab.

With regard to place of origin, 92 percent (25,887) of the inbound labor force (16 years or older) resided in New York City, while the remaining 8 percent (2,283) resided in various places outside of New York City. Of the inbound labor force who resided in New York City, 82 percent (21,165) resided in Kings County, 10 percent (2,526) resided in Queens County, 3 percent (813) resided in New York County, 2 percent (558) resided in Bronx County, and 3 percent (825) resided in Richmond County. The remaining inbound labor force resided in New York State outside of New York City (5 percent), Connecticut (0.1 percent), New Jersey (2 percent), and elsewhere (1 percent). See Table A-4.

Based on this analysis of the journey-to-work 2000 census data, the local resident and the inbound labor forces that make use of public transportation or walk to and from work within the study area significantly contribute to the number of pedestrians on the streets in the area of study and are part of the street network on a daily basis.

This is reinforced with the fact that 61 percent of the households located within the study area do not have a vehicle as illustrated in Figure A-2. In contrast, 39 percent of the households have at least one or more vehicles available. Of these households only 76 percent have one car, followed by 19 percent with two cars, and 4 percent with three or more.

Figure A - 2



Source: U.S. Census 2000

Due to rounding in the CTPP and Census policies, there are differences between the total workers for the Modal Split (29,502) and for the Place of Origin (28,170), the difference is only 1,332 people or 4.5% .

Table A - 3

Modal Split for Workers 16 Years and Older Who Travel into the Study Area

	Means of Transportation														
Census Tract	Car, Truck, or Van:	Drove Alone	Carpooled	Public Transportation	Bus, Streetcar, or Trolley	Subway	Railroad	Ferryboat	Taxicab	Motorcycle	Bicycle	Walked	Other means	Worked at Home	Total
177	160	125	35	170	50	100	10	-	10	-	15	25	-	-	370
213	765	605	160	765	210	500	20	-	35	-	-	40	-	50	1,620
323	110	65	45	99	35	60	4	-	-	-	-	20	-	10	239
325	260	215	45	228	60	150	4	10	4	-	15	50	-	30	583
327	160	125	35	110	60	40	10	-	-	-	-	25	-	10	305
508	578	420	158	685	360	260	45	-	20	-	10	195	-	105	1,573
510	170	105	65	310	175	100	-	10	25	10	-	130	10	70	700
514	120	100	20	174	65	75	15	4	15	-	10	60	4	35	403
516	265	155	110	329	165	150	4	-	10	-	-	65	-	60	719
518	214	175	39	124	50	60	4	-	10	-	15	60	-	90	503
650	229	195	34	160	90	45	-	-	25	-	-	110	-	15	514
652	484	390	94	130	85	30	-	-	15	-	-	75	-	4	693
662	695	550	145	420	245	115	15	25	20	-	-	125	-	10	1,250
670	184	140	44	65	55	10	-	-	-	-	-	15	-	4	268
672	382	340	42	144	100	40	4	-	-	-	-	20	-	10	556
674	140	115	25	44	20	10	10	4	-	-	-	65	-	4	253
682	154	125	29	30	20	10	-	-	-	-	-	4	-	15	203
702.02	430	280	150	160	125	25	-	-	10	-	15	30	-	-	635
734	155	115	40	35	10	15	-	-	10	-	-	10	-	30	230
736	190	160	30	180	75	65	30	-	10	-	-	70	10	55	505
738	418	325	93	134	75	55	4	-	-	-	-	60	4	45	661
740	298	270	28	340	205	105	20	-	10	-	15	50	20	45	768
742	154	140	14	130	40	90	-	-	-	-	25	50	-	35	394
744	29	25	4	25	25	-	-	-	-	-	-	-	-	25	79
746	1,045	825	220	369	254	105	-	-	10	-	4	165	35	10	1,628
770	259	190	69	149	85	60	-	-	4	-	-	75	-	15	498
772	1,790	1,365	425	1,745	760	885	60	15	25	10	4	345	10	15	3,919
774	315	275	40	369	190	155	4	10	10	-	-	90	10	55	839
776	105	85	20	115	45	70	-	-	-	-	-	15	-	45	280
784	40	30	10	29	4	25	-	-	-	-	-	30	-	25	124
786	324	240	84	245	135	90	10	-	10	-	-	95	-	70	734
788	200	175	25	170	45	90	-	-	35	-	-	55	-	10	435
790	164	135	29	135	70	55	-	-	10	-	-	30	10	10	349
792	370	245	125	315	105	165	10	-	35	-	-	80	10	20	795
794	734	570	164	855	515	285	10	-	45	-	10	360	20	-	1,979
796	559	360	199	724	360	325	35	-	4	-	25	175	10	50	1,543
798	170	115	55	369	144	215	-	10	-	-	10	65	15	70	699
800	135	105	30	90	40	50	-	-	-	-	4	40	-	25	294
802	210	170	40	164	129	20	15	-	-	-	10	55	-	15	454
822	210	110	100	210	120	60	-	-	30	-	10	55	20	70	575
828	148	120	28	100	40	60	-	-	-	-	-	70	-	15	333
Total	13,522	10,375	3,147	11,144	5,441	4,825	343	88	447	20	197	3,154	188	1,277	29,502
Percent	46%			38%						0%	1%	11%	1%	4%	100%

Source: U.S. Census 2000 CTPP

Table A - 4

Place of Origin for Workers 16 Years and Older Who Travel into the Study Area to Work

	Place of Origin													
Census Tract	**New York City (all counties)**	New York County	Kings County	Queens County	Bronx County	Richmond County	**New York State (Outside NYC)**	Long Island	Westchester	New York Upstate	Connecticut State	New Jersey State	Elsewhere	**Total**
177	**312**	19	247	32	4	10	**18**	8	10	-	4	-	-	**334**
213	**1,417**	108	941	204	94	70	**98**	94	-	4	-	38	36	**1,589**
323	**192**	4	150	34	-	4	**4**	-	-	4	-	14	-	**210**
325	**509**	10	411	70	-	18	**44**	26	18	-	-	-	-	**553**
327	**266**	10	218	38	-	-	**15**	15	-	-	-	4		**285**
508	**1,433**	39	1,224	98	29	43	**62**	58	-	4	-	27	4	**1,526**
510	**666**	24	598	34	-	10	**4**	4	-	-	-	4	-	**674**
514	**367**	10	288	65	-	4	**14**	14	-	-	-	4	-	**385**
516	**628**	29	502	63	14	20	**28**	18	10	-	-	28	8	**692**
518	**476**	39	392	25	10	10	**18**	4	4	10	-	10	-	**504**
650	**479**	-	389	43	10	37	**14**	14	-	-	-	-	-	**493**
652	**600**	-	488	56	4	52	**42**	42	-	-	-	10	10	**662**
662	**1,042**	38	809	114	10	71	**86**	86	-	-	4	12	4	**1,148**
670	**207**	10	185	8	-	4	**26**	26	-	-	-	14	-	**247**
672	**413**	-	288	85	18	22	**75**	67	-	8	4	4	-	**496**
674	**214**	25	157	28	-	4	**4**	4	-	-	-	-	10	**228**
682	**180**	-	137	33	10	-	**10**	10	-	-	-	-	10	**200**
702.02	**551**	4	446	16	-	85	**66**	56	-	10	-	-	-	**617**
734	**220**	-	152	24	-	44	**4**	4	-	-	-	-	-	**224**
736	**415**	-	401	-	-	14	**36**	32	-	4	-	4	10	**465**
738	**614**	-	512	98	-	4	**18**	18	-	-	-	8	4	**644**
740	**637**	29	497	69	34	8	**58**	48	-	10	4	18	-	**717**
742	**367**	4	315	38	10	-	**4**	4	-	-	-	14	-	**385**
744	**68**	-	68	-	-	-	**-**	-	-	-	-	-	-	**68**
746	**1,396**	34	1,220	106	10	26	**100**	96	-	4	-	22	58	**1,576**
770	**411**	8	327	36	40	-	**41**	41	-	-	-	8	10	**470**
772	**3,476**	166	2,853	321	49	87	**185**	139	32	14	10	98	32	**3,801**
774	**751**	45	619	53	10	24	**32**	28	4	-	-	8	4	**795**
776	**266**	15	217	34	-	-	**8**	8	-	-	-	-	-	**274**
784	**114**	20	90	4	-	-	**10**	10	-	-	-	-	-	**124**
786	**651**	24	534	49	34	10	**50**	30	-	20	-	8	-	**709**
788	**374**	4	322	34	-	14	**18**	18	-	-	-	-	-	**392**
790	**307**	4	269	24	-	10	**8**	8	-	-	-	-	-	**315**
792	**688**	22	580	41	10	35	**46**	42	-	4	-	12	-	**746**
794	**1,805**	26	1,600	148	-	31	**82**	82	-	-	-	14	4	**1,905**
796	**1,360**	14	1,086	176	72	12	**76**	72	-	4	4	30	12	**1,482**
798	**619**	-	452	105	58	4	**10**	10	-	-	-	34	-	**663**
800	**230**	-	188	14	-	28	**38**	38	-	-	-	-	-	**268**
802	**367**	4	293	56	14	-	**32**	24	8	-	4	18	-	**421**
822	**544**	15	481	38	-	10	**10**	10	-	-	-	15	-	**569**
828	**255**	10	219	12	14	-	**40**	40	-	-	-	15	4	**314**
Total	**25,887**	**813**	**21,165**	**2,526**	**558**	**825**	**1,534**	**1,348**	**86**	**100**	**34**	**495**	**220**	**28,170**
Percent	**92%**						**5%**				**0.1%**	**2%**	**1%**	**100%**

Source: U.S. Census 2000 CTPP

Part B
Zoning and Land Use

Zoning and Land Use

The second part of this report gives an overview of the citywide zoning followed by a detailed description of the zoning districts along Flatbush Avenue within the area of study. Finally, a description of the land use surrounding Flatbush Avenue is provided.

Zoning

Here is a brief overview of New York City's zoning:
There are three basic zoning designations within New York City: residential (R), commercial (C), and manufacturing (M). The three basic categories are further subdivided into lower, medium, and higher density of residential, commercial, and manufacturing districts. Development within these districts is regulated by use, bulk, and parking regulations.

Residential zoning districts range from R1 (the lowest density) to R10 (the highest density). R1 and R2 districts allow only detached single-family residences and certain community facilities. The R3-2 through R10 districts permit all types of dwelling units and community facilities and are distinguished by differing bulk and density, height and setback, parking, and lot coverage or open space requirements. However R2A, R2X, R3A, R3X, R3-1, R4-1, R5A, and R5-B permit limited types of one, two or three family houses depending on the residential district.

Commercial zoning districts range from C1 to C8. Of the eight basic commercial districts, two (C1 and C2 districts) are designed to serve local needs, one (C4 district) is for shopping centers outside the central business district, two (C5 and C6 districts) are for the central business districts, and three (C3, C7, and C8 districts) are designed for special purposes (waterfront activity, large commercial amusement parks and heavy repair services). The eight basic commercial districts are further subdivided to reflect variations in bulk, parking, and loading requirements.

Manufacturing is permitted in three districts: M1, M2, and M3. These districts incorporate performance standards that establish limits on the amount and type of industrial nuisances which may be created. The more noxious uses are restricted to M3 districts but may be permitted in M1 and M2 districts if they comply with the performance standards of those districts. Retail and commercial uses are permitted in manufacturing districts with some exceptions. The floor area ratio is the primary instrument for controlling both building size, levels of activity and congestion in manufacturing districts.

The zoning designation determines which uses are allowed in each zoning district. These uses are categorized into 18 Use Groups by their common functional characteristics. Use Groups 1-4 include residential and community facility uses, which are considered the least burdensome uses on the nuisance scale. Use Groups 5-16 consist of commercial uses. However, these are further broken down into local retail and commercial uses (Use Groups 5-11), waterfront and recreational uses (Use groups 12-15), and general service uses such as automotive-related services (Use Group 16). Finally, Use Groups 17 and 18 are comprised of manufacturing uses.

Figure B-1 represents the study area, a large area that has been divided into four sections in this report to better understand the zoning and land use configurations within the area of study. Section 1 stretches along Flatbush Avenue from Empire Boulevard to Albermarle Road, Section 2 from Albermarle Road to Glenwood Road, Section 3 from Glenwood Road to Flatlands Avenue and Section 4 from Flatlands Avenue to Avenue V.

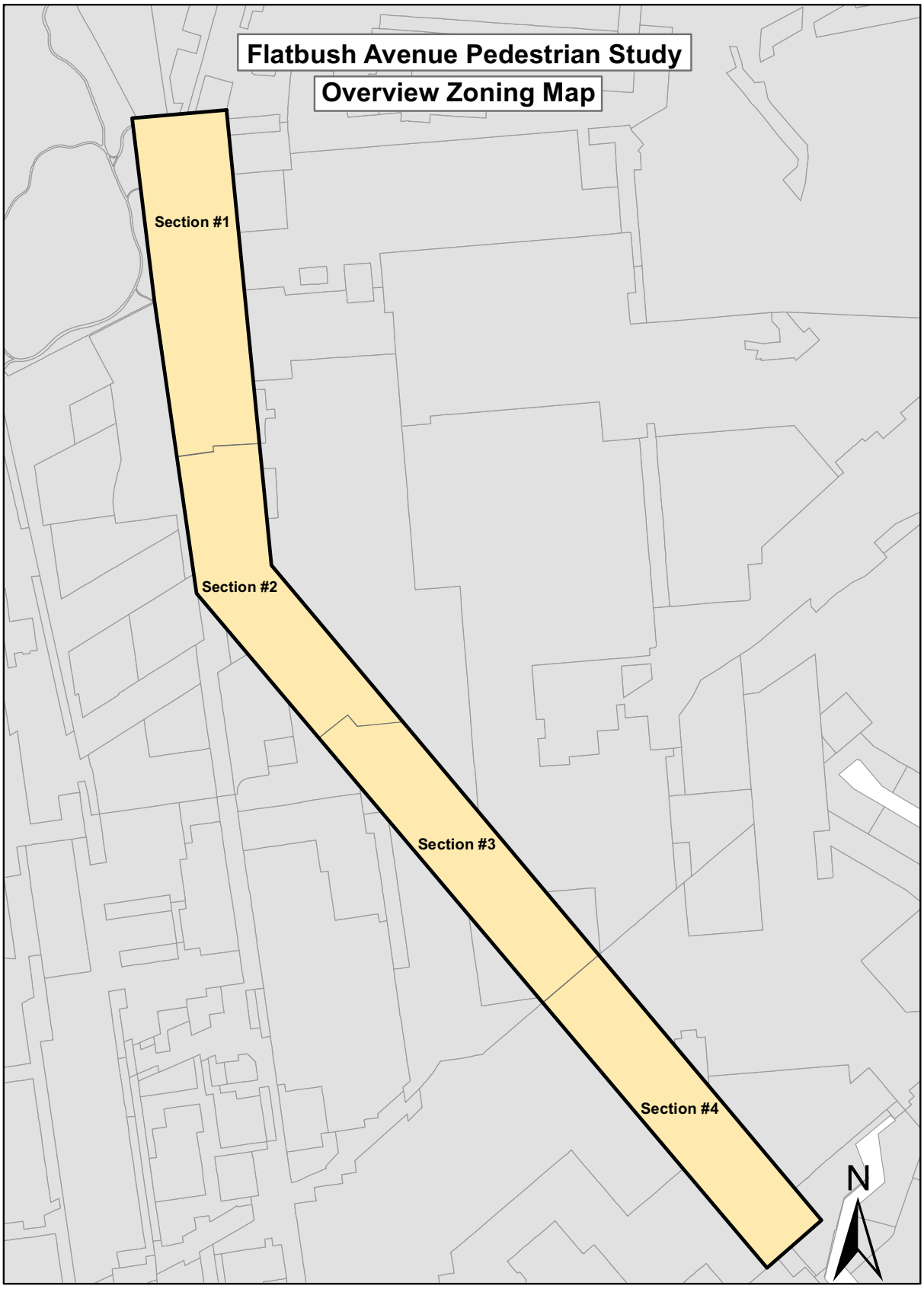

Flatbush Avenue Pedestrian Study
Overview Zoning Map
Section #1
Section #2
Section #3
Section #4
N

Figure B-1

Residential Zoning Districts:

There are six residential zoning districts ranging from R2 to R7-1.

R2 District

The R2 district is bounded by Lincoln Road to the north, Fillmore Street to the south, Bedford Avenue to the east and Flatbush Avenue to the west (see Zoning Map - Section 1, Figure B-2).

In R2 districts, residential development is limited to single-family detached houses.

R3-2 District

One of the three areas zoned R3-2 is generally bordered by Foster Avenue to the north, Bedford Avenue to the east and the study area boundary to the west (see Zoning Map -Section 2, Figure B-3). The other R3-2 district is located at the southern end of the study area and is bounded generally by Flatlands Avenue to the north, Avenue S to the south, East 49th Street to the east and Coleman Street to the west (see Zoning Map - Section 4, Figure B-5). Finally, there is a small triangular block just north of Flatlands Avenue and east of East 38th Street which is also zoned R3-2 (see Zoning Map - Section 3, Figure B-4).

R3-2 districts are residential districts that allow a variety of housing types, including low-rise attached houses, small multi-family apartment houses, detached and semi-detached one- and two-family residences.

R4 District

There are three separate R4 districts located within the study area. The first site is bounded by Avenue I to the north, East 35th Street to the east and the study area boundary to the west. The second site is bounded generally by East 36th Street to the west and Avenue K to the south (see Zoning Map - Section 3, Figure B-4). The third R4 district in the study area is bounded by Avenue S to the north, Avenue V to the south, Coleman Street to the west and Flatbush Avenue to the east (see Zoning Map - Section 4, Figure B-5).

R4 districts are residential zones that permit for a variety of housing types including single- and two-family residences that are detached or semi-detached, row houses, and garden apartments. The buildings are usually three stories high.

R5 District

The R5 district is another residential district which exists within the study area. The first R5 district is limited to the north by Empire Boulevard, to the south by Lincoln Road, to the west by Flatbush Avenue and to the east by Bedford (see Zoning Map – Section 1, Figure B-2). The second R5 district is generally bounded by Avenue I to the north, Flatlands Avenue to the south, and by the study area boundary to the west and east (see Zoning Map - Section 3, Figure B-4). The third R5 district in the study area is generally limited to the north by Utica Avenue, to the south by Avenue U, to the west by Flatbush Avenue and to the east by the study area boundary (see Zoning Map – Section 4, Figure B-5).

R5 districts allows for the development of three story attached houses and small apartment houses.

R6 District

There are five areas within the study area zoned R6. The first R6 district is adjacent to Prospect Park and located north of Empire Boulevard. The second R6 district area is limited to the north by Fenimore Street, to the south by Clarkson Avenue, to the west by Flatbush Avenue and to the east by Bedford Avenue. In addition there is a very small R6 area just north of Church Avenue and east of Bedford Avenue (see Zoning Map - Section 1, Figure B-2). The third R6 district, which is a large area in the middle of the study area, is generally bounded to the north by Cortelyou Road, to the south by Glenwood Road, to the west by East 21st Street/Foster Avenue/Bedford Avenue and to the east by the study area boundary (see Zoning Map - Section 2, Figure B-3). The last two R6 zoning districts are generally bounded to the north by Glenwood Road and to the south by Avenue I. They are separated in the middle by Flatbush Avenue and several commercial districts (see Zoning Map - Section 3, Figure B-4).

R6 districts encourage small apartment buildings on small lots and tall narrow buildings on larger lots. Heights of tall buildings can range from seven to thirteen-story apartment houses.

R7-1 District

An elongated R7-1 residential district stretches from north to south from Empire Boulevard to Newkirk Avenue. This area is generally bounded to the west by Ocean Avenue, to the east by Flatbush and Bedford Avenues (see Zoning Map - Section 1 and 2, Figures B-2 and B-3).

R7-1 districts encourage low apartments buildings on smaller zoning lots and on larger lots, taller buildings with low lot coverage. Within R7-1 residential zoning district, parking is required for 60% of the dwelling units but can be waived if five or fewer spaces are required.

Commercial Zoning Districts:

There are five commercial zoning districts within the study area ranging from C4-2 to C8-4 and several commercial overlay districts lined up along Flatbush Avenue.

C4-2 and C4-3 Districts

The C4-2 district in the study area is limited by Martense Street to the north, Cortelyou Road to the south, East 21st Street to the west and Bedford Avenue to the east (see Zoning Map - Section 1, Figure B-2).

The C4-3 district located further south is bordered to the north by Glenwood Road, to the south by Avenue H and extends midblock east and west of Flatbush Avenue (see Zoning Map - Section 3, Figure B-4).

In general C4 districts are mapped in regional commercial centers outside of the central business districts. This district allows for specialty and department stores, theaters, and other commercial and office uses that serve a larger area and generate more traffic than the typical neighborhood shopping area. It also permits residential development of a R6 district.

C8-1, C8-2 and C8-4 Districts

There are three C8 zoning districts located in the study area: C8-1, C8-2 and C8-4 districts.

The C8-1 district extends generally from Avenue R to Avenue V along Flatbush Avenue (see Zoning Map - Section 4, Figure B-5). The C8-2 districts occupy small sections of the study area. The first C8-2 district is located near Prospect Park and is bounded to the north by Sullivan Avenue, to the south by Sterling Street, to the west by Flatbush Avenue and to the east by Bedford Avenue. The second C8-2 district is limited to the north by Church Avenue, to the south by Albermarle Road and stretches along Bedford Avenue (see Zoning Map - Section 1, Figure B-2). The last two C8-2 districts lie generally between Avenue H and Avenue I and are separated by Flatbush Avenue and the only C8-4 commercial district in the study area (see Zoning Map - Section 3, Figure B-4).

C8 districts permit automotive and heavy commercial services that often require large amounts of land. Typically mapped along major traffic arteries, allowable uses include automobile showrooms, gas stations, and car washes. Housing is not permitted within these districts.

The allowable uses are similar among all C8 districts however the maximum floor area ratio and parking requirements are determined by the difference in the numerical suffix. Automotive uses in C8-1 to C8-3 districts require substantial parking while C8-4 districts are usually exempt from parking requirements.

Commercial Overlay Districts

The commercial overlay districts within the study area are aligned along Flatbush Avenue grouped in four clustered areas:

a) between Sterling Street and Church Avenue,
b) between Cortelyou Road and Glenwood Road,
c) between Avenue H and Fillmore Avenue,
d) just north and south of Avenue U on the west side of Flatbush Avenue

Refer to Zoning Map Sections 1 – 4 (Figures B-2 through B-5) at the beginning of Part B for the location of the commercial overlay districts.

There are a total of ten designated commercial overlay districts mapped along Flatbush Avenue: C1-1, C1-2, C1-3, C1-4, C1-5, C2-1, C2-2, C2-3, C2-4, and C2-5. They permit retail uses that cater to the daily needs of the immediate and local neighborhood. These uses include grocery stores, small dry cleaners, and local clothing stores. However C2 overlay districts permit a wider range of uses including funeral homes and local repair shops than C1 districts. For both C1 and C2 overlay districts, in mixed residential/commercial buildings, commercial uses are limited to one or two floors and must always be located below the residential use.

Manufacturing Zoning Districts:

The only manufacturing district M3-1 is located at the southernmost part of the study area. This area is bordered by Avenue U to the north, Avenue V to the south, Flatbush Avenue to the west and by the study area boundary to the east (see Zoning Map - Section 4, Figure B-5).

M3 districts are for heavy industries that generate noise, traffic or pollutants. Typical uses include power plants, solid waste transfer facilities and recycling plants, and fuel supply depots. M3 districts are usually located near the waterfront and buffered from residential areas.

Zoning Map - Section 1 of 4

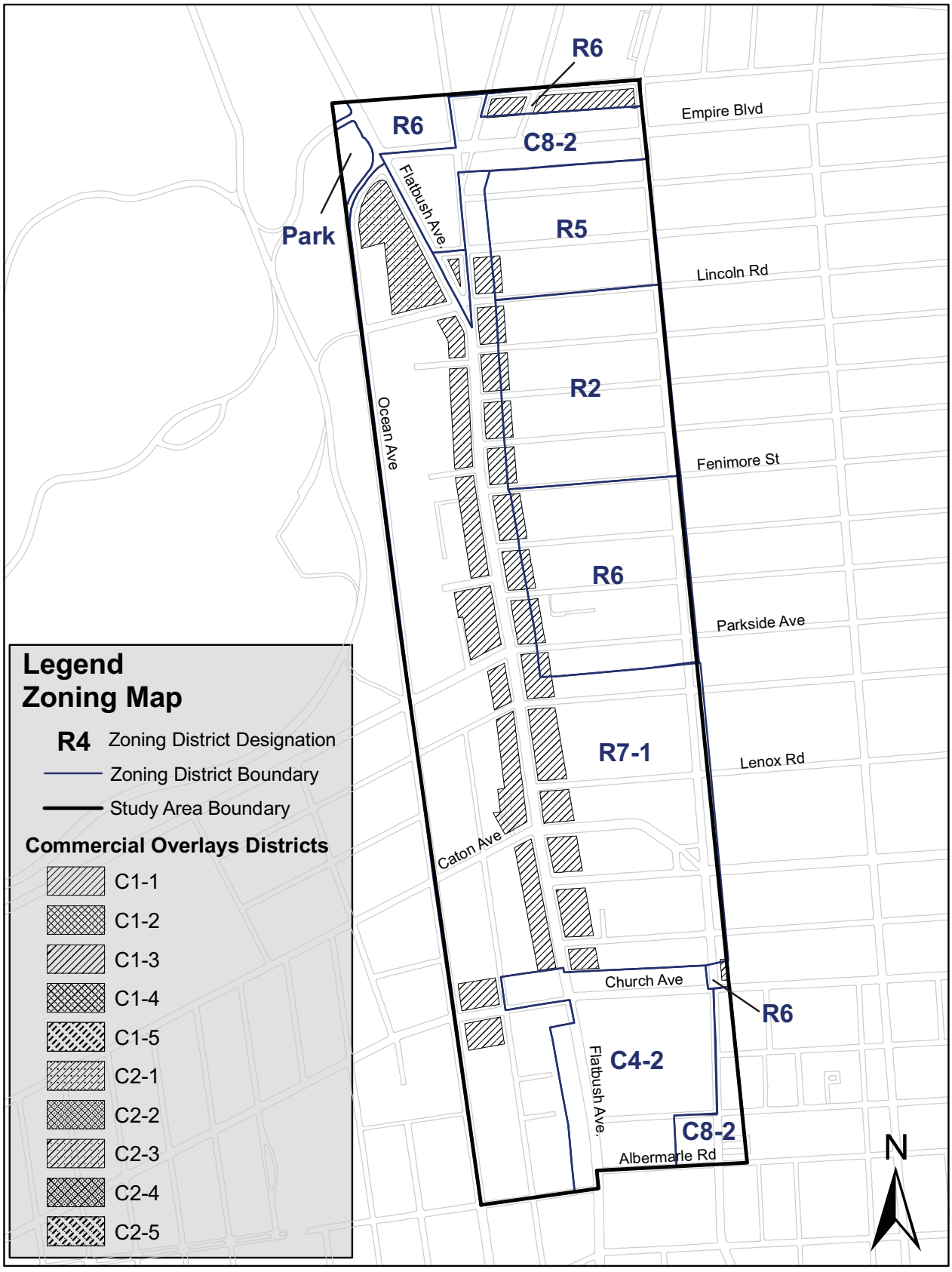


Figure B-2

Zoning Map - Section 2 of 4

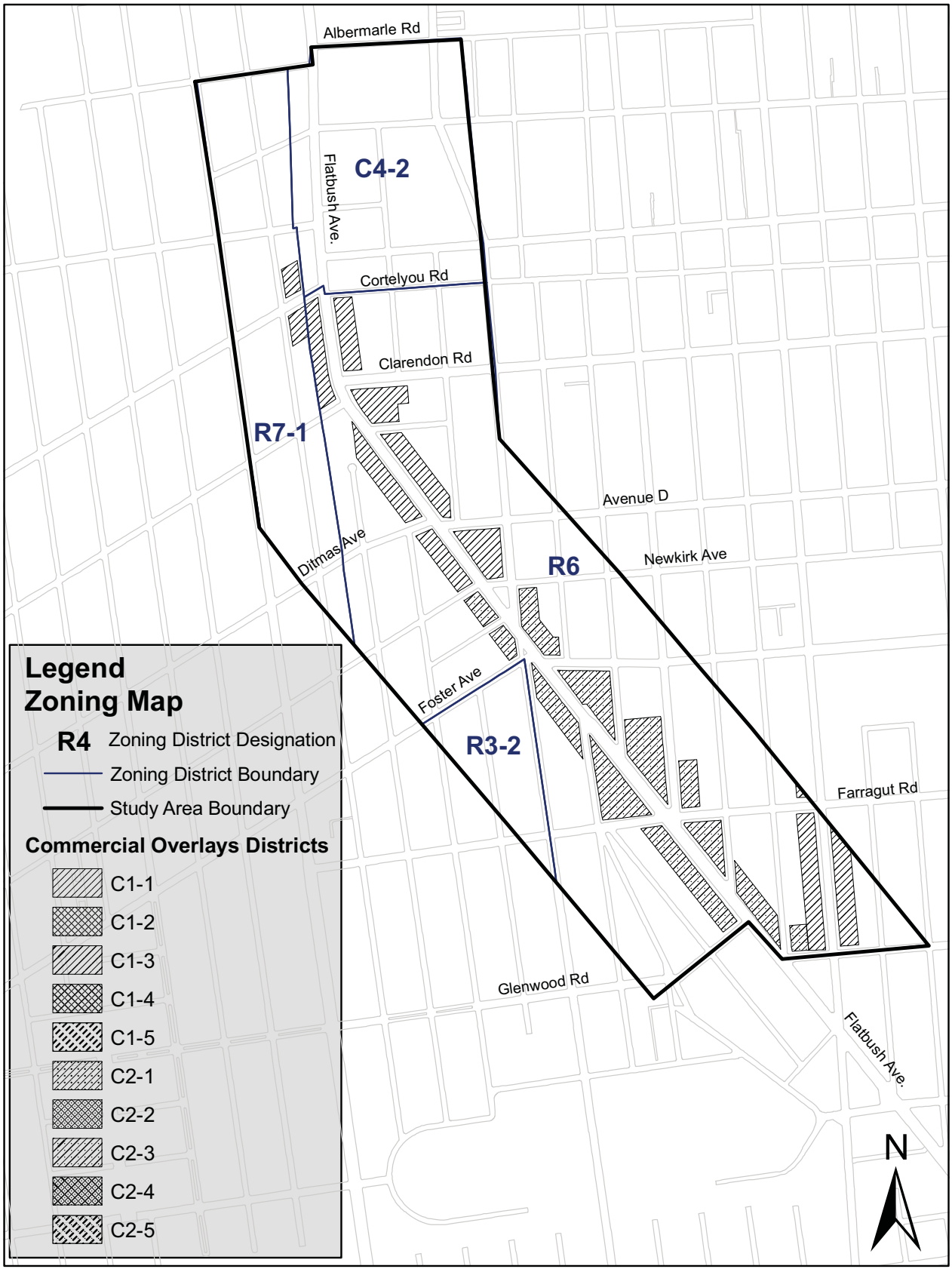


Figure B-3

Zoning Map - Section 3 of 4

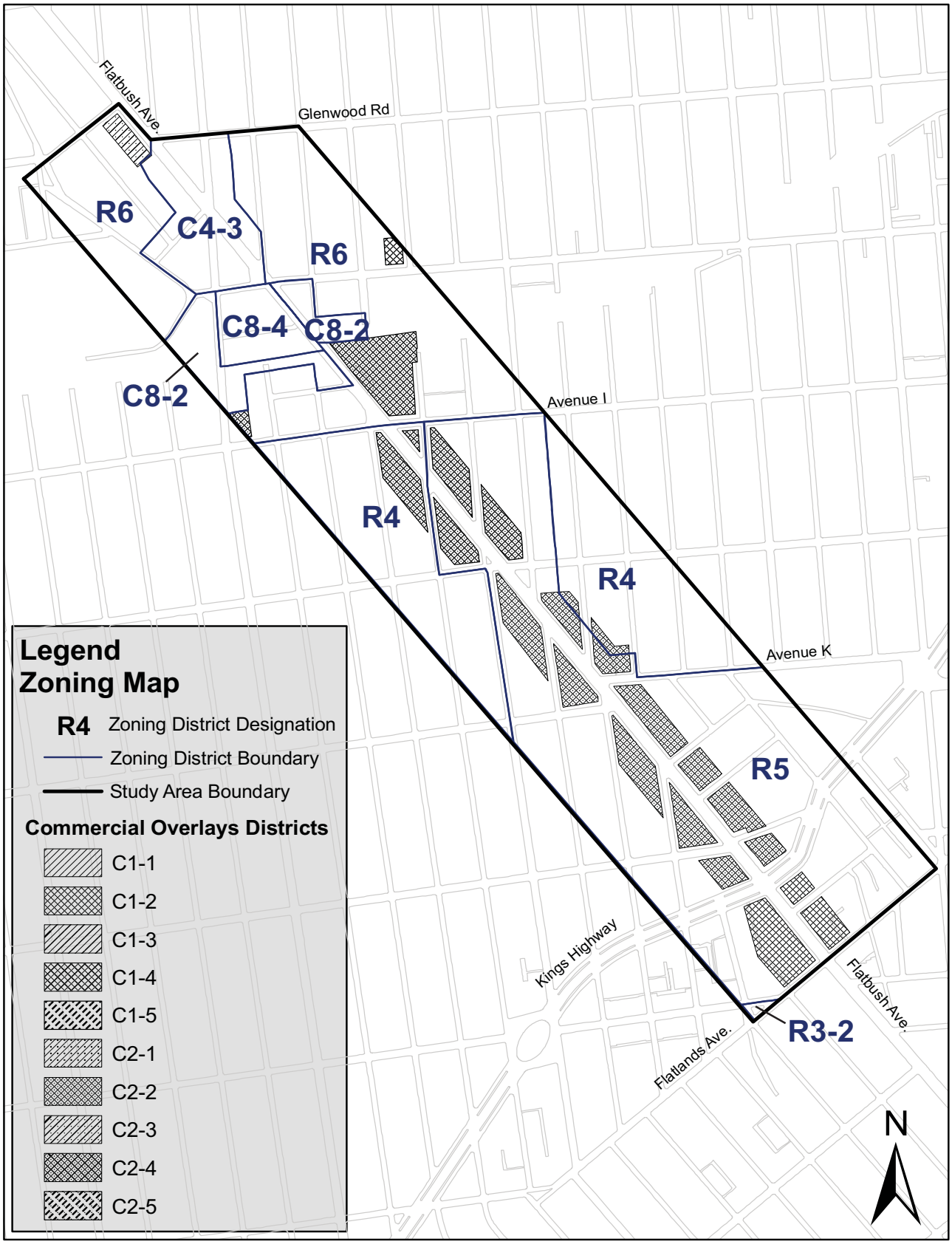


Figure B-4

Zoning Map - Section 4 of 4

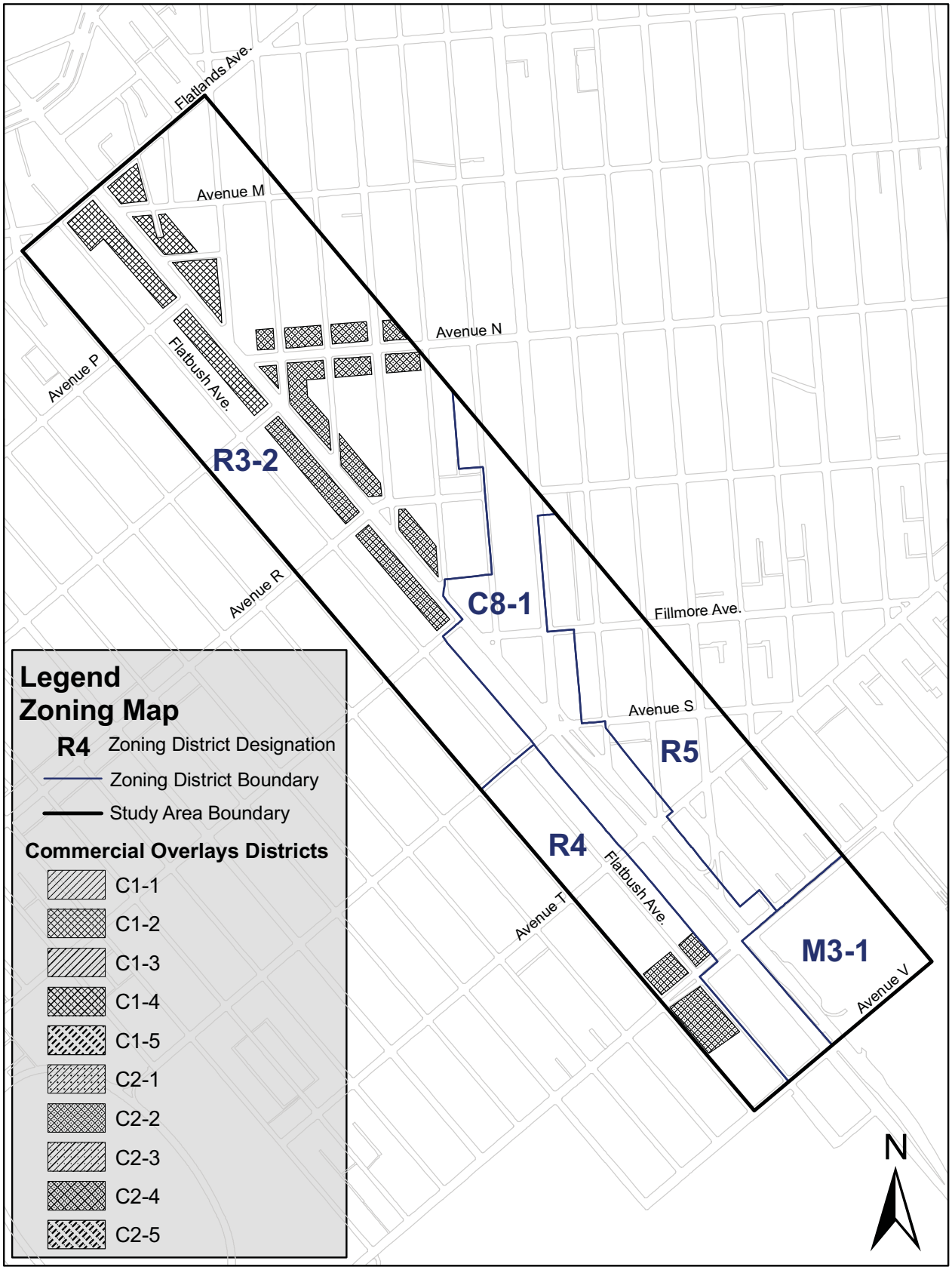


Figure B-5

Land Use

The study area is predominantly residential (70% of the study area) with commercial activities and businesses along the Flatbush Avenue corridor.

Residential Use

The residential area is made up of 47% of one- and two-family houses, which occupies close to half the residential lots in the study area, while 38% of multi-family walkup and elevator buildings exists within the study area boundaries.

From Empire Boulevard to Newkirk Avenue, the area consists of multi-family residential buildings primarily west of Flatbush Avenue and of one-and two-family houses located east of the major retail corridor. Many of the residences are brick and stone one- and two- family houses particularly in the historic district of Lefferts Gardens (see Land Use Map – Section 1 and 2, Figures B-6 and B-7). Secondly, at the southern end of the study area from Avenue I to Avenue U, the housing stock is comprised of one- and two- family detached and semi-detached houses (see Land Use Map – Section 3 and 4, Figures B-8 and B-9). Third, a sizeable number of multi-family residential buildings are concentrated in the middle of the study area between Newkirk Avenue and Avenue I (see Land Use Map – Section 2 and 3, Figures B-7 and B-8).

Aligned along the Flatbush Avenue corridor are mixed commercial and residential buildings with residential units above businesses and retail stores. They represent 15% of the residential area.

Commercial Use

Flatbush Avenue is a major transportation route and is a central shopping and commercial area that serves the needs of the residents within the Flatbush Avenue Pedestrian Study area. Many of the structures on both sides of Flatbush Avenue are two- to three-story mixed-use commercial/residential buildings with retail on the ground floor and residential or office/business space above. These mixed use buildings represent 8% of the study area.

Along the Flatbush Avenue corridor, there are several franchise restaurants such as McDonald's, Wendy's, Golden Krust, DeIslands and local eateries that serve the many ethnic groups that live in the study area. In addition, there are major financial centers (Chase, Citibank, Flatbush Federal Savings Bank, etc), chain pharmacies (Rite Aid, Walgreens), medical clinics and small family owned businesses in this busy commercial area. Located at the southern most point of the study area is the recently renovated Kings Plaza Shopping Mall Center that serves as a "one stop shop" location for goods, services, and entertainment.

The retail chain store "Target" recently opened on Flatbush Avenue at Avenue H on what used to be an underutilized municipal parking lot. It is a new addition to the already busy commercial area and is expected to boost economic revenue in the area.

Public Facilities & Institutions

There are few public facilities or institutions and are dispersed throughout the study area. However there are a few with notable historical significance for Brooklyn. They include: Erasmus Hall High School, whose buildings were erected between 1905 and 1940 and are arranged around an open quadrangle with the original school building in the middle[1]; the Brooklyn College Campus built in the 1930's is

located north of the Midwood area[2] and the Flatbush Dutch Reform Church located at the corner of Flatbush and Church Avenue built in 1793[3]. These institutions serve as landmarks and attract many people who visit the area.

Recreational Facilities , Parks and Open Space

The Flatbush Avenue Pedestrian Study area has few open spaces but one large park serves the northern end of the study area. It is the historic Prospect Park, one of the major parks in the city of New York and is more than 450 acres in size. The Brooklyn Botanic Garden which occupies 52 acres in open space across from Prospect Park also attracts many residents for recreational purposes.

There is one small park/playground at the border of the study area shown in the Land Use Map – Section 3 (Figure B-8) and is used by residents of the area. It is the Amersfort Park located at Avenue J and East 38th Street.

Parking Facilities

There is a scarce amount of parking facilities scattered throughout the study area. In general these lots lie adjacent to commercial or mixed-use lots. A few parking facilities are in residential areas. Refer to Land Use Map – Section 2 (Figure B-7) and Land Use Map – Section 4, Figure B-9 for locations.

Transportation and Utilities

The study area is well served by public transportation (subways and buses) and has several utilities such as a Metropolitan Transportation Authority (MTA) bus depot, gas stations, etc.

At the northern end of the study area is the B/Q subway station with utilities above ground linked to the functioning of the subway station. This subway line runs parallel and adjacent to the Flatbush Avenue corridor up to Parkside Avenue. South of this street, Flatbush Avenue distances away from the B/Q subway line.

The 2/5 subway line also serves this area and runs along Nostrand Avenue about 6 blocks east of Flatbush Avenue. It ends at the junction of Nostrand and Flatbush Avenues which is a major transfer point for subway and bus passengers.

There are over ten local bus routes that exist through the study area. The B41 operates along Flatbush Avenue in the north-south direction; bus routes B2, B3, B7, B9, B12, B35, B43, B46, B47, and B103 operate in the east-west direction, and the Q35 operates between the study area and Rockaway Park, Queens.

There are several utilities along the major retail corridor. Located in the southern section of the study area and near the intersection of Fillmore Avenue, is the MTA Flatbush Bus Depot where the buses are refueled and housed while not in circulation. In addition to the MTA transit properties, several gas stations (Mobil, Shell), and a Con Edison property, located on Avenue N east of Flatbush Avenue, make up the remainder of the utilities within the study area.

Land Use Map - Section 1 of 4

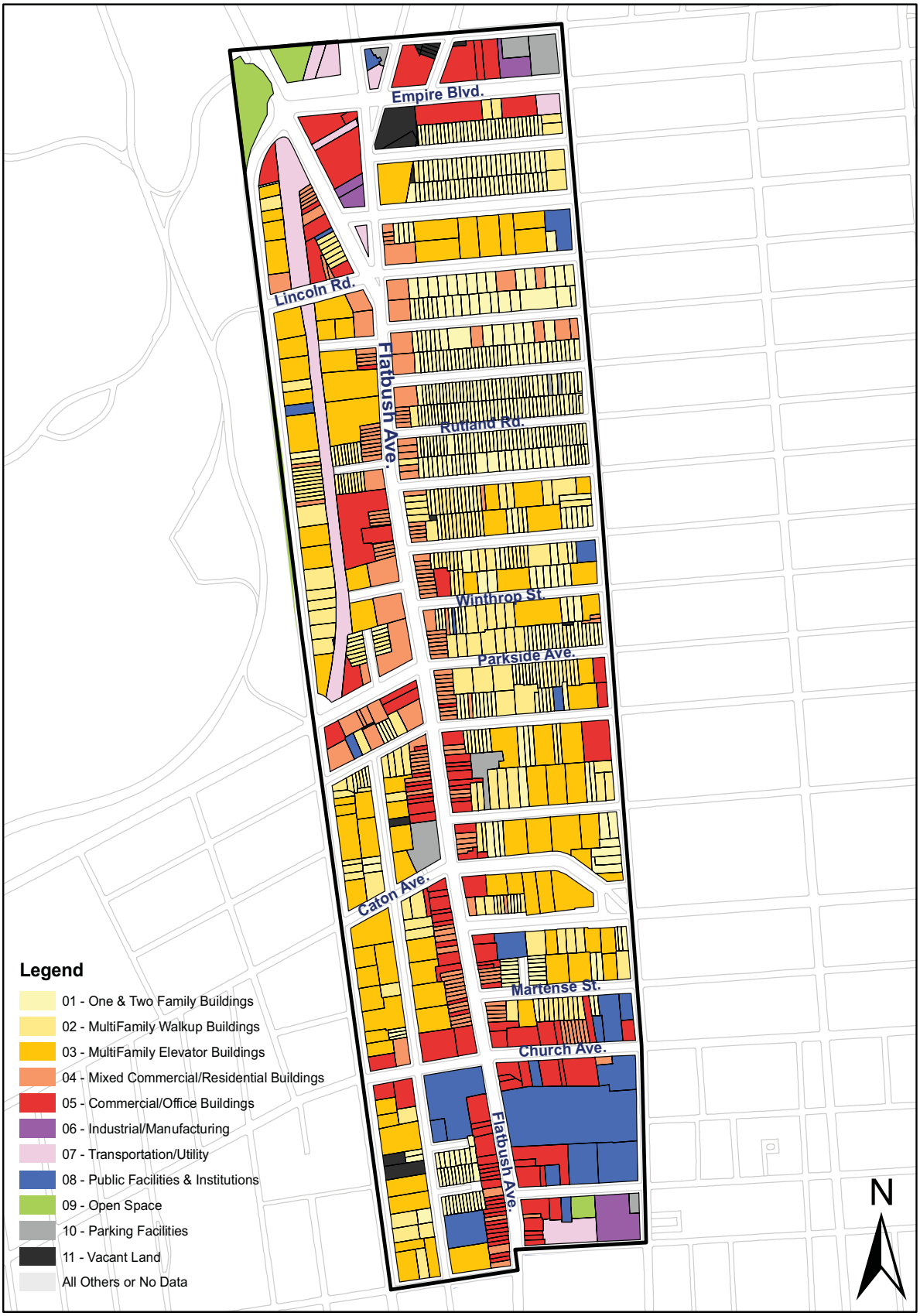


Figure B-6

Land Use Map - Section 2 of 4

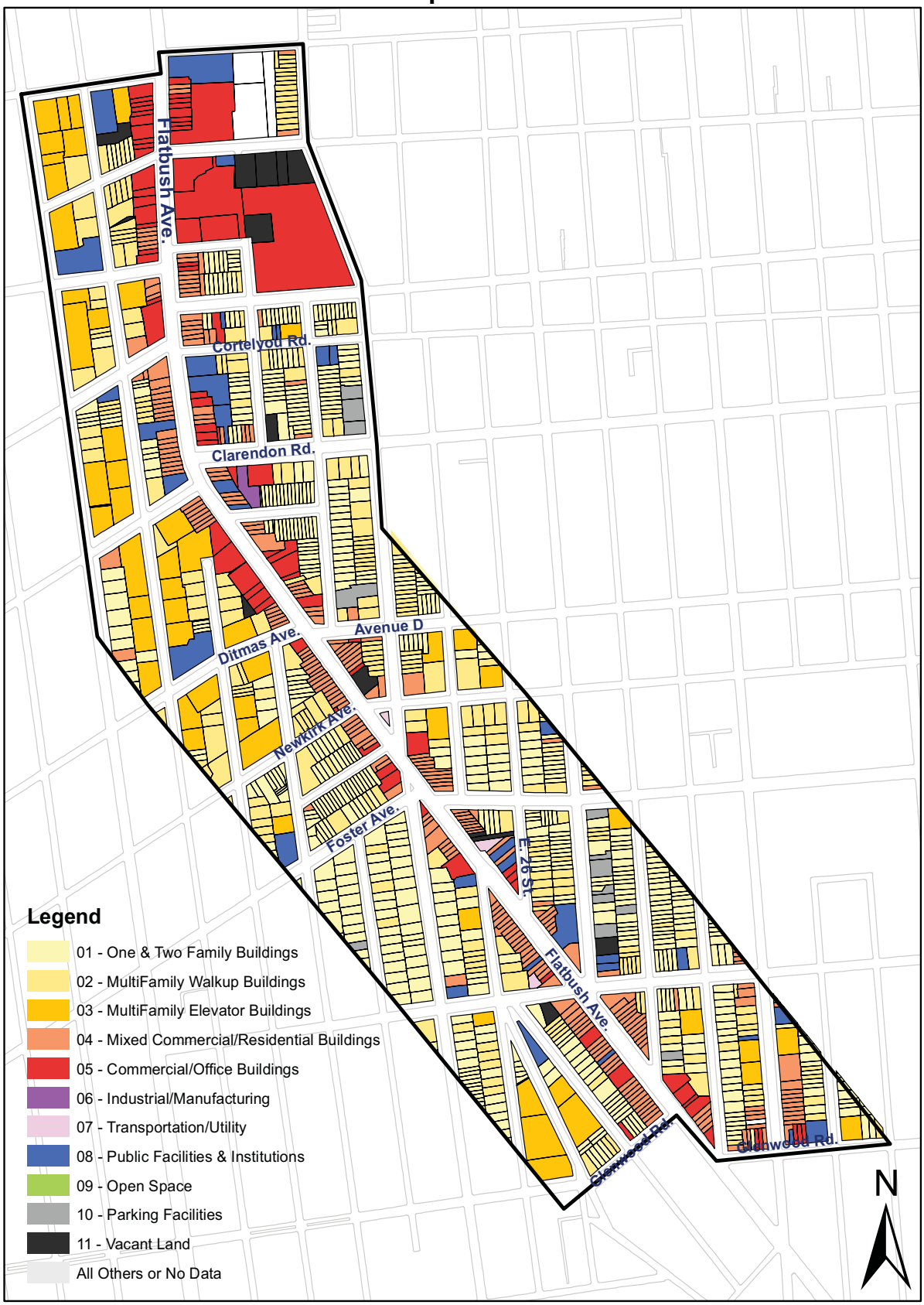


Figure B-7

Land Use Map - Section 3 of 4

Figure B-8

Land Use Map - Section 4 of 4

Figure B-9

Part C
Study Locations Analysis

A total of thirty three (33) locations were selected along Flatbush Avenue for study and analysis in terms of pedestrian safety, mobility, and circulation. The selection criteria for these locations were as follows:

- if five or more pedestrian accidents had occurred from 2004 -2006,
- if they presented any safety issues for pedestrians,
- and/ or demonstrated problematic trends or opportunities for improvement in terms of pedestrians.

The locations are categorized into three groups: major, secondary and other study locations. The major study locations compared to the secondary study locations had unique conditions along the corridor that required a more detailed analysis in terms of pedestrian traffic, vehicular traffic and the level of service.

The major study locations are:

- Flatbush Avenue and Church Avenue
- Flatbush Avenue and Foster/ Bedford Avenue
- Flatbush Avenue and Avenue U
- Flatbush Avenue between Avenue U and Avenue V

The secondary study locations are:

- Flatbush Avenue and Empire Boulevard/ Ocean Avenue
- Flatbush Avenue and Winthrop Street
- Flatbush Avenue and Parkside Avenue
- Flatbush Avenue and Martense Street
- Flatbush Avenue and Cortelyou Road
- Flatbush Avenue and Clarendon / Dorchester Road
- Flatbush Avenue and Avenue D/ Ditmas Avenue
- Flatbush Avenue and Newkirk Avenue
- Flatbush Avenue and Glenwood Road
- Flatbush Avenue and Nostrand Avenue/ Hillel Place
- Flatbush Avenue and Avenue H
- Flatbush Avenue and Kings Highway
- Flatbush Avenue and Utica Avenue

An additional group of 16 other locations were studied and analyzed where one-way streets intersect Flatbush Avenue at an angle. At these intersections pedestrians crossing are not always visible to motorists due to the geometry of the intersection. Here is a listing of the other study locations:

- E 26th Street (SB traffic – west of Flatbush Ave.)
- E 26th Street (NB traffic – east of Flatbush Ave.)
- E 31st Street (NB traffic – east of Flatbush Ave.)
- Aurelia Court (WB traffic – east of Flatbush Ave.)
- E 34th Street – (SB traffic - west of Flatbush Ave)
- Brooklyn Ave (NB traffic – east of Flatbush Ave.)
- E 36th Street (SB traffic – west of Flatbush Ave.)
- E 38th Street (SB traffic - west of Flatbush Ave.)
- Hubbard Place (EB traffic - east of Flatbush Ave.)
- Alton Place (EB traffic - east of Flatbush Ave.)

- Lott Place (EB traffic- east of Flatbush Ave.)
- Baughman Pl (EB traffic - east of Flatbush Ave)
- Schenectady Avenue (NB traffic – east of Flatbush Ave.)
- E 48th Street (NB traffic – east of Flatbush Ave.)
- E 51st Street (NB traffic – east of Flatbush Ave.)
- E 53rd Street (NB traffic, east of Flatbush Ave.)

Major Study Locations

- Flatbush Avenue and Church Avenue
- Flatbush Avenue and Foster/ Bedford Avenue
- Flatbush Avenue and Avenue U
- Flatbush Avenue between Avenue U and Avenue V

Location: Flatbush Avenue and Church Avenue

Intersection of Flatbush Avenue and Church Avenue

Description of Existing Conditions

At this location Flatbush Avenue has a width of 55 ft with two travel lanes in each direction of traffic. The sidewalks along this major street are 12 – 15 ft wide.

Church Avenue is 45 ft wide and has one travel lane in each direction. The width of its sidewalks range from 7 to 17 ft.

Both streets are major retail corridors in Brooklyn and generate heavy pedestrian volumes at the intersection. A significant volume of vehicles travel through the area and a large number of them make turning movements at this location. In addition there are "School Advance Warning" signs at all corners (fluorescent yellow/green signs).

There is a short Leading Pedestrian Interval (LPI) phase for pedestrians crossing Church Avenue.

Level of Service Analysis (LOS)

- Vehicle Analysis

The capacity analysis shows that most of the approaches at this intersection operate acceptably, at LOS C for all peak hours. However some intersection approaches operate at LOS D or worse with more than 40 seconds of delay. They are: the eastbound and westbound approach movement in the AM, PM and on Saturday. See Table C-1: Intersection Level of Service.

- Pedestrian Analysis

An analysis of the sidewalks at Flatbush Avenue and Church Avenue indicates that the pedestrian LOS generally operates at a comfortable LOS A during the four peak periods. Tables C-2 presents a summary of the LOS results and Appendix D-1 "LOS Methodology and Vehicular and Pedestrian Traffic Volumes" has a diagram showing the numbering system for the walkways analyzed.

The corners of this intersection operate at LOS C or better for all peak periods. Finally an analysis of the crosswalks indicates that during all peak periods, the crosswalks operate at LOS A (see Tables C-3: Crosswalks Level of Service and C-4: Corners Level of Service).

