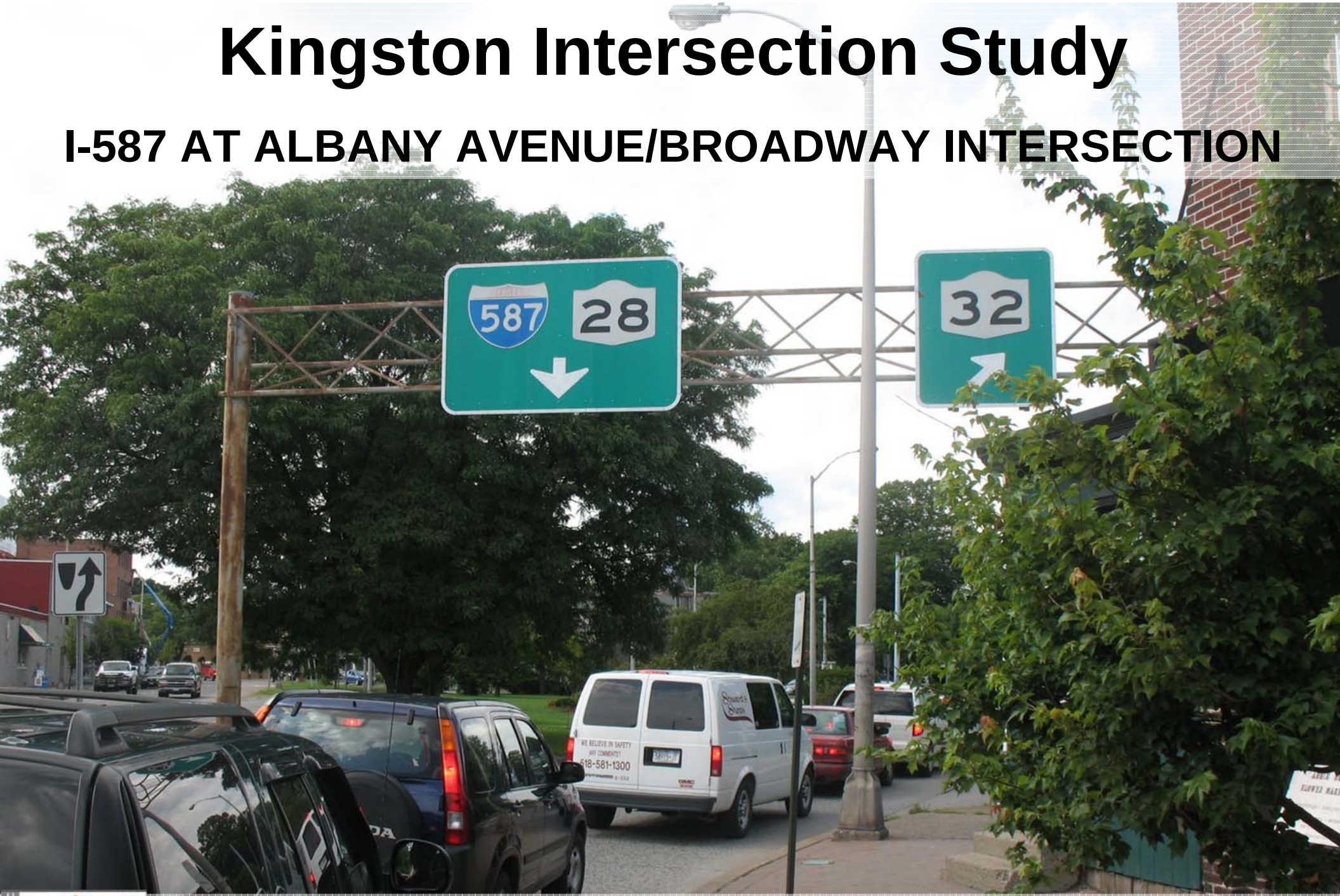
Kingston Intersection Study

I-587 AT ALBANY AVENUE/BROADWAY INTERSECTION



Project Discovery

Technical Memorandum

ULSTER COUNTY TRANSPORTATION COUNCIL

City of Kingston I-587/Albany/Broadway Intersection Study
Project Discovery Technical Memorandum

Prepared for the Ulster County Transportation Council

Prepared by:

Fitzgerald & Halliday, Inc.

August 2010

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Introduction

When the initial plans for the Interstate Highway System were outlined by the Bureau of Public Roads in 1955, a highway was planned for the NY 28 corridor. Route 28 was rerouted and named Colonel Chandler Drive, which was later designated as Interstate 587. NY 28 continued to extend eastward from Colonel Chandler Drive along Broadway to US 9W until its truncation at NY 32 in the early 1980s. As with many truncated expressways around the nation, what resulted is an abrupt transition from a high speed, limited access facility to a downtown commercial and residential setting.

The study area is generally defined by the area shown in Figure 1. This report describes the existing and future conditions within the study area and recognizes the influence of other factors adjacent to the study intersection.

Existing Conditions

Roads and Traffic

A review of the study area roadway network includes the following:

- Physical geometric characteristics of the roads;
- Traffic control devices and pavement markings
- Signage;
- Traffic volumes and traffic operations, and
- Accident history.

Geometric Conditions

The physical layout, or geometry, of a road influences the flow of traffic and contributes to the degree of safety for motorists, bicyclists, and pedestrians. Factors such as number of lanes, lane width, grade, curvature, and intersection type affect traffic volume, capacity, travel speed, congestion, safety, access to property, and driver behavior. The following sections present an inventory of geometric conditions which are to be used to help understand the factors that contribute to congestion and safety issues. Table 1 lists the geometric conditions for study area roadways.

The study area consists mostly of straightly aligned streets with little change in grade. Sightlines are generally good with the exception of Broadway northbound approaching Albany Avenue eastbound via East Saint James Street. Due to poor sightlines at this location, directional signage for lane assignments is often not visible until the driver has already committed to a lane.

Intersections along Clinton Avenue are near right angle while intersections with Albany Avenue and Broadway are mainly skewed. Skewed intersections reduce driver visibility, have wider pedestrian crossings, require more pavement, affect signal timing, and are generally less desirable than right angle intersections.

City of Kingston I-587 at Albany Avenue/Broadway Intersection Study

Figure 1 Study Area

Table 1: Geometric Inventory of Study Area Roads

Street	Road Width	# of Lanes	Lane Width	Median or Centerline	Parking	Shoulder Stripe	Sidewalk Width	Sidewalk Cond.	Planting Strip
Albany Ave									
Clinton to Maiden	36-60'	3	9'-15'	Centerline	9'	No	5-6'	Good	5'
Broadway to St. James Ct.	48-72'	4	12'	Landscaped Medians	None	No	5'	Good	4'
St. James Ct. to Tremper	40'	2	14'	Centerline	10'	Yes	5'	Poor	5'
Broadway									
Albany to East St. James	Varies 20-30'	4 total, 2 northbound, 2 southbound	12'-20'	Landscaped Medians	9' southbound side	No	7-8'	Good	4' Brick
East St. James to Elmendorf	46-60'	2	14	Centerline/Painted Median	9'	No	7-8'	Good	4' Brick
Clinton Ave									
Main Street to Albany	36'	2	18'	Centerline	None	No	4.5'	Good	3'
Albany to St. James	40'	2	11	None	9'	No	5'	Good	3'
Maiden Lane	30’	2	Unstriped	None	South side	No	5'	Good	3'
St. James St.	37'	2	Unstriped	None	Yes, unstriped	No	5-7'	Fair/Good	3'
East St. James	32'	1	Unstriped	None	Yes, unstriped	No	5'	Good	2'
St. James Court	22’	2	Unstriped	None	Yes, unstriped	No	4'	Fair	None

Lane merges are also an issue at two locations. Two lanes of eastbound traffic on Albany Avenue merges with one lane from East Saint James Street, then narrows back down to a single lane on Albany Avenue east of East St. James Street. Another lane merge occurs on Broadway where two lanes of southbound traffic merge to a single lane just south of St. James Street. These merges occur over distances of less than 200 feet and may be contributing to traffic accidents and congestion. Figure 2 illustrates the geometric conditions of study area roads.

Lane arrangement at study area intersections have been inventoried for the purpose of understanding intersection capacity. Figure 3 illustrates the lane arrangements at study area intersections.

