Kingston Intersection Study

I-587 AT ALBANY AVENUE/BROADWAY INTERSECTION

Executive Summary

ULSTER COUNTY TRANSPORTATION COUNCIL

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City of Kingston I-587/Albany/Broadway Intersection Study Executive Summary

Prepared for the Ulster County Transportation Council

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URS

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Acknowledgements

The City of Kingston and the Ulster County Transportation Council would like to thank the Technical Advisory Committee and members of the community who have devoted their time and effort to working with us in developing this plan. Many of your ideas have been incorporated into these recommendations and will enhance the City of Kingston for generations to come.

The Technical Advisory Committee (TAC) included the following people:

AC Member	Organization
Sue Cahill	City of Kingston Planning Department
Alderman Tom Hoffay	City of Kingston Ward 2
K.J. McIntyre	Kingston Digital Corridor
Lisa Mondello	NYSDOT Region 8
Mark Morano	NYSDOT Traffic Division
Kevin Quilty	Kingston Uptown Business Association
Jim Rapoli	NYSDOT Planning Division
Joe Rich	Federal Highway Administration
Charlie Schaller	UC Traffic Safety Board
Ralph Swenson	City of Kingston Engineering Dept.
Dennis Doyle	UC Planning/UC Transportation Council

Executive Summary

Study Area

The I-587/Albany Avenue/Broadway Intersection is located at the western edge of the city of Kingston and serves as a major entrance to the City. The intersection marks the abrupt transition from a short, high-speed Interstate highway to the urban fabric of the City of Kingston. The Intersection controls access to the main arteries of the City and most of its economic drivers. Broadway runs north/south through the heart of City and serves schools and hospitals along its corridor, as well as its own 'main street' businesses. Broadway also leads to the City's revitalized waterfront.

Albany Avenue provides an east/west link between Kingston's neighborhoods and the uptown shopping areas and government offices. The Intersection is located amid a mix of commercial and residential structures that offer the first glimpse of the City for visitors. Historic buildings front the intersection as do relatively recent commercial buildings.

The study area includes the road network adjacent to the Intersection to ensure that design alternatives would allow these to operate with acceptable parameters (see Figure 1). The study also includes a discussion of how to improve the linkage between the transportation system and the future development pattern for the uptown area that can reduce congestion while expanding economic opportunity.

Study Purpose

The Intersection is currently scheduled for reconstruction in 2016. The study is an effort by the UIster County Transportation Council (UCTC), working collaboratively with the NYSDOT and the City of Kingston, to engage the community to determine the most effective and acceptable alternative for this reconstruction. The UCTC established a Technical Advisory Committee (TAC) that included local officials and stakeholders that lived or worked near the intersection, as well as transit providers and emergency responders. The following goals were established by the UCTC for the Study.

- Reduce vehicle and pedestrian delays
- Improve vehicular and pedestrian safety
- Minimize impacts to area residents and businesses
- Preserve parking capacity
- Improve freight mobility
- Enhance economic vitality
- Incorporate energy efficiencies/green technologies
- Improve gateway appearance
- Protect the historical character of the area
- Incorporate public input into the process and results

Study Elements

To study is divided into three main elements, each supported by a Technical Report. The elements are:

1. Analysis of existing conditions (Project Discovery Technical Memorandum);
2. Public outreach (Design Workshop and Concept Development); and
3. Analysis of alternatives (Conceptual Design Report).

Figure 1 – Study Area

Analysis of Existing Conditions (Project Discovery)

A review of existing data was supplemented with field observation to determine the relevant characteristics of the transportation system, adjacent land use, and physical environment. The key findings are listed herein.

Land Use

The City of Kingston is a long-established urban environment. The study area contains a mix of land uses including a senior residence, church, park and numerous small commercial establishments. Several vacant storefronts exist and in the area immediately around the intersection. Congestion and the overall intersection design may be a factor in these vacancies. Reconstruction of the intersection offers the opportunity to create potential for redevelopment and infill that that can be nourished by greater useable space associated with intersection design and easier access for both vehicles and pedestrians alike.

The information on land use along with trends in traffic growth provides an understanding of how the distribution and character of development affects traffic and travel patterns. It forms the basis of likely future peak hour volumes for the intersection. The opportunity for redevelopment with the area and the lack of a grid pattern road network to provide alternative routes provided an impetus for the study to examine long term redevelopment patterns.

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. Figure 2 summarizes the land use composition of the study area.

