BMTS SAFETY ACTION PLAN

DRAFT

Appendices

BMTS | Binghamton Metropolitan Transportation Study

Table of Contents

Appendix 1
Project Profiles

Corridors

Intersections

Project Profiles:

Corridors

Corridor Broome County

PRIORITY 1

Conklin Ave. (NY-7)

City of Binghamton

Existing Conditions

The segment of Conklin Avenue (NY-7) is 1.44 miles long and is located within the City of Binghamton. The corridor spans from the intersection with Tompkins Street to the Binghamton City Line. The surrounding area is both residential and commercial with numerous businesses, residential homes, and an elementary school located along the corridor. A total of 184 crashes occurred during the study period between 2019 and 2023, with 34 of these crashes resulting in injury. Thirteen of the crashes during the study period for this corridor involved a bicyclist or pedestrian, with one of those resulting in serious injury.

The crash types most prevalent for this corridor during the study period were rear end and right-angle crashes. Conklin Avenue maintains one travel lane and bicycle lane in each direction from Tompkins Street to Holmes Place and transitions to one shared use travel lane in each direction to the City Line. This corridor features two intersections with traffic control by span wire traffic signals which are Tompkins Street and Burr Avenue. Two intersections feature traffic control by mast arm traffic signals which are Broome Street and Hayes Street.

This corridor features sixteen streets that meet Conklin Avenue at an intersection where stop control is only on the minor approach while Conklin Avenue is uncontrolled. The Conklin Avenue intersections with Duke Street, Iva Avenue, and the Sandy Beach Park parking lot all feature uncontrolled pedestrian crossings that have pedestrian warning signage present. Curb ramps are present at all intersections throughout the corridor that feature plastic detectable warning units, with the exception of the uncontrolled crossing at the Sandy Beach Park which has no detectable warning unit on the southern curb ramp. Type LS crosswalks are present at all intersections along Conklin Avenue. Sidewalks are present on the south side of Conklin Avenue from Tompkins Street to the Sandy Beach Park crossing and on the north side from Tompkins Street to Iva Avenue. The corridor features street lighting throughout the corridor with most of the lighting on the south side of Conklin Avenue and some supporting lights on the north side of the road.

Highway Characteristics

Owner	City of Binghamton
Description	Two lane undivided urban road with bicycle lanes
Segment Length	1.44 miles
Speed Limit	30 mph
AADT	10,558 VPD
Functional Class	(16) Minor Arterial
LOSS	4
HRN Score	5
Equity Rank	Top 20

Photo 1: Conklin Ave over NYSW Railway looking west

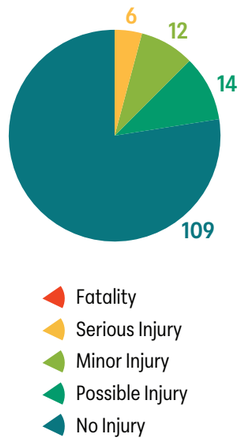
Photo 2: Conklin Ave east of Felters Rd looking east

Crash Data

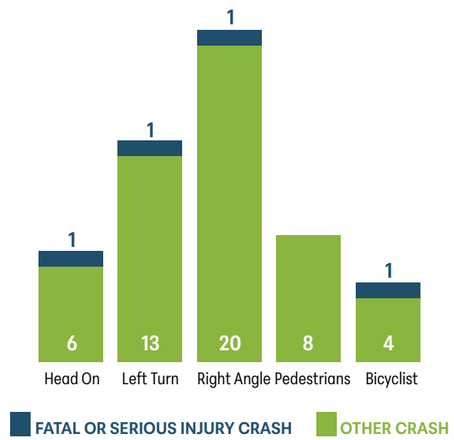
Contributing Factors

- Lack of advanced warning signage
- Lack of bicycle and shared use lane markings
- Lack of audible pedestrian signals at signalized intersections

Crash Severity



Most Frequent Collision Type



Proposed Improvements

Proposed Countermeasures

Backplates with Retroflective Borders

Enhanced Delineation for Horizontal Curves

Bicycle Lanes

Rectangular Rapid Flashing Beacons

Contributing factors at Conklin Avenue from the intersection with Tompkins Street to the Binghamton City Line included a lack of advanced warning signage, a lack of bicycle and shared use lane markings, and a lack of audible pedestrian signals at signalized intersections. Potentially relevant safety countermeasures at this location include, installation of rectangular rapid flashing beacons (RRFB) at an uncontrolled crossing with advanced warning signage, installation of audible pedestrian signals, installation of bicycle and shared use lane markings, installation of curve warning signage, and the addition of retroreflective traffic signal backplates. RRFBs will be installed on the existing pedestrian signs present at the uncontrolled crossing of Conklin Ave adjacent to Sandy Beach Park. Additional advanced warning signage accompanied by rapid flashing beacons will be installed for all other uncontrolled crossings along the corridor. This will ensure drivers are aware of potential pedestrians crossing the road and provide them with adequate warning time to stop and yield. Audible pedestrian signal infrastructure will be added at all traffic signal-controlled intersections throughout the corridor. Adding these ADA compliant pedestrian signals will contribute to increasing accessibility along the entire corridor. Compliant pedestrian signals are essential in preventing serious injury crashes involving pedestrians, especially those who are visually impaired. Bicycle lane markings and shared use markings will be added throughout the corridor. Where the shoulders are at least 5 feet in width, bike lane markings will be added to give bicycles a designated travel space. Where there is not adequate space for a bike lane, sharrow markings will be used to emphasize the need for drivers to share the road with bicyclists. The sharrow markings will allow bicycles to navigate the entire corridor and travel between designated bike lanes without needing to use the sidewalk. Advanced warning signage will be added to sharp horizontal curves warning road users of an upcoming bend in the road. This increased curve awareness will reduce the risk of vehicles straying out of their travel lane and decrease the potential for all types of collisions. At all existing traffic signals along the corridor, retroreflective borders will be installed to increase visibility of the signal heads and reduce the frequency of right angle and turning induced collisions at the intersections within the corridor.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Striping Symbols	85.00	EA	$300.00	$25,500.00
Rectangular Rapid Flashing Beacon (RRFB)	2.00	EA	$15,000.00	$30,000.00
Warning Signage	10.00	EA	$1,250.00	$12,500.00
Installation of Audible Pedestrian Signals	20.00	EA	$2,500.00	$50,000.00
Traffic Signal Backplates	28.00	EA	$600.00	$16,800.00
			Construction Total	$134,800.00
			Contingency and Inflation (20%)	$27,000.00
			Subtotal	$161,800.00
			Work Zone Traffic Control (10%)	$16,200.00
			Mobilization (4%)	$6,500.00
			Survey (2%)	$3,300.00
			Engineering Design (10%)	$16,200.00
			Construction Inspection & Administration(15%)	$24,300.00
			Grand Total	**$228,300.00**

Corridor Broome County

PRIORITY 2

Robinson St.

City of Binghamton

Existing Conditions

The segment of Robinson Street is 1.45 miles long and is located within the City of Binghamton. The corridor spans from the intersection with Chenango Street to the intersection with Fairview Avenue. The surrounding area is both residential and commercial with numerous businesses, residential homes, and a school located along the corridor.

A total of 326 crashes occurred during the study period between 2019 and 2023, with 42 of these crashes resulting in injury. 20 of the crashes during the study period for this corridor involved a bicyclist or pedestrian, with 2 of those resulting in serious injury. The crash types most prevalent for this corridor during the study period were rear end and right-angle crashes. Robinson Street maintains one travel lane in each direction from Chenango Street to Brandywine Avenue and from Whitney Avenue to Fairview Avenue. From Brandywine Avenue to Whitney Avenue, Robinson Street maintains two eastbound travel lanes with one being a dedicated left turn lane and three westbound travel lanes with one being a dedicated left turn lane and one being a dedicated right turn slip ramp. This corridor features eight intersections with traffic control by span wire signals which are Chenango Street, Brandywine Avenue, Whitney Avenue, Griswold Street, Broad Avenue, Moeller Street, Mason Avenue, and Fairview Avenue. This corridor features fourteen streets that meet Robinson Street at an intersection where stop control is only on the minor approach while Robinson Street is uncontrolled. The Robinson Street intersections with Ely Street, Louisa Street, Gaylord Street, and Bigelow Street all feature two uncontrolled crossings across Robinson Street that have pedestrian warning signage present.

There are two uncontrolled pedestrian crossings in front of Calvin Coolidge School at the intersections of Robinson Street with Riverside Street and Glen Avenue which also have warning signage present. Curb ramps are present at all intersections throughout the corridor that feature plastic detectable warning units, with the exception of the intersection of Robinson Street and Brandywine Avenue which features NYSDOT standard cast iron detectable warning units. Type LS crosswalks are present at all intersections along Robinson Street with the exception of Emmett Street and Wales Avenue which lack crosswalks. Sidewalks are present for the entirety of the corridor on both sides of Robinson Street. The corridor features street lighting throughout the corridor with most of the lighting on the south side of Robinson Street and some supporting lights on the north side of the road.

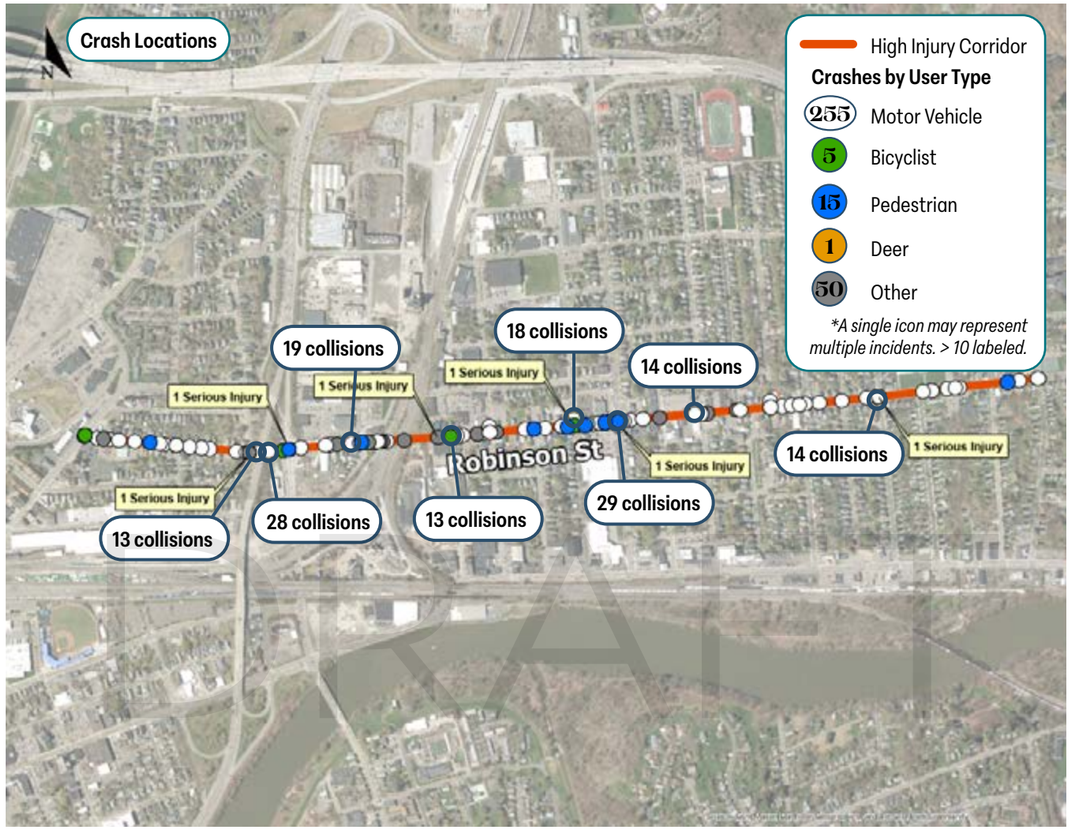
Highway Characteristics

Owner	City of Binghamton
Description	Two lane undivided urban road with sections parking on one side and one block of four lane undivided
Segment Length	1.45 miles
Speed Limit	30 mph
AADT	8,989 VPD
Functional Class	(17) Major Collector
LOSS	4
HRN Score	5
Equity Rank	Top 20

Photo 1: Robinson St Walgreens looking east

Photo 2: Robinson St and Griswold St looking northeast

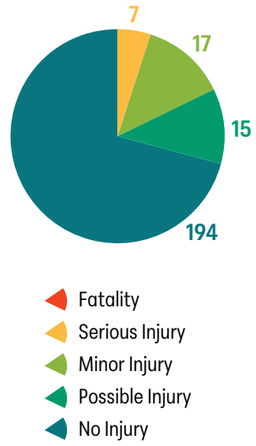
Crash Data



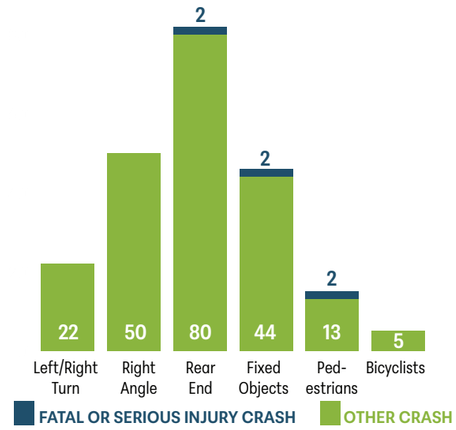
Contributing Factors

- Lack of advanced warning signage for uncontrolled pedestrian crossings
- Lack of bicyclist accommodations
- Pedestrian signal infrastructure is outdated

Crash Severity



Most Frequent Collision Type



Proposed Improvements

Proposed Countermeasures

Contributing factors at Robinson Street from the intersection with Chenango Street to the intersection with Fairview Avenue included a lack of advanced warning signage for uncontrolled pedestrian crossings, a lack of bicyclist accommodations, and pedestrian signal infrastructure is outdated. Potentially relevant safety countermeasures at this location include, installation of rectangular rapid flashing beacons (RRFB) at uncontrolled crossings with advanced warning signage, replacement of pedestrian signal infrastructure, installation of shared use lane markings, installation of high visibility crosswalks where missing, and addition of traffic signal backplates. RRFBs will be installed at the uncontrolled crossings adjacent to Calvin Coolidge School at Riverside Street and Glen Avenue. These systems will run on solar power, and the flashing beacons will activate when a button is pushed to alert drivers to stop and yield to pedestrians. Additional advanced warning signage will be installed at the other uncontrolled crosswalk locations in the corridor, to increase driver awareness of pedestrian crossings. The existing pedestrian signal infrastructure will be replaced, and audible pedestrian signals will be added at all intersections that are currently controlled by a traffic signal. These will create a more accessible corridor for vulnerable road users and the visually impaired. The existing pedestrian infrastructure at Brandywine Avenue will be maintained as the pedestrian signals there were recently updated. Shared use lane markings will be added throughout the corridor to emphasize drivers sharing the road with bicyclists. Implementing sharrows will allow bicyclists to utilize the travel lanes along with motor vehicles and will reduce the risk of future bicyclist accidents. Enhanced visibility crosswalks will be installed at all the intersections currently lacking them to increase pedestrian safety in the corridor. Traffic signal backplates with retroreflective borders will be installed at all signalized intersections. Retroreflective signal backplates will provide increased visibility of the signal heads at the intersections within the corridor and reduce the frequency of serious injury crashes taking place at intersections on Robinson St.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Type LS Crosswalk	110.00	LF	$24.00	$2,700.00
Striping Symbols	70.00	EA	$300.00	$21,000.00
Rectangular Rapid Flashing Beacon (RRFB)	4.00	EA	$15,000.00	$60,000.00
Pedestrian Warning Signage	15.00	EA	$1,250.00	$19,000.00
Replacing Pedestrian Signals and Pushbuttons	50.00	EA	$6,000.00	$300,000.00
Traffic Signal Backplates	65.00	EA	$600.00	$39,000.00
			Construction Total	$441,700.00
			Contingency and Inflation (20%)	$88,400.00
			Subtotal	$530,100.00
			Work Zone Traffic Control (10%)	$53,100.00
			Mobilization (4%)	$21,300.00
			Survey (2%)	$10,700.00
			Engineering Design (10%)	$53,100.00
			Construction Inspection & Administration(15%)	$79,600.00
			Grand Total	**$747,900.00**

Corridor Broome County

PRIORITY 3

East Main St. (Route 17C)

Town of Union

Existing Conditions

East Main St (Route 17C) is located in the Town of Union, adjacent to the Village of Endicott. The high-injury corridor from Bassett Ave to Lincoln Ave is 1.26 miles long and has a speed limit of 30 mph. East Main St is utilized by many commuters going in between the tri-cities and Owego. It is also home to many commercial businesses, restaurants, as well as Union-Endicott High School.

There was a total of 164 crashes during the study period from 2019 to 2023 with 19 of those crashes resulting in some form of injury and 4 of them causing serious injuries. 5 crashes involved bicyclists, and 3 crashes involved pedestrians. The width of the road is between 40-50 ft wide and maintains two 11-foot travel lanes with dedicated turn lanes at some of the intersections. There is sidewalk present on both sides of the highway throughout.

To the east of this corridor, a road diet was recently performed which eliminated a travel lane to implement a two-way left turn median and create a bicyclist and pedestrian safety corridor. A previously performed capacity analysis showed a similar treatment would not be feasible within this study's limits.

Bike lanes are present on both sides of the street at the east end of the corridor until Badger Ave. The bike lanes pick up again at Adams Ave which is east of the high-injury corridor. The corridor includes several intersections where serious injury crashes have occurred such as the intersections with South Loder Ave and Vestal Ave.

There are type LS crosswalks present at some of these intersections. The asphalt pavement shows signs of deterioration, and the striping has faded slightly. Overhead lighting is present on both approaches throughout this corridor. Traffic lights and pedestrian signals are outdated and may no longer be within ADA compliance.

Highway Characteristics

Owner	NYSDOT
Description	Two-lane undivided urban road
Segment Length	1.26 miles
Speed Limit	30 mph
AADT	21,301 VPD
Functional Class	(16) Minor Arterial
LOSS	4
HRN Score	4
Equity Rank	Top 20 Worst

Photo 1: East Main St concrete arch looking west

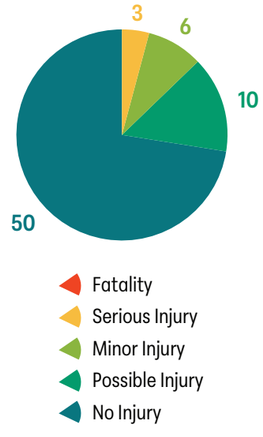
Photo 2: East Main St and Vestal Ave looking west

Crash Data

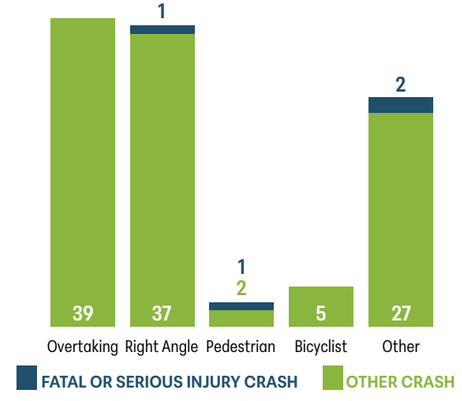
Contributing Factors

- Deteriorated pedestrian infrastructure
- Outdated traffic control systems
- Inconsistent bicyclist accommodations

Crash Severity



Most Frequent Collision Type



Proposed Improvements

Proposed Countermeasures

Contributing factors at East Main Street from Bassett Avenue to Lincoln Avenue included deteriorated pedestrian infrastructure, outdated traffic control systems, and inconsistent bicyclist accommodations. Potentially relevant safety countermeasures at this location include, traffic signal upgrades with retroreflective backplates, rectangular rapid flashing beacons, and enhanced type LS crosswalks. Also proposed is the addition of bike lane signs and sharrow pavement markings to allow bicyclists traveling in the bike lanes from the east and west to share the travel lanes with other traffic in a safe manner. The existing symbols for the bike lanes to the west have faded and will be repainted as part of the implementation project. Rectangular reflective flashing beacons will be added at the midblock crossings of Bassett Ave and Badger Ave. The beacons will enhance visibility for drivers and make them aware when pedestrians are attempting to cross an intersection that does not have pedestrian signals due to the absence of a traffic light. New curb ramps, type LS crosswalks, and sharrows will be installed at the intersections of East Main St and Page Ave, Badger Ave, Exchange Ave, Liberty Ave, and Vestal Ave. The crosswalks present at these locations have faded significantly, and most of the curb ramps have deteriorated to fall out of ADA compliance. Replacing these facilities will allow all road users to cross in a safe manner. Adding and improving the sharrows will allow bicyclists to safely navigate the corridor and effectively connect the bike lanes present to the east and west. Traffic signal improvements with reflective backplates will be constructed at Exchange Ave, S Loder Ave, Vestal Ave, Harrison Ave, and Lincoln Ave. Some of these signals are outdated and in need of replacements, all of them lack reflective backplates. Improvements to these traffic signals will enhance the safe and efficient flow of traffic, reducing the risk of high injury crashes.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Concrete Sidewalk	69.44	SY	$1,500.00	$105,000.00
Granite Curb	2,500.00	LF	$80.00	$200,000.00
Curb Ramps and Warning Units	30.00	EA	$10,000.00	$300,000.00
LS Type Crosswalks	900.00	LF	$24.00	$22,000.00
Retroreflective Signal Backplates	40.00	EA	$600.00	$24,000.00
Rectangular Rapid Flashing Beacon (RRFB)	4.00	EA	$15,000.00	$60,000.00
Bike Lane Signs and Posts	12.00	EA	$1,250.00	$15,000.00
Bike Lane/Sharrow Pavement Markings	40.00	EA	$300.00	$12,000.00
			Construction Total	$738,000.00
			Contingency and Inflation (20%)	$148,000.00
			Subtotal	$886,000.00
			Work Zone Traffic Control (10%)	$89,000.00
			Mobilization (4%)	$36,000.00
			Survey (2%)	$18,000.00
			Engineering Design (10%)	$89,000.00
			Construction Inspection & Administration(15%)	$133,000.00
			Grand Total	**$1,251,000.00**

Corridor Broome County

PRIORITY 4

North St.

Village of Endicott

Existing Conditions

The segment of North Street is 0.94 miles long and is located within the Village of Endicott. The corridor spans from the intersection with Nanticoke Avenue to the intersection with McKinley Avenue. The surrounding area is both residential and commercial with numerous businesses located along and north of the corridor and numerous residential streets south of the corridor. A total of 184 crashes occurred during the study period between 2019 and 2023, with 38 of these crashes resulting in injury. Twelve of the crashes during the study period for this corridor involved a bicyclist or a pedestrian with three of those resulting in serious injury.

The crash type most prevalent for this corridor during the study period was rear end crashes with 59 crashes and 2 of those involving serious injury. North Street maintains one travel lane and bicycle lane in each direction from Nanticoke Avenue to Vestal Avenue. From Vestal Avenue to Harrison Avenue, North Street transitions to having one shared use travel lane and a narrow shoulder in each direction with an eastbound parking lane for only from Fillmore Avenue to Harrison Avenue. From Harrison Ave to Lincoln Avenue, North Street transitions to one shared use travel lane in each direction with a two-way left turn lane. From Lincoln Avenue to McKinley Avenue, North Street maintains one shared use travel lane in each direction with three blocks of eastbound parking and a mix of dedicated left turn lanes mostly alternating blocks in each direction due to the numerous intersections within a short length.

This corridor features four intersections that have traffic control by span wire traffic signal which are Nanticoke Avenue, Lincoln Avenue, Oak Hill Avenue/Madison Avenue, and Washington Avenue. An additional two intersections are controlled by a mast arm traffic signal which are Vestal Avenue and McKinley Avenue. This corridor features fifteen streets that meet North Street at an intersection where stop control is only on the minor approach while North Street is uncontrolled. The North Street and Jefferson Avenue intersection features two uncontrolled crossings across North Street that have pedestrian warning signage. There is another uncontrolled midblock crossing west of Grant Ave that features a rapid rectangular flashing beacon (RRFB).

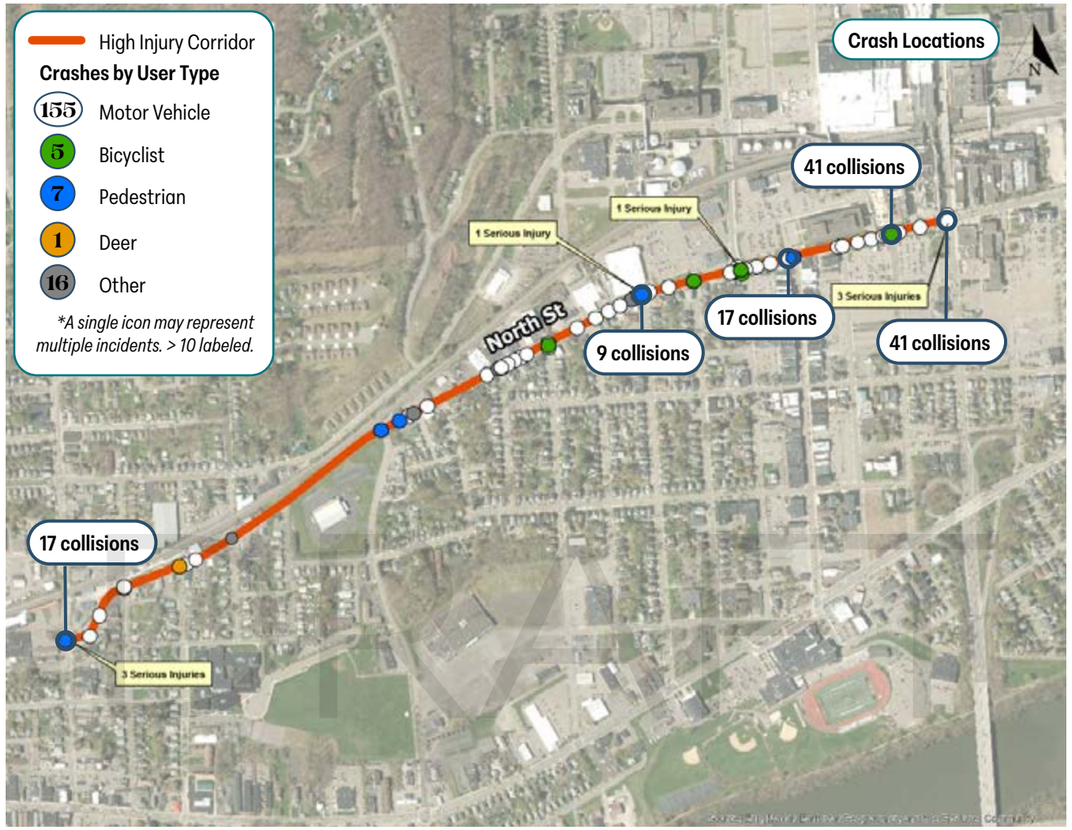
Curb ramps are present at all intersections throughout the corridor with detectable warning units present, but none of the intersections have NYSDOT standard cast iron detectable warning units. Crosswalks are present at all intersection with a variety of type L, S, and LS crosswalks being used throughout the corridor. Sidewalks are present for the entirety of the south side of the corridor. There are sidewalks present for the majority of the north side of the corridor with the exception of just east of Nanticoke Avenue to just west of Harrison Avenue. The corridor features street lighting throughout with lighting on both sides of the street and alternating for most of the corridor.

