L E S S O N 4

Pedestrian and Bicycle Crash Types

4.1 Purpose

Many professionals involved in pedestrian and bicycle programs have never received training that focuses on crash causation. Everyone–from traffic safety specialists to traffic engineers, planners, educators, and law enforcement personnel–can benefit from an understanding of how crashes occur and how to avoid them.

This lesson provides an understanding of crash characteristics, crash rates, exposure, and a grounding in crash typing. The most significant crash types will be explained and associated with contributing factors and typical errors made. The concepts of corridor and site crash analysis and team problem-solving will be emphasized. Discussion will include special conditions–especially nighttime crashes, those involving impaired drivers, pedestrians and bicyclists, and high-speed roadways.

4.2 What Is a Crash?

The word “crash” may be new to some people as a way to describe the event in which a bicyclist or pedestrian greets the ground, a motor vehicle, or any other solid object in a way that can result in bodily harm and/or property damage. Historically, these were called “accidents.” The term “accident” implies heavy doses of chance, unknown causes, and the connotation that nothing can be done to prevent them.

Crashes are preventable. Bicyclist and pedestrian “crashes” are not random events. They fall into a pattern of reoccurring crash types and occur because the parties involved make mistakes. The mistakes can be identified and counteracted through a combination of education, skill development, engineering, and enforcement measures so crashes can be substantially reduced.

4.3 The Crash Avoidance Process

Whether you are a pedestrian, bicyclist, or motorist, you generally go through a similar sequence of actions leading from searching for and recognizing a potential crash situation to taking steps to avoid it.

The steps in this sequence are described below. If any of these steps are overlooked by either party, a crash may result.

Step 1: Search – Both driver and bicyclist or pedestrian scan their environment for potential hazards.

Step 2: Detect – One or both parties (bicyclist, pedestrian, or motor vehicle) sees the other.

Step 3: Evaluate – The threat of collision is recognized, along with the need for action to avoid it.

Step 4: Decide – Assess risk and select the actions necessary to avoid a collision. This may involve judging location, closing speed, direction of travel, position in traffic, likely behavior, and other factors.

Step 5: Action – This step involves the successful performance of the appropriate action(s) to avoid a collision.

4.4 Number of Bicycle and Pedestrian Crashes

Approximately 6,500 pedestrians and 900 bicyclists are killed each year as a result of collisions with motor vehicles. As a group, pedestrians and bicyclists comprise more than 14 percent of all highway fatalities each year. Pedestrians account for as much as 40 to 50 percent of traffic fatalities in some large urban areas. The 1994 General Estimates System (GES) data indicate that 90,000 pedestrians and 60,000 bicyclists were injured in this type of crash. Many more injuries are not reported to record-keeping authorities. A study by Stutts, et al. (1990) showed that fewer than two-thirds of bicycle-motor vehicle crashes serious enough to require emergency room treatment were reported on State motor vehicle crash files.

4.5 Summary of Bicycle and Pedestrian Crash Characteristics

In the 1996 study conducted by the Federal Highway Administration (*Pedestrian and Bicycle Crash Types of the Early 1990's*, FHWA-RD-95-163), 5,000 pedestrian and 3,000 bicycle crashes in 5 States were studied extensively in order to code crash types, determine the specific factors associated with the crash types, and to identify how countermeasures could be used to reduce the frequency of crashes. The following is a summary of the findings of the study.

Pedestrian-Motor Vehicle Crash Sample Summary

1. Compared to their representation in the overall U.S. population, young persons (under 25 years of age)

were overrepresented in pedestrian crashes with motor vehicles, while older adults (ages 25 to 44) and the elderly (age 65+) were underrepresented. Elderly pedestrians in crashes, however, were more than twice as likely to be killed (15 percent versus 6 percent) compared to young persons.

2. Collisions with motor vehicles led to serious and fatal injuries to pedestrians in more than 33 percent of the crashes.

Forty-one percent of pedestrian crashes occur at intersections.

3. Alcohol or drug use was noted in about 15 percent of pedestrian crashes overall, but increased to 31 percent for pedestrians in the 25 to 44 age group. Alcohol/drug crashes were also more frequent on weekends and during the hours of darkness.

4. Pedestrian crashes occurred most frequently during the late afternoon and early evening hours, times when exposure is probably highest and visibility may be a problem.

5. About two-thirds of the crashes were categorized as urban. Fifteen percent of the pedestrian crashes reported occurred on private property, primarily in commercial or other parking lots. The elderly were overrepresented in commercial parking lot crashes, young adults in non-commercial parking lot crashes, and children under age 10 in collisions occurring in driveways, alleys, or yards.

6. Nearly 60 percent of the road-related crashes occurred on two-lane roadways. Serious and fatal injuries to pedestrians were directly proportional to speed limit and number of lanes.

7. Forty-one percent of crashes occurred at roadway intersections, and an additional 8 percent occurred in driveways or alley intersections.

8. The pedestrian was judged to be solely at fault in 43 percent of the crashes. Running into the road, failure to yield, alcohol impairment, stepping out from between parked vehicles, and walking or running in the wrong direction (with traffic) were the most frequently cited pedestrian contributing factors. Younger pedestrians were more likely to be at fault.

9. Motor vehicle drivers were judged to be solely at fault in 35 percent of the crashes. Driver hit and run and failure to yield were the most frequently cited driver contributing factors, followed by improper backing, safe movement violations, and exceeding safe speed. Only 3 percent of motor vehicle drivers striking pedestrians were judged to have been impaired by alcohol.

10. More than three-fourths of pedestrian crashes fell into one of the following eight crash-type categories: vehicle turn/merge (9.8 percent), intersection dash (7.2 percent), other intersection (10.1 percent), midblock dart/dash (13.3 percent), other midblock (13.2 percent), not in roadway/ waiting to cross (8.6 percent), walking along roadway (7.9 percent), and backing vehicle (6.9 percent). These and the other seven major crash-type categories discussed in this report varied with respect to the pedestrian, driver, locational/environmental, and roadway factors that characterized them. It is critically important

A memorial to a bicyclist killed at a busy intersection in Newark, DE.

for individual States and communities to develop a better understanding of the particular traffic situations endangering their residents.

Bicycle-Motor Vehicle Crash Sample Summary

1. The basic bicycle-motor vehicle crash patterns are similar to those seen in the late 1970's. Intersections, driveways, and other junctions continue to be locations where about three-fourths of the crashes occur. Emerging facilities should be designed with this fact in mind.

2. Compared with their representation in the overall U.S. population, young bicyclists under the age of 15 (and particularly ages 10 to 14) were overrepresented in crashes with motor vehicles, while older adults (ages 25 to 44) and the elderly (age 65+) were under- represented. However, bicyclists older than age 44 were overrepresented with regard to serious and fatal injury.

3. Collisions with motor vehicles led to serious and fatal injuries to bicyclists in just over 18 percent of the crashes.

4. Alcohol or drug use was noted in about 5 percent of bicycle crashes overall, but increased to 15 percent for bicyclists in the 25 to 44 age group. This may be an emerging problem. Alcohol-drug crashes were more frequent on weekends and during hours of darkness.

5. About two-thirds of the bicyclist crashes occurred during late afternoon and early evening hours. Exposure is likely quite high during these hours, and visibility can be a problem.