Figure 2 – Composition of Land Use in Study Area

Environment

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 features 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 water-bodies in the study area are some unnamed ponds on either side of I-587 north of the intersection with Albany Avenue and Broadway.

- Considerable open space exists associated with the Esopus Creek and its flood plain and this offers an opportunity to connect the urban environment with the open space.

- A short-line recreation railroad passes through the study area as well. This provides an opportunity for rail with trail development.

Transportation

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 operations affect traffic volume, capacity, travel speed, congestion, safety, access to property, and driver behavior. Figures 3 and 4 illustrate the geometric conditions and operational issues on study area roads.

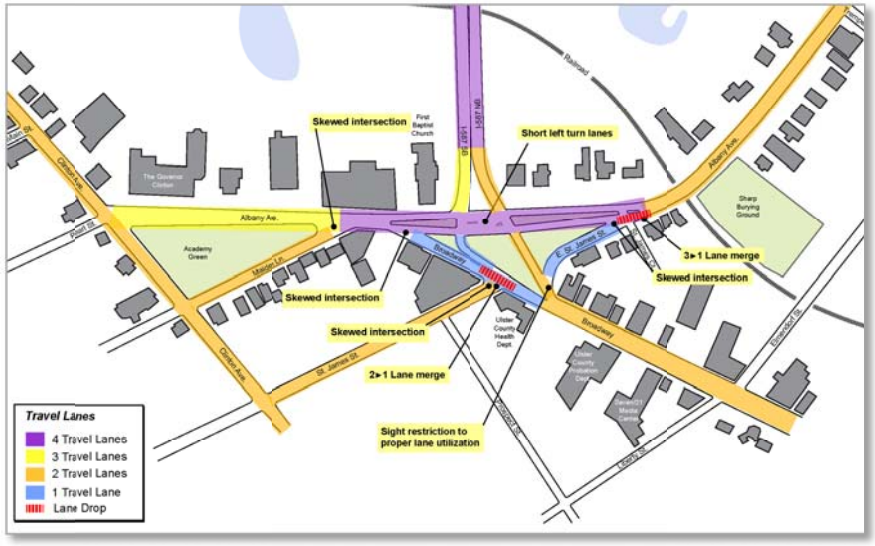

Figure 3 – Geometric Conditions

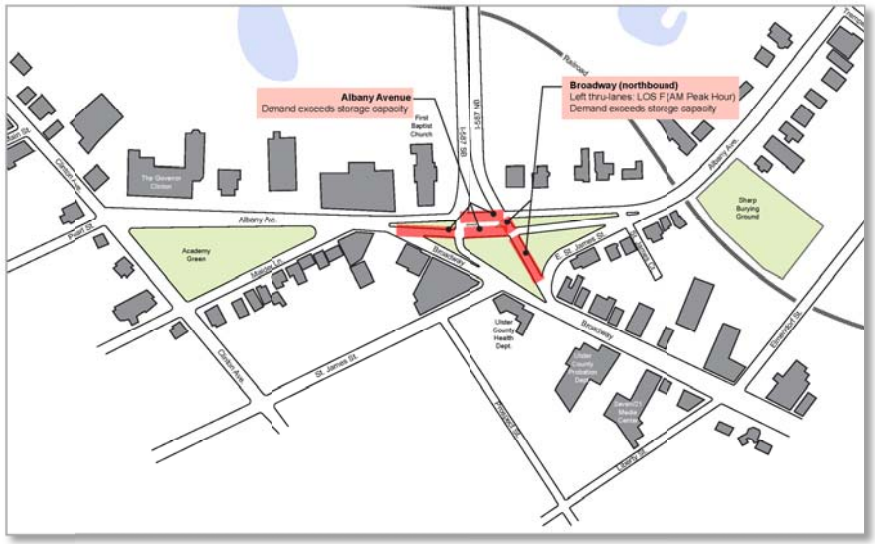

Figure 4 – Operational Issues

Additional observations about the transportation system are as follows:

- Sightlines along intersection approaches are generally good with the exception of Broadway (northbound) approaching Albany Avenue (eastbound) via East Saint James Street.

- Directional signage for lane assignments at Broadway (northbound) approaching Albany Avenue (westbound) is often not visible until the driver has already committed (see Figure 5).

Figure 5 - Approach to Albany Avenue is confusing

- Skewed intersections in the study area reduce driver visibility, have wider pedestrian crossings, require more pavement area, affect signal timing, and are generally less desirable than right angle intersections for those reasons.

- Merging of lanes on both Albany Avenue and Broadway creates congestion.