Table C-1 - Intersection Level of Service

Intersection	Lane Approach	AM			MD			PM			SAT MD		
Flatbush Avenue and Church Avenue		**V/C**	**Delay**	**LOS**	**V/C**	**Delay**	**LOS**	**V/C**	**Delay**	**LOS**	**V/C**	**Delay**	**LOS**
	Eastbound												
	LTR	0.78	48.2	D	0.57	25.2	C	0.79	47.8	D	0.72	42.2	D
	Westbound												
	LTR	0.98	71.2	E	0.79	32.8	C	0.89	56.6	E	0.67	40.8	D
	Northbound												
	LTR	0.52	21.4	C	0.78	27.5	C	0.80	31.2	C	0.62	23.9	C
	Southbound												
	LTR	0.52	21.5	C	0.64	22.8	C	0.70	26.4	C	0.73	26.7	C
		Inters. Delay = 42		LOS = D	Inters. Delay = 27.3		LOS = C	Inters. Delay = 38.7		LOS = D	Inters. Delay = 32		LOS = C

Table C-2 - Sidewalks Level of Service

		AM				MD			PM			SAT		
				Pedestrian Flow Rate			Pedestrian Flow Rate			Pedestrian Flow Rate			Pedestrian Flow Rate	
Intersection	Walkway	15 Min Vol. Two-Way	Effective Walkway Width	p/m/f	LOS	15 Min Vol.	p/m/f	LOS	15 Min Vol.	p/m/f	LOS	15 Min Vol.	p/m/f	LOS
Flatbush Avenue and Church Avenue	1	130	12	0.7	A	160	0.9	A	155	0.9	A	208	1.2	A
	2	159	12	0.9	A	137	0.8	A	159	0.9	A	169	0.8	A
	3	54	16	0.2	A	66	0.3	A	80	0.3	A	47	0.2	A
	4	83	15	0.4	A	93	0.4	A	63	0.3	A	61	0.3	A
	5	147	12	0.8	A	160	0.9	A	157	0.9	A	204	1.1	A
	6	157	9	1.2	A	240	1.8	A	173	1.3	A	304	2.3	A
	7	93	7	0.9	A	77	0.7	A	88	0.8	A	74	0.7	A
	8	166	10.7	1	A	150	0.9	A	163	1	A	170	1.1	A

Table C-3- Crosswalks Level of Service

		AM		MD		PM		SAT	
		Crosswalk Space		Crosswalk Space		Crosswalk Space		Crosswalk Space	
Intersection	Crosswalk	SF/P	LOS	SF/P	LOS	SF/P	LOS	SF/P	LOS
Flatbush Avenue and Church Avenue	North	110.0	A	110.4	A	102.7	A	78.6	A
	East	121.7	A	100.5	A	101.3	A	85.7	A
	South	93.0	A	104.7	A	91.1	A	96.6	A
	West	157.7	A	132.0	A	176.2	A	165.9	A

Table C-4 - Corners Level of Service

		AM		MD		PM		SAT	
Intersection	Corner	SF/P	LOS	SF/P	LOS	SF/P	LOS	SF/P	LOS
Flatbush Avenue and Church Avenue	Northwest	98.8	A	99.6	A	108.7	A	91.7	A
	Northeast	150.4	A	148	A	137.2	A	116.6	A
	Southeast	94.7	A	97.1	A	83.5	A	86.4	A
	Southwest	33.7	C	36.0	C	32.5	C	33.6	C

Pedestrian Accident Data 2004 -2006
10 pedestrian accidents

Table: C-5 – Summary of Pedestrian Accidents

Accident Location	Year	Time	Pedestrian Action	Pedestrian Location	Vehicle Action
Church Ave	5/13/2004	daylight	crossing with signal	at intersection	going straight ahead
Church Ave (2 peds injured)	9/28/2004	daylight	crossing with signal	at intersection	making a left turn
Church Ave	10/28/2004	daylight	emerged from behind parked vehicle	at intersection	going straight ahead
Church Ave	7/9/2005	night	crossing against signal	at intersection	going straight ahead
Church Ave	12/15/2005	night, rain	crossing against signal	at intersection	left on red
Church Ave	12/19/2005	night	crossing against signal	at intersection	going straight ahead
Church Ave	10/2/2005	daylight	other actions in road	at intersection	backing
Church Ave	3/12/2006	daylight	not reported	at intersection	not reported
Church Ave	8/14/2006	daylight	working in roadway	at intersection	making a left turn

Problems

- Pedestrian conflicts with turning vehicles
  Pedestrians crossing at the intersection are often in conflict with the volume of vehicles making a turn from either Flatbush or Church Avenue. A "Leading Pedestrian Interval"(LPI) give pedestrians crossing at the intersection 6 seconds ahead of vehicular traffic to cross before vehicles make their turns. However the volume of pedestrians attracted to the retail stores and businesses in the area and crossing at this intersection combined with the volume of vehicles turning at this location still create delays and conflicts at this intersection for pedestrians. The majority of the conflicts occur in the direction of traffic with the highest volumes which are among pedestrians in the west and east crosswalks and from vehicles turning from Flatbush Avenue. On average, during the peak 15-minute about 130 – 165 pedestrians cross Church Avenue on each side of Flatbush Avenue while on average 20 - 35 vehicles make a turn from Flatbush Avenue (See Appendix D-1 for detailed pedestrian and traffic volumes).

- Pavement Conditions
  In general the pavement of both streets is in poor condition and covered with potholes which vehicles avoid by slowing down and swerving around them. This can be dangerous for pedestrians since drivers do this without warning and sometimes nearly miss pedestrians crossing at the intersection.

  Also the pavement markings "high visibility crosswalks and stop bars" have faded and are also in poor condition.

Poor Pavement Conditions on Church Avenue

- Jaywalking
  At times delivery trucks traveling eastbound on Church Avenue are observed parking west of the intersection to load/unload goods. This creates traffic congestion/delays on Church Avenue for eastbound vehicles as they approach the intersection since one of the two travel lanes gets blocked by the illegally parked delivery trucks. Pedestrians on the other hand take advantage of the gaps in traffic to jaywalk and cross in between vehicles.

Recommendations

- Increase Enforcement
  An increase in police presence at this location particularly on Church Avenue is recommended for enforcement of traffic regulations.

- Improve Pavement Conditions
  Repair the potholes and the roadway defects at this location. In addition, the restriping of the crosswalks and stop bars is necessary to be clearly visible to motorists and pedestrians.

- Signage
  In order to reduce pedestrians jaywalking in between delayed vehicles, a "No Standing Anytime" sign is proposed on Church Avenue at the south curb and west of the intersection. This new sign would replace the existing "No Parking Regulation" sign. The "No Standing Anytime" sign usually discourages loading and unloading of trucks and standing at the curb by motorists in general.

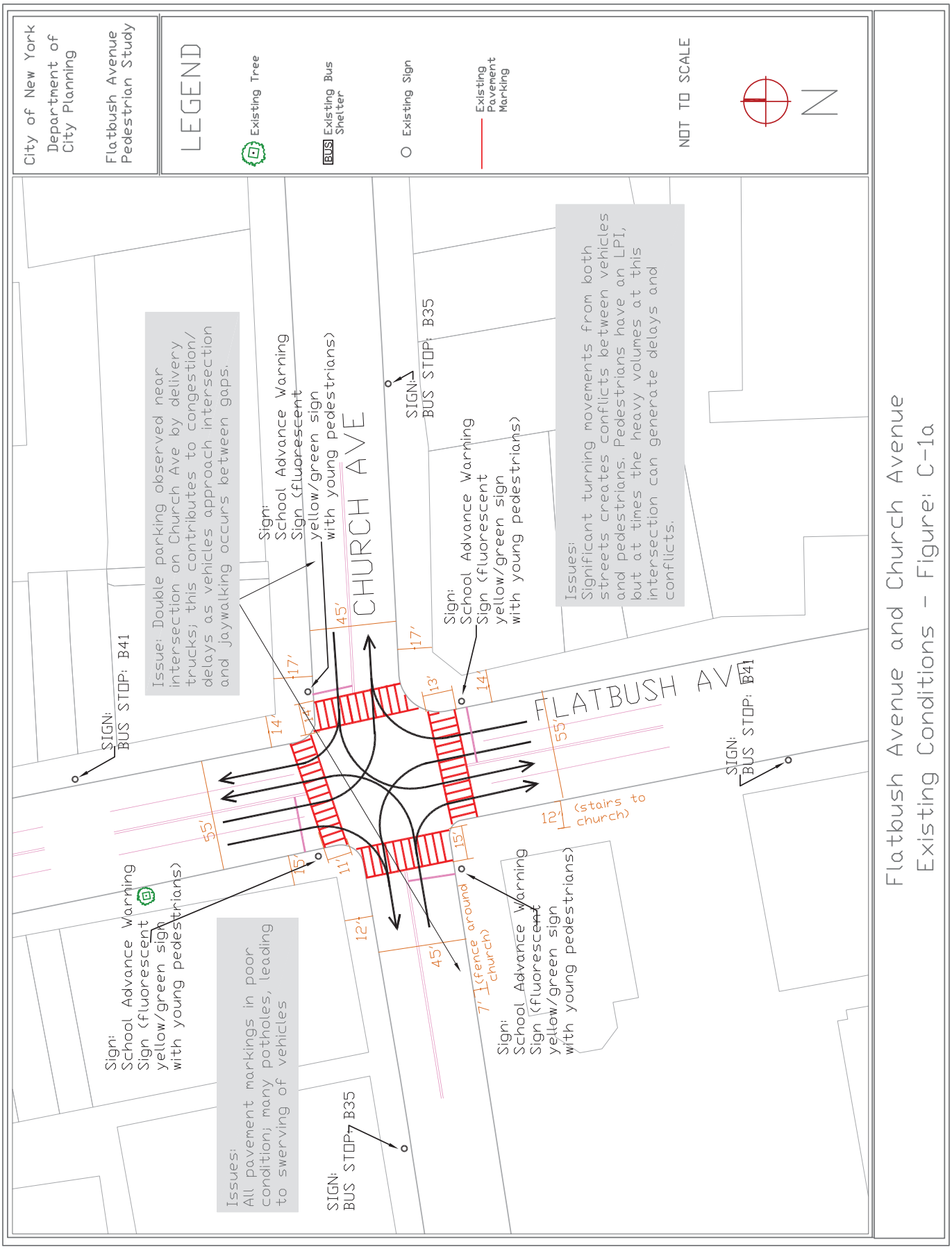
- Streetscape Improvement
  Improve the pedestrian environment at the bus stops on Flatbush Avenue with new bus shelters and concrete bus pads where passengers wait for the arrival of a bus.

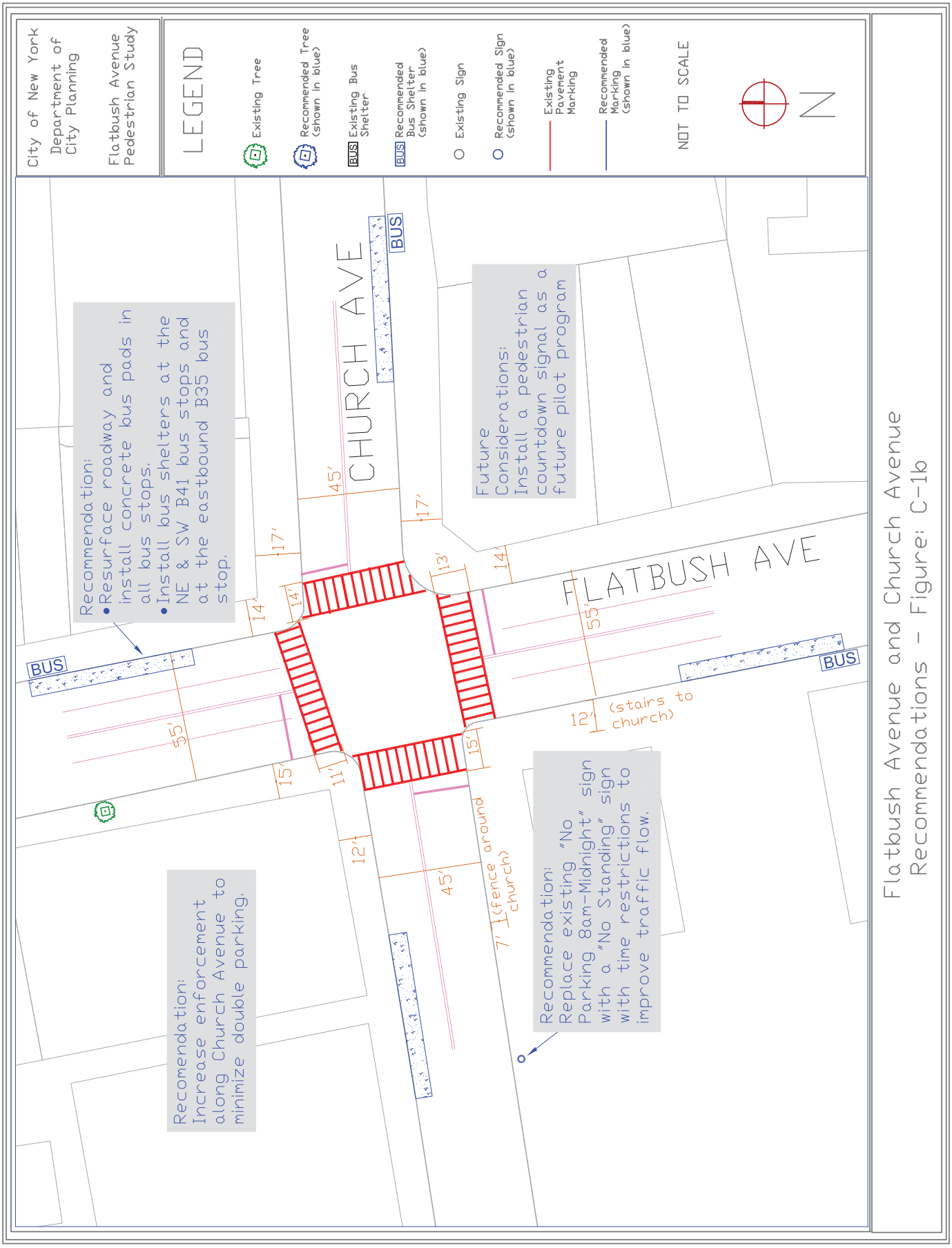
Consideration for the Future

Recommendation for a Countdown Pedestrian Signal

The installation of a countdown pedestrian signal is recommended to be considered for Flatbush and Church Avenues to reduce conflicts between pedestrians crossing and vehicles making turns. This type of traffic signal can provide pedestrians with information about the amount of time remaining in a crossing interval and can improve pedestrian signal compliance.

Currently New York City Department of Transportation (NYCDOT) is conducting a study and a pilot program of countdown pedestrian signals at 24 intersections. This pilot program has been expanded and will also take place along selected busy corridors in all five boroughs. This study is to be completed in the fall of 2008 (Source: DOT Press Release on 11/8/07).


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
BUS Existing Bus Shelter
Existing Sign
Existing Pavement Marking
NOT TO SCALE
N
CHURCH AVE
FLATBUSH AV
Issue: Double parking observed near intersection on Church Ave by delivery trucks; this contributes to congestion/ delays as vehicles approach intersection and jaywalking occurs between gaps.
Issues: Significant turning movements from both streets creates conflicts between vehicles and pedestrians. Pedestrians have an LPI, but at times the heavy volumes at this intersection can generate delays and conflicts.
Issues: All pavement markings in poor condition; many potholes, leading to swerving of vehicles
Sign: School Advance Warning Sign (fluorescent yellow/green sign with young pedestrians)
SIGN: BUS STOP: B41
SIGN: BUS STOP: B35
7' (fence around church)
12' (stairs to church)
Flatbush Avenue and Church Avenue
Existing Conditions - Figure: C-1a


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
Recommended Tree (shown in blue)
BUS Existing Bus Shelter
BUS Recommended Bus Shelter (shown in blue)
Existing Sign
Recommended Sign (shown in blue)
Existing Pavement Marking
Recommended Marking (shown in blue)
NOT TO SCALE
N
CHURCH AVE
FLATBUSH AVE
BUS
Recommendation:
• Resurface roadway and install concrete bus pads in all bus stops.
• Install bus shelters at the NE & SW B41 bus stops and at the eastbound B35 bus stop.
Future Considerations:
Install a pedestrian countdown signal as a future pilot program
Recomendation:
Increase enforcement along Church Avenue to minimize double parking.
Recommendation:
Replace existing "No Parking 8am-Midnight" sign with a "No Standing" sign with time restrictions to improve traffic flow.
(stairs to church)
(fence around church)
45'
55'
17'
14'
13'
15'
11'
12'
7'
Flatbush Avenue and Church Avenue
Recommendations - Figure: C-1b

Location: Flatbush Avenue/Bedford Avenue and Foster Avenue

Intersection of Flatbush Avenue and Foster/Bedford Avenue

Description of Existing Conditions

Flatbush Avenue intersects at an angle with two main avenues at this location, Foster Avenue and Bedford Avenue, which creates an awkwardly shaped intersection.

Flatbush Avenue has a width of 55 - 60 ft with two travel lanes in each direction of traffic. The sidewalks are approximately 11-14 ft wide in this area.

Foster Avenue is 40-45 ft wide and has one travel lane in each direction. The width of its sidewalks range from 10 to 17 ft.

Bedford Avenue travels north-south and is 45 feet wide. It has one travel lane and a bicycle lane in each direction of traffic.

Flatbush and Bedford Avenues are major traffic corridors in Brooklyn and generate significant vehicular volumes at the intersection (mainly through traffic). A moderate volume of pedestrians travels through this intersection where many pedestrians arrive by bus. This is a common transfer point for bus riders between the B41, B8 and B49.

In addition there are warning signs posted: “School Advance Warning” signs (fluorescent yellow/green sign with young pedestrians).

Level of Service Analysis (LOS)

- Vehicle Analysis

The capacity analysis shows that two of the approaches at this intersection operate acceptably, at LOS C or better for all four peak hours (eastbound to Flatbush Ave. and southbound on Bedford Ave). Three other approaches operate at LOS C or better for at least one peak hour (northbound on Flatbush and Bedford Aves; southbound on Bedford Ave.). However the rest of the intersection approaches operate at LOS D or worse with more than 40 seconds of delay. (Table C-6: Intersection Level of Service)

- Pedestrian Analysis

An analysis of the sidewalks at Flatbush Avenue/ Bedford Avenue and Foster Avenue indicates that the pedestrian LOS generally operates at a comfortable LOS A during the four peak periods. Table C-7: Sidewalks Level of Service presents a summary of the LOS results and Appendix D-1: “LOS Methodology and Vehicular and Pedestrian Traffic Volumes” has a diagram showing the labeling system for the walkways and crosswalks analyzed.

The corners and the crosswalks of this intersection operate at LOS A for all peak periods. See Tables C-8: Crosswalks Level of Service and C-9: Corners Level of Service.

Table C-6 - Intersection Level of Service

Intersection	Lane Approach	AM			MD			PM			SAT MD		
Flatbush/ Bedford Aves and Foster Ave		**V/C**	**Delay**	**LOS**	**V/C**	**Delay**	**LOS**	**V/C**	**Delay**	**LOS**	**V/C**	**Delay**	**LOS**
	Eastbound to Flatbush												
	LTR	0.42	25.3	C	0.32	10.9	B	0.32	15.3	B	0.21	14.0	B
	Eastbound to Bedford												
	TR	1.00	95.1	F	0.73	42.2	D	0.93	71.2	E	0.61	48.5	D
	Westbound to Flatbush												
	LTR	1.02	101.2	F	0.89	56.6	E	1.00	90.0	F	0.98	85.0	F
	Westbound to Bedford												
	LT	0.96	92.2	F	0.77	44.6	D	0.94	79.8	E	0.59	47.9	D
	Northbound (Flatbush)												
	LTR	0.52	19.6	B	0.71	28.4	C	0.63	31.3	C	0.87	42.2	D
	Northbound (Bedford)												
	LR	0.37	50.4	D	0.24	29.9	C	0.23	37.6	D	0.21	36.8	D
	R	0.32	45.8	D	0.22	28.2	C	0.16	35.1	D	0.19	35.5	D
	Southbound (Flatbush)												
	LT	0.57	20.7	C	0.87	38.8	D	0.84	41.8	D	0.83	40.5	D
	Southbound (Bedford)												
	TR	0.09	4.2	A	0.15	5.5	A	0.12	5.8	A	0.06	5.4	A
	Bedford/ Foster	Inters. Delay = 77.3		LOS = E	Inters. Delay = 36.2		LOS = D	Inters. Delay = 62.8		LOS = E	Inters. Delay = 43.2		LOS = D
	Flatbush/ Foster	Inters. Delay = 35.9		LOS = D	Inters. Delay = 32.8		LOS = C	Inters. Delay = 42.8		LOS = D	Inters. Delay = 45.5		LOS = D

Table C-7 - Sidewalks Level of Service

Intersection	Walkway	AM 15 Min Vol. Two-Way	AM Effective Walkway Width	AM Pedestrian Flow Rate p/m/f	AM Pedestrian Flow Rate LOS	MD 15 Min Vol.	MD Pedestrian Flow Rate p/m/f	MD Pedestrian Flow Rate LOS	PM 15 Min Vol.	PM Pedestrian Flow Rate p/m/f	PM Pedestrian Flow Rate LOS	SAT 15 Min Vol.	SAT Pedestrian Flow Rate p/m/f	SAT Pedestrian Flow Rate LOS
Flatbush Avenue and Foster/ Bedford Avenue	1	35	18	0.1	A	28	0.1	A	31	0.1	A	23	0.1	A
	2	64	12	0.4	A	78	0.4	A	69	0.4	A	52	0.3	A
	3	31	17.8	0.1	A	37	0.1	A	31	0.1	A	22	0.1	A
	4	31	17.8	0.1	A	37	0.1	A	29	0.1	A	34	0.1	A
	5	36	12.3	0.2	A	67	0.4	A	93	0.5	A	56	0.3	A
	6	26	5	0.3	A	35	0.5	A	31	0.4	A	25	0.3	A
	7	30	5	0.4	A	35	0.5	A	40	0.5	A	24	0.3	A
	8	35	13.8	0.2	A	28	0.1	A	31	0.1	A	23	0.1	A
	9	19	13	0.1	A	16	0.1	A	17	0.1	A	12	0.1	A
	10	45	10	0.3	A	56	0.4	A	81	0.5	A	25	0.2	A

Table C-8- Crosswalks Level of Service

Intersection	Crosswalk	AM Crosswalk Space SF/P	AM Crosswalk Space LOS	MD Crosswalk Space SF/P	MD Crosswalk Space LOS	PM Crosswalk Space SF/P	PM Crosswalk Space LOS	SAT Crosswalk Space SF/P	SAT Crosswalk Space LOS
Flatbush Avenue and Foster/Bedford Avenue	North	No crosswalk							
	East	375.6	A	170.6	A	236.0	A	445.0	A
	South-A	183.8	A	188.9	A	182.5	A	464.5	A
	South-B	172.3	A	149.5	A	198.7	A	370.7	A
	West	222.9	A	169.2	A	218.3	A	444.7	A
	Center	1246.6	A	748.9	A	1029.2	A	1126.7	A

Table C-9 - Corners Level of Service

Intersection	Corner	AM		MD		PM		SAT	
		SF/P	LOS	SF/P	LOS	SF/P	LOS	SF/P	LOS
Flatbush Avenue and Foster/ Bedford Avenue	Northwest	867	A	817.5	A	743.2	A	1244	A
	Northeast	501	A	475.2	A	434.8	A	731.6	A
	Southeast	226.3	A	198.9	A	178.2	A	346.5	A
	Southwest	194.1	A	179.6	A	161.7	A	354.9	A
	Southcorner	135.0	A	153.6	A	128.4	A	281.3	A

Pedestrian Accident Data 2004 -2006
6 pedestrian accidents

Table: C-10 – Summary of Pedestrian Accidents

Accident Location	Year	Time	Pedestrian Action	Pedestrian Location	Vehicle Action
Foster Ave	11/23/2004	daylight	crossing with signal	at intersection	going straight ahead
Foster Ave	12/12/2004	dark road lighted	crossing against signal	at intersection	going straight ahead
Foster Ave	11/26/2004	daylight	crossing – no signal or crosswalk	at intersection	going straight ahead
Foster Ave	6/3/2005	dark road lighted	crossing with signal	at intersection	going straight ahead
Foster Ave	9/23/2005	dark road lighted	crossing - no signal - marked crossing	at intersection	backing
Foster Ave	9/14/2005	daylight	crossing with signal	at intersection	going straight ahead

Problems

- Pedestrian Crossing Midblock and at "Stop Bar" locations
  Flatbush Avenue, Foster Avenue and Bedford Avenue all meet at this point. These streets do not align and are at an angle to each other. In addition "Stop bars" have been placed north of Foster Avenue to indicate where vehicles arriving at this location should stop in the middle of the block. Pedestrians were observed crossing at that particular spot. It was observed at that midblock location during the peak hours of a typical weekday that 41 pedestrians cross in the morning (7:00 - 9:00 am), 56 in the midday (12:00 – 2:00 pm) and 71 pedestrians cross in the evening (4:00 – 6:00 pm). During the weekend between 1:00 and 3:00pm 62 pedestrians typically cross Flatbush Avenue at that midblock location. In addition northbound traffic on Flatbush Avenue as it approaches Bedford Avenue often does not stop since it is permitted to make a right turn on red onto Bedford Avenue. There are signs to inform pedestrians not to cross at that particular location: "No Ped Crossing Use Crosswalks". But these signs are ignored by pedestrians arriving at the intersection. See following map of intersection, Figure C2-a: Existing Conditions.

  In addition, the passengers getting off at the bus stop on the east side of Flatbush Avenue (B41, BM2 and B103 buses) and heading westbound to Foster Avenue or southbound to Bedford Avenue often cross or jaywalk midblock to continue their route or to make a connection with the B49 going westbound which is a dangerous crossing location for pedestrians. The distance from the bus stop to the nearest crosswalk is at least 200 ft and often these pedestrians/bus passengers cross midblock and do not take the time to cross at the crosswalks (See following map of intersection).

Pedestrian crossing Flatbush Avenue midblock just north of Foster Avenue

- Signage
  The "No Ped Crossing Use Crosswalks" signs placed midblock on Flatbush Avenue inform pedestrians not to cross at that particular location. But these signs are smaller than the other regulatory signs posted and because of their location and orientation along Flatbush Avenue they often go unnoticed to pedestrians arriving at the intersection.

- Pedestrian Amenities
  The sidewalks on the west side of Flatbush Avenue lack trees and landscaping between Foster Avenue and Stephens Court.

  Pedestrian amenities are street furniture that can make the streets more attractive and provide added convenience for pedestrians. Elements of street furniture include trees, greenstreet elements, benches, bus shelters, bicycle racks, newspaper boxes, wayfinding signage, etc.

Recommendations

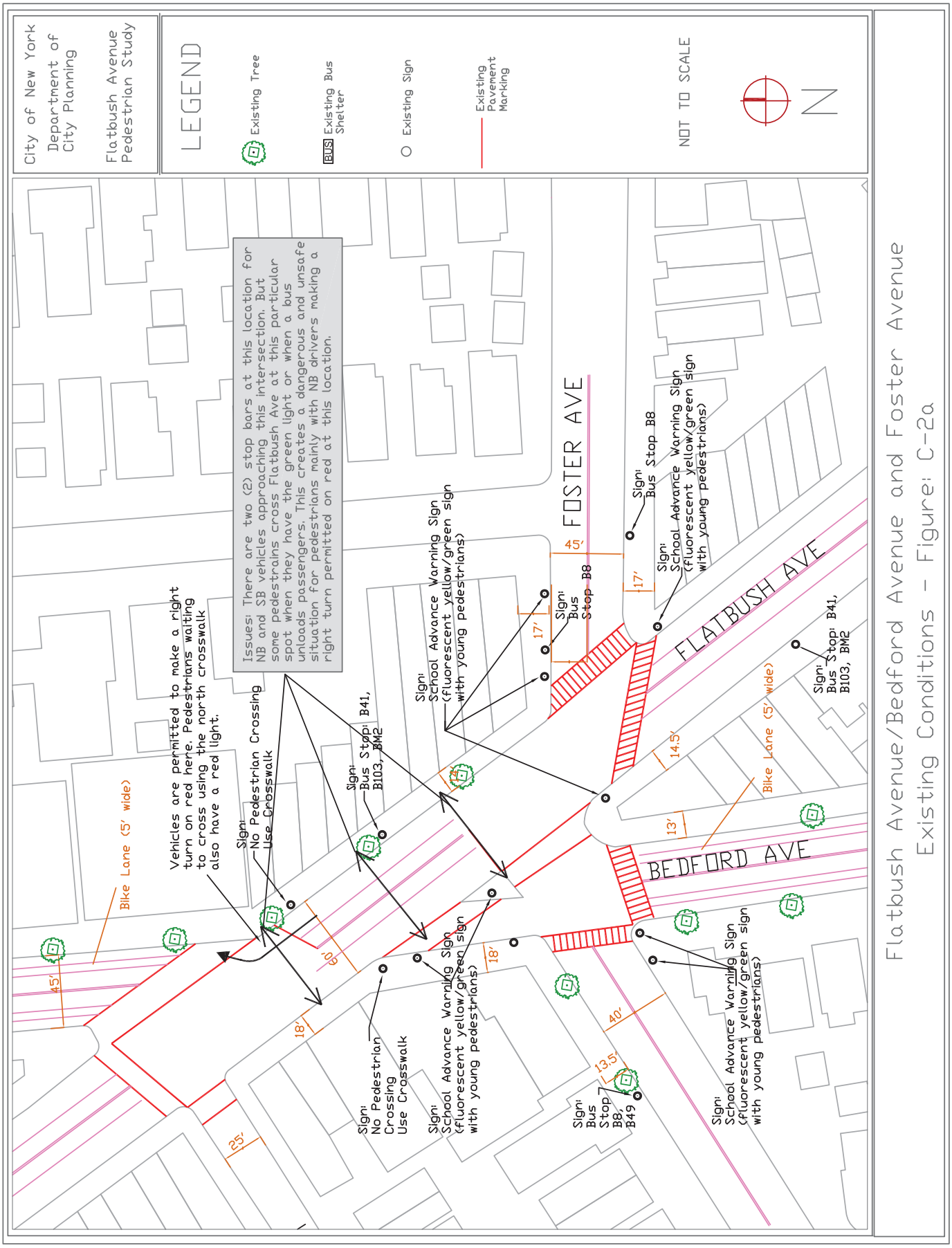
- Install a new crosswalk
  As a proposal, install a new crosswalk across Flatbush Avenue that would link the north sidewalks of Foster Avenue. This would provide a safe and designated crossing for pedestrians who often cross midblock just north of Foster Avenue. This new facility would also require an adjustment to the signal timing and the installation of a new pedestrian signal. The pedestrian signal should allow the right-of-way for crossing pedestrians during the Foster Avenue phase. During that phase traffic on Flatbush Avenue and on Bedford Avenue have the red light.

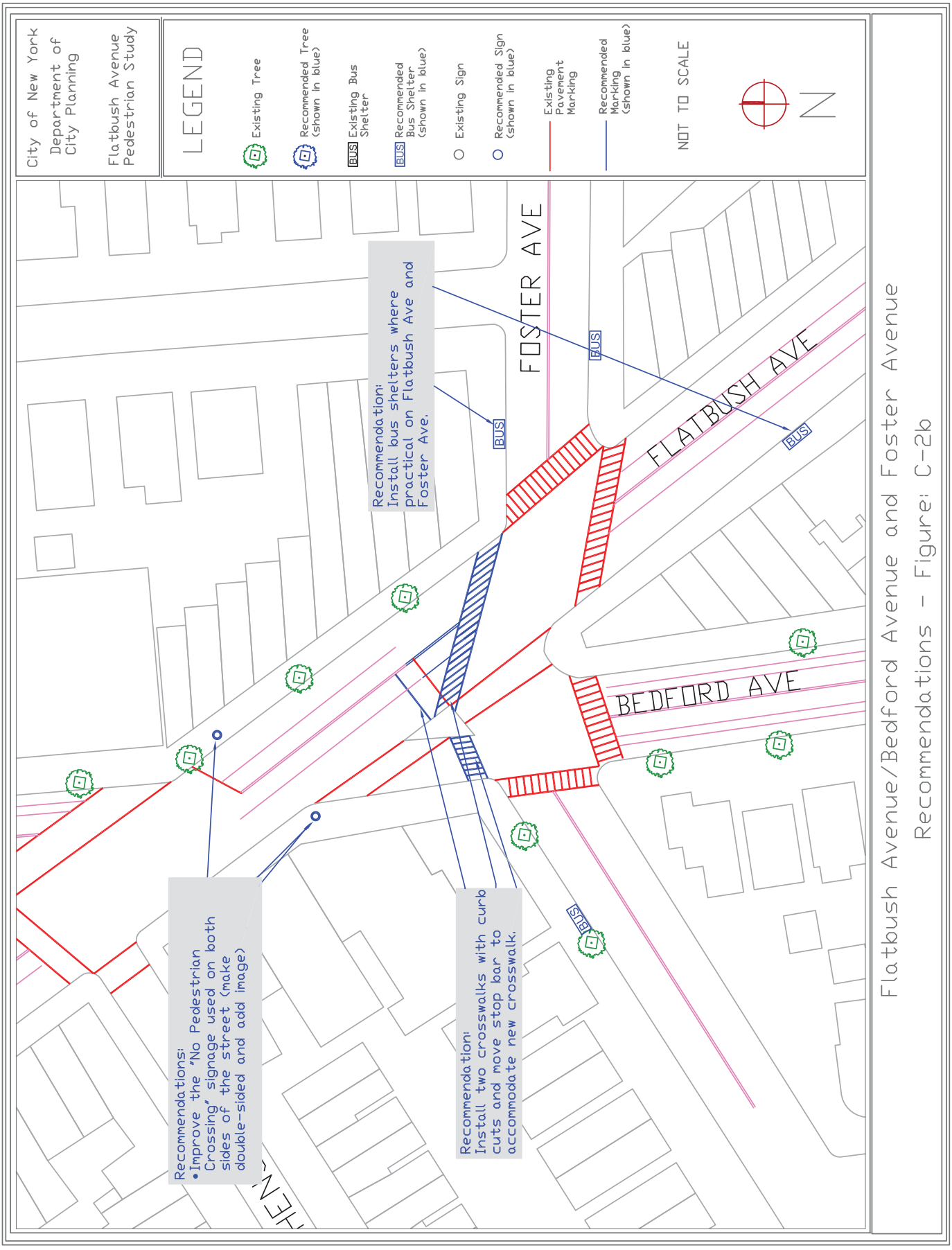
- Improve Curb Cuts
  Improve existing curb cuts at the traffic island and add new curb cuts that would be necessary with the installation of the proposed crosswalk.

- Improve Signage
  The existing signs "No Ped Crossing Use Crosswalks" are not very useful based on their placement and orientation. First of all, install double-sided signs that face all pedestrian approaches and can be seen from any direction as you approach the midblock location. Secondly, install an additional sign adjacent to or above the "No Ped Crossing Use Crosswalks" sign. This sign should be an image of a pedestrian with a red interdiction symbol over it (MUTCD manual "R9-3a" sign; see image in Appendix D-2: Standards for Signs Recommended). The graphic reinforces the first sign's message that pedestrians are prohibited from crossing the roadway at this undesirable location.

- Streetscape Improvement
  It is recommended to plant trees and add landscaping at this location near the intersection: 3 - 4 trees on the west sidewalk of Flatbush Avenue between Foster Avenue and Stephens Ct. The number of trees has been determined based on the standards set by the New York City Department of Parks and Recreation in terms of tree spacing requirements from an intersection and from street lights. The traffic island could be improved with landscaping.

  In addition install bus shelters at bus stops on Flatbush Avenue and Glenwood Road where passengers wait for the arrival of a bus. It may only be possible to install a narrow bus shelter at certain locations based on the width of the sidewalk and NYCDOT's Street Furniture requirements (see Appendix D-4: Standards for Bus Shelters).


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
BUS Existing Bus Shelter
Existing Sign
Existing Pavement Marking
NOT TO SCALE
N
Issues: There are two (2) stop bars at this location for NB and SB vehicles approaching this intersection. But some pedestrains cross Flatbush Ave at this particular spot when they have the green light or when a bus unloads passengers. This creates a dangerous and unsafe situation for pedestrians mainly with NB drivers making a right turn permitted on red at this location.
Vehicles are permitted to make a right turn on red here. Pedestrians waiting to cross using the north crosswalk also have a red light.
Sign: No Pedestrian Crossing Use Crosswalk
Sign: Bus Stop: B41, B103, BM2
Sign: School Advance Warning Sign (fluorescent yellow/green sign with young pedestrians)
Sign: Bus Stop B8
Sign: School Advance Warning Sign (fluorescent yellow/green sign with young pedestrians)
Sign: Bus Stop: B41, B103, BM2
Sign: No Pedestrian Crossing Use Crosswalk
Sign: School Advance Warning Sign (fluorescent yellow/green sign with young pedestrians)
Sign: Bus Stop B8, B49
Sign: School Advance Warning Sign (fluorescent yellow/green sign with young pedestrians)
Bike Lane (5' wide)
Bike Lane (5' wide)
FOSTER AVE
FLATBUSH AVE
BEDFORD AVE
45'
60'
18'
25'
18'
40'
13.5'
45'
17'
17'
14.5'
13'
Flatbush Avenue/Bedford Avenue and Foster Avenue
Existing Conditions - Figure: C-2a


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
Recommended Tree (shown in blue)
Existing Bus Shelter
Recommended Bus Shelter (shown in blue)
Existing Sign
Recommended Sign (shown in blue)
Existing Pavement Marking
Recommended Marking (shown in blue)
NOT TO SCALE
N
FOSTER AVE
FLATBUSH AVE
BEDFORD AVE
BUS
Recommendation:
Install bus shelters where practical on Flatbush Ave and Foster Ave.
Recommendations:
•Improve the "No Pedestrian Crossing" signage used on both sides of the street (make double-sided and add image)
Recommendation:
Install two crosswalks with curb cuts and move stop bar to accommodate new crosswalk.
Flatbush Avenue/Bedford Avenue and Foster Avenue
Recommendations - Figure: C-2b

Location: Flatbush Avenue and Avenue U

Intersection of Flatbush Avenue and Avenue U

Description of Existing Conditions

Flatbush Avenue is very wide at this location with a width of 145 ft and six travel lanes, in each direction of traffic. Dedicated left and right turning lanes are provided (two lanes for each type of turn in the northbound and southbound directions). The sidewalks along this main arterial are 13 – 14 ft wide. However at the southeast corner the sidewalk is 42 ft wide then merges into a plaza in front of the shopping mall.

Avenue U on the other hand is 85 ft wide with four travel lanes in each direction which are divided into a left turn lane, one through lane, one through-right turn lane and a right turn lane. The sidewalks on Avenue U are 10 - 14 f t wide.

Medians are located in the middle of the roadway for both arterials.

The vehicular volumes are heavy on both streets at this intersection while pedestrian volumes are light but with a steady flow. This location can be considered more of a destination with the Kings Plaza shopping mall and a concentration of big retail stores in the area. Many of the pedestrians observed on the sidewalks come in general from the buses and vans that unload/load passengers heading to/from the shopping mall and the retail stores in the area.

Level of Service Analysis (LOS)

- Vehicle Analysis

The capacity analysis shows that all approaches at this intersection operate at LOS C or worse for all peak hours. However the intersection approaches operating at LOS D or worse have more than 35 seconds of delay (See Table C-11- Intersection LOS).

- Pedestrian Analysis

An analysis of the sidewalks at Flatbush Avenue and Avenue U indicates that the pedestrian LOS generally operates at a comfortable LOS A during all peak periods. Table C-12: “Sidewalks Level of Service” presents a summary of the LOS results and Appendix D-1 “LOS Methodology and Vehicular and Pedestrian Traffic Volumes” has a diagram showing the numbering system for the walkways analyzed at this intersection.

The corners and crosswalks of this intersection operate at LOS A for the four peak periods analyzed (See Table C-13: Crosswalks Level of Service and Table C-14: Corners Level of Service).

Table C-11 - Sidewalks Level of Service

Intersection	Lane Approach	AM			MD			PM			SAT MD		
Flatbush Avenue and Avenue U		**V/C**	**Delay**	**LOS**	**V/C**	**Delay**	**LOS**	**V/C**	**Delay**	**LOS**	**V/C**	**Delay**	**LOS**
	Eastbound												
	L	0.75	52.2	D	0.67	45.5	D	1.00	90.7	F	0.74	48.0	D
	TR	0.50	34.5	C	0.62	39.3	D	0.56	35.8	D	0.44	35.3	D
	R	0.27	30.8	C	0.30	33.4	C	0.28	31.0	C	0.21	32.0	C
	Westbound												
	L	0.89	59.7	E	0.70	44.6	D	1.00	78.3	E	0.46	35.5	D
	TR	0.53	34.6	C	0.57	37.5	D	0.70	38.7	D	0.49	35.8	D
	Northbound												
	L	0.34	31.9	C	0.32	31.4	C	0.36	35.7	D	0.35	32.0	C
	T	1.00	64.1	E	0.82	44.4	D	1.01	63.6	E	0.64	38.0	D
	R	0.94	69.1	E	0.83	55.2	E	0.99	75.8	E	0.80	50.7	D
	Southbound												
	L	0.27	37.9	D	0.31	33.2	C	0.29	41.4	D	0.36	33.2	C
	TR	0.68	38.5	D	0.71	39.3	D	0.95	52.9	D	0.62	37.1	D
		Inters. Delay = 48.3		LOS = D	Inters. Delay = 41.2		LOS = D	Inters. Delay = 56.2		LOS = E	Inters. Delay = 38.0		LOS = D

Table C-12 - Sidewalks Level of Service

Intersection	Walkway	AM 15 Min Vol. Two-Way	AM Effective Walkway Width	AM Pedestrian Flow Rate p/m/f	AM LOS	MD 15 Min Vol.	MD Pedestrian Flow Rate p/m/f	MD LOS	PM 15 Min Vol.	PM Pedestrian Flow Rate p/m/f	PM LOS	SAT 15 Min Vol.	SAT Pedestrian Flow Rate p/m/f	SAT LOS
Flatbush Avenue and Avenue U	1	63	13.9	0.3	A	86	0.4	A	77	0.4	A	79	0.4	A
	2	141	15.2	0.6	A	150	0.7	A	131	0.6	A	127	0.6	A
	3	91	12.9	0.5	A	141	0.7	A	116	0.6	A	121	0.6	A
	4	113	13.4	0.6	A	116	0.6	A	93	0.5	A	86	0.4	A
	5	151	43	0.3	A	233	0.4	A	281	0.5	A	294	0.6	A
	6	38	13.8	0.2	A	55	0.3	A	48	0.2	A	30	0.1	A
	7	80	14.8	0.4	A	36	0.2	A	60	0.3	A	60	0.3	A
	8	49	10	0.3	A	38	0.3	A	36	0.2	A	23	0.2	A

Table C-13- Crosswalks Level of Service

Intersection	Crosswalk	AM Crosswalk Space SF/P	AM LOS	MD Crosswalk Space SF/P	MD LOS	PM Crosswalk Space SF/P	PM LOS	SAT Crosswalk Space SF/P	SAT LOS
Flatbush Avenue and Avenue U	North	136.8	A	92.1	A	118.9	A	99.8	A
	East	60.8	A	81.9	A	71.8	A	80.7	A
	South	119.0	A	88.6	A	130.6	A	208.1	A
	West	175.6	A	277.7	A	275.4	A	354.2	A

Table C-14 - Corners Level of Service

Intersection	Corner	AM SF/P	AM LOS	MD SF/P	MD LOS	PM SF/P	PM LOS	SAT SF/P	SAT LOS
Flatbush Avenue and Avenue U	Northwest	152.1	A	119.8	A	132.7	A	193.1	A
	Northeast	106.6	A	81.8	A	78.7	A	121.6	A
	Southeast	96.1	A	74.1	A	75.5	A	137.3	A
	Southwest	196.9	A	162.8	A	186.2	A	411.2	A

Pedestrian Accident Data 2004 -2006
14 pedestrian accidents

Table: C-15 – Summary of Pedestrian Accidents

Accident Location	Year	Time	Pedestrian Action	Pedestrian Location	Vehicle Action
Avenue U	8/23/2004	daylight	crossing with signal	at intersection	making a right turn
Avenue U	9/28/2004	night, rain	crossing with signal	at intersection	making a left turn
Avenue U	11/2/2004	night	crossing with signal	at intersection	making a left turn
Avenue U	1/11/2005	night, wet surface	crossing with signal	at intersection	making a left turn
Avenue U	5/31/2005	daylight	crossing with signal	at intersection	making a right turn
Avenue U	10/22/2005	daylight, wet	emerged from behind parked vehicle	at intersection	going straight ahead
Avenue U	2/4/2006	daylight, rain	crossing against signal	at intersection	going straight ahead
Avenue U	6/2/2006	daylight, wet surface	crossing against signal	at intersection	making a left turn
Avenue U	9/17/2006	daylight	crossing with signal	at intersection	making a left turn
Avenue U (2 peds injured)	10/6/2006	daylight, rain	other actions in roadway	at intersection	stopped in traffic
Avenue U	9/1/2006	daylight	crossing against signal	at intersection	making a left turn
Avenue U	11/24/2006	dusk	crossing with signal	at intersection	making a right turn

Problems and Opportunities

- Pedestrian conflicts with left turning vehicles
  Vehicles located in the dedicated left turning lanes make their turn during a protected left turn signal phase for 10 – 13 seconds. However left turning vehicles are also allowed to make a left turn when the traffic light is green for through traffic. During this phase the left turn arrow is not lit. This creates conflicts between pedestrians crossing and vehicles turning left. In this situation, drivers do not always yield to pedestrians and often speed up as they rush to make the left turn as heavy volumes of vehicles in the opposite direction arrive at the intersection which represents a dangerous situation for pedestrians (See Appendix D-1 for traffic volumes at this intersection).

  In addition 50% of the pedestrian accidents that occurred at this intersection from 2004 - 2006 happened as pedestrians were crossing with the signal while a vehicle was making a left or right turn (see above pedestrian accident data).

- Pavement Markings
  In general they are in good condition, but the markings of the northbound travel lanes south of the intersection have faded markings.

- Pedestrian Amenities
  There are no trees along the medians and on the sidewalks at all approaches of the intersection

- Pedestrian refuge/median
  The medians or pedestrian refuge on Avenue U stop just before the crosswalk. They are 4ft wide and are not ADA (American Disability Act) accessible which leave pedestrians and wheelchair users stranded in the crosswalk waiting for the next green phase to cross.

Recommendations

- Future Restriction of Turns
  Due to major vehicular and pedestrian conflicts affecting pedestrian's safety at this intersection, it is possible that left turns by vehicles may have to be restricted in the future, especially on Flatbush Avenue. This would require reconfiguration of the intersection and new signal timing.

- Increase Enforcement
  An increase in police presence is recommended for this location for enforcement of traffic regulations.

- Improve Pavement Markings
  Repair and restripe pavement markings of the northbound travel lanes south of the intersection

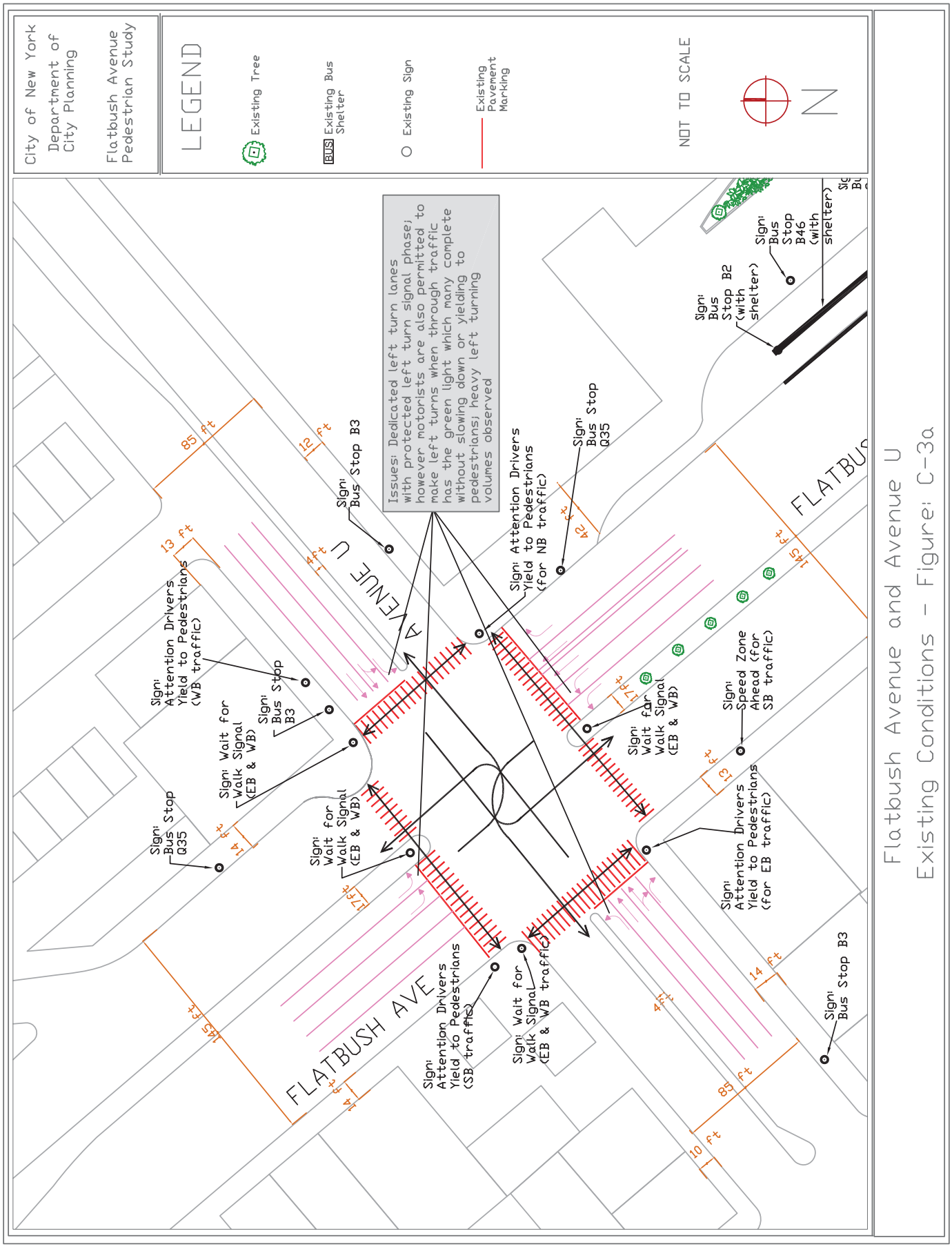
- Provide Additional Pedestrian Amenities
  Have trees/planters and landscaping along the medians and on the sidewalks where possible.

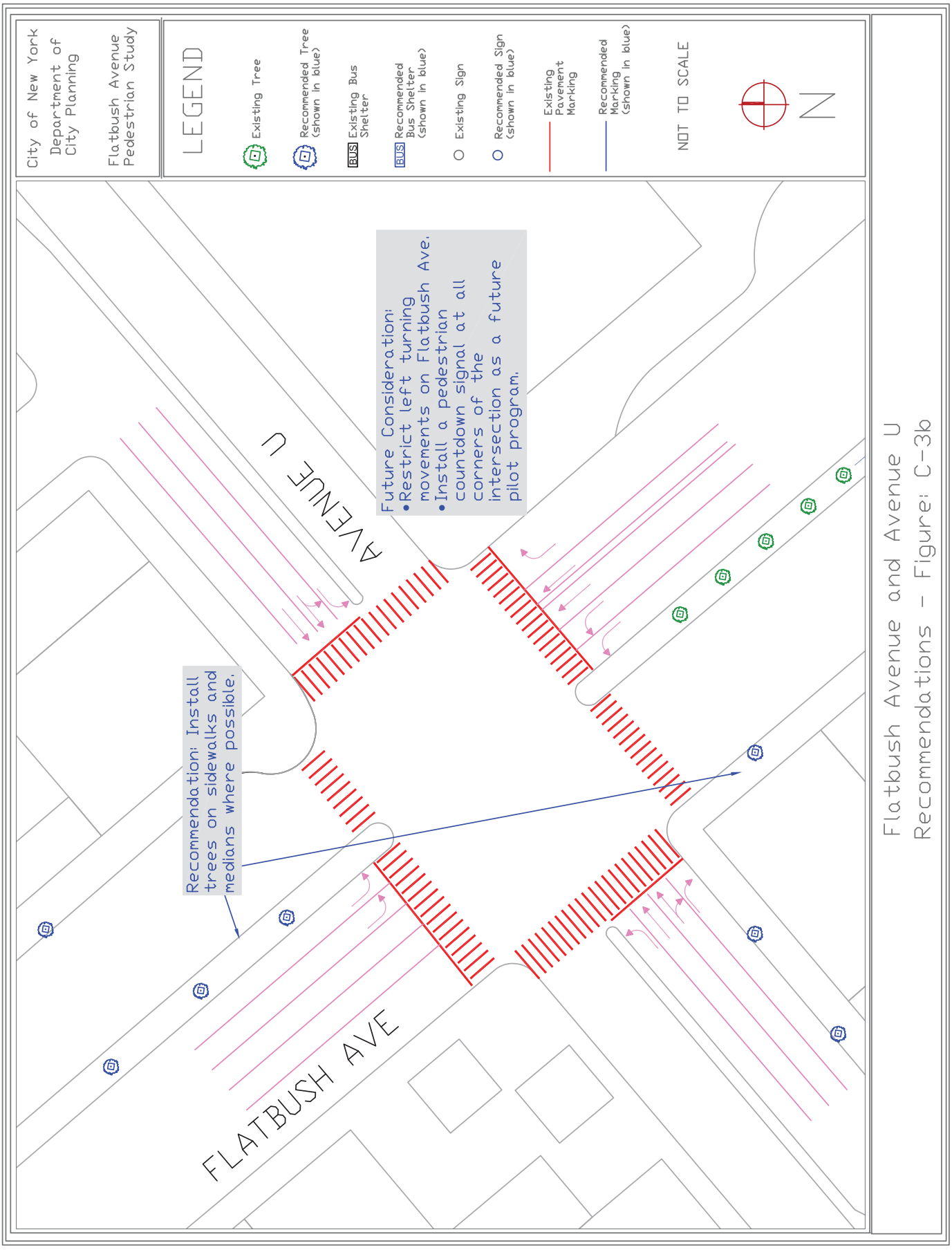
Consideration for the Future

Recommendation for a Countdown Pedestrian Signal

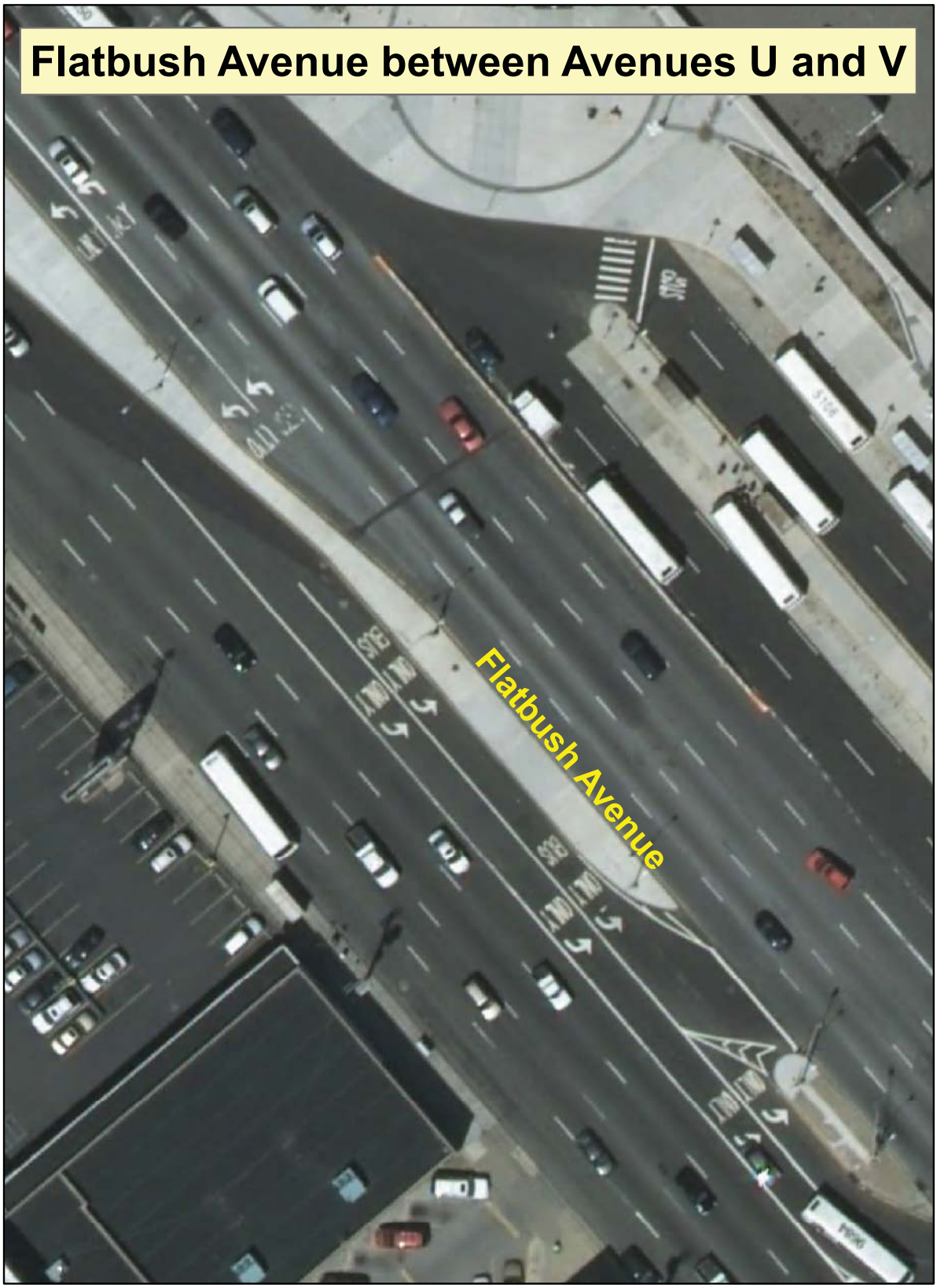
The installation of a countdown pedestrian signal is recommended for consideration at Flatbush Avenue and Avenue U, to reduce conflicts between pedestrians crossing and vehicles making turns. This type of traffic signal can provide pedestrians with information about the amount of time remaining in a crossing interval and can improve pedestrian signal compliance. This pedestrian countdown signal is recommended as a future pilot program.