6. About two-thirds of the crashes were categorized as urban. About 7 percent occurred on private property. Bicyclists less than 10 years old were somewhat overrepresented in crashes in housing-related parking lots, driveways, alleys, and private roads.

7. About 60 percent of the road-related crashes occurred on two-lane roadways. Roads with narrower lanes and roads with higher speed limits were associated with more than their share of serious and fatal injuries to bicyclists.

8. Bicyclists were judged to be at fault in about half of these crashes with motor vehicles. Bicyclists need training about how to ride in traffic. Failure to yield, riding against traffic, stop sign violations, and safe movement violations were the most frequently cited bicyclist contributing factors. The likelihood of the bicyclist being responsible for the crash was greatest for the younger bicyclists. When the crash-involved bicyclist was older, the motor vehicle driver was more likely to be at fault.

9. Motor vehicle drivers were judged to be solely at fault in 28 percent of the cases. Failure to yield, hit and run, and failure to see the bicyclists were the most frequently cited driver contributing factors.

10. The bicycle-motor vehicle crashes were divided into the three main categories as such:

Parallel-path events	36 percent
Crossing-path events	57 percent
Specific circumstances	7 percent

11. The most frequent parallel-path crashes were motorist turn/merge into bicyclist's path (12.2 percent), motorist overtaking the bicyclist (8.6

percent), and bicyclist turn/merge into motorist's path (7.3 percent). The most frequent crossing-path crashes were motorist failed to yield to bicyclist (21.7 percent), bicyclist failed to yield at an intersection (16.8 percent), and bicyclist failed to yield midblock (11.8 percent). These six individual crash types accounted for almost 80 percent of all bicycle-motor vehicle crashes.

Project Summary and Recommendations

1. Much of what is reported in this study seems strongly connected to basic walking, riding, and driving patterns — in other words, related to exposure. Future studies of pedestrians and bicyclists and related facilities should be planned with this need in mind.

2. As a measure of accountability, it is recommended that local and State pedestrian-bicycle coordinators continually track crashes in their jurisdictions. A simplified crash typing procedure that coordinators can easily use should be prepared and disseminated.

3. With the current increased interest in both bicycling and walking, crash investigators on the State and local levels should be urged to report completely on any bicyclist and pedestrian crashes, particularly for roadway-related variables.

4. A systemwide approach will be necessary to make safety gains as well as reach the goals of the National Bicycling and Walking Study (Federal Highway Administration, 1994), namely: (1) to double the number of trips made by bicycling and walking, and (2) to reduce by 10 percent the number of bicyclists and pedestrians injured or killed in traffic collisions. Engineering, education, and enforcement approaches are vital to improved safety. There is a continuing need to establish the mindset that bicyclists and pedestrians are worthy and viable users of our transportation system.

4.6 Common Pedestrian and Bicycle Crash Types

This portion of the lesson presents information specific to pedestrian and bicycle crashes. It looks at the number, types, and characteristics of these crashes. The information was generated through a study conducted by the Highway Safety Research Center at the University of North Carolina (published by the Federal Highway Administration in June 1996). The study purpose was to update 1970's era crash data to reflect more recent crash types, with particular attention to roadway and locational factors so that designers can reduce crash frequency through engineering methods and other interventions. See the following pages for examples.

Pages 4-6 through 4-9: Eight most common pedestrian crash types.

Pages 4-10 through 4-13: Eight most common bicycle crash types.

4.7 Exercise: Design a Countermeasures Program

Part 1
Design a program that specifically provides countermeasures aimed at reducing one (or more) common bicycle and/or pedestrian crash types. Countermeasures can include physical changes to the bicycle/pedestrian environment (engineered and constructed solutions), or education programs aimed at a particular audience that may be susceptible to certain crash types. Be specific about what the program would include, and how it would be implemented throughout a community. Include an explanation of how you would propose to evaluate the effectiveness of your program.

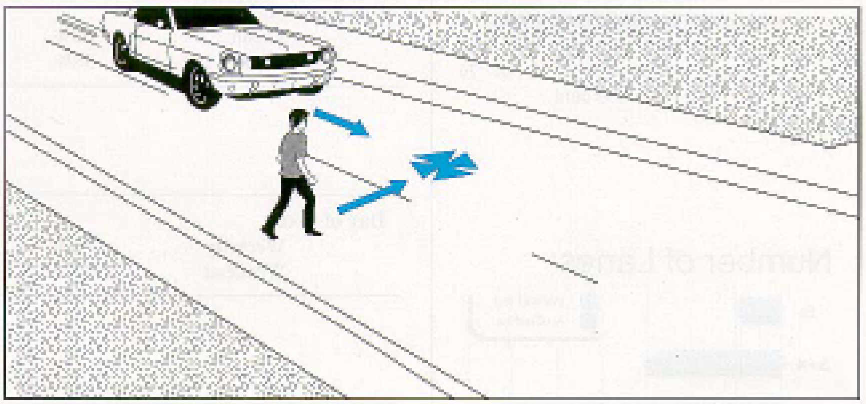
Part 2
Using the data provided for the case study location, Piedmont Park in Atlanta, Georgia, developed some conclusions regarding the crash data obtained through the State department of transportation (DOT) for 1995, 1996, and 1997 (see Figures 4.3 to 4.8). Cross-tabulations of crashes by time of day, location, and causation factors are helpful in gaining insight into safety problems and possible countermeasures. Data available for these type evaluations are often limited due to the low percentage of reported pedestrian accidents and bicycle crashes. However, important information can be obtained by a thorough analysis of available data.

Figure 4.1: Eight of the Most Common Pedestrian Crash Types. Source: *Pedestrian Crash Types - A 1990's Informational Guide*, 1997.

Midblock—Other

Frequency: 548 cases; 10.8% of all crashes
Severity: 49% resulted in serious or fatal injuries

Description: The crash occurred at midblock, but does not conform to any of the specified crash types.



Vehicle Turn/Merge

Frequency: 497 cases; 9.8% of all crashes
Severity: 18% resulted in serious or fatal injuries

Description: The pedestrian and vehicle collided while the vehicle was preparing to turn, in the process of turning, or had just completed a turn (or merge).

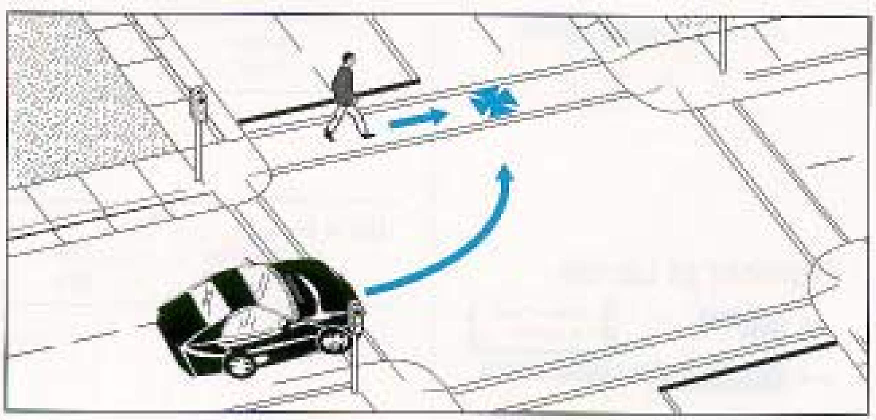
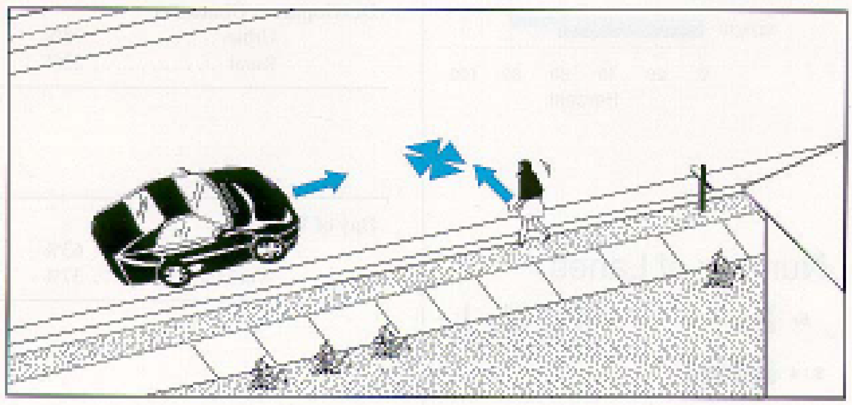