Highway Characteristics

Owner	Village of Endicott
Description	Two lane undivided urban road with sections of two-way left turn lane
Segment Length	0.94 miles
Speed Limit	30 mph
AADT	8,103 VPD
Functional Class	(17) Major Collector
LOSS	4
HRN Score	5
Equity Rank	Top 20

Photo 1: North street westbound looking northeast

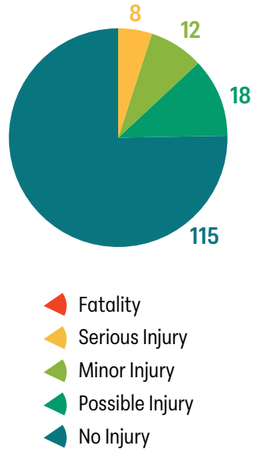
Crash Data



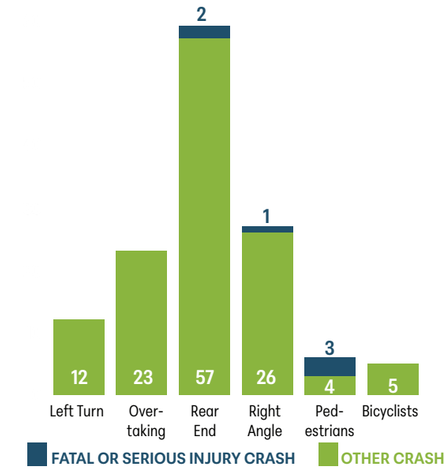
Contributing Factors

- Lack of high visibility crosswalks at numerous intersections
- Uncontrolled crossings at Jefferson Avenue
- Faded striping throughout corridor

Crash Severity



Most Frequent Collision Type



Proposed Improvements

Proposed Countermeasures

Contributing factors at North Street from the intersection with Nanticoke Avenue to the intersection with McKinley Avenue included a lack of high visibility crosswalks at numerous intersections, uncontrolled crossings at Jefferson Avenue, faded striping throughout corridor. Potentially relevant safety countermeasures at this location include, re-striping bicycle lanes and shared use lanes where applicable, installation of high visibility crosswalks, addition of traffic signal backplates, and install rapid reflective flashing beacons (RRFB) at Jefferson Avenue. Sections of the corridor with faded bicycle facility striping and symbols will be re-striped to provide increased visibility and awareness from roadway users. High visibility crosswalks would be installed at all intersections currently lacking them to increase pedestrian safety in the corridor. The installation of traffic signal backplates will provide increased visibility of the signal heads at the intersections within the corridor. Rapid reflective flashing beacons will be installed at the uncontrolled crossings at the intersection of North Street with Jefferson Avenue to provide increased visibility and safety for these crossings.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Type LS Crosswalk	1,800.00	LF	$24.00	$43,200.00
White Striping	6,000.00	LF	$2.00	$12,000.00
Striping Symbols	55.00	EA	$300.00	$16,500.00
Traffic Signal Backplates	48.00	EA	$600.00	$28,800.00
Rectangular Rapid Flashing Beacon (RRFB)	4.00	EA	$15,000.00	$60,000.00

Construction Total	$160,500.00
Contingency and Inflation (20%)	$32,100.00
Subtotal	$192,600.00
Work Zone Traffic Control (10%)	$19,300.00
Mobilization (4%)	$7,800.00
Survey (2%)	$3,900.00
Engineering Design (10%)	$19,300.00
Construction Inspection & Administration(15%)	$28,900.00
Grand Total	**$271,800.00**

Corridor Broome County

PRIORITY 5

Hooper Rd. (CR 33)

Town of Union

Existing Conditions

The segment of Hooper Road (CR 33) is 0.76 miles long and is located within the Town of Union. The corridor spans from the intersection with Hoover Avenue to the intersection with Pheasant Lane. The surrounding area is both residential and commercial with numerous businesses, myriad retail driveways, and residential homes located along the corridor. A total of 88 crashes occurred during the study period between 2019 and 2023, with 15 of these crashes resulting in injury. Two of the crashes during the study period for this corridor involved a bicyclist.

The crash type most prevalent for this corridor during the study period involved rear end crashes, which indicates a potential need for better access management. Hooper Road maintains one travel lane in each direction from Hoover Avenue to Beatrice Lane and from Pruyne Street to Pheasant Lane. From Beatrice Lane to Country Club Road, Hooper Road maintains two northbound travel lanes with one being a dedicated left turn lane and one southbound travel lane. From Country Club Road to Royal Road, Hooper Road maintains one northbound travel lane and three southbound travel lanes with one being a dedicated left turn lane and one being a dedicated right turn lane. From Royal Road to Pruyne Street, Hooper Road maintains one travel lane in each direction and a two-way left turn lane.

This corridor features three intersections with traffic control by span wire traffic signals which are Country Club Road, Smith Drive, and Pruyne Street. This corridor features six streets that meet Hooper Road at a three-leg intersection where stop control is only on the minor approach and Hooper Road is uncontrolled. Curb ramps are present at all intersections throughout the corridor, but only ramps at Country Club Road and the northeast corner of Beatrice Lane have plastic detectable warning units. Type S crosswalks are present at the intersection with Country Club Road, Royal Road, Smith Drive, Pruyne Street, and Pheasant Lane while the rest of the intersections lack crosswalks. Sidewalks are present for the entirety of the east side of the corridor. There are sidewalks present on the west side of the corridor from just south of Country Club Road to Pruyne Street. The corridor features street lighting throughout with most of the lighting based on the east side of Hooper Road.

Highway Characteristics

Owner	Broome County
Description	Two lane undivided urban road sections of a two-way left turn lane
Segment Length	0.76 miles
Speed Limit	30 mph
AADT	15,443 VPD
Functional Class	(16) Minor Arterial
LOSS	N/A
HRN Score	4
Equity Rank	Top 40

Photo 1: Hooper Rd looking southeast towards Country Club Rd

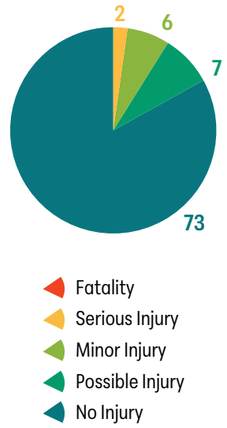
Photo 2: Hooper Rd and Smith Dr looking northwest

Crash Data

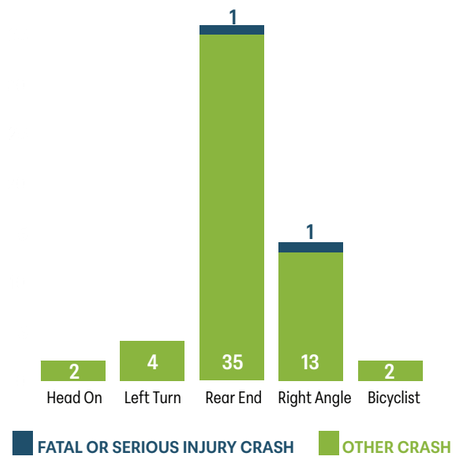
Contributing Factors

- Lack of high visibility crosswalks at intersections
- Lack of bicyclist accommodations
- Faded striping throughout corridor

Crash Severity



Most Frequent Collision Type



Proposed Improvements

Proposed Countermeasures

Contributing factors at Hooper Road from the intersection with Hoover Avenue to the intersection with Pheasant Lane included a relatively high density of commercial and residential driveways, lack of high visibility crosswalks at intersections, a lack of bicyclist accommodations, and faded striping throughout corridor. Potentially relevant safety countermeasures at this location include, reducing the density of driveways (enhancing access management), implementation of bicycle lanes and shared use lanes where applicable, installation of high visibility crosswalks, and the addition of traffic signal backplates with retroreflective borders. Techniques for better access management include decreasing the number of driveways through closure, consolidation, or relocation, and limiting allowed movements at driveways (e.g., right-in / right-out). In sections of the corridor where the existing travel lane is wide enough, there is an opportunity to split the travel lane in each direction into a travel lane and a bicycle lane. This will give bicyclists a designated space to travel along the corridor with appropriate separation from motor vehicle traffic. In the other sections of the corridor, where the existing lane width does not allow for a bike lane, shared use markings will be added to emphasize the need for drivers to share the road with bicyclists. The implementation of this bicycle infrastructure will create a more accessible corridor for bikes to safely navigate between the neighborhoods and businesses along Hooper Rd. This is especially important given the corridors close proximity to the Maine Endwell schools and the high volume of students who use this section of Hooper Rd to travel to and from school both on foot and via bicycle. At all the intersections along this corridor, high visibility crosswalks will be installed to enhance driver awareness of pedestrian crossings and thus increase pedestrian safety throughout the corridor. Lastly, new traffic signal backplates will be installed with retroreflective borders to provide increased visibility of the signal heads at the intersections within the corridor.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Type LS Crosswalk	620.00	LF	$24.00	$14,880.00
White Striping	7,425.00	LF	$2.00	$14,850.00
Striping Symbols	40.00	EA	$300.00	$12,000.00
Traffic Signal Backplates	20.00	EA	$600.00	$12,000.00
			Construction Total	$53,730.00
			Contingency and Inflation (20%)	$10,800.00
			Subtotal	$64,600.00
			Work Zone Traffic Control (10%)	$6,500.00
			Mobilization (4%)	$2,600.00
			Survey (2%)	$1,300.00
			Engineering Design (10%)	$6,500.00
			Construction Inspection & Administration(15%)	$9,700.00
			Grand Total	**$91,200.00**

Corridor Broome County

PRIORITY 6

Vestal Parkway East

Town of Vestal

Existing Conditions

The Vestal Parkway East (NY-434) corridor from African Rd to Clubhouse Rd consists of 3.5 miles of two lane divided highway. The corridor runs through a densely populated area just went of the City of Binghamton and provides access to SUNY Binghamton as well as several commercial plazas.

A total of 758 crashes occurred during the study period with 119 of these crashes resulting in some form of injury. There were 10 total crashes resulting in either fatalities or serious injuries and 9 crashes involving vulnerable road users which consisted of 4 pedestrians and 5 bicyclists. Over half the crashes were rear ends, however there were a significant number of right-angle collisions and collisions with fixed objects. The speed limit for the majority of Vestal Pkwy E is 45 mph when some reduced speed limit zones around Binghamton University. The road width varies throughout the corridor and primarily consists of two 11-ft travel lanes in each direction which are accompanied by dedicated turn lanes at several intersections.

The east and westbound travel lanes are separated by a centerline median that varies between concrete barrier and curbed, vegetated area. These median barriers are in poor condition at many locations along this highway. Concrete sidewalks are present at limited locations, resulting in a lack of connectivity. There are a few slight horizontal curves and no significant vertical curves on this corridor leading to major no sight distance issues. Bike lanes are present in some locations along the corridor; however, they are inconsistent and present some difficulties for vulnerable road users navigating the corridor. Pedestrian crossings exist at most of the intersections along the corridor. Three other projects were identified in the action plan at high-injury intersections along the Vestal Pkwy E corridor.

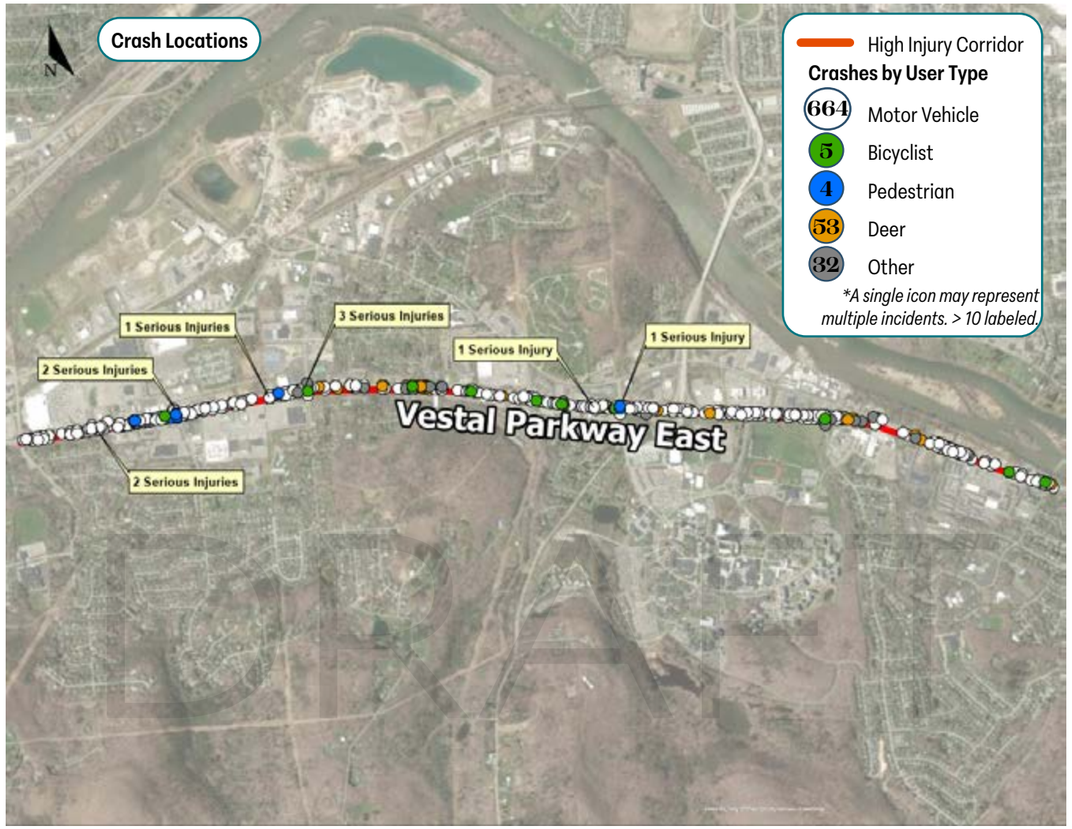
Highway Characteristics

Owner	NYSDOT
Route No.	NY-434
Description	Two-lane divided urban highway
Segment Length	4.83 miles
Speed Limit	45 mph
AADT	25,619 VPD
Functional Class	(14) Principal Arterial Other
LOSS	None
HRN Score	5
Equity Rank	Top 20

Photo 1: Vestal Pkwy E at Rano Blvd looking west

Photo 2: Vestal Pkwy E looking west

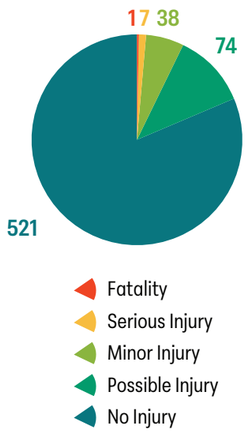
Crash Data



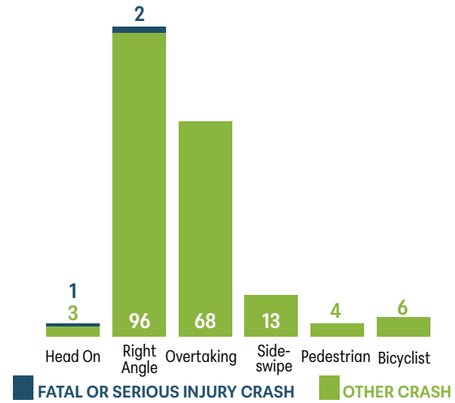
Contributing Factors

- Deteriorated median barrier
- Excessive driver speed
- Difficult turning movements
- High traffic volume

Crash Severity



Most Frequent Collision Type



Proposed Improvements

Proposed Countermeasures

Speed Safety Cameras

Rectangular Rapid Flashing Beacons

Median Barriers

Medians and Pedestrian Refuge Islands in Urban and Suburban Areas

Contributing factors at Vestal Parkway East from African Road to Clubhouse Road included deteriorated median barrier, excessive driver speed, difficult turning movements, and high traffic volume. Potentially relevant safety countermeasures at this location include, speed safety cameras, median barriers, rectangular rapid flashing beacons, and pedestrian refuge islands. Drivers traveling at unsafe speeds has been a recurring contributing factor for crashes on Vestal Parkway East. To address this speed safety cameras (SSCs) will be installed at locations staggered throughout the corridor. Both fixed and point-to-point SSCs are suitable options for this corridor due to its length and wide distribution of crashes. The existing median barriers along this corridor are old and have deteriorated away over time offering little protection for drivers that stray from their travel lane. To improve these conditions, the existing median barriers will be reconstructed using curbed concrete and raised concrete in some locations. The new median barriers will offer protection against head on collisions and collisions with fixed objects which are together responsible for 5 serious injuries within this corridor. Along with these concrete medians, select sections of sidewalks will be reconstructed throughout the corridor to provide safe, accessible access for pedestrians. Rectangular rapid flashing beacons (RRFBs) will be installed on either side of the crossing at the unsignalized intersection of Vestal Pkwy E and the State Route 26 on/off ramp. These RRFBs will activate via a push button and provide increased driver awareness of pedestrians. Lastly, pedestrian refuge islands will be installed at the intersections of Vestal Pkwy E and Rano Blvd, African Rd and South Washington St. These high-injury locations are a part of separate projects included in the intersections portion of this document. The costs for these refuge islands are accounted for only in the intersection specific estimates. The impact of these refuge islands will improve the overall safety for pedestrians and bicyclists along this entire corridor.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
New Concrete Sidewalk	1,400.00	CY	$1,500.00	$2,100,000.00
Concrete Median Barrier	850.00	CY	$1,500.00	$1,275,000.00
Speed Safety Cameras	8.00	EA	$25,000.00	$200,000.00
Curb Ramp and Warning Units	12.00	EA	$10,000.00	$120,000.00
Rectangular Rapid Flashing Beacon (RRFB)	2.00	EA	$15,000.00	$30,000.00
Pedestrian Warning Signage	2.00	EA	$1,250.00	$2,500.00
			Construction Total	$3,727,500.00
			Contingency and Inflation (20%)	$745,500.00
			Subtotal	$4,473,000.00
			Work Zone Traffic Control (10%)	$447,300.00
			Mobilization (4%)	$179,000.00
			Survey (2%)	$89,500.00
			Engineering Design (10%)	$447,300.00
			Construction Inspection & Administration(15%)	$671,000.00
			Grand Total	**$6,307,100.00**

Corridor Broome County

PRIORITY 7

Union Center-Maine Highway (NY 26)

Town of Union / Town of Maine

Existing Conditions

The segment of Union Center-Maine Highway (NY 26) is 4.95 miles long and is located within the Towns of Union and Maine. The corridor spans from the intersection with Daugherty Road to Nanticoke Creek, just north of Day Hollow Road. The surrounding area is both residential and commercial with numerous businesses and residential homes located along the corridor.

A total of 174 crashes occurred during the study period between 2019 and 2023, with 26 of these crashes resulting in injury. One of the crashes during the study period for this corridor involved a pedestrian which resulted in a fatality. Union Center-Maine Highway maintains one travel lane with a striped shoulder in each direction and a two-way left turn lane from Nanticoke Creek, just north of Day Hollow Road to just north of Ann G. McGuinness Elementary School. From just north of Ann G. McGuinness Elementary School to Daugherty Road, Union Center-Maine Highway maintains one travel lane with a striped shoulder in each direction. Just north and south of the intersection with NY 38B, Union Center-Maine Highway widens to accommodate a northbound dedicated left turn lane.

This corridor is uncontrolled along Union Center-Maine Highway and features ten streets that meet Union Center-Maine Highway at a three-leg intersection where stop control is only on the minor approach. Sidewalks are only present for a short distance on both sides of the road at the southern terminus of the corridor around Linnaeus W West Elementary School. The only curb ramps in the corridor are located in front of the previously mentioned school for a driveway crossing and an uncontrolled midblock crossing which has a rectangular rapid flashing beacon (RRFB). These two crossings at the school feature type LS crosswalks. The corridor features street lighting throughout with the lighting alternating sides of the road at different sections of the corridor.

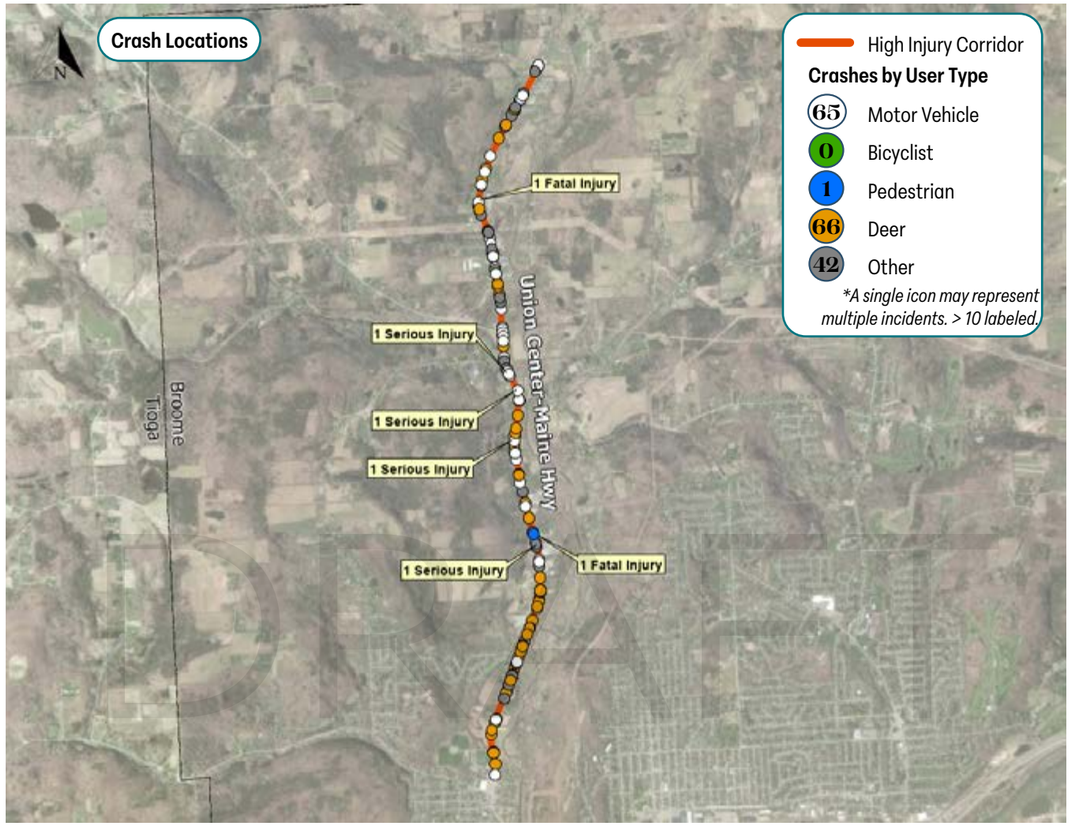
Highway Characteristics

Owner	NYSDOT
Description	Two lane undivided urban road sections of a two-way left turn lane
Segment Length	4.95 miles
Speed Limit	35-55 mph
AADT	12,639 VPD
Functional Class	(16) Minor Arterial
LOSS	N/A
HRN Score	3
Equity Rank	Top 20
Adjacent Lane Use	Urban

Photo 1: South end of high-injury corridor looking south

Photo 2: Union Center-Maine Highway looking north

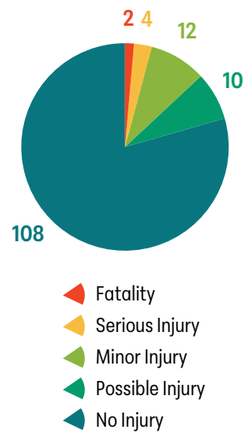
Crash Data



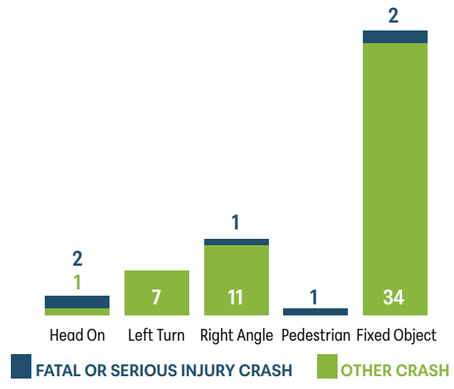
Contributing Factors

- Lack of guide railing at horizontal curves with higher crash rates
- Lack of pedestrian and bicyclist accommodations
- Faded centerline striping throughout corridor

Crash Severity



Most Frequent Collision Type



Proposed Countermeasures

Roadside Design Improvements at Curves

Rectangular Rapid Flashing Beacons

Bicycle Lanes

Safety Edge

Contributing factors at Union Center-Maine Highway from the intersection with Daugherty Road to Nanticoke Creek, included a lack of guide railing at horizontal curves with higher crash rates, a lack of pedestrian and bicyclist accommodations, and faded centerline striping throughout corridor. Potentially relevant safety countermeasures at this location include, roadside design improvements with shoulder widening and installation of guide railing, installation of rectangular rapid flashing beacons (RRFB) at midblock crossing, restriping the yellow centerline, and installation of solar speed feedback signs. The existing paved shoulder widths vary throughout the corridor and where they are less than 5 feet, they will be expanded to meet the width suitable for bicycle use. 5 feet is the minimum width for a bicycle path and by expanding the shoulder, adequate space will be provided for bicycles to travel with proper distance between them and motor vehicle traffic. Guide railing will be installed at multiple horizontal curves throughout the corridor to guide vehicles that have veered off the curve back onto the road. Guide railing in these locations is essential to prevent serious injuries in the event off run-off-the-road crashes. RRFBs will be installed at the uncontrolled midblock crossing to the south of the project limits just north of Carden Street to provide enhanced visibility of the crossing. There are existing pedestrian signs here but, replacing these with RRFB's will improve driver awareness of the crossing and give them proper warning when a pedestrian is present in the crosswalk. The double yellow centerline striping has faded in certain areas throughout the corridor and will be restriped to enhance visibility of the lanes in the corridor. These will decrease the potential for head on collisions and improve drivers' awareness of their respective travel lane. Solar speed feedback signs would be installed near the elementary school at the south end of the corridor in an effort to reduce vehicle speed around the school. These areas near the school have a reduced speed limit that drivers may neglect, creating a dangerous hazard for pedestrians. Adding the speed feedback sign will make drivers aware of their speed limit and encourage them to decrease their speed as they enter the school zone.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Subbase Course	488.89	CY	$100.00	$49,000.00
Asphalt Pavement	577.50	TON	$150.00	$87,000.00
Yellow Epoxy Striping	5,000.00	LF	$2.00	$10,000.00
Removal of Existing Guide Rail	1,200.00	LF	$5.00	$6,000.00
Box Beam Guide Railing	2,500.00	LF	$50.00	$125,000.00
Rectangular Rapid Flashing Beacon (RRFB)	2.00	EA	$15,000.00	$30,000.00
Solar Speed Feedback Sign	2.00	EA	$20,000.00	$40,000.00
			Construction Total	$347,000.00
			Contingency and Inflation (20%)	$69,400.00
			Subtotal	$416,400.00
			Work Zone Traffic Control (10%)	$42,000.00
			Mobilization (4%)	$17,000.00
			Survey (2%)	$9,000.00
			Engineering Design (10%)	$42,000.00
			Construction Inspection & Administration(15%)	$63,000.00
Grand Total				**$589,400.00**

Page intentionally left blank

Corridor Tioga County

PRIORITY 2

State Route 17C

Village of Owego

Existing Conditions

This segment of State Route 17C (NY-17C) is 0.97 miles long and is located just to the east of the Village of Owego. There was a total of 65 crashes during the study period from 2019 to 2023, with 6 of those crashes resulting in injury. There were 2 crashes involving pedestrians and 1 crash with a bicyclist. 1 of the pedestrians suffered serious injuries from the crash. The speed limit of this road is 40 mph throughout the entire length included in the high-injury network. The width of the road ranges between 40-ft and 50-ft and maintains one travel lane each way with a centerline two-way left turn lane. Each travel lane is approximately 11 feet wide, the left turn median has a width of 12 feet. There are shoulders on either side ranging from 2-ft to 11-ft throughout the corridor.