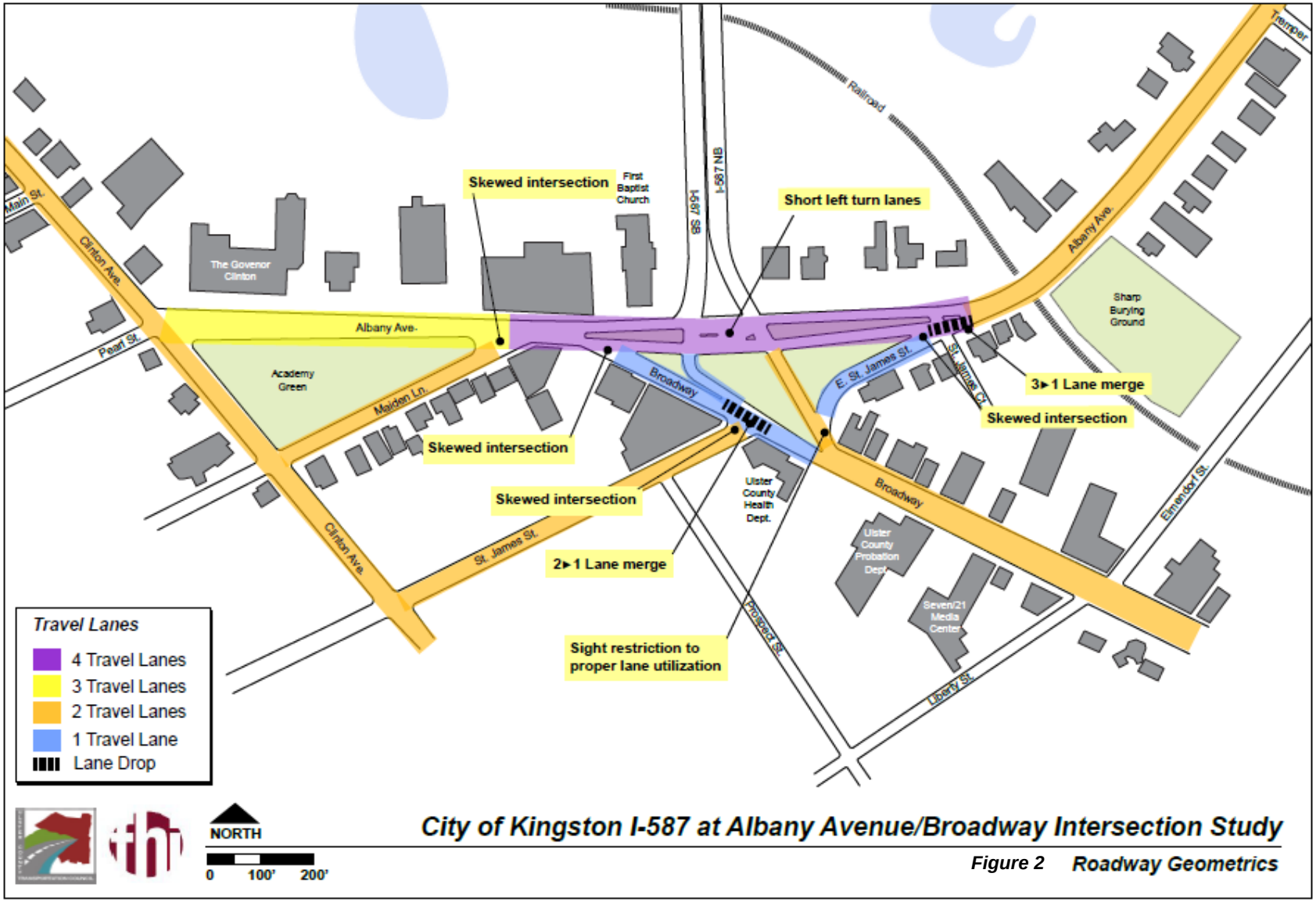
Traffic Control and Pavement Marking

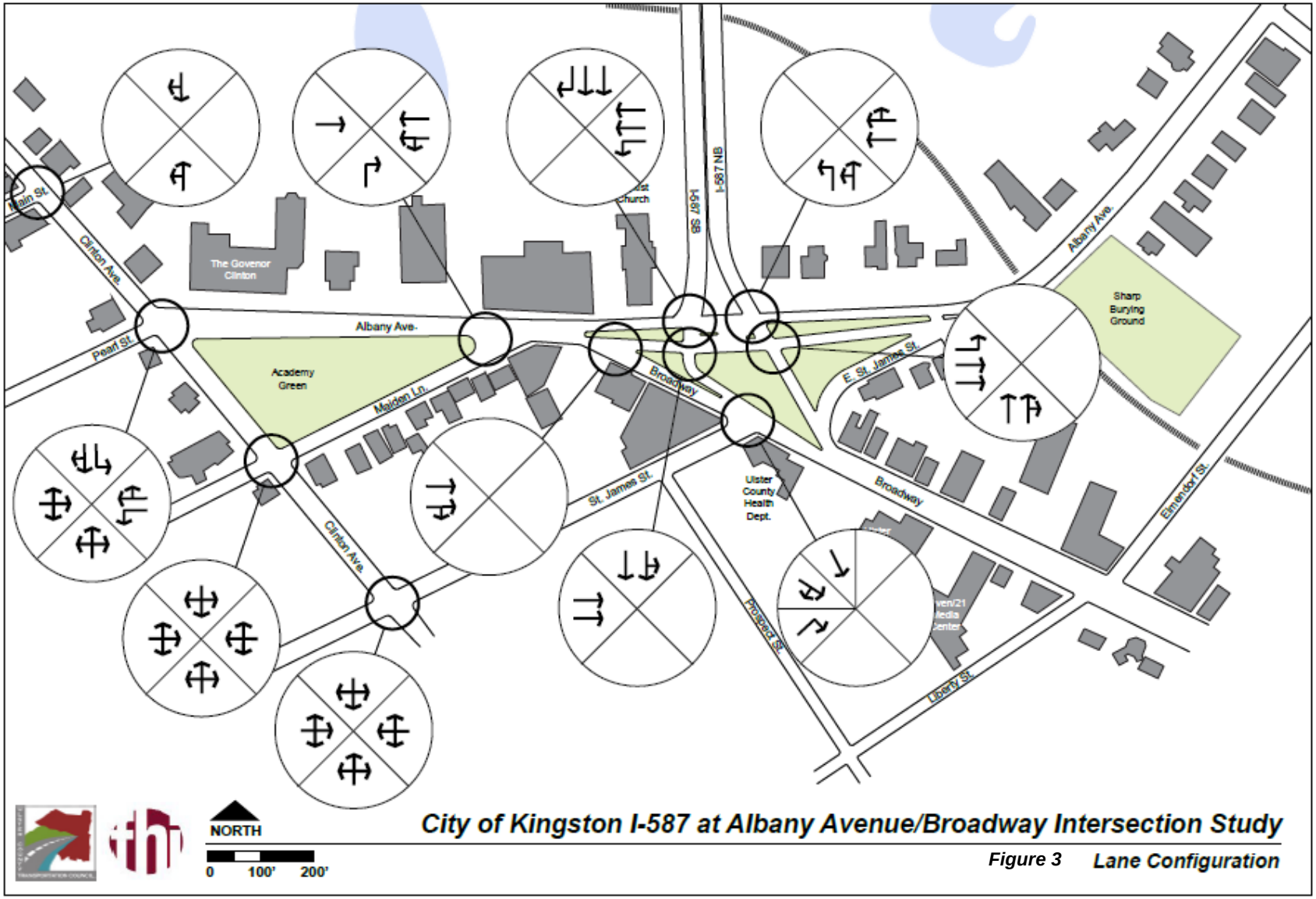
The location of traffic signals, stop and yield signs, and pavement markings including roadway striping and stop bar locations has been illustrated in Figure 4. Currently, there are four traffic signals in the study area along Albany Avenue at the intersection with I-587. The signals operate in two pairs, with eastbound and westbound Albany Avenue on the same controller. These signals are maintained by NYSDOT.

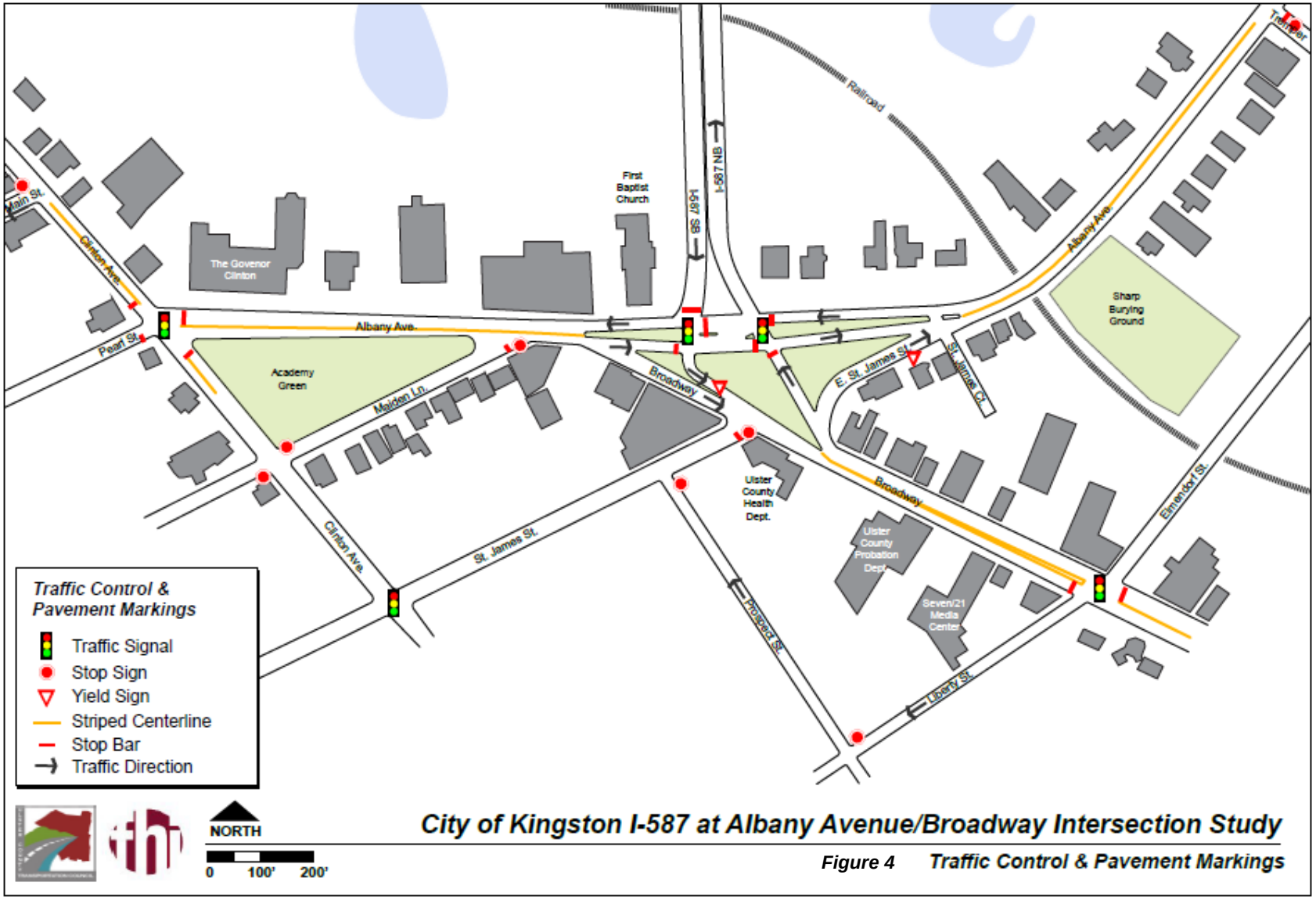
Signage

Regulatory, warning and guide signs help to communicate traffic laws, roadway hazards, and route information to drivers. When signs are improperly located, obscured or damaged, or clustered in groups, their effectiveness is minimized. In general, there is a proliferation of signage in the study area that contributes to driver confusion. A detailed signing plan prepared by NYSDOT for the study area can be found in the Technical Appendix.

Multiple signs on Broadway approaching Albany Avenue


Skewed intersection
First Baptist Church
I-587 SB
I-587 NB
Short left turn lanes
Railroad
Albany Ave.
Tremper
Main St.
Clinton Ave.
The Governor Clinton
Albany Ave.
Sharp Burying Ground
Pearl St.
Academy Green
Maiden Ln.
Broadway
E. St. James St.
St. James Ct.
3▸1 Lane merge
Skewed intersection
Skewed intersection
Skewed intersection
Ulster County Health Dept.
Broadway
Elmendorf St.
Clinton Ave.
St. James St.
2▸1 Lane merge
Ulster County Probation Dept.
Seven/21 Media Center
Prospect St.
Sight restriction to proper lane utilization
Liberty St.
Travel Lanes
4 Travel Lanes
3 Travel Lanes
2 Travel Lanes
1 Travel Lane
Lane Drop
NORTH
0 100' 200'
City of Kingston I-587 at Albany Avenue/Broadway Intersection Study
Figure 2 Roadway Geometrics


Main St.
Clinton Ave.
Pearl St.
The Governor Clinton
Albany Ave.
Academy Green
Maiden Ln.
Broadway
St. James St.
Clinton Ave.
1st Church
I-587 SB
I-587 NB
Albany Ave.
Sharp Burying Ground
E. St. James St.
Broadway
Ulster County Health Dept.
Prospect St.
Liberty St.
Elmendorf St.
NORTH
0 100' 200'
City of Kingston I-587 at Albany Avenue/Broadway Intersection Study
Figure 3 Lane Configuration


Traffic Control & Pavement Markings
Traffic Signal
Stop Sign
Yield Sign
Striped Centerline
Stop Bar
Traffic Direction
NORTH
0 100' 200'
City of Kingston I-587 at Albany Avenue/Broadway Intersection Study
Figure 4 Traffic Control & Pavement Markings
Main St.
Clinton Ave.
Pearl St.
Albany Ave.
The Governor Clinton
First Baptist Church
I-587 SB
I-587 NB
Railroad
Albany Ave.
Sharp Burying Ground
Academy Green
Maiden Ln.
Broadway
E. St. James St.
St. James Ct.
Ulster County Health Dept.
Ulster County Probation Dept.
Seven/21 Media Center
Broadway
Elmendorf St.
Clinton Ave.
St. James St.
Prospect St.
Liberty St.

Traffic Volume and Operations

Existing condition traffic volumes were developed based on available traffic count data obtained from the New York State Department of Transportation (NYSDOT), Ulster County, and from previous studies. The available daily traffic volumes obtained from Ulster County indicate that Albany Avenue west of I-587 carries approximately 33,000 vehicles per day, almost twice as much as Albany Avenue east of I-587. Broadway carries approximately 18,000 vehicles per day between Elmendorf Street and Albany Avenue. A summary of the daily traffic volumes on study area arterials is provided in Table 2.

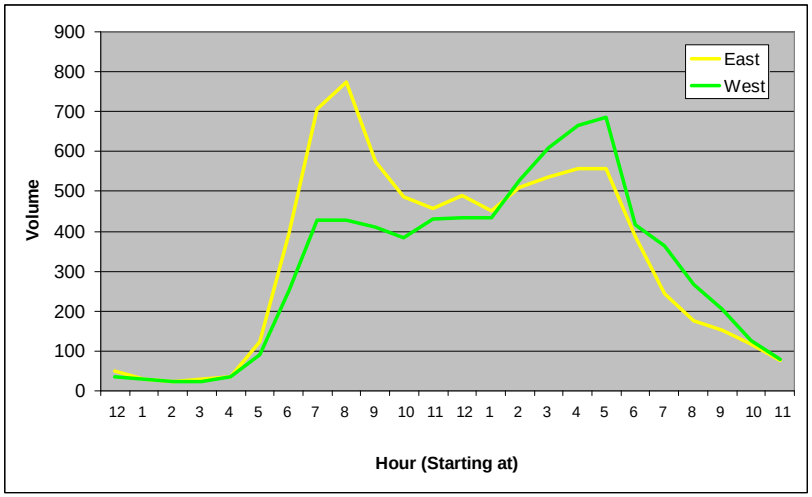
Table 2: Daily Traffic Volumes on Arterials

Roadway	Segment	Year Collected	Average Annual Daily Traffic (vehicles per day)
Broadway	Elmendorf Street to Albany Avenue	2007	17,759
Albany Avenue	I-587 to Flatbush	2008	18,600
Albany Avenue	Clinton Avenue to Broadway	2009	32,820