Currently New York City Department of Transportation (NYCDOT) is conducting a study and a pilot program of countdown pedestrian signals at 24 intersections. This pilot program has been expanded and will also take place along selected busy corridors in all five boroughs. This study is to be completed in the fall of 2008 (Source: DOT Press Release on 11/8/07).


City of New York
Department of City Planning
Flatbush Avenue Pedestrian Study
LEGEND
Existing Tree
BUS Existing Bus Shelter
Existing Sign
Existing Pavement Marking
NOT TO SCALE
N
Issues: Dedicated left turn lanes with protected left turn signal phase; however motorists are also permitted to make left turns when through traffic has the green light which many complete without slowing down or yielding to pedestrians; heavy left turning volumes observed
AVENUE U
FLATBUSH AVE
FLATBUS
Sign: Bus Stop B3
Sign: Attention Drivers Yield to Pedestrians (WB traffic)
Sign: Bus Stop B3
Sign: Wait for Walk Signal (EB & WB)
Sign: Bus Stop Q35
Sign: Wait for Walk Signal (EB & WB)
Sign: Attention Drivers Yield to Pedestrians (SB traffic)
Sign: Wait for Walk Signal (EB & WB traffic)
Sign: Attention Drivers Yield to Pedestrians (for NB traffic)
Sign: Bus Stop Q35
Sign: Bus Stop B2 (with shelter)
Sign: Bus Stop B46 (with shelter)
Sign: Wait for Walk Signal (EB & WB)
Sign: Speed Zone Ahead (for SB traffic)
Sign: Attention Drivers Yield to Pedestrians (for EB traffic)
Sign: Bus Stop B3
Flatbush Avenue and Avenue U
Existing Conditions - Figure: C-3a


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
Recommended Tree (shown in blue)
BUS Existing Bus Shelter
BUS Recommended Bus Shelter (shown in blue)
Existing Sign
Recommended Sign (shown in blue)
Existing Pavement Marking
Recommended Marking (shown in blue)
NOT TO SCALE
N
AVENUE U
FLATBUSH AVE
Future Consideration:
•Restrict left turning movements on Flatbush Ave.
•Install a pedestrian countdown signal at all corners of the intersection as a future pilot program.
Recommendation: Install trees on sidewalks and medians where possible.
Flatbush Avenue and Avenue U
Recommendations - Figure: C-3b

Location: Flatbush Avenue between Avenue U and Avenue V



Midblock of Flatbush Avenue between Avenue U and Avenue V

Description of Existing Conditions

Flatbush Avenue as mentioned above is 145 ft wide with six travel lanes, in each direction of traffic which include dedicated turning lanes.

Avenue U is 85 ft wide with four travel lanes in each direction while Avenue V is 55 ft with 2 travel lanes in each direction.

Flatbush Avenue has a median in the middle of the roadway which separates the two-way traffic of heavy vehicular volumes.

Pedestrian Accident Data 2004 -2006
8 pedestrian accidents

Table: C-16 – Summary of Pedestrian Accidents

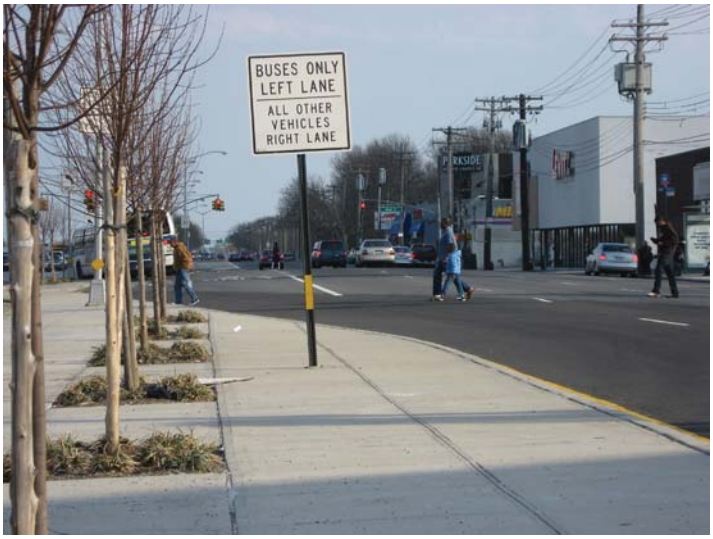
Accident Location	Year	Time	Pedestrian Action	Pedestrian Location	Vehicle Action
Ave U and Ave V (midblock)	2/8/2004	daylight	not in roadway	midblock	going straight ahead
Ave U and Ave V (midblock)	2/8/2004	daylight	crossing- no signal; no crosswalks	midblock	going straight ahead
Ave U and Ave V (midblock)	1/10/2004	night	crossing against signal	midblock	making a left turn
Ave U and Ave V (midblock)	3/1/2004	dusk	working in roadway	midblock	going straight ahead
Ave U and Ave V (midblock; 2 peds injured)	8/14/2004	rain, wet	crossing- no signal; no crosswalks	midblock	one parked getting out to go south; the other going straight SB
Ave U and Ave V	12/2/2005	night	crossing- no signal; no crosswalks	not at intersection	going straight ahead
Ave U and Ave V	2/11/2006	night, rain	crossing- no signal; no crosswalks	midblock	going straight ahead

Problems and Opportunities

- Pedestrian Jaywalking
  Flatbush Avenue at this location has the Kings Plaza Shopping Mall on the east side and a strip mall/big box retail stores on the west side. Some pedestrians jaywalk midblock from/to these buildings to cross Flatbush Avenue instead of using the crosswalks located at the intersection of Flatbush Avenue with Avenue U or Avenue V. There is also a bus stop for the Q35 midblock on the west side of the street which some shoppers get from/to by jaywalking.

  This is an unsafe practice for pedestrians who jaywalk in the area. With the high volume of vehicles (NB = 285 and SB = 245 vehicles on average/ 15-minute peak volumes) traveling daily along Flatbush Avenue, accidents are bound to happen at this midblock location. A total of eight pedestrian accidents have already occurred at this location between 2004 and 2006 (see above accident table). A survey was done regarding the volume of pedestrians crossing midblock: AM Peak Period (7:00 – 9:00AM) = 7, MD Peak Period (12:00 – 2:00 PM) = 11 and PM Peak Period

(4:00 – 6:00 PM) = 10 pedestrians. During the weekend peak period (1:00 – 3:00 PM), the midblock crossing volume = 20 pedestrians.

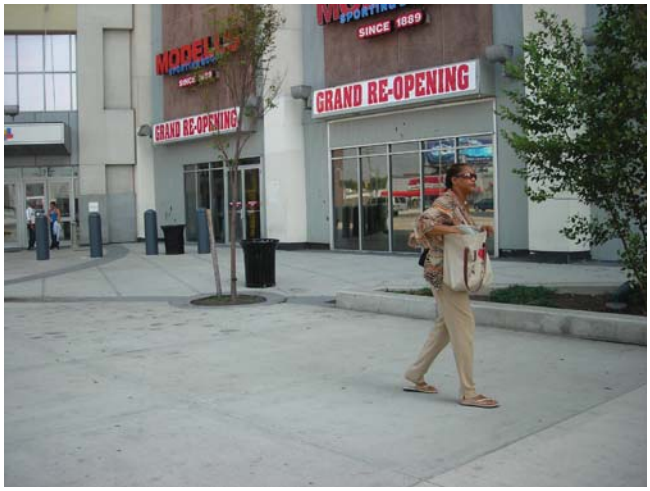


Pedestrians crossing Flatbush Avenue midblock between Avenue U and Avenue V

In addition, at this particular location a sign indicates to southbound drivers that a high speed road is ahead. Usually drivers at this point start preparing to speed up as they get closer to the Belt Parkway which represents a dangerous situation for pedestrians crossing midblock at this location.

- Pedestrian Amenities
  At the time of the fieldwork in July of 2007 the median and sidewalks along Flatbush Avenue at this midblock location were empty and unattractive with no trees or plantings. But as of December 2007 small trees have been planted along the median at this midblock location.

  Also the plaza in front of the shopping mall lacks benches and sitting areas for the Kings Plaza patrons waiting for a bus.



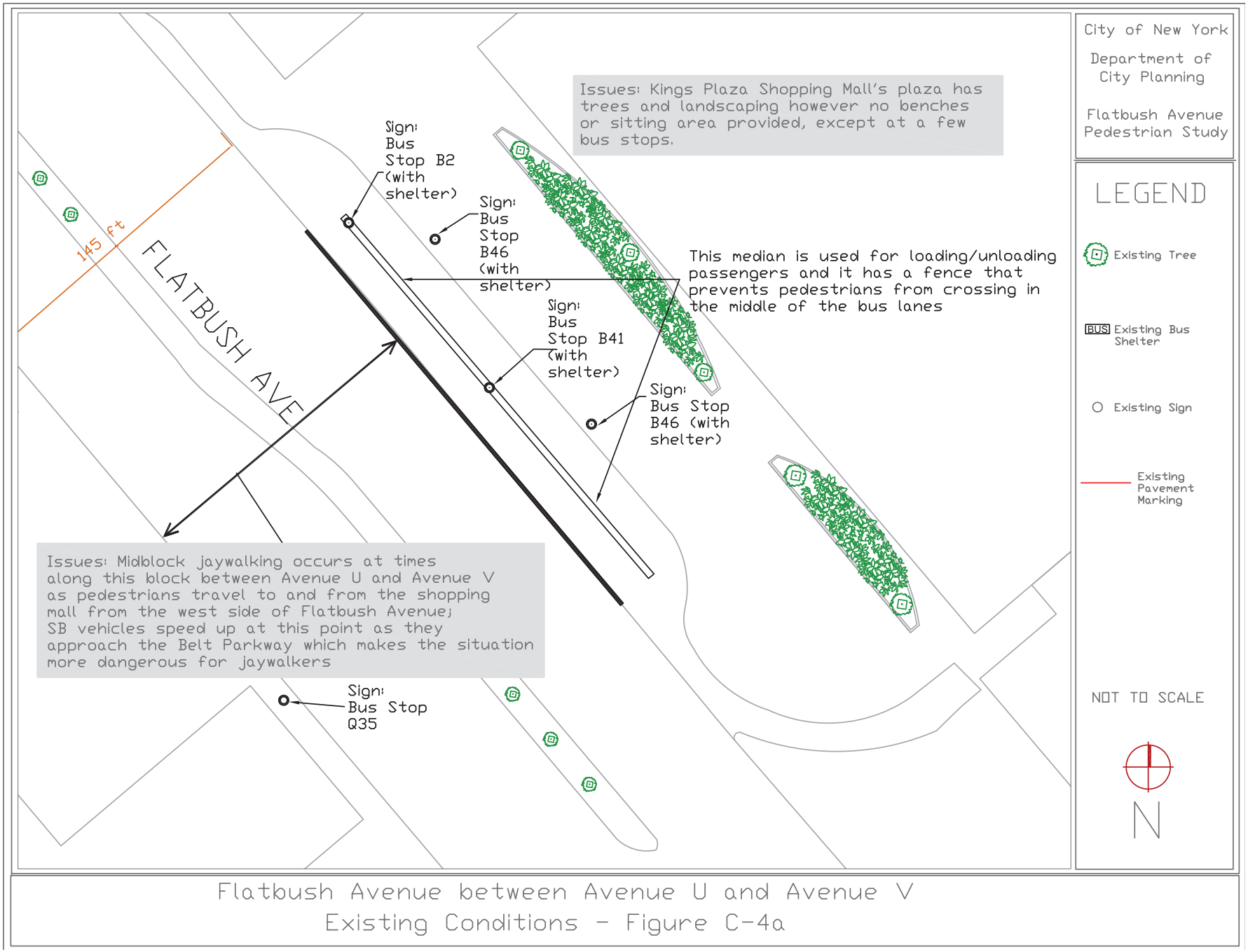
Plaza in front of Kings Plaza Mall lack sitting area and benches

Recommendations

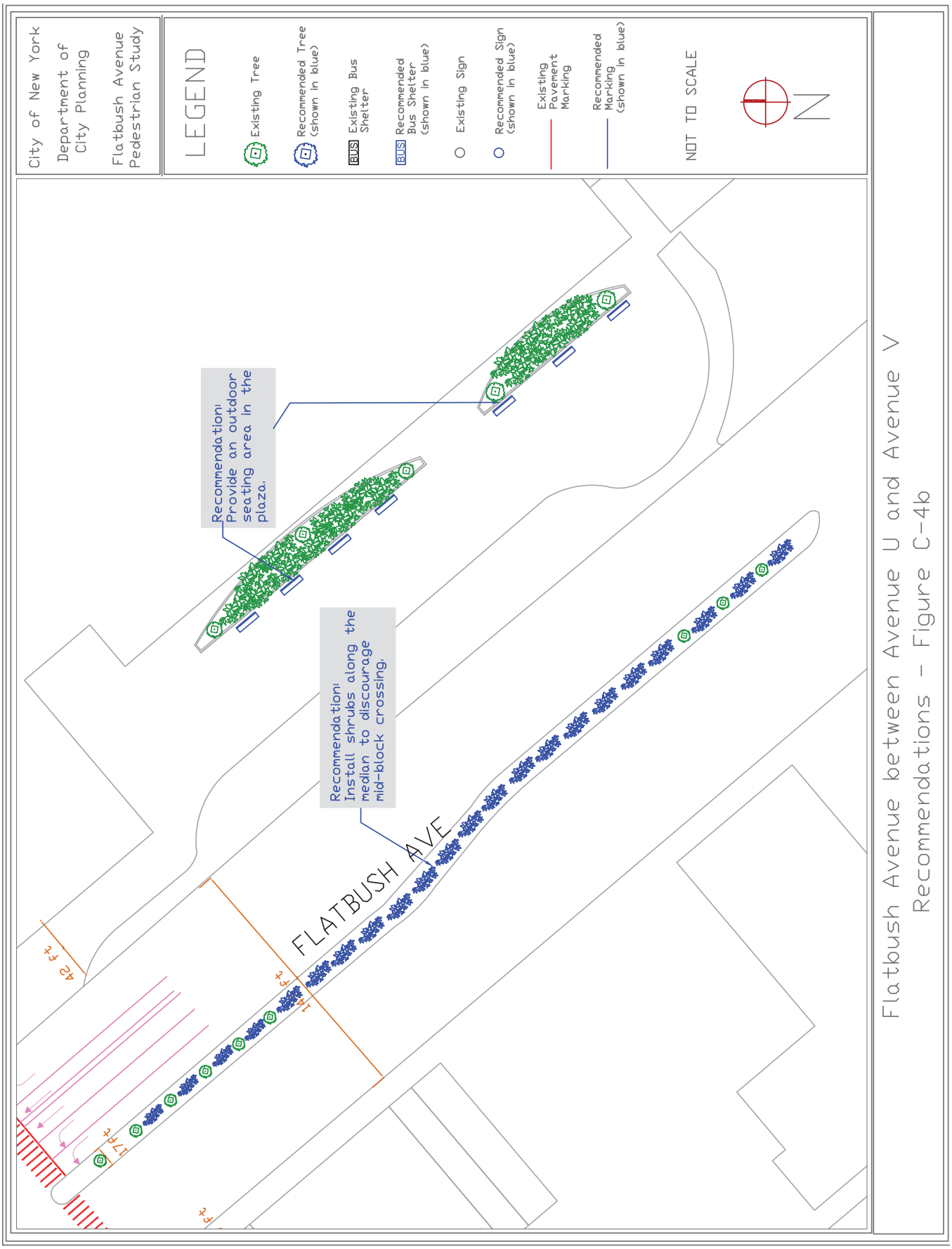
- Install a barrier
  Plant shrubs along the median in between Avenue U and Avenue V to block and discourage pedestrian from jaywalking. In addition, have some of the following signs installed midblock "Cross only at Crosswalks" and "Use Crosswalk (with a directional arrow)" directing pedestrians to the crosswalks at Avenue U or Avenue V (MUTCD Manual R9-2 and R9-3b signs; see Appendix D-2: Standards for Recommended Signs).

- Provide Additional Pedestrian Amenities
  Place trees/planters on the sidewalks where possible. In terms of the medians on Flatbush Avenue, they recently as of December 2007, had small trees planted.

  Additional sitting areas at the entrance of the Kings Plaza shopping mall would be convenient for patrons waiting for the arrival of the bus.



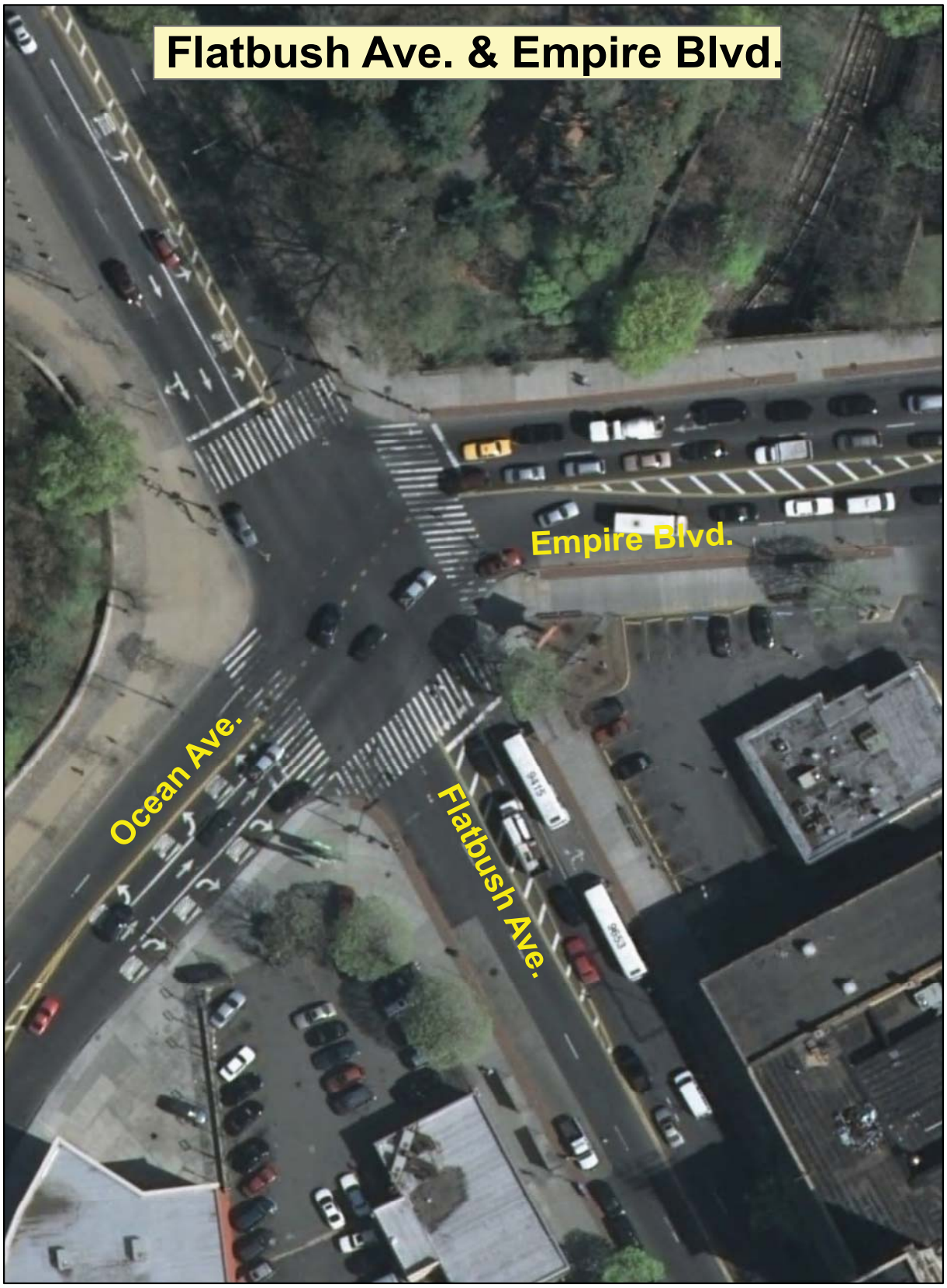
Flatbush Avenue between Avenue U and Avenue V
Existing Conditions - Figure C-4a


City of New York
Department of City Planning
Flatbush Avenue Pedestrian Study
LEGEND
Existing Tree
Recommended Tree (shown in blue)
Existing Bus Shelter
Recommended Bus Shelter (shown in blue)
Existing Sign
Recommended Sign (shown in blue)
Existing Pavement Marking
Recommended Marking (shown in blue)
NOT TO SCALE
N
Recommendation: Provide an outdoor seating area in the plaza.
Recommendation: Install shrubs along the median to discourage mid-block crossing.
FLATBUSH AVE
42 ft
14 ft
17 ft
Flatbush Avenue between Avenue U and Avenue V
Recommendations - Figure C-4b

Secondary Study Locations

- Flatbush Avenue and Empire Boulevard/ Ocean Avenue
- Flatbush Avenue and Winthrop Street
- Flatbush Avenue and Parkside Avenue
- Flatbush Avenue and Martense Street
- Flatbush Avenue and Cortelyou Road
- Flatbush Avenue and Clarendon/ Dorchester Road
- Flatbush Avenue and Avenue D/ Ditmas Avenue
- Flatbush Avenue and Newkirk Avenue
- Flatbush Avenue and Glenwood Road
- Flatbush Avenue and Nostrand Avenue/ Hillel Place
- Flatbush Avenue and Avenue H
- Flatbush Avenue and Kings Highway
- Flatbush Avenue and Utica Avenue

Location: Flatbush Avenue and Empire Boulevard/ Ocean Avenue



Intersection of Flatbush Avenue and Empire Boulevard/Ocean Avenue

Description of Existing Conditions

Flatbush Avenue has a width of 60 ft at this location. In the northbound direction, there are two travel lanes while the southbound direction has a through lane, a right-turn-through lane, and a left-turn lane. The sidewalks along this street are about 20 ft wide, however in front of the Brooklyn Botanic Garden and Prospect Park they widen to 25ft and 30 ft respectively.

Empire Boulevard is 70 ft wide and Ocean Avenue is 60 ft wide approximately. Each has through and turning lanes for vehicles. The sidewalks' dimensions range from 19 to 20 ft.

This area has heavy vehicular volumes where three major arterials intersect at an irregular angle: Empire Boulevard and Ocean Avenue do not intersect with Flatbush Avenue at a right angle. The heaviest volumes were observed in the morning and evening rush hours. Pedestrian volumes are in general light, but moderate in the afternoon and early evening. The pedestrian volumes are mainly generated by subway/ bus users and the major attractions in the area such as the Brooklyn Botanic Garden, Prospect Park and a concentration of fast food restaurants.

There is a short Lead Pedestrian Interval (LPI) phase of 6 seconds for pedestrians crossing Empire Boulevard and Ocean Avenue.

Pedestrian Accident Data 2004 -2006

6 Pedestrian Accidents

Table: C-17 – Summary of Pedestrian Accidents

Accident Location	Year	Time	Pedestrian Action	Pedestrian Location	Vehicle Action
Empire Blvd / Ocean Ave	1/20/2004	daylight	crossing – no signal or crosswalk	midblock	going straight ahead
Empire Blvd / Ocean Ave	9/06/2004	daylight	not reported	at intersection	making a left turn
Empire Blvd / Ocean Ave	8/11/2005	daylight	not reported	at intersection	making a left turn
Empire Blvd / Ocean Ave	5/17/2006	not reported	not reported	at intersection	not reported
Empire Blvd / Ocean Ave	5/13/2006	daylight	not in roadway	not at intersection	backing
Empire Blvd / Ocean Ave	6/13/2006	daylight	crossing with signal	at intersection	going straight ahead

Problems

- Pedestrians Crossing Midblock

  More pedestrians than usual were crossing midblock on Flatbush Avenue between Empire Boulevard and Sterling Street. This occurs mainly whenever there is a gap in vehicular traffic. One important factor that contributes to this behavior is that this block is quite long with a length of approximately 500 ft. Most pedestrians cross midblock to the other side of the street as they come out of or head to the B, Q, S subway station located on the west side of the street midblock.

  A sample data collection of pedestrian volumes crossing midblock for this location was done on Tuesday, December 11, 2007 from 9:15 – 9:30 AM and included subway riders crossing midblock to/from the subway station. A total of 69 people were observed crossing during those 15 minutes.

  In addition there are pavement markings indicating a traffic island on Flatbush Avenue that pedestrians use to cross midblock. This traffic island is south of the intersection with a length of approximately 100 ft from the intersection in between the northbound and southbound travel lanes.

Pedestrians crossing Flatbush Avenue midlock between Empire Blvd and Sterling Street

- Pedestrian Amenities

  The southwest corner has three concrete posts with signage announcing Flatbush Avenue for motorists and pedestrians traveling through the area. This corner also has a wide sidewalk, but it is empty and barren. The MTA has an existing parking lot at that corner for employees with private vehicles and extends their parking activity onto this sidewalk space at the corner beyond the fence, which is unattractive compared to the other three landscaped corners.

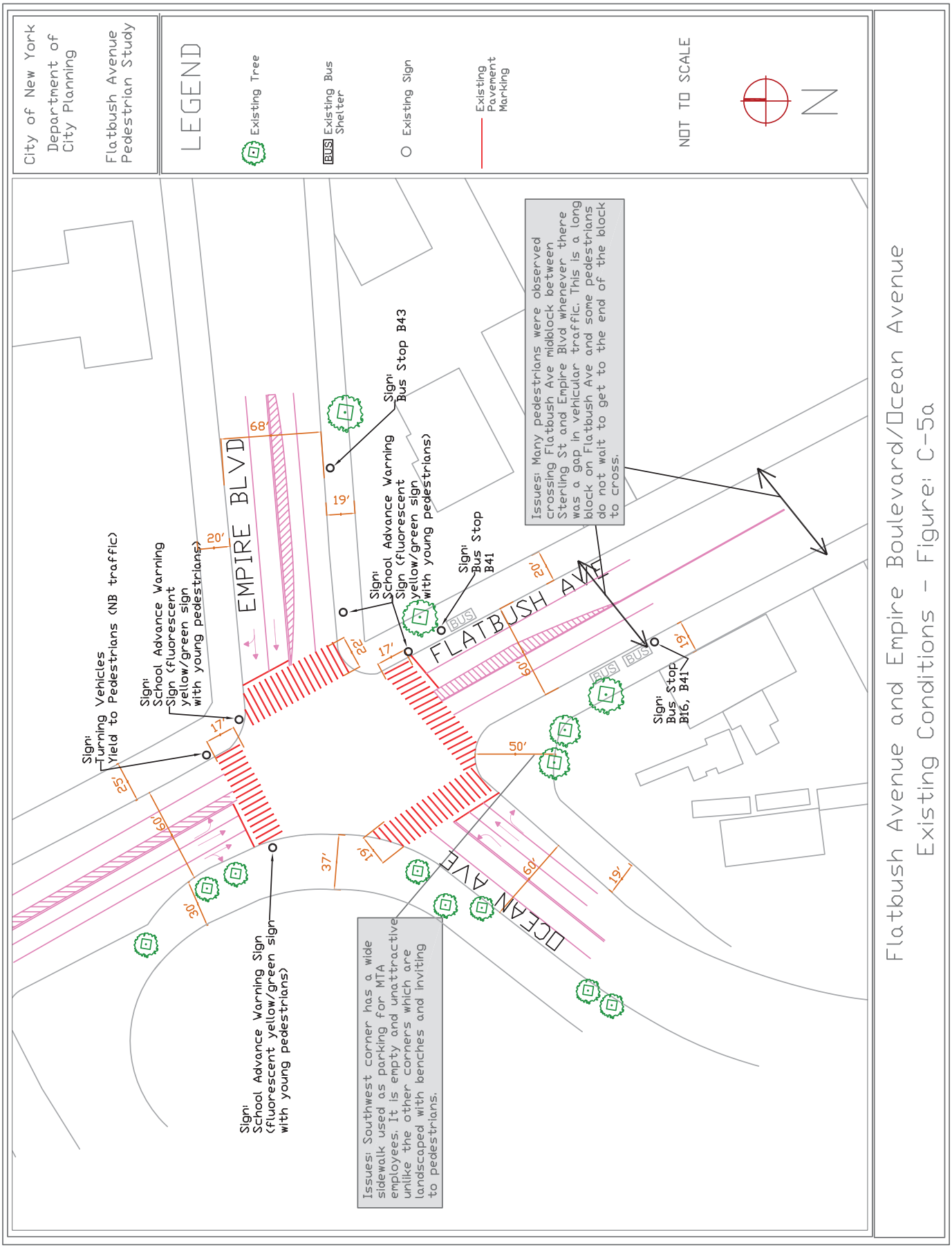
  The illegal parking on the sidewalk also creates conflicts with pedestrians, with cars pulling in and out of that public space while pedestrians are present.

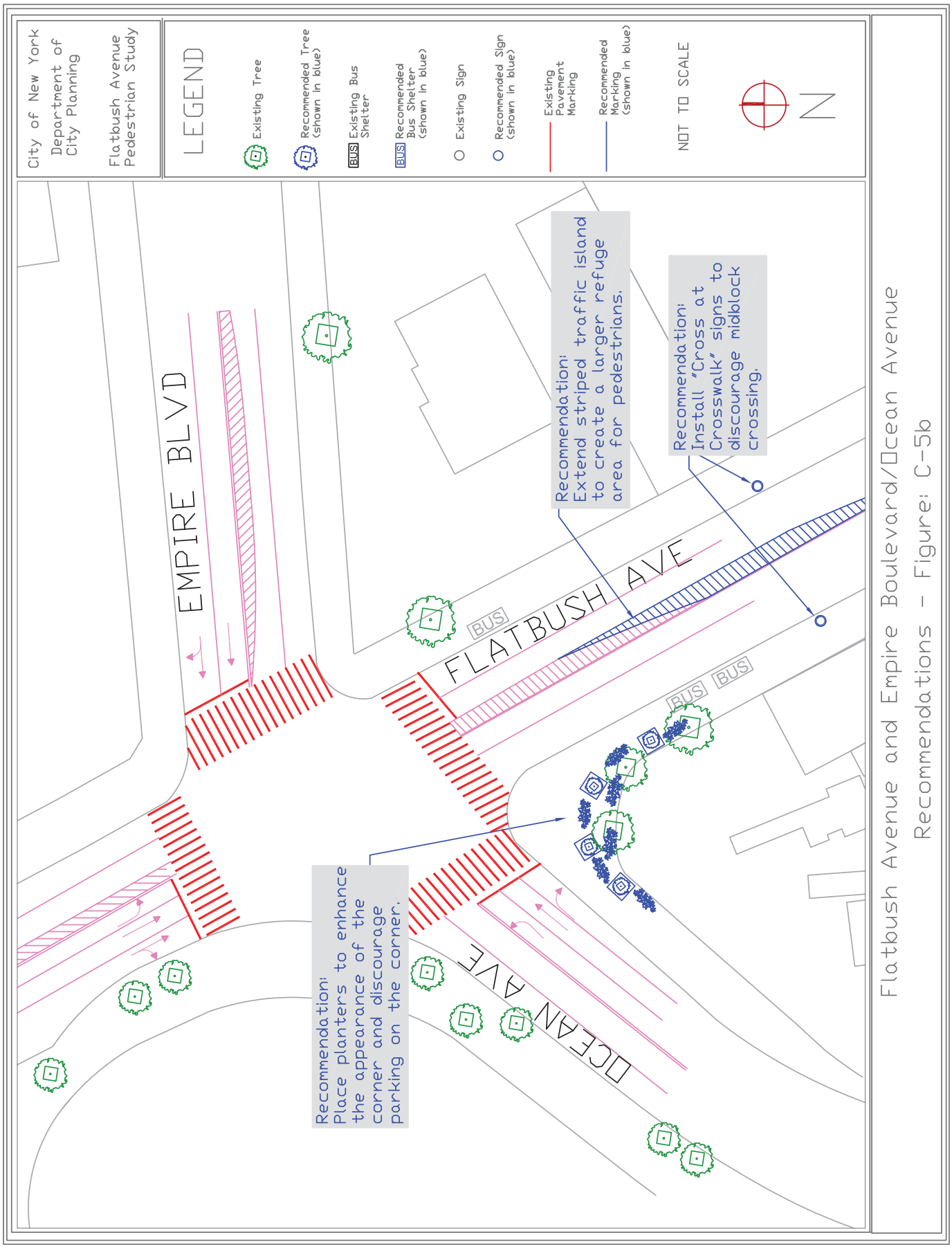
Vehicles parked on sidewalk at southwest corner of intersection

- Extend Center Island Refuge
  Extend the existing marked center traffic island on Flatbush Avenue by 100 ft to provide a refuge for pedestrians who nonetheless will cross midblock because of the length of the block between Empire Boulevard/ Ocean Avenue and Sterling Street. In addition it would reduce vehicular speed on Flatbush Avenue at this location with the narrowing of the travel lanes. This extended striped traffic island should maintain its current width.

- New Signage
  A combination of the following signs could be used at this location and installed midblock to deter pedestrians from jaywalking midblock:
  - "No Ped Crossing Use Crosswalks" sign that is double-sided and can be seen from any direction as you approach the midblock location
  - "A sign that has an image of a pedestrian with a red interdiction symbol over it" (MUTCD manual "R9-3a" sign, see Appendix D-2: Standards for Signs Recommended)
  - "Use Crosswalk" sign with a directional arrow to direct pedestrians to the crosswalks (MUTCD Manual R9-3b sign, see Appendix D-2: Standards for Signs Recommended).

- Streetscape Improvement
  Eliminate the practice of parking vehicles on the sidewalk at the southwest corner with the cooperation of the MTA and NYC Department of Transportation. In this space, install landscaping instead and put in greenstreets elements to enhance and beautify this corner which can be more in harmony with the other landscaped corners of this intersection.


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
BUS Existing Bus Shelter
Existing Sign
Existing Pavement Marking
NOT TO SCALE
N
EMPIRE BLVD
FLATBUSH AVE
OCEAN AVE
Sign: Turning Vehicles Yield to Pedestrians (NB traffic)
Sign: School Advance Warning Sign (fluorescent yellow/green sign with young pedestrians)
Sign: School Advance Warning Sign (fluorescent yellow/green sign with young pedestrians)
Sign: School Advance Warning Sign (fluorescent yellow/green sign with young pedestrians)
Sign: Bus Stop B43
Sign: Bus Stop B41
Sign: Bus Stop B16, B41
Issues: Many pedestrians were observed crossing Flatbush Ave midblock between Sterling St and Empire Blvd whenever there was a gap in vehicular traffic. This is a long block on Flatbush Ave and some pedestrians do not wait to get to the end of the block to cross.
Issues: Southwest corner has a wide sidewalk used as parking for MTA employees. It is empty and unattractive unlike the other corners which are landscaped with benches and inviting to pedestrians.
Flatbush Avenue and Empire Boulevard/Ocean Avenue
Existing Conditions - Figure: C-5a


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
Recommended Tree (shown in blue)
Existing Bus Shelter
Recommended Bus Shelter (shown in blue)
Existing Sign
Recommended Sign (shown in blue)
Existing Pavement Marking
Recommended Marking (shown in blue)
NOT TO SCALE
N
EMPIRE BLVD
FLATBUSH AVE
OCEAN AVE
BUS
BUS
BUS
BUS
Recommendation:
Extend striped traffic island to create a larger refuge area for pedestrians.
Recommendation:
Install "Cross at Crosswalk" signs to discourage midblock crossing.
Recommendation:
Place planters to enhance the appearance of the corner and discourage parking on the corner.
Flatbush Avenue and Empire Boulevard/Ocean Avenue
Recommendations - Figure: C-5b

Location: Flatbush Avenue and Winthrop Street

Intersection of Flatbush Avenue and Winthrop Street

Description of Existing Conditions

The intersection of Flatbush Avenue and Winthrop Street is a T-shaped intersection.

Flatbush Avenue has a width of 55ft in this part of the study area with two travel lanes in each direction of traffic.

Winthrop Street is 30 ft wide and is a one-way westbound street with all vehicles making a turn onto Flatbush Avenue.

Vehicle volumes on Flatbush Avenue at this intersection is moderate and can get heavy at times. Winthrop Street on the other hand has light vehicle volumes. Pedestrian volumes in general are light at this location.

Pedestrian Accident Data 2004 -2006

5 Pedestrian Accidents

Table: C-18 – Summary of Pedestrian Accidents

Accident Location	Year	Time	Pedestrian Action	Pedestrian Location	Vehicle Action
Winthrop St	9/8/2004	dawn, rain	crossing with signal	at intersection	making a left turn
Winthrop St	1/1/2005	daylight	crossing with signal	at intersection	making a left turn
Winthrop St	4/6/2005	daylight	crossing with signal	at intersection	making a left turn
Winthrop St	3/29/2005	daylight	crossing with signal	at intersection	going straight ahead
Winthrop St	7/26/2005	dusk	crossing with signal	at intersection	making a left turn

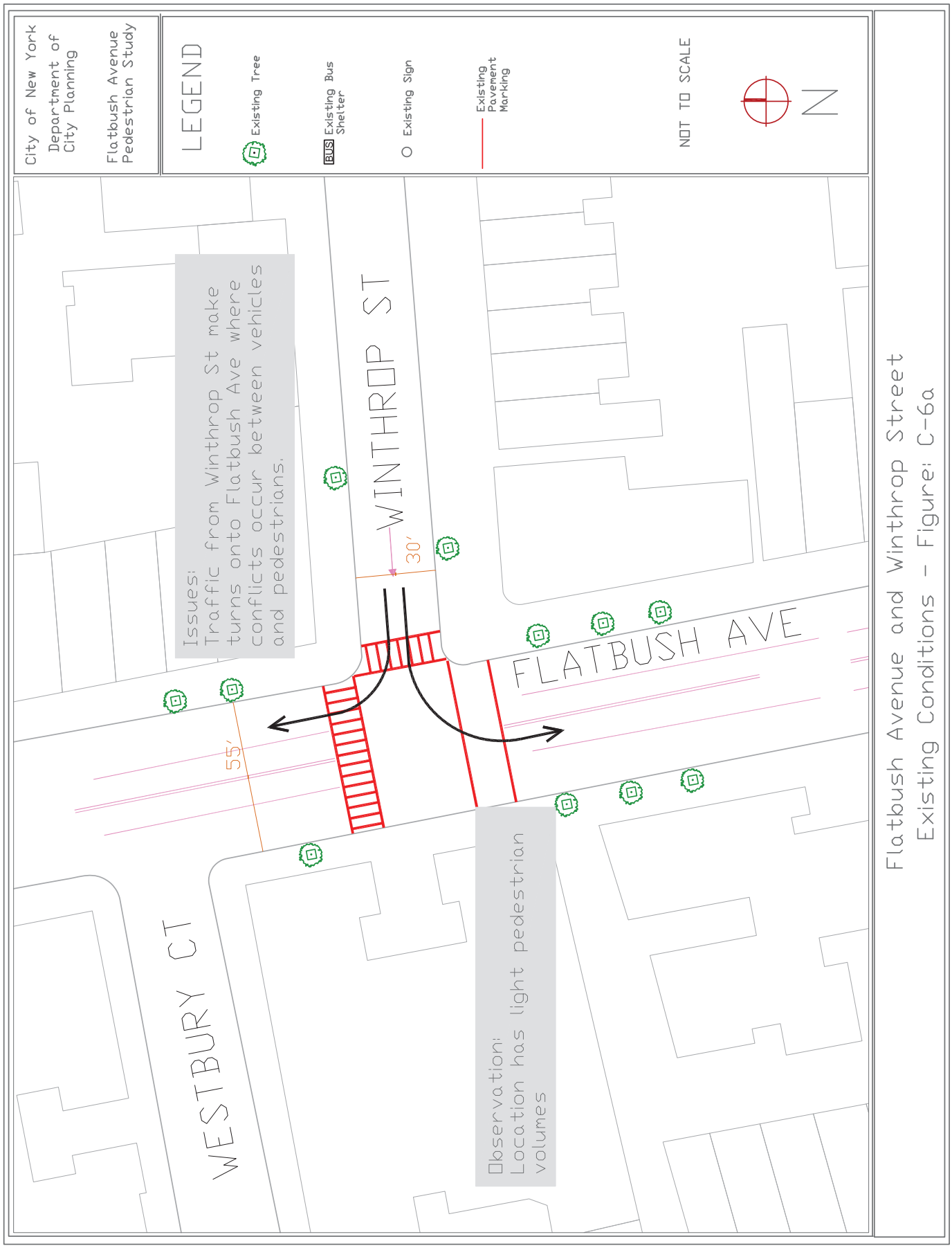
Problems

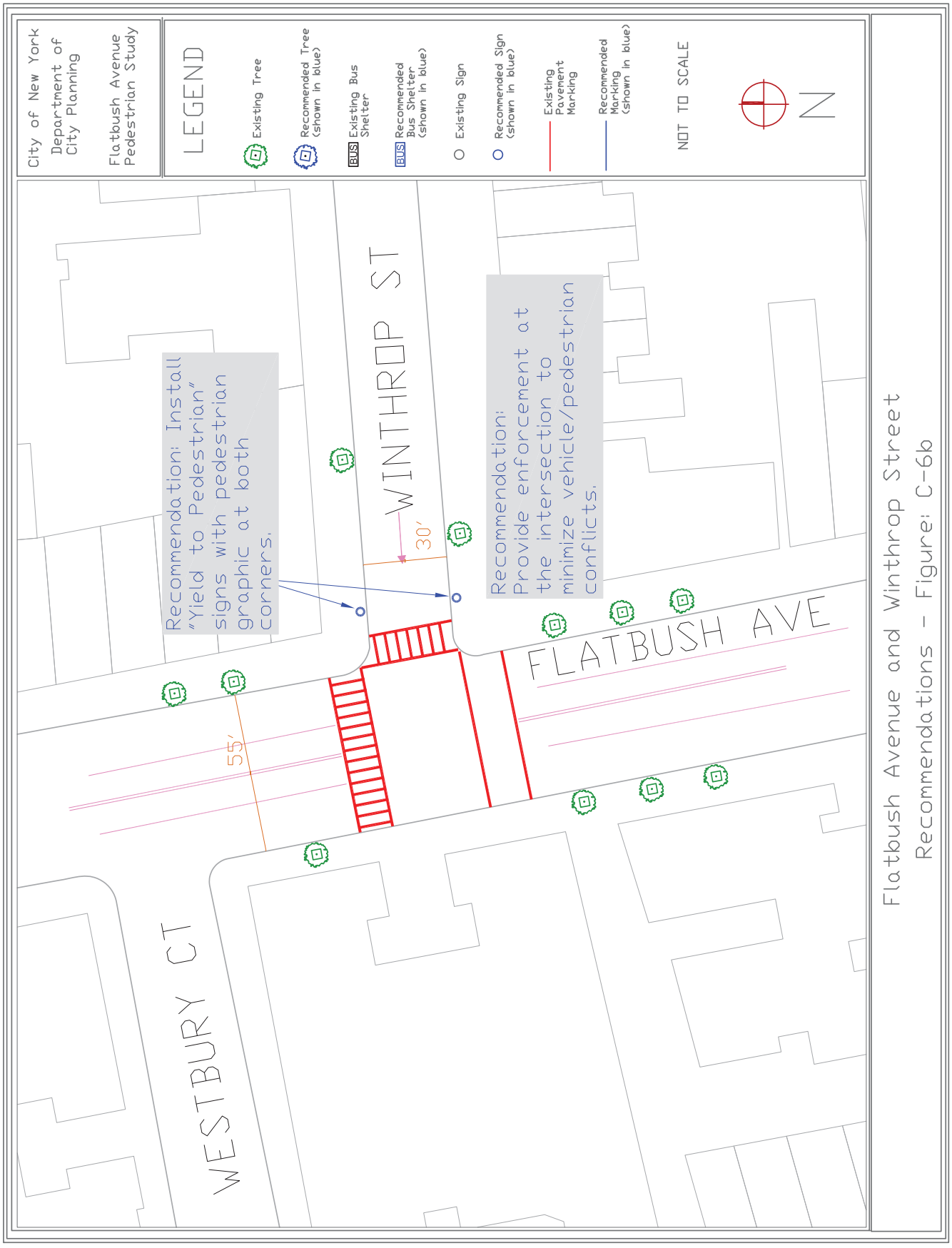
- Pedestrian/ Vehicle Conflicts
  Similar to other intersections there are often conflicts with vehicles making a turn and pedestrians crossing with the green light. The pedestrian accident data from 2004 to 2006 revealed that all pedestrians (5 pedestrians) were injured at this intersection during vehicular turning movements from Winthrop Street as pedestrians were crossing with the signal.

Recommendations

- Reduce Conflicts
  It is recommended to install at the northeast and southeast corners of the intersection "Attention Drivers Yield to Pedestrians" signs (with graphics – See Appendix D-2) to get motorists to slow down and stop for pedestrians and also to be more aware of the presence of pedestrians at this intersection.

- Increase Enforcement
  An increase in police presence on Flatbush Avenue is recommended to enforce observance of the New York State law which requires vehicles to yield to pedestrians legally using a marked crosswalk.


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
BUS Existing Bus Shelter
Existing Sign
Existing Pavement Marking
NOT TO SCALE
N
WINTHROP ST
FLATBUSH AVE
WESTBURY CT
30'
55'
Issues:
Traffic from Winthrop St make turns onto Flatbush Ave where conflicts occur between vehicles and pedestrians.
Observation:
Location has light pedestrian volumes
Flatbush Avenue and Winthrop Street
Existing Conditions - Figure: C-6a


City of New York
Department of City Planning
Flatbush Avenue Pedestrian Study
LEGEND
Existing Tree
Recommended Tree (shown in blue)
Existing Bus Shelter
Recommended Bus Shelter (shown in blue)
Existing Sign
Recommended Sign (shown in blue)
Existing Pavement Marking
Recommended Marking (shown in blue)
NOT TO SCALE
N
WINTHROP ST
FLATBUSH AVE
WESTBURY CT
30'
55'
Recommendation: Install "Yield to Pedestrian" signs with pedestrian graphic at both corners.
Recommendation: Provide enforcement at the intersection to minimize vehicle/pedestrian conflicts.
Flatbush Avenue and Winthrop Street
Recommendations - Figure: C-6b

Location: Flatbush Avenue and Parkside Avenue

Intersection of Flatbush Avenue and Parkside Avenue

Description of Existing Conditions

At this location Flatbush Avenue has a width of 55 ft with two travel lanes in each direction of traffic. The sidewalks along this major street are 13 – 14 ft wide.

Parkside Avenue to the west of Flatbush Avenue is 50 ft wide and has two-way vehicular traffic. The sidewalks are 18-19 ft wide. To the east of Flatbush Avenue this street is 30 ft wide with one-way traffic (eastbound). The width of the sidewalks range from 14 – 15 ft.

A significant volume of vehicles travel through the area and many of them make turning movements at this location. In addition there are "School Advance Warning" signs at the northwest and northeast corners (fluorescent yellow/green signs) warning motorists to yield to school children.

Pedestrian Accident Data 2004 -2006

11 Pedestrian Accidents

Table: C-19 – Summary of Pedestrian Accidents

Accident Location	Year	Time	Pedestrian Action	Pedestrian Location	Vehicle Action
Parkside Ave	4/12/2004	not reported	not reported	at intersection	not reported
Parkside Ave	9/15/2004	night, rain	crossing with signal	at intersection	making a left turn
Parkside Ave	9/14/2004	daylight	other actions in road	at intersection	Going straight ahead
Parkside Ave	2/6/2005	daylight	crossing with signal	at intersection	not reported
Parkside Ave	4/18/2005	daylight	crossing with signal	at intersection	Going straight ahead
Parkside Ave	11/9/2005	night, rain	crossing- no signal; no crosswalks	at intersection	Going straight ahead
Parkside Ave (2 peds injured)	6/6/2006	daylight	crossing with signal	at intersection	making a left turn
Parkside Ave	11/10/2006	daylight	playing in roadway	at intersection	not reported
Parkside Ave	9/4/2006	daylight	crossing- no signal; no crosswalks	at intersection	not reported
Parkside Ave	8/18/2006	dusk	crossing with signal	at intersection	making a right turn

Problems

- Pedestrian Conflicts with Vehicular Turning Movements
  Turning vehicle movements occur at this intersection and are often in conflict with pedestrians crossing. Based on field observations, motorists do not always yield to pedestrians. The majority of the turns are made by southbound traffic making a turn to go west and eastbound traffic turning to go north.
  The southbound turning movements generate the most conflicts with pedestrians on the west side of the street (west crosswalk) where pedestrian volumes are the highest.

  In addition, 50% of the pedestrian accidents that occurred from 2004 to 2006 at this intersection happened while pedestrians were crossing with the signal.

Pedestrians are often in conflict with vehicles making a turn at the intersection of Flatbush Avenue and Parkside Avenue

- Pavement Conditions
  In general the pavement is in poor condition and covered with potholes which vehicles avoid by slowing down and swerving around them. This can be dangerous for pedestrians since drivers do this without warning and nearly swerve into the path of pedestrians crossing at the intersection.

  The pavement markings have also faded and are in poor condition.

Recommendations

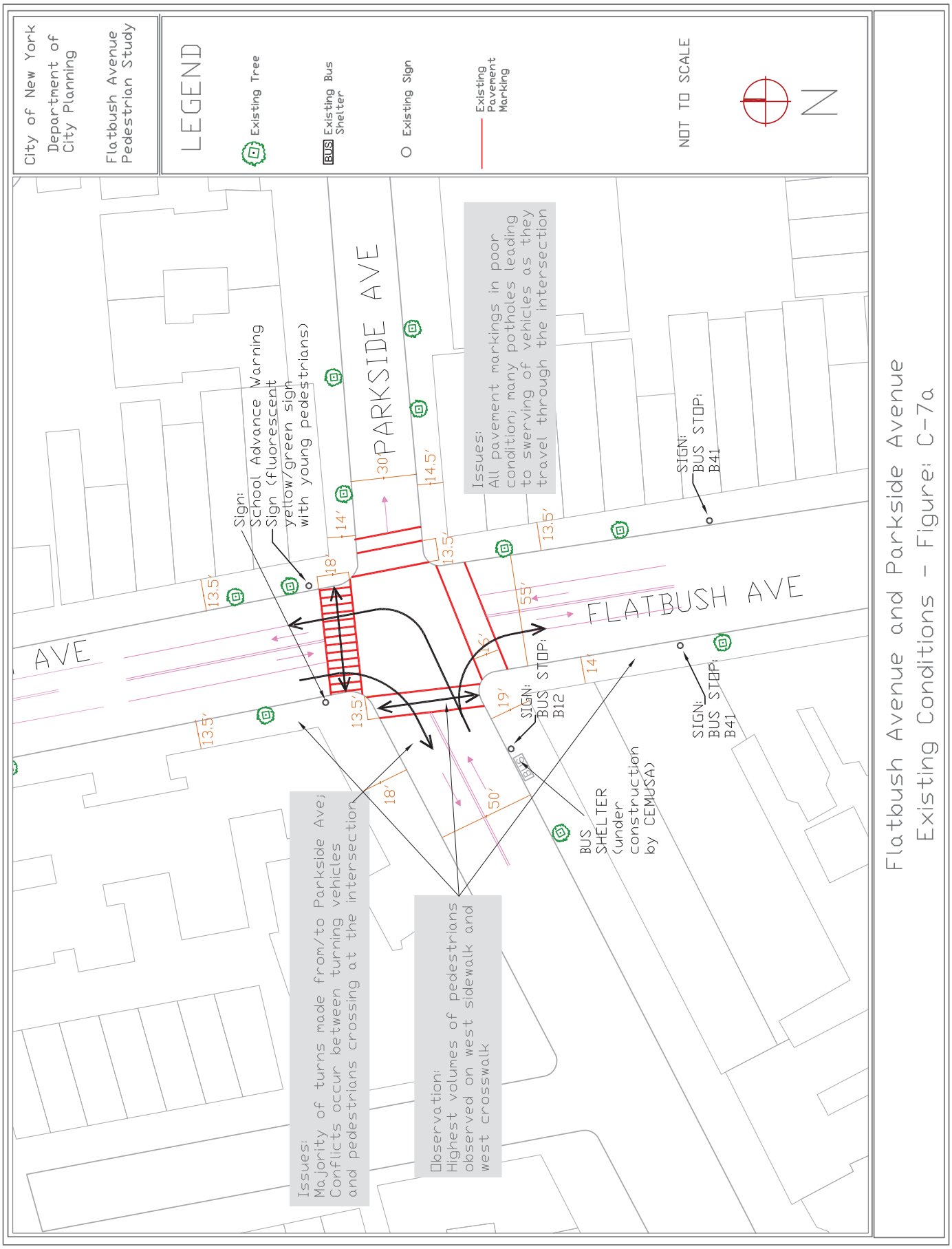
- Increase Enforcement
  Increase police presence is recommended for this location for the enforcement of traffic regulations.

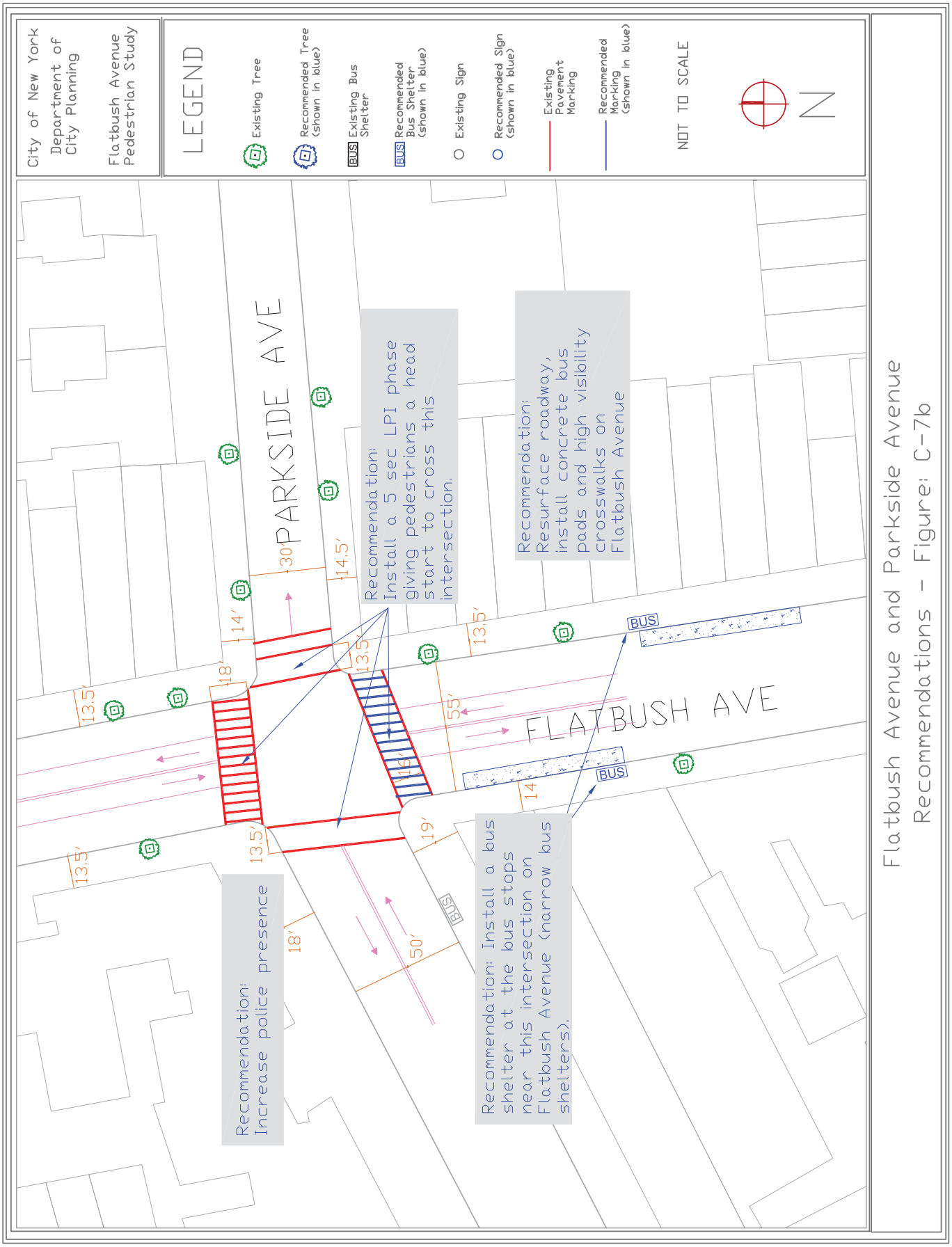
- Improve Pavement Conditions
  Restipe crosswalks with high visibility markings on Flatbush Avenue. Reduce the swerving movement of vehicles by repairing and filling in potholes at this intersection. Additionally, installing concrete bus pads at the bus stops on Flatbush Avenue can help reduce pavement bumps generated by buses pulling in and out of the bus stops.