The corridor begins to the east with the NY-434 Connection off-ramp consisting of a sharp turn radius. To the west, the corridor narrows down and the left turn median ends. This stretch includes several driveways on either side of the roadway leading to commercial businesses. There is one four-way signalized intersection with a shopping plaza and hotel on either side. There are sharrows present on both roadway approaches on the east side of the corridor.

Signage indicates that there is a bike lane which begins at the entrance to Wendy's and continues along both approaches into the village of Owego. There are, however, no existing pavement markings to indicate the presence of bike lanes. There are several "no driving on shoulder" signs along the road. Light posts are scattered throughout the corridor, primarily at and around the driveways and parking lots. Type LS crosswalks are located crossing Route 17C at the NY-434 off-ramp, and Hampton Inn intersections. They are accompanied by audible pedestrian signals but do not have any curb ramps or detectable warning units. There are no sidewalks present within this corridor. The asphalt pavement is in poor condition, the striping and pavement markings are still fairly visible.

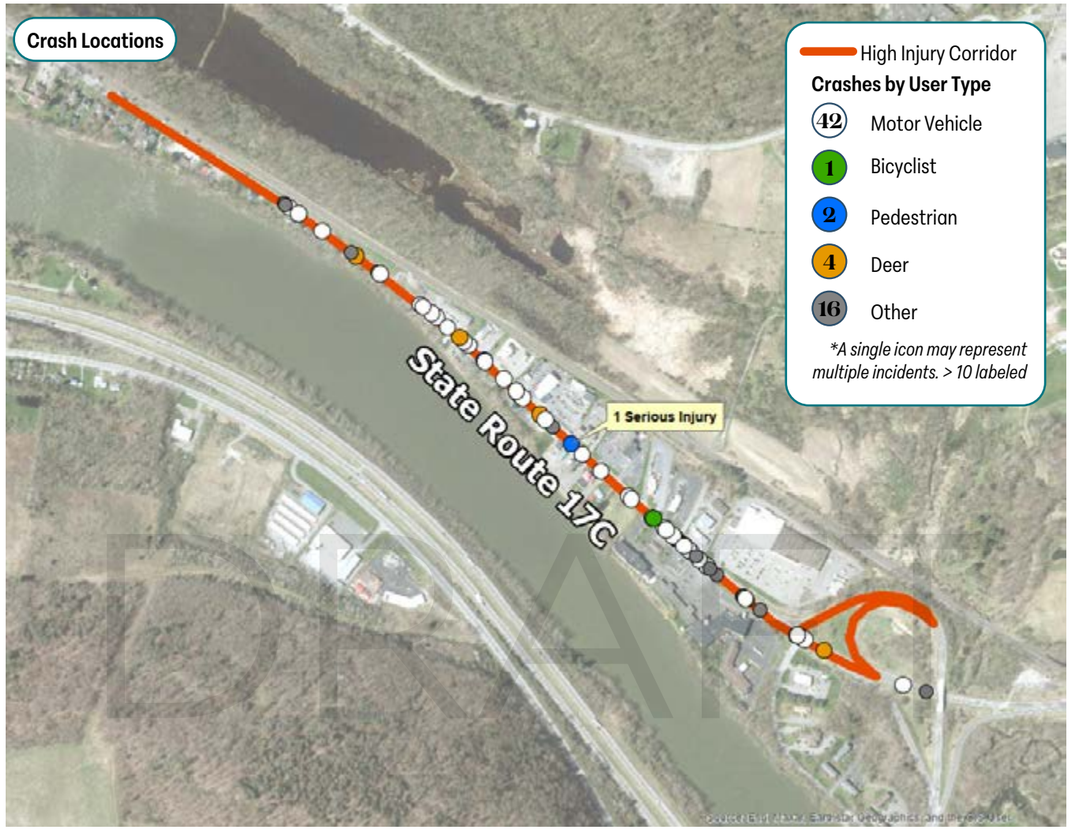
Highway Characteristics

Owner	NYSDOT
Description	Two-lane undivided urban road with left turn median
Segment Length	0.97 miles
Speed Limit	30-40 mph
AADT	9,586 VPD
Functional Class	(16) Minor Arterial
LOSS	3
HRN Score	3
Equity Rank	Normal Equity

Photo 1: Intersection of State Route 17C and Grand Union Plaza

Photo 2: State Route 17C westbound looking east

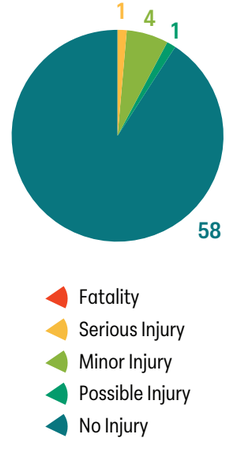
Crash Data



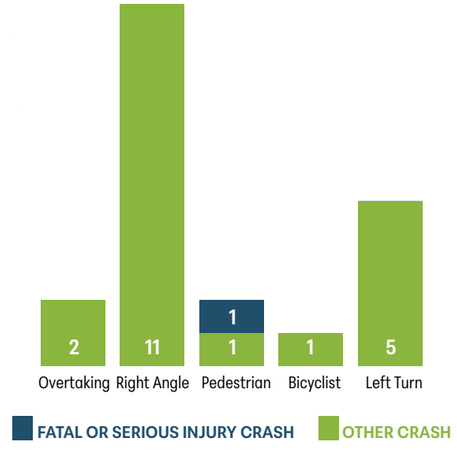
Contributing Factors

- No sidewalks or curb ramps present
- Poorly indicated bike lanes
- Outdated traffic signals

Crash Severity



Most Frequent Collision Type



Proposed Improvements

Proposed Countermeasures

Contributing factors at State Route 17C (NY-17C) included no sidewalks or curb ramps present, poorly indicated bike lanes, and outdated traffic signals. Potentially relevant safety countermeasures at this location include, new concrete sidewalks, traffic signal improvements, and bike lane accommodations. 7-foot sidewalks would be installed beginning directly to the west of the off-ramp and continue along both approaches until 5th Avenue where the left-turn median ends. These sidewalks will provide an elevated paved surface that separates pedestrians from motor vehicle traffic by a curb. The sidewalks will be accompanied by ADA compliant curb ramps and detectable warning surfaces. Having sidewalks along the corridor will offer a safe path for pedestrians to access the stores and restaurants on this stretch of Route 17C. It will also provide a connection for the village of Owego residents. With approximately 60 feet of right-of-way available, the project will allow for 5-ft bike lanes and 7-ft sidewalks in both directions in addition to the existing vehicular travel lanes. Additional pavement markings and signage will be added to the bike lanes per the guidelines for bicyclist facilities. Type LS crosswalks will be restriped and added at the crossings of the Grand Union Plaza entrance. The 3-color traffic signals on span wires at the two intersections will be replaced with updated signals that will be reprogrammed to ensure safe and efficient timing. In addition, backplates with retroreflective borders will be added to the new traffic signals for enhanced visibility.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Concrete Sidewalk	450.00	CY	$1,500.00	$675,000.00
Curb Ramp & Warning Units	12.00	EA	$10,000.00	$120,000.00
Granite Curb	5,100.00	LF	$80.00	$408,000.00
Type LS Crosswalks	400.00	LF	$24.00	$10,000.00
Traffic Signal Replacement	16.00	EA	$10,000.00	$160,000.00
Traffic Signal Backplates	16.00	EA	$600.00	$9,600.00
Bike Lane Signs and Posts	10.00	EA	$1,250.00	$12,500.00
Bike Lane Pavement Markings	20.00	EA	$300.00	$6,000.00
			Construction Total	$1,401,100.00

Contingency and Inflation (20%)	$280,300.00
Subtotal	$1,681,400.00
Work Zone Traffic Control (10%)	$169,000.00
Mobilization (4%)	$68,000.00
Survey (2%)	$34,000.00
Engineering Design (10%)	$169,000.00
Construction Inspection (15%)	$253,000.00
Grand Total	**$2,375,000.00**

Corridor Tioga County

PRIORITY 3

NY-434

Town of Owego

Existing Conditions

The high-injury segment of NY-434 is 1.27 miles long and is located within the Town of Owego. The corridor spans from the intersection with Degroat Road to northwest of the NY 17C Access Road.

The surrounding area is both residential and commercial with The Owego Town Court, several businesses, and residential homes located in close proximity to the corridor. A total of 37 crashes occurred during the study period between 2019 and 2023, with 8 of these crashes resulting in injury. Many of the crashes during the study period for this corridor were located along the horizontal curves or involved a deer-related crash. One of the crashes during the study period for this corridor involved a pedestrian which resulted in serious injury. NY-434 maintains one travel lane and a striped shoulder in each direction for the entire corridor. The speed limit for this stretch is posted as 55 mph.

The three-leg intersection with NY-17 Access Road is controlled by span wire traffic signal which also includes pedestrian signal infrastructure for crossing NY-434 with a type LS crosswalk. The intersection with the I-86 on/off ramps features yield control for the I-86 off ramp and is uncontrolled along NY-434. The three-leg intersection with Degroat Road features stop control on Degroat Road and is uncontrolled along NY-434. The corridor lacks pedestrian infrastructure such as sidewalks and curb ramps. The entirety of the corridor is void of street lighting.

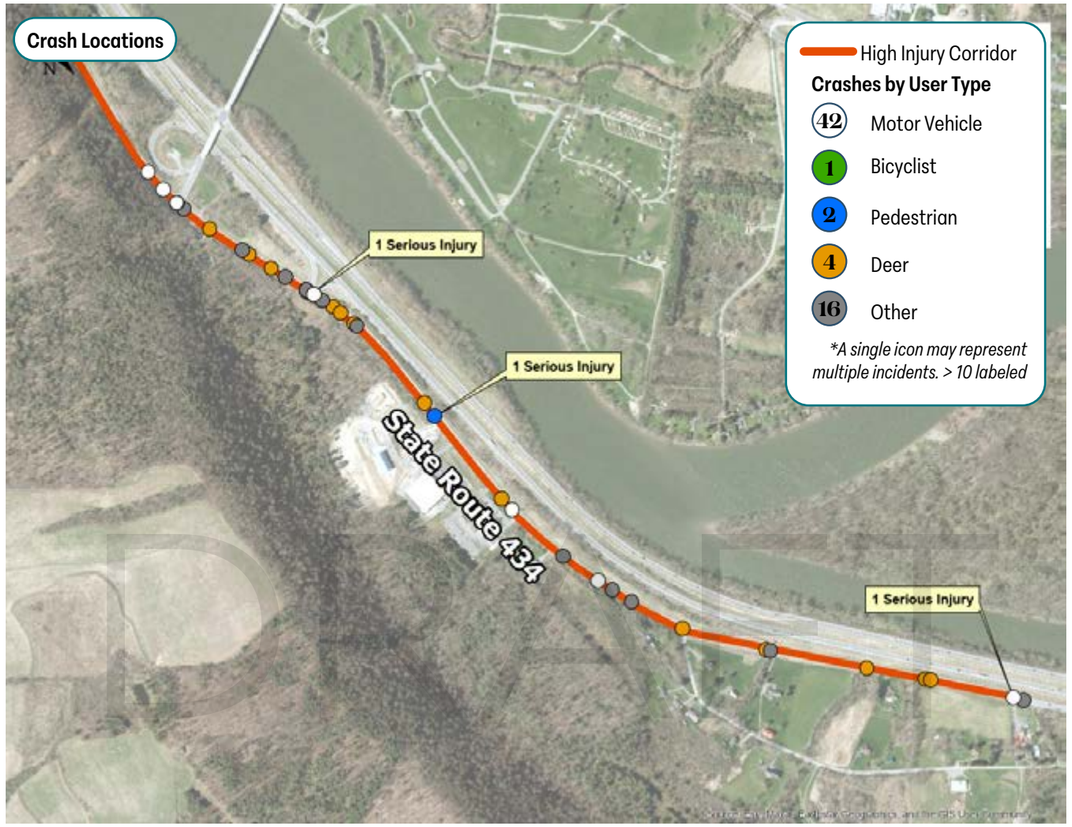
Highway Characteristics

Owner	NYSDOT
Description	Two lane undivided urban road
Segment Length	1.27 miles
Speed Limit	55 mph
AADT	4,088 VPD
Functional Class	(16) Minor Arterial
LOSS	3
HRN Score	3
Equity Rank	None

Photo 1: Outside of Owego Town Hall looking east on NY-434

Photo 2: Northbound approach at NY 17C Access Road intersection looking northwest

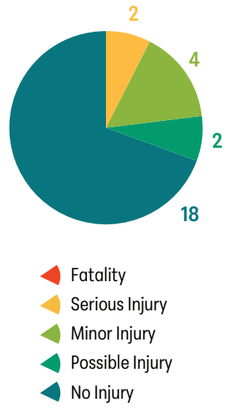
Crash Data



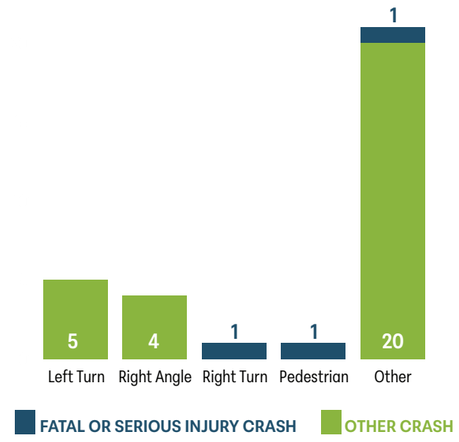
Contributing Factors

- Sharp horizontal curves
- Insufficient warning signage
- No lighting present in corridor

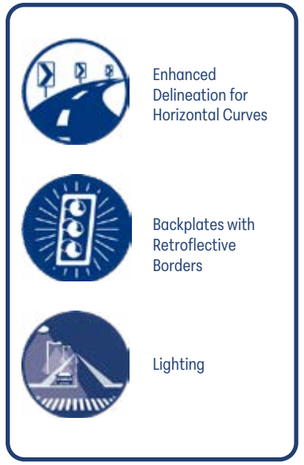
Crash Severity



Most Frequent Collision Type



Proposed Countermeasures



Contributing factors at NY-434 from the intersection with Degroat Road to northwest of the NY 17C Access Road included sharp horizontal curves, insufficient warning signage, and no lighting present in corridor. Potentially relevant safety countermeasures at this location include, enhanced delineation for horizontal curves through the installation of curve warning signage including chevrons, installation of deer warning signage, the addition of traffic signal backplates with retroreflective borders, and lighting improvements. Curve warning signage and chevrons will be installed at each of the horizontal curves throughout the corridor. This enhanced signage will increase driver awareness of the upcoming curves and prevent vehicles from straying outside of their travel lane or off the around these curves, preventing crashes of all types. The curve warning signage will include supplemental signage to recommend a lower speed around the curves with a high concentration of crashes. This lower speed will increase drivers' reaction time and ability to maintain their travel path around curves. Due to the high number of crashes involving animals, deer warning signage will also be installed to increase roadway users' awareness of the potential presence of deer throughout the corridor. To provide increased visibility of the signal heads at the intersection, traffic signal backplates with retroreflective borders will be installed at the intersection with NY 17 Access Road. Lighting improvements would be installed at the intersections with NY 17 Access Road and the I-86 ramps to provide increased visibility and enhance safety at the intersections. These lighting improvements will also improve drivers' capability to see during dawn and dusk hours when deer are the most active, decreasing the potential for fatal or serious injury crashes involving deer.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Curve Warning Signage	8.00	EA	$1,250.00	$10,000.00
Chevron Signage	20.00	EA	$1,000.00	$20,000.00
Deer Warning Signage	2.00	EA	$1,250.00	$2,500.00
Traffic Signal Backplates	6.00	EA	$600.00	$3,600.00
Lighting Improvements	1.00	LS	$50,000.00	$50,000.00
			Construction Total	$86,100.00
			Contingency and Inflation (20%)	$17,300.00
			Subtotal	$103,400.00
			Work Zone Traffic Control (10%)	$10,400.00
			Mobilization (4%)	$4,200.00
			Survey (2%)	$2,100.00
			Engineering Design (10%)	$10,400.00
			Construction Inspection (15%)	$15,600.00
			Grand Total	**$146,100.00**

Page intentionally left blank

Corridor Tioga County

PRIORITY 5

Sulphur Springs Rd.

Town of Owego

Existing Conditions

The high-injury segment of Sulphur Springs Road (CR-25) is 0.75 miles long and is located within the Town of Owego. The corridor spans from the intersection with Stanton Hill Road to the Village of Owego line. The surrounding area is both residential and commercial with numerous businesses and homes located along the corridor.

A total of 14 crashes occurred during the study period between 2019 and 2023, with 4 of these crashes resulting in some form of injury. The majority of crashes related to roadway departure (i.e., vehicle travels off road or into oncoming traffic). All 3 serious injury crashes were located along the same horizontal curve situated south of I-86.

The high incidence of roadway departure crashes along the corridor is influenced by curves and limited or outdated guide railing. Sight distance obstructions are caused by the several significant horizontal and vertical curves throughout the corridor. Despite these curves and the presence of ditches and fixed objects along the side of the road, there is very little guide railing to protect vehicles that stray from their travel lane off the road. The existing guide railing on the south end of the high-injury corridor is outdated corrugated guide railing that is in need of replacement. The speed limit on this section of Sulphur Springs Rd is posted at 45 mph. Sulphur Springs Road maintains one travel lane in each direction for the entire corridor.

This corridor features three streets that meet Sulphur Springs Road where stop control is only on the minor approach and Sulphur Springs Road is uncontrolled which are Stanton Hill Road, Waits Road, and East River Road.

The corridor is lacking pedestrian infrastructure such as sidewalks, curb ramps, and crosswalks. The east end of the corridor in the eastbound direction is the end of the greenway bicycle path. The entirety of the corridor is void of street lighting. There are steep ditches on either side of the road throughout the corridor which present a dangerous condition in the event of a run-off-road crash, also known as a roadway departure crash.

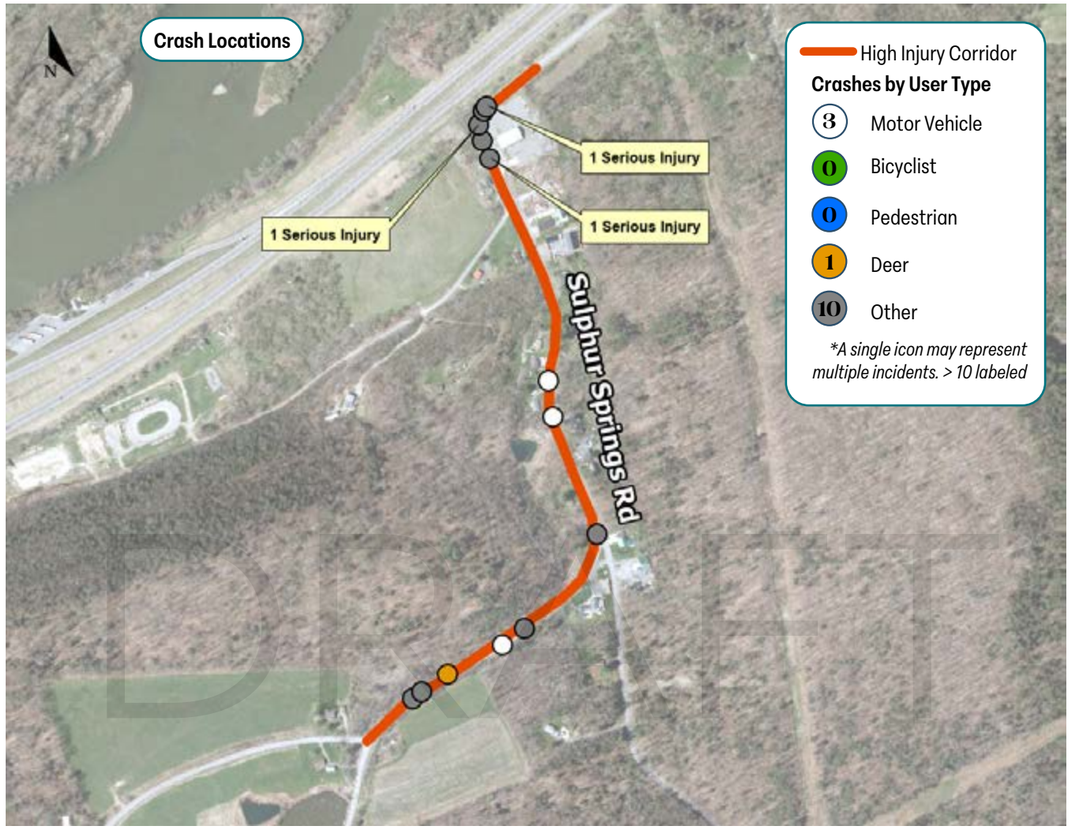
Highway Characteristics

Owner	Tioga County
Description	Two lane undivided urban road
Segment Length	0.75 miles
Speed Limit	55 mph
AADT	1,780 VPD
Functional Class	(17) Major Collector
LOSS	3
HRN Score	3
Equity Rank	Top 20
Adjacent Lane Use	Urban

Photo 1: Looking north past upper bend in Sulphur Springs Rd. to I-86

Photo 2: Sulphur Springs Rd. looking north near middle of segment

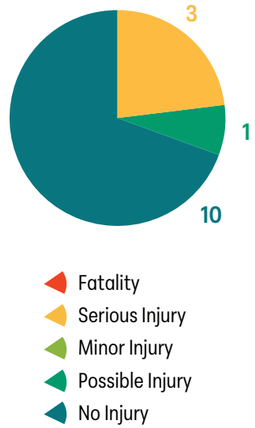
Crash Data



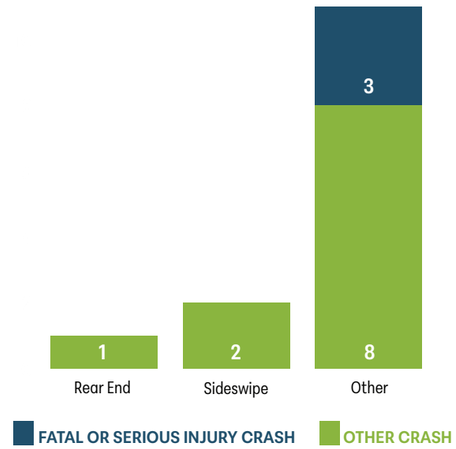
Contributing Factors

- Sharp horizontal and vertical curves
- Insufficient curve warning signage and chevrons
- Faded striping and limited sight distance
- Lack of striped shoulders

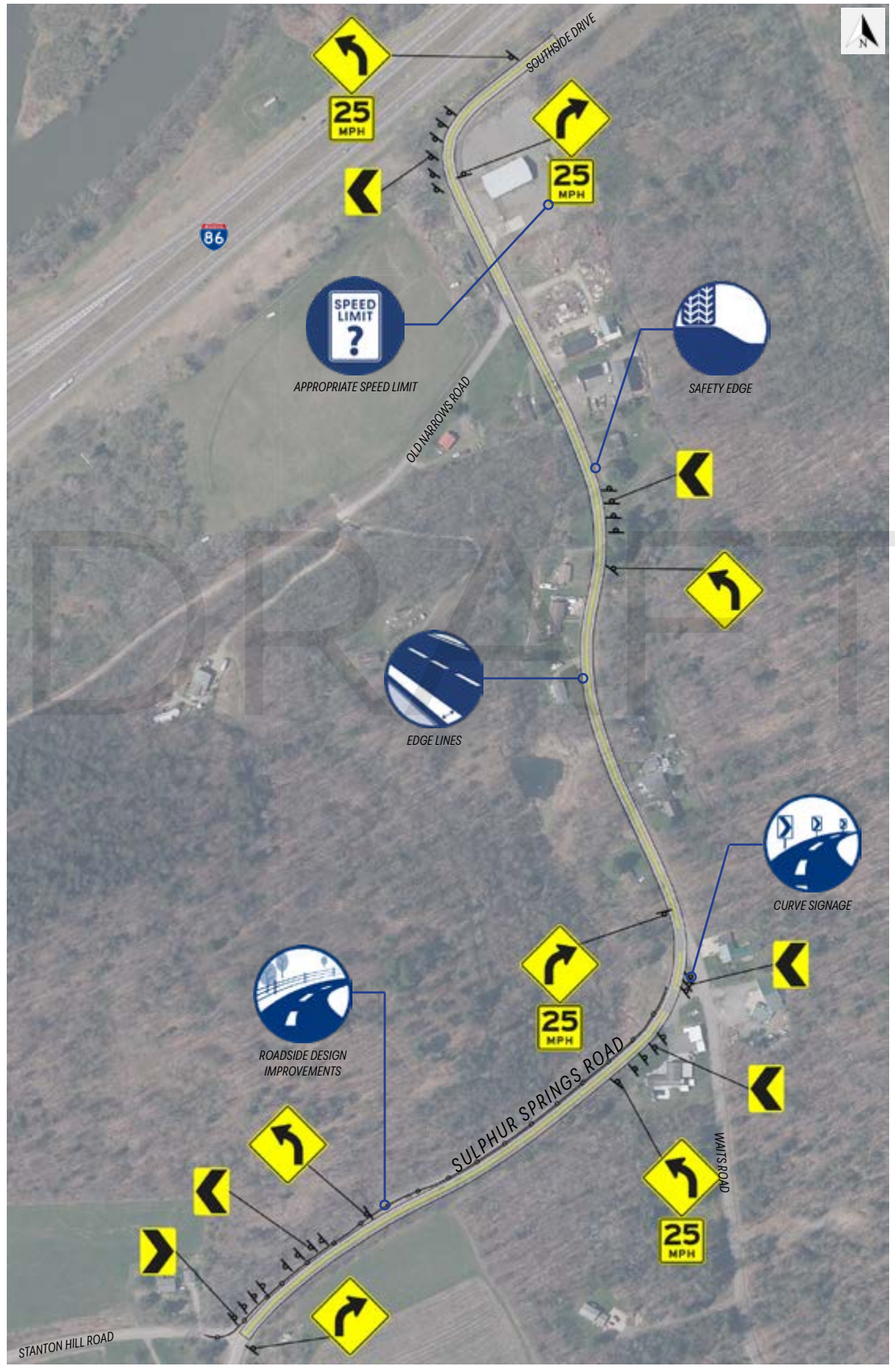
Crash Severity



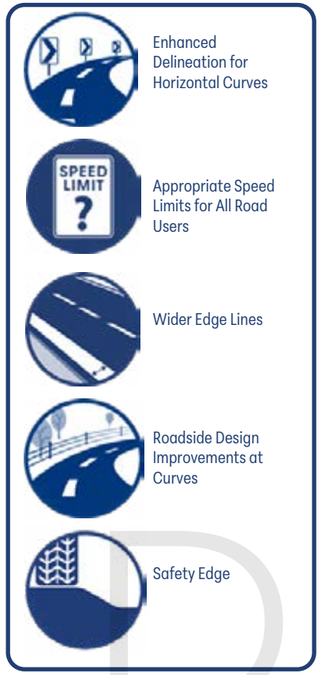
Most Frequent Collision Type



Proposed Improvements



Proposed Countermeasures



Contributing factors at Sulphur Springs Road from the intersection with Stanton Hill Road to the Village of Owego line included sharp horizontal and vertical curves, insufficient curve warning signage and chevrons, faded striping and limited sight distance, and a lack of striped shoulders. Potentially relevant safety countermeasures at this location include, enhanced delineation for horizontal curves through the installation of curve warning signage and chevrons, new wider edge lines striped onto the road shoulder, and the addition of a 4-foot-wide asphalt shoulder with a safety edge. To improve driver awareness of the horizontal curves present, warning signage and chevrons will be installed at each of the curves throughout the corridor. The curve warning signage will include supplemental signage to recommend a lower speed around the curves. Through the crash data analysis, it was observed that a majority of crashes taking place on this corridor were located at curves due to high speeds, slippery roads, and driver inattention. Several of these roadway departure crashes also resulted in collisions with fixed objects, ditches or rocks directly adjacent to the travel way. Where there is currently no existing shoulder striping, 6" wide edge lines will be installed to increase driver visibility of the road around curves to increase roadway safety. This will give drivers a better sense of where they should be in their travel lane and encourage them to maintain a proper path around curves. To further improve roadside safety for drivers the existing shoulder will be widened an additional 4 feet with asphalt accompanied by a safety edge. This wider will allow drivers extra space to correct the course of their vehicle and prevent them from leaving the roadway around a curve. The safety edge will also allow them to easily re-enter the travel way in a safe manner in the event that they do fall on the edge of the road and prevent them from having a potential collision with a ditch or fixed object that could result in a fatal or serious injury.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Asphalt Pavement	1,600.00	TON	$150.00	$240,000.00
Subbase	1,200.00	CY	$100.00	$120,000.00
White Striping	7,700.00	LF	$2.00	$15,400.00
Curve Warning Signage	7.00	EA	$1,250.00	$8,750.00
Chevron Signage	25.00	EA	$1,000.00	$25,000.00
Box Beam Guide Railing	1,500.00	LF	$50.00	$75,000.00
			Construction Total	$484,150.00
			Contingency and Inflation (20%)	$96,900.00
			Subtotal	$581,100.00
			Work Zone Traffic Control (10%)	$58,200.00
			Mobilization (4%)	$23,300.00
			Survey (2%)	$11,700.00
			Engineering Design (10%)	$58,200.00
			Construction Inspection (15%)	$87,200.00
			Grand Total	**$819,700.00**

Corridor Broome County

PRIORITY 8

George F Highway West (NY-17C)

Town of Union

Existing Conditions

George F Highway West (NY-17C) is 1.52 miles in length and is located between Johnson City and Endicott, NY. The project limits span from the intersection with River Road to Main Street. There was a total of 35 crashes during the study period between 2019 and 2023 with 7 of them resulting in injuries. Among these injury crashes was a pedestrian fatality and one other serious injury crash.