- There is a proliferation of signage in the study area that contributes to driver confusion.

- Average Daily Traffic (ADT) on study area roads is between 15,300 and 18,800 vehicles per day, of which about 4% of peak hour traffic is made up by trucks (see Figure 6).

Figure 6 - Average Daily Traffic in Study Area

- Sidewalks in the study area are composed of various materials and much of network is overgrown with weeds and grass. Some sections are raised from tree roots. These uneven and cluttered surfaces are additional obstacles for pedestrians, especially those with disabilities or pushing strollers.

Figure 7 - Person riding in the roadway on Clinton Avenue

- The study area is difficult for the blind or visually challenged to navigate. There are no audible pedestrian signals in the corridor.

- The majority of bicyclists observed in the study area were traveling on the sidewalk network. This is likely due to the high traffic volumes coupled with narrow lanes, as well as a lack of bicyclist and motorist education.

Figure 8 – Bicyclist riding on sidewalk

Traffic Operations

Existing Conditions

Level of Service (LOS) is a measure of driver delay resulting from a combination of factors including traffic volume, road geometry, and traffic signal operations. LOS is described by letter grades ranging from A (best) to F (worst). Results from the arterial LOS analysis (see Table 1) indicate that portions of Albany Avenue and Broadway in the study area operate at LOS F and traffic averages less than 10 mph during the peak hours of the day. The close spacing of the four signalized intersections and the timing of the signals to provide ample vehicle clearance time through the intersection affects the traffic operations. Details for the individual intersections are provided as follows:

		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

Table 1 - Arterial Level-of-Service Summary (2010)

- *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.

  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.

- 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).

Future Conditions

A No-Build alternative for intersection was modeled for future conditions using anticipated development along the corridors and traffic volume trends. The model year is 2035. 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.

Public Involvement

Public involvement for the study included an on-line survey, three public meetings, and a three day design workshop with one-on-one interaction with the consultant team.

Public Survey

An on-line survey was designed to provide input on the existing problems at the intersection as well as design considerations for its reconstruction. The survey results for existing conditions traffic profile closely mirrors those observed in the field. Figure 9 illustrates the actual hourly traffic profile against survey responses on when traffic congestion typically occurs.

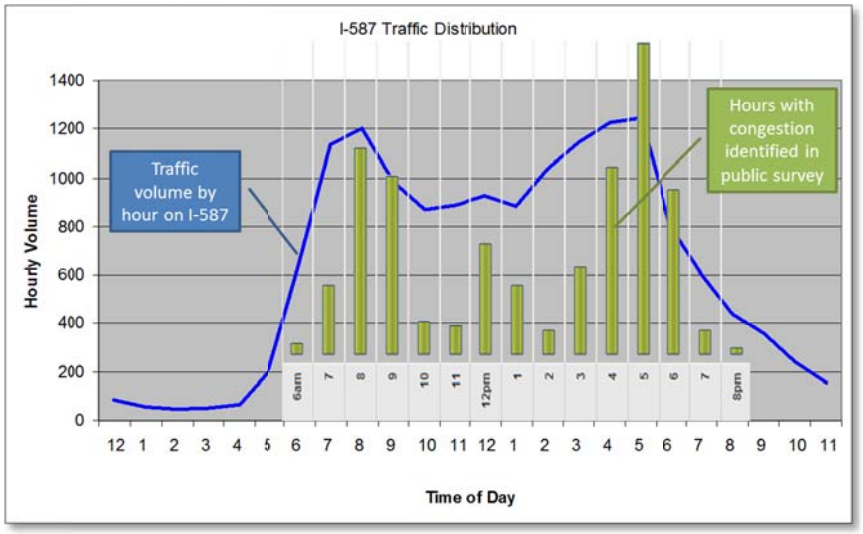

Figure 9 – Survey responses on hours of traffic congestion

Looking to the future, the survey indicates that relieving congestion is the highest priority for close to 50% of the respondents; however, it is important to note that over 50% of the respondents identified other goals to be accomplished (see Figure 10).