- Examine feasibility of a Leading Pedestrian Interval (LPI) Phase
  Install a Leading Pedestrian Interval Phase (LPI = 5 seconds) for pedestrians walking on Flatbush Avenue and crossing Parkside Avenue. It will give pedestrians a head start to vehicular traffic and also give them the advantage to be in the crosswalk when southbound and northbound vehicles position themselves to make their turn.

- Additional Signage
  It is recommended to install at all corners of the intersection “Turning Vehicles Yield to Pedestrians” signs to get the attention of motorists making a turn at the intersection.

- Pedestrian Amenities
  Install narrow bus shelters (3.5’ x 14’) on Flatbush Avenue at this location (one on each side of the street) for pedestrians to use as shelter from inclement weather when waiting for the bus.


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
BUS Existing Bus Shelter
Existing Sign
Existing Pavement Marking
NOT TO SCALE
N
PARKSIDE AVE
FLATBUSH AVE
AVE
Sign:
School Advance Warning
Sign (fluorescent
yellow/green sign
with young pedestrians)
Issues:
All pavement markings in poor
condition; many potholes leading
to swerving of vehicles as they
travel through the intersection
SIGN:
BUS STOP:
B41
SIGN:
BUS STOP:
B12
BUS
SHELTER
(under
construction
by CEMUSA)
Issues:
Majority of turns made from/to Parkside Ave;
Conflicts occur between turning vehicles
and pedestrians crossing at the intersection
Observation:
Highest volumes of pedestrians
observed on west sidewalk and
west crosswalk
30
14.5'
14'
18'
13.5'
55'
19'
50'
14
Flatbush Avenue and Parkside Avenue
Existing Conditions - Figure: C-7a


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
Recommended Tree (shown in blue)
Existing Bus Shelter
Recommended Bus Shelter (shown in blue)
Existing Sign
Recommended Sign (shown in blue)
Existing Pavement Marking
Recommended Marking (shown in blue)
NOT TO SCALE
N
PARKSIDE AVE
FLATBUSH AVE
BUS
Recommendation: Install a 5 sec LPI phase giving pedestrians a head start to cross this intersection.
Recommendation: Resurface roadway, install concrete bus pads and high visibility crosswalks on Flatbush Avenue
Recommendation: Increase police presence
Recommendation: Install a bus shelter at the bus stops near this intersection on Flatbush Avenue (narrow bus shelters).
Flatbush Avenue and Parkside Avenue
Recommendations - Figure: C-7b

Location: Flatbush Avenue and Martense Street

Intersection of Flatbush Avenue and Martense Street

Description of Existing Conditions

The intersection of Flatbush Avenue and Martense Street is a T-shaped intersection.

Flatbush Avenue is 55ft wide with two travel lanes in each direction of traffic.

Martense Street has a width of 35 ft with two-way vehicular traffic.

Vehicle volumes on Flatbush Avenue at this intersection are moderate but heavy at times. Traffic volumes on Martense Street are much lighter. Pedestrian volumes are light at this location.

Pedestrian Accident Data 2004 -2006

6 Pedestrian Accidents

Table: C-20 – Summary of Pedestrian Accidents

Accident Location	Year	Time	Pedestrian Action	Pedestrian Location	Vehicle Action
Martense St	10/7/2004	daylight	crossing with signal	at intersection	not reported
Martense St	11/17/2004	daylight	crossing with signal	at intersection	making a left turn
Martense St	2/27/2005	daylight	crossing with signal	at intersection	making a left turn
Martense St	3/9/2005	night; snow, ice	crossing with signal	at intersection	making a right turn
Martense St	6/2/2005	daylight	crossing with signal	at intersection	going straight ahead
Martense St	11/12/2005	daylight	crossing with signal	at intersection	not reported

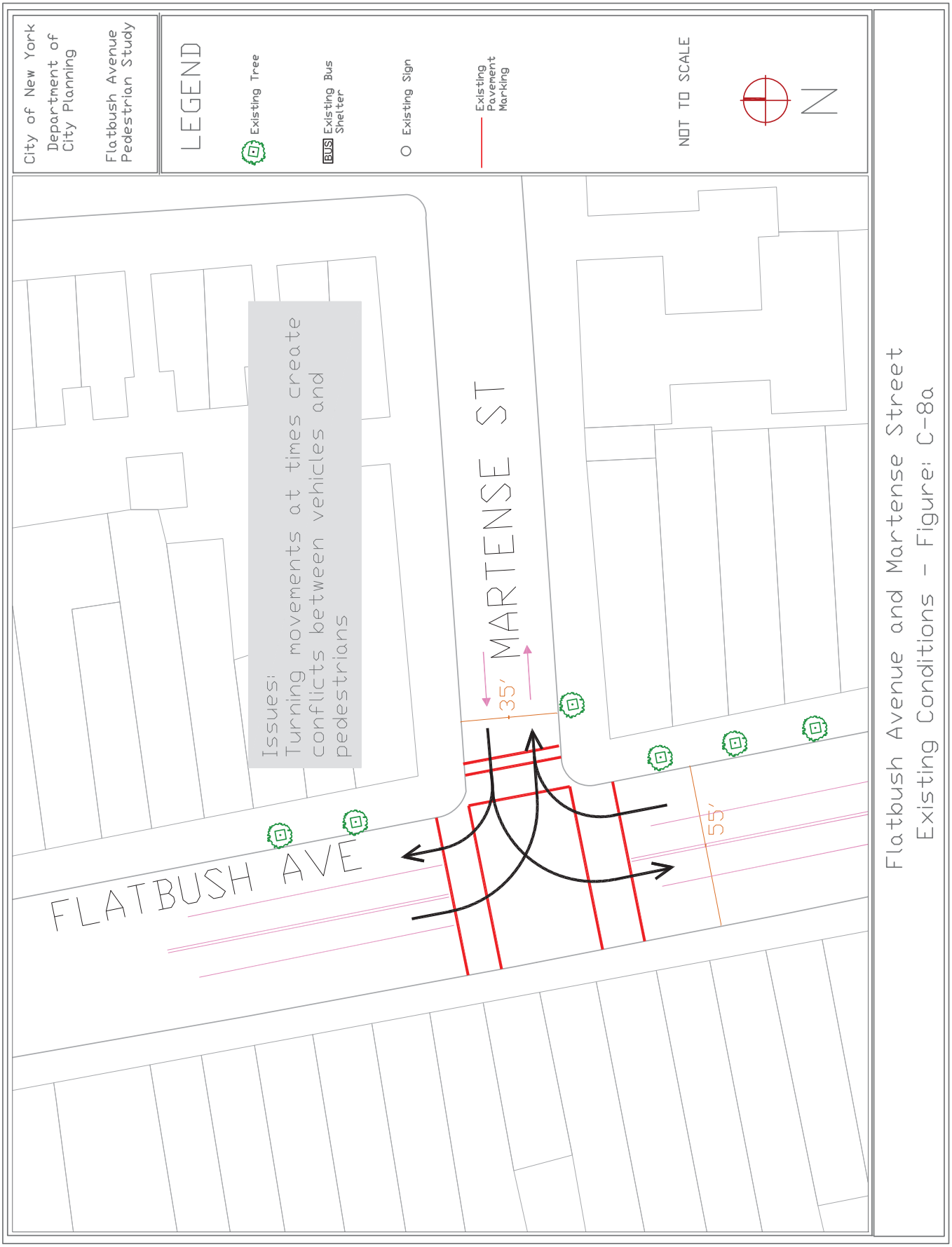
Problems and Opportunities

- Pedestrian/ Vehicle Conflicts
  The situation at this intersection is similar to other intersections where conflicts occur with vehicles making turns and pedestrians crossing with the green light. Based on the pedestrian accident data from 2004 to 2006, six pedestrians were injured at the intersection as they were crossing with the traffic signal which indicates that the motorists involved in the accidents most likely did not yield to pedestrians at the intersection.

Recommendations

- New Signage
  It is recommended to install at all corners of the intersection "Attention Drivers Yield to Pedestrians" signs (with graphics - see Appendix D-2) to get motorists to yield for crossing pedestrians and also to be more aware of the presence of pedestrians at this intersection.

- Increase Enforcement
  An increase in police presence on Flatbush Avenue is recommended to enforce observance of the New York State law which requires vehicles to yield to pedestrians legally using a marked crosswalk.


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
BUS Existing Bus Shelter
Existing Sign
Existing Pavement Marking
NOT TO SCALE
N
Issues:
Turning movements at times create conflicts between vehicles and pedestrians
MARTENSE ST
FLATBUSH AVE
35'
55'
Flatbush Avenue and Martense Street
Existing Conditions - Figure: C-8a


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
Recommended Tree
(shown in blue)
Existing Bus
Shelter
Recommended
Bus Shelter
(shown in blue)
Existing Sign
Recommended Sign
(shown in blue)
Existing
Pavement
Marking
Recommended
Marking
(shown in blue)
NOT TO SCALE
N
Recommendation: Install
"Yield to Pedestrian"
signs with pedestrian
graphic at corners.
MARTENSE ST
35'
Recomendation:
Provide enforcement at
the intersection to
minimize vehicle/pedestrian
conflicts.
55'
FLATBUSH AVE
Flatbush Avenue and Martense Street
Recommendations - Figure: C-8b

Location: Flatbush Avenue and Cortelyou Road

Intersection of Flatbush Avenue and Cortelyou Road

Description of Existing Conditions

Flatbush Avenue has a width close to 55 ft near this intersection with two travel lanes and a parking lane in each direction of traffic. The sidewalks along this street are 13 to 15 ft wide.

Cortelyou Road is a two-way street to the west of Flatbush Avenue and has a width of 45 ft while it is a one-way street (eastbound) to the east of Flatbush Avenue with a width of 30 ft. The sidewalks are 18 ft wide along the two-way section of Cortelyou Road and 9-10ft wide along the one-way section.

The streets at this intersection have moderate vehicular volumes which can be heavy at times. Pedestrian volumes are in general moderate along Flatbush Avenue and lighter on Cortelyou Road.

Near this intersection there are two potential projects to be undertaken by EDC in the future that may affect transportation in the area. They are:

1) The Sears parking lot two blocks north near Tilden Avenue is a public/private partnership project, where an agreement has been made that the city would lease this parcel out to a parking operator. The site is under a lease until 2035, however the current agreement would allow the city to build a parking garage on the site, at any time, in the future.

2) The Lowes Theater along Flatbush Avenue between Beverly and Cortelyou Rd, is expected to be renovated in the next 5-10 years. EDC will be issuing shortly an RFP to renovate the theater. They are also allowing developers to pursue the option of expanding the theater, and thus closing off 22nd street between Tilden Avenue and Duryea Place. This would allow the Lowes Theater to become a venue for live music and other entertainment events. This may also require the construction of a parking garage. EDC expects to have proposals submitted by spring 2008.

Lowes Theater on Flatbush Avenue between Beverly and Cortelyou Road to be renovated

Pedestrian Accident Data 2004 -2006
8 Pedestrian Accidents

Table: C-21 – Summary of Pedestrian Accidents

Accident Location	Year	Time	Pedestrian Action	Pedestrian Location	Vehicle Action
Cortelyou Rd	12/10/2004	dawn, rain	not reported	at intersection	making a left turn
Cortelyou Rd	12/14/2004	night	crossing- no signal; no crosswalks	at intersection	making a left turn
Cortelyou Rd	5/17/2005	night	along highway with traffic	at intersection	backing
Cortelyou Rd	11/28/2006	daylight	crossing with signal	at intersection	backing
Cortelyou Rd (3 peds injured)	5/10/2006	daylight	crossing with signal	at intersection	going straight ahead
Cortelyou Rd	2/21/2006	daylight	not reported	at intersection	going straight ahead

Problems

- Pedestrian/ Vehicle Conflicts
  Conflicts occur with vehicles making turns at the intersection and pedestrians crossing with the green light. Motorists do not always yield to pedestrians crossing at this location. Vehicles from Cortelyou Road in general turn onto Flatbush Avenue.

- Illegal Crossing by Pedestrians
  Many pedestrians using the east crosswalk often do not wait for the green light when crossing at this location. When there is a gap in traffic on Cortelyou Road pedestrians often take a chance and cross the one-way segment of Cortelyou Rd even though the light is red for pedestrians.

Pedestrians often cross Cortelyou Road east of Flatbush Avenue on red.

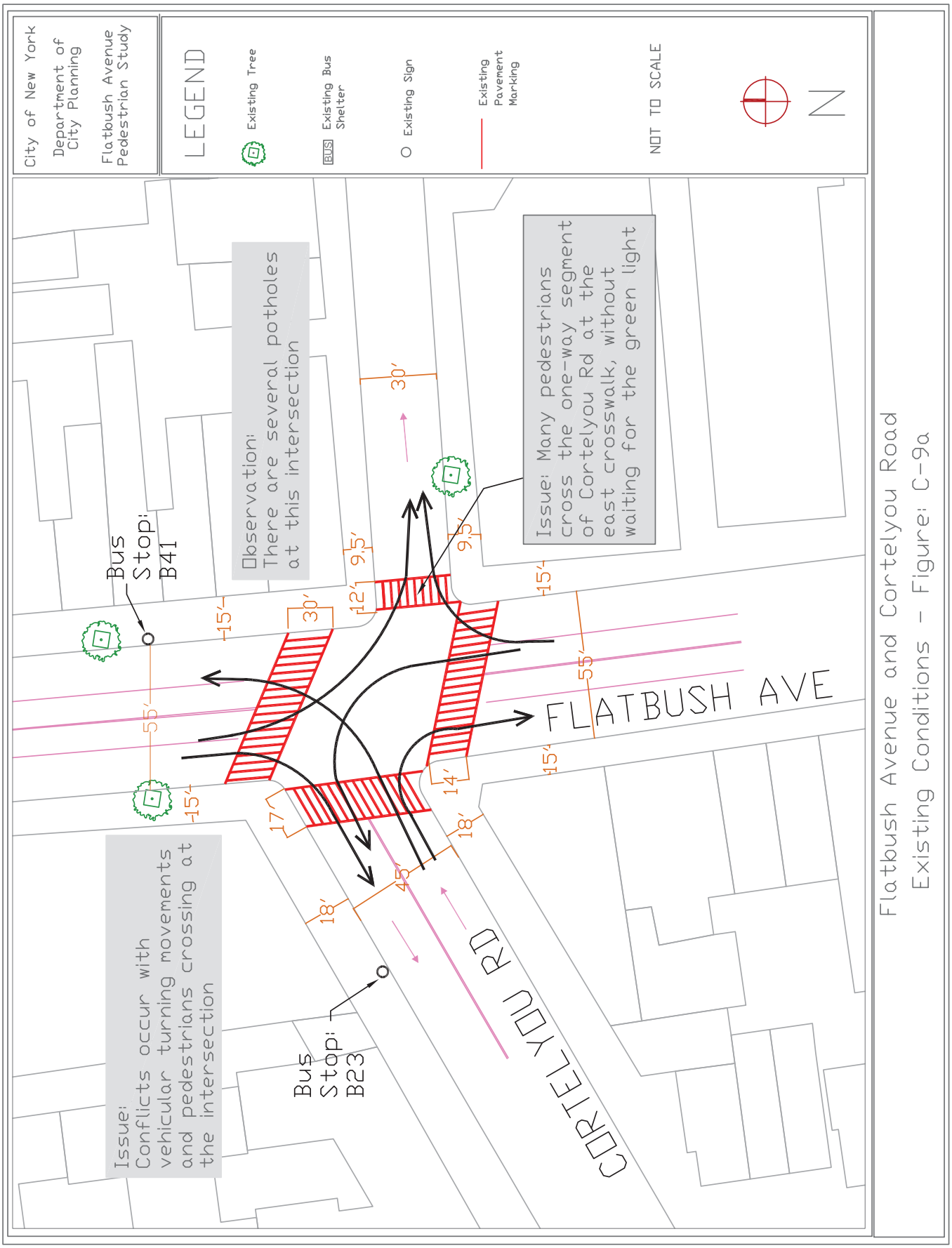
- Pavement Conditions
  Drivers tried to avoid potholes at this intersection by swerving around them as they traveled through the intersection. This can be an unsafe situation for pedestrians because drivers can swerve into the path of pedestrians crossing at the time.

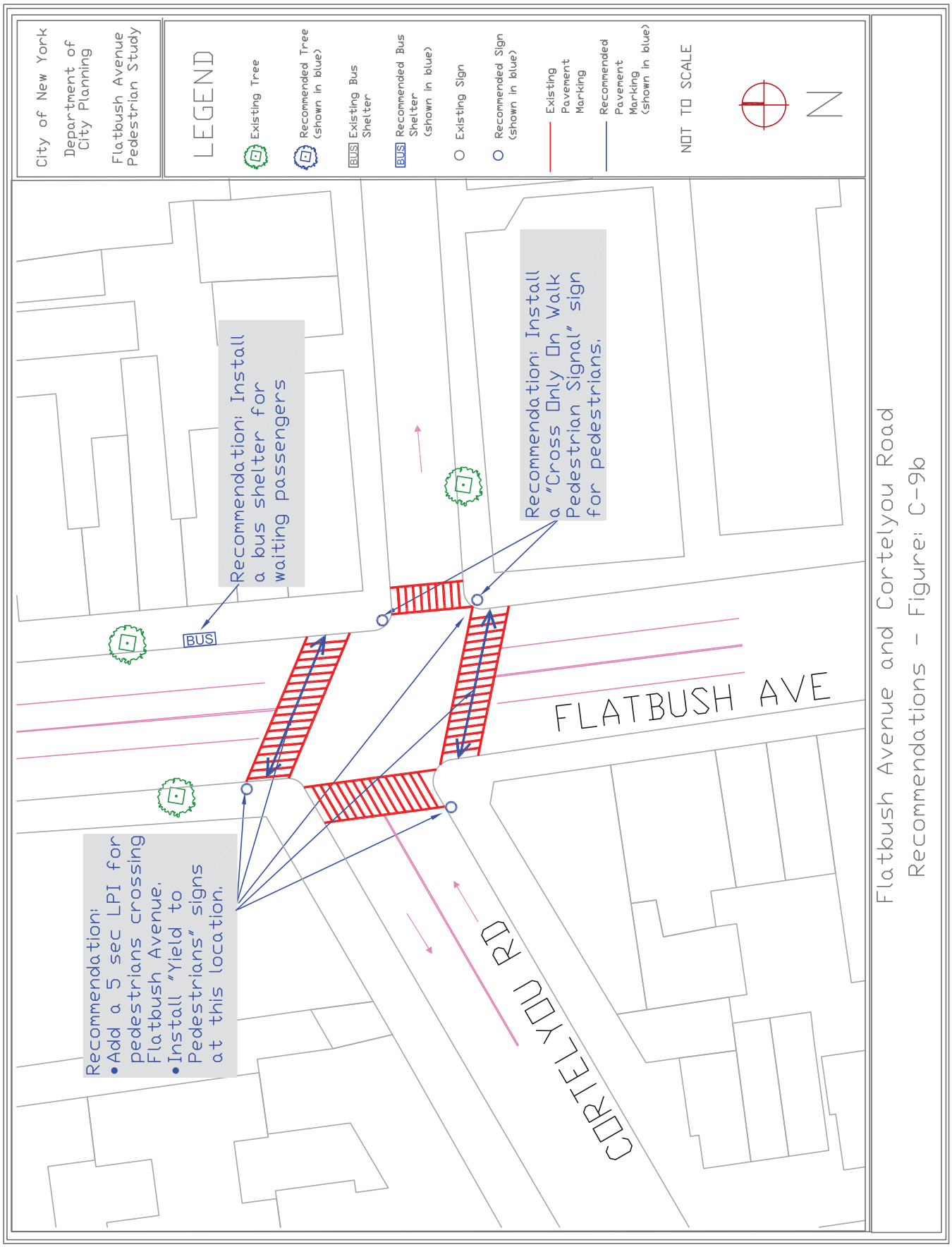
Recommendations

- Install a Leading Pedestrian Interval (LPI)
  For pedestrians crossing Flatbush Avenue it is recommended to install a Leading Pedestrian Interval Phase (LPI = 5 seconds). It provides pedestrians with a head start before the vehicular green phase starts and allows them to clear the intersection much quicker in order to allow vehicles to make their turns with fewer conflicts. At the same time pedestrians are more visible to motorists who are more likely to yield to pedestrians.

- Signage
  As a recommendation signage can be used to increase traffic safety at the intersection. Install a "Cross on Green Light Only" sign (MUTCD, R10-1 sign; see Appendix D-2: Standards for Signs Recommended) at the east crosswalk. This encourages pedestrians to wait for the green light when crossing at this location. Also install signs oriented towards motorists at this intersection at the corners requesting "Turning Vehicles to Yield to Pedestrians".

- Improve Pavement Conditions
  Repair the roadway at this intersection and fill in the potholes as a recommendation in order to reduce the swerving movement of vehicles as they travel through the intersection.


City of New York
Department of City Planning
Flatbush Avenue Pedestrian Study
LEGEND
Existing Tree
Existing Bus Shelter
Existing Sign
Existing Pavement Marking
NOT TO SCALE
N
Bus Stop: B41
Observation: There are several potholes at this intersection
Issue: Many pedestrians cross the one-way segment of Cortelyou Rd at the east crosswalk, without waiting for the green light
Issue: Conflicts occur with vehicular turning movements and pedestrians crossing at the intersection
Bus Stop: B23
FLATBUSH AVE
CORTELYOU RD
30'
9.5'
12'
15'
55'
17'
14'
18'
45'
Flatbush Avenue and Cortelyou Road
Existing Conditions - Figure: C-9a


City of New York
Department of City Planning
Flatbush Avenue Pedestrian Study
LEGEND
Existing Tree
Recommended Tree (shown in blue)
Existing Bus Shelter
Recommended Bus Shelter (shown in blue)
Existing Sign
Recommended Sign (shown in blue)
Existing Pavement Marking
Recommended Pavement Marking (shown in blue)
NOT TO SCALE
N
Recommendation: Install a bus shelter for waiting passengers
Recommendation: Install a "Cross Only On Walk Pedestrian Signal" sign for pedestrians.
Recommendation:
• Add a 5 sec LPI for pedestrians crossing Flatbush Avenue.
• Install "Yield to Pedestrians" signs at this location.
BUS
FLATBUSH AVE
CORTELYOU RD
Flatbush Avenue and Cortelyou Road
Recommendations - Figure: C-9b

Location: Flatbush Avenue and Clarendon Road /Dorchester Road

Intersection of Flatbush Avenue and Clarendon Road/Dorchester Road

Description of Existing Conditions

Flatbush Avenue is 55 ft wide approximately at this location, has two travel lanes and a parking lane in each direction of traffic. The sidewalks along this street are 14 – 15 ft wide.

Clarendon Road a two-way street to the east of Flatbush Avenue, is 52 ft wide while Dorchester Road a one-way street on the west side of Flatbush Avenue is 35 ft wide with traffic calming markings placed between the travel lanes and the parking lane. The sidewalks on Clarendon and Dorchester Roads are wide for this area of Brooklyn with dimensions of 22 – 23 ft.

Vehicle volumes on Flatbush Avenue at this intersection can get heavy at times. The intersecting streets have moderate vehicle volumes which can be light at times. Pedestrian volumes are light in general in this area.

Two signs near the "Stop bar" at the intersection inform pedestrians not to cross at that particular location: "No Ped Crossing Use Crosswalks".

Pedestrian Accident Data 2004 -2006

5 Pedestrian Accidents

Table: C-22 – Summary of Pedestrian Accidents

Accident Location	Year	Time	Pedestrian Action	Pedestrian Location	Vehicle Action
Clarendon Rd	7/31/2004	daylight	going north	at intersection	going straight ahead
Clarendon Rd	5/21/2005	daylight, rain	crossing against signal	at intersection	going straight ahead
Clarendon Rd	5/1/2005	daylight, rain	crossing against signal	at intersection	going straight ahead
Clarendon Rd	3/21/2005	daylight	crossing with signal	at intersection	going straight ahead
Clarendon Rd	1/3/2006	daylight, rain	crossing with signal	at intersection	making a left turn

Problems

- Pedestrians Crossing at "Stop Bar" locations
  Clarendon Road to the east of Flatbush Avenue changes to Dorchester Road west of Flatbush Avenue. These two streets or segments do not align and in between the two segments stop bars are placed to stop vehicles as they arrive at the intersection. However pedestrians cross Flatbush Avenue at that particular spot when the light turns green which creates a dangerous and unsafe situation for pedestrians. Drivers going westbound on Clarendon Road and continuing onto Dorchester Road do not expect pedestrians to be crossing at that location especially when a right turn is permitted on red at Dorchester Road. There are signs to inform pedestrians not to cross at that particular location: "No Ped Crossing Use Crosswalks". But these signs are smaller than the existing regulatory signs posted and are often not noticeable to pedestrians arriving at the intersection because of their size and location.

The volume of pedestrians crossing midblock was collected for this location: 83 pedestrians for the AM peak period (7:00 – 9:00AM), 112 pedestrians for the MD peak period (12:00 – 1:00PM), 135 pedestrians for the PM peak period (4:00 – 6:00 PM) and 58 pedestrians for the weekend peak period (1:00 – 3:00 PM).

- Pedestrian Amenities
  The wide sidewalks on Clarendon and Dorchester Roads are empty and have very light pedestrian activity. Space is available on these streets for pedestrian amenities such as trees, planters, etc.

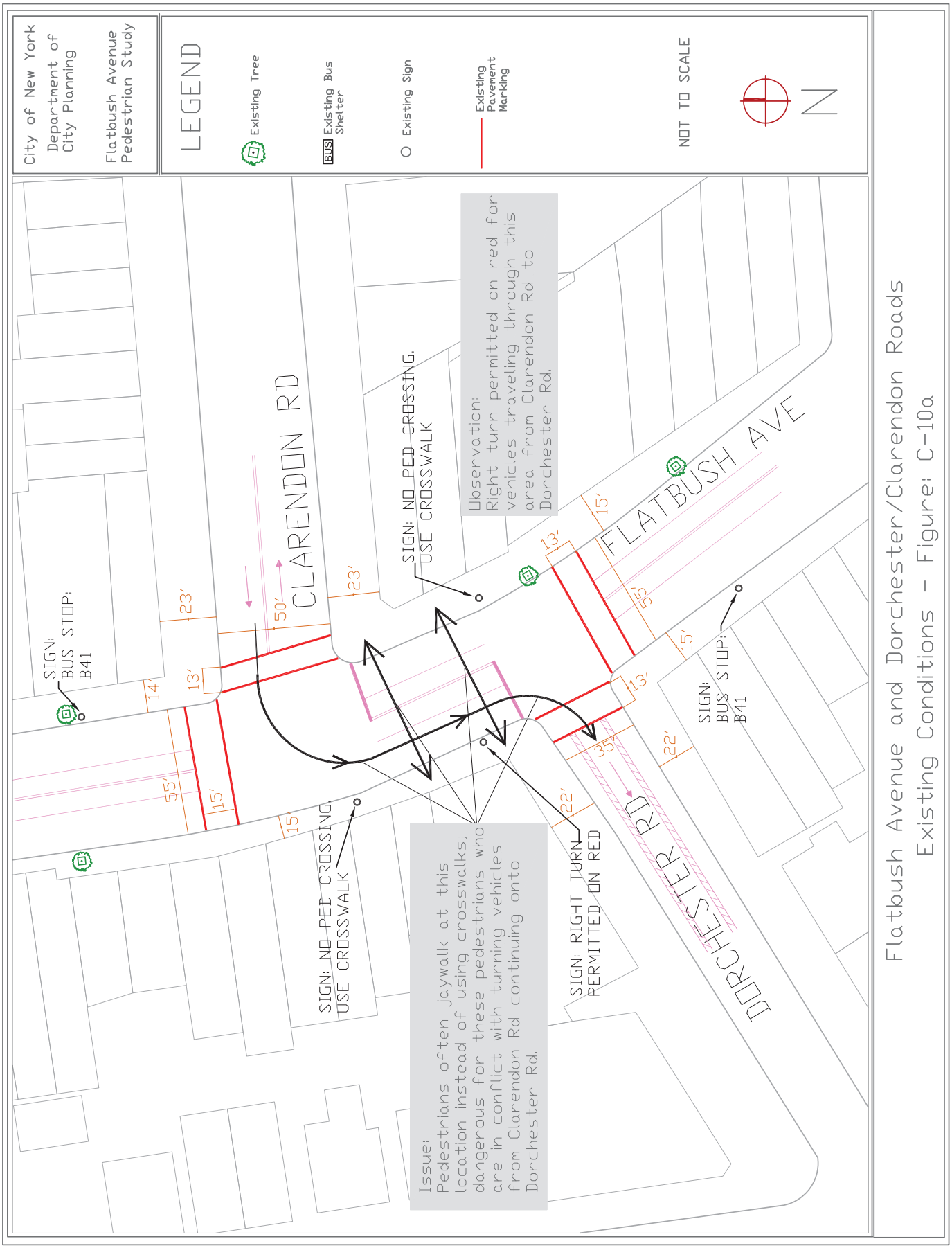
Sidewalks on Clarendon Road are empty with no trees

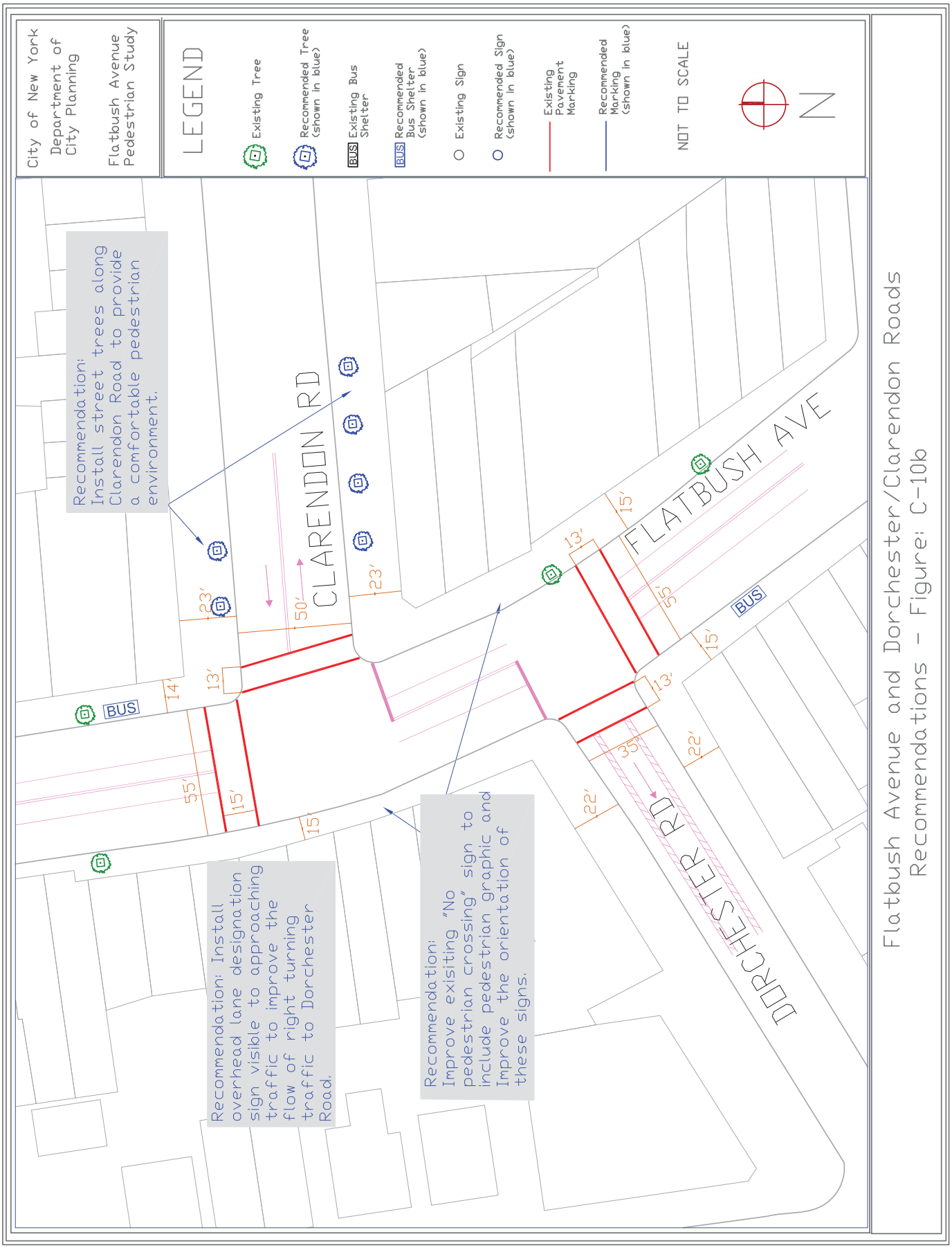
Recommendations

- Improve Signage
  Improve existing signage related to pedestrian crossings. The "No Ped Crossing Use Crosswalks" signs are not easily noticeable to pedestrians based on their placement and orientation. An improvement can be done by having a double-sided sign that faces pedestrian approaches and can be seen from any direction. The existing sign can be reinforced with an additional sign that can be placed adjacent to or above the "No Ped Crossing Use Crosswalks" sign. This new sign should be an image of a pedestrian with a red interdiction symbol over it (MUTCD manual "R9-3a sign"; see Appendix D-2: Standards for Signs Recommended).

  Another recommendation is to have a sign for southbound vehicles on Flatbush Avenue making a right turn on red. This sign would indicate to drivers where to position themselves in the travel lanes at the intersection approach in order to allow an easy flow of right turns on red. An improvement in these right turns can make it safer for pedestrians crossing Dorchester Rd by reducing traffic flow conflicts at this intersection.

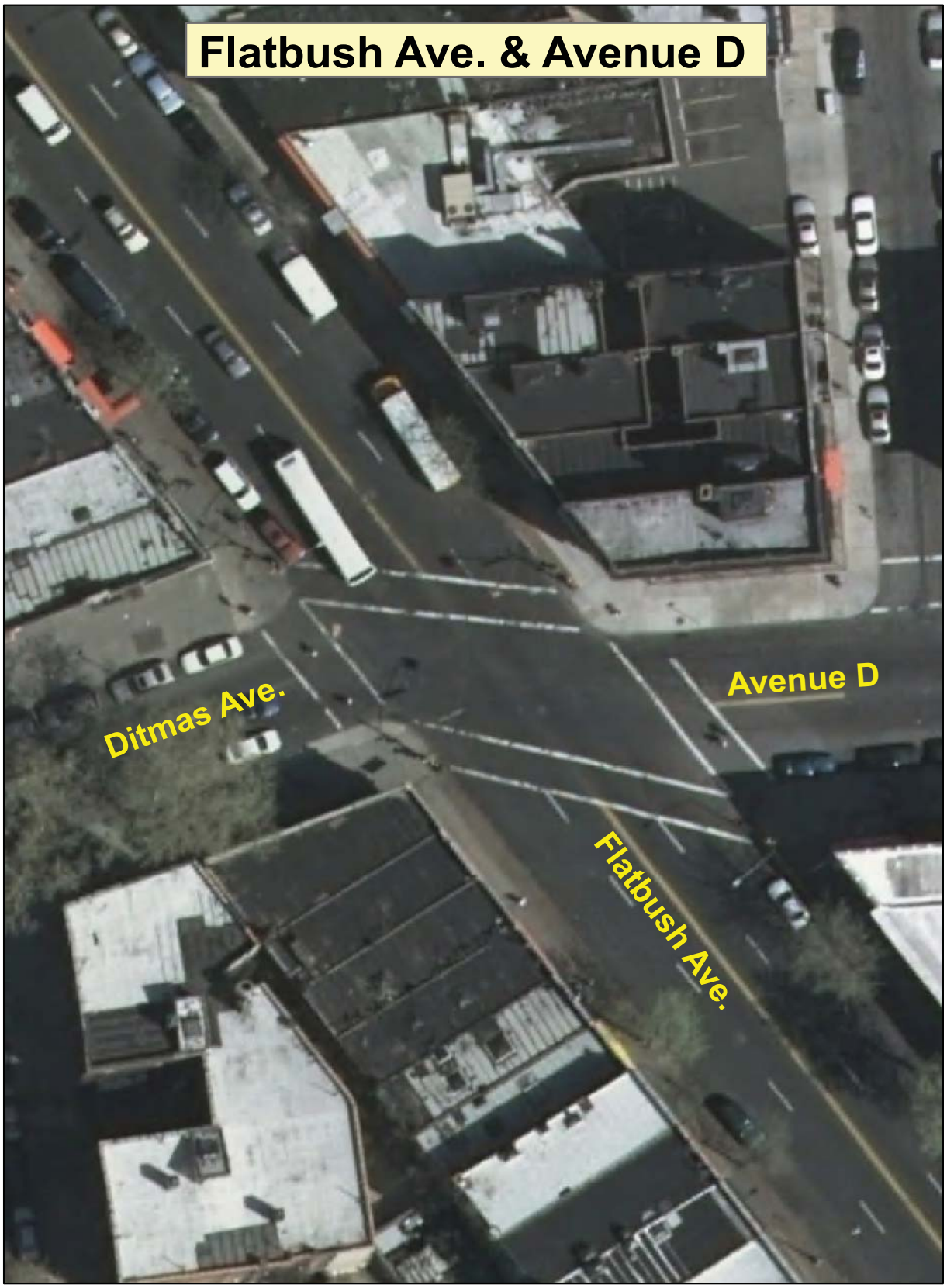
- Streetscape Improvement
  Have trees planted at this location along Clarendon Road according to the standards and minimum distances set by the New York City Department of Parks and Recreation (NYCDPR). Add landscaping or streetscape elements on the sidewalk where possible. Narrow bus shelters are also recommended on Flatbush Avenue at the bus stops for bus passengers.


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
BUS Existing Bus Shelter
Existing Sign
Existing Pavement Marking
NOT TO SCALE
N
CLARENDON RD
FLATBUSH AVE
DORCHESTER RD
SIGN: BUS STOP; B41
SIGN: NO PED CROSSING, USE CROSSWALK
SIGN: NO PED CROSSING, USE CROSSWALK
SIGN: RIGHT TURN PERMITTED ON RED
SIGN: BUS STOP; B41
Observation:
Right turn permitted on red for vehicles traveling through this area from Clarendon Rd to Dorchester Rd.
Issue:
Pedestrians often jaywalk at this location instead of using crosswalks; dangerous for these pedestrians who are in conflict with turning vehicles from Clarendon Rd continuing onto Dorchester Rd.
23'
14'
13'
50'
23'
55'
15'
15'
15'
13'
55'
15'
13'
35'
22'
22'
Flatbush Avenue and Dorchester/Clarendon Roads
Existing Conditions - Figure: C-10a



Flatbush Avenue and Dorchester/Clarendon Roads
Recommendations - Figure: C-10b

Location: Flatbush Avenue and Ditmas Avenue/ Avenue D



Intersection of Flatbush Avenue and Ditmas Avenue/ Avenue D

Description of Existing Conditions

Flatbush Avenue is about 55 ft wide in this part of the study area. It also has two travel lanes and a parking lane in each direction of traffic. The sidewalks along this major street are 14 ft wide.

The intersecting street at this location has two different names: Ditmas Avenue/ Avenue D. Ditmas Avenue is located to the west of Flatbush Avenue with a width of 35 ft and has wide sidewalks, 22 - 23 ft wide. Avenue D is located to the east of Flatbush and is 45 ft wide. The sidewalks are 18 ft wide. These streets are both two-way streets with one travel lane in each direction of traffic.

Based on field observation, significant vehicular volumes exist at this intersection with higher volumes on Flatbush Avenue. Pedestrian volumes at this location are light.

Pedestrian Accident Data 2004 -2006

8 Pedestrian Accidents

Table: C-23 – Summary of Pedestrian Accidents

Accident Location	Year	Time	Pedestrian Action	Pedestrian Location	Vehicle Action
Ave D/ Ditmas Ave	11/21/2004	night	along highway with traffic	at intersection	going straight ahead
Ave D/ Ditmas Ave	3/10/2005	daylight	crossing- no signal; no crosswalks	at intersection	making a right turn
Ave D/ Ditmas Ave	11/29/2005	night, rain	crossing with signal	at intersection	making a left turn
Ave D/ Ditmas Ave (3 peds injured)	2/27/2006	daylight	crossing with signal	at intersection	making a left turn
Ave D/ Ditmas Ave	9/19/2006	daylight	crossing with signal	at intersection	going straight ahead
Ave D/ Ditmas Ave	12/27/2006	night	crossing with signal	at intersection	making a left turn

Problems and Opportunities

- Vehicles and Crosswalks
  The awkward shape of the intersection often has vehicles on Flatbush Avenue waiting for the green light partially in the crosswalk which is at an angle. This creates conflicts between drivers and pedestrians and reduces visibility due to a shorter sight distance at the intersection for the driver.

Vehicles on Flatbush Avenue partially block crosswalk as they wait for the green light

- Long Crosswalk
  Ditmas Avenue and Avenue D do not align at this location. With this geometry, the south crosswalk is at an angle and its length from one corner to the other is greater than the width of the street. This increases the crossing distance for pedestrians using the south crosswalk, especially for the elderly or the handicapped. The south crosswalk is 87 ft long while Flatbush Avenue is approximately 55 ft wide. The signal timing during the day for pedestrians crossing Flatbush Avenue is 42 seconds.

- Pavement Conditions
  This location has several potholes especially on Flatbush Avenue which vehicles avoid by swerving around them. This can be dangerous for pedestrians crossing when drivers do this maneuver without warning and swerve into the path of the pedestrian.

  In addition, the south sidewalk on Ditmas Avenue is in poor condition.

Poor pavement conditions on Flatbush Avenue

Poor sidewalks on Ditmas Avenue

- Pedestrian Amenities
  There are a few trees on Flatbush Avenue. Ditmas Avenue/Avenue D corridor lacks also in trees near this part of Flatbush Avenue.

Recommendations

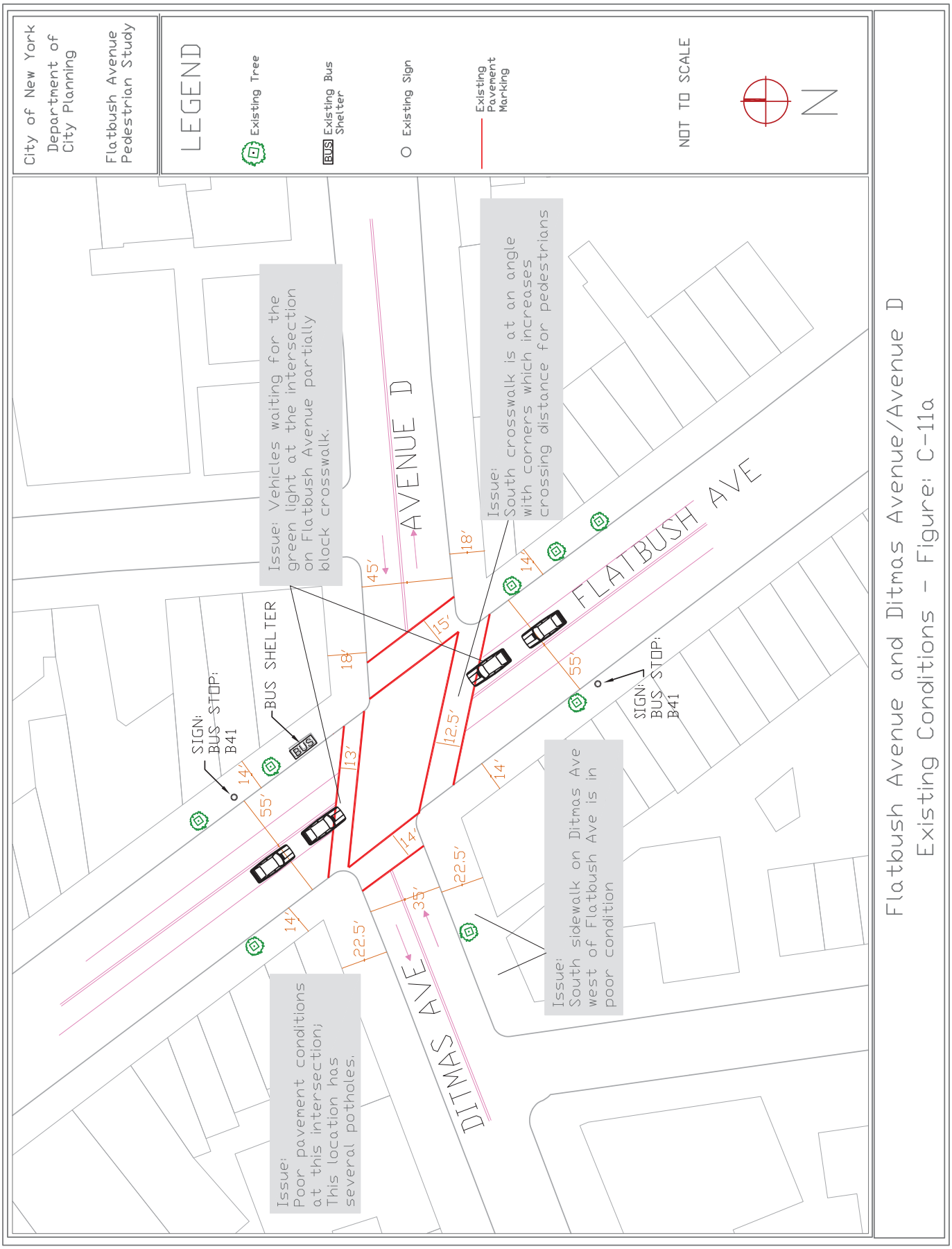
- Install a Stop bar
  It is recommended to install a stop bar or stop line about 15 ft from each crosswalk located on Flatbush Avenue to facilitate eastbound and westbound crossings. This reduces conflicts between pedestrians and motorists, allows them to have a better view of each other at the intersection and improves sight distances for the motorist. It will also make left turning movements easier from Ditmas Avenue/ Avenue D and improve safety for crossing pedestrians.

- Install a Leading Pedestrian Interval (LPI)
  Install a Leading Pedestrian Interval Phase (LPI = 5 seconds) for pedestrians crossing Flatbush Avenue. It provides pedestrians with a head start before vehicles travel through the intersection and reduces conflicts with turning vehicles. Motorists are more likely with this phase to yield to pedestrians.

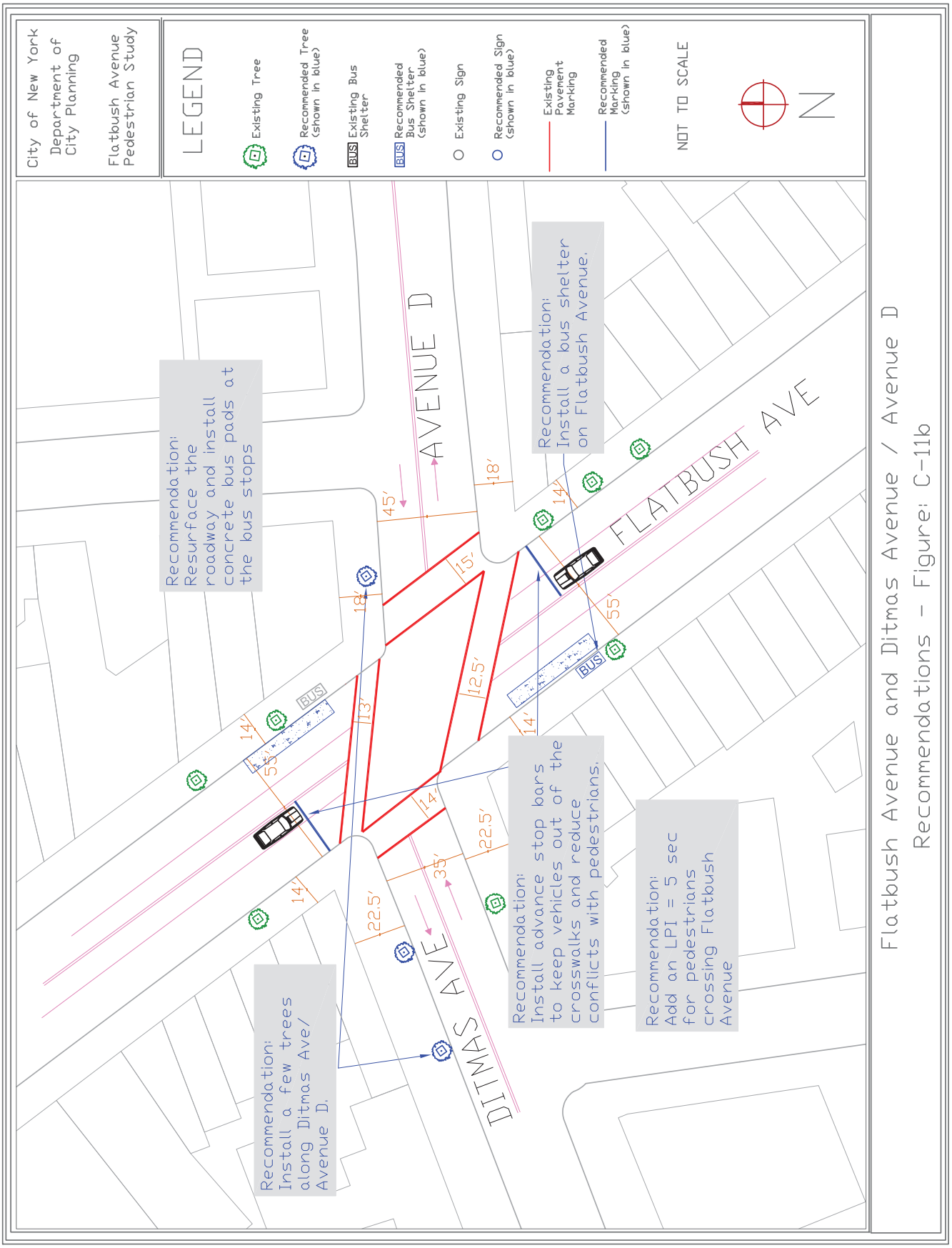
- Repair Pavement and Sidewalk
  Repair and resurface the pavement at this location in order to reduce swerving movements by drivers as they travel through the intersection. The addition of concrete bus pads can help eliminate bumps created by buses coming in and out of the bus stop.

  Rebuild the south sidewalk on Ditmas Avenue as an improvement to the pedestrian's environment.

- Streetscape improvement
  In order to enhance the pedestrian environment install bus shelters at the bus stops based on NYDOT's guidelines and standards for placement of street furniture and plant a few trees where possible and adequate at this location (see Appendix D-3: Standards for Bus Shelters and Appendix D-4: Standards for Trees for more details).



Flatbush Avenue and Ditmas Avenue/Avenue D
Existing Conditions - Figure: C-11a


City of New York
Department of City Planning
Flatbush Avenue Pedestrian Study
LEGEND
Existing Tree
Recommended Tree (shown in blue)
Existing Bus Shelter
Recommended Bus Shelter (shown in blue)
Existing Sign
Recommended Sign (shown in blue)
Existing Pavement Marking
Recommended Marking (shown in blue)
NOT TO SCALE
N
AVENUE D
FLATBUSH AVE
DITMAS AVE
BUS
Recommendation: Resurface the roadway and install concrete bus pads at the bus stops
Recommendation: Install a bus shelter on Flatbush Avenue.
Recommendation: Install advance stop bars to keep vehicles out of the crosswalks and reduce conflicts with pedestrians.
Recommendation: Add an LPI = 5 sec for pedestrians crossing Flatbush Avenue
Recommendation: Install a few trees along Ditmas Ave/ Avenue D.
45'
18'
15'
12.5'
14'
55'
13'
22.5'
35'
Flatbush Avenue and Ditmas Avenue / Avenue D
Recommendations - Figure: C-11b

Location: Flatbush Avenue and Newkirk Avenue

Intersection of Flatbush Avenue and Newkirk Avenue

Description of Existing Conditions

The width of Flatbush Avenue is 55 ft at this location with two travel lanes in each direction of traffic. Newkirk Avenue is a one-way street with a width of 25 ft to the west of Flatbush Avenue and 30 ft to the east of this avenue. Vehicular traffic travels eastbound on this street.

Vehicle volumes on Flatbush Avenue are generally heavy. Newkirk Avenue has moderate vehicle volumes which can be light at times. Pedestrian volumes are moderate to light at this location.

Pedestrian Accident Data 2004 -2006

5 Pedestrian Accidents

Table: C-24 – Summary of Pedestrian Accidents

Accident Location	Year	Time	Pedestrian Action	Pedestrian Location	Vehicle Action
Newkirk Ave	12/17/2004	daylight	crossing with signal	at intersection	going straight ahead
Newkirk Ave	5/11/2005	daylight	crossing- no signal; no crosswalks	at intersection	going straight ahead
Newkirk Ave	6/29/2006	daylight	crossing with signal	at intersection	making a left turn
Newkirk Ave	8/23/2006	daylight	crossing against signal	at intersection	going straight ahead
Newkirk Ave	2/13/2006	daylight, snow/ ice surface	getting on/off vehicle	at intersection	going straight ahead

Problems

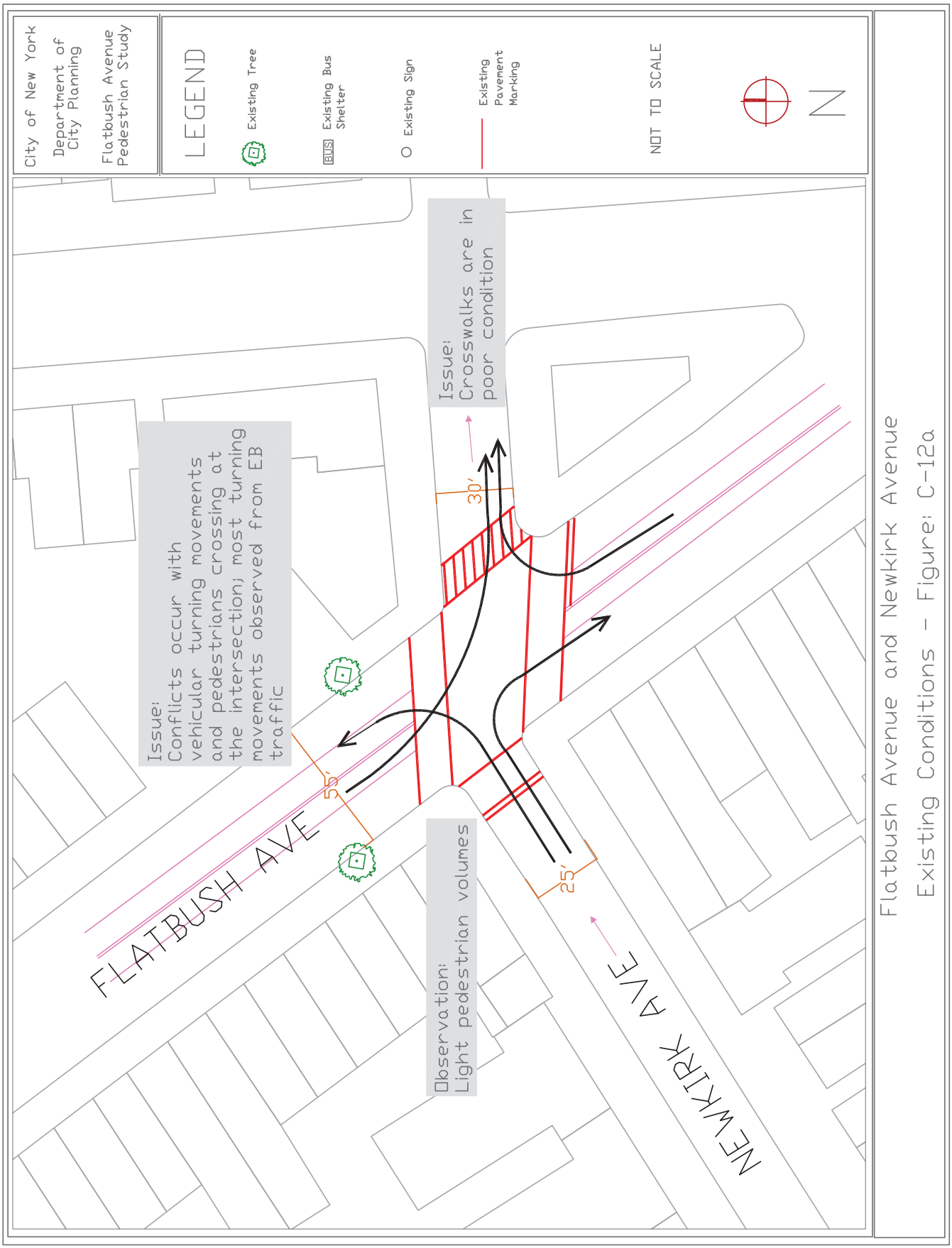
- Pedestrian/ Vehicle Conflicts
  Similar to other intersections in the city there are conflicts with vehicles making a turn and pedestrians crossing with the green light. Most of the turning movements observed at this location was made from Newkirk Avenue onto Flatbush Avenue.