This stretch of George F Hwy W is a two-lane, one-way road (westbound) that follows the state speed limit of 55 mph. The width of the road ranges from 30 to 40 feet and is composed of two 11-foot travel lanes in the westbound direction. The two travel lanes are separated by a broken white line allowing lane changes and passing throughout the stretch. The corridor features an exterior right white edge line, and the left lane has a yellow edge line. There are two stretches where a temporary third lane emerges to accommodate traffic getting on or off the southern tier expressway. There are wide shoulders throughout the corridor varying from 4 feet to 11 feet.

Based on field visits, and discussions with local municipalities, it was observed that pedestrians opt to use this route to travel between Johnson City and municipalities to the west as it is a fairly flat route with wide shoulders. The high-injury corridor begins to the east where NY-17C becomes Main St. To the west, the high-injury corridor ends just as it converges with George F Hwy eastbound. The Norfolk Southern Railway runs alongside the corridor to the north. The high-injury stretch of George F Highway W does not directly connect to any residential or commercial driveways.

There is guide railing along either side of the road for the majority of the corridor. There are no existing bicyclist or pedestrian accommodations along the corridor. The pavement is in poor condition with significant cracking and some deformation which has also led to faded striping. Light poles are present along the south side of the corridor; however, this lighting was observed to be outdated and inadequate.

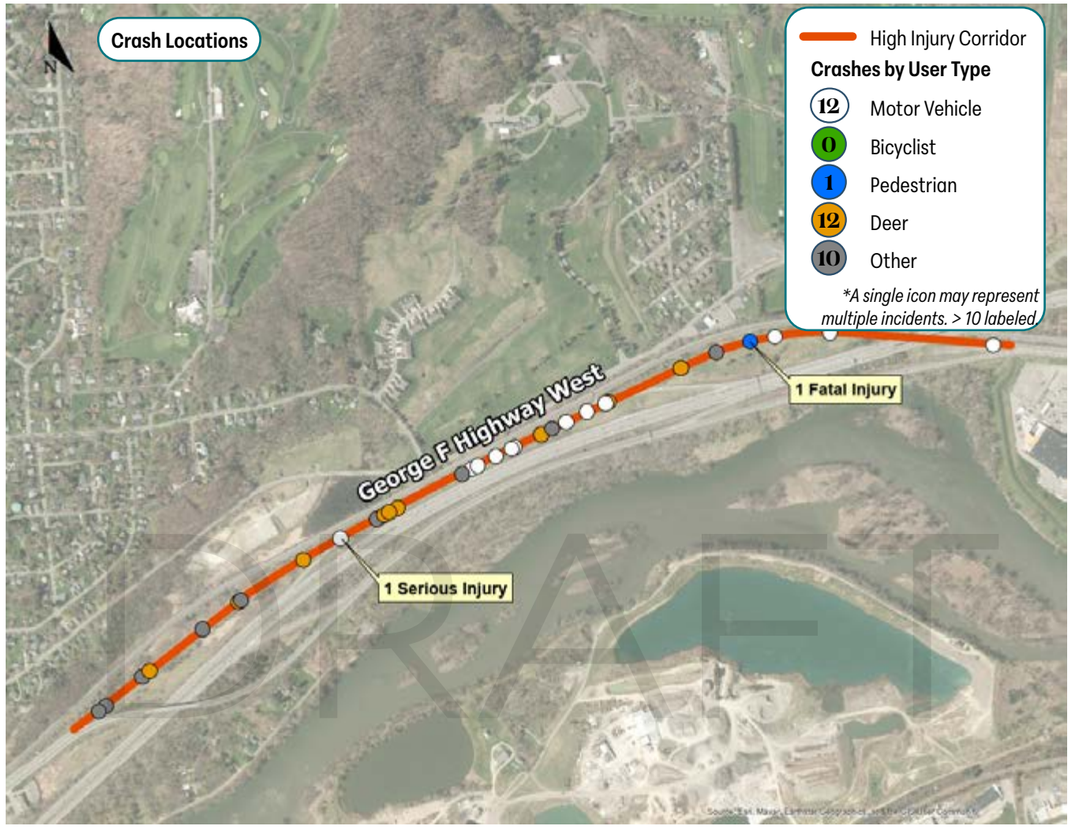
Highway Characteristics

Owner	NYSDOT
Route No.	NY-17C
Description	Two-lane one-way highway
Segment Length	1.52 miles
AADT	9,182 VPD
Functional Class	(12) Principal Arterial Expressway
LOSS	Not Available
HRN Score	4
Equity Rank	Normal Equity

Photo 1: George F Highway westbound looking east

Photo 2: George F Highway westbound looking west

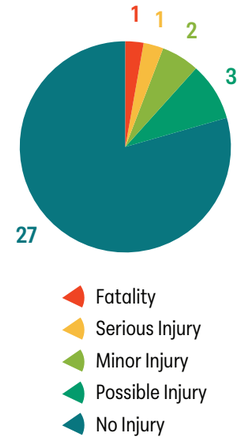
Crash Data



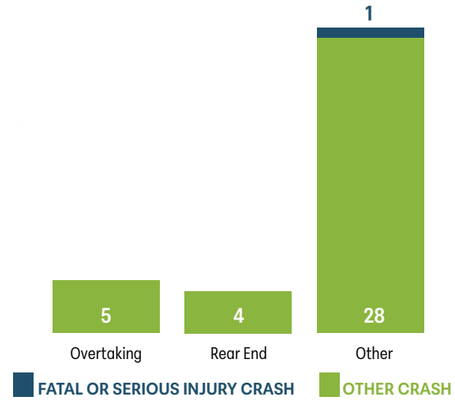
Contributing Factors

- Lack of pedestrian/bicycle accommodations
- Poor roadway lighting
- Deteriorated pavement and striping

Crash Severity



Most Frequent Collision Type



Proposed Improvements

Proposed Countermeasures

Contributing factors at George F Highway West from the intersection with River Road to Main Street included a lack of pedestrian/bicycle accommodation, poor roadway lighting, deteriorated pavement and striping. Potentially relevant safety countermeasures at this location include, roadside design improvements, crosswalk visibility enhancements, bike lanes, walkways, lighting improvements, and a pedestrian hybrid beacon. These countermeasures are all centered around the reconfiguration of the roadway to construct a shared use path on the north side of the highway. These improvements will require shoulder widening and guide rail relocation. This will include removing and replacing the old guide rail with improved box beam guide railing. The existing pavement edge will be extended approximately 4 feet, and the guide railing will be relocated approximately 6 feet towards the existing outside travel lane. This will create space for a 10-foot-wide shared use path accessible to both bicyclists and pedestrians. This pathway will begin to the east where the existing sidewalk will be extended approximately 600 feet to meet the asphalt path which consists of two 5-foot shared use lanes. The path will have pavement markings and signage to identify the direction of travel and occupancy of both pedestrians and bicycles. The path will be separated from the roadway by the new box beam guide railing. To the west the path will cross George F Hwy W with a type LS crosswalk. This crossing will have push buttons on either side that activate a pedestrian hybrid beacon, stopping traffic temporarily to permit safe crossing. This path will allow residents to safely travel between the cities of Endicott, Endwell and Johnson City. It will offer increased protection for vulnerable road users who are already using this corridor without any existing accommodations. Lighting improvements will also be added to the corridor to replace the existing outdated light poles with new LED streetlights. This will enhance the visibility of drivers traveling in the morning and evening to better see and avoid pedestrians, bicyclists and deer.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Concrete Sidewalk	38.27	CY	$1,500.00	$58,000.00
Subbase Course	391.11	CY	$100.00	$40,000.00
Asphalt Pavement	693.00	TON	$150.00	$104,000.00
Overhead Street Lighting	30.00	EA	$5,000.00	$150,000.00
Removal of Existing Guide Rail	9,000.00	LF	$5.00	$45,000.00
Box Beam Guide Rail	8,900.00	LF	$50.00	$445,000.00
Shared Use Path Signs	16.00	EA	$1,250.00	$20,000.00
HAWK Beacon	1.00	EA	$150,000.00	$150,000.00
			Construction Total	$1,012,000.00
			Contingency and Inflation (20%)	$203,000.00
			Subtotal	$1,215,000.00
			Work Zone Traffic Control (10%)	$122,000.00
			Mobilization (4%)	$49,000.00
			Survey (2%)	$25,000.00
			Engineering Design (10%)	$122,000.00
			Construction Inspection & Administration(15%)	$183,000.00
			Grand Total	**$1,716,000.00**

Corridor Broome County

PRIORITY 9

Route 11

Town of Kirkwood

Existing Conditions

Kirkwood Ave (US Route 11) from Meadow Lane to Main St is 2.53 miles in length and is located in the Town of Kirkwood, NY, southeast of the City of Binghamton. There was a total of 42 crashes on this corridor during the study period from 2019 to 2023 and 8 of those crashes resulted in some form of injury. There were 5 serious injury crashes with 4 of them involving vehicles running off the road. One of the crashes resulted in a fatality due to a collision with a deadly fixed object.

The high-injury corridor begins just south of Fivemile Point and ends north of the Conklin Kirkwood Bridge. The Susquehanna River and Norfolk Southern Railway run parallel to Kirkwood Ave to the west. There are several culverts which pass underneath this stretch of Route 11. This corridor maintains one travel lane each way with a speed limit of 55 mph. The width of the road ranges from 22 to 30 feet with 11-foot travel lanes in the northbound and southbound directions. The two travel lanes are separated by full barrier double yellow lines for a majority of the corridor. Passing is permitted through the use of broken yellow lines through certain stretches where sight distance is adequate. Both travel lanes have a 4" white line to indicate the edge of the travel lane. There are shoulders present on either side of the corridor which vary between 2 and 4 feet in width.

There are numerous driveways and side streets present along the east side of Kirkwood Ave. Advanced signage is present in some locations to give warning of upcoming intersections. Other than two standalone pedestrian signs located south of Trim St, there are no existing pedestrian or bicyclist accommodations on this corridor. There is existing guide railing present along some of the horizontal curves and along the culvert crossings. The bridge railing appears to be in good condition, but the corrugated guide rail along the curves is in need of replacement. Based on field observations and discussion with the local highway department, there are sight distance issues present at Ostrum Rd and Grange Hall Rd due to overgrowth of vegetation. The pavement on Kirkwood Ave is in poor condition and has significant cracking which has led to faded striping. There are few streetlights present along the study corridor.

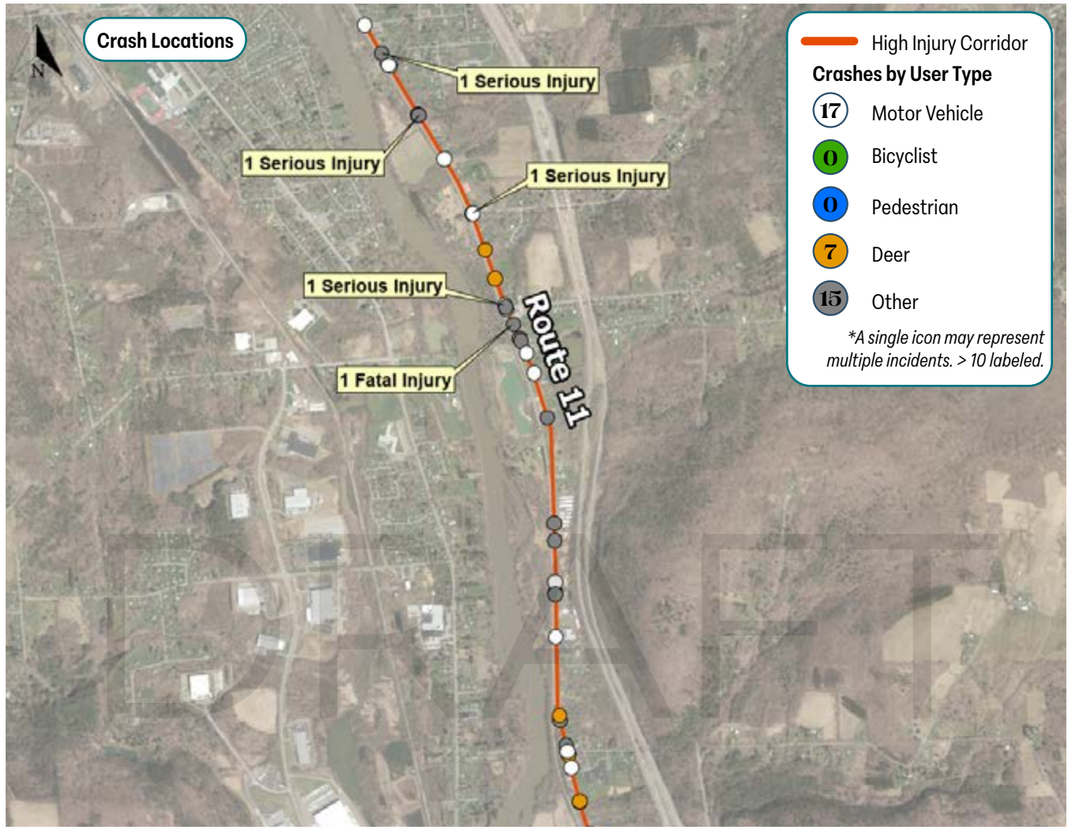
Highway Characteristics

Owner	NYSDOT
Route No.	Route 11
Description	Two-lane local highway
Segment Length	2.53 miles
Speed Limit	55 mph
AADT	2,703 VPD
Functional Class	(17) Major Collector
LOSS	4
HRN Score	3
Equity Rank	Normal Equity

Photo 1: Kirkwood Ave at First Christian Church looking north

Photo 2: Kirkwood Ave south of Johnson Rd looking south

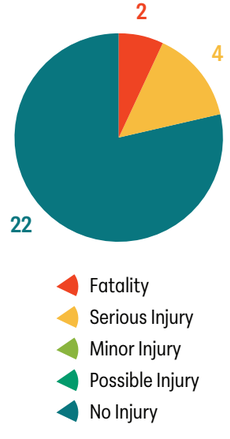
Crash Data



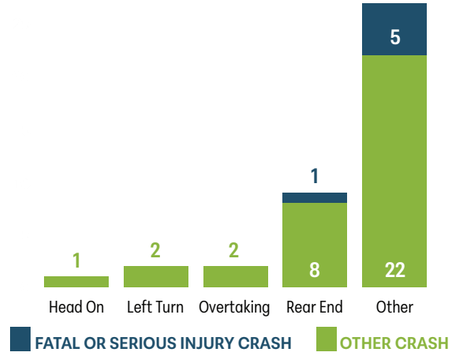
Contributing Factors

- Narrow shoulder width
- Minimal protection from fixed objects
- Poor roadway lighting

Crash Severity



Most Frequent Collision Type



Proposed Improvements

Proposed Countermeasures

- Longitudinal Rumble Strips and Stripes on Two-Lane Roads
- Safety Edge
- Roadside Design Improvements at Curves
- Lighting

Contributing factors at Kirkwood Avenue (US Route 11) from Meadow Lane to Main Street included narrow shoulder width, minimal protection from fixed objects, and poor roadway lighting. Potentially relevant safety countermeasures at this location include, longitudinal rumble strips, safety edge, roadside design improvements at curves, and lighting. Rumble strips will be grooved longitudinally along the centerline of the corridor. These will alert drivers who may be drowsy or are straying out of their lane. The existing shoulder on either side of the roadway will be widened and additional 4 feet using subbase material. With this new material, a safety edge will also be formed to provide an easier transition back onto the travel way in the event that a vehicle runs off the road. Where there is existing guiderail and along horizontal curves, new box beam guide railing will be installed. This will provide a safe barrier for cars that exit the travel way during a crash to prevent them from undergoing serious injuries. The striping along the centerline has faded and will be impacted by the installation of the new rumble strip, so it should be restriped. The locations where passing is permitted from one direction or both should also be reevaluated to prevent future head on crashes. New streetlights will also be added to the corridor primarily along the southern half of the corridor where there is no existing streetlights present. This will allow for increased visibility during the morning and evening. The increased lighting will decrease the risk of crashes involving vulnerable road users as well as deer and animals. Lastly, vegetation will be cut back and removed around existing signage and approaches near side streets. This will allow for increased visibility of motor vehicles looking to pull out onto Route 11.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Vegetation Removal	1.00	LS	$25,000.00	$25,000.00
Shoulder Backup Subbase	485.33	CY	$100.00	$49,000.00
Yellow Epoxy Striping	2,500.00	LF	$2.00	$5,000.00
Box Beam Guide Railing	2,000.00	LF	$50.00	$100,000.00
Longitudinal Rumble Strip	7,500.00	LF	$2.00	$15,000.00
Lighting Improvements	1.00	LS	$100,000.00	$100,000.00
			Construction Total	$294,000.00
			Contingency and Inflation (20%)	$58,800.00
			Subtotal	$352,800.00
			Work Zone Traffic Control (10%)	$35,300.00
			Mobilization (4%)	$14,200.00
			Survey (2%)	$7,100.00
			Engineering Design (10%)	$35,300.00
			Construction Inspection & Administration(15%)	$53,000.00
			Grand Total	**$497,700.00**

Corridor Broome County

PRIORITY 10

Lewis Rd. (CR 72)

Town of Maine/Town of Chenango

Existing Conditions

This stretch of Lewis Road (CR 72) from Middle Stella Ireland Rd to Upper Front Street is 2.59 miles long and is located north of the City of Binghamton.

There was a total of 33 crashes during the study period with 10 of them resulting in injury. There were five serious injury crashes, including four run-off-the-road crashes. The speed limit on Lewis Road varies from 30 to 45 mph with 25 mph advisory speeds at horizontal curves. The width of the road ranges between 30 and 50 feet. The corridor primarily maintains one 11-foot travel lane each way but expands to two lanes each way for a short distance at the west end of the corridor. The shoulder width varies throughout the corridor from 0 to 4 feet. The corridor has many residential homes present on both sides of the road.

There are several significant horizontal and vertical curves which present sight distance issues throughout the corridor. Limited sight distance, reduced curve speed, and curve warning chevrons are present at select locations on Lewis Road. There are no existing bicyclist or pedestrian accommodations present on this corridor. Guide railing is present at the severe geometric curves, but is in poor condition, and has fallen into disrepair at several locations, likely as the result of previous crashes.

Passing is restricted within the entire stretch with the use of a full barrier double yellow centerline. White edge lines are missing from the majority of the corridor. The striping is overall in good condition, but there are several stretches where it has faded and needs updating.

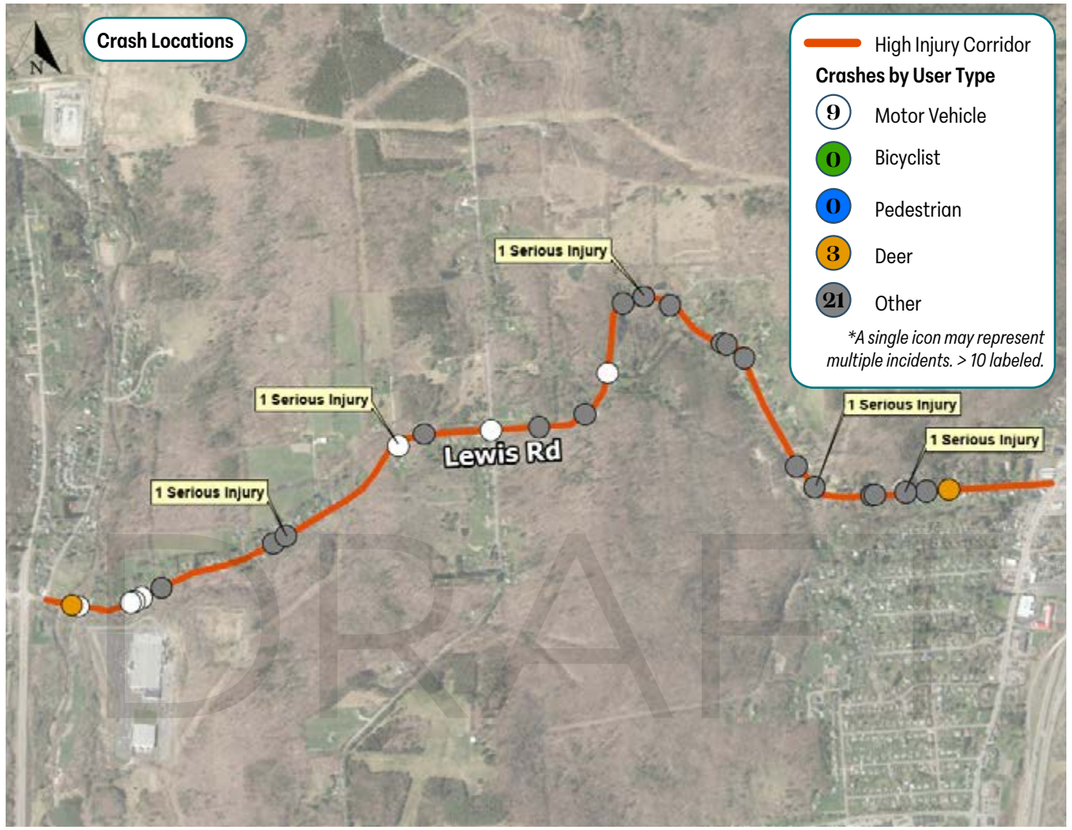
Highway Characteristics

Owner	Broome County
Route No.	CR-72
Description	Two-lane undivided rural road
Segment Length	2.59 miles
Speed Limit	30-45 mph
AATD	VPD
Functional Class	(17) Major Collector
LOSS	3
HRN Score	2
Equity Rank	Top 40

Photo 1: Lewis Rd looking north

Photo 2: Lewis Rd looking west

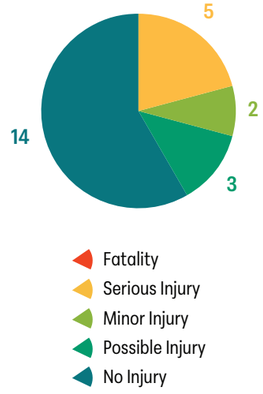
Crash Data



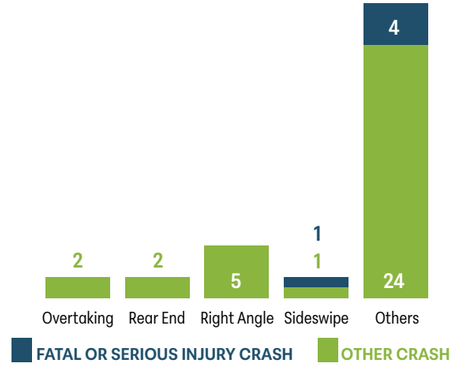
Contributing Factors

- Steep vertical and sharp horizontal curves
- High run-off-road risk
- Limited sight distance

Crash Severity



Most Frequent Collision Type



Proposed Improvements

Proposed Countermeasures

Contributing factors at Lewis Road from Middle Stella Ireland Road to Upper Front Street included steep vertical and sharp horizontal curves, high run-off-road risk, and limited sight distance. Potentially relevant safety countermeasures at this high-injury corridor include wider edge lines, enhanced delineation at horizontal curves, safety edge installation, and roadside design improvements at curves. New 6" white epoxy edge lines will be striped onto Lewis Rd where they are currently missing. This will give drivers a better sense of where they are on the road and prevent them from straying too close to the edge of the travel lane. This will reduce the risk of run-off-road and head on crashes by keeping drivers appropriately positioned within their lane. Curve warning chevrons will be added to areas of sharp horizontal curvature and existing curve warning signs will be replaced. This will improve driver awareness of upcoming curves and reduce the risk of them crashing with other vehicles or fixed objects as they go around curves. Along the corridor, shoulder backup subbase will be added to provide drivers with additional recovery zones. To improve roadside safety at curves, existing guide railing that is in disrepair will be replaced and additional guide railing will be added at areas of extreme curvature. Lastly, there are some existing signage including a speed limit and curve warning sign that are covered up by vegetation. This vegetation shall be cut back and cleared to allow drivers to easily view the signage and have appropriate sight distance around curves.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Shoulder Backup Subbase	888.89	CY	$100.00	$89,000.00
Box Beam Guide Rail	2,705.00	LF	$50.00	$136,000.00
Vegetation Removal	1.00	LS	$10,000.00	$10,000.00
Curve Warning Chevrons	12.00	EA	$1,000.00	$12,000.00
White Edge Lines	25,500.00	LF	$2.00	$51,000.00
			Construction Total	$298,000.00
			Contingency and Inflation (20%)	$59,600.00
			Subtotal	$357,600.00
			Work Zone Traffic Control (10%)	$36,000.00
			Mobilization (4%)	$15,000.00
			Survey (2%)	$8,000.00
			Engineering Design (10%)	$36,000.00
			Construction Inspection & Administration(15%)	$54,000.00
			Grand Total	**$506,600.00**

Project Profiles:

Intersections

Intersection Broome County

PRIORITY 1

Vestal Parkway East & S Washington St.

City of Binghamton

Existing Conditions

The intersection of Vestal Parkway East (NY 434) and South Washington Street is located within the City of Binghamton. The surrounding area is mostly commercial with numerous businesses in close proximity to the intersection along with residential developments further south and east of the intersection.

A total of 66 crashes occurred during the study period between 2019 and 2023, with 14 of these crashes resulting in injury. The majority of crashes within the study period at this intersection were rear end crashes. Nine crashes during the study period for this corridor involved a pedestrian or bicyclist and four of those crashes resulted in serious injury. The northbound and southbound approaches to the intersection on South Washington Street maintains two travel lanes with one being a dedicated right turn lane. The eastbound approach on Vestal Parkway East maintains four travel lanes with one being a dedicated left turn lane. The westbound approach to the intersection on Vestal Parkway East maintains three travel lanes with one being a dedicated left turn lane.