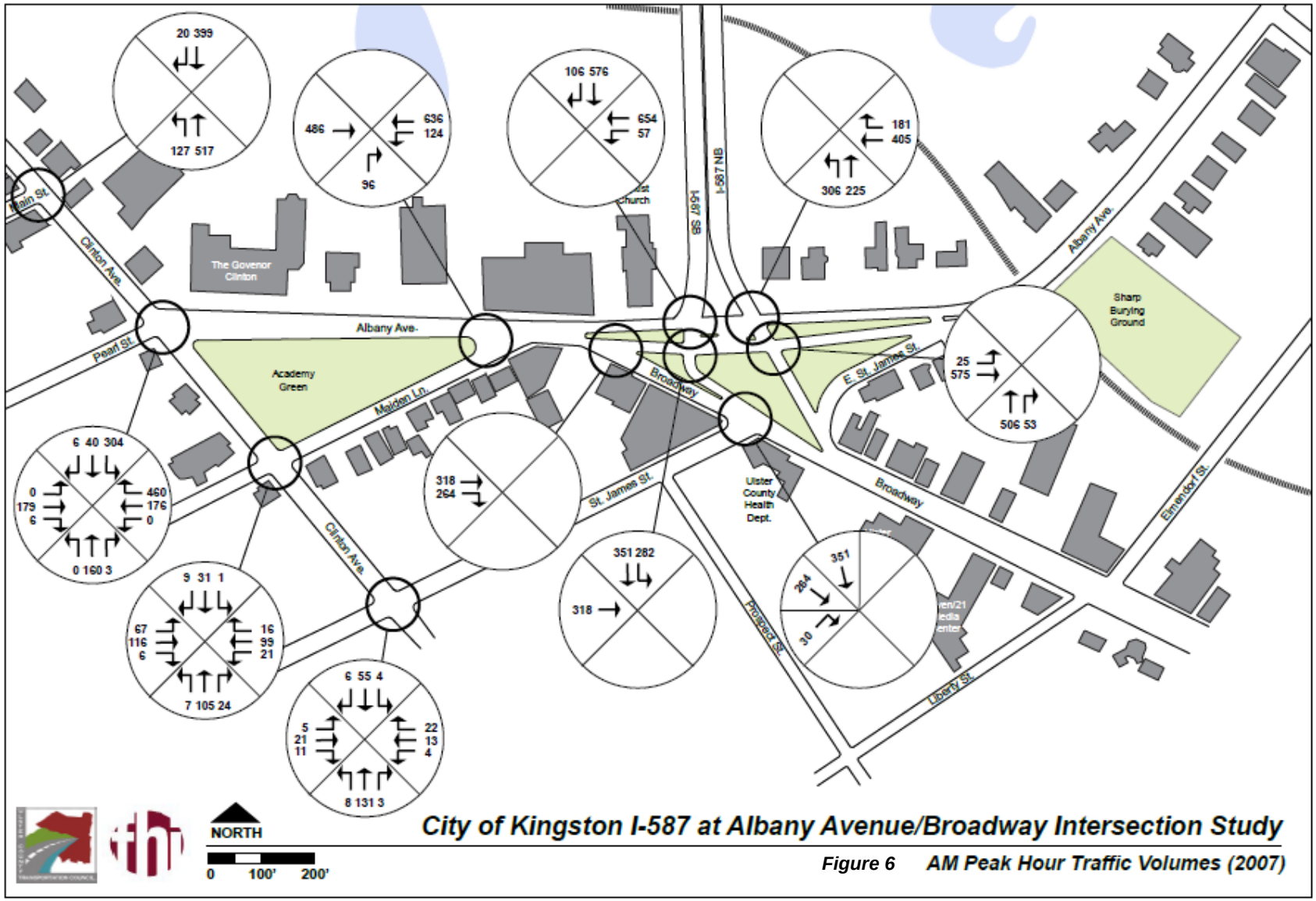
Source: Fitzgerald & Halliday, Inc., August 2010

Traffic data provided by NYSDOT was recorded on I-587 east of Sawkill Road in September 2009. Daily traffic volume is approximately 15,300 vehicles. The data indicates that traffic on I-587 peaks in the eastbound direction between 8:00 and 9:00 AM and in the westbound direction between 5:00 and 6:00 PM. Figure 5 illustrates the traffic volume along I-587 by time of day.

Figure 5: Traffic Volume along I-587

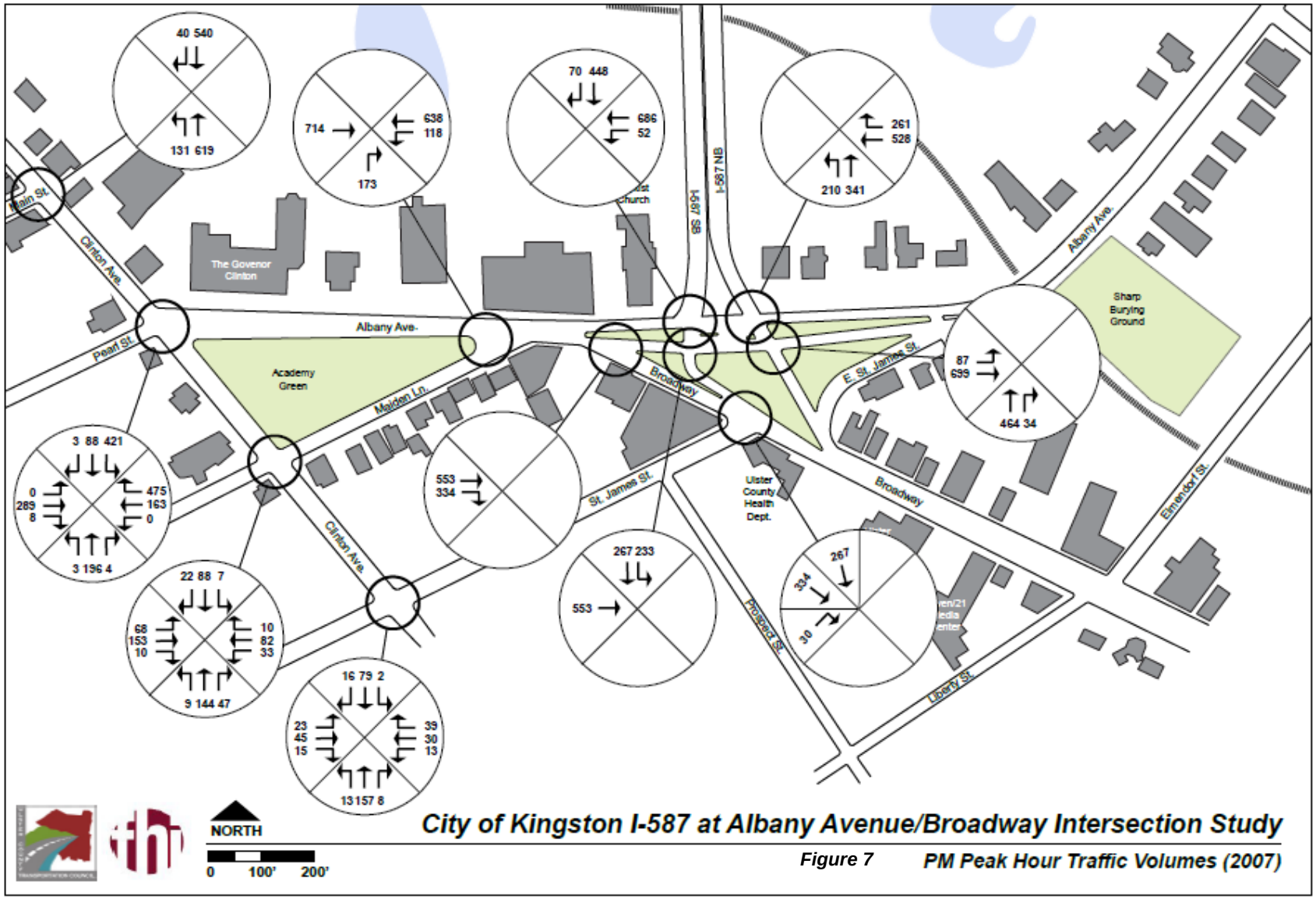


Turning movement counts were obtained from NYSDOT for the year 2007. Based on the data, the weekday morning and afternoon peak hour in the study area is between 8:00 am – 9:00 am and from 4:00 pm – 5:00 pm, respectively. Peak hour traffic volumes are provided in Figures 6 and 7 and illustrate that Broadway northbound and Albany Avenue westbound carry the highest peak hourly traffic volumes in the morning ranging from 550 to 715 vehicles per hour. During the afternoon peak hour, Albany Avenue eastbound and Broadway southbound carry the highest traffic volumes ranging from 550 to 790 vehicles per hour.



City of Kingston I-587 at Albany Avenue/Broadway Intersection Study

Figure 6 AM Peak Hour Traffic Volumes (2007)


40 540
131 619
714
638
118
173
70 448
686
52
261
528
210 341
87
699
464 34
3 88 421
0
289
8
475
163
0
3 196 4
22 88 7
68
153
10
10
82
33
9 144 47
16 79 2
23
45
15
39
30
13
13157 8
553
334
267 233
553
267
334
30
Main St.
Clinton Ave.
Pearl St.
The Govenor Clinton
Albany Ave.
Academy Green
Maiden Ln.
Broadway
St. James St.
I-587 SB
I-587 NB
E. St. James St.
Albany Ave.
Sharp Burying Ground
Ulster County Health Dept.
Broadway
Clinton Ave.
Prospect St.
Liberty St.
Elmendorf St.
NORTH
0 100' 200'
City of Kingston I-587 at Albany Avenue/Broadway Intersection Study
Figure 7 PM Peak Hour Traffic Volumes (2007)

According to the NYSDOT traffic counts recorded on I-587, trucks represent about 5% of the traffic in the AM peak hour and about 4% of the traffic in the PM peak hour. No truck data was recorded on the study area arterials.

Traffic operations were modeled using Synchro 7.0, a computer-based intersection operations model, which implements procedures presented in the Highway Capacity Manual 2000, published by the Transportation Research Board. A level-of-service (LOS), queue, and arterial analysis was conducted at the study area intersections to assess traffic operations and was based on the following assumptions:

- Traffic volumes obtained from 2007 and utilized for the analyses are anticipated to be the same for the year 2010, as traffic volumes in the study area have not increased over the last three years.
- Based on vehicle classification data obtained from NYSDOT, a 5% heavy vehicle rate during the morning peak hour and 4% heavy vehicle rate during the afternoon peak hour were applied.

A description of each analysis is provided below.

Level-of-Service Analysis: Level-of-service (LOS) is a term used to denote different operating conditions which occur at a given intersection under various traffic volume loads. It is a qualitative measure of the effect of a number of factors including intersection geometrics, speed, travel delay, freedom to maneuver, and safety. Level-of-Service provides an index to the operational qualities of an intersection. Six levels-of-service are defined by letter designations ranging from A to F, with LOS A representing the best operating conditions and LOS F representing the worst.

Level-of-Service designation is reported differently for signalized and unsignalized intersections. For signalized intersections, LOS is defined in terms of delay, which contributes to driver discomfort and frustration, fuel consumption, and lost travel time. Specifically, LOS criteria are stated in terms of average stopped delay per vehicle for the peak 15-minute period of the peak hour for the entire intersection and also by approach.

For unsignalized intersections, the analysis assumes that the traffic on the major street is not affected by traffic on the side street. The LOS for each turn movement on the side street is calculated by determining the number of gaps that are available in the major street's traffic stream. Based upon the number of gaps, the capacity of the movement is calculated. The overall demand of the movement is then compared to the capacity to determine the average delay for the movement. For unsignalized intersections, an overall intersection LOS is not determined.

The delay ranges differ slightly between unsignalized and signalized intersections due to driver expectations and behavior for each LOS. Table 3 summarizes the Level-of-Service criteria for both signalized and unsignalized intersections.

Table 3: Level-of-Service Criteria

Level-of-Service (LOS)	Signalized Intersection Control Delay (sec/veh)	Unsignalized Intersection Control Delay (sec/veh)
A	0-10	0-10
B	>10-20	> 10-15
C	>20-35	>15-25
D	>35-55	>25-35
E	>55-80	>35-50
F	>80	>50

Source: 2000 Highway Capacity Manual (Special Report 209) and Fitzgerald & Halliday, Inc., August 2010

Queue Analysis: Reports from the Synchro queue analysis (stacking of cars in each lane) present the 95th percentile of queue for each lane group. The 95th percentile queue represents the maximum back of queue (number of vehicles that are queued based on arrival patterns of vehicles and vehicles that do not clear the intersection during a given green phase) with 95th percentile traffic volumes. Queues are compared with the amount of storage that is actually available to determine where blockage occurs. Storage lengths were measured from aerial mapping.

Arterial Analysis: Arterial analysis provides information about the speed and travel time for an arterial in each direction. It considers the influence of multiple intersections along a given section of arterial that function as a single system. The classification of the arterial is automatically calculated based on the distances between the intersections and the roadway speeds. The arterial LOS is based on the speed and the arterial class. Table 4 summarizes the LOS by arterial class.

Table 4: Arterial Level-of-Service by Class

Arterial Class	Class I	Class II	Class III	Class IV
Range of Free-flow Speed	55 to 45 mph	45 to 35 mph	35 to 30 mph	35 to 25 mph
Typical Free-flow Speed	50 mph	40 mph	35 mph	30 mph
LOS	Average Travel Speed (mph)			
A	> 42	>35	>30	>25
B	>34-42	>28-35	>24-30	>19-25
C	>27-34	>22-28	>18-24	>13-19
D	>21-27	>17-22	>14-18	>9-13
E	>16-21	>13-17	>10-14	>7-9
F	<=16	<=13	<=10	<=7

Source: 2000 Highway Capacity Manual (Special Report 209) and Fitzgerald & Halliday, Inc., August 2010

The analysis results describe the operational effectiveness of the system and identify current traffic-related deficiencies in the area. Results from the LOS, queue, and arterial analysis, as shown in Tables 5, 6, and 7 respectively, indicate operational issues at the study area intersections as described in the following section.