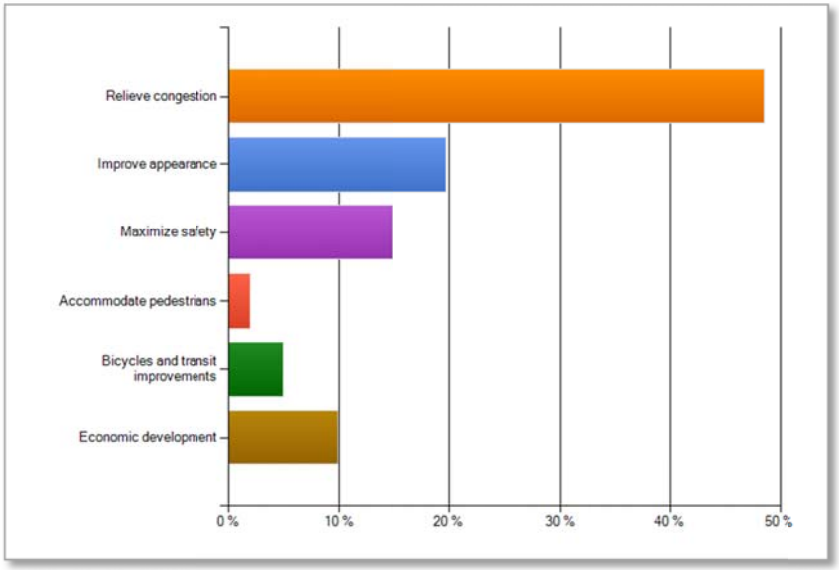

Figure 10 – Survey responses on what intersection improvements should accomplish

Design Workshop

The design workshop was a major component of the Study. The workshop was held in the study area and included an orientation meeting with the TAC, interviews with landowners and other stakeholders, and public meetings. The discussion lead to a broadening of the study to look beyond the immediate area of the intersection and understand how travel and conditions here affect other areas of the City including: Uptown, the length of Broadway, open space and trails, and as far as the Rondout historic area at the waterfront. Solutions for the intersection and beyond were developed in ways that would serve the diverse transportation and community quality of life needs of the City as a whole with all recognizing that there is a great opportunity to do so.

Direction for the Future – What We Heard

As the design team listened to the people of Kingston, and key stakeholders in the study area, many common themes emerged. The following is a summary of the key ideas expressed during the workshop.

- **Kingston community is proud of the City!** Many folks who attended one of the workshop events expressed how proud they are of Kingston's heritage as well as its many assets including the surrounding natural beauty of the area.
- **Intersection improvements are not just about traffic.** Some folks thought the traffic congestion and hazards were a huge problem and some did not. But everyone seemed to agree that the intersection as a space was a "dead zone" of asphalt and grass that does not benefit the City in the way that it should. The intersection poses many concerns that are not traffic related.
- **This is <u>the</u> gateway to Kingston.** It was the general consensus that the place where I-587 enters Kingston is major entry point. It is a driver's first introduction to the City – a doorway into the City environment. As such, it does not serve the City well. It should be attractive, inviting and welcoming.
- **Mobility improvement is needed for sustainability.** Sustainability is the efficient use of resources to meet the needs of today's community while not sacrificing the ability of future generations to enjoy the same resources. The transportation network is a resource. It must function well for all users including those on foot or bicycle. In order for the City of Kingston to be a vibrant community for both today's community and future generations, the transportation network and all modes of travel must function well.

- **A constrained network is good!** A constrained network is one that allows traffic to flow – but at lower speeds and with room for other uses. An unconstrained network favors traffic over people and the community's sense of place. There was a consensus that the quality of the intersection area as a place should not be sacrificed to improve traffic flow or handle an increasing number of cars.
- **A fix at one place should not create problems elsewhere.** There are a variety of things that could be done to 'fix' the I-587/Albany Avenue intersection, but if traffic flow is changed there, it could easily move the congestion safety issues to nearby intersections such as Albany Avenue at Clinton Street, where there are also problems with traffic. It was agreed that this is not a solution. Any solution must take into account the entire local street network and the City mobility needs as a whole, as all the parts are interconnected.
- **Fulfill Kingston's potential.** Many stakeholders emphasized that Kingston is a City in a strategic location with a wealth of unrealized potential to thrive and be a destination. Revitalizing Kingston is a significant goal for the community.
- **Aesthetics and sense of place are key goals.** The I-587/Albany Avenue intersection should be an attractive place with not only well designed streets, but landscaping, streetscaping (such as attractive lighting and street art and furniture) as well as complementary architecture, and well placed attractive signage.
- **Respect the history, hidden potential, and historic and natural assets of Kingston.** The community agreed that as solutions to traffic issues are developed, Kingston's many assets should be considered and taken into account.
- **Kingston streets should be complete streets** – good for pedestrians, bicyclists, buses, as well as cars. The intersection solutions need to include bicycle lanes, traffic calming (visual cues to encourage drivers to slow down), well-marked pedestrian crossings, a sound sidewalk system and ease of travel for buses and fire trucks.
- **Improvements should include long and short term options.** Stakeholders suggested that the intersection plan include short term things that are low cost and could be done quickly and compliment the long term solution that may be more costly.