The intersection features traffic control by span wire traffic signal including compliant pedestrian signals. Compliant curb ramps and type LS crosswalks allow for pedestrian movements between all corners of the intersection. The two pedestrian crossings across Vestal Parkway East have minimal median refuge islands. Sidewalk is present along both sides of South Washington Street and only along the southern side of the westbound approach on Vestal Parkway East. The intersection has street lighting at all approaches to the intersection.of all four approaches except for the south side of the westbound approach. The intersection follows the city speed limit of 30 mph for all approaches and traffic is controlled at the intersection with Brandywine Ave by a signal supported via span wire. Field observations showed that the pavement and striping are in fair condition.

Highway Characteristics

Owner	NYSDOT
Intersection Type	Urban 4-Leg Signalized
Traffic Control	Span Wire Signal
Speed Limit	30 mph
AATD (Vestal Pkwy E)	19,858 VPD
AATD (S Washington St)	2,202 VPD
Functional Class (Vestal Pkwy E)	(12) Principal Arterial – Other Freeway/Expressway
Functional Class (S Washington St)	(17) Major Collector
LOSS	4
HRN Score	4
Equity Rank	Top 20

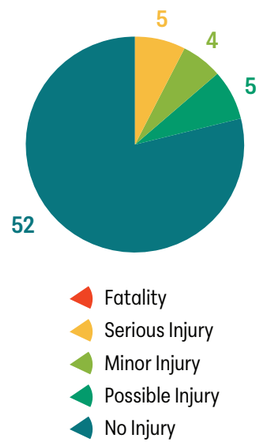
Photo 1: Northeast corner looking west

Crash Data

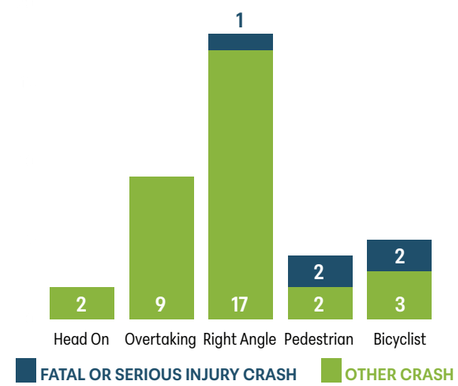
Contributing Factors

- Long crossing length (pedestrian exposure)
- Very high volume of traffic
- Faded crosswalk striping

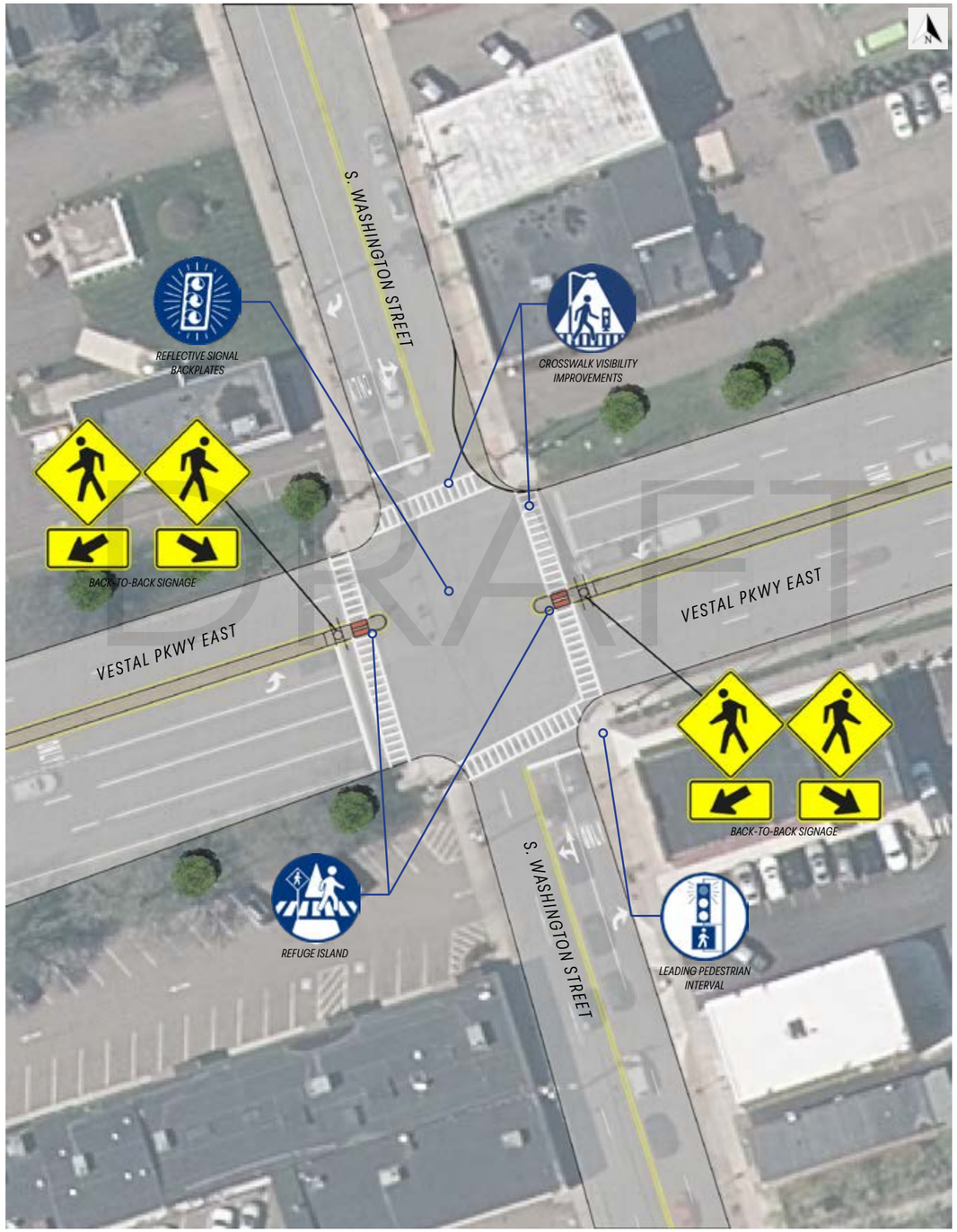
Crash Severity



Most Frequent Collision Type



Proposed Improvements



Proposed Countermeasures

- Backplates with Retroflective Borders
- Leading Pedestrian Intervals
- Crosswalk Visibility Enhancements
- Medians and Pedestrian Refuge Islands in Urban and Suburban Areas

Contributing factors at Vestal Parkway East and South Washington Street included long crossing length, a very high volume of traffic, and faded crosswalk striping. Potentially relevant safety countermeasures at this intersection include, reconstruction of median refuge islands, a curb bump out in the northeast corner of the intersection, high visibility crosswalks, adding a leading pedestrian interval (LPI), and adding traffic signal backplates. The reconstruction of the existing concrete median refuge islands for the Vestal Parkway East crossings would provide additional protection for pedestrians in the long crossings. A curb bump out will be installed in the northeast corner of the intersection to shorten the crossing distance for pedestrians. High visibility crosswalks would be installed for all crossings at the intersection to replace the existing faded striping. A leading pedestrian interval would be added to give pedestrians the opportunity to enter the crosswalk prior to vehicles being given a green indication to better establish their presence in the crosswalk. The installation of retroreflective backplates will provide increased visibility of the signal heads at the intersection and give drivers advanced warning.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Type LS Crosswalk	240.00	LF	$24.00	$5,760.00
Curb Ramp	3.00	EA	$10,000.00	$30,000.00
Granite Curb	180.00	LF	$80.00	$14,400.00
Concrete Sidewalk	20.00	CY	$1,500.00	$30,000.00
Traffic Signal Backplates	10.00	EA	$600.00	$6,000.00
Leading Pedestrian Interval (LPI)	1.00	LS	$3,000.00	$3,000.00
Pedestrian Warning Signage	2.00	EA	$1,250.00	$2,500.00
			Construction Total	$91,660.00
			Contingency and Inflation (20%)	$18,400.00
			Subtotal	$110,100.00
			Work Zone Traffic Control (10%)	$11,100.00
			Mobilization (4%)	$4,500.00
			Survey (2%)	$2,300.00
			Engineering Design (10%)	$11,100.00
			Construction Inspection (15%)	$16,600.00
			Grand Total (Rounded)	**$155,700.00**

Intersection Broome County

PRIORITY 2

Vestal Parkway East & Rano Blvd

Town of Vestal

Existing Conditions

The intersection of Vestal Parkway East (NY-434) and Rano Boulevard is located in the Town of Vestal, NY in the greater Binghamton area. The intersection is surrounded by several large commercial plazas, and the intersection is categorized as a 4-leg signalized intersection.

During the study period between 2019 and 2023 there were a total of 89 crashes that occurred with 18 of them resulting in injury. 3 of the crashes involved pedestrians and 1 of those crashes resulted in serious injury to a pedestrian. The eastbound approach on Vestal Pkwy East maintains two thru lanes and both right and left dedicated turn lanes. The westbound approach maintains the same configuration with two thru lanes and a left and right dedicated turn lane. The northbound approach on Rano Blvd consists of one travel lane and a dedicated left turn lane. The southbound approach on Sycamore St maintains a dedicated left turn lane and a travel lane with a 3-way arrow.

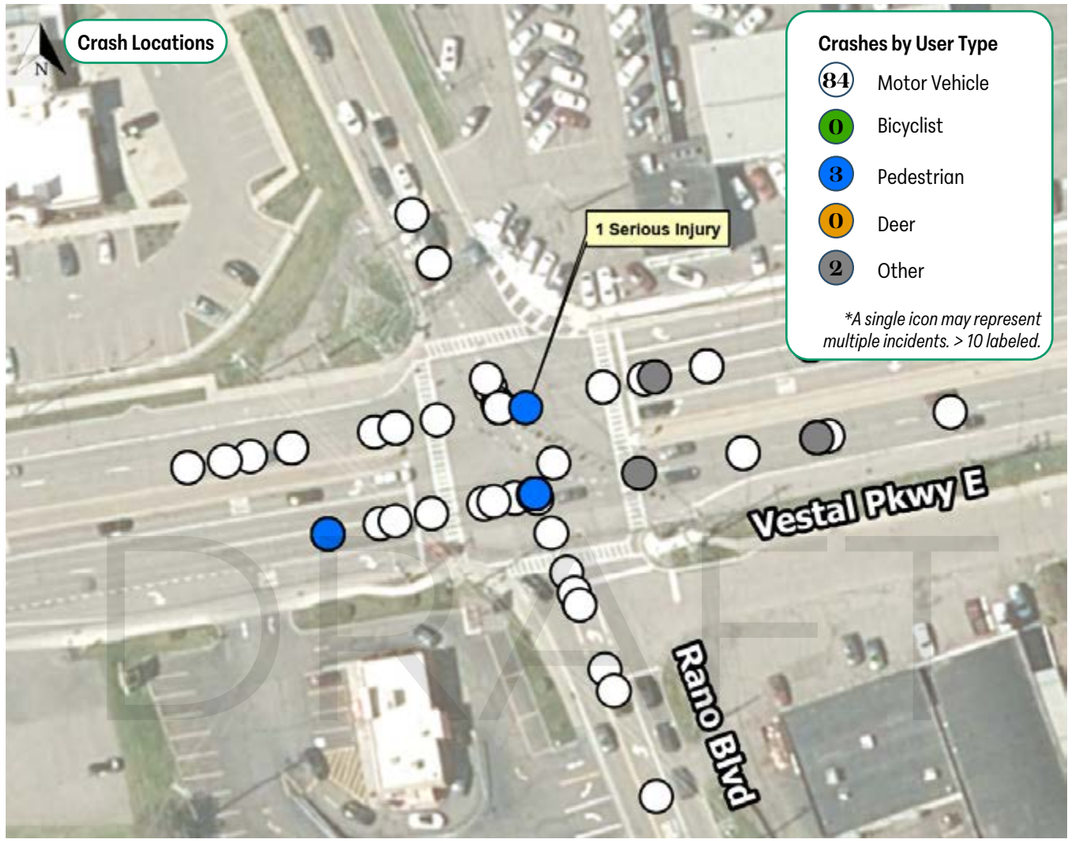
There are type LS crosswalks along each of the approaches which are accompanied by ADA compliant pedestrian signals. The crossing distances along Vestal Pkwy E measure approximately 100 feet in length. There is currently a leading pedestrian interval present for these crossings. There is existing concrete sidewalk present along each of the approaches. The curb ramps are in good condition and some of the detectable warning units are ADA compliant cast-iron while others are plastic warning units. Field observations showed the pavement at this intersection is in fair condition with some minor cracking. The striping is also in fair condition, with the crosswalks having faded in some locations.

Photo 1: Southeast corner of intersection looking northwest

Highway Characteristics

Owner (Vestal Pkwy E)	NYSDOT
Owner (Rano Blvd)	Town of Vestal
Intersection Type	Urban 4-leg signalized
Traffic Control	Span Wire Signal
Pedestrian Signals	All Approaches
Speed Limit	45 mph
AADT (Vestal Pkwy E)	23,940 VPD
AADT (Rano Blvd)	9,330 VPD
Functional Class (Vestal Pkwy E)	(14) Principal Arterial Other
Functional Class (Rano Blvd)	(17) Major Collector
LOSS	3
HRN Score	5
Equity Rank	Top 20

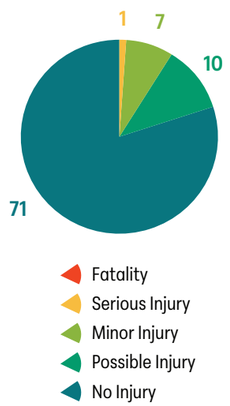
Crash Data



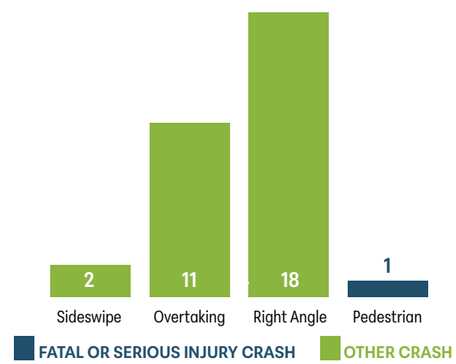
Contributing Factors

- Long pedestrian crossing length
- High traffic volume
- Faded crosswalk striping

Crash Severity



Most Frequent Collision Type



Proposed Improvements

Proposed Countermeasures

Crosswalk Visibility Enhancements

Medians and Pedestrian Refuge Islands in Urban and Suburban Areas

Contributing factors at Vestal Parkway East and Rano Boulevard included long pedestrian crossing length, high traffic volume, and faded crosswalk striping. Potentially relevant safety countermeasures at this intersection include, the construction of pedestrian refuge islands and crosswalk visibility enhancements. One of the contributing factors at this intersection is long crossing lengths leading to extended pedestrian exposure. To address this issue, the existing concrete center median can be extended out to create a pedestrian refuge island. The refuge island will provide vulnerable road users with extra protection and allow them to cross one direction of traffic at a time. To further protect individuals crossing the road the existing crosswalks will be reconstructed with a high visibility treatment. This new high visibility crosswalk will increase driver awareness of the crossing and allow them to recognize pedestrians crossing the street with adequate time to stop. These proposed countermeasures in combination with the existing leading pedestrian interval and retroreflective traffic signal backplates will increase the overall safety for all road user and reduce the likelihood of future serious injury crashes.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Type LS Crosswalk	320.00	LF	$24.00	$7,680.00
Concrete Refuge Island	20.00	CY	$1,500.00	$30,000.00
Granite Curb	200.00	LF	$80.00	$16,000.00
Curb Ramp and Warning Units	4.00	EA	$10,000.00	$40,000.00
Pedestrian Warning Signage	2.00	EA	$1,250.00	$2,500.00
			Construction Total	$96,180.00
			Contingency and Inflation (20%)	$19,300.00
			Subtotal	$115,500.00
			Work Zone Traffic Control (10%)	$11,600.00
			Mobilization (4%)	$4,700.00
			Survey (2%)	$2,400.00
			Engineering Design (10%)	$11,600.00
			Construction Inspection & Administration(15%)	$17,400.00
			Grand Total	**$163,200.00**

Intersection Broome County

PRIORITY 3

Court St. & Brandywine Ave.

City of Binghamton

Existing Conditions

The location of Court Street (Route 11) from Chapman St to Brandywine Avenue (NY-7) is located within the City of Binghamton, east of the central business district. A total of 144 crashes occurred during the study period between 2019 and 2023, with 31 of these crashes resulting in injuries.

There were in total 11 crashes involving bicyclists or pedestrians, resulting in 5 serious injury crashes with vulnerable road users. The crashes are largely concentrated at the intersection with Brandywine Ave. Looking specifically at that intersection, the southbound approach maintains two travel lanes with a dedicated left turn lane. The northbound approach is the Tompkins St bridge which crosses the Susquehanna River and consists of two travel lanes including a dedicated left turn lane. On Court St, the eastbound approach maintains four travel lanes and a bike lane with dedicated right and left turn lanes at the intersection. The westbound approach maintains two travel lanes with a dedicated left turn lane and a bike lane that continues through the intersection.

The intersection has type LS crosswalks present on the eastbound, southbound, and westbound approaches. These crosswalks are accompanied by ADA compliant curb ramps and pedestrian signals. There is currently no crosswalk on Tompkins St. There are concrete sidewalks on both sides of all four approaches except for the south side of the westbound approach. The intersection follows the city speed limit of 30 mph for all approaches and traffic is controlled at the intersection with Brandywine Ave by a signal supported via span wire. Field observations showed that the pavement and striping are in fair condition.

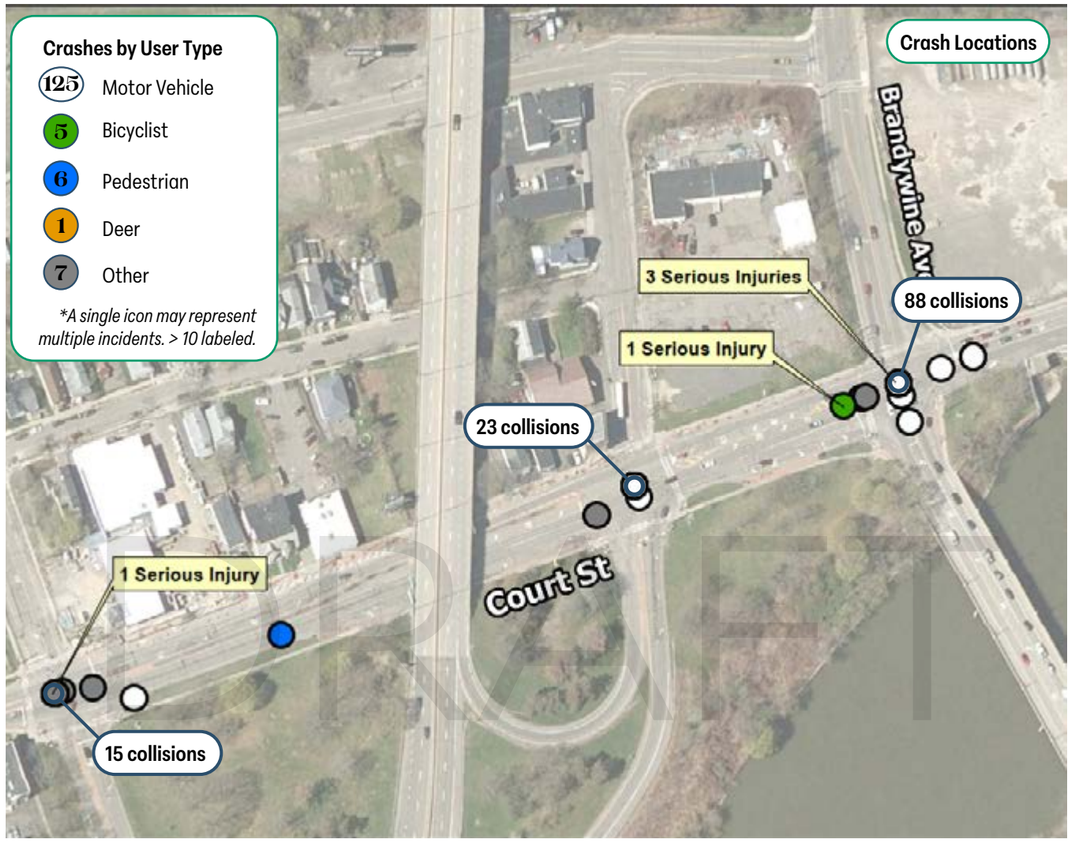
Highway Characteristics

Owner	NYSDOT
Intersection Type	Urban 4-Leg Signalized
Traffic Control	Signalized Span Wire
Pedestrian Signals	All Crossings
Speed Limit	30 mph
AATD (Major)	18,227 VPD
AATD (Minor)	9,276 VPD
Functional Class (Major)	(16) Minor Arterial
Functional Class (Minor)	(16) Minor Arterial
LOSS	3
HRN Score	5
Equity Rank	Top 20 Lowest

Photo 1: Northeast corner looking west

Photo 2: Northwest corner looking south

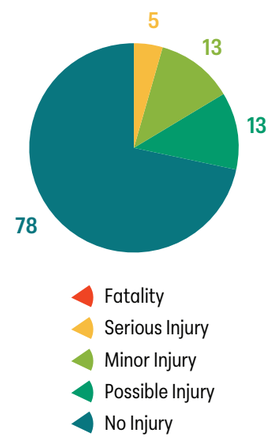
Crash Data



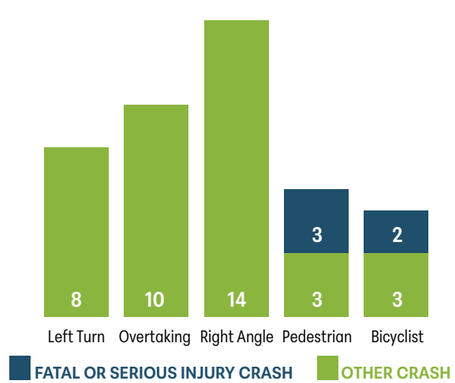
Contributing Factors

- Long crossing length (pedestrian exposure)
- Inconsistent bike lane infrastructure
- Immediate travel lane drop (eastbound)

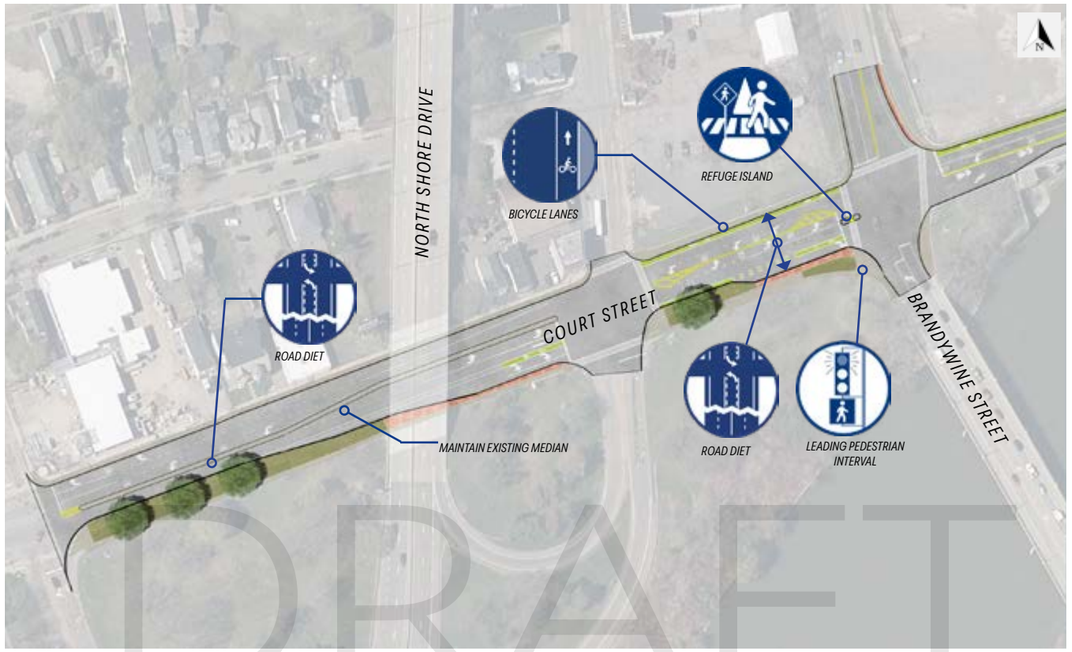
Crash Severity

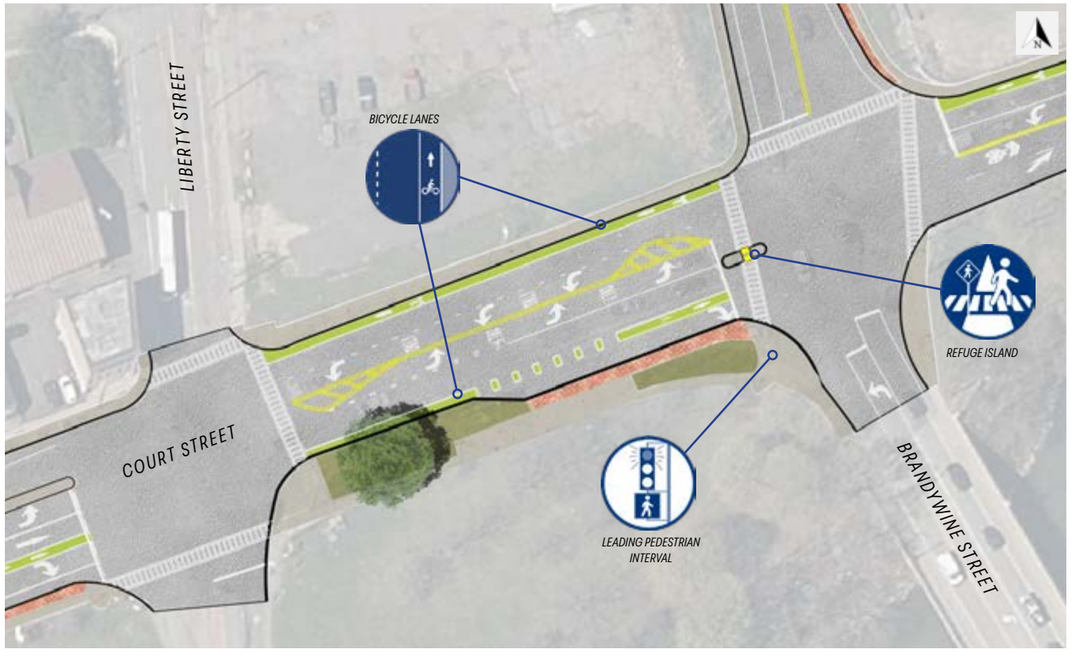


Most Frequent Collision Type



Proposed Improvements





Proposed Countermeasures

Contributing factors at Court Street and Brandywine Avenue included long crossing length, inconsistent bike lane infrastructure, and an immediate travel lane drop (eastbound). Potentially relevant safety countermeasures at this intersection include, a road diet, consistent bike lane treatments, a median refuge island, and a leading pedestrian interval. A road diet is feasible beginning to the west at the intersection of Chapman St and continuing until Brandywine Ave. The new road configuration on Court St would consist of one through lane each way and dedicated right and left turn lanes on Court St heading eastbound. The road diet would maintain bike lanes on both sides of Court St which can become sharrows to the east of the intersection. The road diet would also include curb bump outs along the eastbound side of the corridor. These bump outs will shorten crossing distance and improve the flow of traffic in a safe manner. A concrete pedestrian refuge island would be installed on Court St along the entire length of the road diet. These refuge islands will be accompanied by ADA compliant curb ramps and additional pedestrian signals at Court St and Brandywine. The road diet and pedestrian refuge island will shorten the crossing distances, making conditions safer for pedestrians. A leading pedestrian interval will be installed at the intersection of Court St and Brandywine Ave giving pedestrians a designated window to enter the crossing and give them the opportunity to establish their presence in the intersection before any vehicular traffic receives a green indication. These countermeasures together enhance the overall safety for all road users at this intersection.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Asphalt Sidewalk/Vegetation Strip	375.00	TON	$400.00	$150,000.00
Concrete Pedestrian Refuge Island	5.00	CY	$1,500.00	$7,500.00
Cast Iron Detectable Warning Signs	2.00	EA	$10,000.00	$20,000.00
Granite Curb	1,200.00	LF	$80.00	$96,000.00
Striping White Line	1,250.00	LF	$2.00	$2,500.00
Striping Yellow Line	250.00	LF	$2.00	$500.00
Striping White Symbols	12.00	EA	$300.00	$3,600.00
Leading Pedestrian Interval (LPI)	1.00	LS	$3,000.00	$3,000.00
			Construction Total	$283,100.00
			Contingency and Inflation (20%)	$57,000.00
			Subtotal	$340,100.00
			Work Zone Traffic Control (10%)	$35,000.00
			Mobilization (4%)	$14,000.00
			Survey (2%)	$7,000.00
			Engineering Design (10%)	$35,000.00
			Construction Inspection (15%)	$52,000.00
			Grand Total (Rounded)	**$483,100.00**

Intersection Broome County

PRIORITY 4

Harry L Dr. & Reynolds Rd.