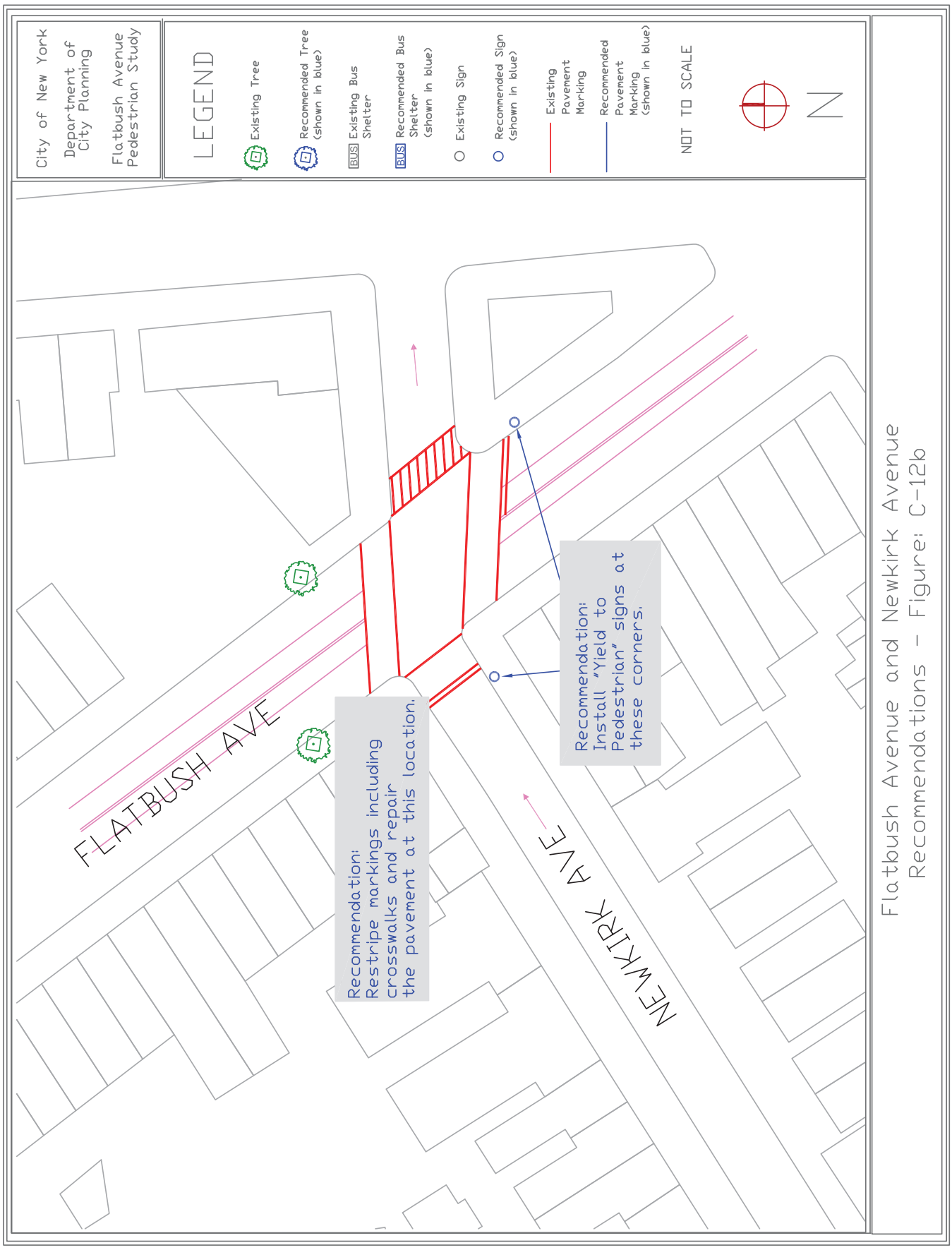
- Pavement Conditions
  The east crosswalk markings along Newkirk Avenue and the pavement at this intersection are in poor condition.

Recommendations

- Additional Signage
  It is recommended to install at the southwest corner at the level of the stop bar a warning sign "Attention Drivers Yield to Pedestrians" for eastbound traffic making a turn onto Flatbush Avenue. Most of the turns are made from Newkirk Avenue and this warning sign can help modify motorists turns and improve safety for pedestrians crossing Flatbush Avenue.

- Improve Pavement Conditions
  Restripe markings at this intersection, particularly the east crosswalk and repave the roadway surface.


City of New York
Department of City Planning
Flatbush Avenue Pedestrian Study
LEGEND
Existing Tree
BUS Existing Bus Shelter
Existing Sign
Existing Pavement Marking
NOT TO SCALE
N
Issue:
Conflicts occur with vehicular turning movements and pedestrians crossing at the intersection; most turning movements observed from EB traffic
Issue:
Crosswalks are in poor condition
Observation:
Light pedestrian volumes
30'
55'
25'
FLATBUSH AVE
NEWKIRK AVE
Flatbush Avenue and Newkirk Avenue
Existing Conditions - Figure: C-12a


City of New York
Department of City Planning
Flatbush Avenue Pedestrian Study
LEGEND
Existing Tree
Recommended Tree (shown in blue)
Existing Bus Shelter
Recommended Bus Shelter (shown in blue)
Existing Sign
Recommended Sign (shown in blue)
Existing Pavement Marking
Recommended Pavement Marking (shown in blue)
NOT TO SCALE
N
FLATBUSH AVE
NEWKIRK AVE
Recommendation: Restripe markings including crosswalks and repair the pavement at this location.
Recommendation: Install "Yield to Pedestrian" signs at these corners.
Flatbush Avenue and Newkirk Avenue
Recommendations - Figure: C-12b

Location: Flatbush Avenue and Glenwood Road

Intersection of Flatbush Avenue and Glenwood Road

Description of Existing Conditions

Flatbush Avenue is about 60 ft wide near Glenwood Road and has two travel lanes and a parking lane in each direction of traffic. The sidewalks along this major arterial are 17 –18 ft wide.

Glenwood Road is segmented and does not align as it intersects Flatbush Avenue. It is a two-way street with one travel lane in each direction of traffic and has a width of 40 ft. The sidewalks on Glenwood Road are 17 -18 ft wide.

Vehicle volumes are observed to be heavy at times in this part of Flatbush Avenue. Glenwood Road has moderate vehicle volumes which can be heavy at times especially during the evening peak hours. In general pedestrian volumes are moderate.

Two signs near the “Stop bar” at the intersection (one at each stop bar location) inform pedestrians not to cross at that particular location: “No Ped Crossing Use Crosswalks”.

Pedestrian Accident Data 2004 -2006
13 Pedestrian Accidents

Table: C-25 – Summary of Pedestrian Accidents

Accident Location	Year	Time	Pedestrian Action	Pedestrian Location	Vehicle Action
Glenwood Rd	9/22/2004	daylight	crossing against signal	at intersection	going straight ahead
Glenwood Rd	10/30/2004	night, wet surface	walking along the road against traffic	at intersection	going straight ahead
Glenwood Rd	10/23/2004	night	crossing with signal	at intersection	making a left turn
Glenwood Rd	12/6/2004	night, rain	crossing with signal	at intersection	making a left turn
Glenwood Rd	2/18/2005	night	not reported	at intersection	going straight ahead
Glenwood Rd	5/7/2005	daylight	other actions in road	at intersection	parked getting out
Glenwood Rd (2 peds injured)	4/15/2006	dusk	crossing with signal	at intersection	first vehicle going straight ahead and other vehicle making a right turn
Glenwood Rd	9/24/2005	daylight	crossing against signal	at intersection	making a left turn
Glenwood Rd	11/8/2006	daylight, rain	crossing against signal	at intersection	making a right turn
Glenwood Rd	12/25/2006	night, rain	crossing with signal	at intersection	making a left turn
Glenwood Rd	12/4/2006	not reported	not reported	at intersection	making a U-turn
Glenwood Rd	9/19/2006	daylight	not in roadway	at intersection	making a right turn

Problems and Opportunities

- Pedestrian Crossing at "Stop Bar" and Midblock locations
  Since Glenwood Road does not align when it intersects Flatbush Avenue, it creates two intersections. In between these intersections two stop bars have been placed on Flatbush Avenue to control vehicles as they approach the intersections. Several pedestrians were observed crossing Flatbush Avenue at the stop bars or midblock when the light turned green for Glenwood traffic. This is an unsafe situation for pedestrians since westbound and eastbound drivers making a turn onto Flatbush Avenue do not expect pedestrians to be crossing midblock or at the stop bars and do not slow down as they make the turn. There are signs to inform pedestrians not to cross at that particular location: "No Ped Crossing Use Crosswalks". But these signs are smaller than the other regulatory signs posted and are not always noticed by pedestrians arriving at the intersection because of their size and location.

  Furthermore this area of Flatbush Avenue is a common transfer point between the B41, B6 and B11. The bus stops are located on Flatbush Avenue and on Glenwood Road near the intersections (see following diagram map of existing conditions). Many pedestrians transferring from one bus to another often cross midblock without using the crosswalks.

  The midblock pedestrian crossing volumes collected for this location are: 28 pedestrians for the AM peak period (7:00 – 9:00 AM), 35 pedestrians for the MD peak period (12:00 – 2:00 PM), 35 pedestrians for the PM peak period (4:00 – 6:00 PM), and 73 pedestrians for the Weekend peak period (1:00 – 3:00 PM).

Pedestrians unsafely cross Flatbush Avenue near Glenwood Road at a stop bar while traffic from Glenwood Road have the green light and turn onto Flatbush Avenue.

- Traffic congestion and delays
  Traffic congestion and delays occur at times on Flatbush Avenue at Glenwood Road and are often caused by double parking in the southbound lanes of trucks and vans loading /unloading merchandise. Several jaywalkers were observed during these delays crossing Flatbush Avenue at midblock locations north and south of Glenwood Road.

- Pavement Conditions
  The pavement in this section of the study area is in poor condition with uneven segments. The north sidewalk of Glenwood Rd (segment south of E 29th Street) is cracked and uneven particularly near Flatbush Avenue.

Recommendations

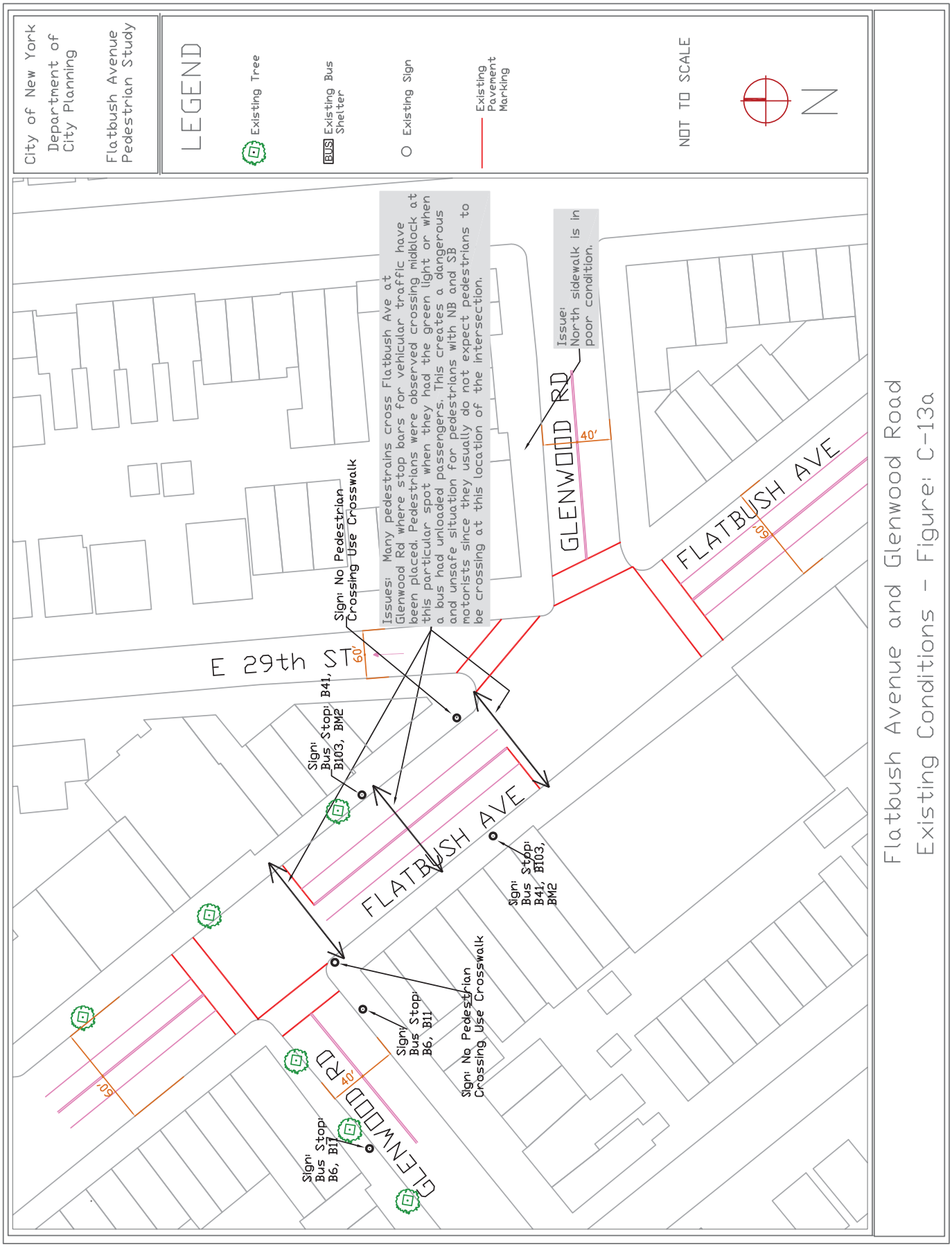
- Improve Pedestrian Crossing
  The existing signs "No Ped Crossing Use Crosswalks" are not very useful based on their placement and orientation. As a recommendation, make each sign a double-sided sign that can be seen from both directions as you approach the midblock location. Have an additional sign put up adjacent to or above the "No Ped Crossing Use Crosswalks" sign. This sign should be an image of a pedestrian with a red interdiction symbol over it (MUTCD manual "R9-3a" sign; see Appendix D-2: Standards for Signs Recommended). It reinforces the first sign and displays graphically that it is prohibited for pedestrians to cross the roadway at an undesirable location where crossing is not designated.

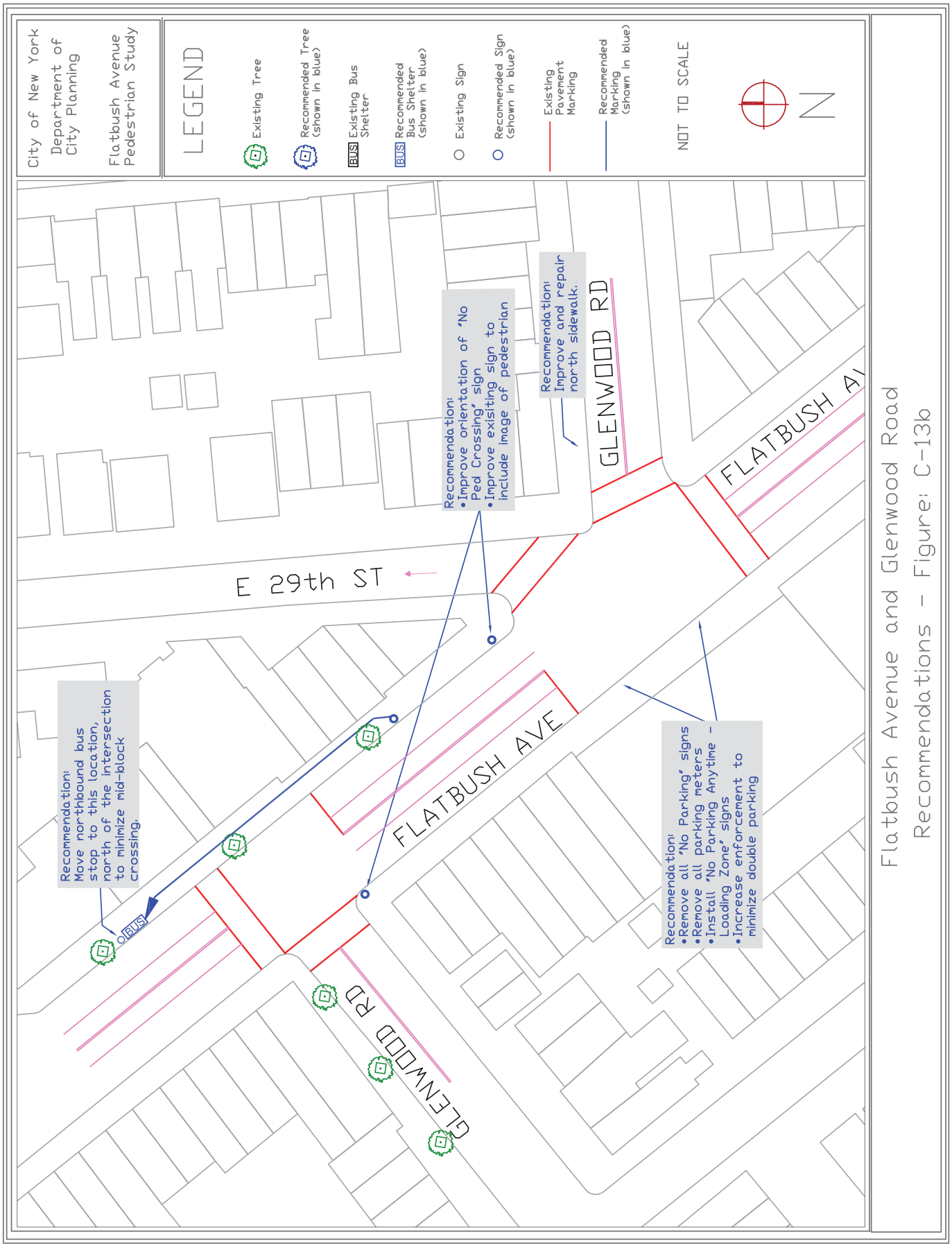
- Bus Stop Relocation
  An additional recommendation is to move the B41 northbound bus stop north of the existing crosswalk with the cooperation of the Metropolitan Transit Authority (MTA). Placing the bus stop at this new location will make it more convenient for bus passengers transferring to/from the B41 bus. The bus stop would be closer to the east - west crosswalk as bus riders cross Flatbush Avenue to transfer from one bus line to the other. Appropriate placement of the bus stop at this intersection is key to pedestrian safety (See following map of recommendations).

- Signage
  As a proposal to minimize double parking on the west side of Flatbush Avenue, loading and unloading zones should be provided for trucks and vans making deliveries to businesses in the area. In return it can discourage pedestrian jaywalking at this location when vehicular traffic delays and gaps are minimized. The loading zone can be provided by removing the "No Parking" signs and metered parking located south of the bus stop and replace them with "No Standing Anytime, except for Deliveries" signs (See following map of recommendations).

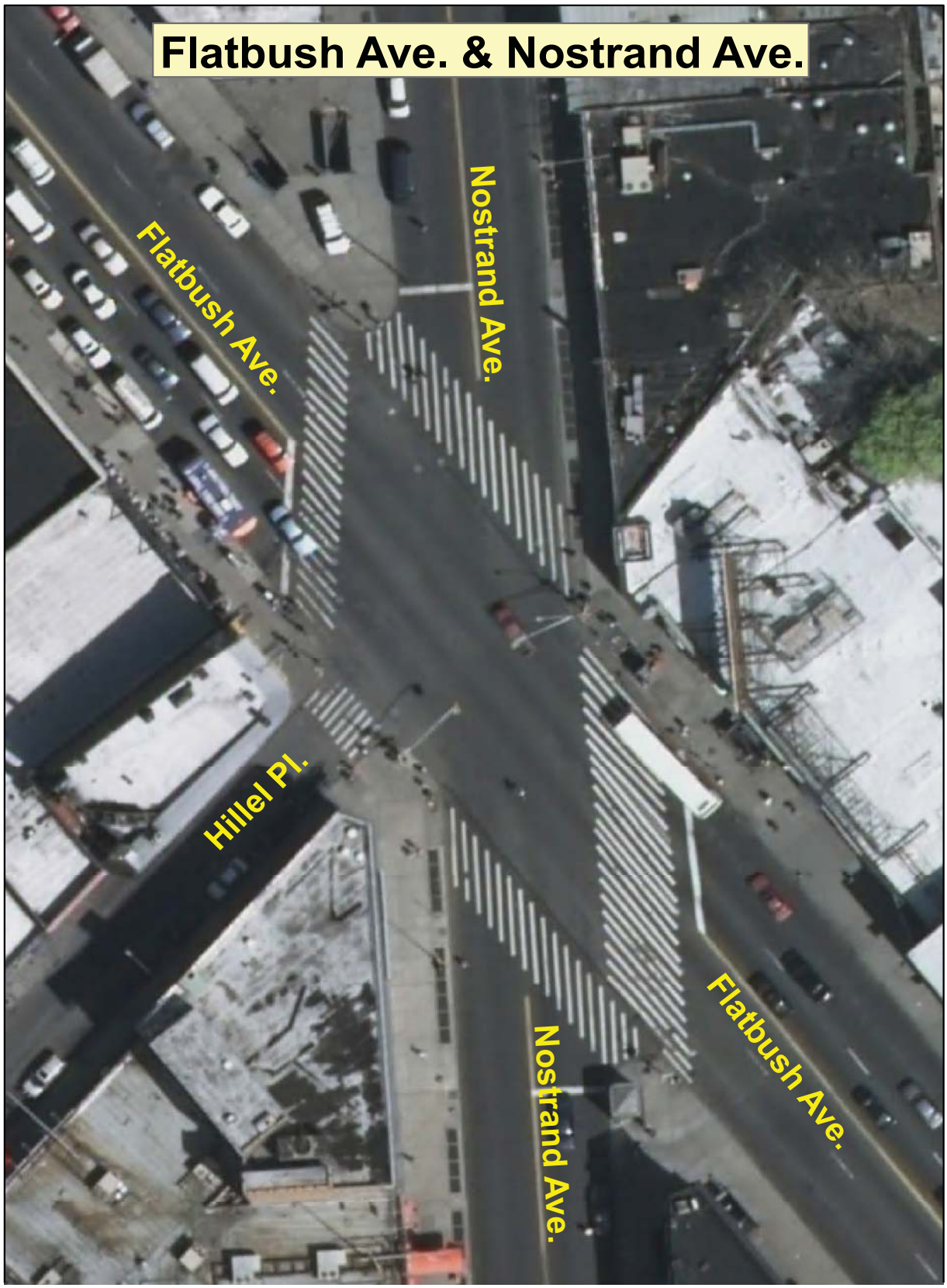
  An increase in enforcement presence can help cut back on illegal double parking in the area.

- Improve Pavement Conditions
  Repair the pavement at this intersection including the north sidewalk of the segment of Glenwood Road south of E 29th Street in order to enhance the street environment for pedestrians walking in this area.


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
BUS Existing Bus Shelter
Existing Sign
Existing Pavement Marking
NOT TO SCALE
N
Issues: Many pedestrains cross Flatbush Ave at Glenwood Rd where stop bars for vehicular traffic have been placed. Pedestrians were observed crossing midblock at this particular spot when they had the green light or when a bus had unloaded passengers. This creates a dangerous and unsafe situation for pedestrians with NB and SB motorists since they usually do not expect pedestrians to be crossing at this location of the intersection.
Issue: North sidewalk is in poor condition.
Sign: No Pedestrian Crossing Use Crosswalk
Sign: Bus Stop: B41, B103, BM2
Sign: Bus Stop: B6, B11
Sign: Bus Stop: B6, B11
Sign: No Pedestrian Crossing Use Crosswalk
Sign: Bus Stop: B41, B103, BM2
E 29th ST
GLENWOOD RD
FLATBUSH AVE
FLATBUSH AVE
GLENWOOD RD
60'
40'
60'
40'
60'
Flatbush Avenue and Glenwood Road
Existing Conditions - Figure: C-13a


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
Recommended Tree (shown in blue)
Existing Bus Shelter
Recommended Bus Shelter (shown in blue)
Existing Sign
Recommended Sign (shown in blue)
Existing Pavement Marking
Recommended Marking (shown in blue)
NOT TO SCALE
N
E 29th ST
GLENWOOD RD
FLATBUSH AVE
FLATBUSH AV
GLENWOOD RD
BUS
Recommendation:
Move northbound bus stop to this location, north of the intersection to minimize mid-block crossing.
Recommendation:
•Improve orientation of "No Ped Crossing" sign
•Improve exisiting sign to include image of pedestrian
Recommendation:
Improve and repair north sidewalk.
Recommendation:
•Remove all "No Parking" signs
•Remove all parking meters
•Install "No Parking Anytime - Loading Zone" signs
•Increase enforcement to minimize double parking
Flatbush Avenue and Glenwood Road
Recommendations - Figure: C-13b

Location: Flatbush Avenue and Nostrand Avenue/ Hillel Place



Intersection of Flatbush Avenue and Nostrand Avenue/ Hillel Place

Description of Existing Conditions

This is a major intermodal transfer location where hundreds of pedestrians travel through to get to/ from subway trains and buses. Brooklyn College is one of the major generators of pedestrian traffic in the area.

At this location two major arterials intersect at an awkward angle Flatbush Avenue and Nostrand Avenue. A smaller street, Hillel Place, ends at this intersection.

Flatbush Avenue is about 65 ft wide at this location with two travel lanes in each direction of traffic. The sidewalks along this major street are 17 to 18 ft wide.

Nostrand Avenue at this intersection is 45 ft wide and is a two-way street with one travel lane in each direction of traffic. Its sidewalks measure 17 to 18 ft wide.

Hillel Place is 25 ft wide. Its sidewalks are 12 - 13 ft wide.

Vehicle and pedestrian volumes are usually heavy throughout the day on Flatbush and Nostrand Avenues. Traffic on Hillel Place is usually light, but pedestrian traffic get heavier at the end or beginning of classes when groups of students walk from/to the Brooklyn College campus.

This intersection is one of the few in New York City with a “Barnes Dance” – All Walk Phase where all pedestrians cross all streets at the same time at any crosswalks or diagonally. The length of the “all pedestrian phase” is about 25 -31 seconds depending on the time of the day.

Pedestrian Accident Data 2004 -2006
9 Pedestrian Accidents

Table: C-26 – Summary of Pedestrian Accidents

Accident Location	Year	Time	Pedestrian Action	Pedestrian Location	Vehicle Action
Nostrand Ave	3/18/2004	daylight, snow and ice	crossing- no signal; no crosswalks	at intersection	going straight ahead
Nostrand Ave	5/3/2004	daylight, rain	crossing with signal	at intersection	going north, then turned to go east (right turn)
Nostrand Ave	9/12/2004	night	not reported	at intersection	going straight ahead
Nostrand Ave	12/7/2004	night, rain	crossing with signal	at intersection	making a left turn
Nostrand Avel	4/29/2005	not reported	not reported	at intersection	backing
Nostrand Ave (2 peds injured)	7/23/2005	daylight	crossing- no signal; no crosswalks	at intersection	backing
Nostrand Ave	8/18/2006	daylight	crossing- no signal; no crosswalks	at intersection	going straight ahead
Nostrand Ave	1/15/2006	daylight, wet surface	crossing against signal	not at intersection	going straight ahead

Problems

- Pedestrian/ Vehicular Conflicts
  Some pedestrians crossing at the intersection of Flatbush / Nostrand Avenue instead of waiting for the "Barnes Dance" phase, go ahead and cross with vehicular traffic when the vehicles have the green light. These pedestrians end up in the path of turning vehicles which is a dangerous situation. In general, vehicles go through the intersection without slowing down knowing that pedestrians have a red phase at the time at all approaches.

Pedestrians often cross when vehicles have the green light putting them in the path of turning vehicles

- Signs
  Several regulatory signs exist but are oriented towards vehicles approaching the intersection. These signs for drivers display the following the message: “Wait for green light”. However there are no signs regulating pedestrian traffic at this intersection.

- Vehicles and Crosswalks
  Flatbush Avenue and Nostrand Avenue intersect at an angle which gives the intersection an awkward shape where vehicles often wait for the green light partially in the crosswalk. This creates conflicts between pedestrians and vehicles and reduces visibility due to a shorter sight distance at the intersection for the driver.

  In addition traffic congestion occurs at times on Flatbush Avenue at Glenwood Road which backs up into Nostrand Avenue creating delays for northbound vehicular traffic. When this happens vehicles block the west crosswalk and make it difficult for pedestrians to cross especially during the peak hours of the day.

- Pedestrian Amenities
  There are no trees or plantings near this intersection. In addition one of the curb cuts at the end of Hillel Place is not flush with the pavement surface which makes it inaccessible to those on wheels.

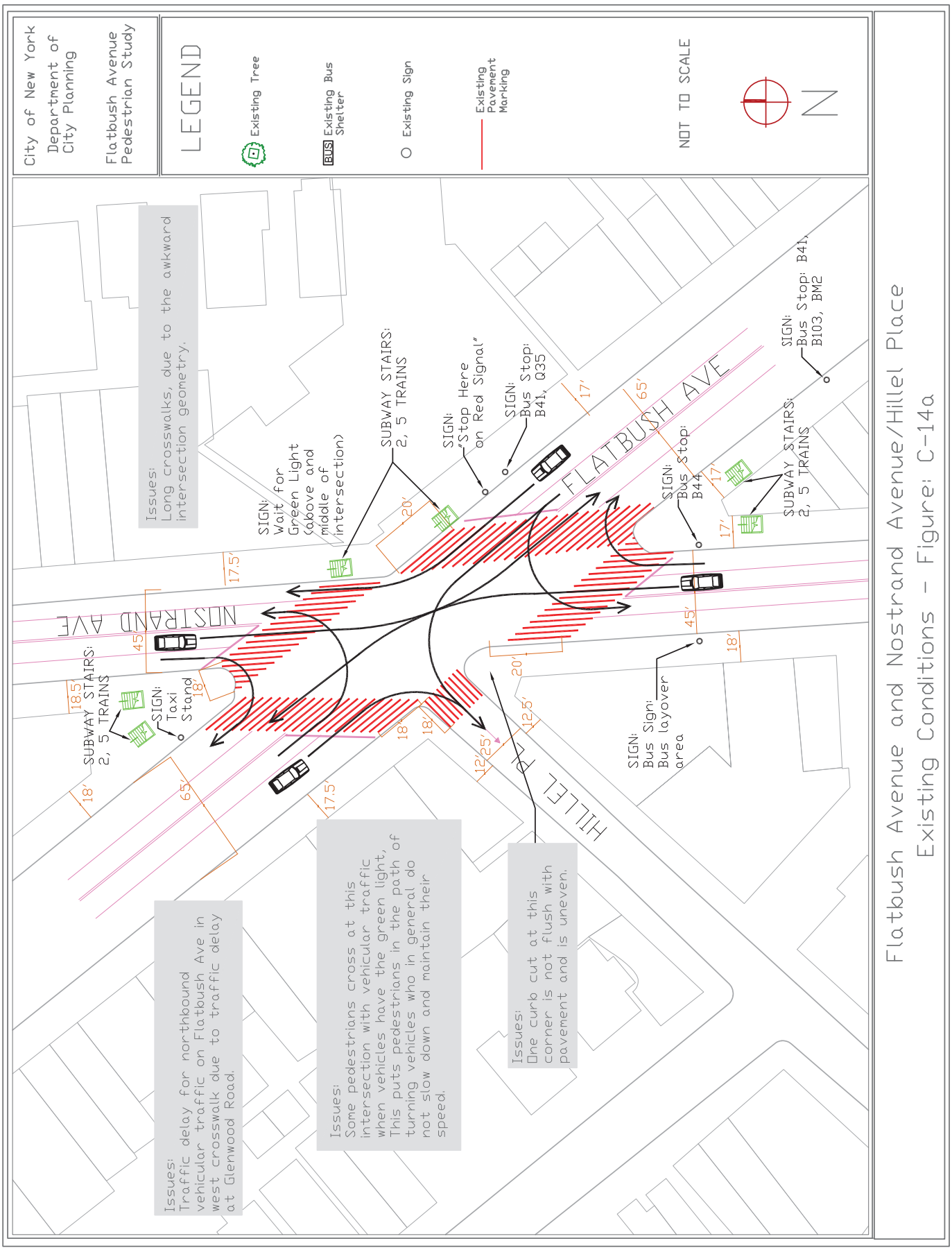
Recommendations

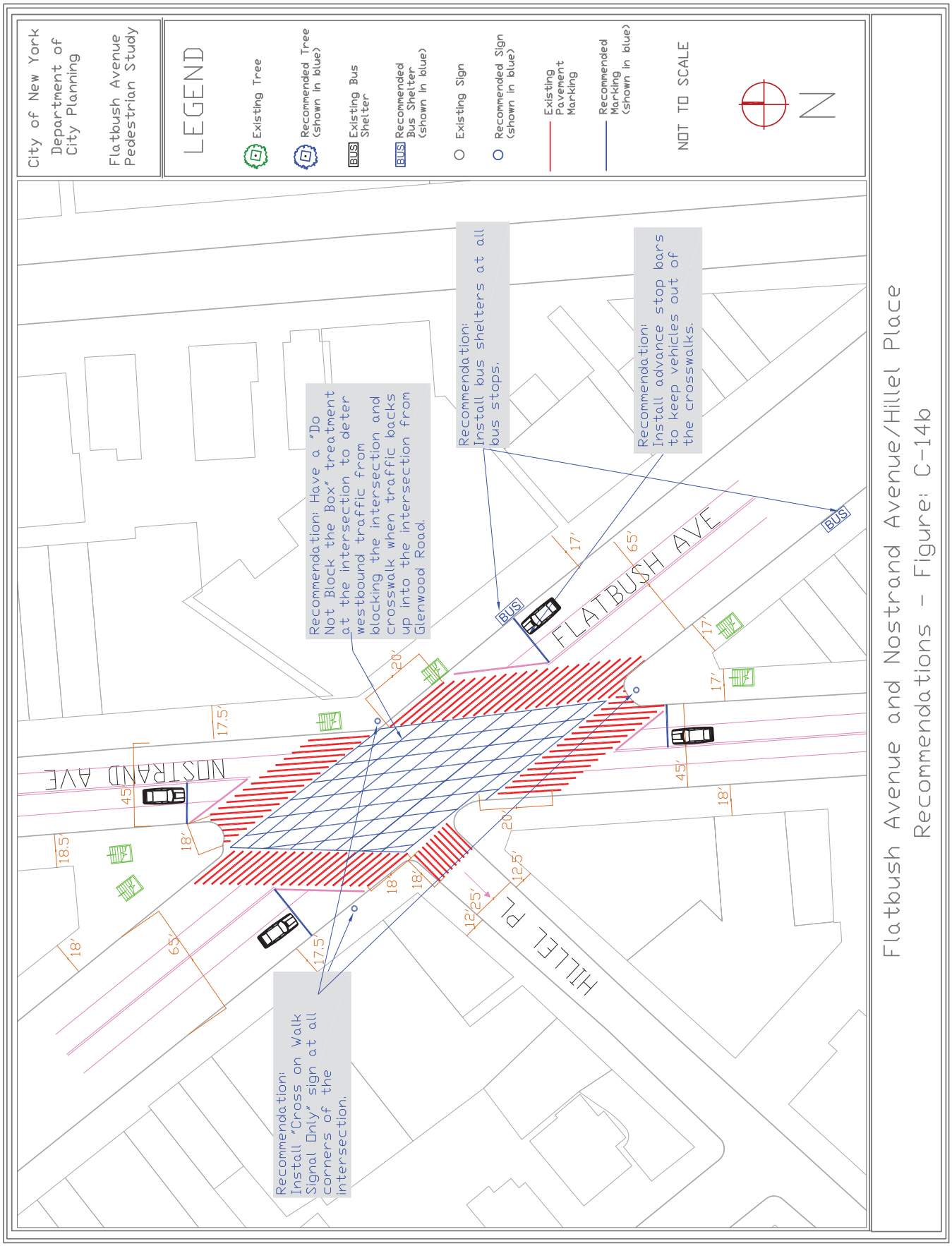
- New Signage
  As a recommendation, have regulatory signs at all corners of the intersection that specifically request pedestrians to cross only when the pedestrian traffic signal allows for it: “Cross Only on Ped (image of ped) Signal” (MUTCD, R10-2a; see Appendix D-2: Standards for Signs Recommended). This will provide helpful information to pedestrians unfamiliar with the area and who do not know that there is an all pedestrian phase at this intersection.

- New Pavement Markings
  The installation of a stop bar or stop line about 15 ft from each crosswalk at this intersection is recommended. This can reduce the potential for conflicts between pedestrians and drivers and improves sight distances for the driver

  An additional recommendation is to stripe or have a “Don’t Block the Box” element for vehicular traffic at this intersection. This would deter northbound traffic from blocking the intersection of Flatbush/ Nostrand Avenue and particularly the west crosswalk where many pedestrians cross.

- Pedestrian Amenities
  Plant new trees where possible and install bus shelters where functional. In addition improve the curb cuts at the corner of Hillel Place and Flatbush Avenue and make them ADA (American Disability Act) accessible.


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
BUS Existing Bus Shelter
Existing Sign
Existing Pavement Marking
NOT TO SCALE
N
FLATBUSH AVE
NOSTRAND AVE
HILLEL PL
SUBWAY STAIRS: 2, 5 TRAINS
SIGN: Taxi Stand
SIGN: Wait for Green Light (above and middle of intersection)
SUBWAY STAIRS: 2, 5 TRAINS
SIGN: "Stop Here on Red Signal"
SIGN: Bus Stop: B41, Q35
SIGN: Bus Stop: B41, B103, BM2
SIGN: Bus Stop: B44
SUBWAY STAIRS: 2, 5 TRAINS
SIGN: Bus Sign; Bus layover area
Issues: Long crosswalks, due to the awkward intersection geometry.
Issues: Traffic delay for northbound vehicular traffic on Flatbush Ave in west crosswalk due to traffic delay at Glenwood Road.
Issues: Some pedestrians cross at this intersection with vehicular traffic when vehicles have the green light, This puts pedestrians in the path of turning vehicles who in general do not slow down and maintain their speed.
Issues: One curb cut at this corner is not flush with pavement and is uneven.
Flatbush Avenue and Nostrand Avenue/Hillel Place
Existing Conditions - Figure: C-14a


City of New York
Department of City Planning
Flatbush Avenue Pedestrian Study
LEGEND
Existing Tree
Recommended Tree (shown in blue)
Existing Bus Shelter
Recommended Bus Shelter (shown in blue)
Existing Sign
Recommended Sign (shown in blue)
Existing Pavement Marking
Recommended Marking (shown in blue)
NOT TO SCALE
N
Recommendation: Have a "Do Not Block the Box" treatment at the intersection to deter westbound traffic from blocking the intersection and crosswalk when traffic backs up into the intersection from Glenwood Road.
Recommendation: Install bus shelters at all bus stops.
Recommendation: Install advance stop bars to keep vehicles out of the crosswalks.
Recommendation: Install "Cross on Walk Signal Only" sign at all corners of the intersection.
FLATBUSH AVE
NOSTRAND AVE
HILLEL PL
BUS
Flatbush Avenue and Nostrand Avenue/Hillel Place
Recommendations - Figure: C-14b

Location: Flatbush Avenue and Avenue H

Intersection of Flatbush Avenue and Avenue H

Description of Existing Conditions

Flatbush Avenue is approximately 65 ft wide in this area. It has two travel lanes in each direction of traffic. The sidewalks are 14 to 17ft wide.

Avenue H is 40 ft wide. The sidewalks are 17 - 18 ft wide. This street is a two-way street with one travel lane in each direction of traffic.

Vehicle volumes at this intersection are moderate and can get heavy at times. Pedestrian volumes observed in this part of the study area are in general light, however the construction of a Target store will generate in the future additional pedestrian traffic at this intersection once completed and opened to the public.

The Target store is a three story retail project with 250,000 sq. ft. of retail space and an attached five story parking garage which contains 532 spaces. The 449,570 sq. ft of development project was under construction in 2007. It is now completed and opened to the public as of March 2008.

There is only one sign at this intersection related to pedestrian traffic. It is a "Stop" sign which requires drivers to come to a complete stop and to yield to pedestrians in the crosswalk. It is located at the northwest corner in the service/side road for southbound traffic making a right turn onto Avenue H.

Pedestrian Accident Data 2004 -2006

5 Pedestrian Accidents

Table: C-27 – Summary of Pedestrian Accidents

Accident Location	Year	Time	Pedestrian Action	Pedestrian Location	Vehicle Action
Avenue H	12/28/2004	night, wet surface	crossing- no signal; no crosswalks	at intersection	going straight ahead
Avenue H	12/13/2004	night, rain	crossing with signal	at intersection	making a left turn
Avenue H	3/11/2005	dusk	crossing with signal	at intersection	making a left turn
Avenue H	4/27/2005	daylight, wet	crossing with signal	at intersection	making a right turn
Avenue H	12/8/2006	not reported	not reported	at intersection	making a right turn

Problems and Opportunities

- Pedestrian/ Vehicle Conflicts
  Conflicts with vehicles making a turn at this intersection and pedestrians crossing with the green light often occur. Based on observation, most of the turning movements are made from Avenue H onto Flatbush Avenue.

- Streetscape Improvemnet
  There is a traffic island indicated with markings between Flatbush Avenue and the service/side road leading to Avenue H. Pedestrians waiting at the traffic island to cross Flatbush Avenue or

Avenue H have no protection or buffer from vehicles going southbound (vehicles often pick up speed after passing Nostrand Avenue).

- With the opening of the Target store at the southwest corner and an increase in the number of pedestrians at this intersection, a new pattern of pedestrian crossing movements is observed. During the second week of March many pedestrians were observed crossing Avenue H from/ to the south sidewalk in front of the Target Store instead of using the traffic island where the crosswalk is located.

Pedestrians often cross Avenue H from south sidewalk instead of from the southwest corner

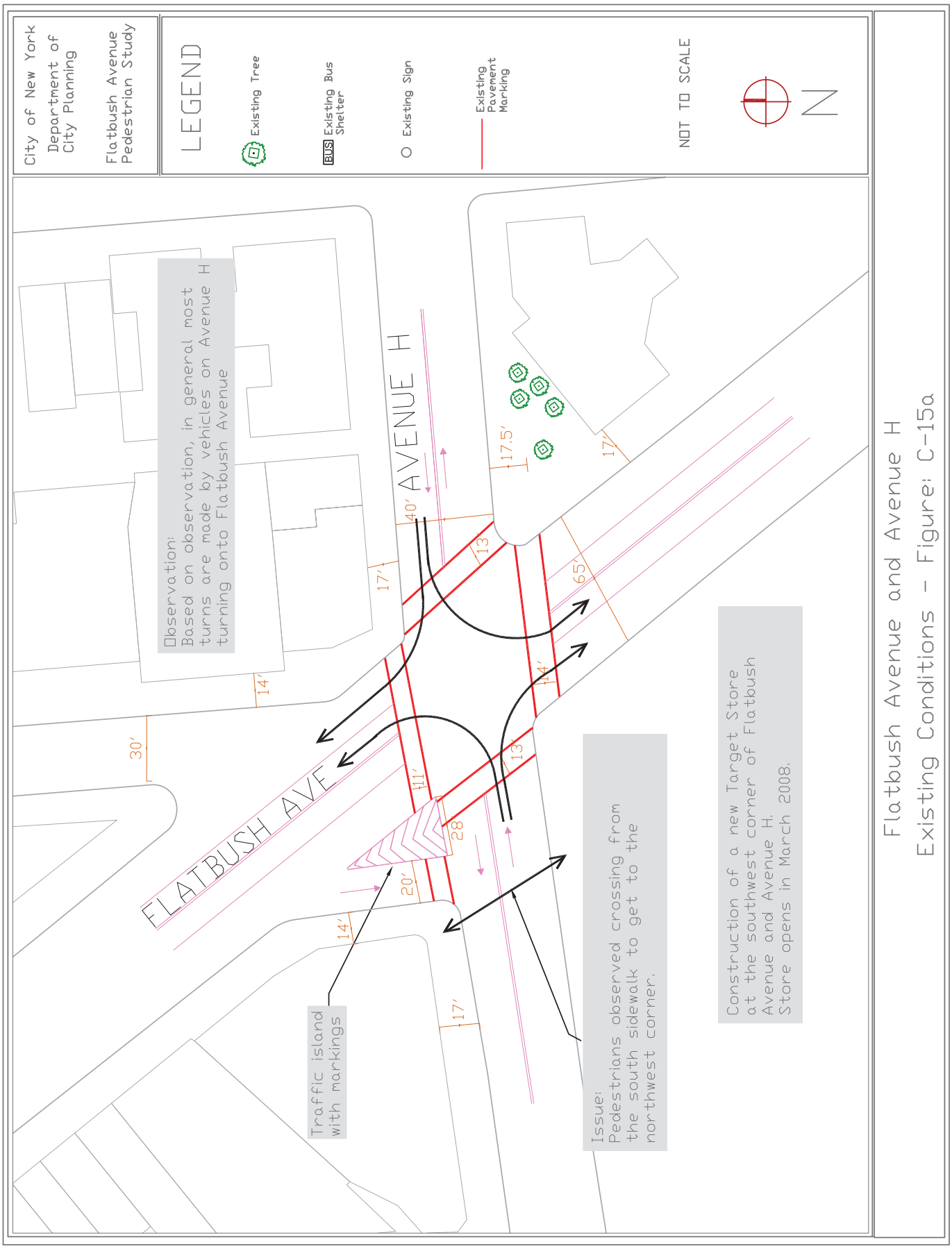
Recommendations

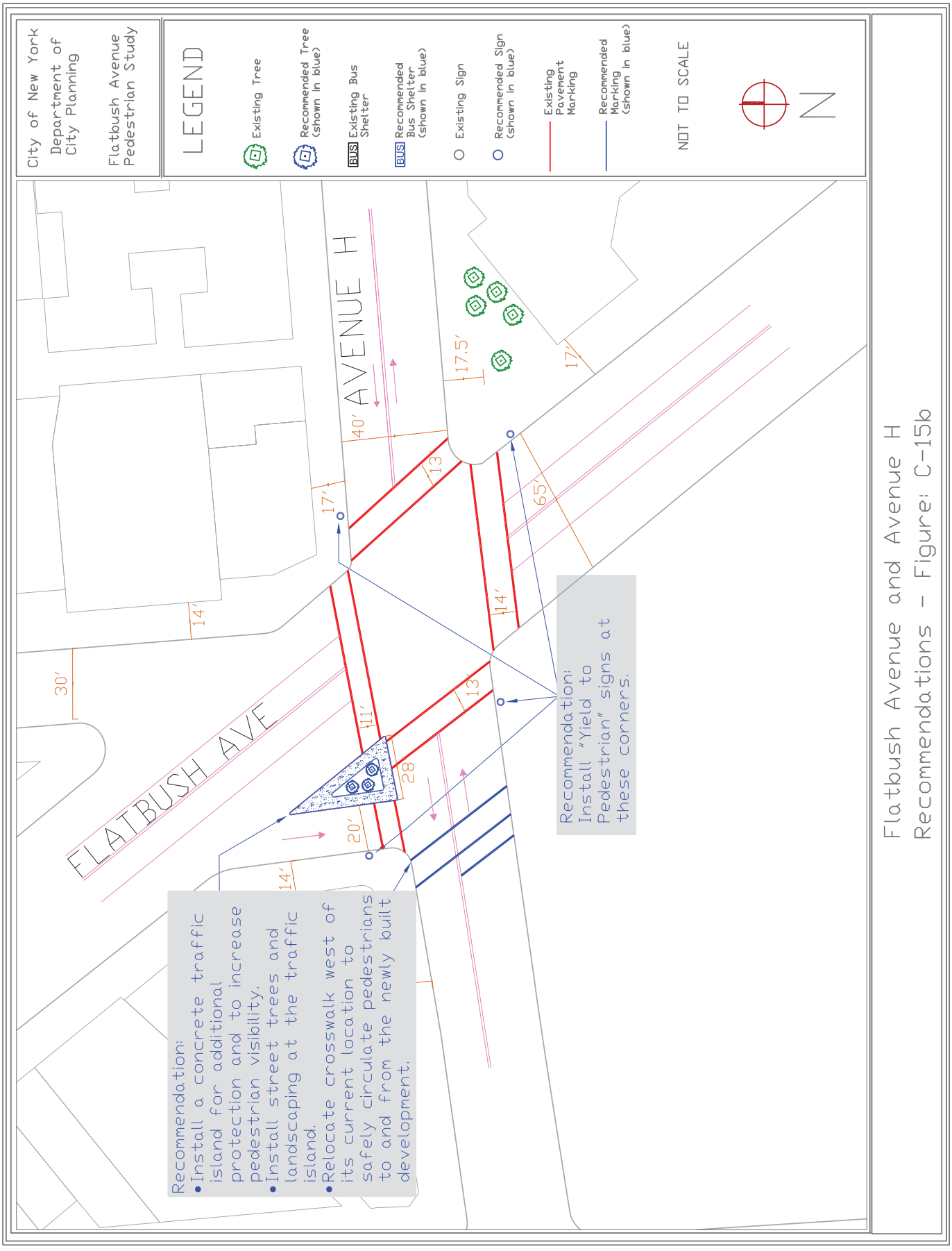
- Signage
  It is recommended to install the following warning sign "Attention Drivers Yield to Pedestrians" at all corners. This warning sign can help modify motorists' turns and improve safety for pedestrians crossing at the intersection.

- Streetscape Improvement
  Build a raised concrete refuge island for pedestrians at the marked traffic island location. This can provide pedestrians with additional protection or buffer from vehicles traveling on Flatbush Avenue. In addition include greenstreets elements at the traffic island to improve the appearance of the intersection.

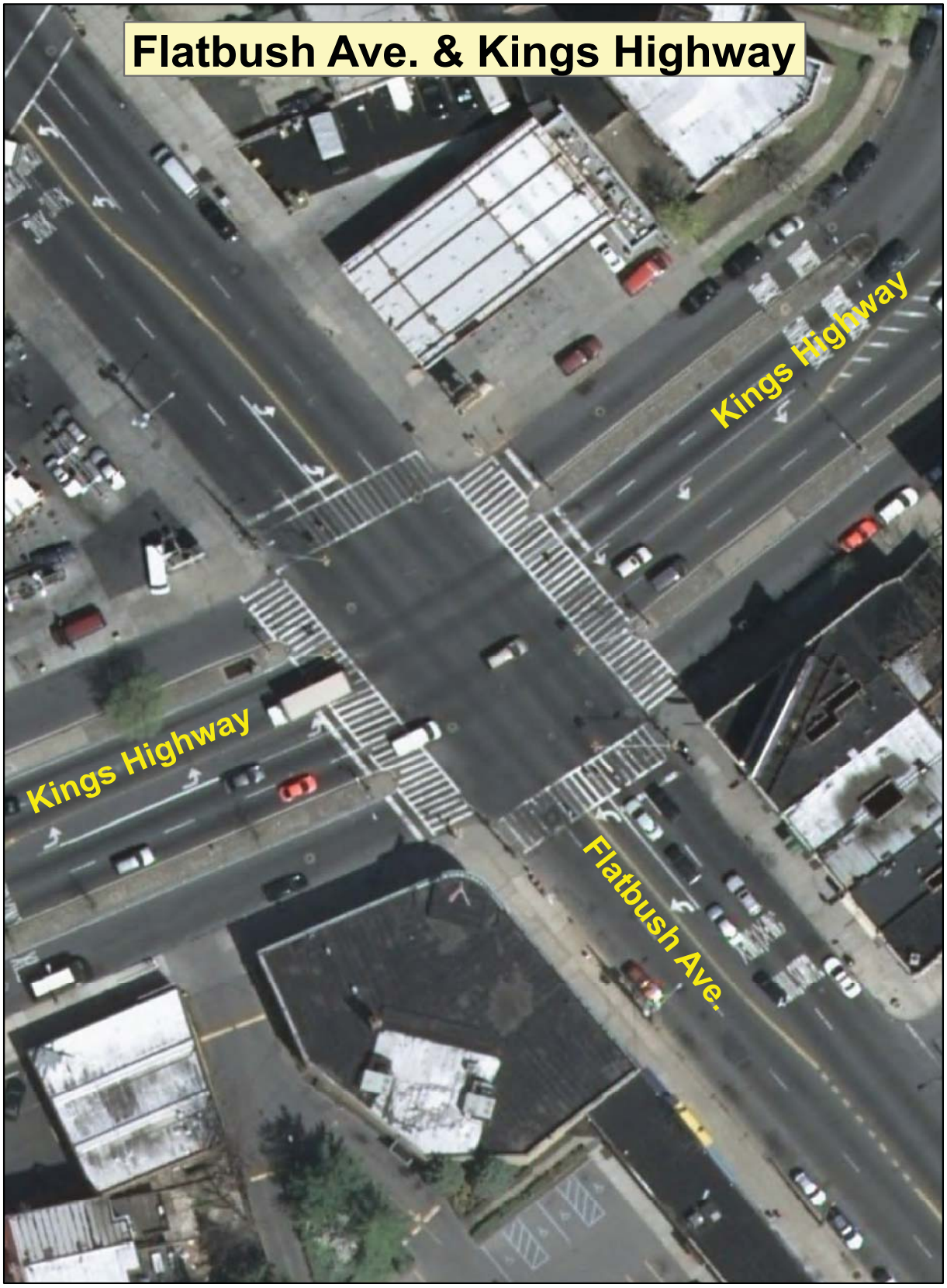
- Add a New Crosswalk
  Place another crosswalk approximately 60 feet west of the existing west crosswalk and parallel to it. This creates an additional designated crossing facility which is convenient and safe for pedestrians who choose to cross Avenue H at this location. A queuing space at the northwest street corner for pedestrians waiting for the signal to change is provided instead of the traffic island which is limited in terms of space for pedestrian queuing. An overloaded traffic island can affect vehicular traffic.

  This new facility would evidently require at this intersection the installation of a new pedestrian signal and a "Stop Bar" for eastbound vehicular traffic.