Figure 4.1: Eight of the Most Common Pedestrian Crash Types (continued).

Midblock Dash

Frequency: 442 cases; 8.7% of all crashes
Severity: 37% resulted in serious or fatal injuries

Description: At midblock location, the pedestrian was struck while running and the motorist's view of the pedestrian was not obstructed.



Not In Roadway

Frequency: 404 cases; 7.9% of all crashes
Severity: 28% resulted in serious or fatal injuries

Description: The pedestrian was struck when not in the roadway. Areas included parking lots, driveways, private roads, sidewalks, service stations, yards, etc.

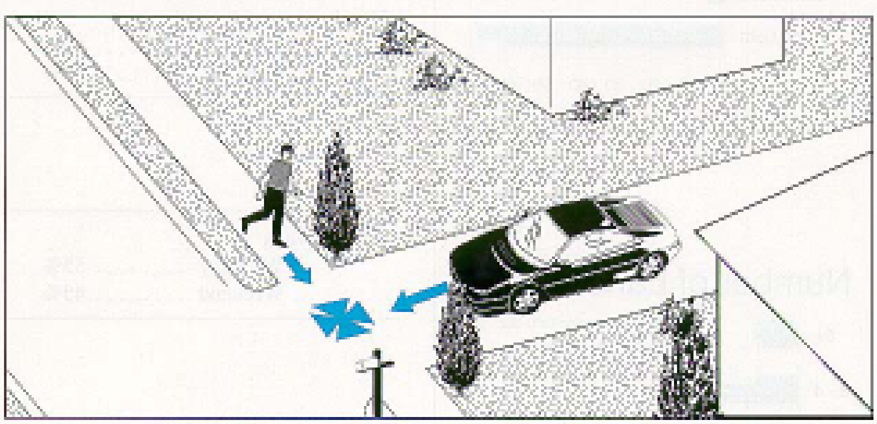
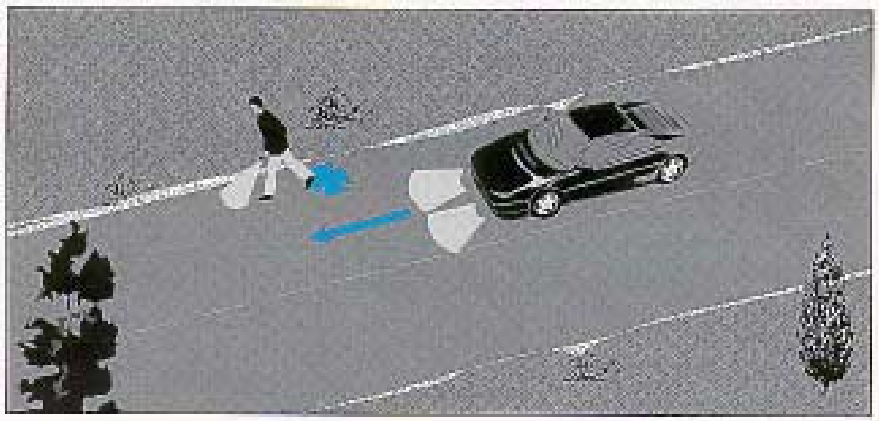


Figure 4.1: Eight of the Most Common Pedestrian Crash Types (continued).

Walking Along Road

Frequency: 375 cases; 7.4% of all crashes
Severity: 37% resulted in serious or fatal injuries

Description: The pedestrian was struck while walking (or running) along a road without sidewalks. The pedestrian may have been: hitchhiking (15 cases), walking with traffic and struck from behind (257 cases) or from the front (5 cases), walking against traffic and struck from behind (76 cases or from the front (7 cases), walking along a road, but the details are unknown (15 cases).



Intersection Dash

Frequency: 363 cases; 7.2% of all crashes
Severity: 34% resulted in serious or fatal injuries

Description: The pedestrian was struck while running through an intersection and/or the motorist's view of the pedestrian was blocked until an instant before impact.

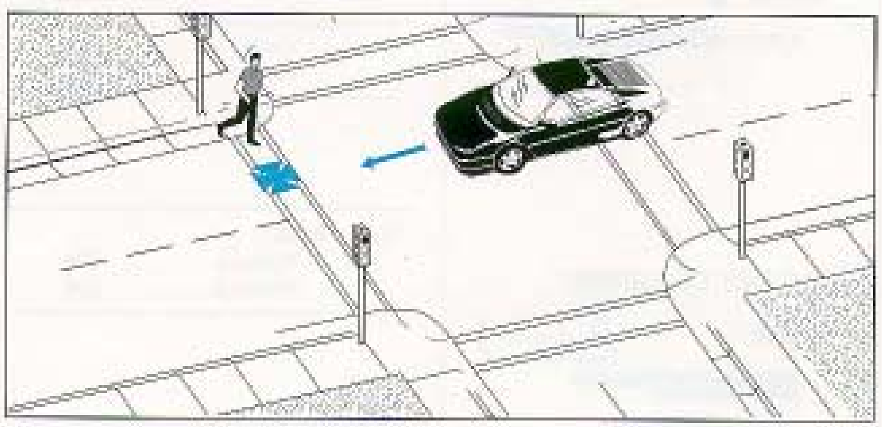
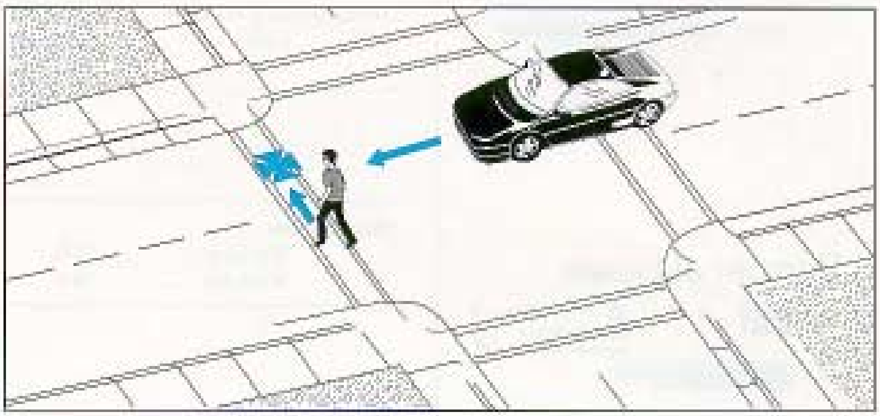


Figure 4.1: Eight of the Most Common Pedestrian Crash Types (continued).