Village of Johnson City

Existing Conditions

The intersection of Harry L Dr and Reynolds Rd is located in the Village of Johnson City adjacent to significant commercial developments (e.g. Wegman's and the Dick's House of Sport). This is a 4-legged signalized intersection that facilitates traffic flows between the cities of Endwell, Endicott and Johnson City, resulting in high traffic volumes.

Between 2019 and 2023 there were 104 total crashes with 14 of them resulting in injury. There were two crashes involving bicyclists and 2 crashes with a pedestrian. None of the crashes during the study period resulted in fatalities or serious injuries. The eastbound approach maintains 5 travel lanes with 2 through lanes, 1 dedicated left turn lane and two dedicated right turn lanes. The right turn lanes lead to the exits of 86 east and west to Binghamton and Corning respectively. The westbound approach maintains 4 travel lanes with two through lanes and two dedicated right turn lanes. The northbound approach also maintains the same configurations with 4 travel lanes and 2 dedicated left turn lanes. The southbound approach consists of 3 travel lanes with 1 left turn lane, and two through lanes.

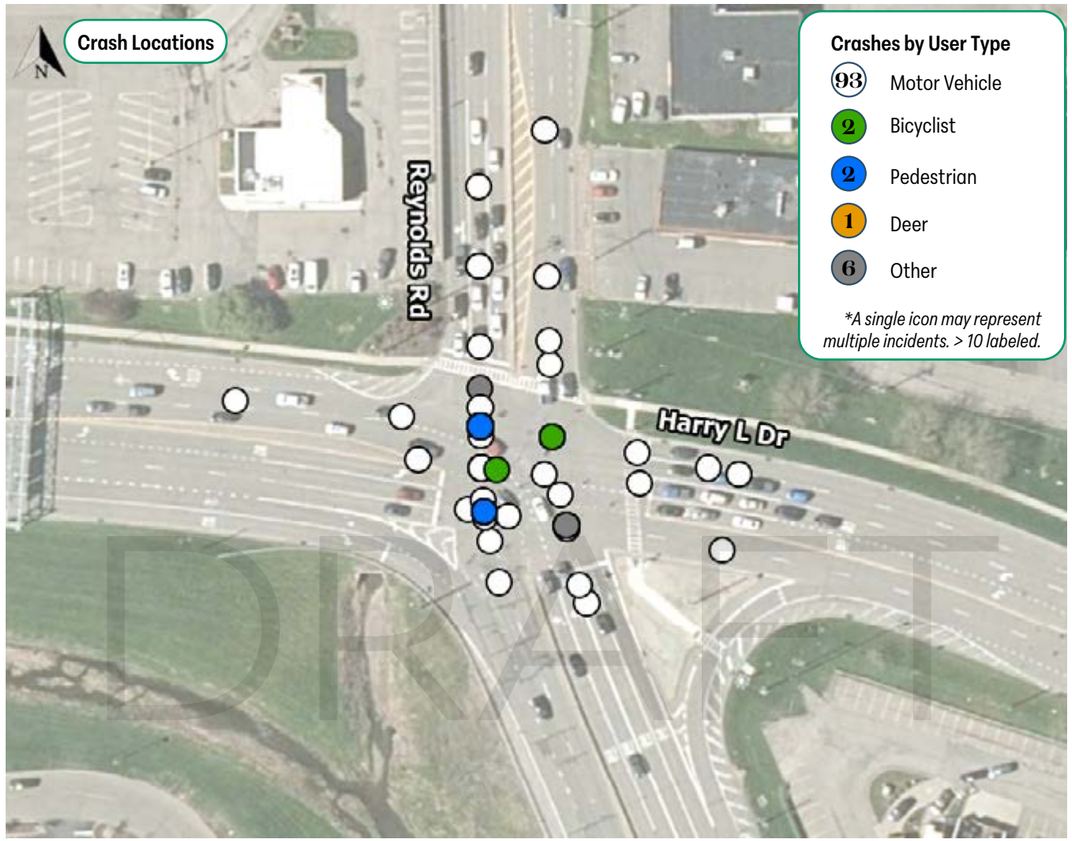
The NYSDOT has planned a project which will add a dedicated left turn lane along the southbound approach. There is centerline guide rail on the southbound approach. There is concrete sidewalk along both the eastbound and westbound approaches. The sidewalk is in fair condition, and the curb ramps are in poor condition, not in ADA compliance. There is a crosswalk across Reynolds Rd at the north end of the intersection connecting the sidewalks, and across Harry L Dr on the east end of the intersection connected to the pedestrian refuge island. There are push buttons at the crossings of Harry L Dr and Reynolds Rd. There are audible pedestrian signals at east of the crossing locations with the exception of the slip ramp in the southeast corner.

Highway Characteristics

Owner (Harry L Dr)	Village of Johnson City
Owner (Reynolds Rd)	NYSDOT (Route 991C)
Intersection Type	4-leg signalized
Traffic Control	Span Wire
Pedestrian Signals	NE and SE
Speed Limit	30 mph
AADT (Harry L Dr)	14,015 VPD
AADT (Reynolds Rd)	17,331 VPD
Functional Class (Harry L Dr)	(16) Minor Arterial
Functional Class (Reynolds Rd)	(16) Minor Arterial
LOSS	4
HRN Score	2
Equity Rank	Top 20

Photo 1: Concrete island in southeast corner looking northwest

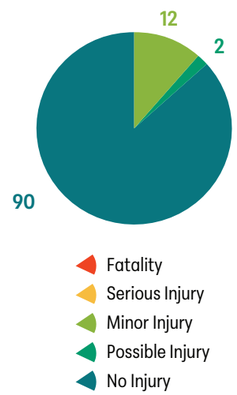
Crash Data



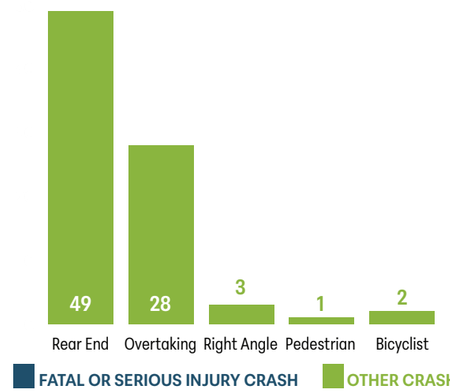
Contributing Factors

- Long pedestrian crossing lengths
- Deteriorated roadway infrastructure
- Poorly signed lane configurations

Crash Severity



Most Frequent Collision Type



Proposed Countermeasures

Contributing factors at Harry L Drive and Reynolds Road included long pedestrian crossing lengths, deteriorated roadway infrastructure, and poorly signed lane configurations. Potentially relevant safety countermeasures at this intersection include, sidewalk improvements, crosswalk enhancements, rectangular rapid flashing beacons (RRFB), concrete refuge islands, a median barrier, and signage improvements. The sidewalks at this intersection are in fair condition, but the curb ramps and associated warning units have deteriorated significantly and are in need of replacement to meet ADA standards. These new curb ramps and warning units will ensure safe crossing for visually impaired users. New crosswalks will be painted at the existing locations over the existing faded LS crosswalks. This will allow crosswalks to be properly visible to all the vehicles moving through this busy intersection. New edge lines, lane lines, and dotted turn lines will be striped on where the existing striping has faded with the deteriorated pavement. The concrete refuge island in the southeast corner is nearing the end of its service life, has cracking, deformation and vegetation growth. This island needs repairs to function as a safe refuge for pedestrians crossing Harry L Dr. A solar powered RRFB will be installed on the existing pedestrian sign present at the slip ramp crossing in the southeast corner.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Concrete Median Refuge Island	54.63	CY	$1,500.00	$82,000.00
Granite Curb	455.00	LF	$80.00	$37,000.00
Cast Iron Dedectable Warning Units	6.00	EA	$10,000.00	$60,000.00
R10-11 No Turn on Red Sign	5.00	SF	$45.00	$300.00
New Exit Signs	16.50	SF	$45.00	$800.00
White Epoxy Striping	5,640.00	LF	$2.00	$12,000.00
Yellow Epoxy Striping	440.00	LF	$2.00	$900.00
Rectangular Rapid Flashing Beacon (RRFB)	1.00	EA	$15,000.00	$15,000.00
			Construction Total	$208,000.00
			Contingency and Inflation (20%)	$41,600.00
			Subtotal	$250,000.00
			Work Zone Traffic Control (10%)	$25,000.00
			Mobilization (4%)	$10,000.00
			Survey (2%)	$5,000.00
			Engineering Design (10%)	$25,000.00
			Construction Inspection & Administration(15%)	$37,500.00
			Grand Total	**$353,000.00**

Page intentionally left blank

Intersection Broome County

PRIORITY 5

Court St. & State St.

City of Binghamton

Existing Conditions

The intersection of Court Street (US 11) and State Street (NY 434) is located within the City of Binghamton. The surrounding area is densely populated and commercial with numerous businesses in close proximity to the intersection along with the Broome County Courthouse. A total of 51 crashes occurred during the study period between 2019 and 2023, with 13 of these crashes resulting in injury. Bicyclists or pedestrians were involved in 10 of the crashes within the study period.

The eastbound approach to the intersection on Court Street maintains two travel lanes with one being a dedicated left turn lane. Prior to the intersection, the eastbound bicycle lane transitions to a shared use lane while the westbound bicycle lane begins. The westbound approach to the intersection maintains three travel lanes with one being a dedicated left turn lane and one being a dedicated right turn lane. The northbound approach to the intersection on State Street maintains two travel lanes with one being a dedicated right turn lane. The southbound approach to the intersection maintains one travel lane.

The intersection features traffic control by mast arm traffic signal including compliant pedestrian signals at all approaches. No turn on red signage is present at all legs of the intersection. Curb ramps, sidewalks, and type LS crosswalks are present at all approaches to the intersection, but all of the curb ramps are not ADA compliant due to the presence of plastic detectable warning units in lieu of cast iron detectable warning units. The intersection is well lit due the presence of street lighting on both side of the road at all approaches.

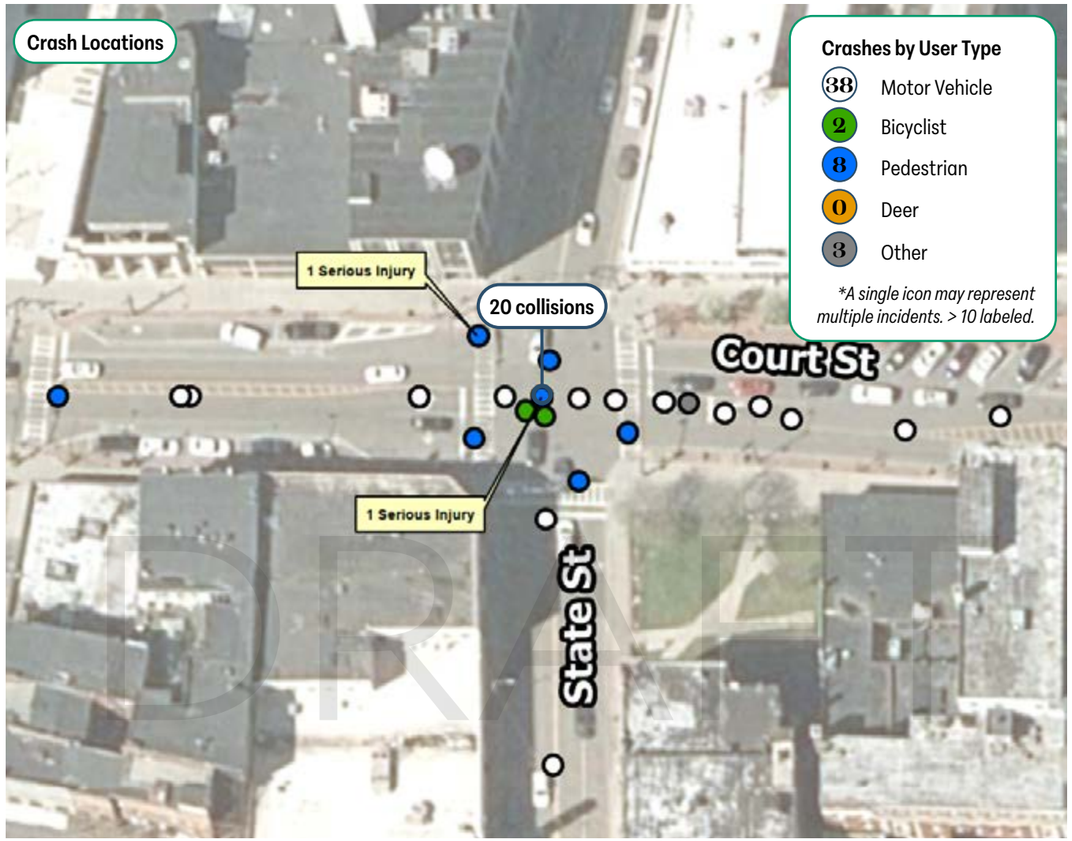
Highway Characteristics

Owner	NYSDOT
Intersection Type	Urban 4-Leg signalized
Traffic Control	Mast Arm Signal
Speed Limit	30 mph
AADT (Court St)	14,179 VPD
AADT (State St)	9,148 VPD
Functional Class (Court St)	(16) Minor Arterial
Functional Class (State St)	(16) Minor Arterial
LOSS	3
HRN Score	6
Equity Rank	Top 20

Photo 1: Court Street crosswalk looking west

Photo 2: Northeast corner looking southeast

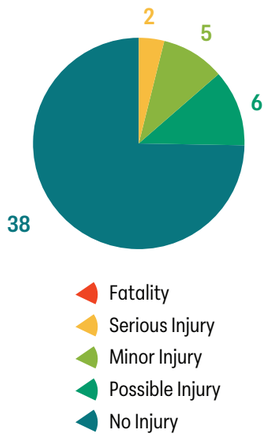
Crash Data



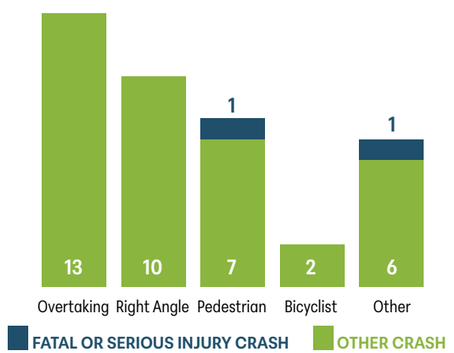
Contributing Factors

- Faded striping and poor sight distance from stopping locations
- Lack of bicyclist accommodations
- Tight turning radii with on street parking
- Very high volume of traffic

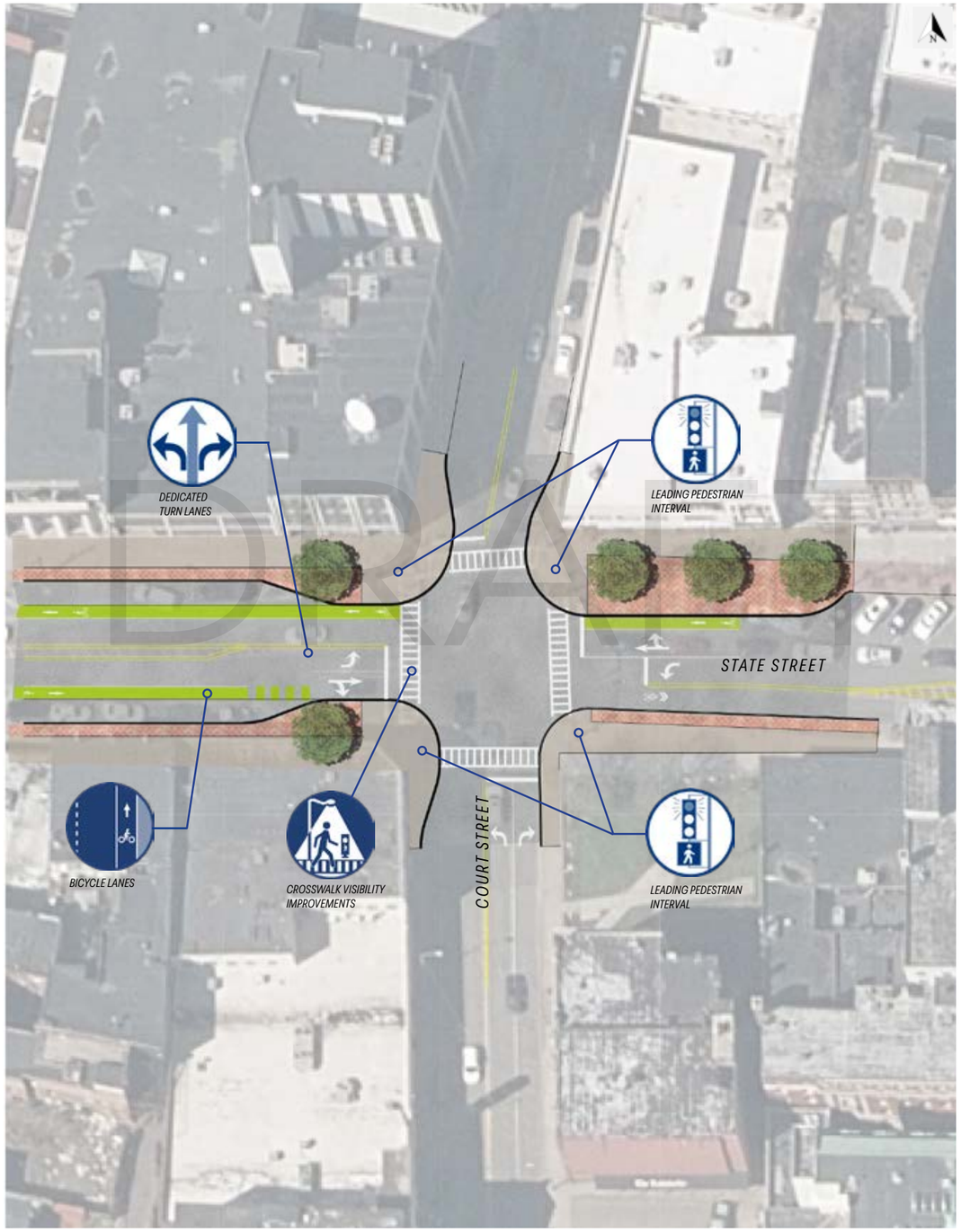
Crash Severity



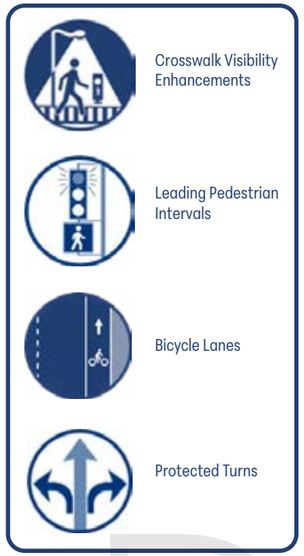
Most Frequent Collision Type



Proposed Improvements



Proposed Countermeasures



Contributing factors at Court and State Streets included faded striping and poor sight distance from stopping locations, lack of bicyclist accommodations, tight turning radii with on street parking, and a very high volume of traffic. Potentially relevant safety countermeasures at this intersection include, high visibility crosswalks, sharrow striping, curb bump outs at multiple corners of the intersection, adding a leading pedestrian interval (LPI), and green arrow protected left turns for both approaches on Court Street. High visibility type LS crosswalks will be installed at all approaches to the intersection with supporting signage. These new crosswalks will enhance the visibility of crossing locations and allow drivers to see pedestrians crossing the street with adequate time to stop. Sharrow striping will be installed at the eastbound approach after the bicycle lane ends and on the westbound approach in both directions. This will notify road users of the need to share the road with bikes and give bicyclists the ability to navigate through this intersection and access the adjacent bike lanes. Curb bump outs will be installed in the northeast, northwest, and southwest corners of the intersection. Bumping out the curb will also involve construction need sidewalk and updating curb ramps at these corners. The newly bumped out curb locations will provide shorter crossing distances for pedestrians and reduce their exposure to motor vehicle traffic. There have been a total of 7 crashes involving pedestrians at this intersection despite the presence of crosswalks and pedestrian signals. Because of this, a leading pedestrian interval is necessary to give pedestrians the opportunity to enter the crosswalk prior to vehicles being given a green indication to better establish their presence in the crosswalk. Court St and State St in downtown Binghamton is a high traffic location frequented by locals and students, many of whom travel on foot or via bicycle, making this an extremely high priority location. These countermeasures implemented together will increase the safety for all road users and reduce the risk of serious injury crashes in the future.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Type LS Crosswalk	160.00	LF	$24.00	$3,900.00
White Striping	880.00	LF	$2.00	$1,800.00
Yellow Striping	300.00	LF	$2.00	$600.00
Striping Symbols	9.00	EA	$300.00	$2,700.00
Curb Ramp	8.00	EA	$10,000.00	$80,000.00
Granite Curb	440.00	LF	$80.00	$36,000.00
Concrete Sidewalk	65.00	CY	$1,500.00	$98,000.00
Leading Pedestrian Interval (LPI)	1.00	LS	$3,000.00	$3,000.00
Green Arrow Protected Left Turns	2.00	EA	$3,000.00	$6,000.00
			Construction Total	$232,000.00
			Contingency & Inflation (20%)	$46,400.00
			Subtotal	$278,400.00
			Work Zone Traffic Control (10%)	$27,900.00
			Mobilization (4%)	$11,200.00
			Survey (2%)	$5,600.00
			Construction & Inspection (15%)	$41,800.00
			Engineering Design (10%)	$27,900.00
			Grand Total	**$392,800.00**

Intersection Broome County

PRIORITY 6

S 363 & Frederick St.

City of Binghamton

Existing Conditions

The intersection of NY 363 and Frederick Street is located within the City of Binghamton, south of the I-86/I-81 interchange. The surrounding area is both residential and commercial with multiple businesses in close proximity to the intersection along with residential developments.

A total of 45 crashes occurred during the study period between 2019 and 2023, with 11 of these crashes resulting in injury. The majority of crashes within the study period at this intersection were rear end crashes. In 2024 there were two fatal crashes at this intersection, one being a rear end crash and the other involved a bicyclist at night. There was an additional fatal crash at this intersection that preceded the study period involving a pedestrian. The northbound approach to the intersection on NY 363 maintains four travel lanes with one being a right turn slip ramp which is uncontrolled and separated by a concrete curb island.

There is an uncontrolled pedestrian crossing between the concrete curb island and the southeast corner of the intersection which has pedestrian warning signage. The southbound approach maintains four travel lanes with one being a dedicated right turn lane and the right-most thru lane transitions into an exit only lane for NY 7 West after the intersection.

The eastbound approach to the intersection on Frederick Street maintains two travel lanes with one being a dedicated left turn lane and the other being a left/right turn lane. The westbound approach maintains one travel lane which is a right turn only slip ramp onto NY 363 which is separated by a concrete curb island. The intersection features traffic control by span wire traffic signals including compliant pedestrian signals for the crossing of NY 363. Compliant curb ramps, sidewalks, and type LS crosswalks allow for pedestrian movements between the southwest and southeast corners of the intersection.

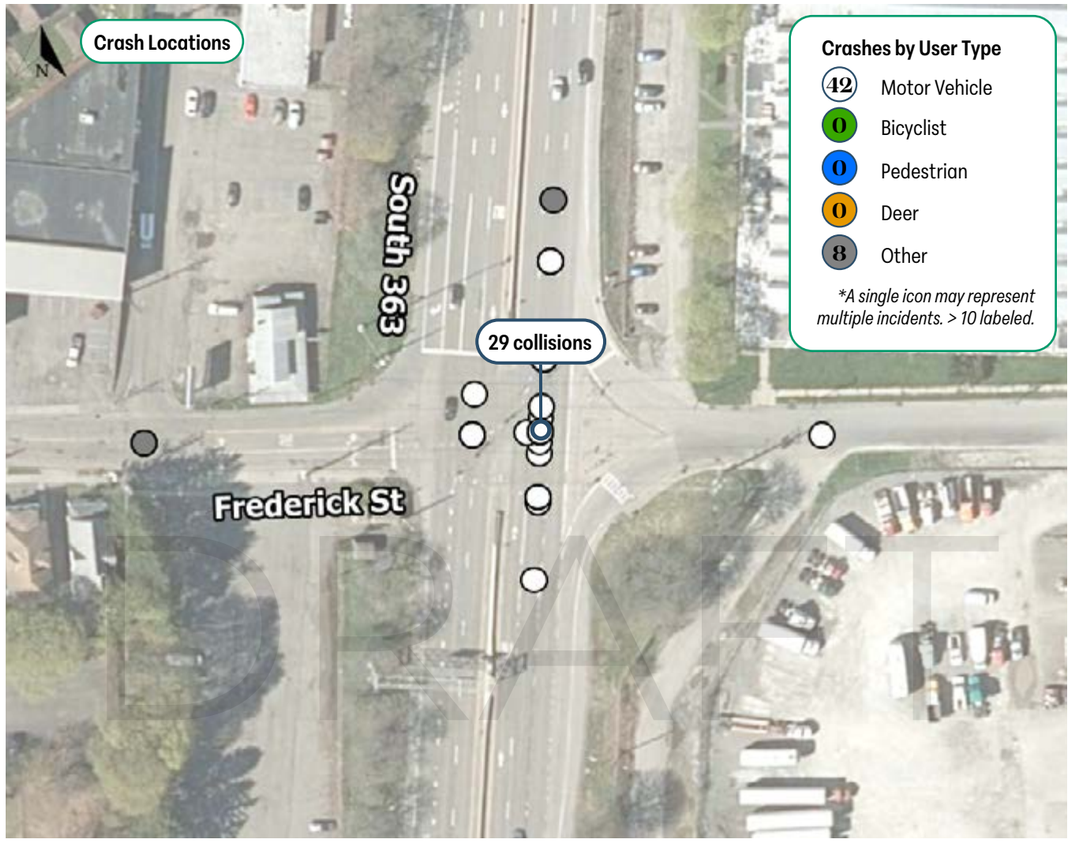
The south side of Frederick Street on both approaches maintains sidewalk. The westbound approach to Frederick Street has a midblock crossing between the intersection with Walter Avenue and the NY 363 intersection which features non-compliant curb ramps, no crosswalk, and no warning signage. The intersection has street lighting on the eastbound and westbound approaches on Frederick Street, but no lighting is present on NY 363.