Table 5: Level-of-Service Summary Existing Condition (2010)

		Existing Condition (2010)					
		AM Peak Hour			PM Peak Hour		
Approach	Movement	v/c Ratio	Delay (sec/veh)	LOS	v/c Ratio	Delay (sec/veh)	LOS
Albany Avenue & I-587 (Northbound)							
Albany Avenue (westbound)	Thru-right	0.46	26.5	C	0.69	34.0	C
Broadway (northbound)	Left	0.43	6.0	A	0.33	1.3	A
Broadway (northbound)	**Thru-left**	0.62	**> 80.0**	**F**	0.79	24.4	C
Intersection		**--**	**> 80.0**	**F**	**--**	26.9	C
Albany Avenue & Broadway (Northbound)							
Albany Avenue (eastbound)	Left	0.03	6.9	A	0.10	4.1	A
Albany Avenue (eastbound)	Thru	0.29	11.9	B	0.39	10.5	B
Broadway (northbound)	Thru	0.74	46.7	D	0.64	41.6	D
Intersection		**--**	26.8	C	**--**	20.2	C
Albany Avenue & I-587 (Southbound)							
Albany Avenue (westbound)	Left	0.07	6.1	A	0.04	1.3	A
Albany Avenue (westbound)	Thru	0.38	10.9	B	0.30	3.2	A
I-587 (southbound)	Thru	0.69	41.8	D	0.64	47.5	D
I-587 (southbound)	Right	0.24	6.2	A	0.20	9.5	A
Intersection		**--**	22.3	C	**--**	18.6	B
Albany Avenue & Broadway (Southbound)							
Albany Avenue (eastbound)	Thru	0.33	34.8	C	0.39	26.6	C
Broadway (southbound)	Thru-left	0.66	4.4	A	0.61	3.2	A
Intersection		**--**	14.8	B	**--**	15.8	B
Albany Avenue & Clinton Avenue							
Pearl Street (eastbound)	Left-thru-right	0.32	14.3	B	0.66	20.9	C
Albany Avenue (westbound)	Thru-right	0.54	5.5	A	0.50	5.0	A
Clinton Avenue (northbound)	Left-thru-right	0.21	7.5	A	0.26	7.9	A
Clinton Avenue (southbound)	Left	0.63	15.0	B	0.71	18.2	B
Clinton Avenue (southbound)	Thru-right	0.06	6.0	A	0.10	6.7	A
Intersection	Thru-right	**--**	9.1	A	**--**	12.0	B

Note: Bold text highlights LOS E or LOS F.

Table 6: Queue Summary Existing Condition (2010)

			Existing Condition (2010)		
			AM Peak Hour	PM Peak Hour	
Approach	Movement	Existing Storage (feet)	95th % Queue (feet)	95th % Queue (feet)	Maximum Vehicles in Blockage
Albany Avenue & I-587 (Northbound)					
Albany Avenue (westbound)	Thru-right	> 350	267	358	
Broadway (northbound)	Left	25	0	1	
Broadway (northbound)	**Thru-left**	**25**	16	**77**	**2**
Albany Avenue & Broadway (Northbound)					
Albany Avenue (eastbound)	Left	110	14	21	
Albany Avenue (eastbound)	**Thru**	**110**	**142**	113	**1**
Broadway (northbound)	**Thru**	**220**	**257**	**248**	**1**
Albany Avenue & I-587 (Southbound)					
Albany Avenue (westbound)	Left	65	29	7	
Albany Avenue (westbound)	**Thru**	**65**	**164**	**85**	**4**
I-587 (southbound)	Thru	> 500	264	215	
I-587 (southbound)	Right	> 500	38	37	
Albany Avenue & Broadway (Southbound)					
Albany Avenue (eastbound)	**Thru**	**175**	**178**	**275**	**4**
Broadway (southbound)	Thru-left	25	1	1	
Albany Avenue & Clinton Avenue					
Pearl Street (eastbound)	Left-thru-right	> 300	83	132	
Albany Avenue (westbound)	Thru-right	> 300	50	52	
Clinton Avenue (northbound)	Left-thru-right	265	52	63	
Clinton Avenue (southbound)	**Left**	**125**	**127**	**223**	**4**
Clinton Avenue (southbound)	Thru-right	> 300	17	30	

NOTE: Bold text highlights queue at approach.

Table 7: Arterial Level-of-Service Summary (2010)

		AM Peak Hour		PM Peak Hour	
Roadway	Direction	Speed (mph)	LOS	Speed (mph)	LOS
Albany Ave.	Eastbound	6.1	F	7.1	E
Albany Ave.	Westbound	9.4	D	9.5	D
Broadway	Northbound	3.7	F	3.2	F

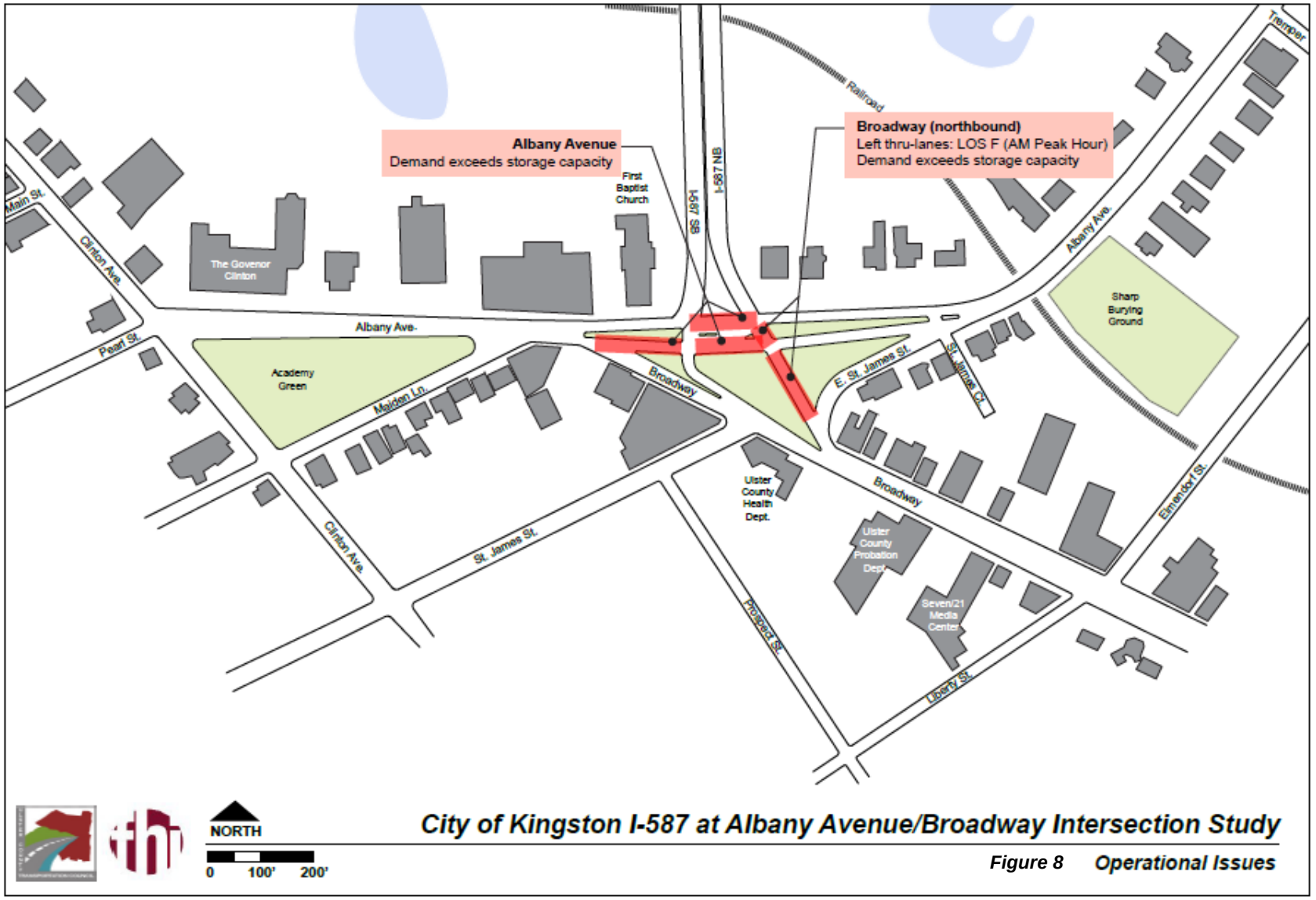
Observations: Albany Avenue and Broadway are characterized as Class IV arterials with a posted speed of 30 miles per hour. Results from the arterial LOS indicate that portions of Albany Avenue and Broadway in this section of Kingston operate at LOS F and less than 10 mph during the peak hours of the day. The distances between the four signalized intersections and the operations of the signals to provide ample clearance through the intersection affect the traffic operations. The short distances combined with the high travel demand to and from I-587 result in slower travel speeds, delay, and queuing through the intersections. Details for the individual intersections are provided as follows:

Albany Avenue at I-587 North and South: Traffic operations at these two intersections operate at LOS D or better except for the intersection of Albany Avenue with the I-587 northbound approach during the morning peak hour. The high traffic demand northbound on Broadway in the morning contributes to the intersection's performance which operates at LOS F. Vehicles on Broadway experience approximately 5 minutes of delay as they either turn left onto Albany Avenue westbound or continue to I-587 northbound. The queue (stacking of cars) on Albany Avenue westbound between the I-587 northbound and southbound approaches exceeds the available storage capacity by about four vehicles.

Albany Avenue at Broadway North and South: Traffic operations at these two intersections operate at LOS D or better during the morning and afternoon peak hours. There is a queue of approximately four vehicles on Albany Avenue eastbound approaching Broadway southbound. Additionally, the queue on the Broadway approach to Albany Avenue eastbound exceeds the available storage capcaity by about two vehicles.

Albany Avenue at Clinton Avenue: Traffic operations at this intersection overall operate at LOS A during the morning peak hour and LOS B during the afternoon peak hour. The queue southbound on Clinton Avenue turning left onto Albany Avenue exceeds available storage capacity by about four vehicles.

Figure 8 illustrates the segments of road where queued vehicles exceed available storage capacity. The result of vehicles spilling out beyond the lanes in which they are assigned is a blockage of adjacent lanes and intersections. When vehicle flow is blocked, the entire system of intersections can fail, even if there is sufficient capacity of each individual intersection to handle the demand.


Albany Avenue
Demand exceeds storage capacity
Broadway (northbound)
Left thru-lanes: LOS F (AM Peak Hour)
Demand exceeds storage capacity
Railroad
Tremper
Main St.
Clinton Ave.
Pearl St.
The Govenor Clinton
First Baptist Church
I-587 SB
I-587 NB
Albany Ave.
Albany Ave.
Sharp Burying Ground
Academy Green
Maiden Ln.
Broadway
E. St. James St.
St. James Ct.
Ulster County Health Dept.
Broadway
Elmendorf St.
Clinton Ave.
St. James St.
Ulster County Probation Dept.
Seven/21 Media Center
Prospect St.
Liberty St.
NORTH
0 100' 200'
City of Kingston I-587 at Albany Avenue/Broadway Intersection Study
Figure 8 Operational Issues

Accident History

Accident data was provided by NYSDOT for a three year period between 2007 and 2009. Accident data provided for three roadways within the study area was analyzed. These roadways include I-587 within 300 feet of Albany Avenue, Albany Avenue between Clinton Avenue and the Sharp Burying Ground, Broadway north of Elmendorf Street and Clinton Avenue between Main Street and St. James Street.

A total of 149 accidents occurred over a three year period with 71 injuries associated with those accidents. There were no fatal accidents within the study area during this three year period. A majority of accidents (59) were found at the Albany Avenue/Broadway/I-587 intersection. This location also experienced the largest number of injuries (30).

Accidents which occurred with relative frequency at the Albany Avenue/Broadway/I-587 intersection include rear end collisions on the I-587 south bound queue and collisions from improper lane usage approaching I-587 north bound from Broadway. Vehicles may be incorrectly using the left most lane to go straight through the intersection to I-587 northbound. If a left turn vehicle is present in the shared left-through lane, a conflict occurs.

Table 2 summarizes the accidents recorded in the study area between 2007 and 2009. Figure 9 illustrates the general locations of those accidents. Detailed accident reports were obtained from NYSDOT and are included in the Technical Appendix.

Table 8: Accident Summary

Accident Location	Accidents	Injuries
I-587 SB North of Albany	10	5
Albany/Broadway/I-587	59	30
Broadway/St.James	10	6
Broadway: St. James to Elendorf	11	3
Clinton: North of Pearl	1	0
Albany/Clinton/Pearl	18	8
Albany: Clinton to Maiden	13	5
Albany/Maiden	17	10
Albany East of I-587	10	4
	149	**71**