Transportation Solutions

During the Design Workshop, the study team developed several transportation concepts that attempt to address all of the feedback from the community. These concepts are presented in the following sections.

I-587 Conversion

The study team, together with the TAC, recognized that the I-587 corridor itself could be an important element of the overall traffic solution. Conversion of I-587 – the nation's shortest interstate - to an arterial street would open up alternatives to create additional street network to better serve this area of the City, and over time, eliminate the current super-block created by the interstate. Current and projected total and peak hour volumes on I-587 can be sufficiently served using two travel lanes, which offers the potential for bicycle and pedestrian facilities associated with the remaining right of way that would provide access to significant open space resources along the Esopus Creek. Even now bicycle and pedestrian activity along the Interstate is observed, even though it is an illegal activity. See Figure 11.

Figure 11: Re-designating I-587 and expanding the street network

Expanding the Street Network

Solving congestion along Albany and Clinton Avenues without major impacts to property and community character requires an extension of the road network north of these two roads. Changing the designation of I-587 to State Road 587 and making a series of new road connections provides alternate access to destinations uptown. In turn, this alternate access alleviates traffic pressure on Albany and Clinton Avenues, and preserves capacity for future economic growth in the city.

Extending the block structure and street network will provide drivers with a variety of travel routes to their destination and balance traffic flow through the network.

The proposed network expansion concept offers an opportunity to re-imagine how Kingston might be developed in the future. Figure 11 illustrates a conceptual street network with the primary street network in red and a secondary, delivery network in blue. An extension of the street grid would provide a considerable increase in street frontage for additional development.

Intersection Reconstruction

The intersection formed at the confluence of I-587, Albany Avenue, and Broadway has outlasted its functional lifespan. The intersection experiences recurrent congestion during the peak travel hours and is unfriendly to pedestrians and bicyclists. Emergency response vehicles avoid the intersection during the busy hours of the day and find alternate routes through neighborhoods. Traffic accidents are frequent and sign clutter contributes to driver confusion.

The two alternatives considered in depth were a compact signalized intersection (see Figure 12) and a mixed-lane roundabout. The consensus among study participants and the consultant team is to replace the existing signalized intersection with a mixed-lane roundabout. A roundabout would improve both vehicular and pedestrian operations from a congestion and safety perspective over other alternatives examined. This option creates a more effective gateway for Kingston and offers ample public space for passive recreation and the relocation of important city monuments.

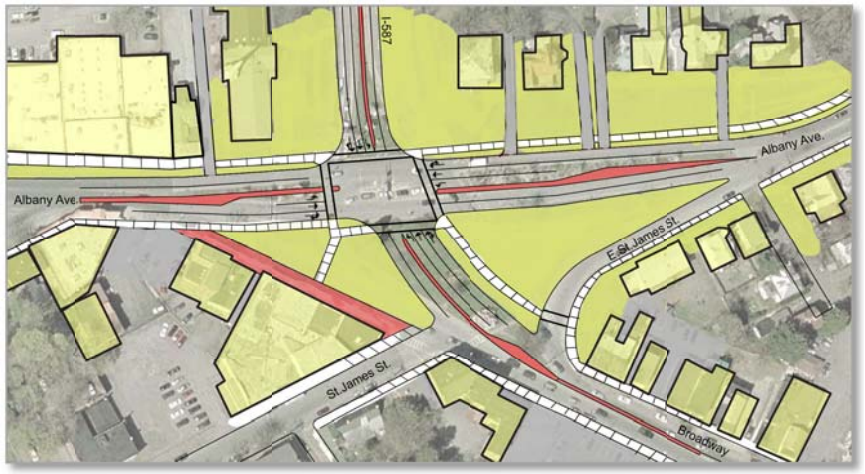

Figure 12 – Compact Signalized Intersection

Figure 13 illustrates the recommended roundabout improvement. The roundabout option provides a cost effective solution with less estimated capital costs and lower operating costs than the compact signalized alternative (see conceptual cost estimates).