Highway Characteristics

Owner	NYSDOT
Intersection Type	Urban 4-Leg signalized
Traffic Control	Span Wire Signal, Stop Control
Speed Limit	30 mph
AADT (S 363)	34,339 VPD
AADT (Frederick)	2,719 VPD
Functional Class (S 363)	(12) Principal Arterial – Other Freeway/Expressway
Functional Class (Frederick)	(17) Major Collector
LOSS	N/A
HRN Score	3
Equity Rank	Top 20

Photo 1: South 363 northbound Looking northeast

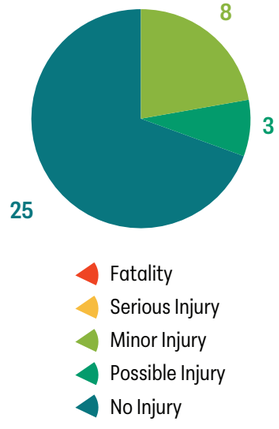
Crash Data



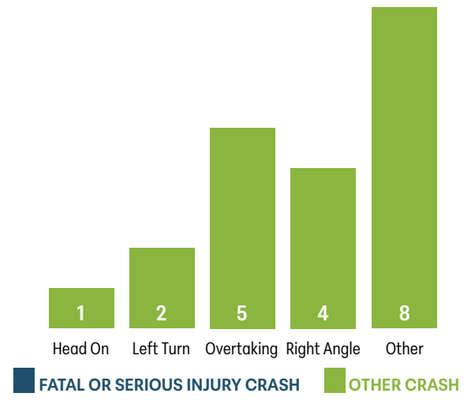
Contributing Factors

- Long crossing length (pedestrian exposure)
- Uncontrolled pedestrian crossing
- Lack of bicyclist accommodations
- Very high volume of traffic

Crash Severity

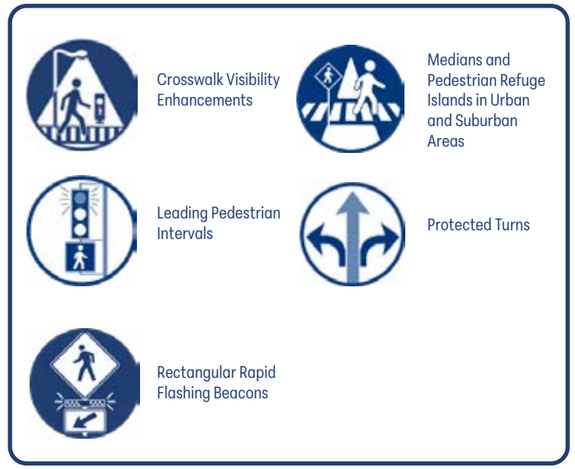


Most Frequent Collision Type



Proposed Improvements

Proposed Countermeasures



Contributing factors at NY 363 and Frederick Street included long crossing length, uncontrolled pedestrian crossing, lack of bicyclist accommodations, and a very high volume of traffic. Potentially relevant safety countermeasures at this intersection include, installation of a median refuge island, high visibility crosswalks, improved lighting, adding a leading pedestrian interval (LPI), installing a rectangular rapid flashing beacon RRFB for the uncontrolled crossing, and warning signage for mid-block crossing on Frederick St. The installation of a concrete median refuge island for the NY 363 crossing would provide additional protection for pedestrians. High visibility crosswalks would be installed for the northbound NY 363 crossing and the northbound slip ramp uncontrolled crossing. Lighting improvements will be installed at the intersection to provide additional visibility. A leading pedestrian interval would be added to give pedestrians the opportunity to enter the crosswalk prior to vehicles being given a green indication to better establish their presence in the crosswalk. A RRFB will be installed at the northbound slip ramp uncontrolled crossing to provide increased visibility and safety for crosswalk users. Pedestrian crossing warning signage will be added to provide additional visibility to the mid-block crossing on Frederick Street.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Type LS Crosswalk	170.00	LF	$24.00	$4,080.00
Curb Ramp	2.00	EA	$10,000.00	$20,000.00
Granite Curb	85.00	LF	$80.00	$6,800.00
Concrete Sidewalk	15.00	CY	$1,500.00	$22,500.00
Lighting Improvements	1.00	CY	$25,000.00	$25,000.00
Rectangular Rapid Flashing Beacon (RRFB)	2.00	EA	$15,000.00	$30,000.00
Leading Pedestrian Interval (LPI)	1.00	LS	$3,000.00	$3,000.00
Pedestrian Warning Signage	8.00	EA	$1,250.00	$10,000.00
			Construction Total	$121,380.00
Contingency and Inflation (20%)				$24,300.00
Subtotal				$145,700.00
Work Zone Traffic Control (10%)				$14,600.00
Mobilization (4%)				$5,900.00
Survey (2%)				$3,000.00
Engineering Design (10%)				$14,600.00
Construction Inspection & Administration(15%)				$21,900.00
Grand Total				**$205,700.00**

Intersection Broome County

PRIORITY 7

Country Club Rd. & Hooper Rd. (CR 33)

Town of Union

Existing Conditions

The intersection of Country Club Road and Hooper Road (CR 33) is located within the Town of Union. The surrounding area is both residential and commercial with multiple businesses in close proximity to the intersection. A total of 18 crashes occurred during the study period between 2019 and 2023, with 3 of these crashes resulting in injury. One of the crashes during the study period resulted in a pedestrian fatality and was attributable to limited driver visibility. Half of the crashes at this intersection during the study period were rear end crashes.

The eastbound and westbound approaches to the intersection on Country Club Road maintains three travel lanes with one being a dedicated left turn lane and one being a dedicated right turn lane. The southbound approach to the intersection on Hooper Road also maintains three travel lanes with one being a dedicated left turn lane and one being a dedicated right turn lane. The northbound approach to the intersection maintains two travel lanes with one being a dedicated left turn lane.

The intersection features traffic control by span wire traffic signal including compliant pedestrian signals at all approaches. Curb ramps and type S crosswalks are present at all approaches to the intersection. All of the curb ramps have plastic detectable warning units in lieu of NYSDOT standard cast iron detectable warning units. All approaches to the intersection feature sidewalks with the exception of the north side of Country Club Road on the westbound approach. The intersection features street lighting in the northeast corner of the intersection and on the northbound approach.

Highway Characteristics

Owner	Town of Union / Broome County
Intersection Type	Urban 4-leg signalized
Traffic Control	Span Wire Signal
Speed Limit	30 mph
AADT (Hooper Road)	15,443 VPD
AADT (Country Club Road)	4,136 VPD
Functional Class (Hooper Road)	(16) Minor Arterial
Functional Class (Country Club Road)	(17) Major Collector
LOSS	3
HRN Score	4
Equity Rank	N/A
Adjacent Lane Use	Urban

Photo 1: Southwest corner of Hooper Rd and Country Club Rd

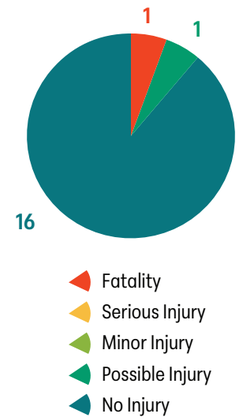
Photo 2: Northeast corner looking west on Hooper Rd

Crash Data

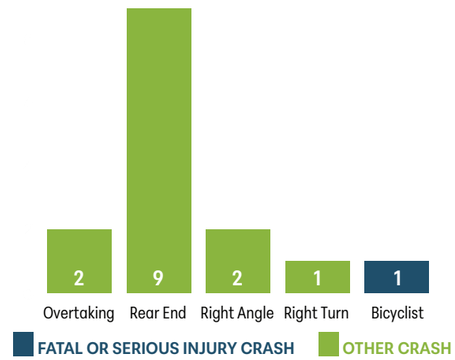
Contributing Factors

- Faded striping and poor intersection sight distance
- Lack of high visibility crosswalks
- Lack of bicyclist accommodations
- Long crossing length (pedestrian exposure)

Crash Severity



Most Frequent Collision Type



Proposed Countermeasures

Contributing factors at Country Club Road and Hooper Road included faded striping and poor intersection sight distance, lack of high visibility crosswalks and bicyclist accommodations, and long crossing length. Potentially relevant safety countermeasures at this intersection include, installation of high visibility crosswalks, addition of traffic signal backplates, adding a leading pedestrian interval (LPI), and sight distance improvements. High visibility crosswalks would be installed at all approaches to the intersection to increase pedestrian safety and driver awareness, especially during darker times of day. The existing traffic signals boxes at this intersection are outdated and in need of traffic signal backplates. The installation of retroreflective backplates will provide increased visibility of the signal heads at the intersection and give drivers increased time to stop from all approaches. This intersection has existing crosswalks at all approaches, accompanied by audible pedestrian signals. However, there was still a pedestrian fatality during the study period. This warrants the need for implementation of a leading pedestrian interval. The LPI will give pedestrians the opportunity to enter the crosswalk prior to vehicles being given a green indication to better establish their presence in the crosswalk. The crash report for the pedestrian fatality at this intersection cited obstruction of view as one of the contributing factors to the crash. To prevent future instances of drivers having an obstructed view, tree trimming will be conducted in the northeast and southeast corners of the intersection, which will increase the sight distance for multiple approaches.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Type LS Crosswalk	240.00	LF	$24.00	$5,760.00
Traffic Signal Backplates	8.00	EA	$600.00	$4,800.00
Tree Trimming	1.00	LS	$5,000.00	$5,000.00
Leading Pedestrian Interval (LPI)	1.00	LS	$3,000.00	$3,000.00
			Construction Total	$18,560.00
			Contingency and Inflation (20%)	$3,800.00
			Subtotal	$22,400.00
			Work Zone Traffic Control (10%)	$2,300.00
			Mobilization (4%)	$900.00
			Survey (2%)	$500.00
			Engineering Design (10%)	$2,300.00
			Construction Inspection & Administration(15%)	$3,400.00
			Grand Total	**$31,800.00**

Page intentionally left blank

Intersection Broome County

PRIORITY 8

N. Nanticoke Ave. & Jennings St.

Village of Endicott

Existing Conditions

The intersection of N Nanticoke Ave (NY-26) and Jennings St is located in the Village of Endicott, New York. It is categorized as a 3-leg urban two-way stop-controlled intersection. Between 2019 and 2023 there were a total of 9 crashes at this intersection, with 5 of them resulting in injury. There were 3 total serious injury crashes, 1 to a bicyclist and 1 to a pedestrian.

The eastbound approach maintains one travel lane with left turns restricted from 4:00pm to 6:00pm on weekdays. The northbound approach maintains one travel lane and a dedicated left turn lane.

The south bound approach maintains one travel lane. Solid yellow hashed striping is present on the southbound approach dividing the travel lanes. To the east there is a parking lot that serves multiple businesses. There is one LS crosswalk present to the north crossing N Nanticoke Ave. The crosswalk is accompanied by a pedestrian sign on either side but does not feature any pedestrian signals. There is concrete sidewalk along all approaches which show signs of disrepair.

Field observations showed the remnants of curb ramps at sidewalk endpoints, but they have fallen out of ADA compliance. The striping at this intersection is in good condition, however the pavement has severe cracking.

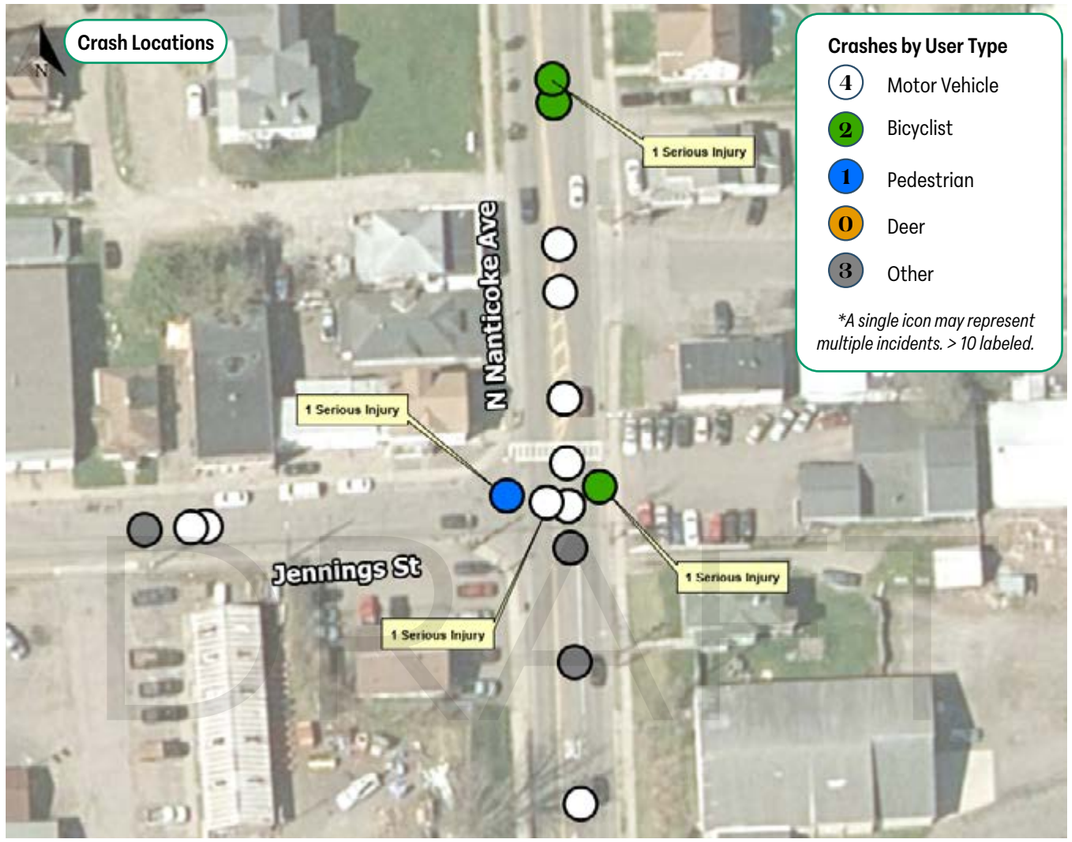
Highway Characteristics

Owner (N Nanticoke)	NYSDOT
Owner (Jennings)	Village of Endicott
Intersection Type	Urban 3-Leg Stop Controlled
Traffic Control	Two-way Stop
Speed Limit	30 mph
AADT (N Nanticoke)	11,470 VPD
AADT (Jennings)	Not Available
Functional Class (N Nanticoke)	(16) Minor Arterial
Functional Class (Jennings)	(N/A) Local Street
LOSS	4
HRN Score	3
Equity Rank	None

Photo 1: Southwest corner of intersection looking north

Photo 2: Northwest corner of intersection looking south

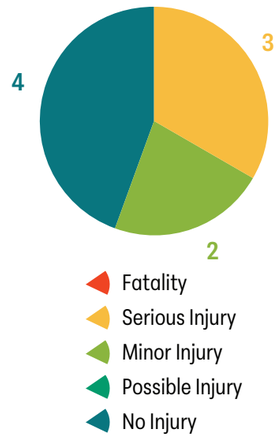
Crash Data



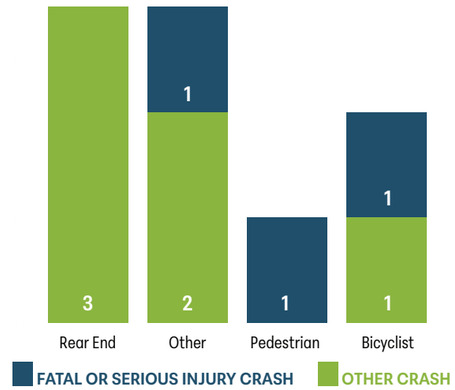
Contributing Factors

- Absence of traffic signal causing dangerous turns
- Long pedestrian crossing with the signals
- Sharp radii and poor sight distance

Crash Severity



Most Frequent Collision Type



Proposed Improvements

Proposed Countermeasures

Contributing factors at N Nanticoke Avenue and Jennings Street included absence of traffic signal causing dangerous turns, long pedestrian crossing with the signals, and sharp radii and poor sight distance. Potentially relevant safety countermeasures at this intersection include, the installation of a 3-color traffic signal with reflective backplates, a pedestrian refuge island, new pedestrian signals and LS type crosswalks, rectangular rapid flashing beacons at the crossing, and reconstruction of curb radii for safer turns. The intersection is currently stop controlled, however traffic could benefit from a traffic signal to prevent accidents from cars turning off the side streets or pedestrians crossing the street. The three-color signals will be linked to pedestrian signals that are placed on either side of the crosswalk. A flashing beacon will be installed on the existing pedestrian signs that will be activated when the pedestrian button is pressed. A concrete pedestrian refuge island will be installed on Nanticoke Ave where the current yellow epoxy hashing is located. This will shorten the crossing length and further improve pedestrian safety at the intersection. The crosswalk on N Nanticoke Ave will be restriped, and an LS type crosswalk will be added on Jennings St. Lastly, the current curb lines will be adjusted slightly to improve the safety of turning movements, this will also allow proper sight distance between cars from Jennings St and oncoming traffic. With this adjusted curb line, the detectable warning units will be replaced at the three existing locations

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Pedestrian Refuge Island	1.38	CY	$1,500.00	$2,100.00
Subbase Course	50.00	CY	$100.00	$5,000.00
Asphalt Pavement	15.00	TON	$150.00	$3,000.00
Concrete Sidewalk	3.33	CY	$1,500.00	$5,000.00
Curb Ramp & Warning Units	6.00	EA	$10,000.00	$60,000.00
Granite Curb	42.00	LF	$80.00	$3,400.00
LS Type Crosswalk	66.00	LF	$24.00	$1,600.00
Striping Yellow Line	134.00	LF	$2.00	$300.00
Rectangular Rapid Flashing Beacon (RRFB)	2.00	EA	$15,000.00	$30,000.00
			Construction Total	$110,400.00
			Contingency and Inflation (20%)	$22,100.00
			Subtotal	$132,500.00
			Work Zone Traffic Control (10%)	$14,000.00
			Mobilization (4%)	$6,000.00
			Survey (2%)	$3,000.00
			Engineering Design (10%)	$14,000.00
			Construction Inspection & Administration(15%)	$20,000.00
			Grand Total	**$190,000.00**

Intersection Broome County

PRIORITY 9

Leroy St., Chestnut St., & Chapin St.

City of Binghamton

Existing Conditions

The intersection of Leroy Street and Chestnut Street is located within the City of Binghamton. The surrounding area is residential with multiple businesses in close proximity to the intersection. At the intersection of Leroy Street and Chestnut Street, a total of 14 crashes occurred during the study period between 2019 and 2023, with 6 of these crashes resulting in injury. The majority of all crashes within the study period at this intersection were rear end crashes with 2 pedestrian involved crashes. All approaches to the intersection maintains one travel lane in each direction with parking on both sides of the road with the exception of no parking on the west side of Chestnut Street. The intersection features traffic control by span wire traffic signal, but lacks pedestrian signals. Curb ramps, sidewalks, and type LS crosswalks are present at all approaches to the intersection, but all of the curb ramps have plastic detectable warning units in lieu of NYSDOT standard cast iron detectable warning units. The intersection is well lit due the presence of street lighting in the northeast and southeast corners of the intersection.

The intersection of Leroy Street and Chapin Street is located three blocks to the east of the previously discussed intersection. A total of 16 crashes occurred during the study period between 2019 and 2023, with 2 of these crashes resulting in injury. The majority of all crashes within the study period at this intersection were right angle crashes. The intersection features stop control at the northbound and southbound approaches on Chapin Street while the eastbound and westbound approaches on Leroy Street are uncontrolled. All approaches to the intersection maintains one travel lane in each direction with parking on both sides of the road with the exception of the southbound approach which is one-way only. Curb ramps and sidewalks are present at all approaches to the intersection, but all of the curb ramps are not ADA compliant due to the lack of detectable warning units. There are no existing crosswalks present at the intersection while there is an existing stop bar at the southbound approach for the one-way approach. The intersection is well lit due the presence of street lighting in the southwest corner of the intersection.

Highway Characteristics

	Leroy & Chestnut St.	Leroy & Chapin St.
Owner	City of Binghamton	City of Binghamton
Intersection Type	Urban 4-leg signalized	Urban 4-leg stop control
Traffic Control	Span Wire Signal	Stop Control
Speed Limit	30 mph	30 mph
AADT	4,029 VPD	4,029 VPD
Functional Class (Leroy)	(17) Major Collector	(17) Major Collector
Functional Class (Chestnut/Chapin)	(19) Local	(19) Local
LOSS	3	4
HRN Score	1	1
Equity Rank	Top 40	Top 40

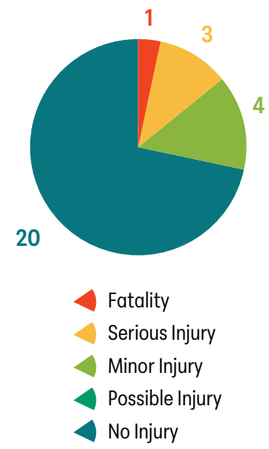
Photo 1: Northwest corner of Leroy St and Chestnut St

Crash Data

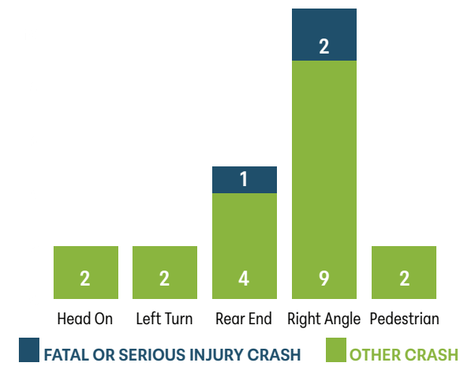
Contributing Factors

- Lack of pedestrian signals – Leroy/ Chestnut
- Lack of crosswalks – Leroy/Chapin
- Poor sight distance from stopping locations at two uncontrolled approaches – Leroy/Chapin
- Tight turning radii with on street parking

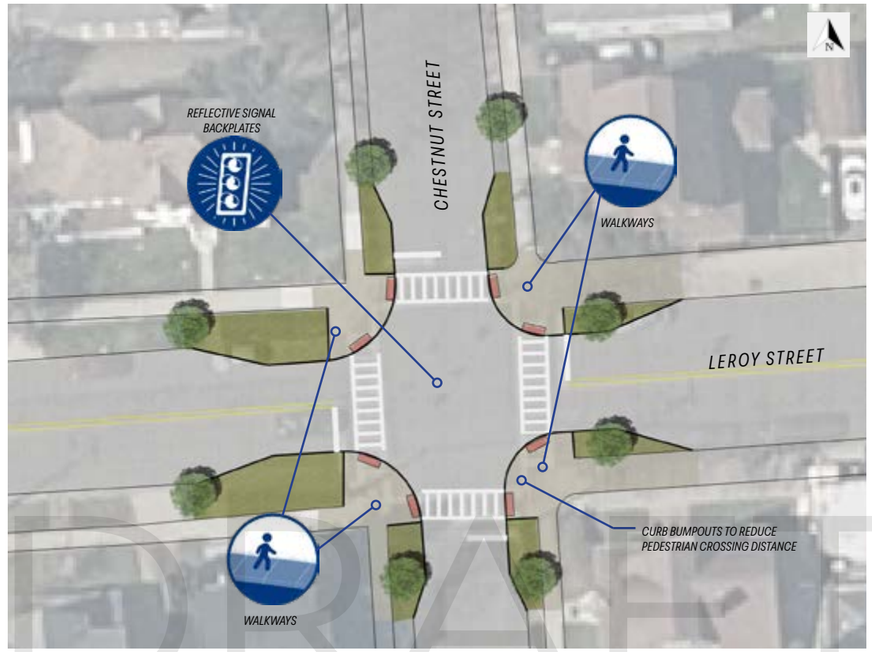
Crash Severity

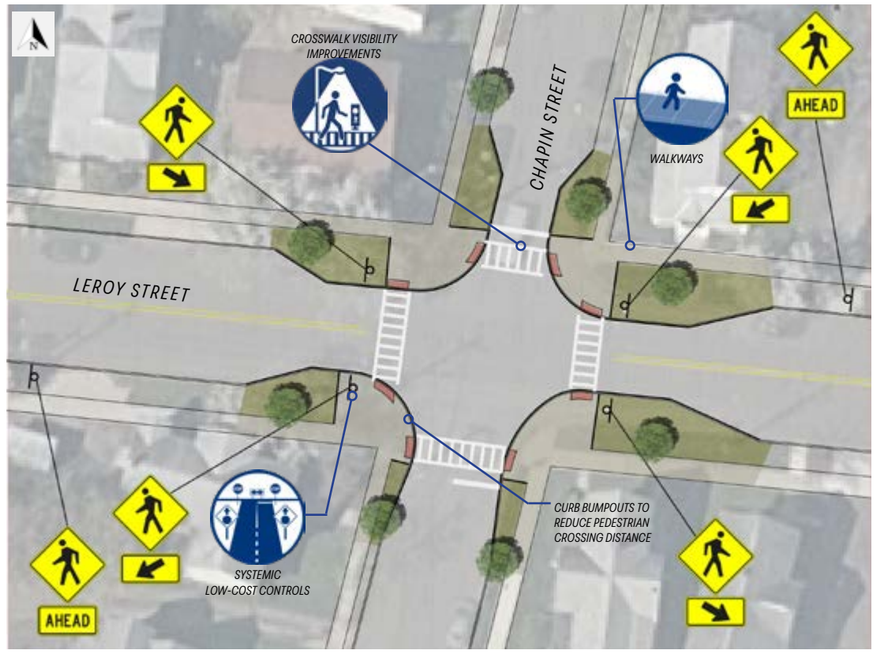


Most Frequent Collision Type



Proposed Improvements





Proposed Countermeasures

Contributing factors at Leroy, Chestnut, & Chapin Streets included lack of crosswalks, pedestrian signals, poor sight distance from stopping locations at the Leroy and Chapin approaches, and tight turning radii. Potentially relevant safety countermeasures at these intersections include, traffic signal enhancements, pedestrian infrastructure improvements, installation of high visibility crosswalks, curb bump outs at all corners of the intersection, and enhanced warning signage. The existing traffic signals at Chestnut St are outdated and are in need of traffic signal backplates with retroreflective borders. These backplates will provide increased visibility of the signal heads at the intersection of Leroy Street and Chestnut Street. At Leroy and Chestnut St there are currently no pedestrian signals at any of the crossing locations. It is necessary to install pedestrian signals to provide increased protection for pedestrians crossing at this intersection where there were two crashes involving pedestrians during the study period. Currently at Chapin St, there are no crosswalks present and the type LS crosswalks at Chestnut St have faded. To address this, high visibility crosswalks will be installed at all approaches to both intersections. These will increase driver awareness of pedestrian crossings and reduce the risk of crashes involving vulnerable road users. To further accommodate pedestrians, curb bump outs will be installed in all corners of both intersections to shorten the crossing distance for crosswalk users. Pedestrian crossing warning signage will be installed at the intersection of Leroy Street and Chapin Street to provide increased visibility at the uncontrolled crossings.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Type LS Crosswalk	210.00	LF	$24.00	$5,040.00
White Striping	450.00	LF	$2.00	$900.00
Yellow Striping	400.00	LF	$2.00	$800.00
Traffic Signal Backplates	8.00	EA	$600.00	$4,800.00
Curb Ramp	16.00	EA	$10,000.00	$160,000.00
Granite Curb	840.00	LF	$80.00	$67,200.00
Concrete Sidewalk	55.00	CY	$1,500.00	$82,500.00
Pedestrian Signals and Poles	8.00	EA	$6,000.00	$48,000.00
Pedestrian Warning Signage	6.00	EA	$1,250.00	$7,500.00
			Construction Total	$376,740.00
			Contingency and Inflation (20%)	$75,400.00
			Subtotal	$452,200.00
			Work Zone Traffic Control (10%)	$45,300.00
			Mobilization (4%)	$18,100.00
			Survey (2%)	$9,100.00
			Engineering Design (10%)	$45,300.00
			Construction Inspection & Administration(15%)	$67,900.00
			Grand Total	**$637,900.00**

Intersection Broome County

PRIORITY 10

Harry L Dr. & Lester Ave. & Zoa Ave.