Source: NYSDOT

Parking

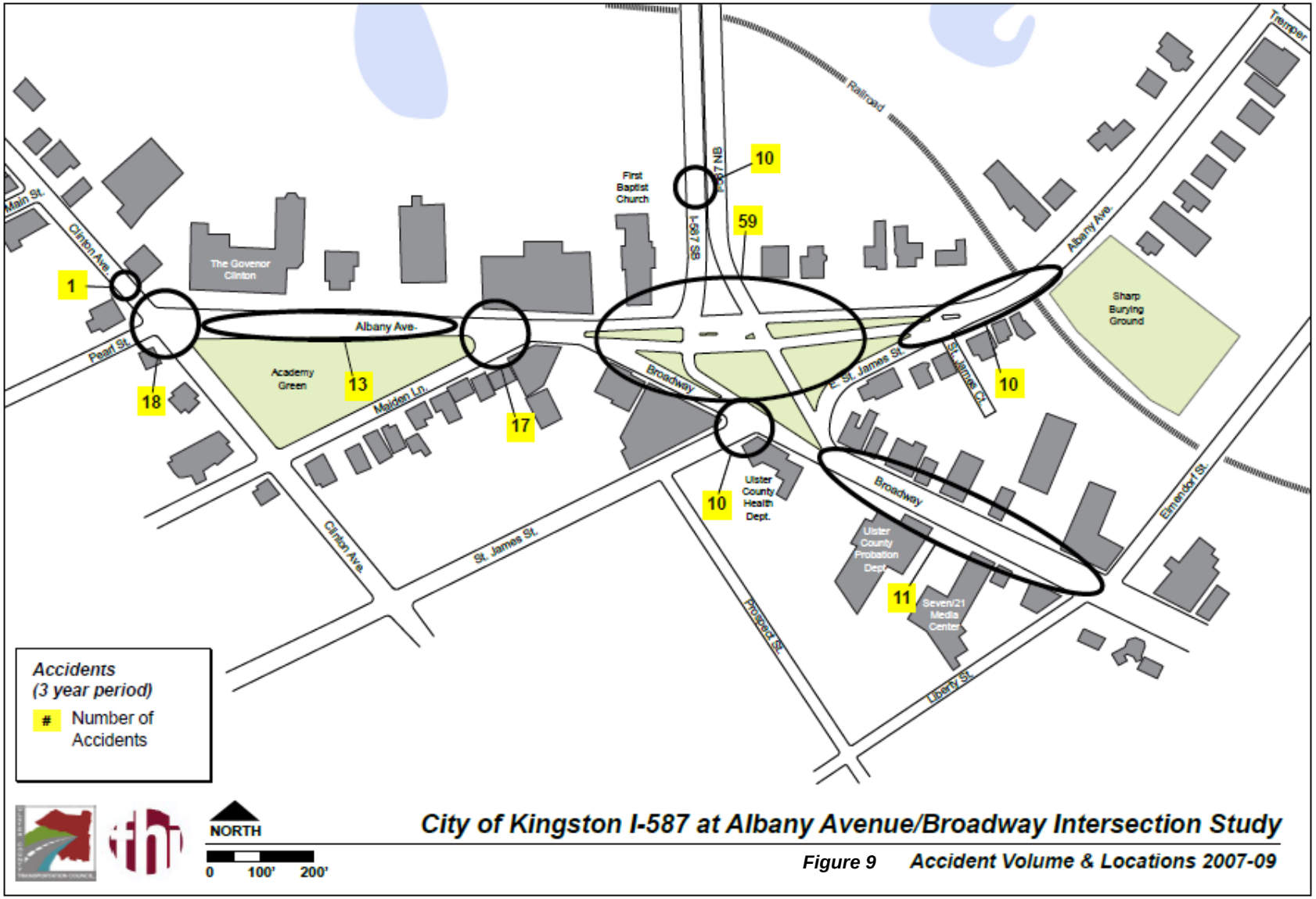
Parking within the study area is available both on-street and off-street in private lots. On street parking is metered on Albany Avenue and Broadway. Several streets have un-metered on-street parking. A total of 318 parking spaces are available on-street with 78 of those spaces metered. Surface parking available off Albany Avenue (between Clinton Avenue and Tremper Avenue) totals approximately 300 spaces. Surface parking off Broadway (between Albany Avenue and Elmendorf Street) totals approximately 350 spaces. Total parking within the study area is found to be approximately 968 spaces not including one and two family residential driveways.

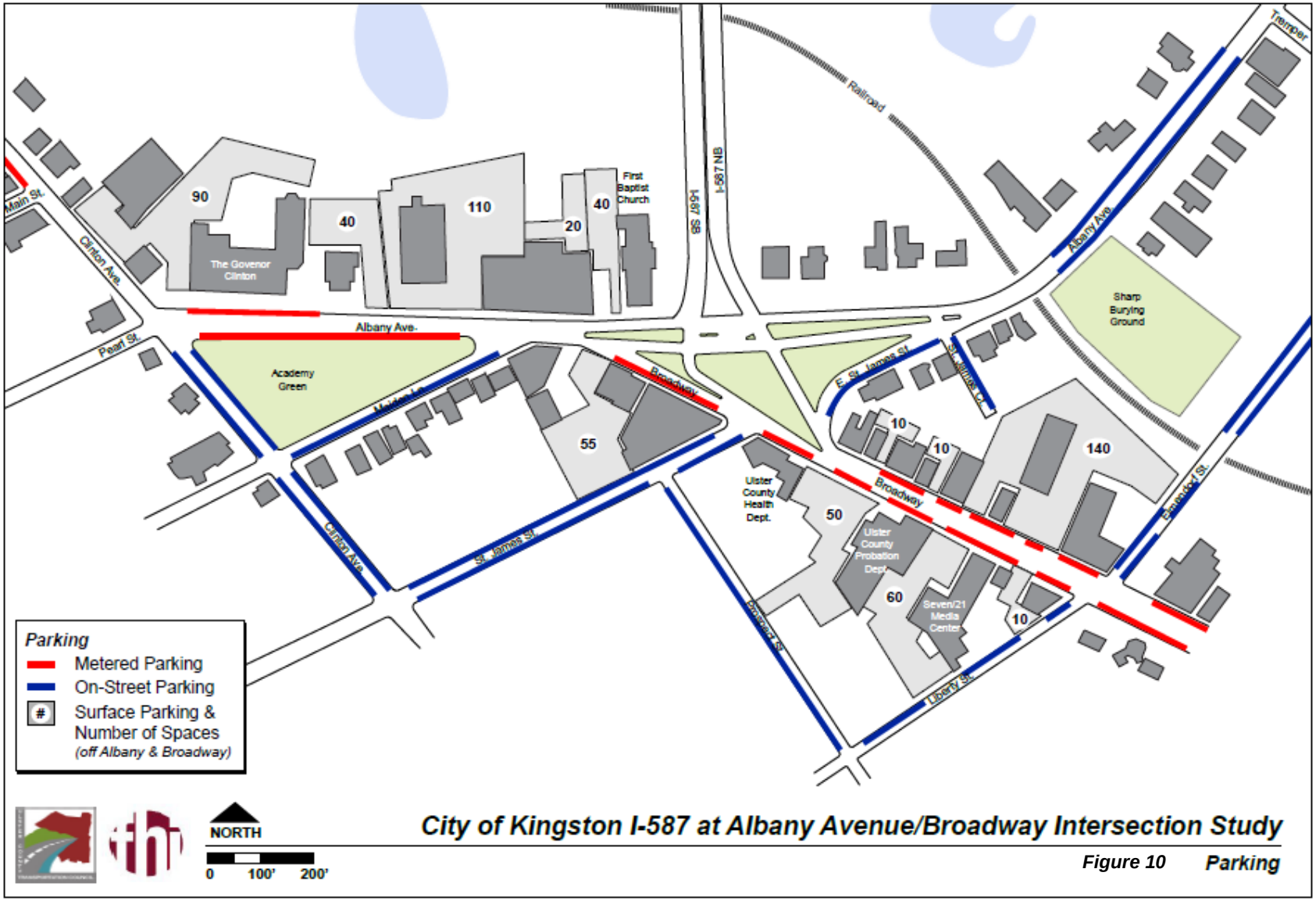
Table 9 summarizes the location and quantity of parking spaces in the study area. Figure 10 illustrates the location of parking in the study area.

Table 9: Parking Summary

On-Street Parking	**Spaces**
Albany Ave. (Railroad to Tremper)	50
Clinton Ave. (Albany to St. James)	40
East St. James Street	15
Elmendorf St. (Broadway to Railroad)	20
Liberty St. (Broadway to Prospect)	15
Maiden Ln. (Clinton to Albany)	20
Prospect St. (St. James to Liberty)	20
St. James Court	10
St. James St. (Clinton to Broadway)	50
	240
On-Street Metered Parking	
Albany Ave.	28
Broadway (Albany to Elendorf St.)	50
	78
Surface Parking	
Off Albany Ave. (Clinton to I-587)	300
Off Broadway (Albany to Liberty)	350
	650

Source: Fitzgerald & Halliday, Inc., August 2010


Main St.
Clinton Ave.
Pearl St.
Albany Ave.
Academy Green
Malden Ln.
The Governor Clinton
First Baptist Church
I-587 SB
I-587 NB
Railroad
Broadway
E. St. James St.
St. James Ct.
St. James St.
Clinton Ave.
Ulster County Health Dept.
Ulster County Probation Dept.
Seven/21 Media Center
Prospect St.
Liberty St.
Elmendorf St.
Tremper
Albany Ave.
Sharp Burying Ground
1
18
13
17
10
59
10
10
11
Accidents
(3 year period)
Number of Accidents
NORTH
0 100' 200'
City of Kingston I-587 at Albany Avenue/Broadway Intersection Study
Figure 9 Accident Volume & Locations 2007-09


Parking
Metered Parking
On-Street Parking
Surface Parking & Number of Spaces
(off Albany & Broadway)
NORTH
0 100' 200'
City of Kingston I-587 at Albany Avenue/Broadway Intersection Study
Figure 10 Parking
Main St.
Clinton Ave.
Pearl St.
Albany Ave.
Academy Green
Broadway
Railroad
I-587 SB
I-587 NB
First Baptist Church
The Governor Clinton
90
40
110
20
40
55
Albany Ave
Tremper
Sharp Burying Ground
E. St. James St.
St. James Ct.
10
10
140
Ulster County Health Dept.
50
Ulster County Probation Dept.
60
Seven/21 Media Center
10
Broadway
Edmond St.
Clinton Ave.
St. James St.
Crown St.
Liberty St.

Bicycles, Pedestrians, and Transit

Pedestrian Facilities

The study area is currently utilized by many types of users. Albany Avenue and Broadway function as complete streets, in that they are shared by all users. Motorists, truck drivers, bus transit users, pedestrians, and bicyclists use these roads to access various destinations within and outside the study area, such as retail, restaurants, transit stops, and other community facilities. The study team observed constant pedestrian activity on Albany Avenue, Broadway, and Clinton Avenue. On these streets, walking is simply a vital form of transportation. While there is an extensive sidewalk network with very few gaps in the study area, improvements could greatly enhance the walking and biking experience for users. Figure 11 displays the existing sidewalk network in the study area.

Sidewalk on Albany Avenue

Along Albany Avenue, the sidewalks are continuous on the north side and mostly continuous on the south side. One notable gap in the sidewalk network on the south side of Albany Avenue is located between Broadway and Saint James Court, near the I-587 intersection. These gaps force pedestrians to cross to the north side of Albany Avenue at a series of marked crosswalks and sidewalks at Broadway on the east and / or west side of the I-587 intersection. The sidewalks along Albany Avenue are generally five to six feet wide and have four to five foot planting strips that serve as a buffer between the sidewalk and the roadway. A small number of properties or sections have an asphalt planting strip. One notable exception is at the railroad overpass, where the sidewalk is immediately adjacent to the roadway on both sides.

Along Broadway, the sidewalks are continuous on the south side and mostly continuous on the north side. One notable gap in the sidewalk network on the north side of Broadway is located between the two sections of Albany Avenue. These gaps force pedestrians traveling westbound to cross to the south side of Broadway at two marked crosswalks at Albany Avenue and the I-587 intersection. The sidewalks along Broadway are generally seven to eight feet wide and have four to five foot brick, asphalt, green planting strip that serve as a buffer between it and the roadway.

Along Clinton Avenue, Maiden Lane, and Saint James Street, the sidewalks are continuous and generally four to six feet wide with a three to four foot wide planting strip serving as a buffer between the sidewalk and roadway.

Perhaps the single greatest deficiency of the sidewalk network is not the gaps mentioned above but rather the maintenance of the surfaces themselves. In the study area, the sidewalks are

composed of various materials including concrete, bluestone, pavers, and asphalt. Much of the sidewalk network is overgrown with weeds and grass and sections of bluestone and asphalt are raised from tree roots. These uneven and cluttered surfaces provide additional obstacles for pedestrians, especially those with disabilities or pushing strollers. At the August 2010 field visit, the FHI team observed a person in a wheelchair scooter traveling on the Clinton Avenue roadway, where there is significant motor vehicle traffic, rather than on the bumpy, disjointed sidewalk.

Person riding in the roadway on Clinton Avenue

There are a significant number of driveways and pull-in parking areas that pedestrians must traverse when walking in the study area. At the site visit, the study team felt that these access points posed few problems for pedestrians. The sidewalks are largely visible to motorists crossing them because they are often slightly raised, various surface materials, and another color than the roadway and planting strip. Because of their visibility, motorists typically are more likely to yield to pedestrians when crossing over this sidewalk.

There are a number of crosswalks, displayed in Figure 11, in the study area. Along Albany Avenue and Broadway, where sidewalks exist, there are crosswalks at all signalized intersections and at many of the smaller intersections. The study team observed no locations that would greatly benefit from the addition of crosswalks. A number of crosswalks, however, were faded and were in need of reapplication. This is especially true of the crosswalks on Albany Avenue and the I-587 intersection.

Where there are signalized intersections and crosswalks, there are typically pedestrian signals. The one exception to this is the intersection of Albany Avenue and I-587 the ramps. Here, pedestrians do not have the ability to push a button to change the light in order to cross the roadway. This is an extremely busy intersection and pedestrians could benefit from a pedestrian push button and even an exclusive pedestrian phase.

In addition, there are a number of Kingston 1777 trail markers along the roadways in the study area. This on-road, interpretive, and recreational trail directs users who want to walk, bike or drive the path taken by British troops when they burned Kingston in 1777.

Kingston 1777 Trail Sign

The *Ulster County Non-Motorized Transportation Plan*, adopted in December 2008, highlights a number of proposed pedestrian improvements in the study area. The plan calls for a number of pedestrian crossings along Broadway and a new

school crossing in front of the Montessori school on Albany Avenue. While these improvements will help address some of the gaps, the overall environment is still hostile to pedestrians due to the heavy traffic, noise, and deteriorated environment.