Intersection—Other

Frequency: 364 cases; 7.2% of all crashes
Severity: 42% resulted in serious or fatal injuries

Description: The crash occurred at an intersection but does not conform to any of the specified crash types.



Backing Vehicle

Frequency: 351 cases; 6.9% of all crashes
Severity: 23% resulted in serious or fatal injuries

Description: The pedestrian was struck by a vehicle that was backing.

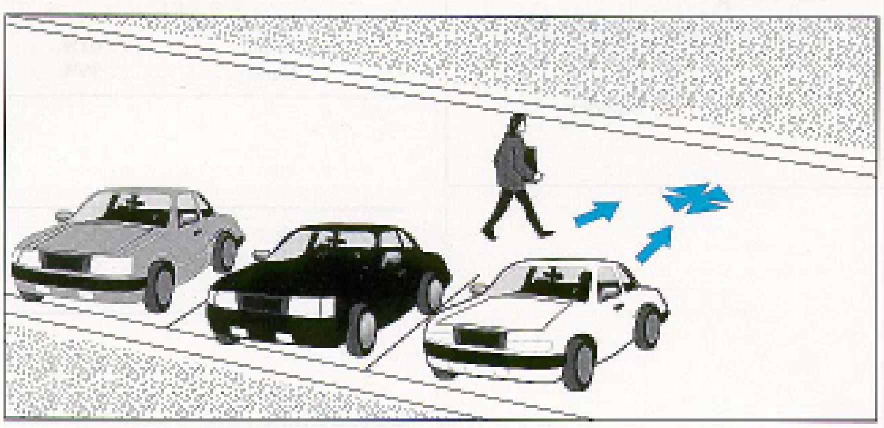
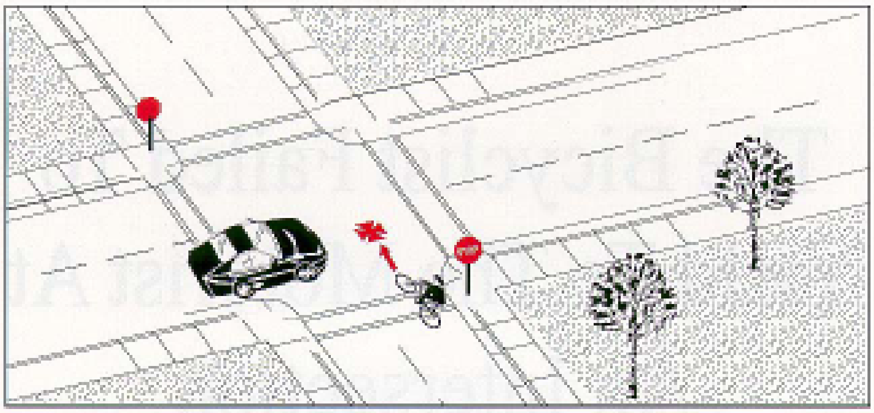


Figure 4.2: Eight of the Most Common Bicycle Crash Types. Source: *Bicycle Crash Types - A 1990's Informational Guide*, 1997.

Ride Out At Stop Sign

Frequency: 290 cases; 9.7% of all crashes
Severity: 23% resulted in serious or fatal injuries

Description: The crash occurred at an intersection at which the bicyclist was facing a stop sign or flashing red light.



Drive Out At Stop Sign

Frequency: 277 cases; 9.3% of all crashes
Severity: 10% resulted in serious or fatal injuries

Description: The crash occurred at an intersection which the motorist was facing a stop sign.

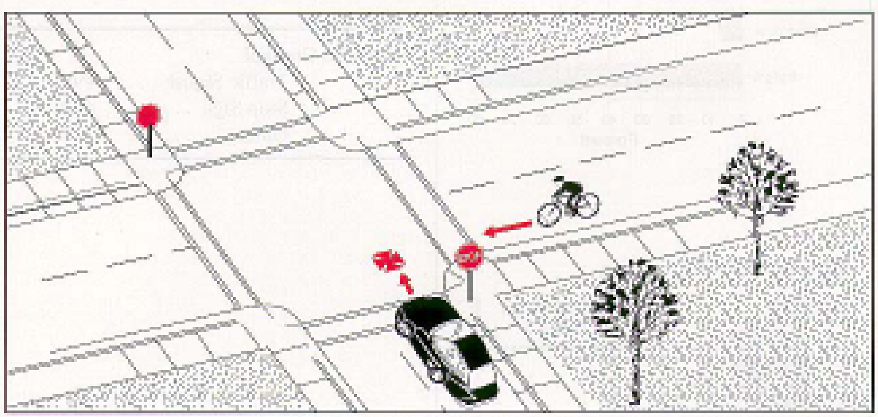
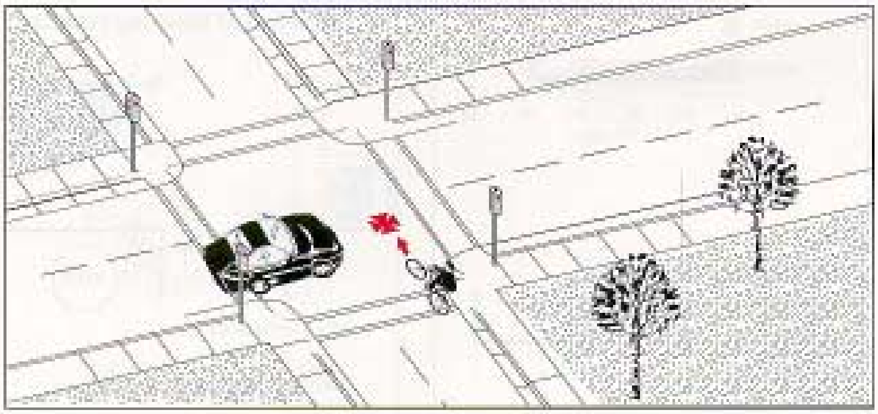


Figure 4.2: Eight of the Most Common Bicycle Crash Types (continued).

Ride Out At Intersection—Other

Frequency: 211 cases; 7.1% of all crashes
Severity: 16% resulted in serious or fatal injuries

Description: The crash occurred at an intersection, signalized or uncontrolled, at which the bicyclist failed to yield.



Drive Out At Midblock

Frequency: 207 cases; 6.9% of all crashes
Severity: 7% resulted in serious and fatal injuries

Description: The motorist was entering the roadway from a driveway or alley.