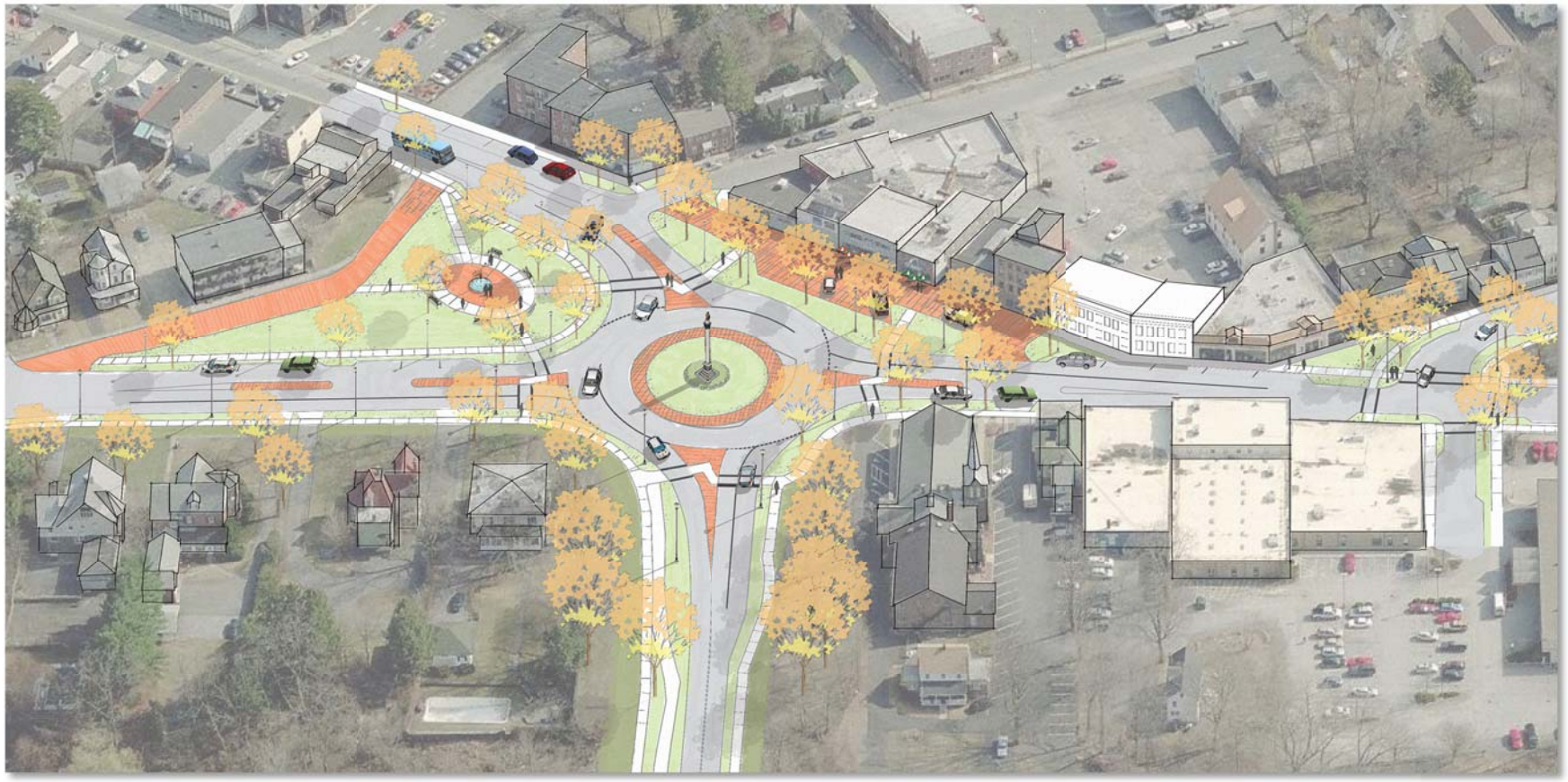

Figure 13: Rendering of the proposed roundabout looking south from I-587

Improvements to Albany Avenue

Many intersections along Albany Avenue and Clinton Avenue, such as Albany Avenue/I-587, Albany Avenue/Clinton Avenue, Clinton Avenue/Main Street, and Clinton Avenue/Westbrook Lane are at capacity during the peak period which is demonstrated by the long vehicle queues at these intersections. Of these, only the intersection of Albany Avenue and I-587 can be improved without property acquisition and/or elimination of on-street parking. Minor improvements may be possible at other locations to improve pedestrian mobility or perhaps vehicle flow; however, given the historic context of the Uptown Stockade, significant expansion of intersections along Clinton Avenue is not recommended.