ADA Compliance

Table 10 provides information, as it relates to meeting the needs of disabled users, for the signalized intersections in the study area. Two intersections with pedestrian signals, such as Albany Avenue at Clinton Avenue and Albany Avenue at Maiden Lane, have exclusive pedestrian phases. These exclusive phases are well placed as the intersection at Clinton Avenue is highly utilized and provides direct access to the Uptown area. The intersection at Maiden Lane is highly utilized because it provides direct access to Academy Green.

The study area is extremely difficult for the blind or visually challenged to navigate. Very few of the signalized intersections have detectible warning surfaces on the ramps. Only the signalized intersection of Albany Avenue and the I-587 southbound ramp has such a feature. In addition, there is a detectible warning surface ramp at the intersection of Clinton Avenue and Main Street. There are no audible pedestrian signals in the corridor.

Detectible warning surface at Albany Avenue and I-587 intersection

As stated earlier, the surfaces of the sidewalks are bumpy, disjointed, and weeded. As observed, the sidewalks are difficult to navigate for those in wheelchairs as well as for those who are blind or visually challenged. The intersection of Albany Avenue and Clinton Avenue, which is very heavily utilized by pedestrians, has no ramps or other ADA amenities. Most intersections generally have good pedestrian button placement as they are placed on the sidewalks, which is accessible from the ramps and to those in wheelchairs.

Bicycle Facilities

As stated in the Pedestrian Facilities section, the I-587 study area has a number of streets that function as complete streets, in that they are shared by all users. Motorists, truck drivers, bus transit users, pedestrians, and bicyclists utilize these travel corridors to access various destinations within and outside the study area, such as retail, restaurants, transit stops, and other community facilities. In particular, the study team observed a large number of bicyclists on Albany Avenue and Broadway. Bicyclists appeared to be using their bicycles as a form of transportation, and only a few appeared to be recreational cycling. In addition, there are numerous bicycle racks on the sidewalks along Broadway.

Bicycle rack on Broadway

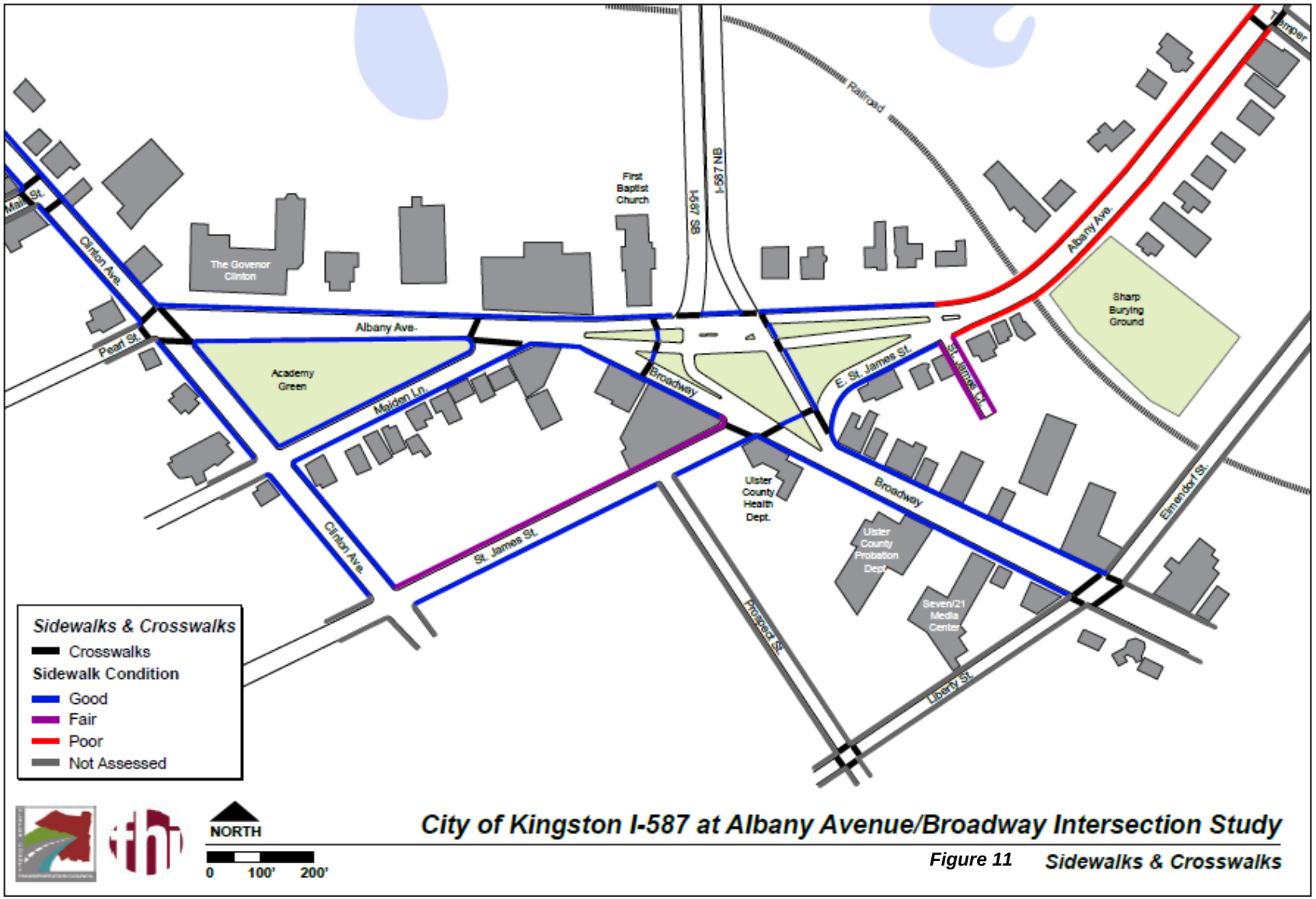

Railroad
First Baptist Church
I-587 SB
I-587 NB
Albany Ave.
The Governor Clinton
Clinton Ave.
Pearl St.
Albany Ave.
Academy Green
Maiden Ln.
Broadway
E. St. James St.
St. James Ct.
Sharp Burying Ground
Ulster County Health Dept.
Broadway
Ulster County Probation Dept.
Seven/21 Media Center
Elmendorf St.
St. James St.
Clinton Ave.
Prospect St.
Liberty St.
Sidewalks & Crosswalks
Crosswalks
Sidewalk Condition
Good
Fair
Poor
Not Assessed
NORTH
0 100' 200'
City of Kingston I-587 at Albany Avenue/Broadway Intersection Study
Figure 11 Sidewalks & Crosswalks

Table 10: ADA Compliance at Signalized Intersections

Intersection	Pedestrian Button	Pedestrian Signal Phasing	Accessible Pedestrian Signal (non-visual)	Crosswalk (Location)	Ramps (Location)	Detectable Warning Surface	Sidewalk (Location)
Broadway & Liberty St.	Four – one at each corner	With signal	No	Four – one at each leg of intersection	Six – at all crosswalk corners (northeast corner (2) and south west corner (2))	None	On all connecting streets, both sides
Albany Ave. & I-587	None	n/a	n/a	Six – two across I-587 ramps, four across Albany Ave.	At all crosswalks	One – at NW corner of I-587 southbound ramp	East-west on north side of Albany Ave. In medians crossing Albany Ave. and Broadway
Albany Ave. & Maiden Ln.	One – at northwest corner	Exclusive	No	Two – one across Albany Ave, one across Maiden La.	Two – at both ends of north-south crosswalk (across Albany)	None	On all connecting streets, both sides
Albany Ave. & Clinton Ave.	Three – one at end of each crosswalk	Exclusive	No	Four – one at each leg of intersection	None	No	On all connecting streets, both sides
St. James St. & Clinton Ave.	None	n/a	n/a	None	Three – two at southeast corner, one at northeast corner	No	On all connecting streets, both sides

Source: Fitzgerald & Halliday, Inc., August 2010

The vast majority of bicyclists observed in the study area were traveling on the sidewalk network. This is likely because of a number of factors including the high traffic volumes, the large percentage of truck traffic, and narrow lanes in the study area, as well as bicyclist and motorist education. Bicycle riding on the sidewalk is a hazard not only to the bicyclist as motorists do not expect to find them in crosswalks, but also to pedestrians who do not expect to be overtaken by the bicyclists from behind. As on all roadways, bicyclists should ride with traffic in the rightmost lane that serves their destination. In addition, very few cyclists were observed wearing helmets.

Bicyclist on sidewalk

Along Albany Avenue between Clinton Avenue and Saint James Court, there are no striped shoulders or bike lanes and no on-street parking. The outer lanes are too narrow for a bicyclist to comfortably share the lane with motor vehicles. East of Saint James Court on Albany Avenue, the outer lanes are wider (14 feet) and there is striped on-street parking. It is easier and safer for a bicyclist to comfortably share the lane with motor vehicles on this portion of Albany Avenue. On Broadway, the lanes are wider (14 feet) and there is on-street parking. There is no shoulder stripe, only simple pavement markings identifying the beginning and end of parking spaces.

The presence of signage could encourage bicyclists and motorists to share the roadway safely. In addition, restriping portions of roadways to include bicycle lanes would encourage bicycling on the facility and make it more comfortable for the bicyclists. Where the width of the roadway cannot accommodate restriping, shared lane markings, called "sharrows" and other Share the Road signs will promote and encourage safer bicycling.

The *Ulster County Non-Motorized Transportation Plan*, adopted in December 2008, highlights a number of new proposed shared use trails and improvements in the study area. The plan calls for proposed bike lanes on Broadway and Albany Avenue, as well as shared lane markings, bicycle actuated signals, and bike boxes at intersections on Broadway. In addition, there is a proposed shared use trail, called the Ulster & Delaware Rail with Trail, along the railroad.

Transit Service and Facilities

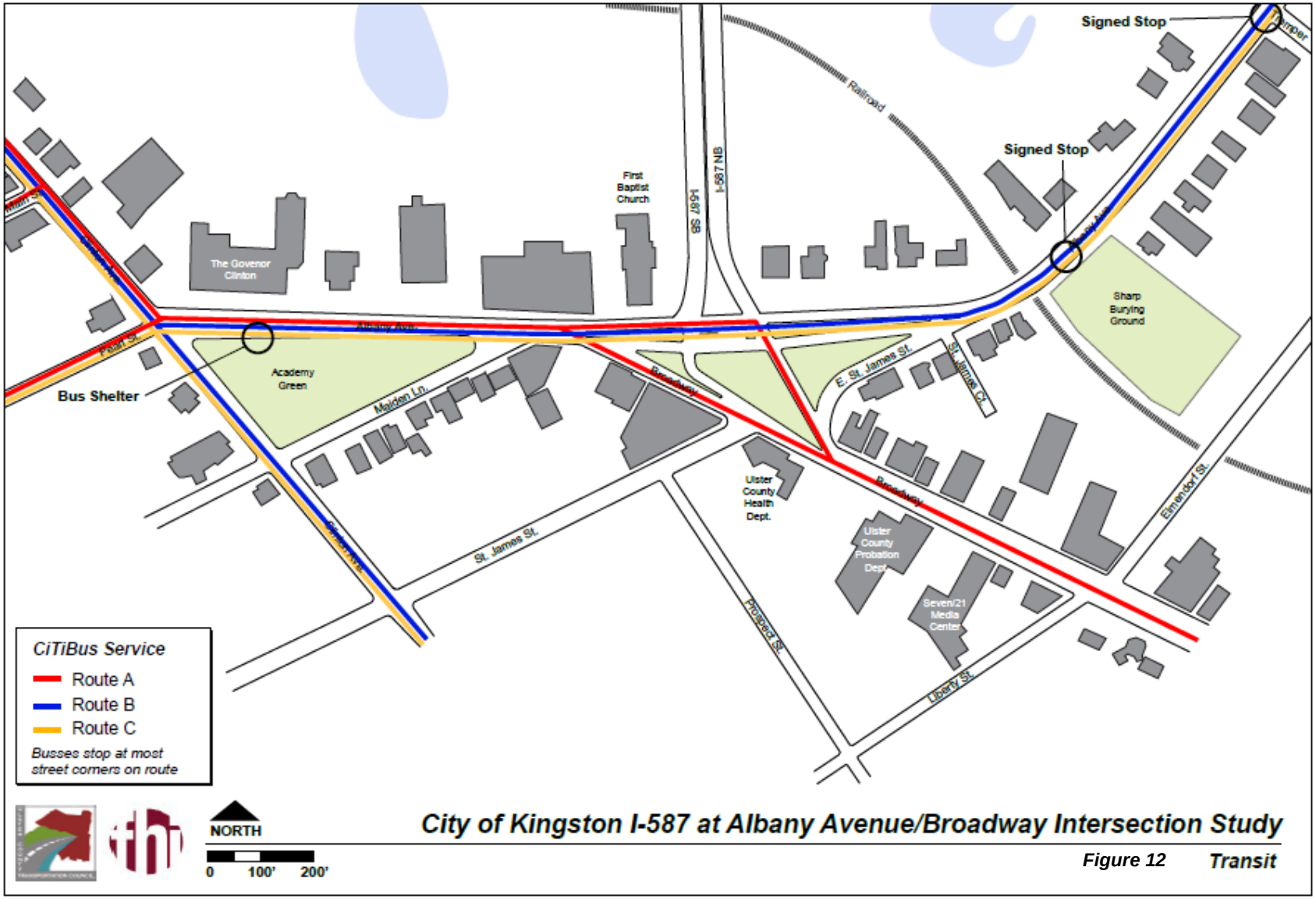
There are two transit bus services that travel throughout the study area. The first of these services is the Kingston Citibus. The Citibus has three routes, displayed in Figure 12, that travel through the study area.