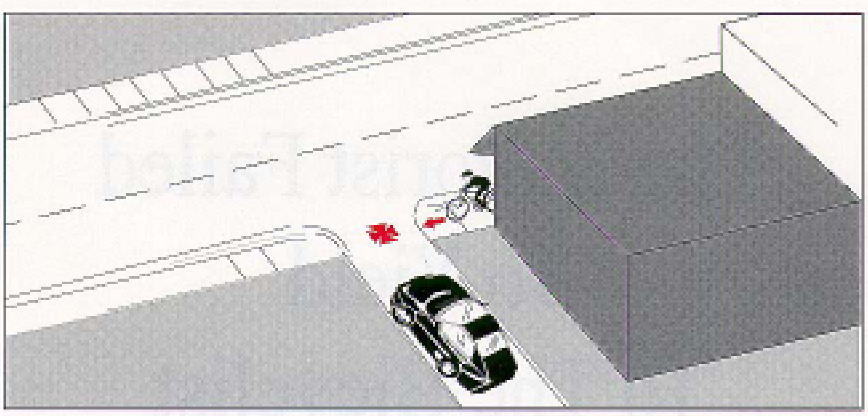
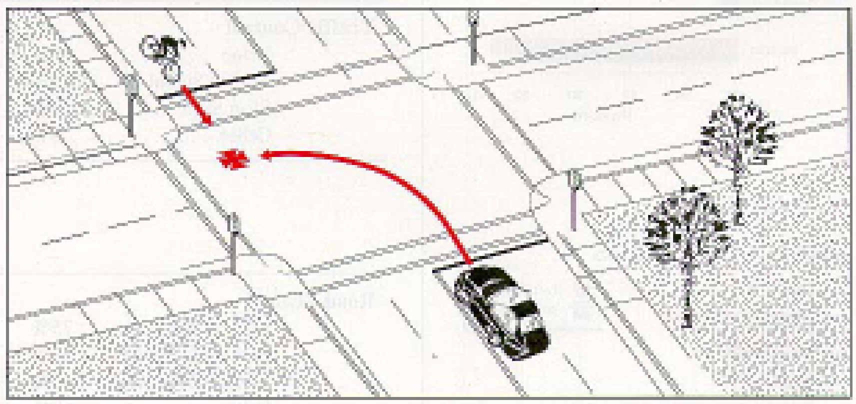


Figure 4.2: Eight of the Most Common Bicycle Crash Types (continued).

Motorist Left Turn—Facing Bicyclist

Frequency: 176 cases; 5.9% of all crashes
Severity: 24% resulted in serious or fatal injuries

Description: The motorist made a left turn while facing the approaching bicyclist.



Ride Out At Residential Driveway

Frequency: 153 cases; 5.1% of all crashes
Severity: 24% resulted in serious or fatal injuries

Description: The bicyclist entered the roadway from a residential driveway or alley.

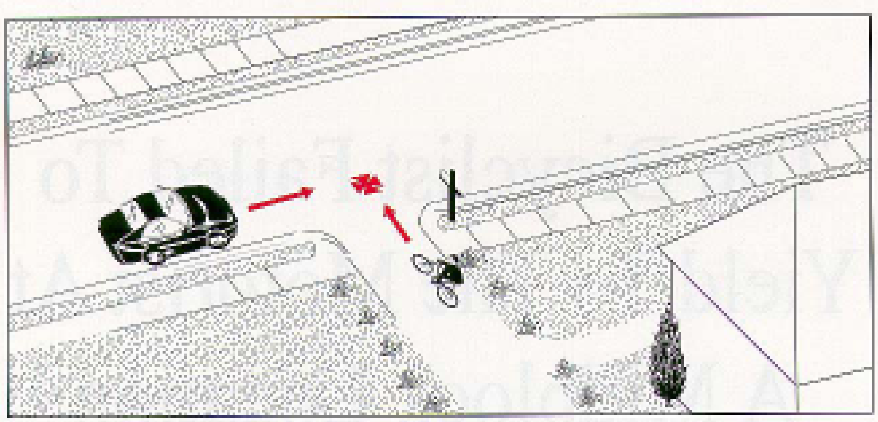
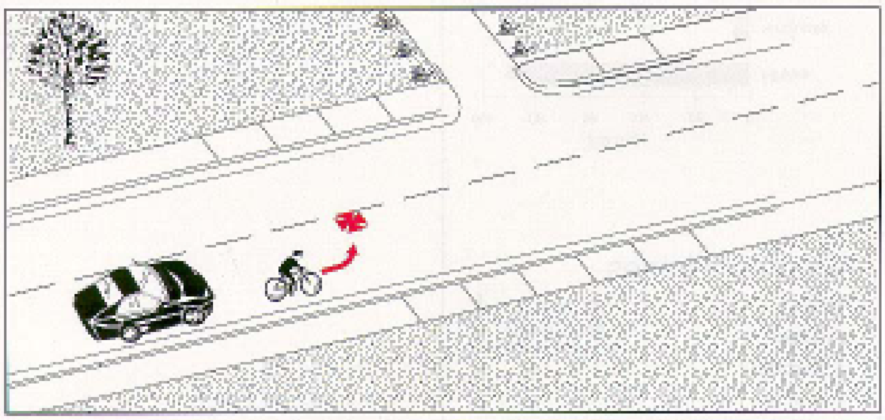


Figure 4.2: Eight of the Most Common Bicycle Crash Types (continued).

Bicyclist Left Turn In Front Of Traffic

Frequency: 130 cases; 4.3% of all crashes
Severity: 28% resulted in serious and fatal injuries

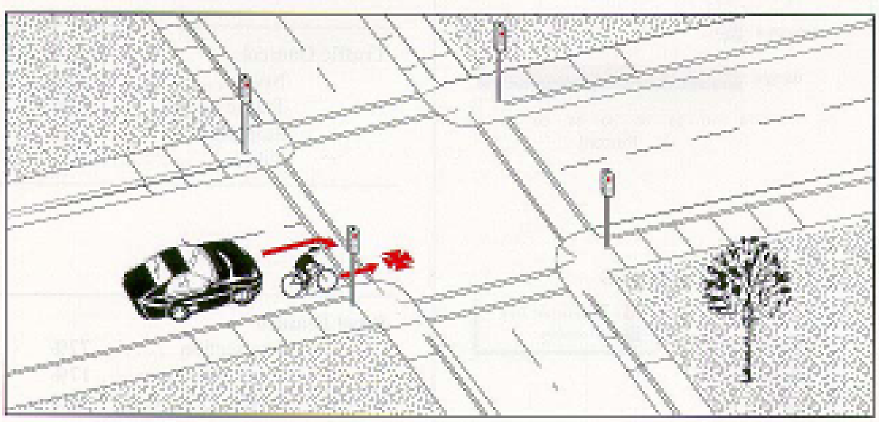
Description: The bicyclist made a left turn in front of traffic traveling in the same direction.



Motorist Right Turn

Frequency: 143 cases; 4.7% of all crashes
Severity: 11% resulted in serious or fatal injuries

Description: The motorist was making a right turn and the bicyclist was riding in either the same or opposing direction.



For the purpose of providing some general background on the case study location, the following descriptive information is provided:

- Piedmont Park is a large public park located approximately 3 miles north of the central business district in the midtown area of Atlanta.
- The park is surrounded on all sides by densely populated residential neighborhoods.
- Very little parking is available within the park and most park users arrive by foot, roller blades, skateboard, or bicycle.
- The park has extensive walking, running, and bicycling trails, and these are the primary uses of the park. In addition, there are numerous festivals and special events.
- Access to the park from surrounding neighborhoods is via surface streets, most of which have narrow (4-foot- to 5-foot-wide) sidewalks.
- The park is bound on all sides by heavily traveled arterial roadways that commonly experience significant peak-hour congestion.
- Two transit stations are located within walking distance near the park and frequent pedestrian access to and from the park is linked with the stations. Typical sidewalk and crosswalk treatments are used along surface streets (10th St. and 14th St.) to connect with the transit stations. Bicycles are allowed on transit fixed-rail vehicles during all operational periods.