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
BUS Existing Bus Shelter
Existing Sign
Existing Pavement Marking
NOT TO SCALE
N
AVENUE H
FLATBUSH AVE
40'
17'
14'
30'
17.5'
17'
13'
65'
14'
13'
11'
28'
20'
14'
17'
Observation:
Based on observation, in general most turns are made by vehicles on Avenue H turning onto Flatbush Avenue
Traffic island with markings
Issue:
Pedestrians observed crossing from the south sidewalk to get to the northwest corner.
Construction of a new Target Store at the southwest corner of Flatbush Avenue and Avenue H.
Store opens in March 2008.
Flatbush Avenue and Avenue H
Existing Conditions - Figure: C-15a


City of New York
Department of City Planning
Flatbush Avenue Pedestrian Study
LEGEND
Existing Tree
Recommended Tree (shown in blue)
Existing Bus Shelter
Recommended Bus Shelter (shown in blue)
Existing Sign
Recommended Sign (shown in blue)
Existing Pavement Marking
Recommended Marking (shown in blue)
NOT TO SCALE
N
AVENUE H
FLATBUSH AVE
40'
30'
14'
17'
17.5'
65'
13
11'
28
20'
Recommendation:
• Install a concrete traffic island for additional protection and to increase pedestrian visibility.
• Install street trees and landscaping at the traffic island.
• Relocate crosswalk west of its current location to safely circulate pedestrians to and from the newly built development.
Recommendation:
Install "Yield to Pedestrian" signs at these corners.
Flatbush Avenue and Avenue H
Recommendations - Figure: C-15b

Location: Flatbush Avenue and Kings Highway



Intersection of Flatbush Avenue and Kings Highway

Description of Existing Conditions

The width of Flatbush Avenue is 65 ft at this intersection with three travel lanes in each direction of traffic. These lanes include two dedicated left turning lanes. The sidewalks range from 17 to 18 ft in width.

Kings Highway is a much wider street with 105 ft in this section of the study area. It has two travel lanes and a left turning lane in each direction of traffic. Service roads are provided for local traffic on Kings Highway which are separated from the main roadway by 7-foot wide medians. The sidewalks are 15 ft wide.

This area has moderate to heavy vehicular volumes where two major arterials intersect. The pedestrian volumes are in general moderate to light.

There is a protected left turn phase only for vehicles making a left turn from Flatbush Avenue. Similar to the other intersections in the study area along Flatbush Avenue there are conflicts with vehicles making turns and pedestrians crossing with the green light. However there are warning signs for drivers making a turn and these signs are posted at the intersection for all approaches: "Yield" signs and "Yield to pedestrians" signs. See "Existing Conditions Map, Figure C-16a for location of signs.

Pedestrian Accident Data 2004 -2006

5 Pedestrian Accidents

Table: C-28 – Summary of Pedestrian Accidents

Accident Location	Year	Time	Pedestrian Action	Pedestrian Location	Vehicle Action
Kings Highway	7/26/2004	daylight	other actions in roadway	at intersection	going straight ahead
Kings Highway	8/3/2004	daylight	not in roadway	at intersection	backing, collision with other fixed object
Kings Highway	3/18/2004	dark road lighted	crossing – no signal or crosswalk	pedestrian not at intersection	going straight ahead
Kings Highway	8/22/2005	daylight	not reported	at intersection	not reported
Kings Highway	7/16/2006	daylight	not reported	not at intersection	backing

Problems and Opportunities

- Pedestrian Amenities
  The medians providing pedestrian refuge space on Kings Highway are in poor condition with many cracks and potholes.

  There is a lack of bus shelters at this location well used as a bus transfer site where many p passengers wait to catch a bus.

  There is also a lack of trees and plantings near this intersection on the sidewalks and along the medians. A few trees exist only south of the intersection along the medians.

Medians on Kings Highway in poor condition

Recommendations

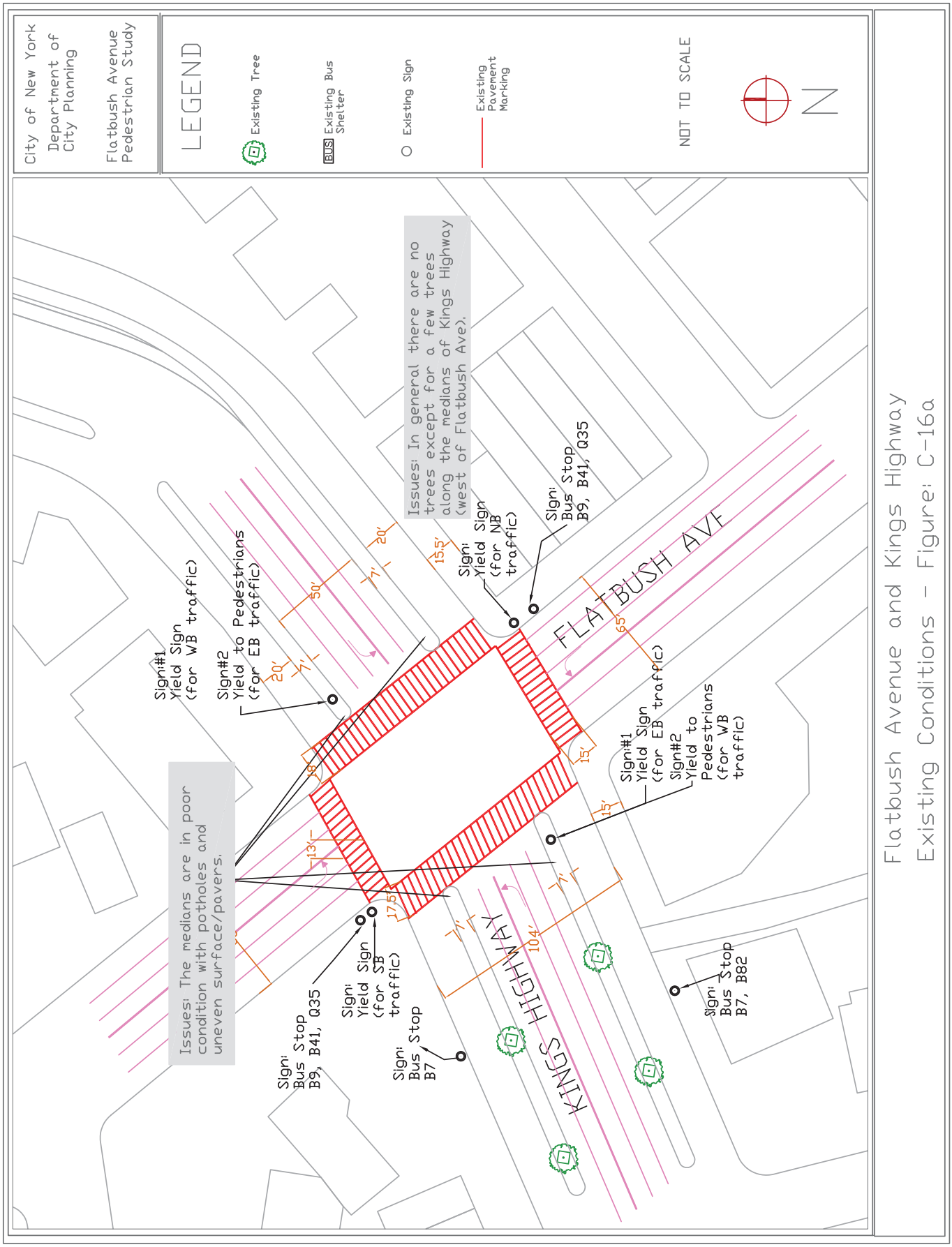
Improve Pedestrian Environment

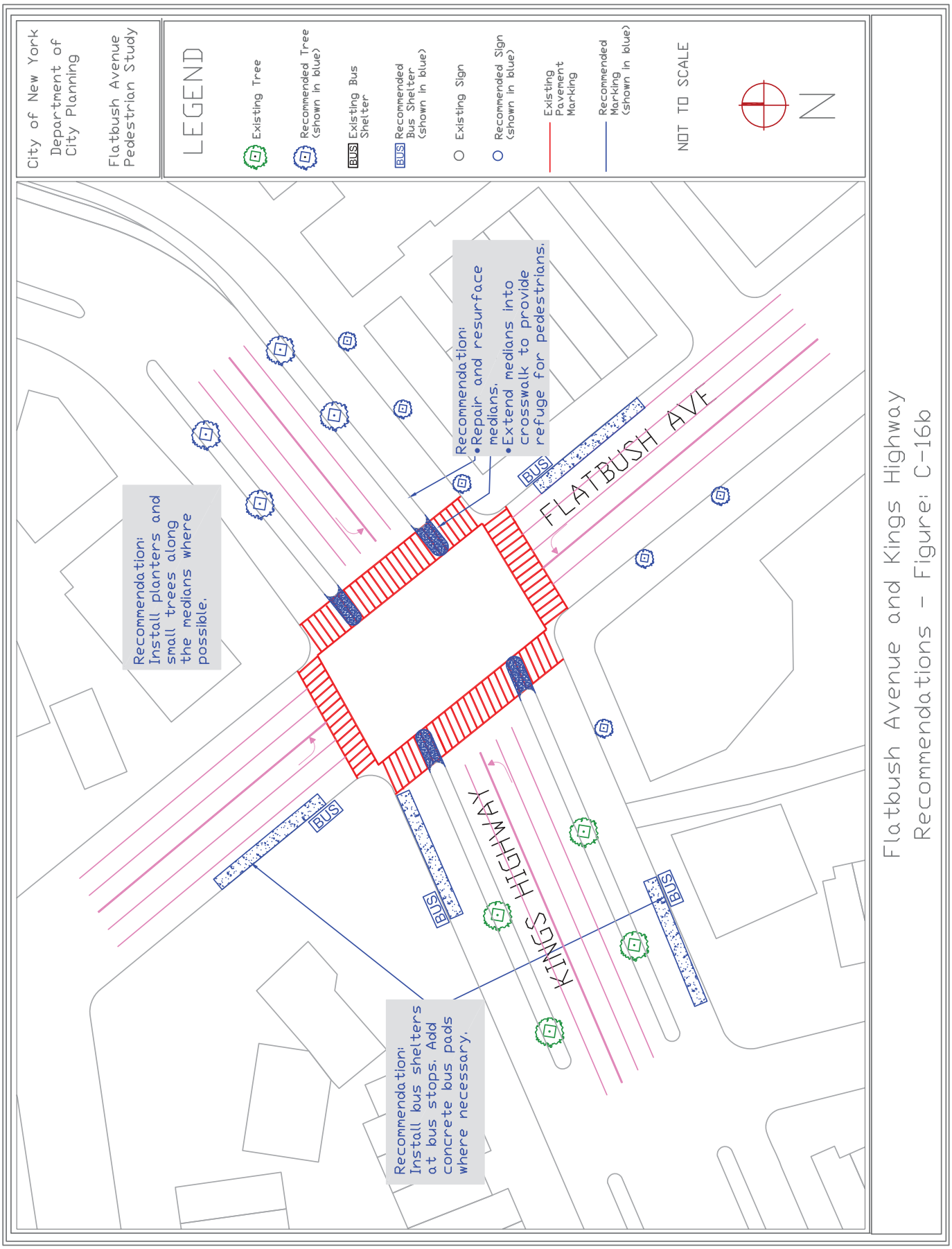
Recommendations that can enhance the pedestrian environment as well as increase the pedestrian's level of comfort and safety at this location are provided below:

- Rebuild and extend medians to better accommodate pedestrians who often use the pedestrian refuge as they wait to cross King Highway.

- Install adequate bus shelters at all bus stops to ensure that pedestrians waiting for a bus have shelter during inclement weather. Bus pads can also be installed to minimize the wear and tear of the pavement at the bus stops. See following Map C-16b: "Recommendations" and Appendix D-3: "Standards for Bus Shelters" at the end of the document for details.

- Plant trees where possible on the sidewalks or along the medians of Kings Highway to make this location more attractive for pedestrians based on the standards of NYCDPR (see Appendix D-4: Standards for Trees).


City of New York
Department of City Planning
Flatbush Avenue Pedestrian Study
LEGEND
Existing Tree
BUS Existing Bus Shelter
Existing Sign
Existing Pavement Marking
NOT TO SCALE
N
Issues: The medians are in poor condition with potholes and uneven surface/pavers.
Issues: In general there are no trees except for a few trees along the medians of Kings Highway (west of Flatbush Ave).
Sign#1 Yield Sign (for WB traffic)
Sign#2 Yield to Pedestrians (for EB traffic)
Sign: Yield Sign (for NB traffic)
Sign: Bus Stop B9, B41, Q35
Sign#1 Yield Sign (for EB traffic)
Sign#2 Yield to Pedestrians (for WB traffic)
Sign: Bus Stop B9, B41, Q35
Sign: Yield Sign (for SB traffic)
Sign: Bus Stop B7
Sign: Bus Stop B7, B82
FLATBUSH AVE
KINGS HIGHWAY
Flatbush Avenue and Kings Highway
Existing Conditions - Figure: C-16a


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
Recommended Tree (shown in blue)
Existing Bus Shelter
Recommended Bus Shelter (shown in blue)
Existing Sign
Recommended Sign (shown in blue)
Existing Pavement Marking
Recommended Marking (shown in blue)
NOT TO SCALE
N
Recommendation:
Install planters and small trees along the medians where possible.
Recommendation:
• Repair and resurface medians.
• Extend medians into crosswalk to provide refuge for pedestrians.
Recommendation:
Install bus shelters at bus stops. Add concrete bus pads where necessary.
FLATBUSH AVE
KINGS HIGHWAY
BUS
BUS
BUS
BUS
Flatbush Avenue and Kings Highway
Recommendations - Figure: C-16b

Location: Flatbush Avenue and Utica Avenue

Intersection of Flatbush Avenue and Utica Avenue

Description of Existing Conditions

At this location of the study area two other streets come together with Flatbush Avenue: there is Utica Avenue which ends at Flatbush Avenue and Avenue S which intersects it.

The width of Flatbush Avenue varies from 65 to 85 ft. The sidewalks are 12 - 15 ft wide. Two medians used as pedestrian refuge south of the intersection are located on Flatbush Avenue. A raised traffic island is located in the middle of the intersection.

Utica Avenue, a major arterial, is 60 ft wide with sidewalks at least 17 ft wide and Avenue S is 45 ft wide with sidewalks 8 - 9 ft wide.

Pedestrian Accident Data 2004 -2006 - No Pedestrian Accidents

This intersection unlike the previous locations did not fall in the category of those locations with five or more pedestrian accidents, but presented unique problems for pedestrians in terms of circulation and environment. These problems have been identified through the analysis of existing conditions.

Problems and Opportunities

- Condition of Medians

  The median on Flatbush Avenue in between the northbound lanes and the service road is very wide (about 17 ft wide near the intersection), but is in poor condition and bleak.

  There is a traffic island in the middle of the intersection with a regulatory sign and a traffic light. It is empty and also bleak.

Medians on Flatbush Avenue in poor condition with no trees

Bleak traffic island at the intersection of Flatbush Avenue and Utica Avenue

- Intersection geometry

  At this location Flatbush Avenue intersects with Utica Avenue and Avenue S at an awkward angle due to the street geometry. This creates a longer crossing distance than usual for pedestrians crossing Flatbush Avenue, especially for users of the north crosswalk which measures 130 ft long and does not have a pedestrian refuge.

- Condition of curb cuts
  The curb cuts at this intersection are in good condition except for the curb cuts located at the southwest corner and the northeast corner of Avenue S and Flatbush Avenue.

- Pedestrian Amenities
  There are no trees or planters along the medians or on the sidewalks in this part of the study area.

Recommendations

- Improve Condition of Medians
  The median with a width of 17 ft should be repaired and resurfaced. Trees and landscaping can be added to make this location more attractive and inviting to pedestrians. The traffic island in the middle of the intersection could also be enhanced with "greenstreets" elements.

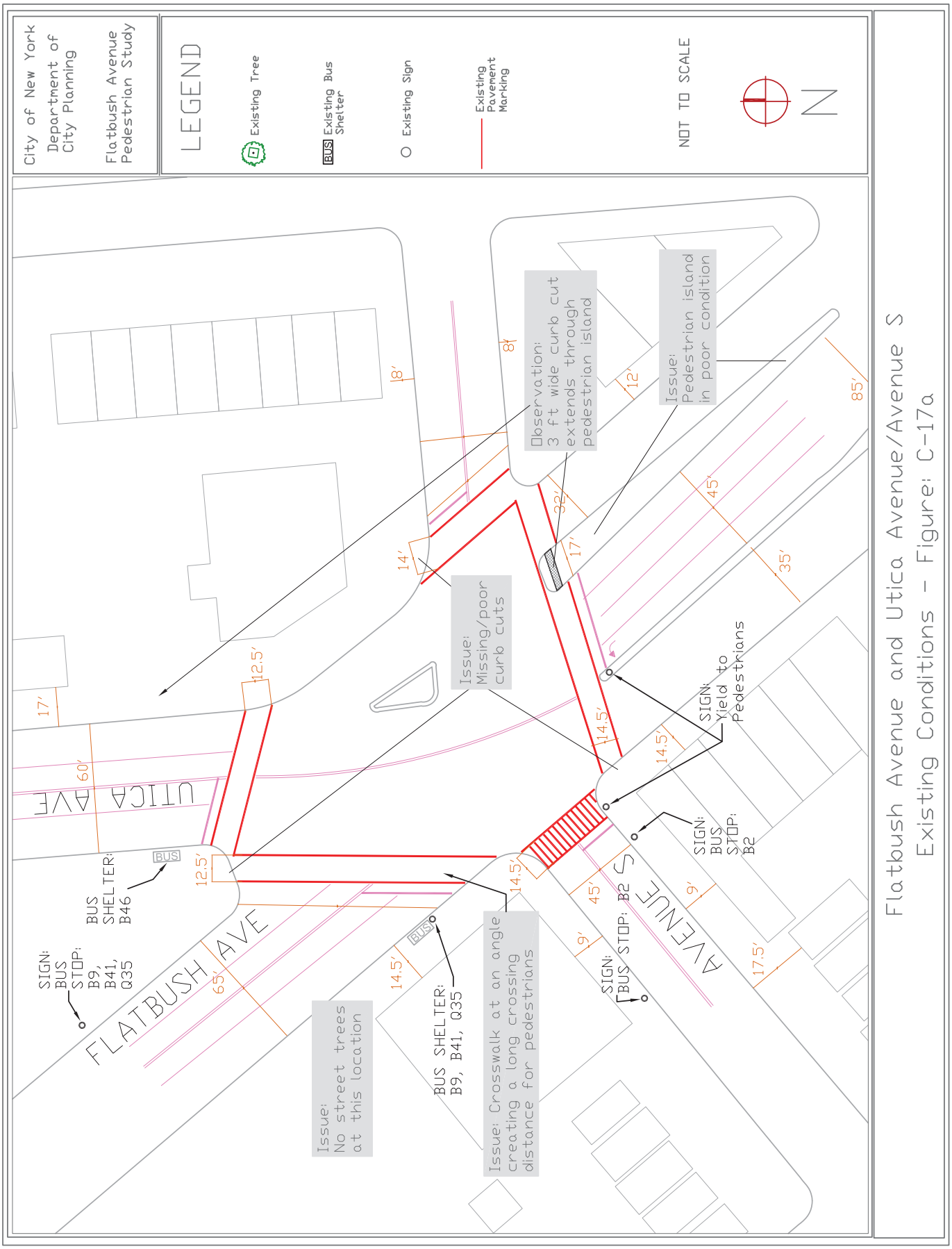
- Install Curb Extensions
  Extend the curb at the northwest corner (bulb-outs). This can improve pedestrians crossing by reducing the distance for pedestrians crossing Flatbush Avenue at the north crosswalk.

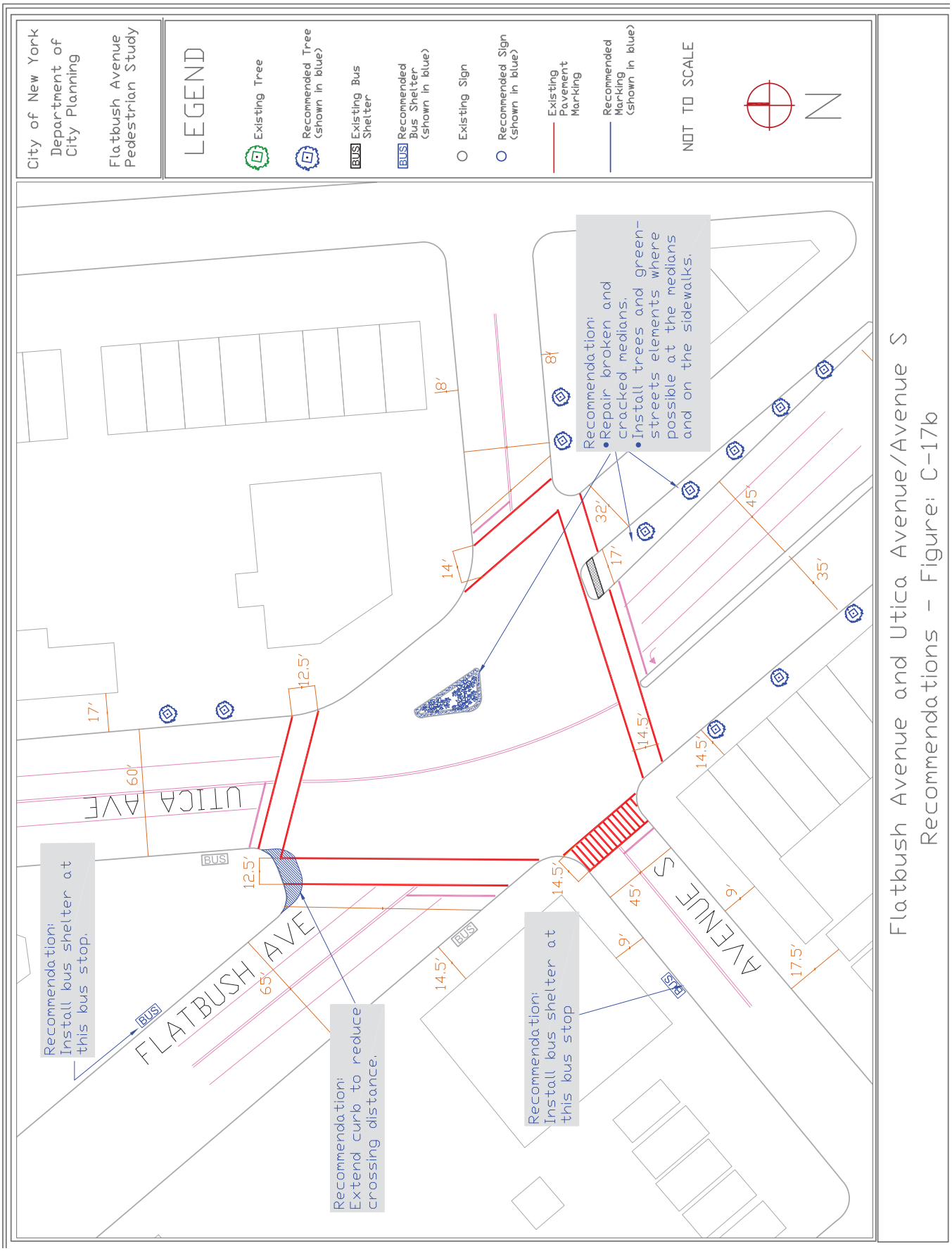
  The length of the corner extension should be done in a way that it does not impede on the right turns from Utica Avenue.

- Pedestrian Amenities
  Install bus shelters at three bus stops (one on Flatbush Avenue and two on Avenue S) to ensure that all pedestrians waiting for a bus at this location have a convenient place to wait. Concrete bus pads can also be added to minimize the wear and tear of the pavement at the bus stops.

  Trees and planters can be planted or placed on the sidewalks where possible (except at the gas station) to make this area more attractive for pedestrians.

  Finally reconstruct a few of the curb cuts at the northeast and southwest corners of the intersection of Avenue S and Flatbush Avenue. (See following Map C-17b: "Recommendations" for details on pedestrian amenities).


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
BUS Existing Bus Shelter
Existing Sign
Existing Pavement Marking
NOT TO SCALE
N
Flatbush Avenue and Utica Avenue/Avenue S
Existing Conditions - Figure: C-17a
FLATBUSH AVE
UTICA AVE
AVENUE S
SIGN: BUS STOP: B9, B41, Q35
BUS SHELTER: B46
BUS SHELTER: B9, B41, Q35
SIGN: BUS STOP: B2
SIGN: BUS STOP: B2
SIGN: Yield to Pedestrians
Issue: No street trees at this location
Issue: Crosswalk at an angle creating a long crossing distance for pedestrians
Issue: Missing/poor curb cuts
Observation: 3 ft wide curb cut extends through pedestrian island
Issue: Pedestrian island in poor condition
60'
65'
17'
12.5'
14'
8'
32'
12'
85'
45'
35'
14.5'
9'
17.5'


City of New York
Department of
City Planning
Flatbush Avenue
Pedestrian Study
LEGEND
Existing Tree
Recommended Tree (shown in blue)
Existing Bus Shelter
Recommended Bus Shelter (shown in blue)
Existing Sign
Recommended Sign (shown in blue)
Existing Pavement Marking
Recommended Marking (shown in blue)
NOT TO SCALE
N
Recommendation:
•Repair broken and cracked medians.
•Install trees and green-streets elements where possible at the medians and on the sidewalks.
Recommendation:
Install bus shelter at this bus stop.
Recommendation:
Extend curb to reduce crossing distance.
Recommendation:
Install bus shelter at this bus stop
UTICA AVE
FLATBUSH AVE
AVENUE S
BUS
60'
65'
17'
18'
8'
14'
32'
17'
45'
35'
12.5'
14.5'
9'
17.5'
Flatbush Avenue and Utica Avenue/Avenue S
Recommendations - Figure: C-17b

Other Study Locations

- E 26th Street (SB traffic – west of Flatbush Ave.)
- E 26th Street (NB traffic – east of Flatbush Ave.)
- E 31st Street (NB traffic – east of Flatbush Ave.)
- Aurelia Court (WB traffic – east of Flatbush Ave.)
- E 34th Street – (SB traffic - west of Flatbush Ave)
- Brooklyn Ave (NB traffic – east of Flatbush Ave.)
- E 36th Street (SB traffic – west of Flatbush Ave.)
- E 38th Street (SB traffic - west of Flatbush Ave.)
- Hubbard Place (EB traffic - east of Flatbush Ave.)
- Alton Place (EB traffic - east of Flatbush Ave.)
- Lott Place (EB traffic- east of Flatbush Ave.)
- Baughman Pl (EB traffic - east of Flatbush Ave)
- Schenectady Avenue (NB traffic – east of Flatbush Ave.)
- E 48th Street (NB traffic – east of Flatbush Ave.)
- E 51st Street (NB traffic – east of Flatbush Ave.)
- E 53rd Street (NB traffic, east of Flatbush Ave.)

Example of One Location: Flatbush Avenue and East 26th Street

Other Study Locations

Flatbush Avenue and Intersecting One-Way Streets

Flatbush Avenue is generally 55 - 60 ft wide within the study area except at Empire Boulevard and Avenue U where it widens to more than 60 ft. It has two travel lanes and a parking lane in each direction of traffic. Its sidewalks are 14 – 15 ft wide.

The streets listed below are one-way streets with one travel lane and two parking lanes. The sidewalks are at least 10 feet wide along the intersecting streets.

Vehicle volumes on Flatbush Avenue at these intersections are moderate to heavy at times. The intersecting streets usually have light vehicle volumes. Pedestrian volumes are usually light at these locations, with a steady flow on Flatbush Avenue.

Problems and Opportunities

Pedestrian Crossing

In general the sixteen (16) locations listed below have:

- no crosswalks for those walking on Flatbush Avenue and crossing intersecting streets
- no traffic signal, unsignalized
- no signs

In general vehicles come or turn from Flatbush Avenue and enter these streets often without slowing down (mainly right turns) and do not always yield to pedestrians crossing at those locations. In addition, since Flatbush Avenue intersects several of these streets at an angle, pedestrians are not always visible to motorists unless the pedestrian is already in the middle of the street.

Typical one-way street intersecting Flatbush Avenue

The one-way streets are:

- E 26th Street (SB Traffic – West of Flatbush Avenue)
- E 26th Street (NB Traffic – East of Flatbush Avenue)
- E 31st Street (NB Traffic – East of Flatbush Avenue)
- Aurelia Court (WB Traffic – East of Flatbush Avenue)

- E 34th Street – (SB traffic - West of Flatbush Avenue)
- Brooklyn Avenue (NB Traffic – East of Flatbush Avenue)
- E 36th Street (SB traffic – West of Flatbush Avenue)
- E 38th Street (SB traffic - West of Flatbush Avenue)
- Hubbard Place (EB Traffic - East of Flatbush Avenue)
- Alton Place (EB Traffic - East of Flatbush Avenue)
- Lott Place (EB Traffic- East of Flatbush Avenue)
- Baughman Place (EB Traffic - east of Flatbush Avenue)
- Schenectady Avenue (NB Traffic – East of Flatbush Avenue)
- E 48th Street (NB Traffic – East of Flatbush Avenue)
- E 51st Street (NB Traffic – East of Flatbush Avenue)
- E 53rd Street (Traffic island at approach – East of Flatbush Avenue)

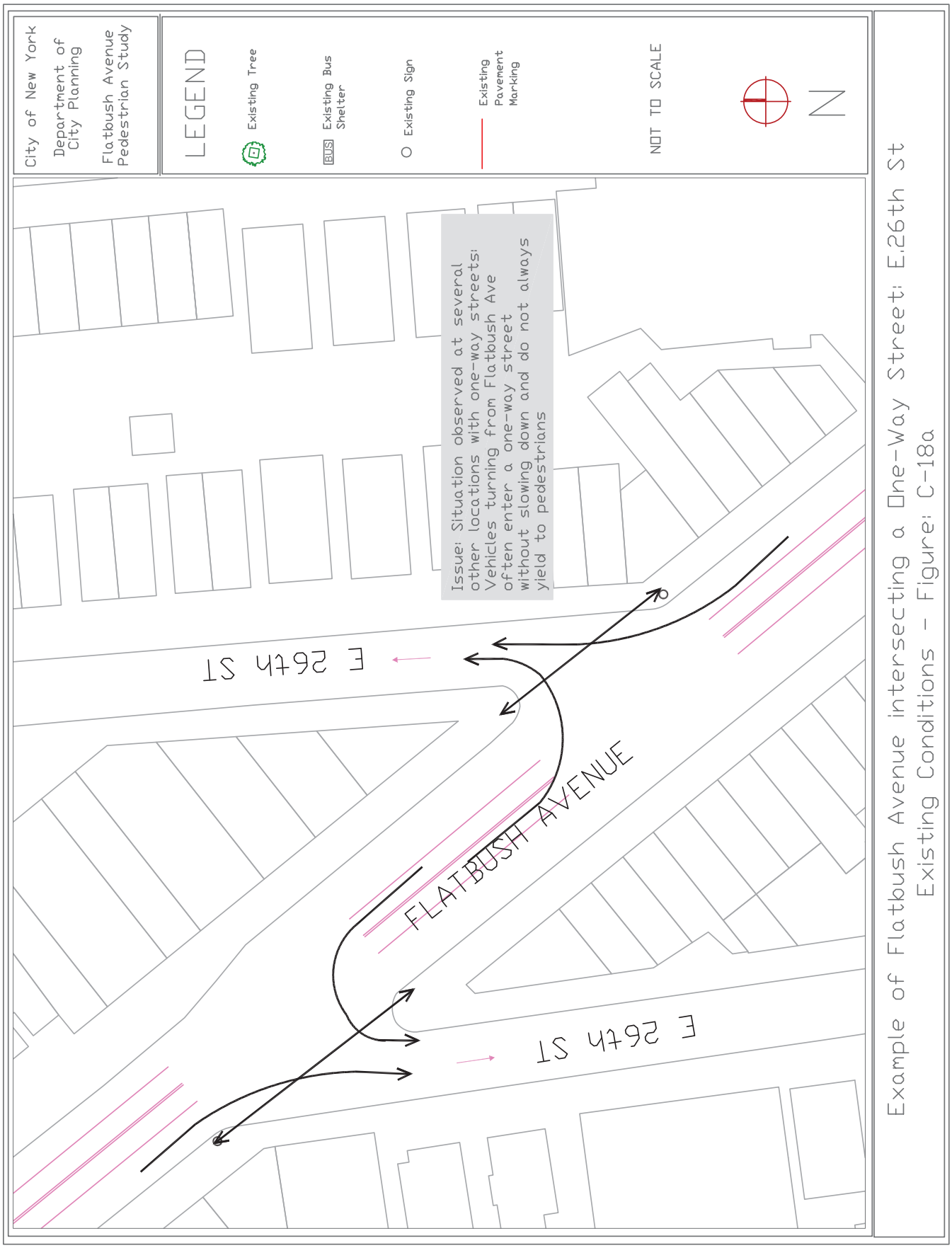
Recommendations

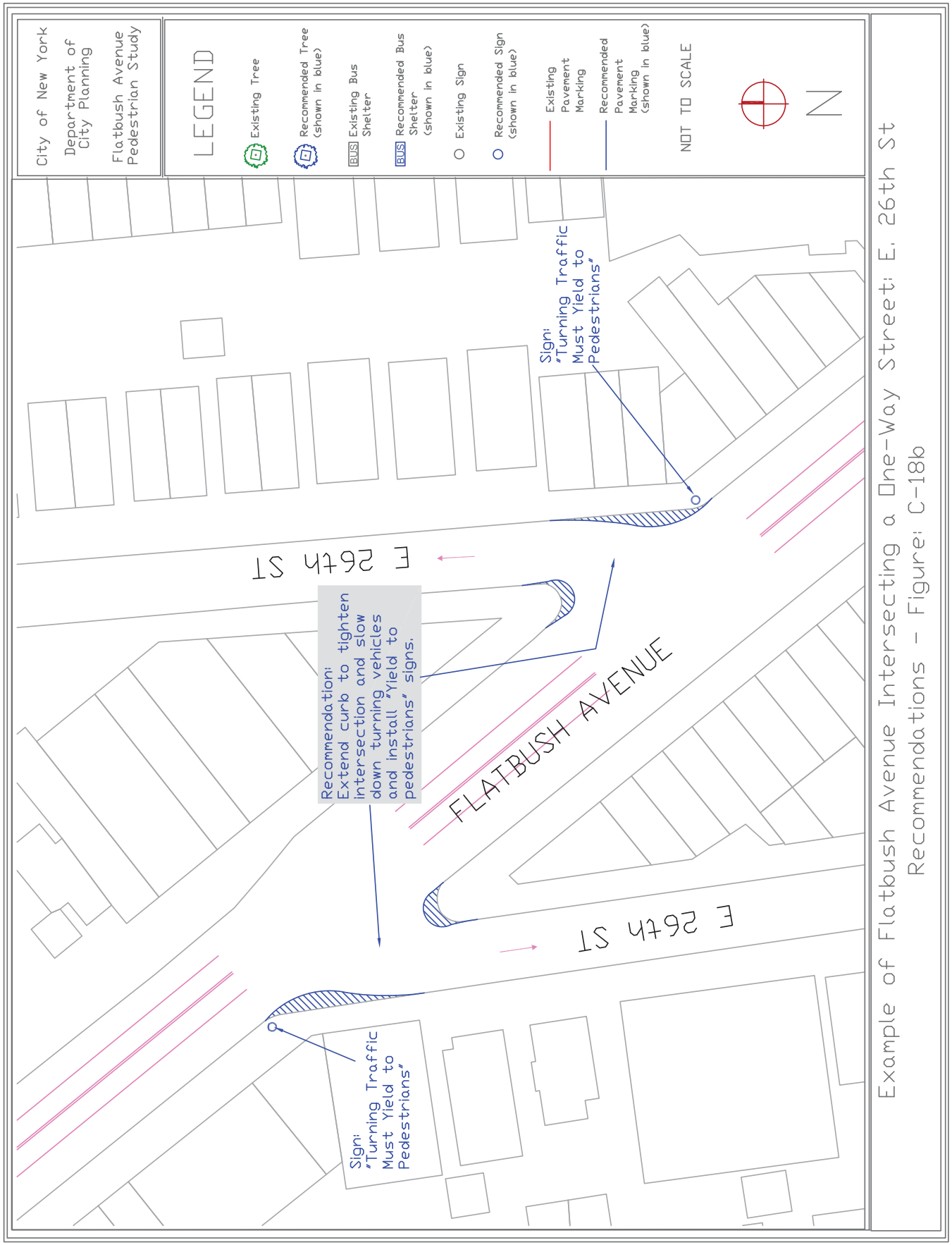
- Improve Pedestrian Crossing
  To improve pedestrians' safety at these intersections it is recommended to redesign the corners by extending the curb line out 6 ft at each corner in order to slow down motorists making turns from Flatbush Avenue and to reduce pedestrians' crossing distance.

  This solution improves the ability for motorists to see pedestrians stepping off the curb as they approach the intersection especially when the one-way street intersects Flatbush Avenue at an angle. It shortens pedestrian crossing distance therefore reducing pedestrian's exposure time in the street to vehicles. Finally, it prevents vehicles from being parked too close to the corner which often blocks motorists' sightlines and visibility of pedestrians and other vehicles.

  This can also be accomplished with pavement markings that fill in the space on the pavement proposed for the curb extension.

  In addition "Yield" signs can be added if necessary to reinforce the action to have vehicles slow down as they make a turn into the one-way street.


City of New York
Department of City Planning
Flatbush Avenue Pedestrian Study
LEGEND
Existing Tree
BUS Existing Bus Shelter
Existing Sign
Existing Pavement Marking
NOT TO SCALE
N
Issue: Situation observed at several other locations with one-way streets: Vehicles turning from Flatbush Ave often enter a one-way street without slowing down and do not always yield to pedestrians
E 26th ST
FLATBUSH AVENUE
E 26th ST
Example of Flatbush Avenue intersecting a One-Way Street: E.26th St
Existing Conditions - Figure: C-18a


City of New York
Department of City Planning
Flatbush Avenue Pedestrian Study
LEGEND
Existing Tree
Recommended Tree (shown in blue)
BUS Existing Bus Shelter
BUS Recommended Bus Shelter (shown in blue)
Existing Sign
Recommended Sign (shown in blue)
Existing Pavement Marking
Recommended Pavement Marking (shown in blue)
NOT TO SCALE
N
Sign: "Turning Traffic Must Yield to Pedestrians"
E 26th ST
Recommendation: Extend curb to tighten intersection and slow down turning vehicles and install "Yield to pedestrians" signs.
FLATBUSH AVENUE
E 26th ST
Sign: "Turning Traffic Must Yield to Pedestrians"
Example of Flatbush Avenue Intersecting a One-Way Street: E. 26th St
Recommendations - Figure: C-18b

Conclusion

This report is an assessment of existing conditions along Flatbush Avenue within the study area and presents the issues, problems and opportunities in relation to pedestrians' safety and mobility. General problems observed along this major arterial include pedestrian-vehicular conflicts at intersections, illegal midblock crossings by pedestrians, blocking of crosswalk, lack of signage, lack of pedestrian amenities.
Recommended improvements such as additional signage, specific street treatments, operational changes (LPI phase, new crosswalk) have been developed to address them.

The next steps are to further assess the feasibility of proposed recommendations that require signal timing adjustments, restricted turns, new crosswalks, new bus shelters, relocation of a bus stop, planting of trees/planters, increased enforcement presence and to work in cooperation with New York City Department of Transportation, New York City Department of Parks and Recreation, the Metropolitan Transportation Authority and the New York City Police Department. This will require field tests and an evaluation of the effectiveness of proposed improvements.

Pedestrian improvements along Flatbush Avenue will make walking safer and more pleasant, encouraging greater pedestrian use and strengthening the economic vitality of this major arterial.

REFERENCES

[1] NYC Landmarks Preservation Commission, [Available at: http://ww.nyc.gov/html/lpc/downloads/pdf/reports/ehall.pdf]

[2] Available at: http://ww.brooklyn.cuny.edu/pub/bc_history.htm

[3] Available at: http://www.brooklynonline.com/history/oldhomes.html)

Part D
Appendices

Appendix D-1: Level of Service Methodology and Traffic Volumes

Appendix D-2: Standards for Signs Recommended

Appendix D-3: Standards for Bus Shelters

Appendix D-4: Tree Planting Guidelines

Appendix D-5: Literature Search

Appendix D-1:

Level of Service Methodology

and

Vehicular and Pedestrian Traffic Volumes

- Flatbush Avenue and Church Avenue
- Flatbush Avenue and Foster/Bedford Avenues
- Flatbush Avenue and Avenue U

Level of Service Analysis and Methodology

Vehicular Traffic

The operation of the intersections at the major study locations within the study area was analyzed applying the methodologies presented in the 2000 Highway Capacity Manual (HCM2000). These procedures evaluate intersections for average delay per vehicle and level of service (LOS).

The capacity analysis methodology separates an intersection approach into lane groups on the basis of the movements occurring during each signal phase. The lane groups are then analyzed to determine the specific vehicular capacity and LOS. This analysis requires the following input parameters: intersection geometry, lane utilization, number of travel lanes, width of travel lanes, on-street parking conditions, locations of bus stops, number of buses stopping per hour, vehicle turning movements, vehicle classification, conflicting pedestrian movements, traffic signal cycle length, and allocation of green time.

The operating characteristics of signalized can be estimated and evaluated by analyzing capacity and performance. The capacity of an intersection represents the throughput of a facility (i.e., the maximum number of vehicles that can be served in one hour). Capacity analysis results in the volume-to-capacity ratio (v/c ratio) which presents the proportion of capacity (supply) utilized by the existing traffic volume (demand). High v/c ratios (>0.85) indicate some traffic congestion, and low v/c ratios (<0.60) indicate a smooth traffic flow.

The performance of an intersection is based on the estimated average delay time (i.e., the average stopped time per vehicle) for each vehicle utilizing a roadway segment. Delay time is determined by the capacity of a lane group, the amount of green time allotted to a lane group, and the signal cycle length. Delay time is a factor which determines the LOS for a lane group. Short delays receive a good LOS while long delays receive a poor LOS.

Flow Quality	Description
Level A	Describes operation with very low delay, i.e., less than or equal to 10 seconds per vehicle. This occurs when progression is extremely favorable and most vehicles arrive during the green phase.
Level B	Describes operation with delay in the range of >10-20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths.
Level C	Describes operation with delay in the range of >20-35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths.
Level D	Describes operation with delay in the range of >35 -55 seconds per vehicle. At level D, the influence of congestion becomes more noticeable.
Level E	Describes operation with delay in the range of >55 – 80 seconds per vehicle. This is considered to be the limit of acceptable delay.
Level F	Describes operation with delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers.

Source: Highway Capacity Manual, Transportation Research Board, National Research Council, Washington, D.C., 2000.

Pedestrian Traffic

The pedestrian LOS on sidewalks or walkways is measured by the pedestrian flow rate per foot of width per minute (PFM). The PFM indicates the quality of pedestrian movement and comfort, and is defined by a density-comfort relationship (see table below).

Street corner and crosswalk analyses are more complex than the sidewalk analysis since they involve sidewalk flows, pedestrian crossings, and other queued pedestrians waiting for the traffic signal to change. The pedestrian LOS on street corners and crosswalks is measured in terms of square feet of space per pedestrian, as defined below, with the definitions of LOS A through F. The methodologies presented in the HCM 2000 were used to analyze the pedestrian LOS.

Flow Quality	Description	Density (PFM)	Space (sq ft/ ped)
LOS A	Unrestricted	< or = 5 PFM	> 60
LOS B	Slightly restricted	> 5 – 7 PFM	> 40 -60
LOS C	Restricted but fluid	> 7 – 10 PFM	> 24 - 40
LOS D	Restricted; necessary to continuously alter walking stride and direction	> 10 – 15 PFM	> 15 - 24
LOS E	Severely restricted	> 15 -23 PFM	> 8 - 15
LOS F	Forward progress only by shuffling; no reverse movement possible	> 23 PFM	< 8

Source: Highway Capacity Manual, Transportation Research Board, National Research Council, Washington, D.C., 2000.

See the following three schematic diagrams showing the numbering system for the analyzed walkways or locations (Figures Int-1, Int-2 and Int-3).

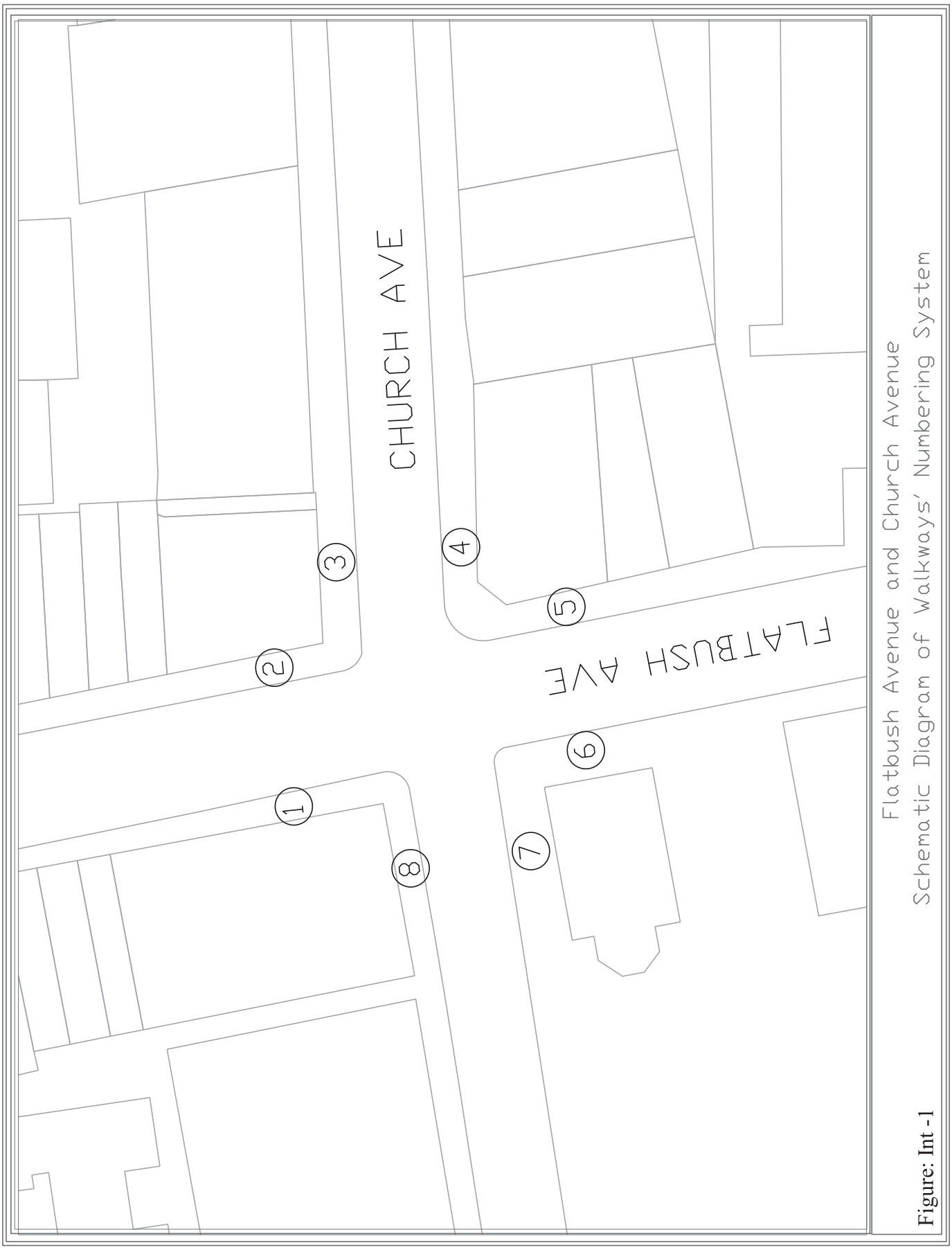

CHURCH AVE
FLATBUSH AVE
1
2
3
4
5
6
7
8
Flatbush Avenue and Church Avenue
Schematic Diagram of Walkways' Numbering System

Figure: Int -1

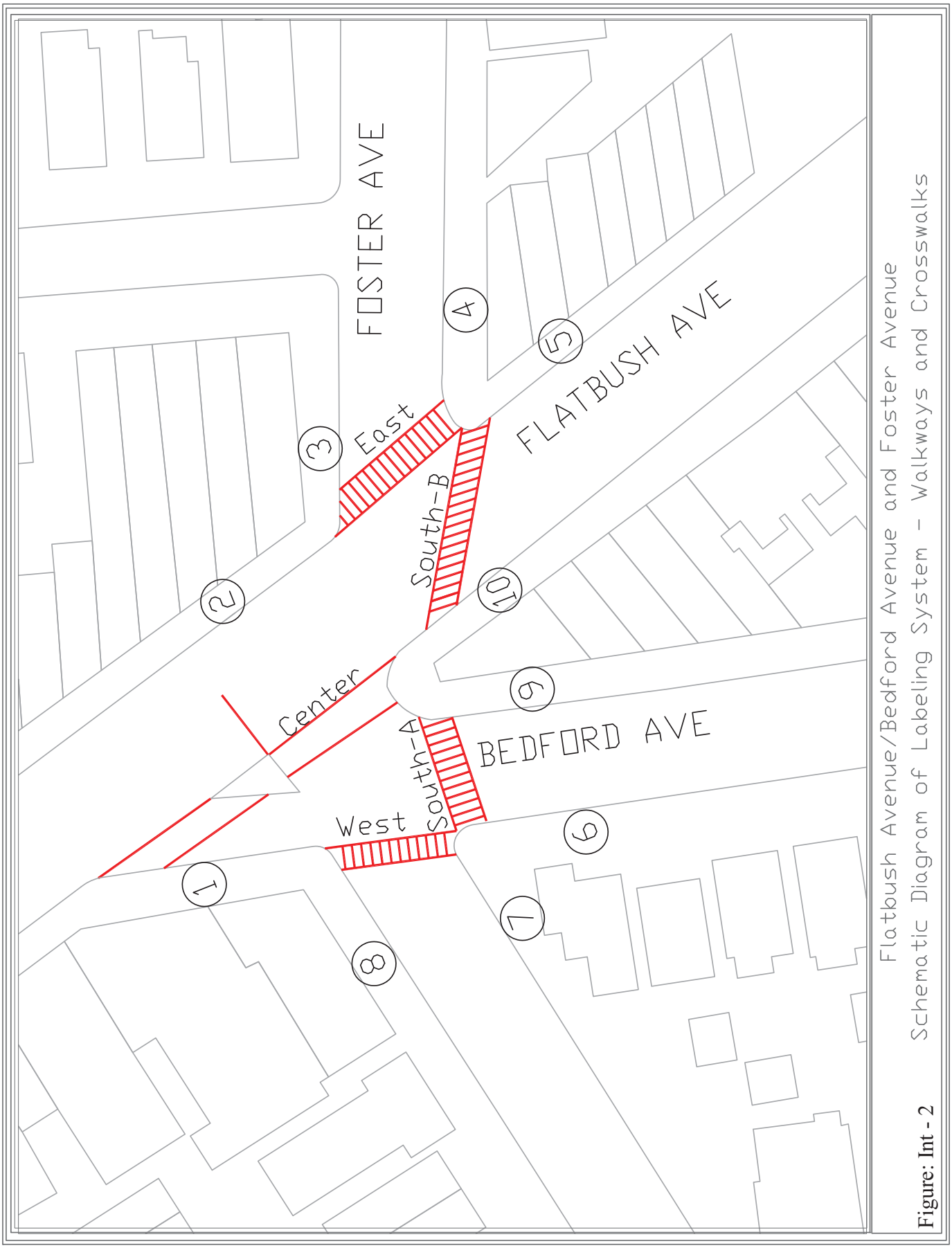

FOSTER AVE
FLATBUSH AVE
BEDFORD AVE
East
South-B
Center
South-A
West
1
2
3
4
5
6
7
8
9
10
Flatbush Avenue/Bedford Avenue and Foster Avenue
Schematic Diagram of Labeling System - Walkways and Crosswalks

Figure: Int - 2

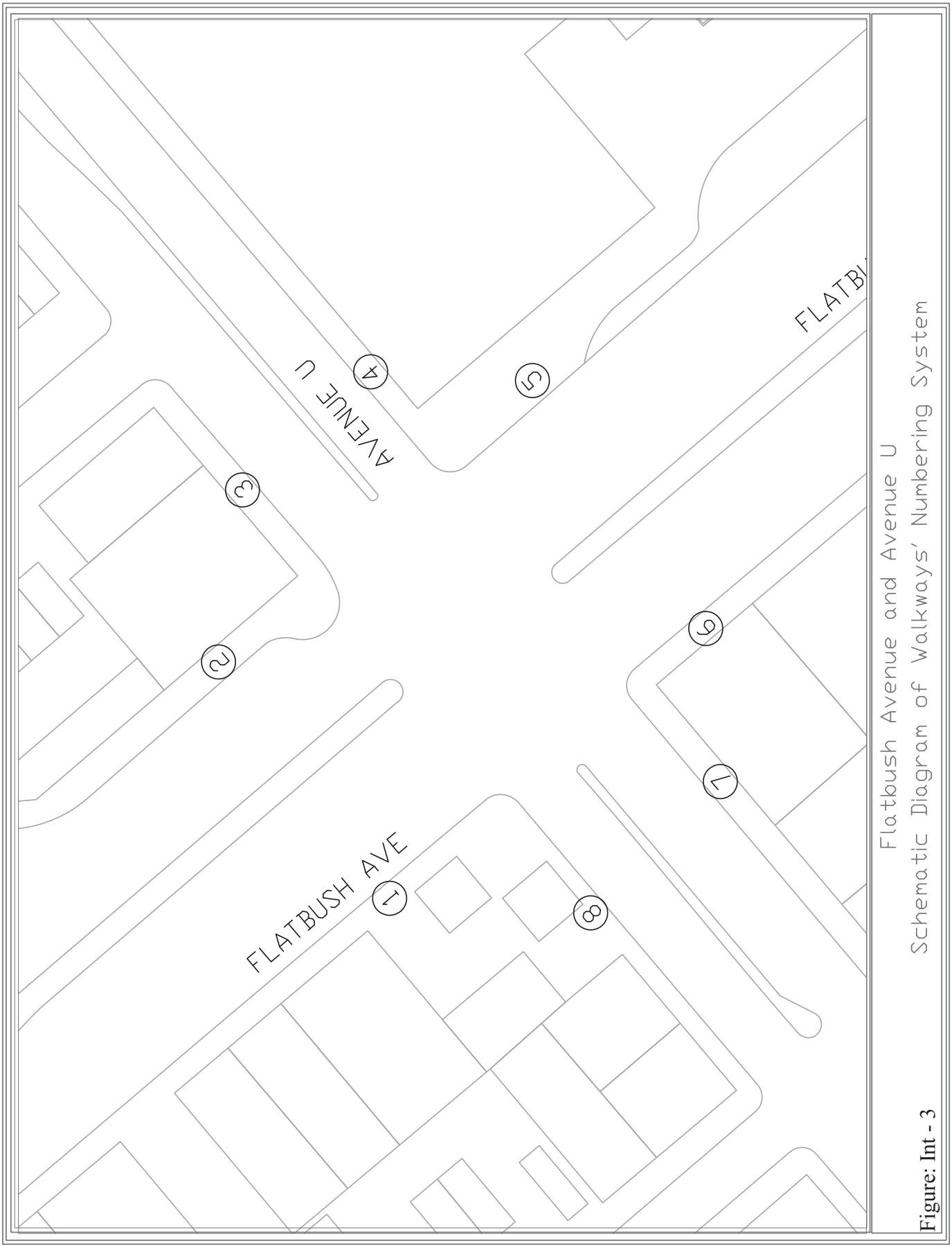
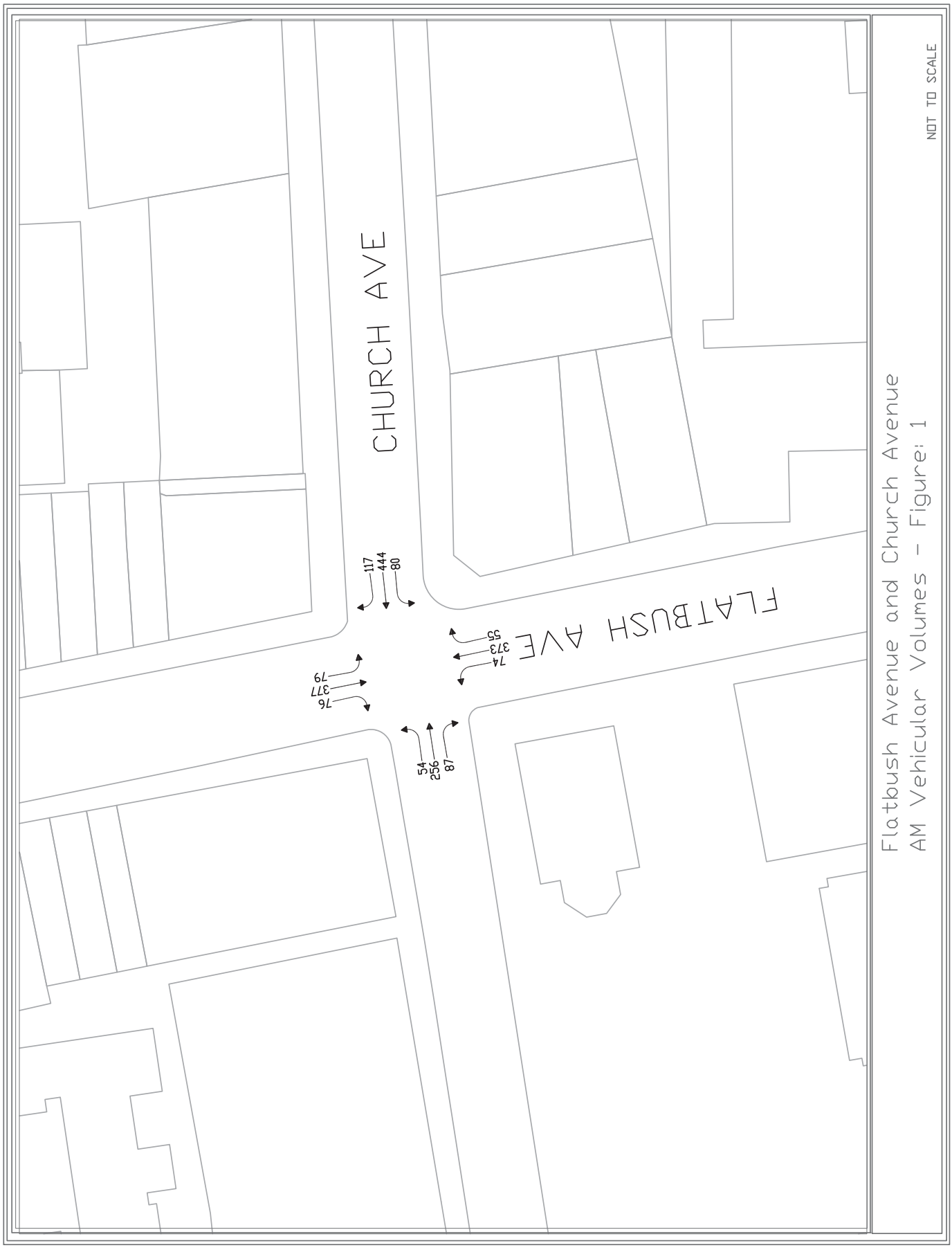