There are many locations where pedestrians cross Albany Avenue between the I-587 intersection and Clinton Avenue. The following refinements to Albany Avenue to better accommodate this pedestrian demand are as follows and illustrated in Figure 14 on the following page.

1. Request a design exception from the NY Department of Transportation to eliminate all of the large overhead signs. Review all other signs with a goal to reduce the number and improve clarity and wayfinding. For example, the proliferation of 'No Parking' signs should be immediately reconsidered and signs eliminated in areas where there is little reason to park due of a lack of immediate destinations. An option is to add a '*No Parking Beyond This Point*' sign to the end of the defined parking areas. Figures 15 and 16 illustrate the issues with signage in the study area.

Figure 15 – Overhead signs communicate speed to drivers

Figure 16 – Sign clutter leads to driver confusion

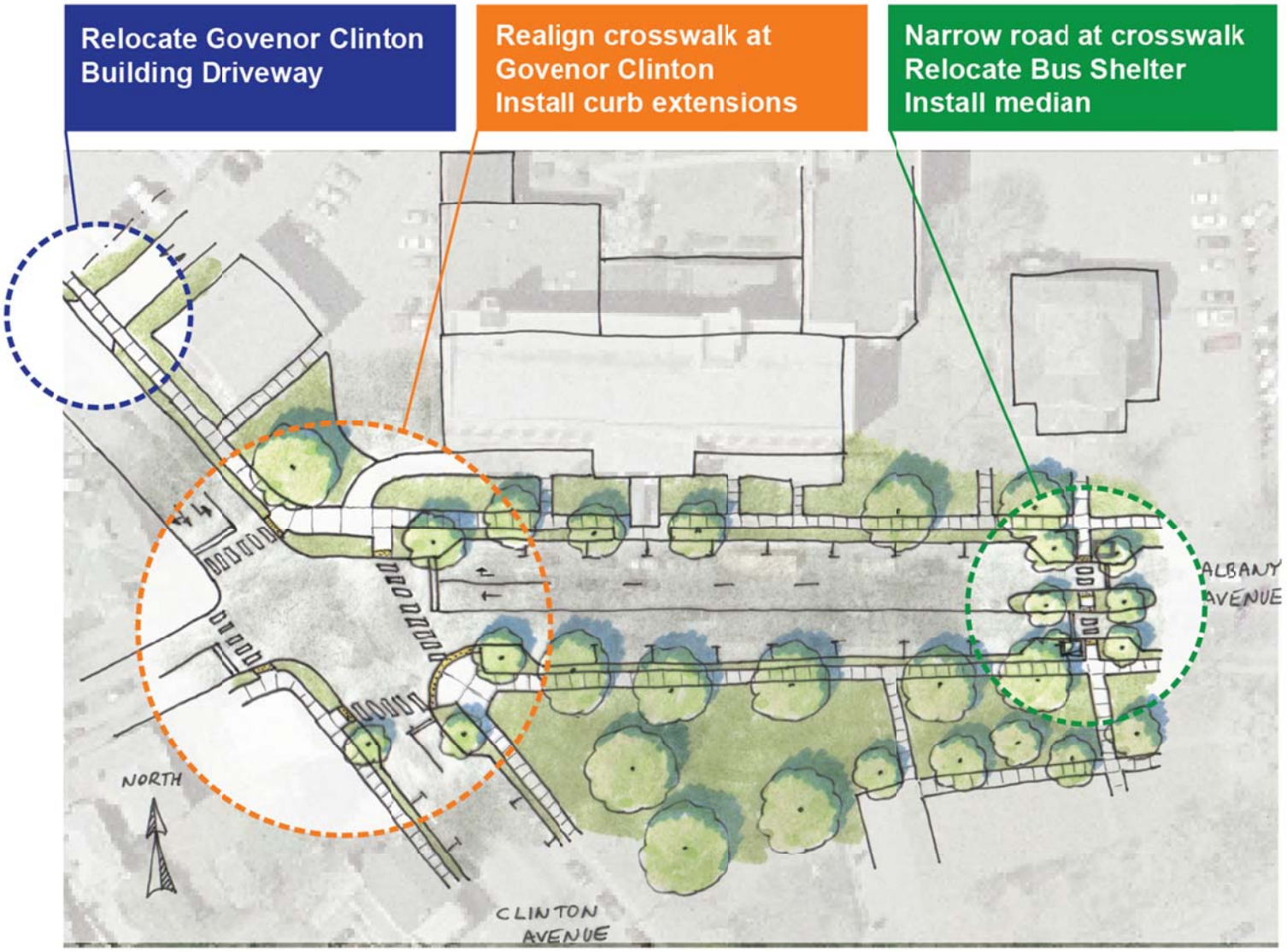

Figure 14: Improvements along Albany Avenue

2. Relocate the crosswalk across Albany Avenue west of I-587 intersection to the intersection. Where this relocated crosswalk crosses Broadway add pedestrian crossing signs to help highlight the pedestrian crossing. Also the addition of pedestrian crossing signals to the crosswalk across Broadway south of St James Street should have pedestrian crossing signs added to both parts of the crosswalk.