Data provided for conducting a case study evaluation of pedestrian and bicycle conditions at Piedmont Park include the following information:

- Bicycle Crash Locations (Figure 4.3).
- Pedestrian Accident Locations (Figure 4.4).
- Site Location Map (Figure 4.5).
- Tabulation of Pedestrian Accident Data (Figure 4.6).
- Tabulation of Bicycle Crash Data (Figure 4.7).
- Usage Data Collected at Major Park Entrances (Figure 4.8).
- Summary of Major Roadways (Figure 4.9).

Part 3

Obtain pedestrian accident and bicycle crash data from your State DOT for a particular roadway or area of interest. You should obtain a minimum of 3 years of data in order to conduct your analysis of factors similar to those discussed in the Piedmont Park case study location. Although local city agencies sometimes maintain crash data, the State DOT is the most reliable source of available data. Most States maintain their crash data in a computerized database system and sorts of the data can be conducted on various field entries to list crashes associated with either pedestrians or bicycles. These types of crashes will only constitute a very small amount of the total crashes occurring along a roadway and it may be useful to receive a full listing of all the crashes associated with your location of interest. DOT’s may only maintain data along the more significant roadways and often do not include subdivision/residential streets.

Most DOT personnel are very helpful and willing to work to get you the data you need. You should clearly explain your intentions, location of interest, and type of data that you would like to obtain. Submitting a request in writing is typically required so that your data request can be efficiently processed through their system. In addition to the crash data, you may need other information that will allow you to decode the crash data and to physically link the crash to a location on the roadway network. An accident/crash investigation manual is usually available that lists all of the coded entries used in creating aggregated crash tabulations. Also, a roadway features log is typically available to link milepost listings to physical map features such as intersections, bridges, and street names. In the initial phases of conducting an analysis of crashes, it is seldom necessary to access the actual crash reports. It is much more useful to utilize aggregated crash records that are available through the crash data system. Allow ample time for DOT personnel to accommodate your request within their day-to-day workload. Generally, data can be received in 2 to 3 weeks after submitting a request.

4.8 References

Text and graphics for this section were derived from the following sources:

Drake and Burden, *Pedestrian and Bicyclist Safety and Accommodation Participant Workbook*, NHI Course #38061, FHWA-HI-96-028, 1996.

Federal Highway Administration, *Bicycle Crash Types: A 1990's Informational Guide,* FHWA-RD-96-163, 1997.

Federal Highway Administration, *Pedestrian and Bicycle Crash Types of the Early 1990's*, Technical Summary, FHWA-RD-95-163, 1996.

Federal Highway Administration, *Pedestrian Crash Types: A 1990's Informational Guide,* FHWA-RD-96-163, 1997.

Figure 4.3

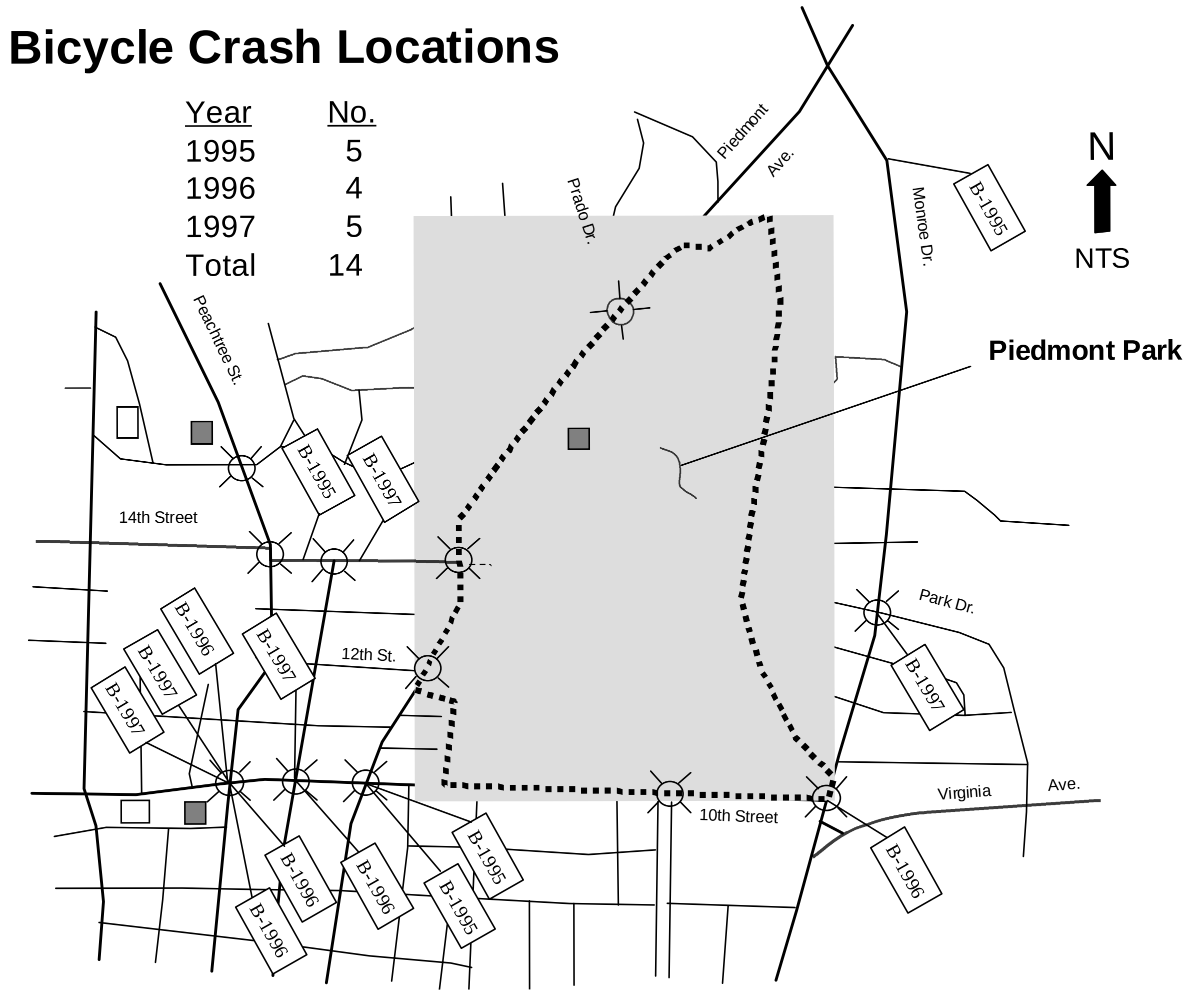

Bicycle Crash Locations
Year No.
1995 5
1996 4
1997 5
Total 14
N
NTS
Piedmont Park
Piedmont
Ave.
Prado Dr.
Monroe Dr.
Peachtree St.
14th Street
12th St.
Park Dr.
Virginia
Ave.
10th Street
B-1995
B-1995
B-1997
B-1996
B-1997
B-1997
B-1997
B-1997
B-1996
B-1996
B-1996
B-1995
B-1995
B-1996

