# 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

| 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 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

| 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 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

| 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 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.

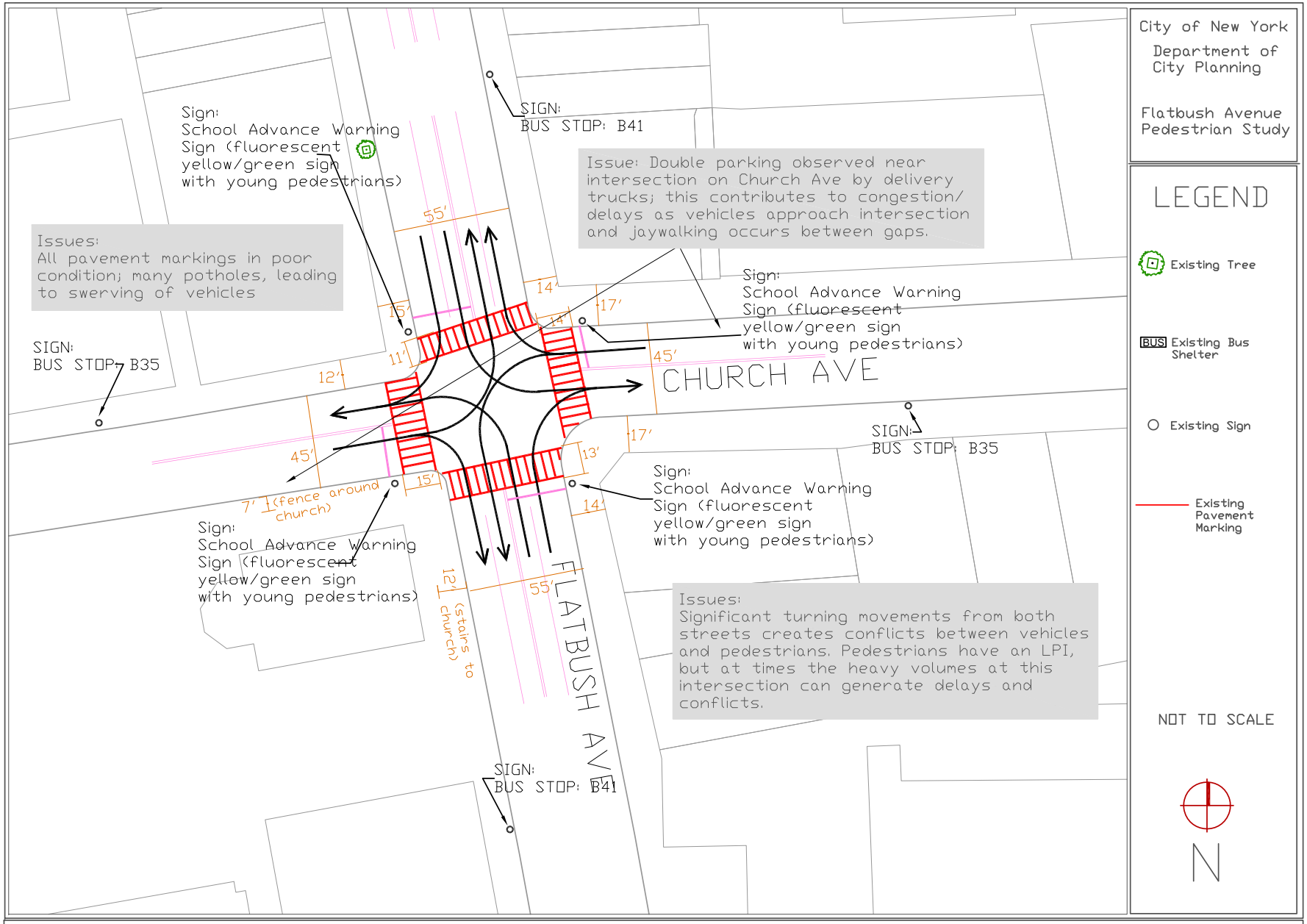
- Streetscape Improvement
  Improve the pedestrian environment at the bus stops on Flatbush Avenue with new bus shelters and concrete bus pads where passengers wait for the arrival of a bus.