Bus route sign on Albany Avenue

Route A provides regular service along Broadway, and on portions of Clinton Avenue, Pearl Street, and Main Street in the study area. Route B provides regular service along Albany Avenue and Clinton Avenue in the study area. There is a signed Route B bus stop on westbound Albany Avenue at Tremper Avenue. This bus drops off and picks up at 20 minutes after each hour during operating hours. Route C provides regular service along Albany Avenue, Clinton Avenue, and Pearl Street in the study area. There is a signed bus stop on eastbound Albany Avenue at the cemetery between Broadway and Tremper Avenue. This bus drops off and picks up at 50 minutes after each hour during operating hours. During the field visit, it was observed that this sign was obstructed by the branches of a large tree and the bus route is not identified on the sign.

In addition to the above mentioned stops, there is a bus stop/shelter on Albany Avenue westbound at Academy Green. Route A and Route C schedules both have this location listed as a stop. Further, all Citibuses stop at most street corners on the routes.

The other transit bus service that travels through the study area is the Ulster County Area Transit (UCAT) service. The UCAT provides regional service and has four routes that travel through, though no stops are made in, the study area. In particular, the K Route travels along Albany Avenue, while R, U, Z routes travel along Clinton Avenue.


Signed Stop
Signed Stop
Railroad
First Baptist Church
I-587 SB
I-587 NB
The Governor Clinton
Albany Ave.
Post St.
Bus Shelter
Academy Green
Malden Ln.
Broadway
E. St. James St.
St. James Ct.
Sharp Burying Ground
Ulster County Health Dept.
Ulster County Probation Dept.
Seven/21 Media Center
St. James St.
Prospect St.
Liberty St.
Elmendorf St.
CiTiBus Service
Route A
Route B
Route C
Busses stop at most street corners on route
NORTH
0 100' 200'
City of Kingston I-587 at Albany Avenue/Broadway Intersection Study
Figure 12 Transit

Study Area Context

Information about the study area beyond the roadways themselves is important to developing an improvement plan that is sensitive to the context of the community. As ideas for improving the way the roadway functions are considered, they must also support the vision for the kind of place Kingston wants to be. The following provides a broad overview of land development, visual character, and environmental conditions in the study area.

Current Land Use

Information on land use provides an understanding as to how the roadways influence quality of life in study area and conversely how the distribution and character of development affects traffic and travel patterns. This information can highlight issues for access to land in the area around the I-587 intersection and offer insights about why areas of traffic congestion forms where they do. Table 11 presents an inventory of existing land uses within the study area. Figure 13 shows the general types of land uses that occur in the study area.

As Kingston is a long-established urban environment, the area has a mix of activities present. There are numerous vacant available retail and office sites in the study area. As a consequence there is the unrealized potential for redevelopment and infill that, if it occurs, could change the character of the area, level of pedestrian activity, and traffic on the study area roadways. Kingston is in the process of developing a new comprehensive plan. Areas of emphasis are expected to include:

- Neighborhoods
- Public Facilities and Recreation
- Community Appearance and Aesthetics
- Business Development & Tourism
- Infrastructure (water sewer, roads, etc.)
- Quality of life (crime, safety, education, diversity)
- Arts & Culture
- Open Space & Natural Resources

It is also notable that there are number of surface parking lots associated with some of the larger uses such as the Ulster County Probation Office, yet no public parking facilities. The following summarizes the land use by street segment in the study area.

Community appearance and design

The visual setting of the study area was qualitatively evaluated in the context of two viewer groups; those driving on study area streets and those who live and work in the area and are traveling on foot. Table 12 generally describes the visual character of the major streets in the study area.

Table 11: Land Use Inventory

Street Segment	Predominant Land Uses	Notable Development
Broadway between Liberty St. and Albany Ave.	Small to medium scale retail, restaurants, and offices – some automotive sales and service	Seven21 Media Center; Ulster County Probation Office
Clinton between St James and Main Streets	Residential and office space – some mixed-use with office and residential together	Adaptive re-use of some historic period buildings; YMCA at Maiden Lane
Elmendorf between Broadway and Tremper	Small to medium scale retail and restaurants fronting on Broadway with single and two-family residences as the road travels eastward	Railroad bed bisects the street and sits well below the street grade; First Presbyterian Church at Elmendorf and Tremper Streets
Liberty between Broadway and Clinton	Small to medium scale retail and restaurants fronting on Broadway with single and two-family residences as the road travels westerly.	Kingston Library sits on the southwest corner of Liberty and Prospect Streets
St James between Broadway and Clinton	The corner where St James meets Broadway is a mix of diverse small uses; the remainder of the street traveling westerly is residential	People's Place Social Services
Maiden Lane between Broadway and Clinton	The north side of Maiden Lane is the Academy Green Park that separates it from Albany Avenue; the south side of Maiden lane is mostly single family homes	Academy Green Park with statuary; YMCA at the corner of Maiden Lane and Clinton Ave.
Albany between Broadway and Clinton	The south side is the triangular park; the north side is a mix of offices and institutional uses	First Baptist Church; Kingston Hospital annex with laboratories and offices; parking for the hospital building
Albany between Broadway and Tremper	Some office uses near Broadway then mostly one and two family homes with one apartment building	Historic period homes and some adaptive reuse of historic period homes for offices; railroad bed bisects the street and sits well below the street grade; historic Old Burying Ground Cemetery
Intersection of I-587, Albany and Broadway	Area dominated by roadway infrastructure and signage – triangular right of way space in amongst the roadways is landscaped green space	Entry to I-587; Dinosaur sculpture in eastern green space

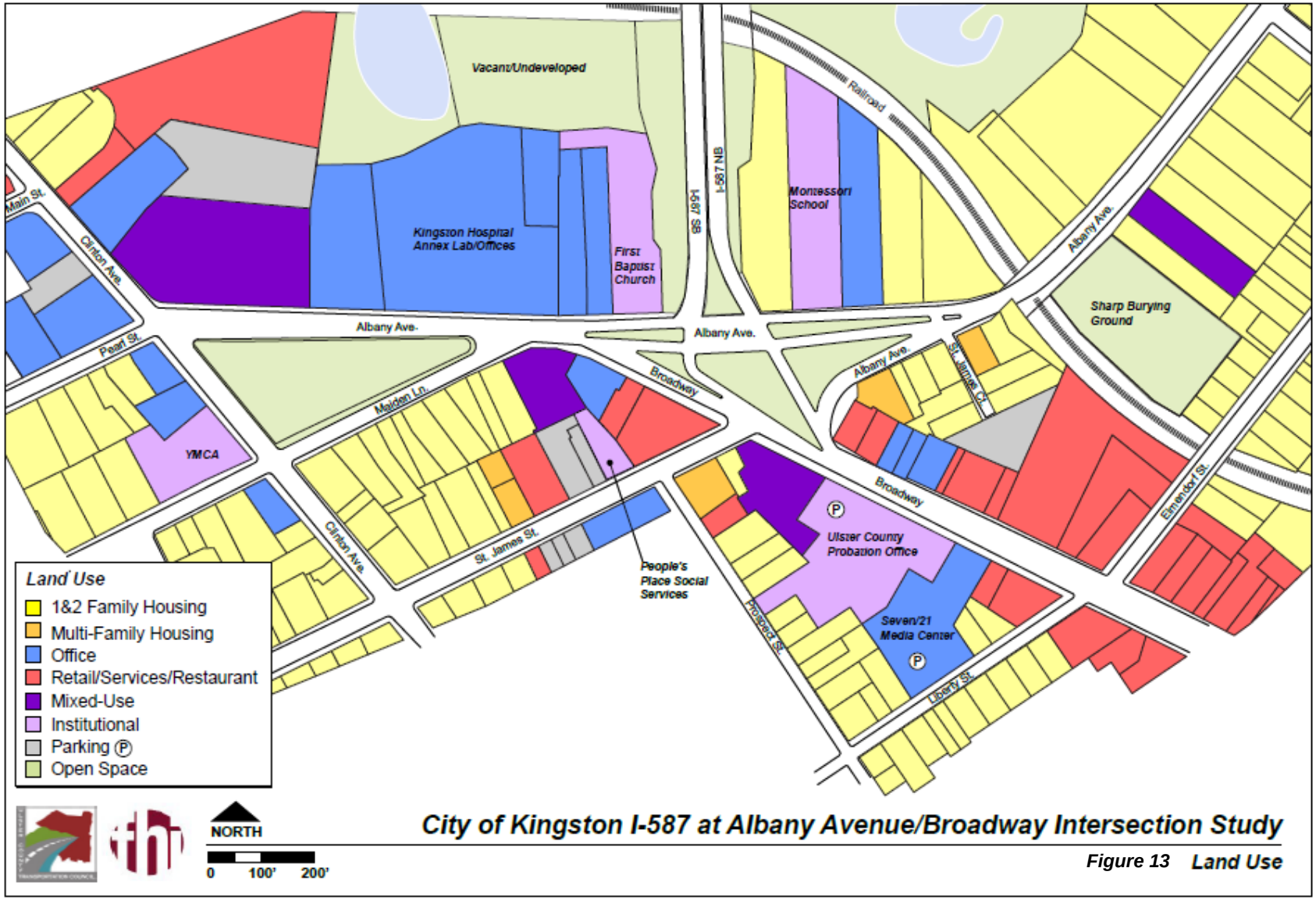

Vacant/Undeveloped
Kingston Hospital Annex Lab/Offices
First Baptist Church
I-587 SB
I-587 NB
Railroad
Montessori School
Albany Ave.
Sharp Burying Ground
Main St.
Clinton Ave.
Pearl St.
Albany Ave.
Albany Ave.
Albany Ave.
St. James Ct.
Maiden Ln.
Broadway
YMCA
Broadway
Elmendorf St.
Clinton Ave.
St. James St.
People's Place Social Services
Ulster County Probation Office
Seven/21 Media Center
Prospect St.
Liberty St.
Land Use
1&2 Family Housing
Multi-Family Housing
Office
Retail/Services/Restaurant
Mixed-Use
Institutional
Parking Ⓟ
Open Space
NORTH
0 100' 200'
City of Kingston I-587 at Albany Avenue/Broadway Intersection Study
Figure 13 Land Use

Table 12: Visual Character Inventory

Street – Street Segment	Visual Character	Example of Setting
Broadway	An urban boulevard with views of an eclectic and often disparate mix of architecture, sidewalks, broad pavement of the boulevard, and vehicle traffic. The railroad bridge fills the horizon to the south and the intersection of 587 and Albany Avenue fills the horizon to the north.	
Clinton between St James and Main	The views along Clinton Avenue are of a tree-lined street with sidewalks with a well-maintained park to the east and Victorian-era buildings set close to the street to the west.	
Elmendorf between Broadway and Tremper	Views along Elmendorf Street are of small one- and two-family homes, many with front porches, set close to the street. This gives the street a neighborhood feel, though it is not architecturally cohesive. The historic First Presbyterian Church anchors the corner of Elmendorf and Tremper	

Liberty between Broadway and Clinton	Views along Liberty Street are of small one- and two-family homes on the east side and a disparate mix of buildings on the west side. The row of homes along the west side of the street is anchored near Broadway by the back side of a brick building with a large satellite dish on top, and a parking lot. Many of the structures along this street are aging and in poor conditions.	
St. James between Broadway and Clinton	Views along St. James Street vary from east to west. To the east at Broadway are nondescript commercial buildings and parking lots. To the west are small one- and two-family homes, many with front porches, set close to the street. This gives the street a neighborhood feel, though it is not architecturally cohesive. Some of the structures along this street are aging and in poor condition.	
Prospect between St. James and Liberty	Views along Prospect Street are of small one- and two- family homes, many with front porches, set close to the street. This gives the street a neighborhood feel, though it is not architecturally cohesive.	

Maiden Lane between Broadway and Clinton	The views along Maiden Lane are of a tree-lined street with sidewalks, with a well-maintained park to the north and Victorian-era buildings set close to the street along the south side.	
Albany between Broadway and Clinton	This section of Albany Avenue is an urban boulevard with mixed views. The Avenue has a well-maintained park to its south, and views of an eclectic mix of architecture on its north side, including sidewalks, the broad pavement of the boulevard, and vehicle traffic.	
Albany between Broadway and Tremper	The views along this section of Albany Avenue are of a tree-lined street with sidewalks and well-maintained Victorian-era buildings set back from the street. The bridge over the rail bed fills the horizon to the south and the intersection of 587 and Albany Avenue fills the horizon to the north.	

Intersection of I-587, Albany and Broadway	Within the intersection, the views are shortened by the signage and infrastructure that surround this area. The views are dominated by roadway pavement and signage. These urban elements contrast the landscaped Academy Green that forms a triangle among the varied roadway segments.	

Environmental factors

The study area is situated in a fully developed urban environment where virtually all of the natural setting has been displaced by structures, pavement, and infrastructure such as roads, lighting and utility lines. Environmental factors of note include:

- There are numerous mature street trees along many of the study area roadways and landscaped green spaces at the I-587 junction area
- There are a number of historic buildings in the study area. Those historic buildings which are on the National Register of Historic Places or potentially eligible for listing are noted on the Existing Land Use map and listed in the table below. Two of these occur on the corners of the intersection of I-587 with the local streets
- The study area is a gateway to the Stockade Historic District with access from Albany Avenue onto Clinton Avenue
- The only waterbodies in the study area are some unnamed ponds on either side of I-587 north of the intersection with Albany Avenue and Broadway.