Flatbush Avenue and Avenue U
Schematic Diagram of Walkways' Numbering System
FLATBUSH AVE
AVENUE U
FLATBU
1
2
3
4
5
6
7
8

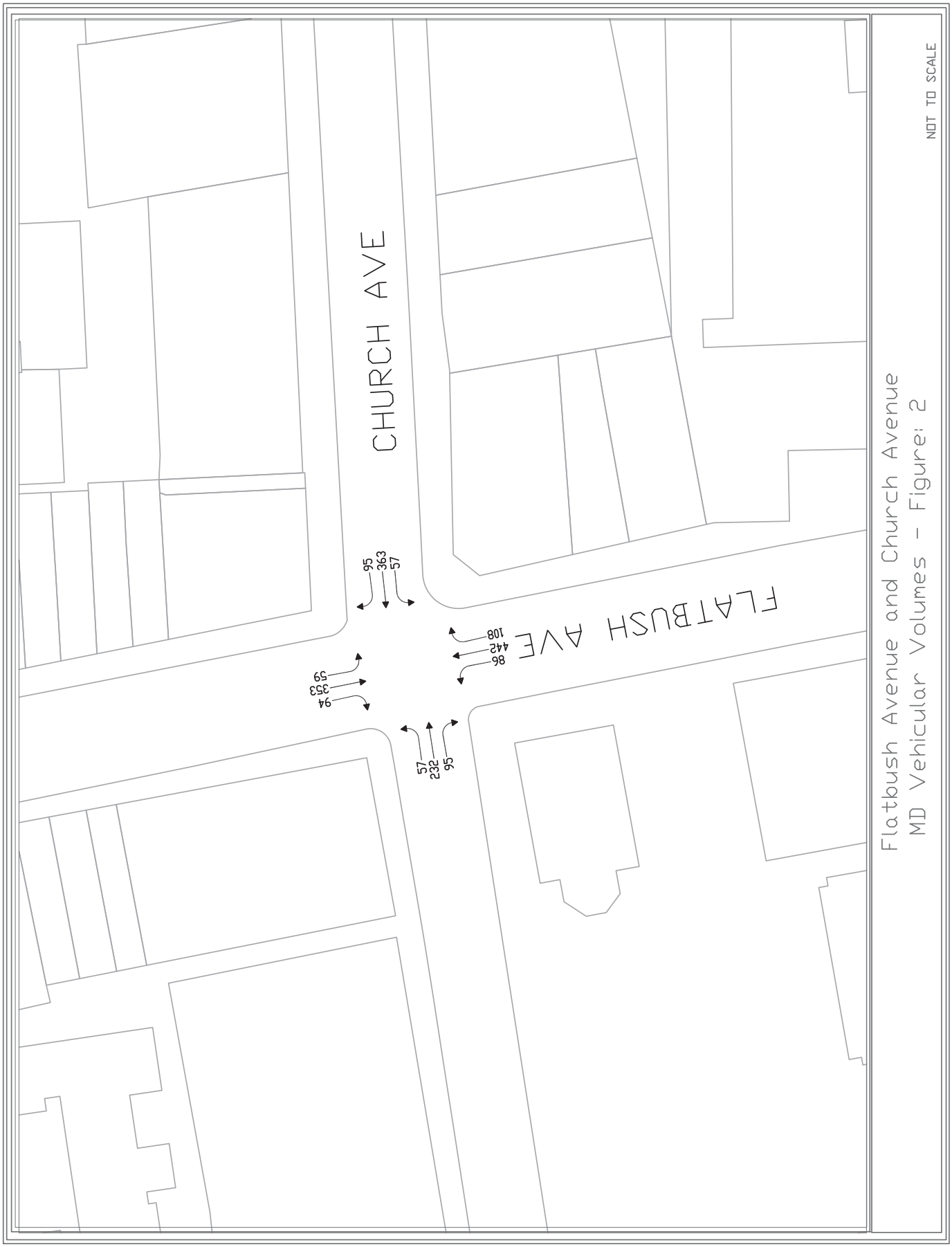
Figure: Int - 3

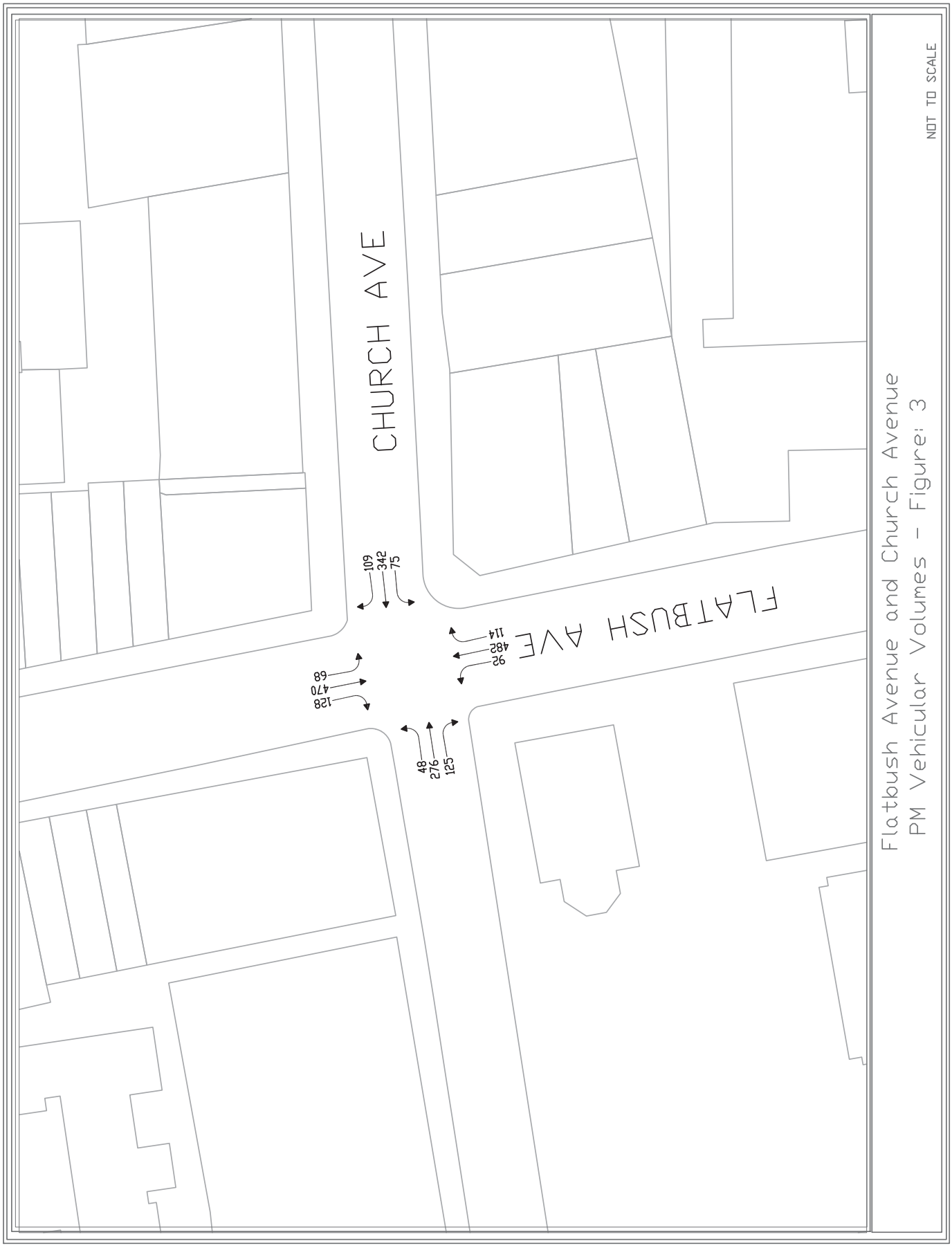
Vehicular and Pedestrian Traffic Volumes Collected

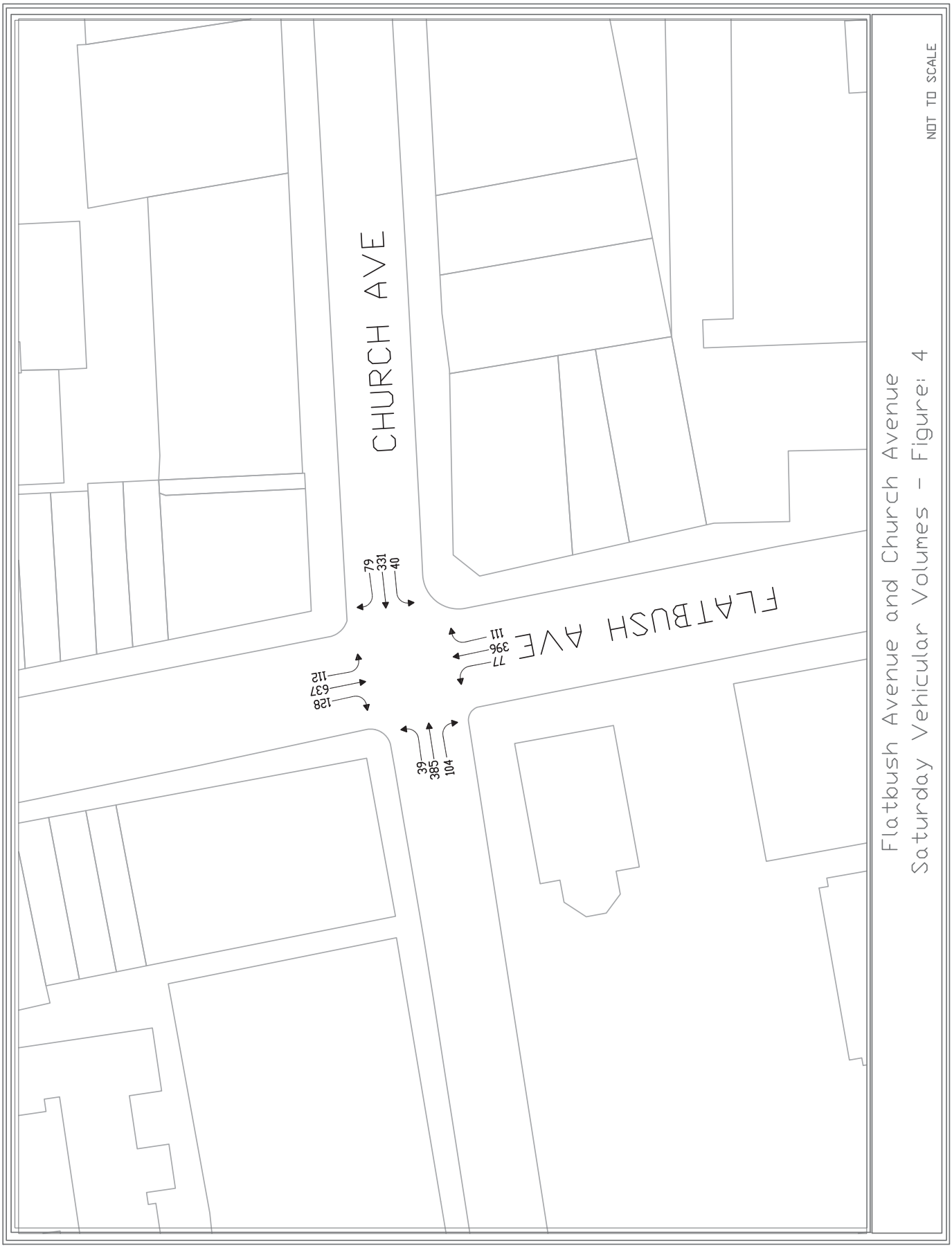
Vehicular and pedestrian traffic volumes for the LOS analysis were collected during the peak hours of the weekday:
7:00 – 9:00 AM
12:00 – 2:00 PM
4:00 – 6:00 PM
and on a Saturday during the midday peak hours from 1:00 – 3:00 PM.

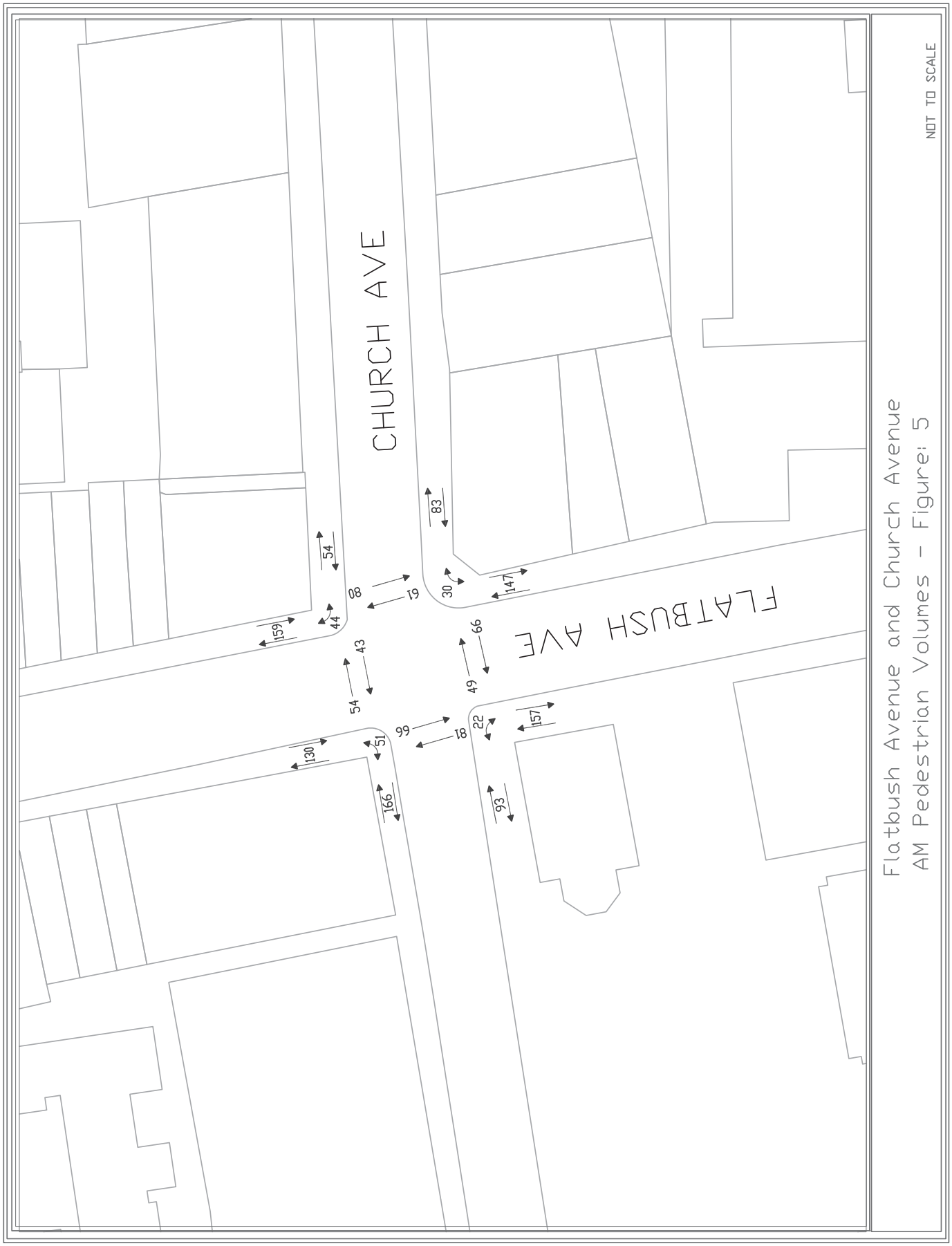
See following intersection maps (Figures 1-24) in Appendix D-1 for detailed traffic and pedestrian volumes.

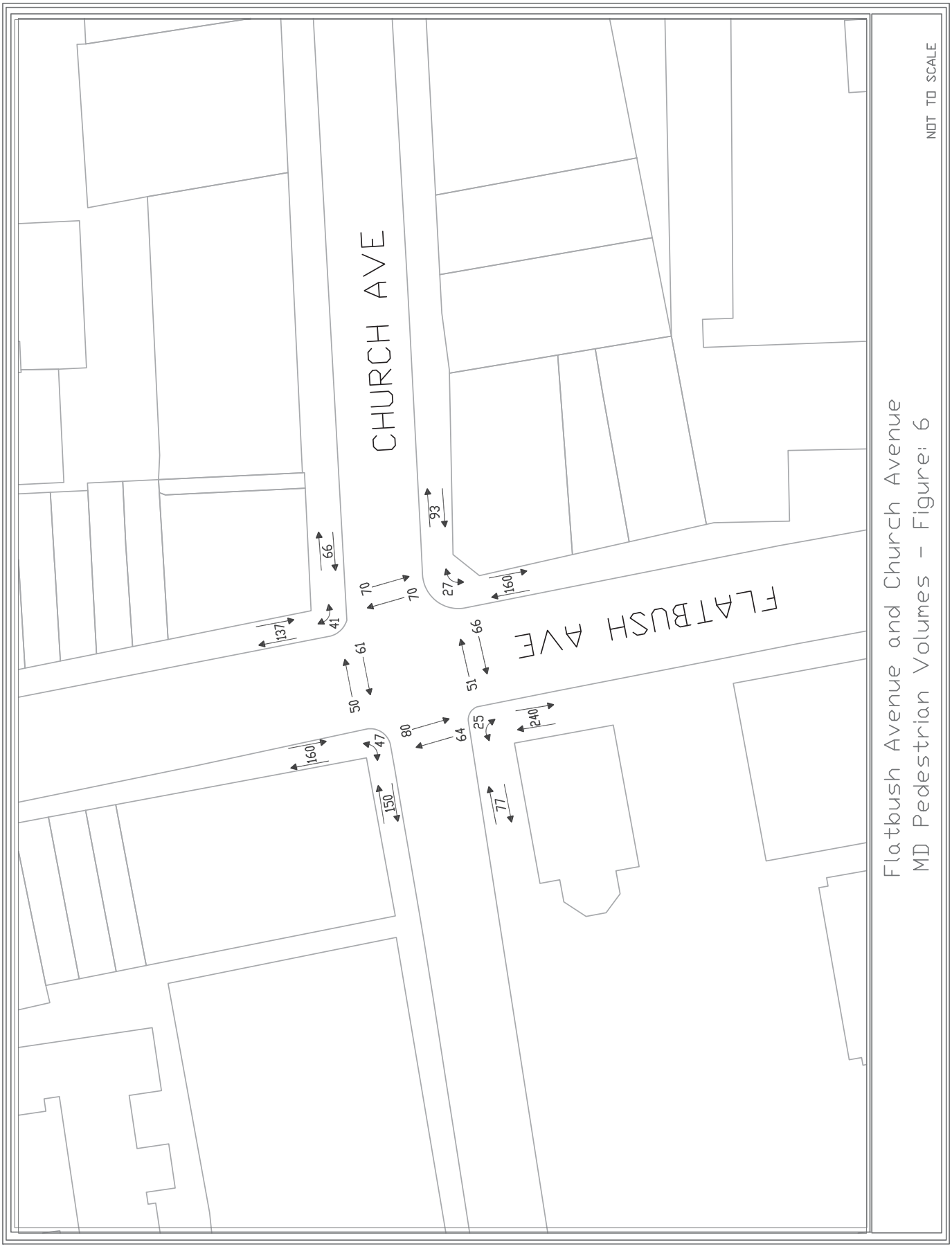

CHURCH AVE
FLATBUSH AVE
117
444
80
55
373
74
79
377
76
54
256
87
NOT TO SCALE
Flatbush Avenue and Church Avenue
AM Vehicular Volumes - Figure: 1

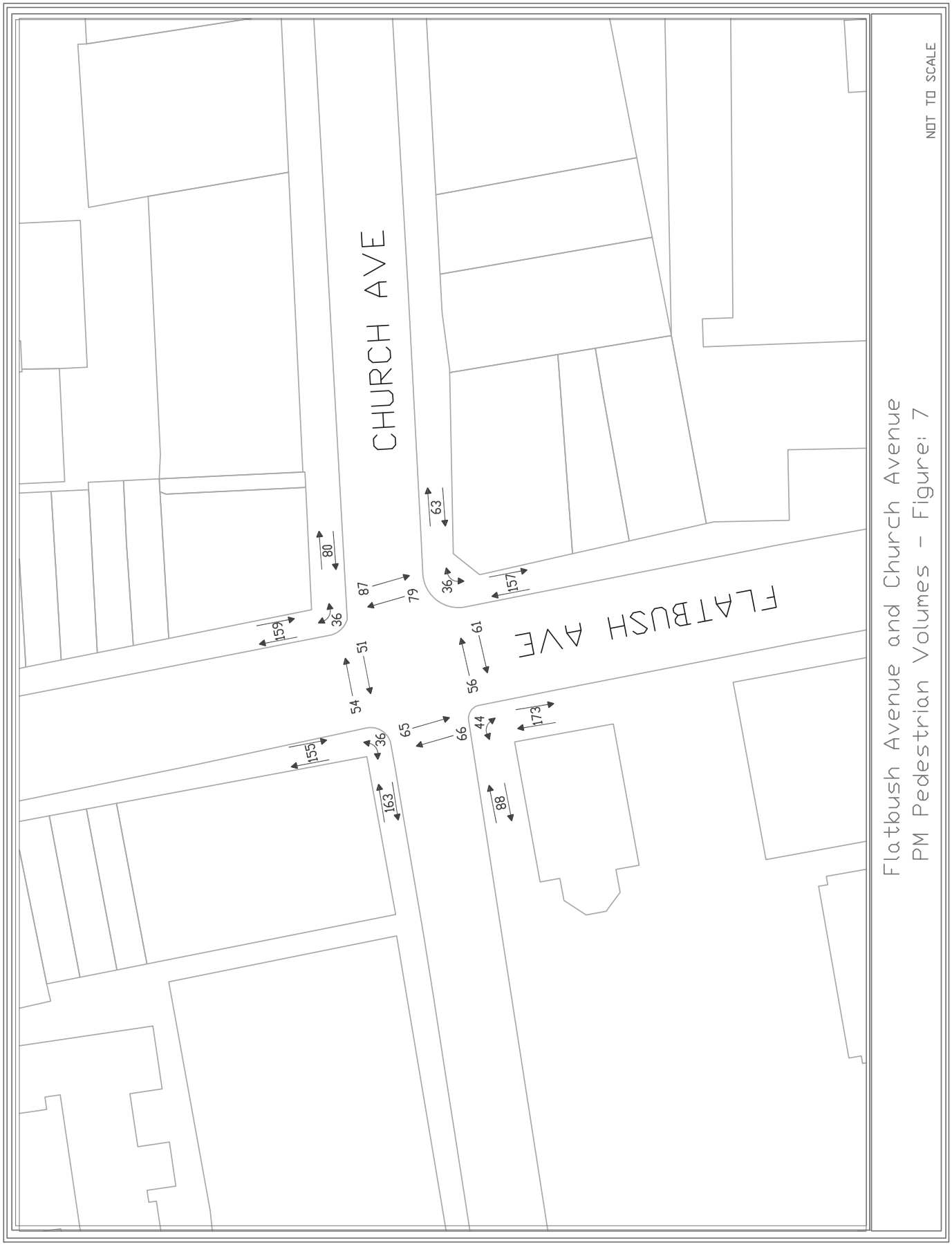

CHURCH AVE
FLATBUSH AVE
95
363
57
108
442
86
59
353
94
57
232
95
NOT TO SCALE
Flatbush Avenue and Church Avenue
MD Vehicular Volumes - Figure: 2


CHURCH AVE
FLATBUSH AVE
109
342
75
114
482
92
68
470
128
48
276
125
NOT TO SCALE
Flatbush Avenue and Church Avenue
PM Vehicular Volumes - Figure: 3

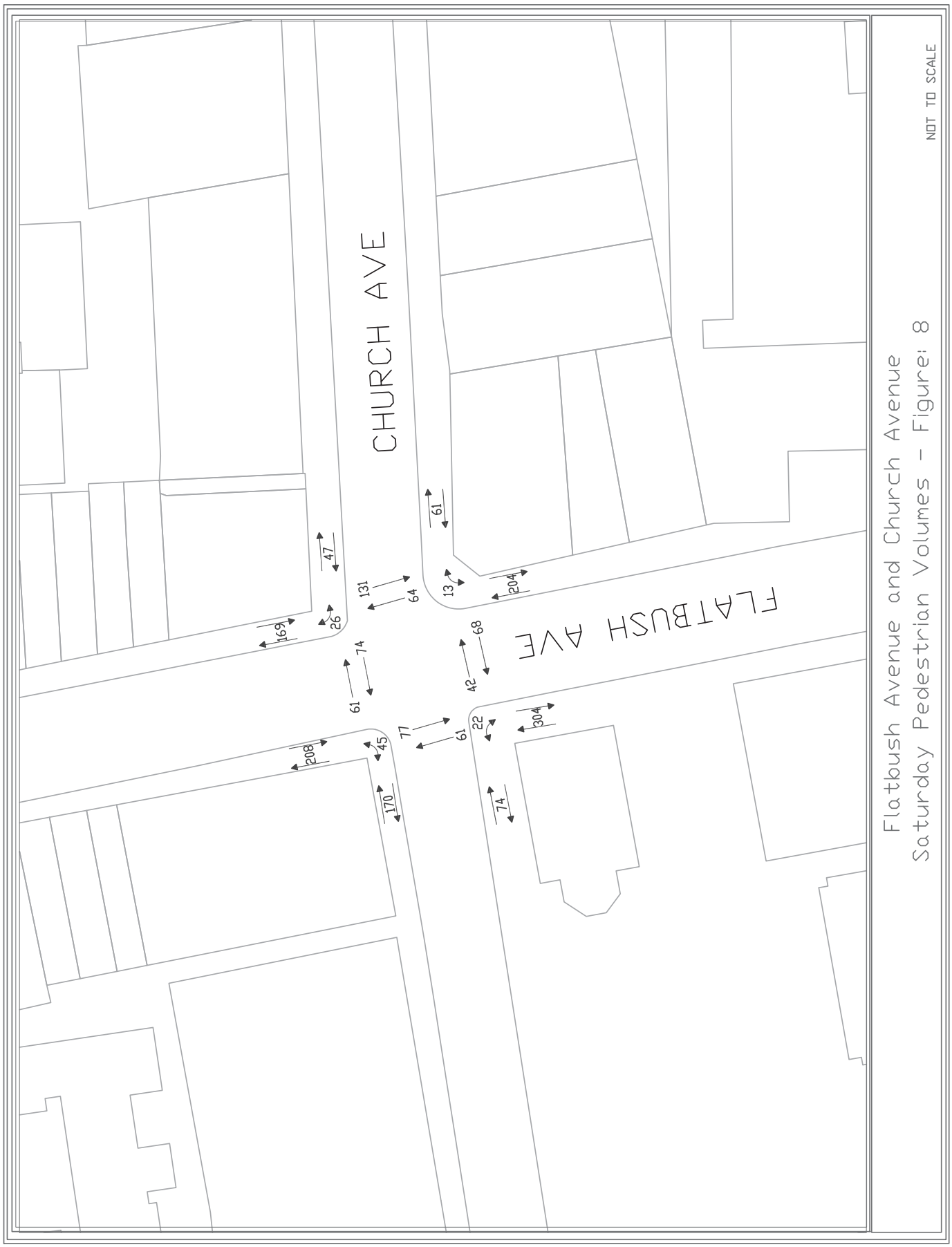

CHURCH AVE
FLATBUSH AVE
79
331
40
111
396
77
112
637
128
39
385
104
NOT TO SCALE
Flatbush Avenue and Church Avenue
Saturday Vehicular Volumes - Figure: 4

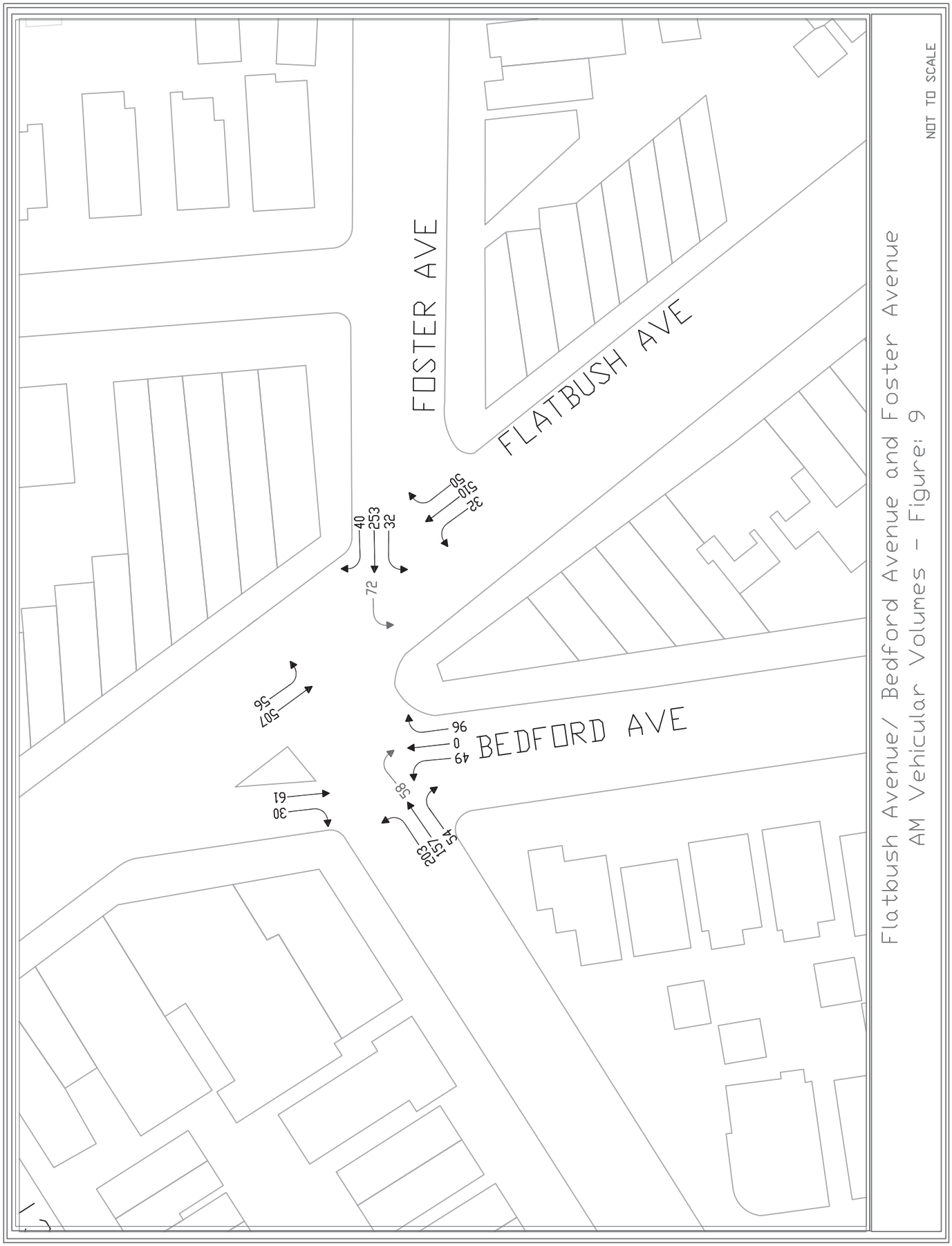

CHURCH AVE
FLATBUSH AVE
NOT TO SCALE
Flatbush Avenue and Church Avenue
AM Pedestrian Volumes - Figure: 5
54
83
80
61
30
147
159
44
43
54
66
49
99
81
22
157
130
51
166
93

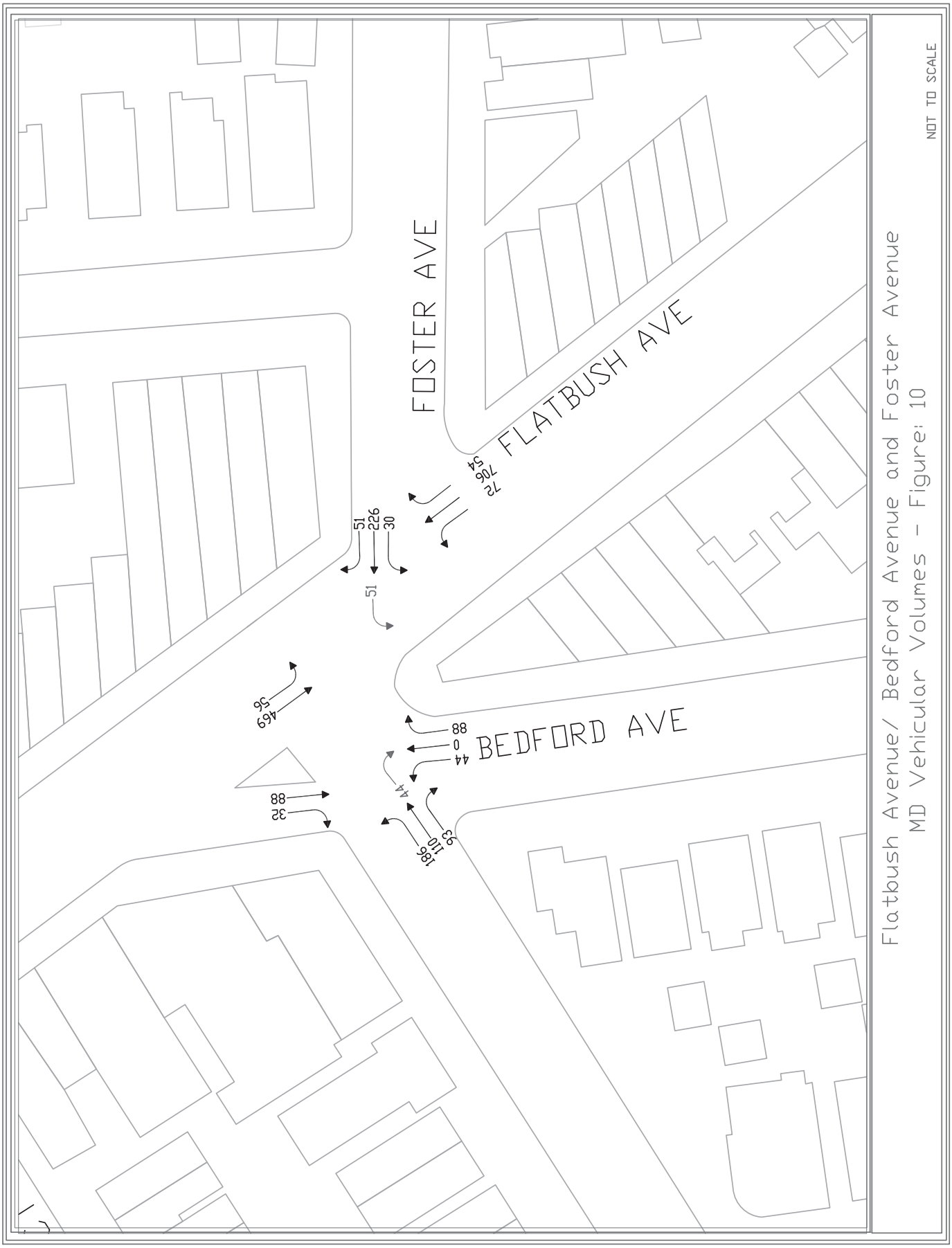

CHURCH AVE
FLATBUSH AVE
66
70
70
93
27
160
137
41
61
50
66
51
80
64
25
240
160
47
150
77
NOT TO SCALE
Flatbush Avenue and Church Avenue
MD Pedestrian Volumes - Figure: 6

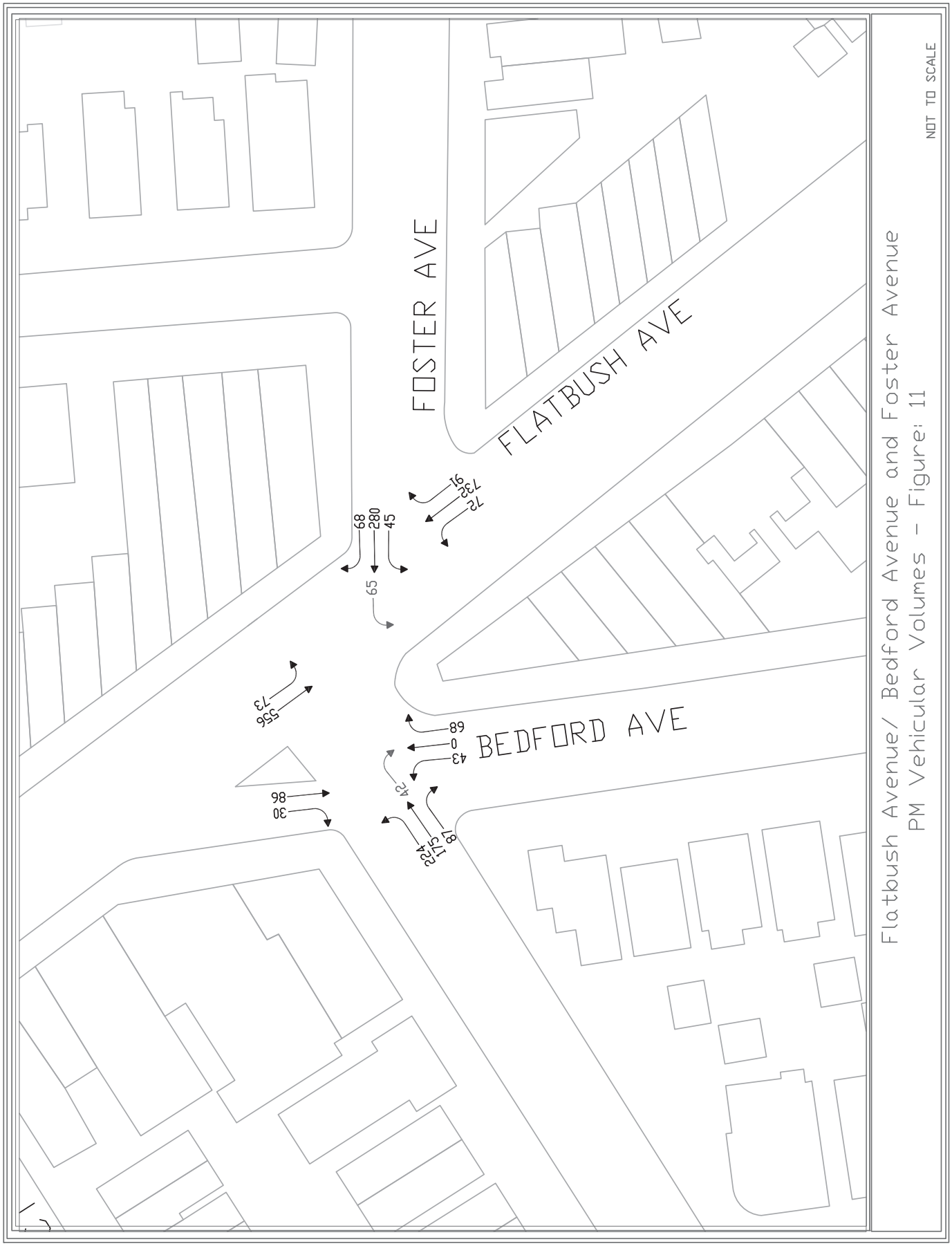


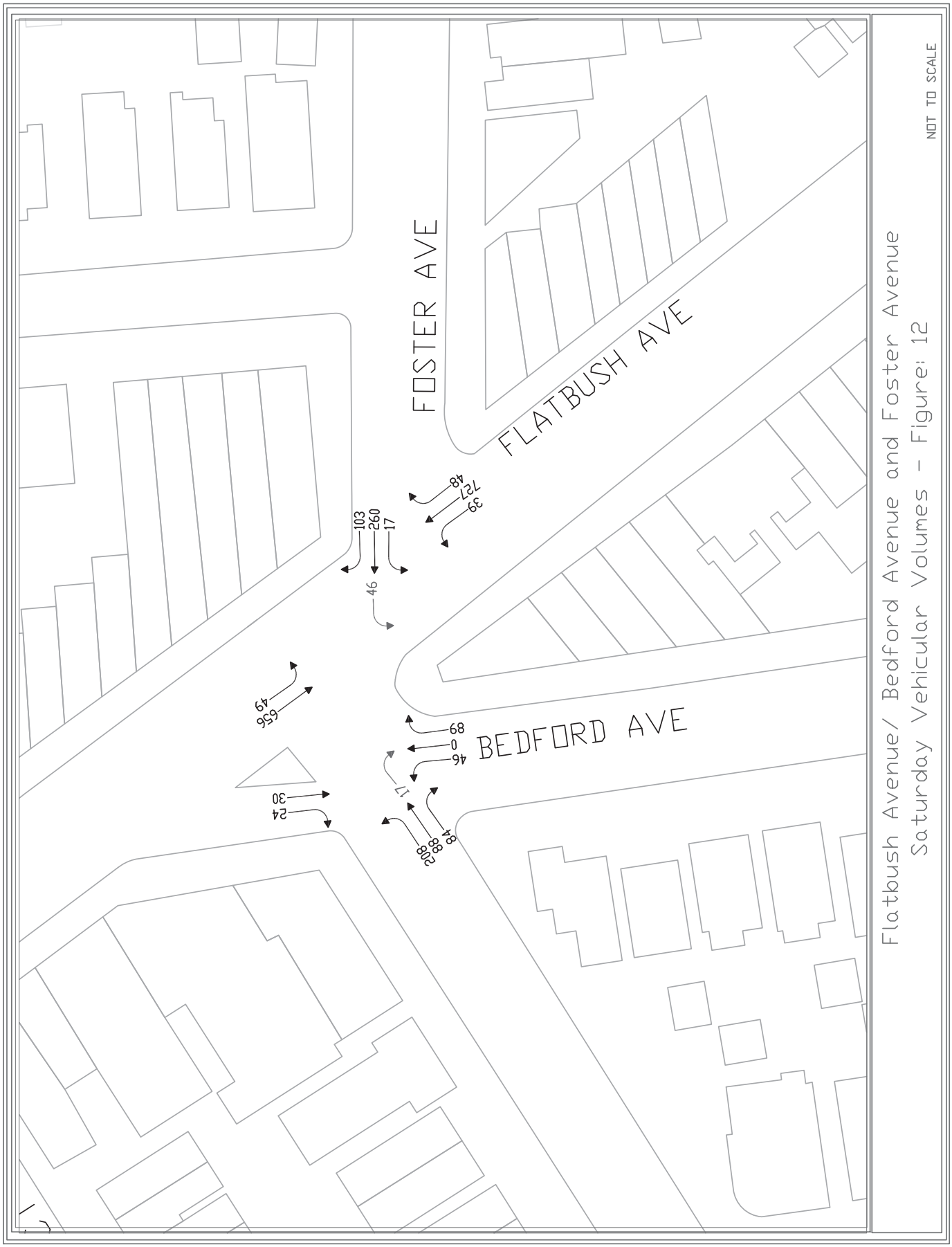
Flatbush Avenue and Church Avenue
PM Pedestrian Volumes - Figure: 7

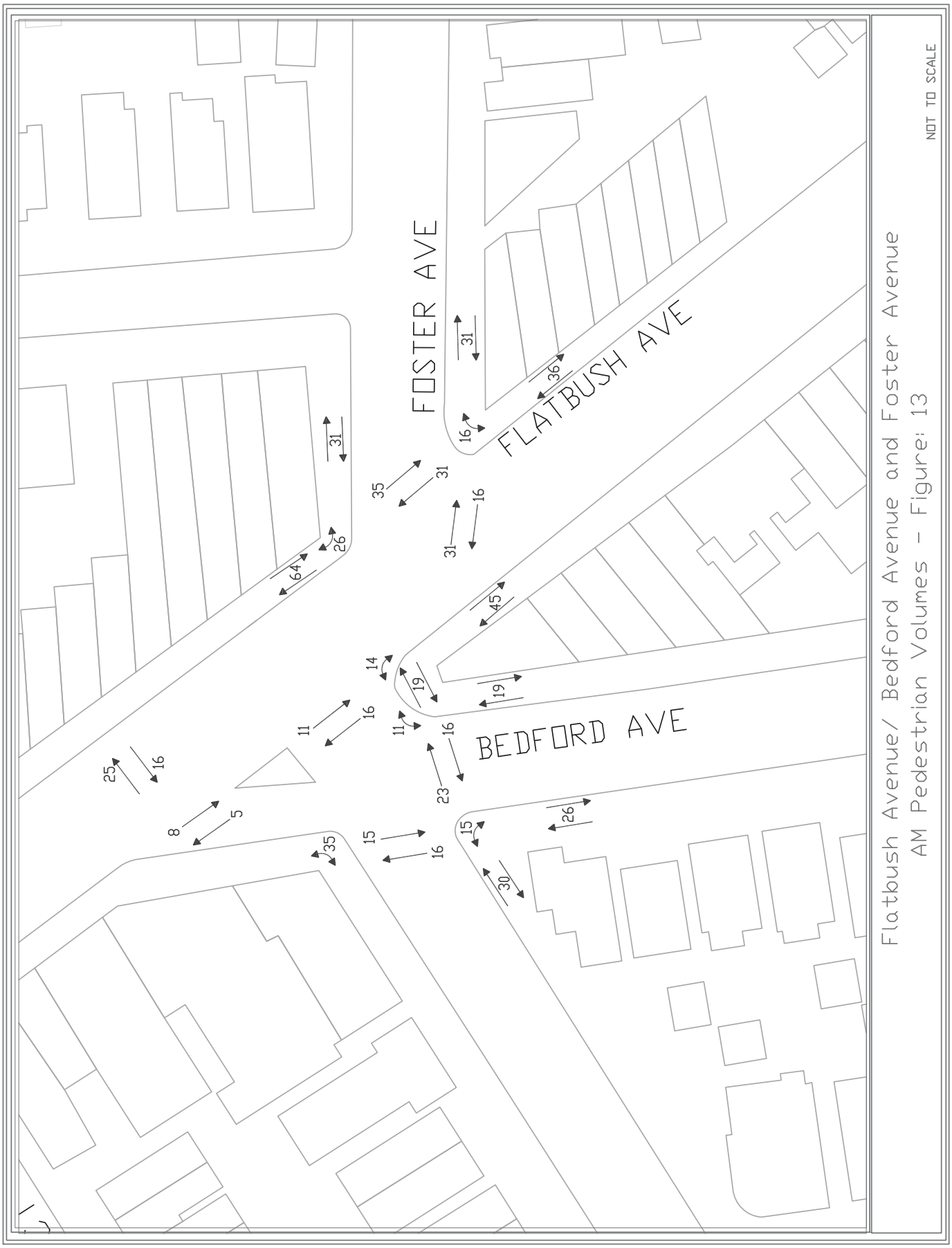

CHURCH AVE
FLATBUSH AVE
47
169
26
131
64
61
13
204
74
61
68
42
77
61
22
304
208
45
170
74
NOT TO SCALE
Flatbush Avenue and Church Avenue
Saturday Pedestrian Volumes - Figure: 8

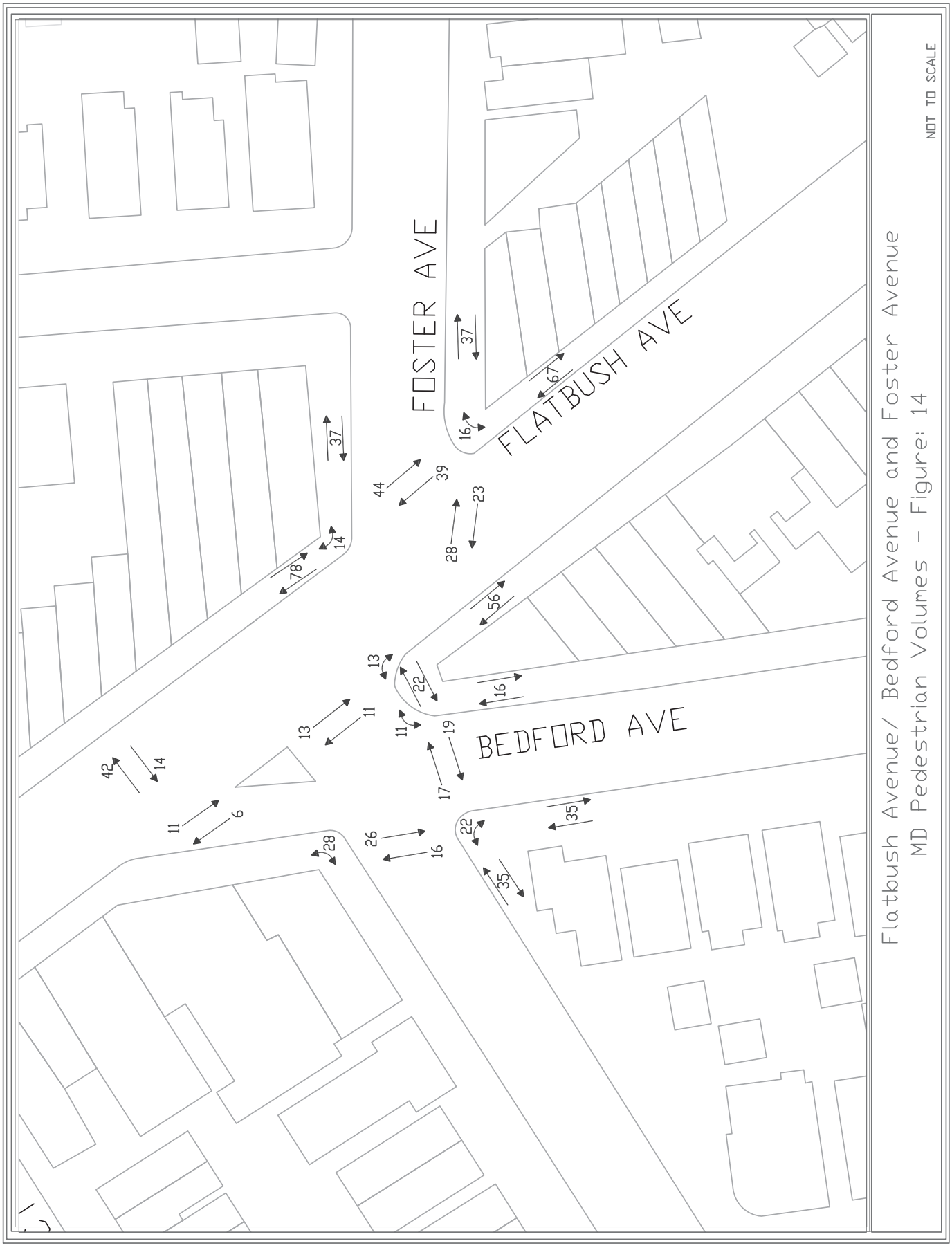

FOSTER AVE
FLATBUSH AVE
BEDFORD AVE
40
253
32
72
50
510
32
507
56
96
0
49
58
61
30
24
152
138
NOT TO SCALE
Flatbush Avenue/ Bedford Avenue and Foster Avenue
AM Vehicular Volumes - Figure: 9

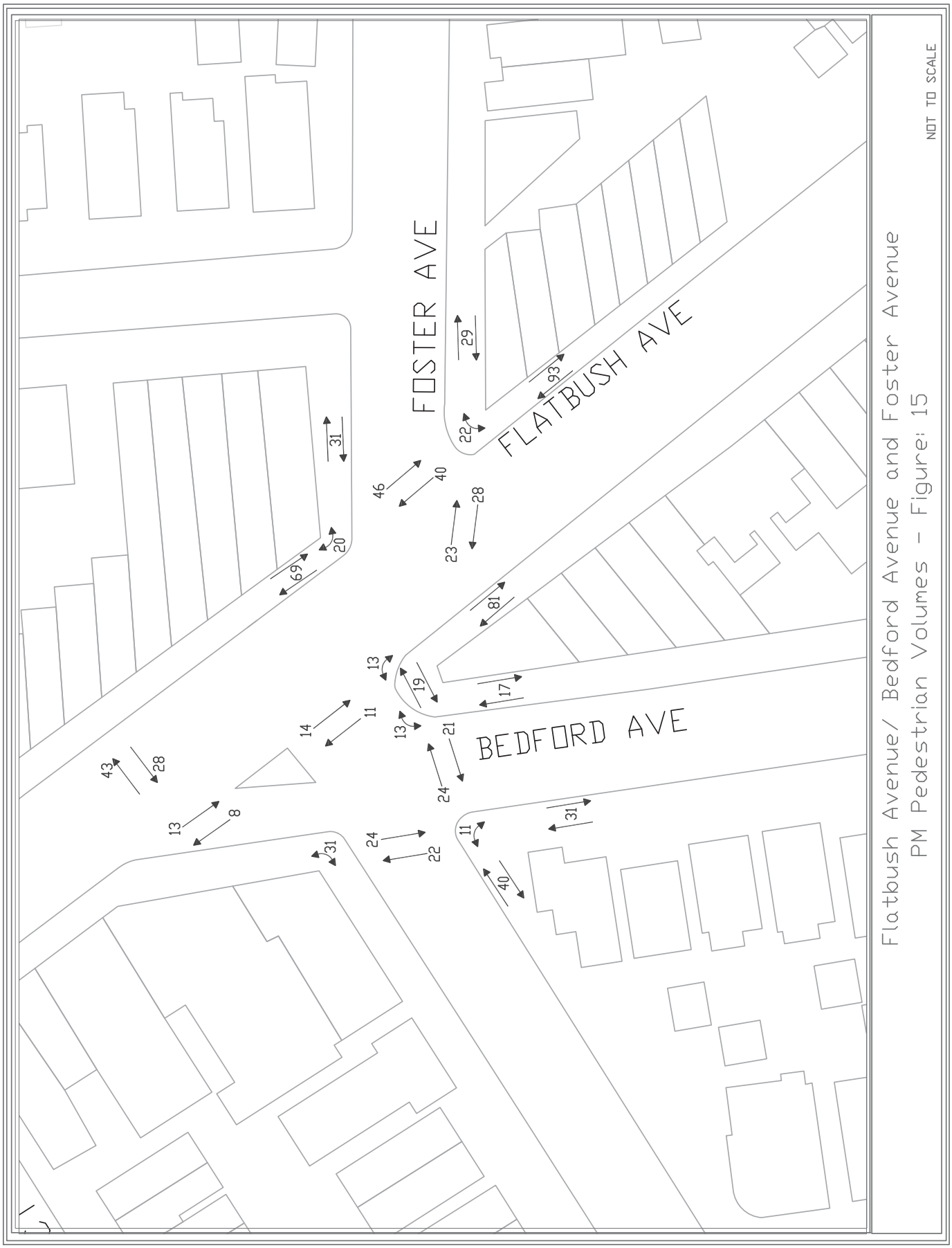

FOSTER AVE
FLATBUSH AVE
BEDFORD AVE
NOT TO SCALE
Flatbush Avenue/ Bedford Avenue and Foster Avenue
MD Vehicular Volumes - Figure: 10