Figure 4.4

Pedestrian Accident Locations

Year	No.
1995	5
1996	8
1997	8
Total	21

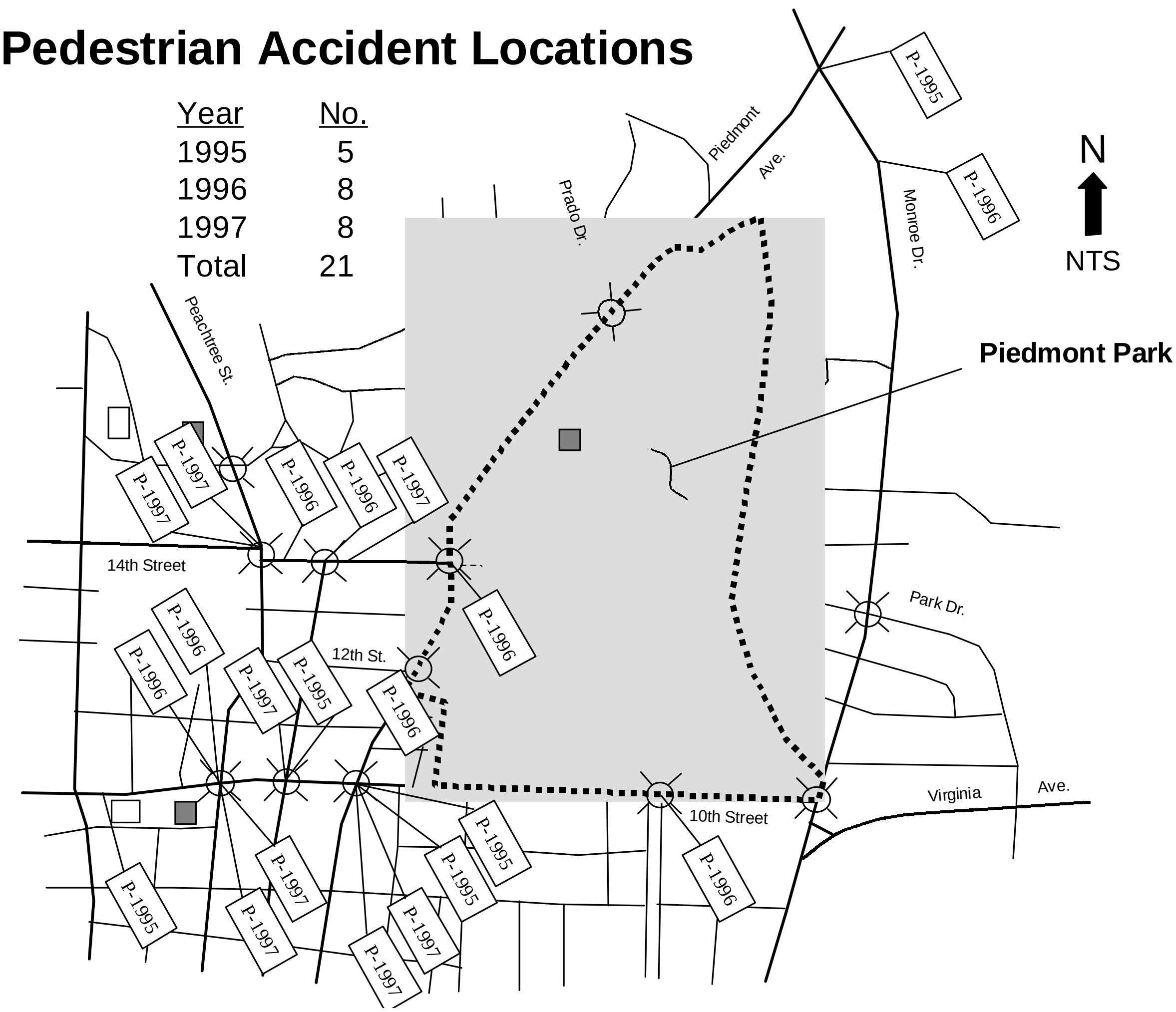


Figure 4.5

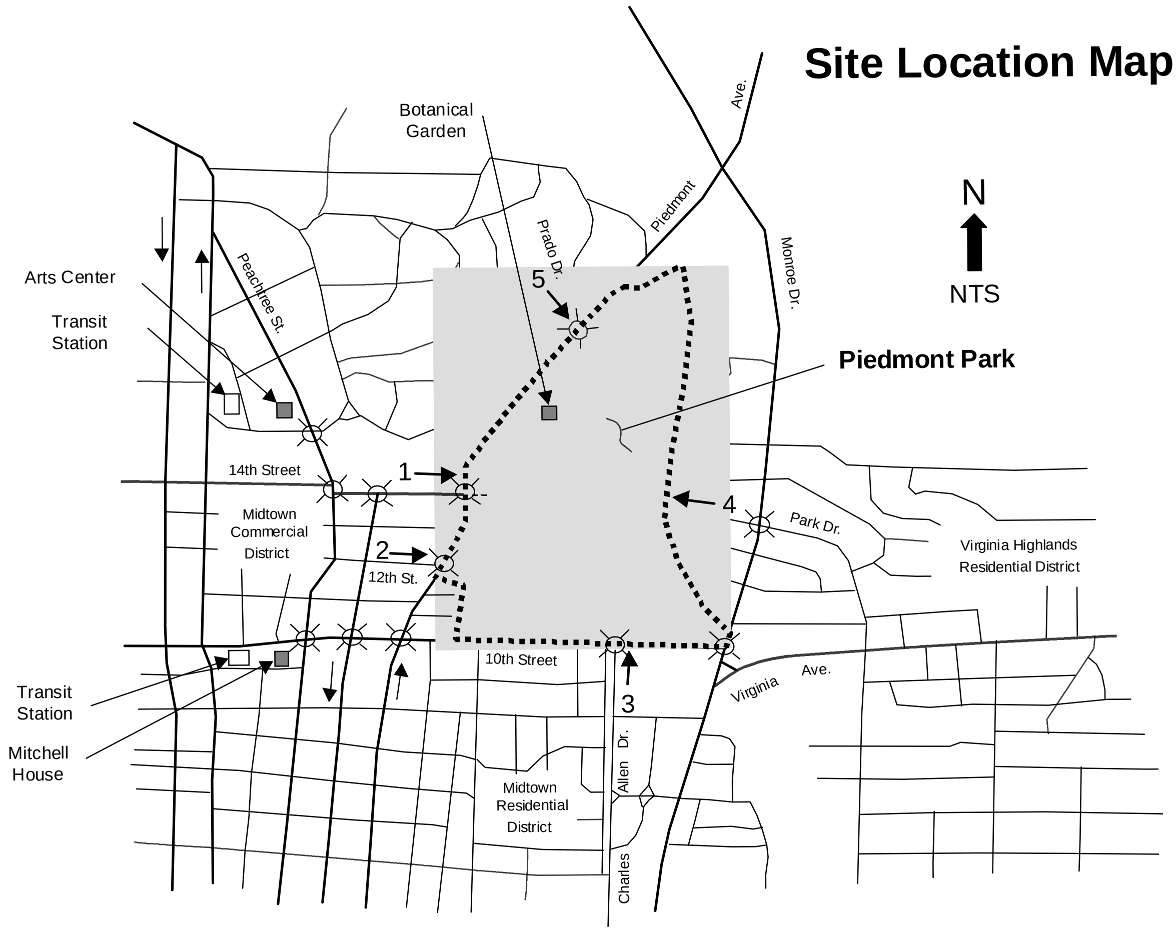

Site Location Map
N
NTS
Botanical
Garden
Arts Center
Transit
Station
Peachtree St.
Prado Dr.
Piedmont
Ave.
Monroe Dr.
Piedmont Park
14th Street
Midtown
Commercial
District
12th St.
10th Street
Park Dr.
Virginia Highlands
Residential District
Virginia
Ave.
Transit
Station
Mitchell
House
Midtown
Residential
District
Allen Dr.
Charles
1
2
3
4
5