Table 13 lists the historic resources within and adjacent to the study area. Figure 14 illustrates the environmental resources within and adjacent to the study area.

Table 13: Historic Resources in and adjacent to the Study Area

Resource Name	Location	Designation
Ten Broeck, Jacob, Stone House	169 Albany Ave.	National Register - Individually Listed
Smith, John, House	103 Albany Ave.	National Register - Individually Listed
House at 356 Albany Avenue	322 Albany Ave.	National Register - Individually Listed
Smith, George J., House	109 Albany Ave.	National Register - Individually Listed
Kirkland Hotel	2 Main St.	National Register - Individually Listed
House at 184 Albany Avenue	184 Albany Ave.	National Register - Individually Listed
Kingston Stockade District	Area bounded by both sides of Clinton Ave., Main, Green, and Front Sts.	National Register - District
Sharp Cemetery, aka Albany Avenue Cemetery	166 Albany Ave.	National Register - Individually Listed
Academy Green Park	Triangular area bounded by Clinton Ave, Maiden Ln, and Albany Ave.	NR Eligible
Forsyth House	31 Albany Ave	National Register - Individually Listed

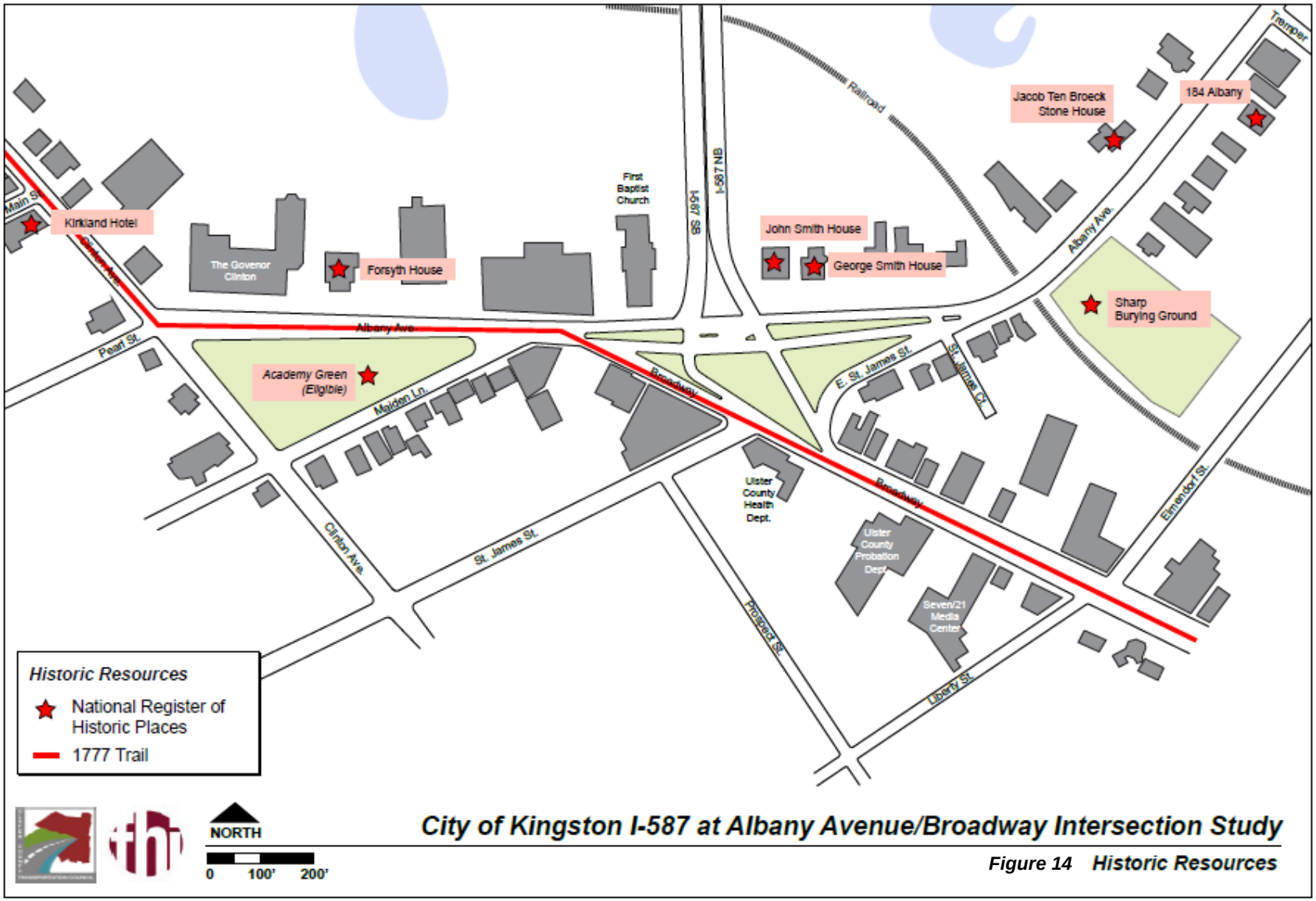


Figure 14 Historic Resources

Future Conditions

Traffic Growth Forecast

Background growth, planned and programmed developments, and roadway improvements were considered when assessing future conditions for the planning year 2035. In consultation with Ulster County, a one and one-tenth percent (1.1%) growth rate per year was assumed to account for background traffic growth over time. Compounding this growth rate over 25 years results in a 31% overall growth forecast over existing 2010 levels.

Traffic growth on regional roads is forecasted by the Ulster County Transportation Council using a travel demand model. Figures 15 and 16 illustrate volume to capacity ratios (V/C) on the larger roadway network for existing and future traffic levels respectively. Comparing these two figures reveals that continued growth in traffic over the next 25 years will result in increased demand for the interchange, as I-587, Albany Avenue and Broadway all show V/C ratios approaching or exceeding a value of 1.0. When traffic demand approaches or exceeds the networks physical capacity, congestion results. When demand cannot be accommodated in the peak hours, it often spreads throughout different times of the day, or diverts to other routes.

Traffic Operations Analysis

In general, an intersection having a poor level-of-service under existing conditions will continue to function poorly or will deteriorate further if additional demand from future growth is added, and if no improvements are made to the roadway. Results from the future No-Build analysis are summarized below:

- Vehicles travelling northbound on Broadway will experience approximately twelve minutes of delay (seven minutes more than under the existing condition) during the morning peak hour and will experience approximately three minutes of delay (two and a half minutes more than under the existing condition) during the afternoon peak hour.

- The travel demand exceeds the lane capacity for travelers southbound on Clinton Avenue for left turns onto Albany Avenue; these vehicles will experience slightly more than a minute of delay.

- Queuing will continue to worsen on Albany Avenue (eastbound and westbound), Broadway northbound, and the left-turn lane on Clinton Avenue southbound. Storage capacity is already exceeded at some of these approaches today and vehicle blockage will continue to degrade operations at the intersection.

- Albany Avenue and Broadway will operate at an arterial LOS E or LOS F during each peak hour; arterial speeds will decrease as much as nineteen percent (19%) during the morning peak hour and as much as twenty-five percent (25%) during the afternoon peak hour.

Figure 15

Year 2010
Existing Volume/Capacity
(A measure of congestion)

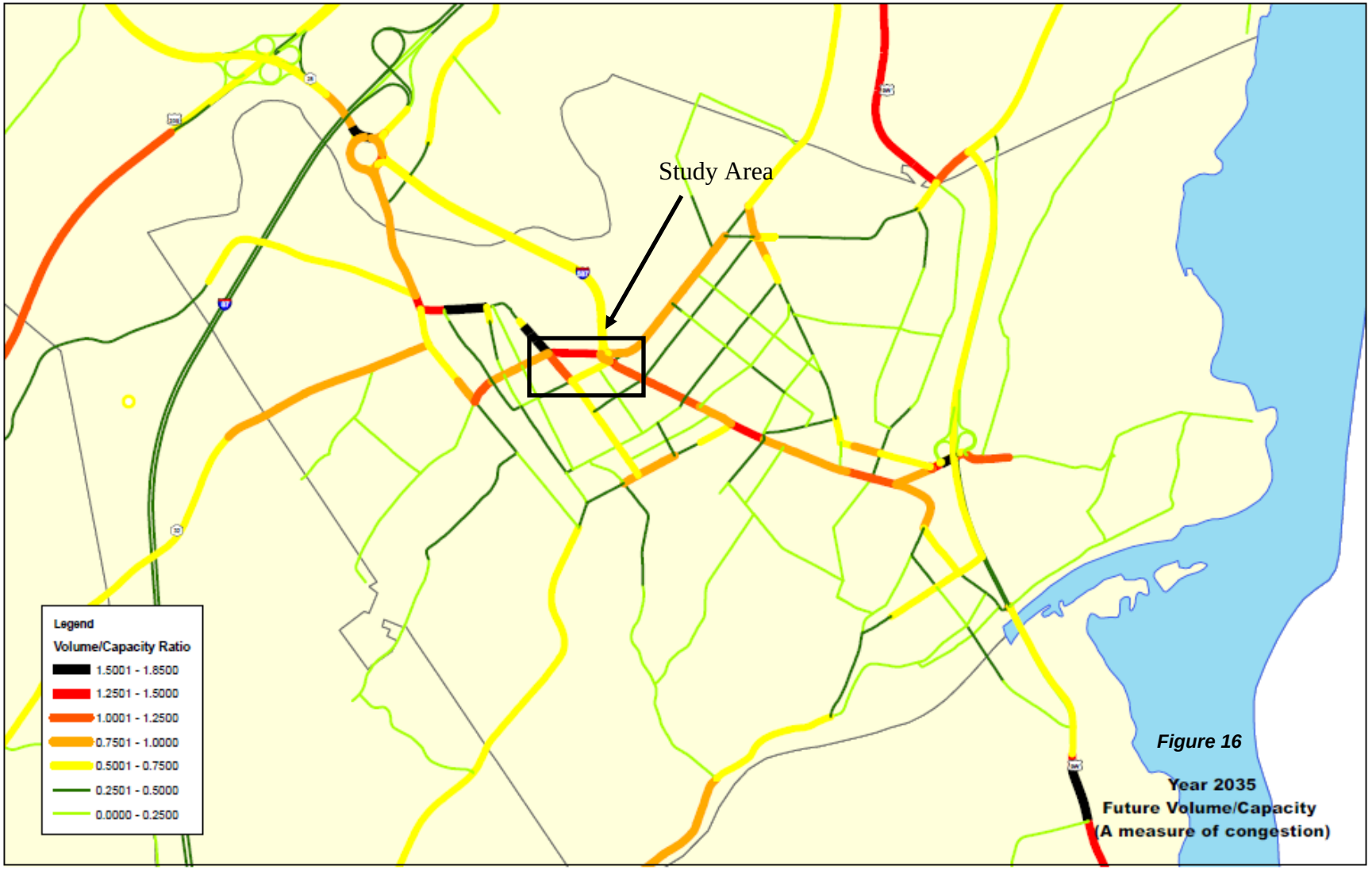


Figure 16

Year 2035
Future Volume/Capacity
(A measure of congestion)

Next Steps

The information presented in this report sets the stage for the Generative Concept Development task that follows. In this task, stakeholders and the public will help create an overall vision for the study area and several conceptual alternatives will be developed. The merits of these concepts will be evaluated and compared against study goals.

Based on the findings presented herein, it is clear that the current intersection was not designed to handle the current demand placed on it. The growth in traffic over the years has contributed to the formation of an environment that is inhospitable to pedestrians, bicyclists, and even automobiles. The unpredictability of delay that results when a complex system is pushed beyond its limits is a source of frustration for locals and commuters alike. The negative consequences of a traffic dominated environment have undoubtedly contributed to the economic blight of the area.

The challenge of this study is to find a solution that improves traffic conditions, is friendly to all modes of travel, and results in the creation of place where people and businesses are welcome. Street life is vital to the local economy and some of Kingston's most vulnerable citizens depend on the streets to serve their daily needs. This study will look beyond the traditional traffic control measures that are routinely applied when traffic congestion seems to be the dominant issue. While such measures are an essential part of a good plan, so are meeting the needs of all users and the local community of which this intersection is a part.

As the study moves forward to the next phase, the public will have the unique opportunity to help the study team shape the future of this area. The outcome will be a new vision for the area that will be influenced greatly by input received at a three-day workshop to be held in September. Many ideas will be explored, some rejected, and others passed on for additional evaluation. Some of the elements that may be considered in the next phase include, but are not limited to the following:

- Signal timing and coordination
- Modifications to lane geometry
- Development of a network of intersections
- Development of a roundabout or series of roundabouts
- Transitioning the expressway to a lower speed boulevard
- Developing a new intersection and bypass road north of the current one
- Creation of more functional public spaces
- Formalizing bicycle lanes
- Enhancing the pedestrian experience
- Prioritizing transit at the intersection
- Streetscaping and landscaping

Following the development of concepts for the intersection, the study team in coordination with the Advisory Committee will consider the best performing ideas relative to the study goals and decide on a preferred alternative. This preferred alternative will be refined so that project feasibility and cost can be determined. The final study report will be completed in early 2011.