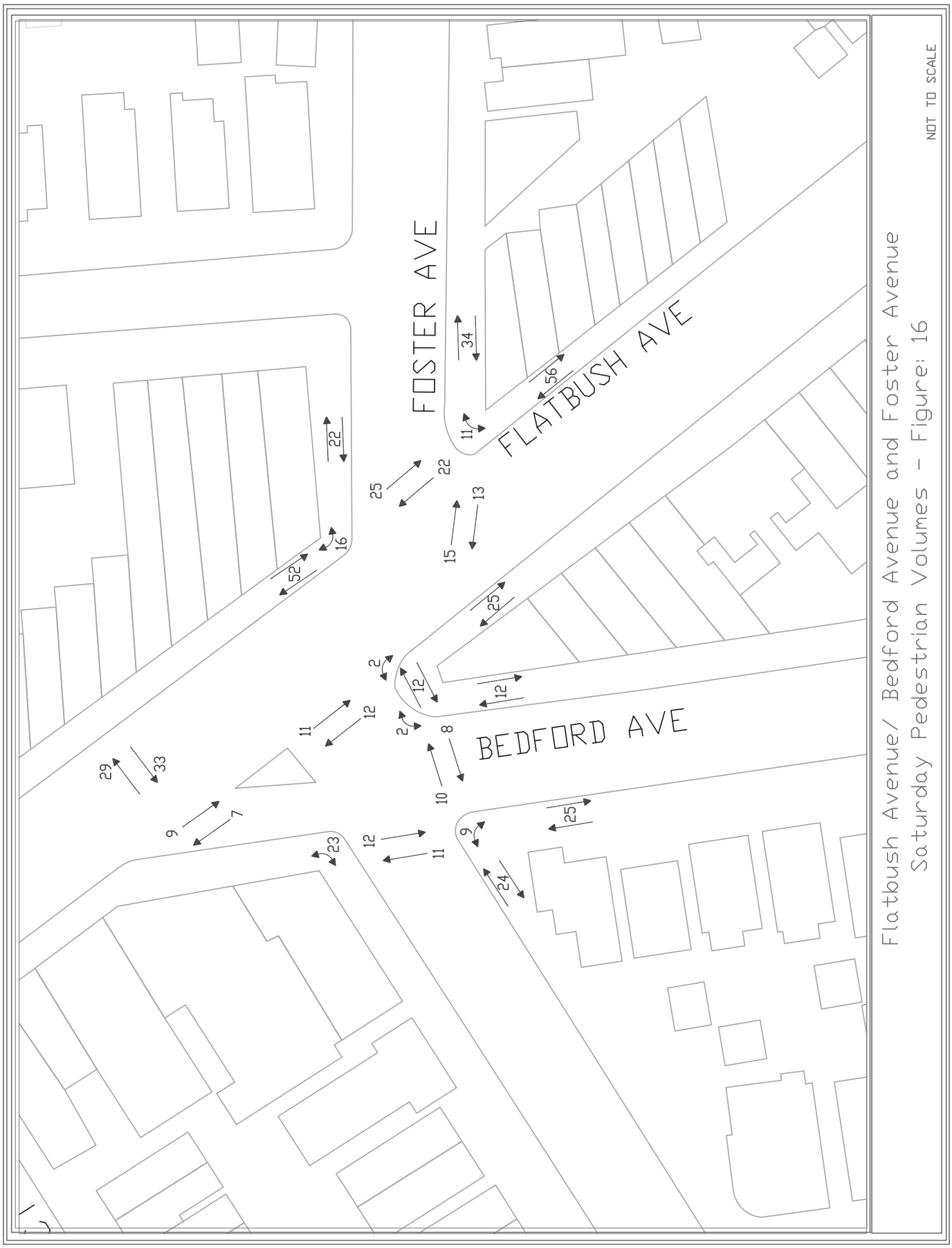

FOSTER AVE
FLATBUSH AVE
BEDFORD AVE
68
280
45
65
91
732
72
556
73
68
0
43
42
98
30
89
1172
428
NOT TO SCALE
Flatbush Avenue/ Bedford Avenue and Foster Avenue
PM Vehicular Volumes - Figure: 11

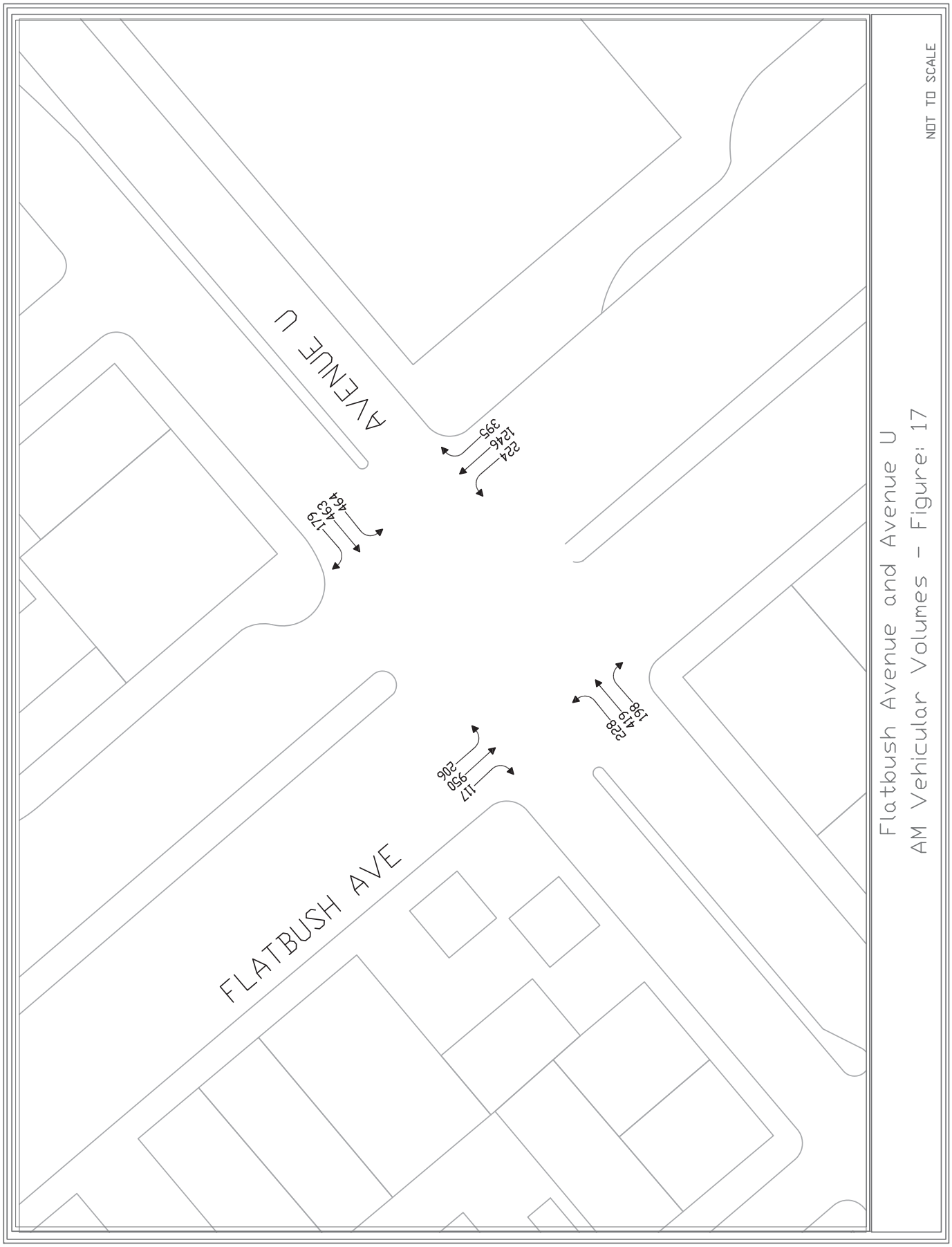

FOSTER AVE
FLATBUSH AVE
BEDFORD AVE
103
260
17
46
48
727
39
656
49
89
0
46
17
30
24
88
208
88
NOT TO SCALE
Flatbush Avenue/ Bedford Avenue and Foster Avenue
Saturday Vehicular Volumes - Figure: 12

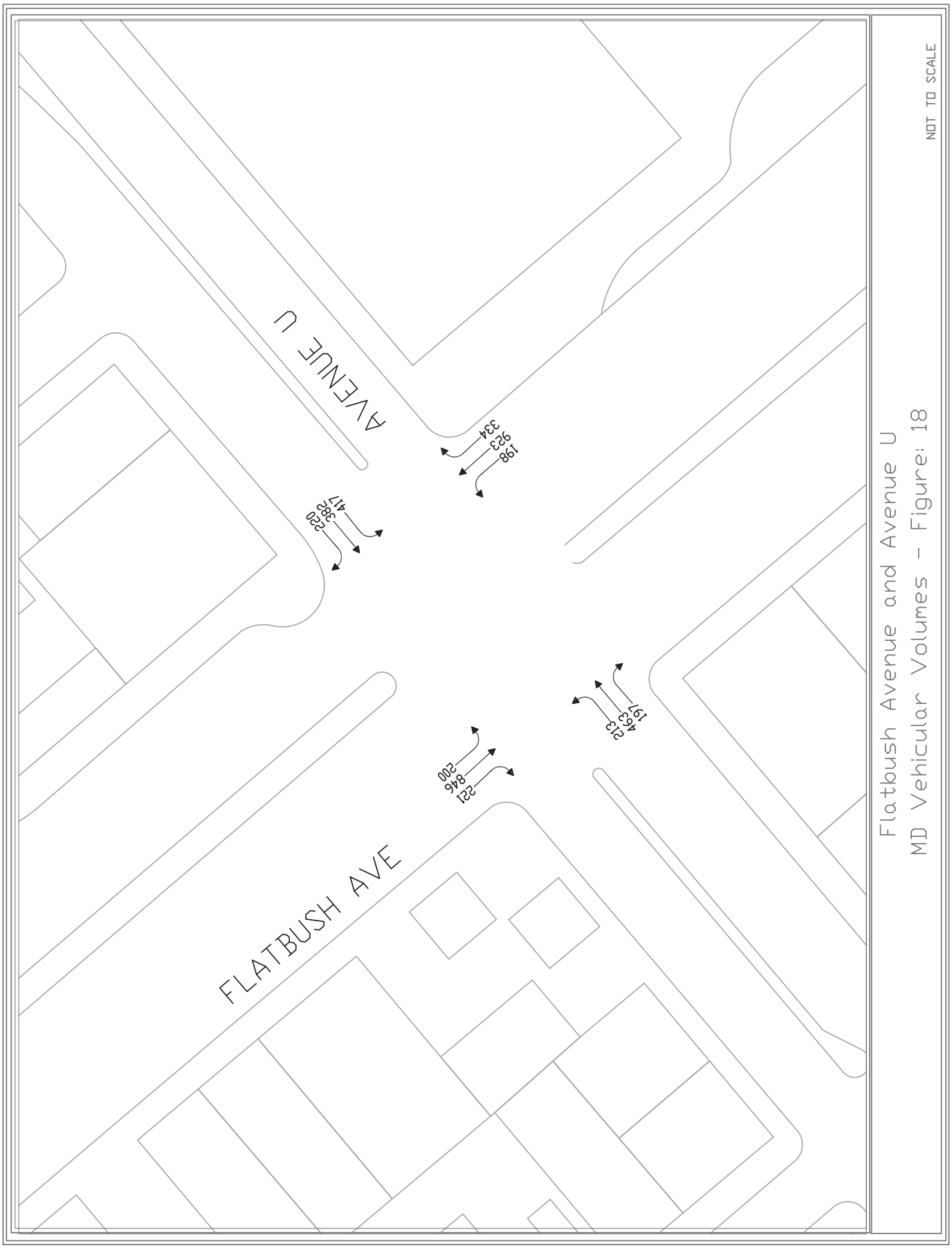

FOSTER AVE
FLATBUSH AVE
BEDFORD AVE
NOT TO SCALE
Flatbush Avenue/ Bedford Avenue and Foster Avenue
AM Pedestrian Volumes - Figure: 13

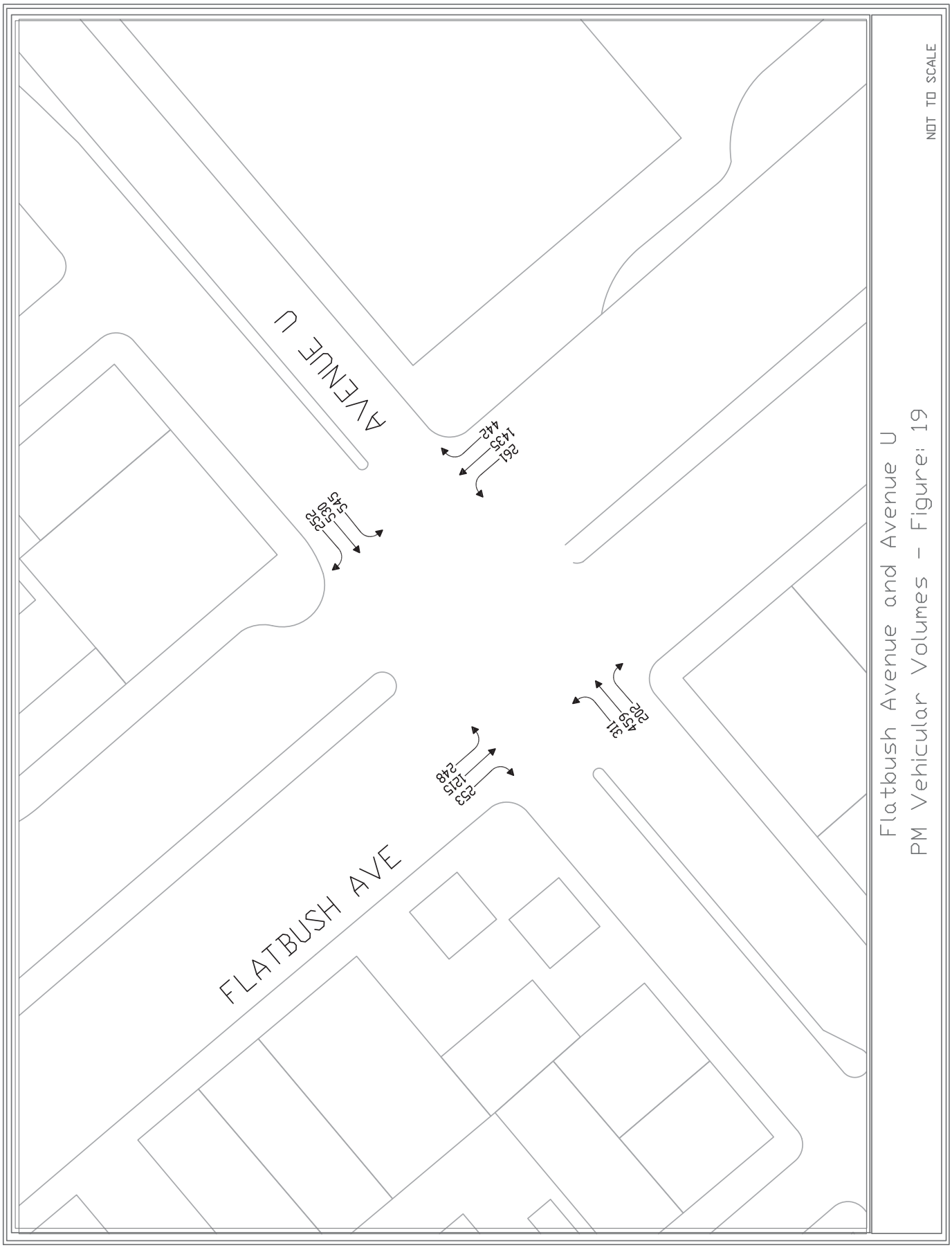

FOSTER AVE
FLATBUSH AVE
BEDFORD AVE
37
67
16
44
39
23
28
37
14
78
56
13
22
16
13
11
11
19
42
14
17
11
6
35
22
26
16
28
35
NOT TO SCALE
Flatbush Avenue/ Bedford Avenue and Foster Avenue
MD Pedestrian Volumes - Figure: 14

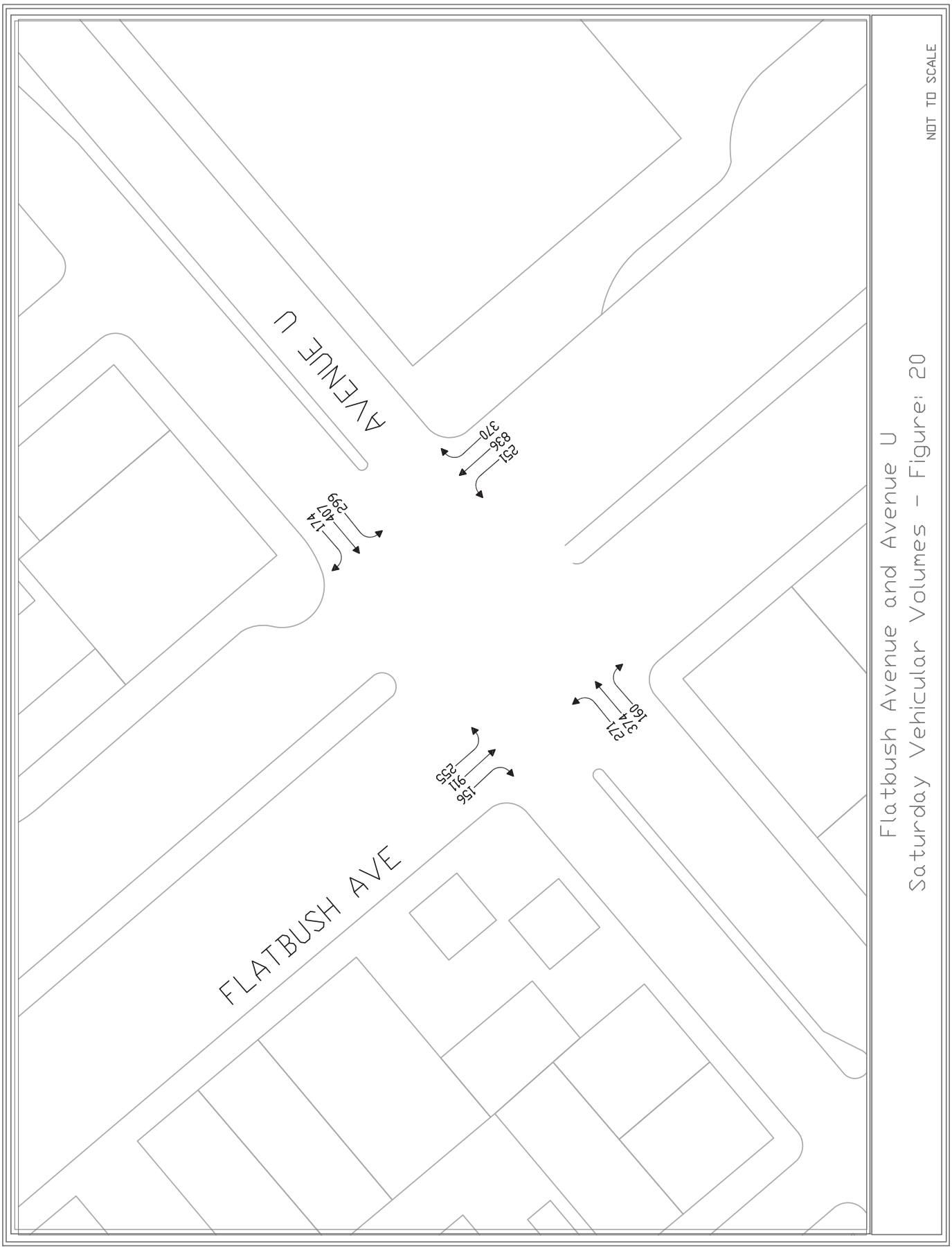

FOSTER AVE
FLATBUSH AVE
BEDFORD AVE
NOT TO SCALE
Flatbush Avenue/ Bedford Avenue and Foster Avenue
PM Pedestrian Volumes - Figure: 15

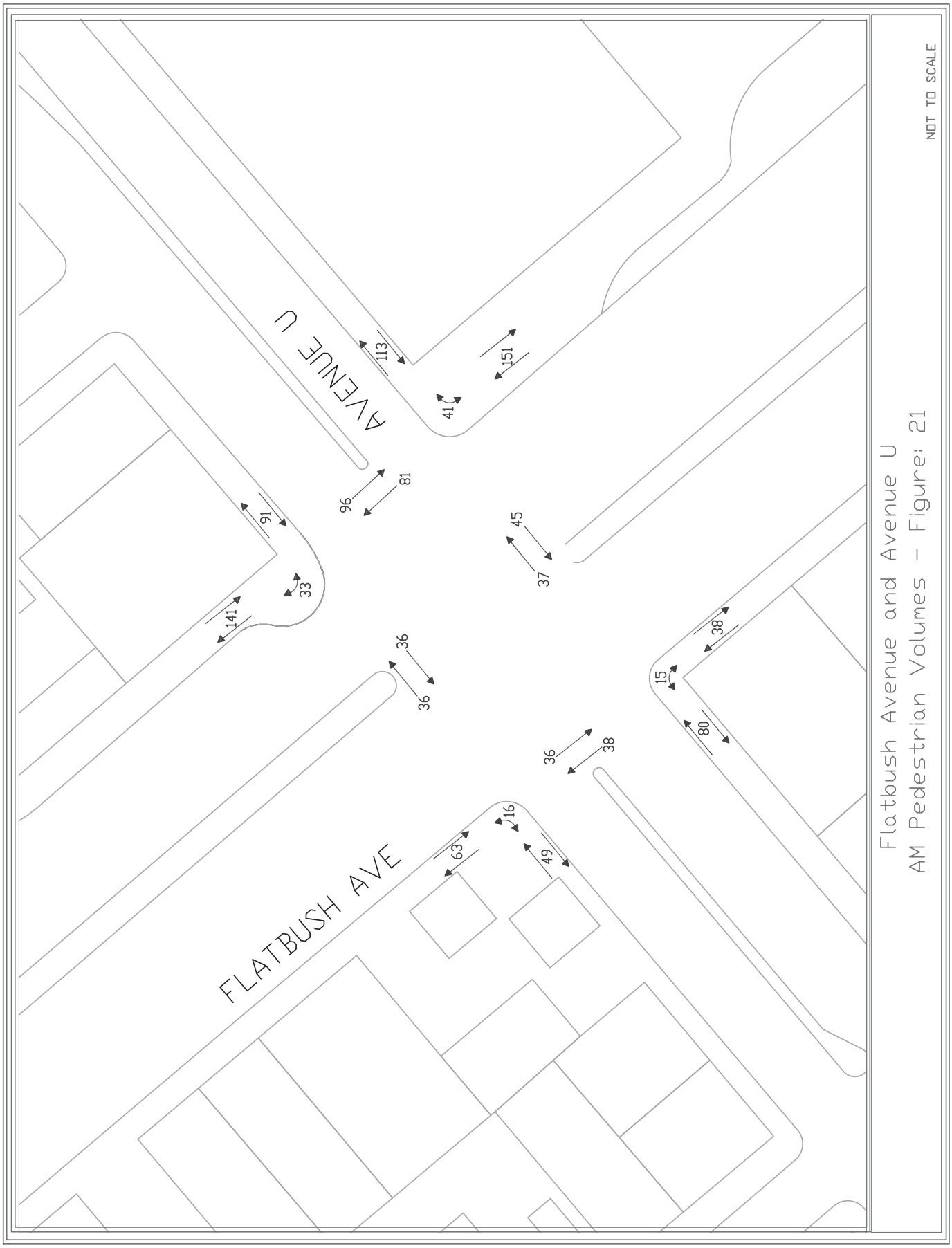

FOSTER AVE
FLATBUSH AVE
BEDFORD AVE
NOT TO SCALE
Flatbush Avenue/ Bedford Avenue and Foster Avenue
Saturday Pedestrian Volumes - Figure: 16

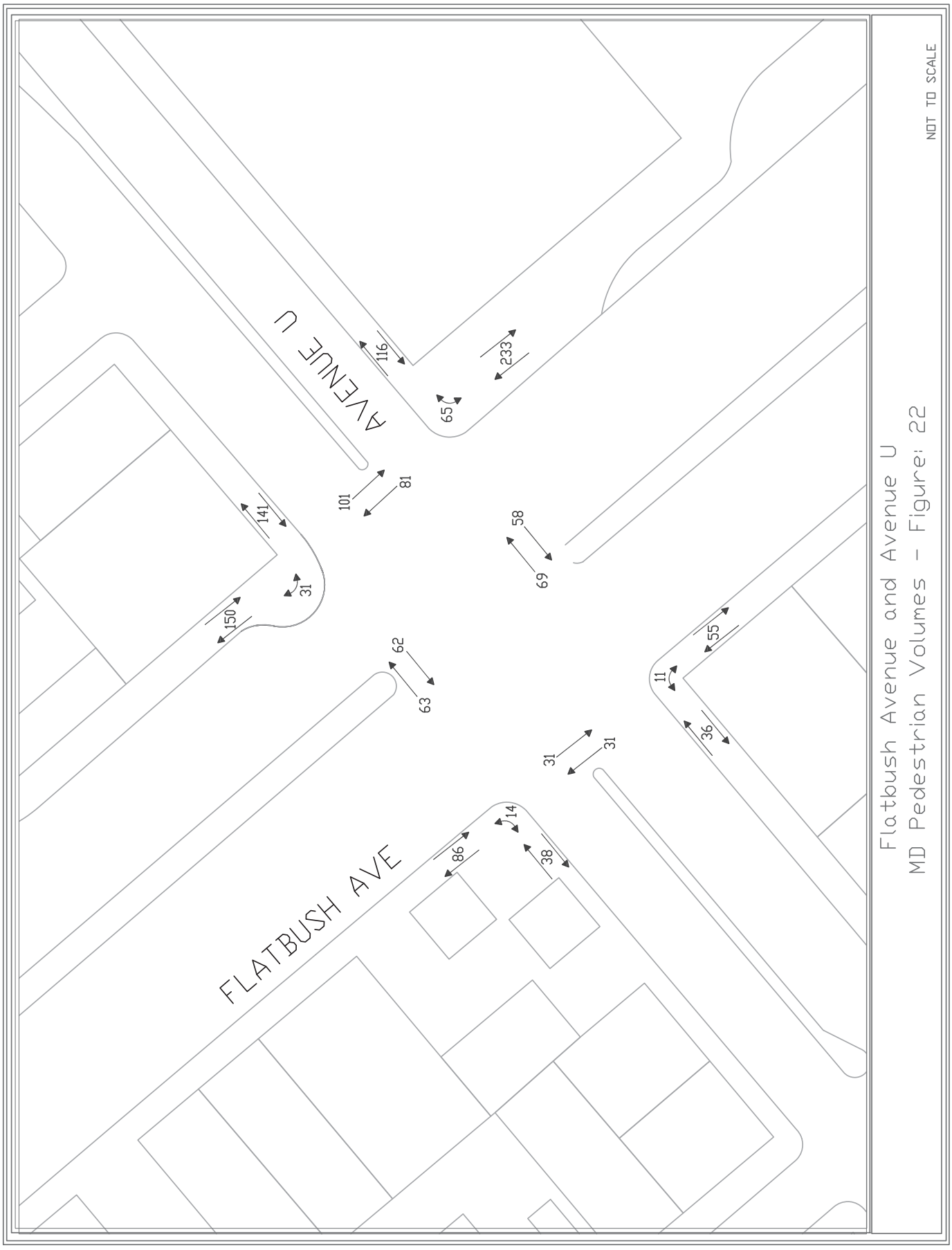

AVENUE U
FLATBUSH AVE
224
1246
395
179
463
464
228
419
198
117
950
206
Flatbush Avenue and Avenue U
AM Vehicular Volumes - Figure: 17
NOT TO SCALE

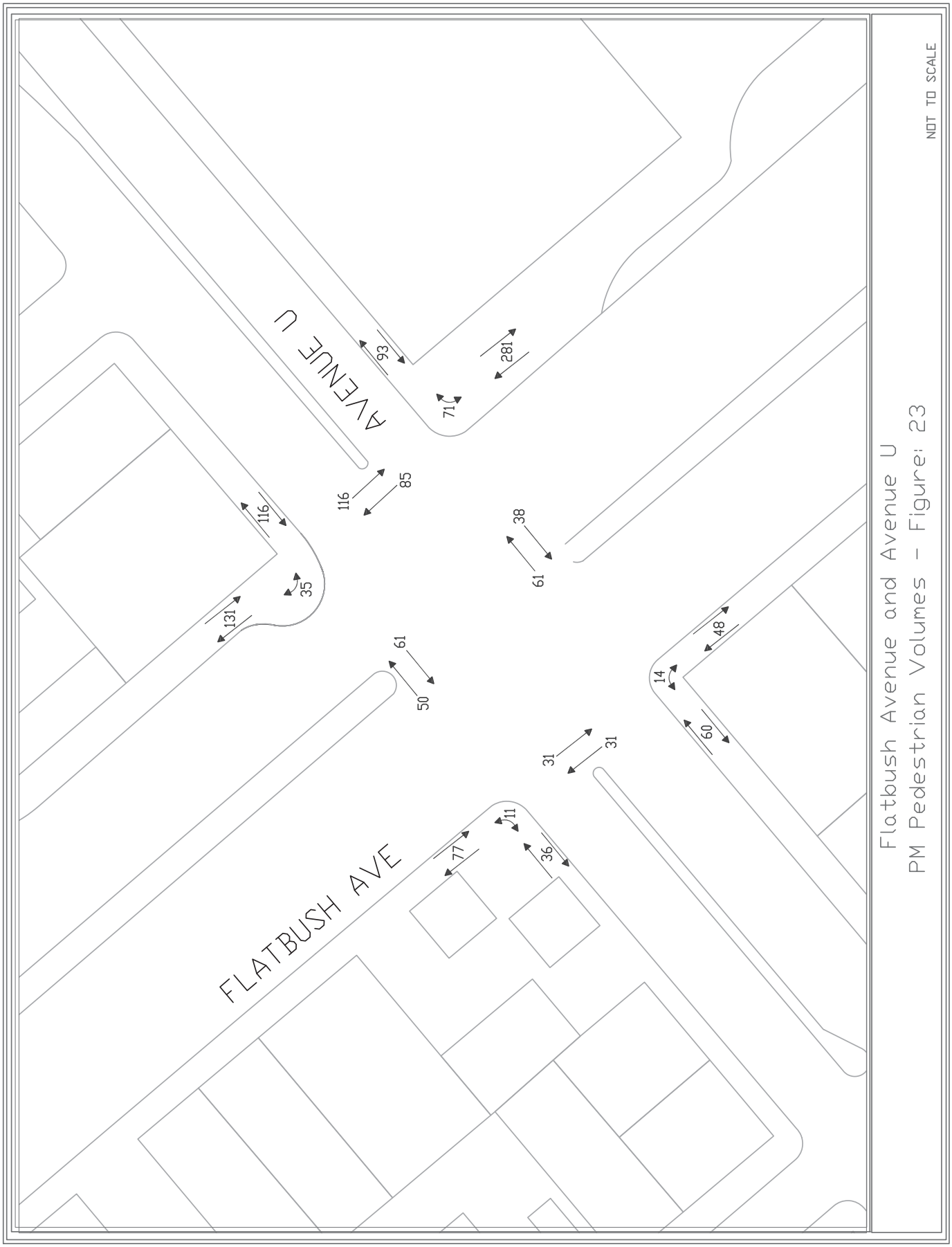

AVENUE U
FLATBUSH AVE
198
923
334
220
382
417
213
463
197
221
846
200
Flatbush Avenue and Avenue U
MD Vehicular Volumes - Figure: 18
NOT TO SCALE

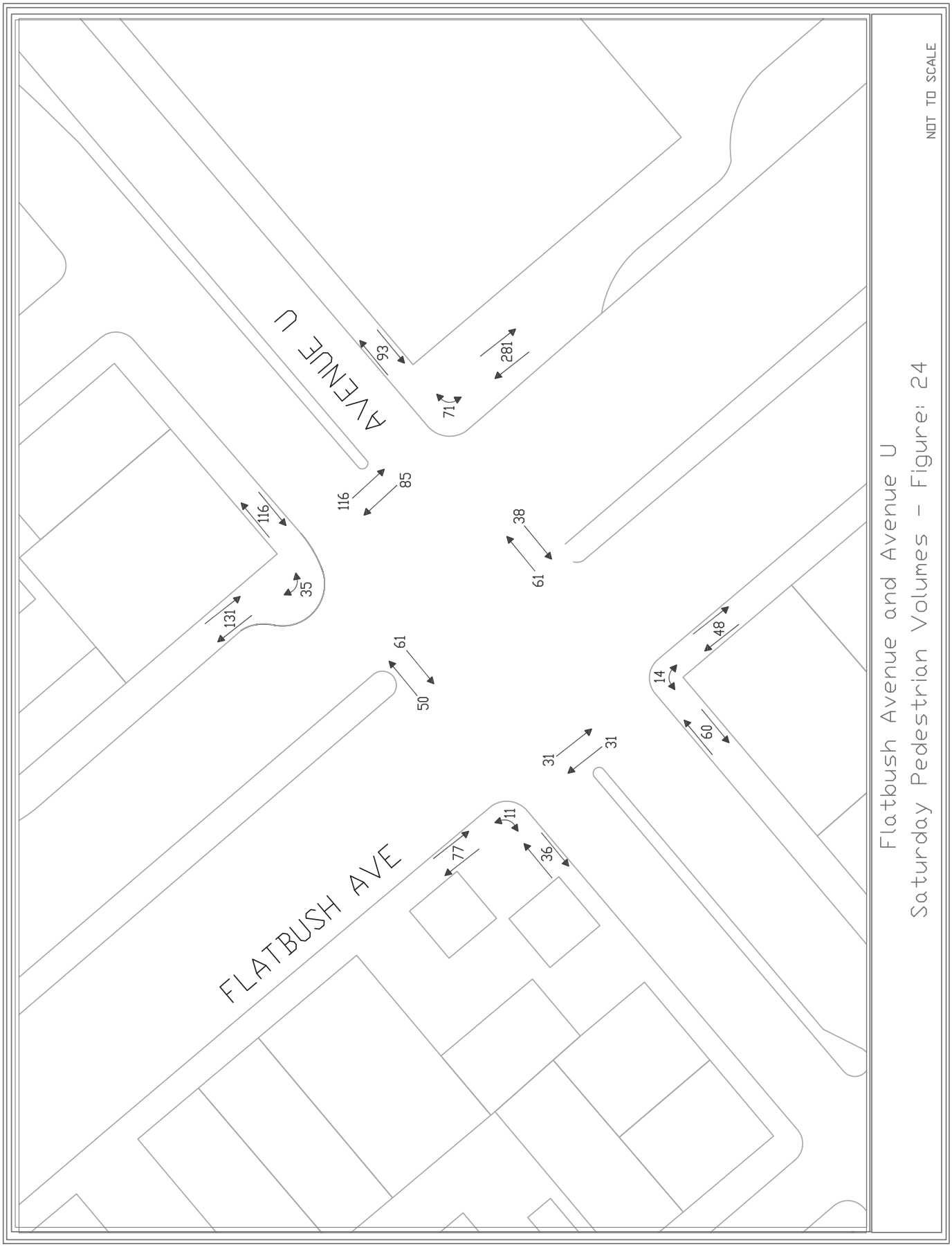

AVENUE U
FLATBUSH AVE
261
1435
442
352
2320
545
253
1215
248
311
459
202
NOT TO SCALE
Flatbush Avenue and Avenue U
PM Vehicular Volumes - Figure: 19


AVENUE U
FLATBUSH AVE
370
836
251
299
407
174
160
374
271
255
911
156
NOT TO SCALE
Flatbush Avenue and Avenue U
Saturday Vehicular Volumes - Figure: 20


Flatbush Avenue and Avenue U
AM Pedestrian Volumes - Figure: 21
NOT TO SCALE
AVENUE U
FLATBUSH AVE
113
41
151
96
81
91
33
141
45
37
36
36
38
15
80
36
38
16
63
49


AVENUE U
FLATBUSH AVE
116
233
65
101
81
141
31
150
58
69
62
63
55
11
36
31
31
14
86
38
Flatbush Avenue and Avenue U
MD Pedestrian Volumes - Figure: 22
NOT TO SCALE


AVENUE U
FLATBUSH AVE
93
281
71
116
85
116
38
61
35
131
61
50
48
14
60
31
31
11
77
36
Flatbush Avenue and Avenue U
PM Pedestrian Volumes - Figure: 23
NOT TO SCALE


AVENUE U
FLATBUSH AVE
93
281
71
116
85
116
35
131
38
61
61
50
48
14
60
31
31
77
11
36
NOT TO SCALE
Flatbush Avenue and Avenue U
Saturday Pedestrian Volumes - Figure: 24

Appendix D-2:
Standards for Signs Recommended

Standard Pedestrian Signs

As written in the Manual on Uniform Traffic Control Devices (MUTCD), pedestrian crossing signs shall be installed to face pedestrian approaches for sufficient visibility.

"No Pedestrian Crossing" Sign (Section 2B.44 of the MUTCD Manual)

The "No Pedestrian Crossing" (R9-3a) sign may be used to prohibit pedestrians from crossing a roadway at an undesirable location or in front of a school or other public building where a crossing is not designated.

R9-3a

"Cross Only at Crosswalks" Sign (Section 2B.44 of the MUTCD Manual)

Where crosswalks are clearly defined, the "CROSS ONLY AT CROSSWALKS (R9-2)" sign may be used to discourage jaywalking or unauthorized crossing.

R9-2

"Use Crosswalk" Sign (Section 2B.44 of the MUTCD Manual)

The USE CROSSWALK (R9-3b) supplemental plaque, along with an arrow, may be installed below either the "No Pedestrian Crossing" word message sign or the R9-3a sign to designate the direction of the crossing.

R9-3b

"Cross On Walk Signal Only" Sign (Section 2B.45 of the MUTCD Manual)
To supplement traffic signal control, traffic signal signs R10-1 through R10-21 may be used to regulate road users.

When used, the traffic signal signs should be located adjacent to the signal face to which they apply.

R10-2a

"Yield to Pedestrians" Sign (Section 2B.10 of the MUTCD Manual)
The YIELD sign shall be located as close as practical to the intersection it regulates, while optimizing its visibility to the road user it is intended to regulate.

The YIELD sign shall be installed on the right side of the approach to which it applies.

Where two roads intersect at an acute angle, the YIELD sign should be positioned at an angle, or shielded, so that the legend is out of view of traffic to which it does not apply.

Except at roundabout intersections, where there is a marked crosswalk at the intersection, the YIELD sign should be installed in advance of the crosswalk line nearest to the approaching traffic.

R10-15

R1-2

Source: Federal Highway Administration (FHWA) - Manual on Uniform Traffic Control Devices: 2003 Edition with Revision 1 and Revision 2 incorporated.

Appendix D-3:
Standards for Bus Shelters

Bus Shelter Site Specifications

Managed by Cemusa through the Coordinated Street Furniture Franchise, the New York City Department of Transportation has developed a set of site specifications for the placement of bus shelters on the sidewalks throughout the city. Bus shelters are available in four sizes (Standard: 14'x 5', Narrow: 14'x 3.5', Short: 10'x 5', Double: 27' x 5') to accommodate various sidewalk widths.

Listed below are the siting criteria developed by the New York City Department of Transportation:

1. Clear Path:
   Bus Shelters shall be installed to allow a minimum clear path of 7feet in width. In no case shall such clear path be less than 5 feet in width. The clear path for a bus shelter may include the area covered by the bus shelter's roof overhang, provided such overhang is a minimum of 7 ½ feet high.
2. Clearance from Curb:
   All bus shelters shall be installed to allow a straight unobstructed path of a minimum of 3 feet in width between the shelter and the curb. The roof of a bus shelter including any overhang shall be set back from the curb line a minimum distance of 2 feet.
3. Relation to the Bus Stop:
   a) All bus shelters shall be located as close as possible to the head of the bus stop, but no less than 10 feet from the head of the bus stop at locations where parking is permitted immediately adjacent to the head of the bus stop.
   b) If a bus shelter has only one enclosed end, it should be situated toward the head of the bus stop.
4. Other Minimum Distances:
   All bus shelters shall be:
   a) 10 feet from fire hydrants, standpipes
   b) 7 feet from tree trunks
   c) 5 feet from tree pits, cellar doors
   d) 3 feet from streetlights, traffic signal poles
   e) 2 feet from ventilation, street signs

Source: New York City Department of Transportation,

Appendix D-4:
Tree Planting Guidelines

Standard Tree Planting Guidelines

Tree Spacing Requirements

The following Tree Planting Standards have been provided by the New York City Department of Parks and Recreation. All of these guidelines shall be observed when siting tree pits along sidewalks. These guidelines generally follow regulations of other agencies with street jurisdictions such as Fire, DOT, and MTA. These guidelines are design and species dependent.

- Do not plant in front of building entrances in order to permit easy access by the Fire Department.
- Minimum distance between trees (center to center) ranges from 20' to 40', depending on the tree species and other local conditions.
- Minimum distance from a streetlight is 25' (varies with tree species).
- Minimum distance from a stop sign is 30'.
- Minimum distance from other traffic signs is 6'.
- Suggested distance from a parking meter is no more than 5' behind the meter, to allow for the swing of the car doors.
- Minimum distance from a gas or water valve is 2' from the edge of the pit.
- Minimum distance from an oil fill pipe is 4' from the edge of the pit.
- Minimum distance from a fire hydrant is 5' from the edge of the pit.
- Minimum distance from a curb cut or driveway is 7'.
- Minimum distance from a street intersection is 40'.
- Minimum distance from the edge of the pit to any opposite obstruction (building wall, stoop, railing, etc) is from 4' to 6', depending upon local conditions and the amount of sidewalk traffic.
- All tree pits must be contiguous to the street curb (except as noted below, or with the permission of the Agency representative).
- Do not plant within bus stops.

Tree Pit Configuration

The minimum allowable tree pit sizes are 5' x 5', or 4' by 6' for narrow sidewalks. Larger pit sizes should be created wherever space allows, especially where larger trees are planted. On a wide sidewalk, 5'x10' is the standard pit size. Below is a sample of a tree pit configuration sheet.

Source: New York City Department of Parks and Recreation

SAMPLE TREE PIT CONFIGURATIONS SHEET

TREE PIT DIMENSIONS*			
	Length (ft)	Surface Area (sf)	Soil Volume (cu ft)
Width: 7 ft			
	6	42	84
	7	49	98
	8	56	112
	9	63	126
	10	70	140
	⋮	⋮	⋮
	25	175	350
	⋮	⋮	⋮
	50	350	700
	⋮	⋮	⋮
	100	700	1400
Width: 6 ft			
	6	36	72
	8	48	96
	9	54	108
	10	60	120
	⋮	⋮	⋮
	25	150	300
	⋮	⋮	⋮
	50	300	600
	⋮	⋮	⋮
	100	600	1200
Width: 5 ft			
	6	30	60
	7	35	70
	8	40	80
	9	45	90
	10	50	100
	⋮	⋮	⋮
	25	125	250
	⋮	⋮	⋮
	50	250	500
	⋮	⋮	⋮
	100	500	1000
Width: 4 ft			
	7	28	56
	8	32	64
	9	36	72
	10	40	80
	⋮	⋮	⋮
	25	100	200
	⋮	⋮	⋮
	50	200	400
	⋮	⋮	⋮
	100	400	800
Width: 3 ft			
	8	24	48
	9	27	54
	10	30	60
	⋮	⋮	⋮
	25	75	150
	⋮	⋮	⋮
	50	150	300
	⋮	⋮	⋮
	100	300	600

Notes:

These dimensions illustrate the variety of tree pit sizes and configurations that are possible. Tree pits should always be as large as possible up to 5 x 10 feet. The larger the soil volume the larger the tree size will be at maturity and the better chance it has for long-term survival.

The longer tree pit lengths on the chart at left show the soil volumes achieved in continuous tree pits, which are underground trenches that are generally treated with structural soil belowground and sidewalk pavement aboveground, except for the area around the tree which resembles the open

Planting Standards

--25 feet from light poles
--30 feet from stop signs
--6 feet from traffic signs
--5 feet from parking meters
--2 feet from water drains
--2 feet from utilities
--5 feet from hydrants
7 feet from driveways
--3 feet minimum passage for ADA considerations
--5 feet passage general requirement NYC DOT
--20 to 30 feet from other trees

Note: these are general infeasibility criteria meant to guide designers. Specific rules and allowances will be established during the DPR permitting process, since exact tree siting varies by tree species selection, local site conditions, and other agency

*all calculations based on a tree pit depth of 2 feet. In general, tree pit depth should match root ball height. In the case of structural soil, tree pits can be deeper.

Prepared by DPR, Central Forestry & Horticulture, August 2007

Appendix D-5: Literature Search

A review of previous and current relevant studies, documents, reports was done in order to identify from the literature any known pedestrian problem areas within the study area. In addition a review of pedestrian studies of other similar geographical locations was undertaken for the purpose of determining and analyzing project elements that may be relevant to this pedestrian study. Finally an examination of the statements of Community Districts Needs for the fiscal year 2006 was completed to determine any known pedestrian problem areas along the Flatbush Avenue corridor, within the limits of the study area.

Title: **Brooklyn Retail Corridors**

Author: New York City Department of City Planning and New York City Department of Transportation

Date: July 2003

Synopsis: Section 5.d. Flatlands (Level of Service/Accident Analysis and Recommendations)

This study examines and focuses on traffic and pedestrian congestion and safety issues in four retail corridors in the borough of Brooklyn which includes Flatlands, Kings Plaza Shopping Center at Flatbush Avenue and Avenue U.

According to this study, overall this intersection operates at a LOS D for the three weekday peak periods and at LOS E for the weekend peak period. All sidewalks, crosswalks and corners operate at acceptable levels for all peak periods. Accident data for this area suggest that large turning volumes, signal timing/phasing and pedestrian traffic may all be contributing factors to the type of accidents that occur at this intersection.

Issues/ Problems

Pedestrian Crossings

Pedestrians at the east-west crosswalks ignore crossing signals and begin crossing whenever there is a gap in traffic. Those crossing north-south with the signal often encounter conflicts with northbound right turning vehicles and pedestrians often are forced to wait on a center median which is not wide enough.

Midblock Crossings

Pedestrians cross Flatbush Avenue midblock between Avenue U and Avenue V to enter the shopping mall.

Public Plaza

The large plaza in front of the shopping mall does not have pedestrian amenities and lacks a bus shelter.

Recommendations in terms of these issues are summarized below:

- On Avenue U, add stop bars to discourage vehicles from encroaching upon the crosswalk
- Have two exclusive left-turn lanes instead of one exclusive left-turn lane for northbound and southbound vehicular traffic
- Adjust the signal timing during the weekend peak period to reduce delays
- Install a pedestrian separator on Flatbush Avenue between Avenue U and V to prevent midblock crossings; Relocate the bus stop in the middle of the block (west side of street) to the corner of Flatbush Avenue at Avenue U
- An “Early Implementation Plan” redesigns the plaza as an off-street transit center with bus shelters and other pedestrian amenities

Title: Safe Streets NYC Study (Traffic Safety Improvements in New York City)

Author: New York City Department of Transportation

Date: April 2006

Synopsis:
New York City Department of Transportation (NYCDOT) has accelerated its efforts over the past few years to improve pedestrian and traffic safety by instituting a systematic approach to the identification of locations throughout the city where innovative safety mitigation measures can be implemented. The focus of this study is to identify the top twenty locations and/or intersections which have experienced the highest number of accidents from 1996 to 2001 in New York City and to improve pedestrian and traffic safety at those locations.

Locations with similar geographical locations as the Flatbush Avenue Pedestrian Study are identified and analyzed for project elements that are relevant to the Flatbush Avenue Pedestrian Study. One of these locations is the Fulton Street Corridor located in the Downtown Brooklyn area where NYCDOT has recently instituted safety strategies and measures based on the needs of the area.

Fulton Street Corridor (Flatbush Avenue to Nostrand Avenue)
It is a major east-west commercial corridor in Brooklyn and is host to numerous street users. The orientation of Fulton Street in relation to the surrounding street grid form “oblique” angles at these intersections which create safety and operational issues for pedestrians and general traffic.

A few locations such as Hanson Place, Putnam Avenue and Gates Avenue were subject to analysis in the “Safe Streets” study and were improved with the implementation of innovative safety measures. Below is a description of the issues identified at these locations in relation to pedestrians and the improvements made to enhance pedestrian safety.

With the oblique angles, turning vehicles would sometimes proceed through the intersection at high speeds and create conflict with pedestrians crossing. NYCDOT eliminated this conflict through the conversion of the intersection to right angles with the use of markings and flexible bollards. The lengths of the crosswalks were significantly reduced and pedestrian space expanded.

Other treatments were installed along Fulton Street at other locations such as Carlton Avenue, Downing Street, Irving Place Spencer Place etc. These treatments consisted of painted neckdowns and flexible bollards to slow down turning vehicles and alert motorists to the changing street character.

Several crosswalks at intersections with high pedestrian activity along Fulton Street have been updated to high-visibility crosswalks in order to meet current DOT’s standards. In addition Wide Turning Zones (WTZ) was established to permit general traffic to turn on and off Fulton Street. They include signage advising pedestrians of turning vehicles at Wide Turn Zones.

Although many of the mitigation measures were implemented with temporary materials, NYCDOT plans to convert the new pedestrian space and improvements into sidewalk space in the near future.

Title: **Streetscape and Pedestrian Improvements in New York City (Technical Memorandum I)**

Author: New York City Department of City Planning

Date: N/A

Synopsis:
This report discusses the streetscape improvements in many areas of New York City including Downtown Flushing. This study also provides a description of the streetscape elements and treatments that are employed and explains the success of these improvements in different parts of the city with the intent to identify potential aids and impediments to the realization of the Downtown Flushing Pedestrian Project. Many of the improvements proved beneficial to the pedestrian environment, increasing pedestrian safety and movement in the area, as well as improving its appearance.

Here is a summary of the streetscape elements described in the report and were used in many streetscape improvement projects throughout the city:

Traffic Calming Devices - To better serve the non-motorized users and the environment, traffic should be slowed down (less noise, less fumes). Design methods that can accomplish this: sidewalk extensions, speed humps and changes in road surface.

Corners and Crosswalks - Here are a few design methods recommended at the corners and crosswalks: Have "Clear Corner Zones" – space allocated at corners that require to be free of excess elements; "Distinct Corners" – set apart from the sidewalk by the paving material or pattern which can reinforce the identity of an area; "Crosswalks – at heavily traveled locations use high-visibility crosswalks; "Barnes Dance Crosswalk" – addresses signal timing that gives a head start to pedestrians as they cross the street.

Sidewalks and Curbs - Use of standard or distinctive sidewalks and curbs generally in New York City. A maintenance agreement must be reached before approval is granted for a distinctive sidewalk.

Street Lighting - Standard street light fixtures are generally used. They also have equipment that is available for certain specific areas and streets, for example the "Flatbush Lamppost and Teardrop Luminaire" are used on Main St. in Flushing.

Banners on Street Light Poles - Banners are usually attached to lampposts and are regulated by NYCDOT in terms of dimensions, height, support and installation. They are generally maintained by a merchant's association or BID.

Signage - The Manual on Uniform Traffic Control Devices (MUTCD) has set the standard for signs and usually they are geared towards drivers and on-street users. Off-street signage can deviate from standards.

Street Trees and Accessories - NYCDPR sets the standards. Accessories include tree grates, tree guards or other types of tree pit design. Beyond city standards a maintenance agreement must be reached before a street tree permit is granted.

Other streetscape elements include street furniture (trash receptacles, benches) and art such as sculpture, murals, gateways etc.

According to this study there have been a number of streetscape improvement projects implemented in Downtown Flushing. A complete list is provided in Appendix C of the report. It includes improvements along Prince Street, Main Street and Union Street with granite curbs, trees, new standard sidewalks etc. and improvements to the Lippmann Plaza.

As part of this study many streetscapes were visited and considered to be a success such as Grand Central, 82nd Street (Jackson Heights), 61st Street (Woodside), etc. The most important factor identified as contributing to these projects success was the maintenance of the streetscape. Safety and security was another major issue that affected the success of a streetscape. If people feel a lack of safety or security they will not visit a certain area. Certain streetscape elements make a strong contribution to the overall success of a streetscape: for example a crosswalk marked with brick pavers provide a clear and visible crossing for pedestrians, sidewalk extensions etc.

Title: 14th Street Transportation Study

Author: New York City Department of City Planning, Transportation Division

Date: April 1998

Synopsis:
The 14th Street Transportation Study was conducted to examine the effects of new developments in Union Square and on 14th Street, east of the park. The analysis focused on intersections that were either unsafe or would be directly affected by the new development.

The pedestrian traffic analysis identified the following circulation issues for pedestrians:

- Inappropriate curb use and a lack of enforcement of curbside regulations cause buses and delivery trucks to double park and obstruct crosswalks and moving lanes along 14th Street.
- Bicycles locked to street signs partially block crosswalk entrances.
- A lack of enforcement of the Mayor's 1995 Executive Order no.22 which authorized sidewalk corner clearance policy. A combination of news boxes and garbage cans were obstructing several crosswalk entrances and queuing areas for crossing pedestrians. Pedestrians were then observed forming queues in the road and walking outside designated crosswalks.
- Pedestrians often conflict with vehicles turning left and right along 14th Street at several intersections. The situation worsens when intervals of heavy pedestrian traffic occurs.
- At the corners during some of the congested intervals, limited corner queuing space was available for pedestrians waiting to cross, resulting in queuing off the curb in the street.
- Some of the crosswalks were faded or in poor condition.

The following recommendations are suggested in this study to address the problems that pedestrians often encounter along 14th Street:

- Give pedestrians a few seconds head start over vehicles turning
- Provide exclusive turning time for left turns at selected locations while pedestrians are not walking
- Restripe or repaint faded crosswalks
- Have a stop bar before crosswalk at locations where pedestrians are often forced to dodge cars stopped in the crosswalk
- Widen crosswalks when necessary
- Install a neckdown at the corner where needed
- Reduce corner clutter where needed: have newspaper boxes other items blocking crosswalk entrance removed

COMMUNITY DISTRICT NEEDS OF BROOKLYN
CD#9, CD#14, CD#18

The study area lies within three Community Districts of the borough of Brooklyn:

- Community District #9
- Community District #14
- Community District #18

Community District #9

1. The recommendations are for the community beautification plan. The greening of traffic triangles and city-owned vacant lots to create vest-pocket parks are all components of this plan. Beautifying our neighborhood streets with the planting of street trees is a top priority.
2. The reconstruction of Empire Boulevard from Flatbush to Utica Ave. This route suffers from flooding and drainage problems which affects pedestrians.

Community District # 14

1. Focus on traffic planning in congested commercial stripes along the Flatbush corridor with the need to develop programs for expansion of sidewalk façade improvement programs for these commercial streets.
2. The continuation of funding for programs to repair sidewalks along the Flatbush Corridor.

Community District # 18

Transportation issues continue to be a top concern for the community board. The intersections around the Kings Plaza Shopping Center are mentioned in the Community Board #18 Statement of Needs document as examples of locations that present safety issues for pedestrian/vehicular traffic that they request to be addressed. A coordinated effort must be made to implement identified solutions for safer streets and pedestrian crossings. So far to date according to the community board nothing of consequence has been done.

Credits

New York City Department of City Planning
Amanda M. Burden, AICP, Director
Richard Barth, Executive Director
Sandy Hornick, Deputy Executive Director for Strategic Planning

Transportation Division
Jack Schmidt, Director
Kevin Olinger, Deputy Director
Stratos Prassas, Team Leader
Lise Dorestant, Project Manager
Dekka Michael, City Planner
David Aigner, City Planner
Alan Ripps, City Planner
Seth Hostetter, City Planner
Kenneth Laidlow, Highway Transportation Specialist
Michelle Katopodes, City Planner

Brooklyn Office
Purnima Kapur, Director
Winston Von Engel, Deputy Director
David Parish