Figure 4.6:

Piedmont Park Vicinity – Atlanta, Georgia
Tabulation of Pedestrian Accident Data

No.	Route Roadway	Mile Post	Time	Month	Day	Year	Severity	Location	Type	Light Condition	Surface Condition
1	10th Street	1.78	23:29	06	13	1997	Injury	Intersection	Pedestrian	Dark-Lighted	Dry
2	10th Street	1.78	13:54	08	25	1997	Injury	Intersection	Pedestrian	Daylight	Dry
3	10th Street	1.87	23:01	06	19	1997	Injury (2)	Intersection	Pedestrian	Dark-Lighted	Dry
4	10th Street	1.99	19:19	02	06	1997	Injury	Intersection	Pedestrian	Dark-Lighted	Dry
5	10th Street	1.99	17:26	07	08	1997	Injury	Intersection	Pedestrian	Daylight	Dry
6	14th Street	0.06	15:00	04	04	1997	Injury	Intersection	Pedestrian	Daylight	Dry
7	14th Street	0.06	18:00	03	03	1997	Injury	Intersection	Pedestrian	Daylight	Dry
8	14th Street	0.00	9:30	06	10	1997	Injury	Intersection	Pedestrian	Daylight	Dry
9	Monroe Drive	5.71	16:12	09	21	1996	Injury	Roadway Segment	Pedestrian	Daylight	Wet
10	10th Street	2.43	15:45	09	07	1996	Injury	Intersection	Pedestrian	Daylight	Dry
11	10th Street	1.78	19:50	07	04	1996	Injury	Intersection	Pedestrian	Daylight	Dry
12	10th Street	1.78	22:05	07	13	1996	Injury	Intersection	Pedestrian	Dark-Lighted	Dry
13	10th Street	2.01	21:30	06	29	1996	Injury	Roadway Segment	Pedestrian	Dark-Lighted	Dry
14	14th Street	0.00	17:10	08	05	1996	Injury	Intersection	Pedestrian	Daylight	Dry
15	14th Street	0.06	13:00	03	13	1996	Injury	Intersection	Pedestrian	Daylight	Dry
16	Piedmont Avenue	1.01	22:20	04	25	1996	Injury	Intersection	Pedestrian	Dark-Lighted	Dry
17	Monroe Drive	5.97	23:06	02	10	1995	Injury	Intersection	Pedestrian	Dark-Lighted	Wet
18	10th Street	1.64	18:20	01	11	1995	Injury	Roadway Segment	Pedestrian	Dusk	Dry
19	10th Street	1.87	17:25	02	08	1995	Injury	Intersection	Pedestrian	Daylight	Dry
20	10th Street	1.99	21:00	10	17	1995	Injury	Intersection	Pedestrian	Dark-Lighted	Dry
21	10th Street	1.99	02:23	01	21	1995	Injury (2)	Intersection	Pedestrian	Dark-Lighted	Dry

Crash data provided by Georgia Department of Transportation.

Figure 4.7

Piedmont Park Vicinity – Atlanta, Georgia
Tabulation of Bicycle Crash Data

No.	Route Roadway	Mile Post	Time	Month	Day	Year	Severity	Location	Type	Light Condition	Surface Condition
1	Monroe Drive	5.14	19:00	09	17	1997	Injury	Intersection	Angle Intersecting	Daylight	Dry
2	10th Street	1.78	12:20	03	14	1997	Injury	Intersection	Angle Intersecting	Daylight	Dry
3	10th Street	1.78	17:32	08	29	1997	Injury	Intersection	Angle Intersecting	Daylight	Dry
4	10th Street	1.87	17:43	03	11	1997	Injury	Intersection	Head On	Daylight	Dry
5	14th Street	0.00	18:10	12	17	1997	Injury	Intersection	Angle Intersecting	Dark-Lighted	Dry
6	Monroe Drive	4.85	01:15	05	05	1996	Injury	Intersection	Rear End	Dark-Lighted	Dry
7	10th Street	1.78	15:33	12	18	1996	PDO	Intersection	Sideswipe Same Dir	Daylight	Dry
8	10th Street	1.78	18:30	12	27	1996	PDO	Intersection	Angle Intersecting	Dark-Lighted	Dry
9	10th Street	1.87	21:45	02	09	1996	PDO	Intersection	Angle Intersecting	Dark-Lighted	Dry
10	Monroe Drive	5.81	17:15	09	02	1995	PDO	Roadway Segment	Angle Intersecting	Daylight	Dry
11	10th Street	1.78	12:22	02	23	1995	Injury	Intersection	Angle Intersecting	Daylight	Dry
12	10th Street	1.99	16:40	09	29	1995	Injury	Intersection	Angle Intersecting	Daylight	Dry
13	10th Street	1.99	17:50	08	03	1995	Injury	Intersection	Angle Intersecting	Daylight	Dry
14	14th Street	0.00	17:45	09	11	1995	Injury	Intersection	Rear End	Daylight	Dry

PDO = Property Damage Only
Crash data provided by Georgia Department of Transportation.

Figure 4.8

Piedmont Park Vicinity – Atlanta, Georgia
Human Powered Transportation (HPT) Modes
HPT Usage Data Collected at Major Park Entrances

			Total for all intersection movements [1]			
No.	**Entrance Location**	**Time of Day**	**Bicyclists**	**Rollerbladers** [2]	**Pedestrians** [3]	**Total HPT Activity**
1 [4]	Piedmont Ave. at 14th St.	4:25 4:40 pm	3	2	22	27
1 [4]	Piedmont Ave. at 14th St.	5:00 5:15 pm	2	3	29	34
2	Piedmont Ave. at 12th St.	4:40 4:55 pm	6	4	12	22
3	10th St. at Charles Allen Dr.	5:20 5:35 pm	3	6	42	51
4	Park Ave. at Elmwood Dr.	5:40 5:55 pm	7	5	18	33

Notes:

1. Conditions were sunny and clear, temperature approximately 90 degrees F. Count duration was for a total of 15 minutes for each spot count location.
2. Count tabulations include occasional skateboarders.
3. Count tabulations include joggers and people with baby strollers.
4. Piedmont Ave. at 14th St. was counted twice, to evaluate peaking characteristics.

Figure 4.9

Piedmont Park Vicinity – Atlanta, Georgia
Summary of Major Roadways

No.	**Roadway**	**Mileposts**	**No. of Lanes**	**Speed Limit**	**1997 ADT**	**Total Length (miles)**
1	Piedmont Avenue Section 1 Section 2	 0.65 to 1.01 1.01 to 1.93	 3 (one way) 4	 35 mph 35 mph	 11,700 26,400	1.28
2	10th Street	1.56 to 2.68	4	35 mph	20,420	1.12
3	14th Street Section 1 Section 2	 0.00 to 0.23 0.00 to 0.06	 4 4	 35 mph 35 mph	 22,400 17,500	0.29
4	Monroe Drive	4.85 to 5.97	4	35 mph	20,500	1.12