3. Upgrade the signalized pedestrian crossing Maiden Lane, with bulb outs on both sides, new signs, preferably post mounted signals that are closer to the driver's eye and pedestrians, which would not require the driver to take his eyes away from a pedestrian to look into the signal in the air.

4. Provide a signalized pedestrian crossing across Albany Avenue between the Governor Clinton building and the Dialysis Center that includes bulb outs on both sides, a raised pedestrian refuge in the middle and post mounted signs with a signal in the pedestrian refuge.

5. Realigning the pedestrian crosswalk on Albany Avenue, east side of Clinton Avenue, as shown on the attached diagrams.

Conceptual Cost Estimates

The estimated construction cost for the Compact Signalized Intersection alternative is $5,200,000 and $4,525,000 for the Roundabout. The estimated construction cost for the improvements to Albany Avenue is $640,000.

Compact Signalized Alternative

Pavement	$ 1,500,000
Drainage	$ 1,200,000
Curbs & Sidewalks	$ 725,000
Street Lighting	$ 500,000
Grass & Landscaping	$ 75,000
Maintenance & Protection of Traffic	$ 150,000
Traffic Signal	$ 100,000
Contingencies (+/- 20%)	$ 950,000
	$ 5,200,000

Table 2 – Compact signalized intersection concept cost estimate

Roundabout Alternative

Pavement	$ 1,400,000
Drainage	$ 1,000,000
Curbs & Sidewalks	$ 600,000
Street Lighting	$ 500,000
Grass & Landscaping	$ 125,000
Maintenance & Protection of Traffic	$ 150,000
Traffic Signal	$ -
Contingencies (+/- 20%)	$ 750,000
	$ 4,525,000

Table 3 – Mixed roundabout concept cost estimate

Albany Avenue Improvements

Pavement	$	15,000
Drainage	$	250,000
Curbs & Sidewalks	$	110,000
Street Lighting	$	-
Grass & Landscaping	$	30,000
Maintenance & Protection of Traffic	$	15,000
Traffic Signal	$	100,000
Contingencies (+/- 20%)	$	120,000
	$	640,000

Table 4 – Albany Avenue improvements concept cost estimate

Implementation Timeframe

The I-587/Albany/Broadway Intersection is currently scheduled for reconstruction in 2016. A detailed engineering design of the recommended roundabout improvement will need to be completed prior to that. It is recommended that the UCTC perform a peer review of the NYSDOT design to ensure that the City of Kingston's requirements, as documented in this report, are satisfied.

In the near-term, the City should apply for a design exception with the NYSDOT to remove the large, overhead signs and reduce any extraneous signage at the intersection. This is an essential first step toward making the intersection more pedestrian-friendly.

Also beginning immediately, the City should engage the NYSDOT and FHWA on de-designating I-587. This is an important component of the long-term vision of the city and necessary for a sustainable transportation solution in the long-term. Because of the complexities of dealing with multiple agencies, these discussions should be ongoing while other improvements are moving forward.

Within the next five years, improvements to Albany Avenue west of the I-587/Albany/Broadway Intersection should be designed and constructed. Intersections along Clinton Avenue must also be considered when designing the I-587/Albany/Broadway Intersection. In addition to the pedestrian improvements recommended in this study, additional signal operational improvements may be necessary to achieve optimal traffic flow along Albany Avenue.

In the longer-term, new streets should be developed to relieve pressure along Albany Avenue and create new opportunities for economic development in the City. The most important connection is the extension of John Street to Westbrook Lane to SR-587 (I-587). Additional streets should be developed over time and in concert with land development plans.

Finally, it is important to note that the either the roundabout option or the compact signalized intersection will still function without providing additional street network or downgrading I-587 to an arterial street; however without such improvements traffic pressure on Albany Avenue will remain problematic.

Appendices

Existing Conditions Report

Design Report