**Consideration for the Future**

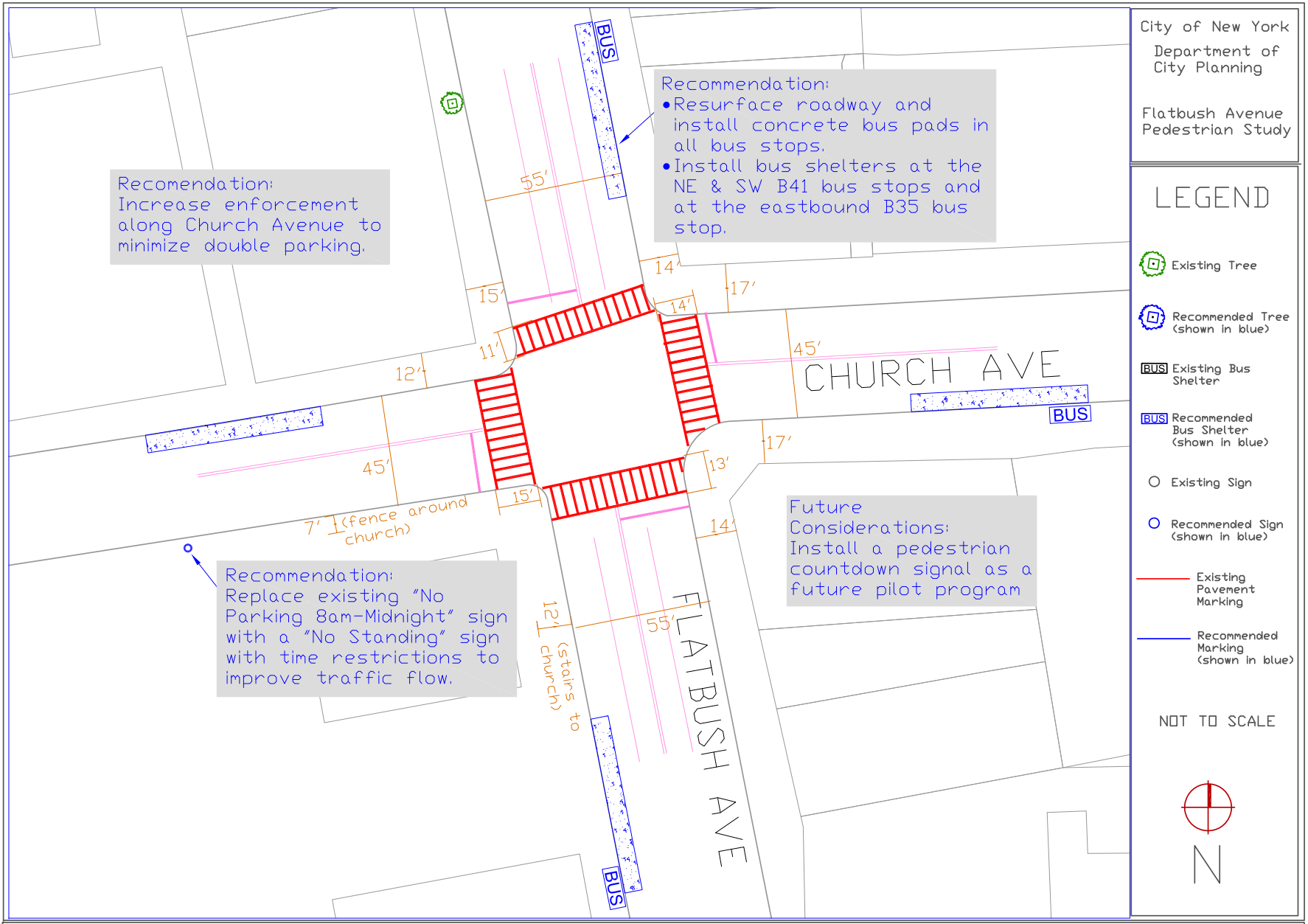
Recommendation for a Countdown Pedestrian Signal

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).




Flatbush Avenue and Church Avenue
Existing Conditions - Figure: C-1a




Flatbush Avenue and Church Avenue Recommendations - Figure: C-1b