Village of Johnson City

Existing Conditions

The intersection of Harry L Dr, Lester Ave, and Zoa Ave is located in the Village of Johnson City east of the Wegmans and Dick's locations. It operates as a 4-legged signalized intersection and features a significant geometric skew. Between 2019 and 2023 there were a total of 13 crashes with 7 of them resulting in some level of injury. There were 3 crashes which led to serious injuries and one crash that involved a pedestrian.

The eastbound approach maintains one travel lane and a bike lane that does not continue through the intersection. The westbound approach maintains one travel lane that expands to add a dedicated left turn lane at the intersection. The northbound approach is Lester Ave which is composed of one travel lane.

The southbound approach is Zoa Avenue which also supports one travel lane. There are sight-distance issues present from all approaches due to existing structures beyond the highway right-of-way that cannot be relocated. All approaches have concrete sidewalks on each side which are in very poor condition showing signs of settlement and cracking. Each approach has a Type S standard crosswalk without ladder bars. The intersection features audible pedestrian signals at each of the crossings. Curb ramps are present at all four quadrants but only the southeast and southwest corners have detectable warning units. These units have fallen out of ADA compliance due to deterioration. East of the intersection on Harry L Dr facilitates traffic from I-86 and NY-69. The speed limit reduces to 30 mph prior to the westbound intersection approach, but vehicles have limited space to transition lanes or observe pedestrians potentially crossing the road before reaching the intersection.

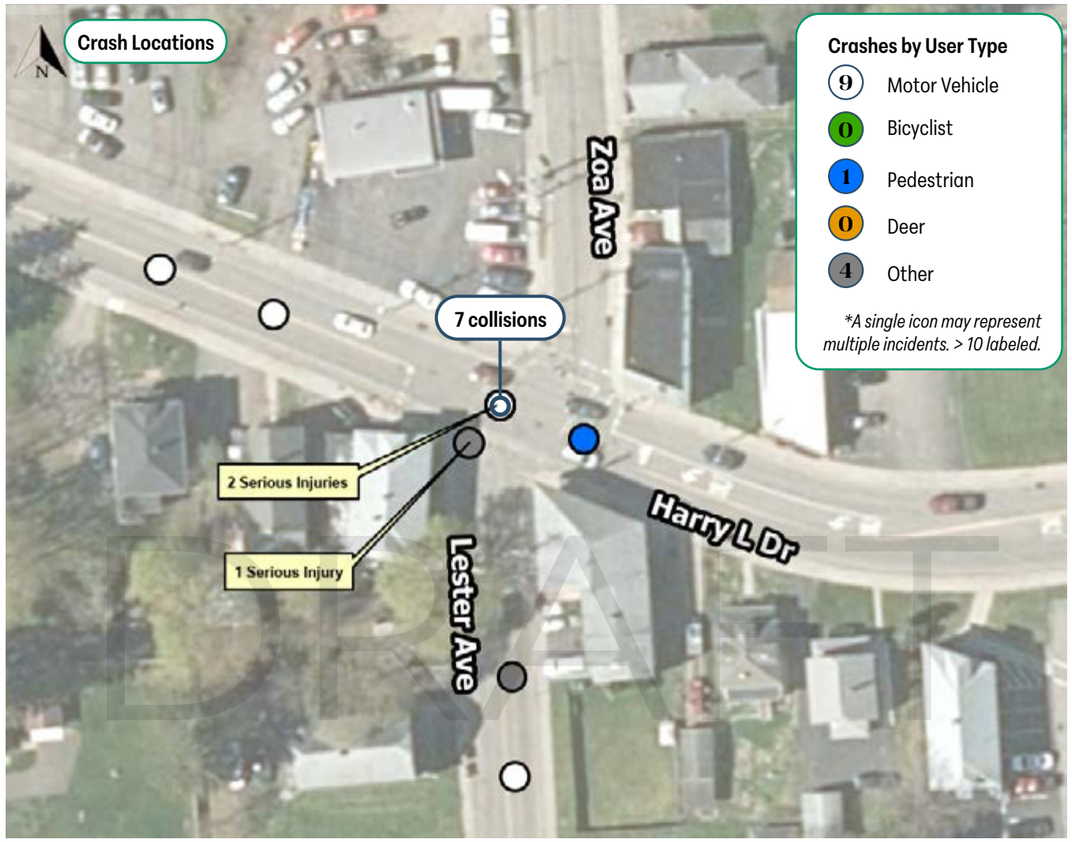
Highway Characteristics

Owner	Village of Johnson City
Intersection Type	Urban 4-Leg signalized
Traffic Control	Span Wire
Speed Limit	30 mph
AADT (Harry L Dr.)	8,000 VPD
AADT (Lester Ave.)	3,593 VPD
Functional Class (Harry L)	(16) Minor Arterial
Functional Class (Lester)	(17) Minor Arterial
LOSS	3
HRN Score	2
Equity Rank	Top 40

Photo 1: Northwest corner looking southeast

Photo 2: Harry L Dr eastbound looking West

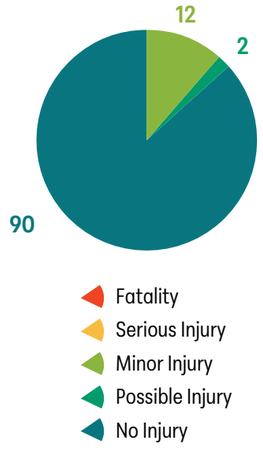
Crash Data



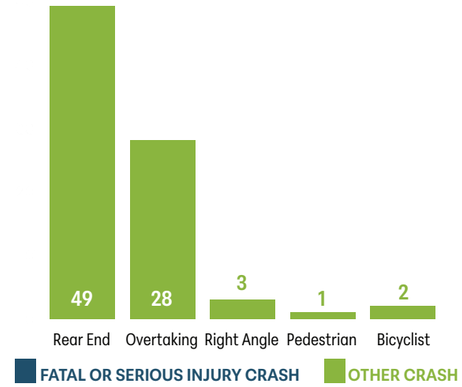
Contributing Factors

- Deteriorated or cracked sidewalks and curb ramps
- Poor intersection sight distance
- Cracked pavement and faded striping

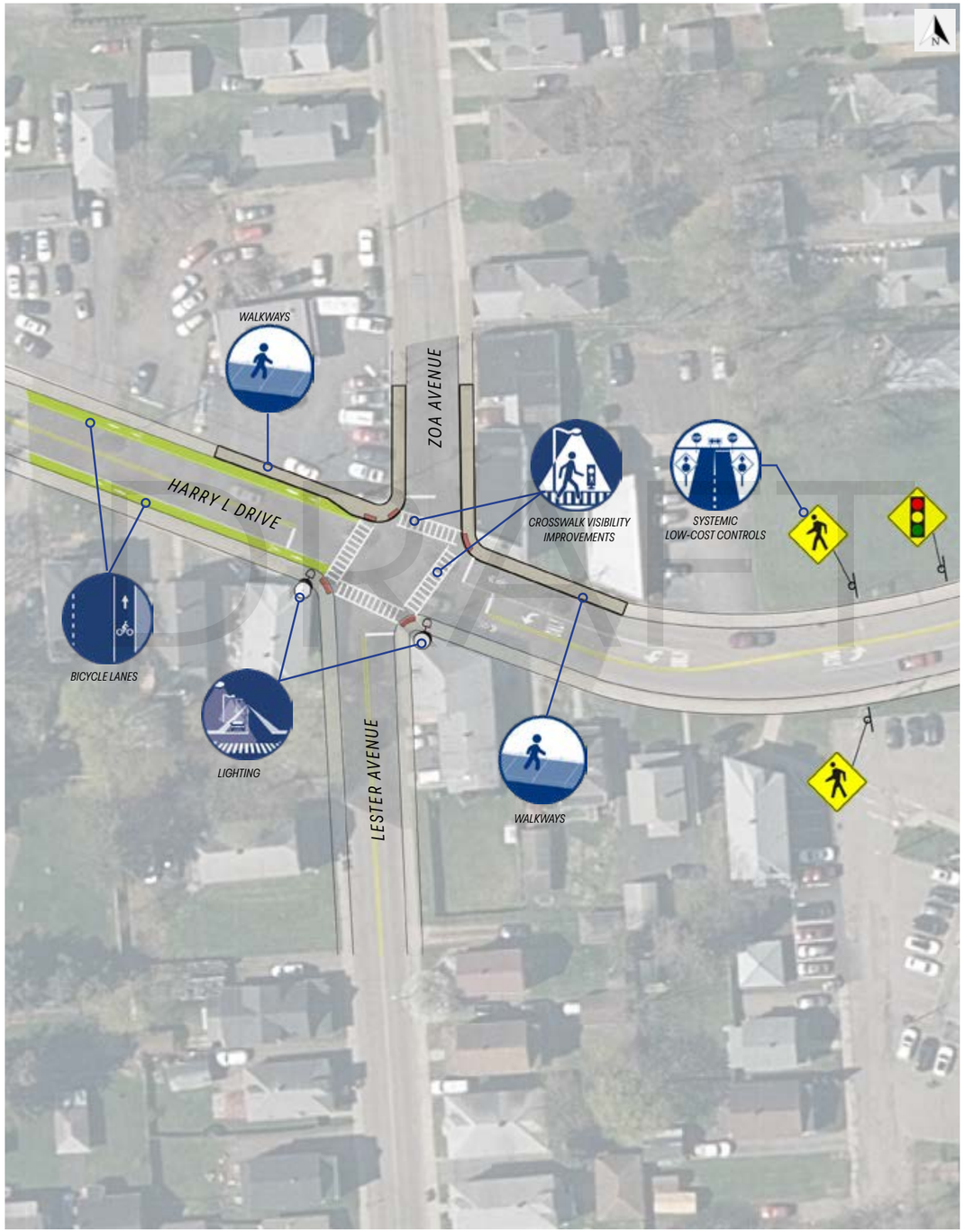
Crash Severity



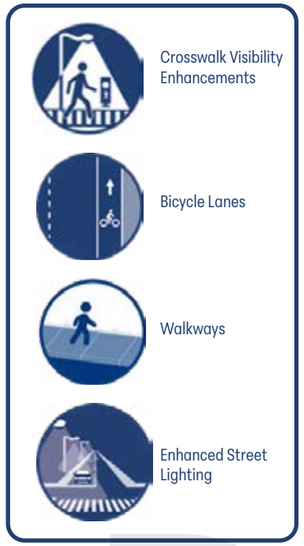
Most Frequent Collision Type



Proposed Improvements



Proposed Countermeasures



Contributing factors at Harry L Drive, Lester Avenue, and Zoa Avenue included deteriorated or cracked sidewalks and curb ramps, poor intersection sight distance, cracked pavement and faded striping. Potentially relevant safety countermeasures at this intersection include, reconstructing walkways with curb bump outs and ADA compliant curb ramps, new type LS crosswalks, lighting improvements, rectangular rapid flashing beacons, signage improvements and traffic signal upgrades. Curb bump outs will allow for safer pedestrian crossing by shortening crossing distances and slowing down traffic. ADA-compliant curb ramps will be installed at all approaches so the visually impaired can safely navigate the intersection. By restriping the crosswalks to combine the standard layout with ladder lines, the crosswalks will be more visible to drivers and further improve the safety of pedestrian crossings. Additional overhead lighting will be installed on the signal pole in the southeast corner to increase visibility of the entire intersection. Neon green advanced pedestrian warning signs are recommended to be installed east of the intersection which will flash when a user activates the pedestrian signal. Vegetation removal is required to unveil the speed limit sign east of the intersection. Lastly, the traffic signals at the intersection are in need of replacement with upgraded signal heads including yellow retroreflective backplates. Also recommended is the replacement of the existing pedestrian signals with updated signals that include countdown timers and audible push buttons.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Concrete Sidewalk	30.24	CY	$1,500.00	$46,000.00
Curb Ramp and Warning Units	4.00	EA	$10,000.00	$40,000.00
Granite Curb	50.00	LF	$80.00	$4,000.00
LS Type Crosswalk	150.00	LF	$24.00	$3,600.00
Striping White Line	250.00	LF	$2.00	$500.00
Striping White Symbols	10.00	EA	$300.00	$3,000.00
Traffic Signal Replacement	8.00	EA	$5,000.00	$40,000.00
Pedestrian Warning Signage	2.00	EA	$1,250.00	$3,000.00
Overhead LED Street Lighting	2.00	EA	$10,000.00	$20,000.00
			Construction Total	$160,100.00
			Contingency and Inflation (20%)	$33,000.00
			Subtotal	$193,100.00
			Work Zone Traffic Control (10%)	$20,000.00
			Engineering Design (10%)	$20,000.00
			Mobilization (4%)	$8,000.00
			Survey (2%)	$4,000
			Construction Inspection & Administration(15%)	$29,000.00
			Grand Total	**$274,100.00**

Intersection Broome County

PRIORITY 11

Vestal Parkway East & African Rd.

Town of Vestal

Existing Conditions

The intersection of Vestal Parkway East (NY-434) and African Rd is located in the Town of Vestal, NY in the greater Binghamton area. This location is adjacent to the Binghamton Walmart and Shoppes at Vestal Plazas.

Vestal Pkwy E and African Rd is categorized as a 4-leg signalized intersection. During the study period between 2019 and 2023 there were a total of 49 crashes with 9 of them resulting in some form of injury. There was one serious injury crash and one collision involving a bicycle. The eastbound approach on Vestal Pkwy E maintains two thru lanes and a dedicated left turn lane. The westbound approach mirrors the same lane configuration with two thru lanes and a dedicated left turn lane. The northbound approach on African Road consists of a thru lanes and dedicated left turn lane. Both of these lanes have sharrow pavement markings present. The southbound approach on N African Rd has a thru lane with a left turn lane set back.

Field observations showed the pavement is in poor condition with significant cracking. There are existing type LS crosswalks that have faded with the deteriorated pavement. The longest crossing along Vestal Pkwy E is over 110-ft in length. Audible pedestrian signals with push buttons are present at each of the crossings. There are curb ramps in good condition with ADA compliant cast iron detectable warning units at three of the four corners except to the southwest where there is a concrete island with no curb ramp.

Highway Characteristics

Owner (Vestal Pkwy E)	NYSDOT
Owner (African Rd)	Town of Vestal
Intersection Type	Urban 4-leg signalized
Traffic Control	Span Wire Signal
Pedestrian Signals	All Approaches
Speed Limit	45 mph
AADT (Vestal Pkwy E)	25,619 VPD
AADT (African Rd)	2,405 VPD
Functional Class (Vestal Pkwy E)	(14) Principal Arterial Other
Functional Class (African Rd)	(17) Major Collector
LOSS	5
HRN Score	3
Equity Rank	Normal Equity

Photo 1: Northwest corner of intersection looking southeast

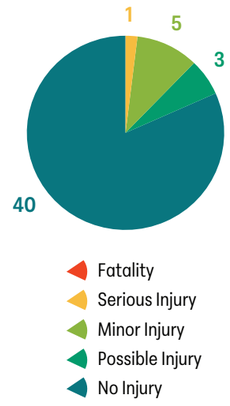
Photo 2: Southeast corner of intersection looking northwest

Crash Data

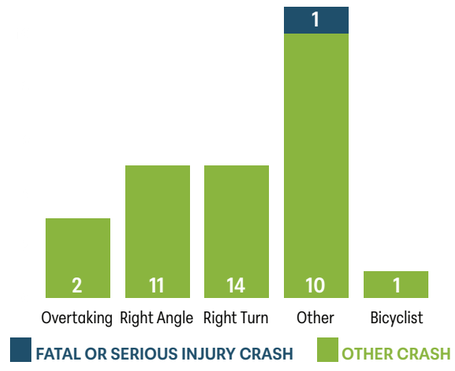
Contributing Factors

- Long pedestrian crossing length
- High traffic volume
- Faded crosswalk striping

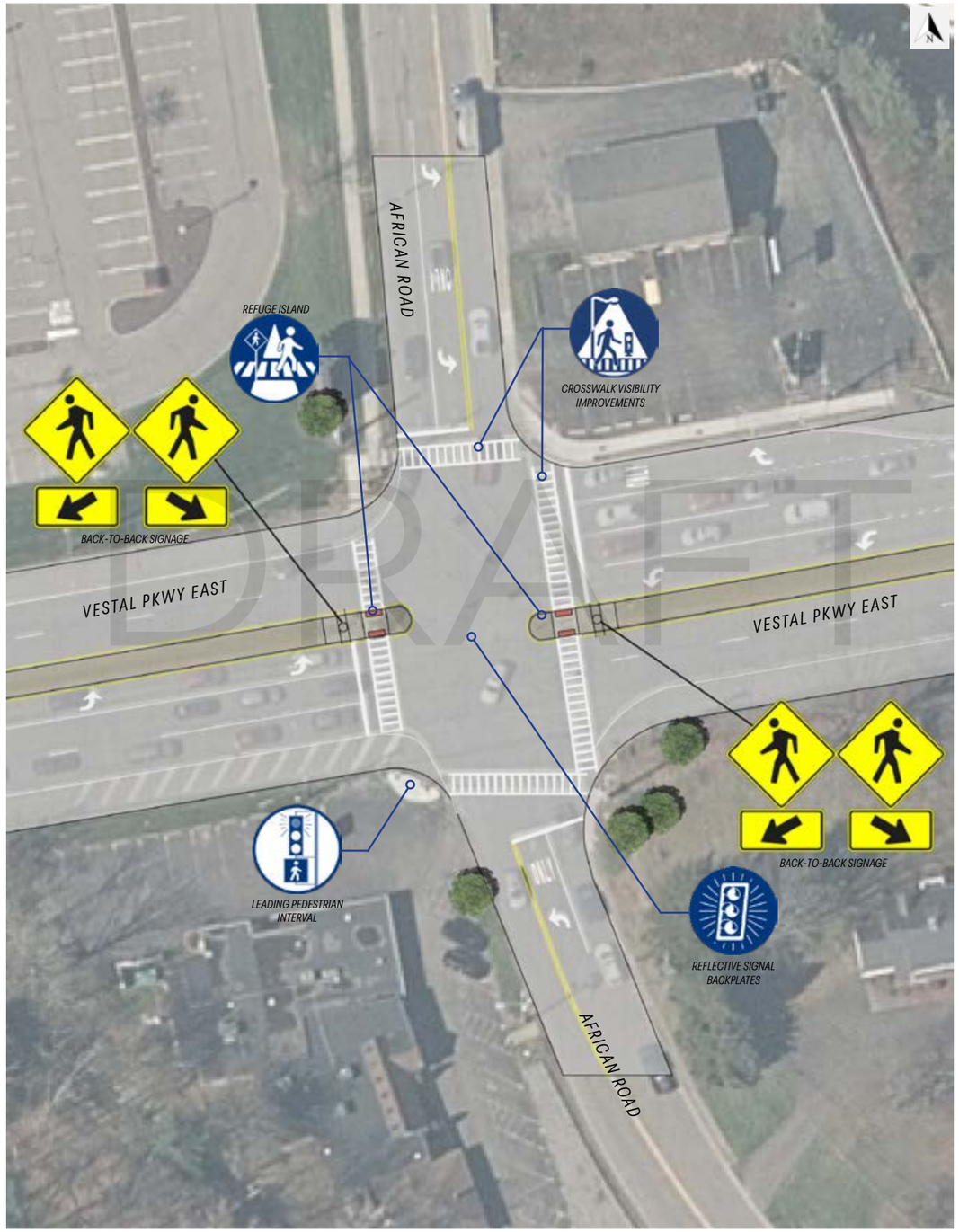
Crash Severity



Most Frequent Collision Type



Proposed Improvements



Proposed Countermeasures

- Crosswalk Visibility Enhancements
- Backplates with Retroflective Borders
- Leading Pedestrian Interval
- Medians and Pedestrian Refuge Islands in Urban and Suburban Areas

Contributing factors at Vestal Parkway East and African Road included long pedestrian crossing length, high traffic volume, and faded crosswalk striping. Potentially relevant safety countermeasures at this intersection include, the construction of pedestrian refuge islands, crosswalk visibility enhancements, retroreflective signal backplates, and the installation of a leading pedestrian interval (LPI). The factors contributing to crashes at this intersection were, long crossing distances, faded pavement markings and a high volume of traffic. To address these issues, a treatment consistent with similar intersections is recommended. Pedestrian refuge islands will be installed as an extension of the existing concrete center median. These islands will be present on each of the Vestal Pkwy E crossings and will provide pedestrians with the opportunity to stop safely without the need to cross several lanes of traffic in one movement. High visibility crosswalks will also be installed along each of the approaches, improving the existing striping and increasing driver awareness of individuals in the crossings. To further accommodate vulnerable road users, an LPI will be installed to give pedestrians additional time to complete their crossing without the interference of traffic. Lastly, backplates with retroreflective borders will be installed on the existing traffic signals. The backplates will provide a visual cue for drivers to and offer an additional measure of safety in the event of a power outage or signal malfunction. These countermeasures in combination with one another will effectively reduce the potential for fatal and serious injury crashes for all road users.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Type LS Crosswalk	300.00	LF	$24.00	$7,200.00
Concrete Refuge Island	20.00	CY	$1,500.00	$30,000.00
Granite Curb	200.00	LF	$80.00	$16,000.00
Curb Ramp and Warning Units	4.00	EA	$10,000.00	$40,000.00
Traffic Signal Backplates	10.00	EA	$600.00	$6,000.00
Leading Pedestrian Interval (LPI)	1.00	LS	$3,000.00	$3,000.00
Pedestrian Warning Signage	2.00	EA	$1,250.00	$2,500.00
			Construction Total	$104,700.00
			Contingency and Inflation (20%)	$21,000.00
			Subtotal	$125,700.00
			Work Zone Traffic Control (10%)	$12,600.00
			Mobilization (4%)	$5,100.00
			Survey (2%)	$2,600.00
			Engineering Design (10%)	$12,600.00
			Construction Inspection & Administration(15%)	$18,900.00
			Grand Total	**$177,500.00**

Intersection Tioga County

PRIORITY 1

Cayuta Ave. & Ithaca St.

Town of Barton

Existing Conditions

The intersection of Cayuta Avenue (NY-34) and Ithaca Street is located within the Village of Waverly. The surrounding area is both commercial and residential with numerous businesses and residential houses in close proximity to the intersection.

A total of 4 crashes occurred during the study period between 2019 and 2023, with 3 of these crashes resulting in injury. The crash types observed within the study period at this intersection were left turn, rear end, and right angle crashes. The intersection features stop control at the eastbound and westbound approaches while the northbound and southbound approaches are uncontrolled. The northbound and southbound approaches to the intersection maintain one travel lane in each direction, with parking on the east side of the road. The eastbound approach maintains one travel lane in each direction with parking on the south side of the street. The westbound approach is a narrow bridge which maintains one travel lane in each direction and has no shoulder. The bridge surface is asphalt pavement which has deteriorated and has missing sections along the edges.

There is also a wooden pedestrian path along the north side of the bridge connecting to the existing sidewalks. Curb ramps and sidewalks are present at all approaches to the intersection with the exception of sidewalks at the westbound approach. All of the curb ramps presently have plastic detectable warning units in lieu of NYSDOT standard cast iron detectable warning units. A Type LS crosswalk is present crossing the southbound approach on Cayuta Avenue while faded Type L crosswalks are present at the two Ithaca Street approaches. The intersection features street lighting on the northeast corner and along the east side of Cayuta Avenue and the north side of Ithaca Street.

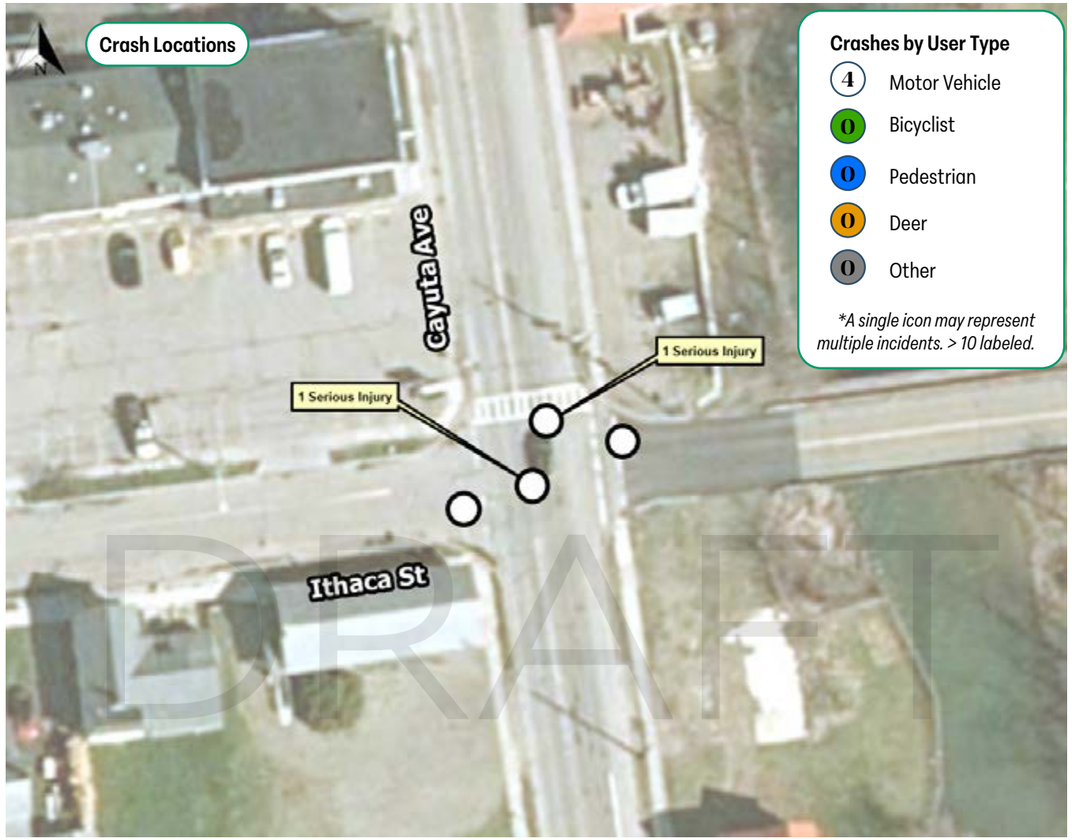
Highway Characteristics

Owner	NYSDOT / Village of Waverly
Intersection Type	Urban 4-leg with stop control on the minor approaches
Traffic Control	Stop Control
Speed Limit	30 mph
AADT (Cayuta Ave)	11,666 VPD
AADT (Ithaca St.)	444 VPD
Functional Class (Cayuta Ave)	(16) Minor Arterial
Functional Class (Ithaca St.)	(19) Local
LOSS	4
HRN Score	2
Equity Rank	Top 20
Adjacent Lane Use	Urban

Photo 1: Eastbound approach looking east

Photo 2: Southwest corner looking north

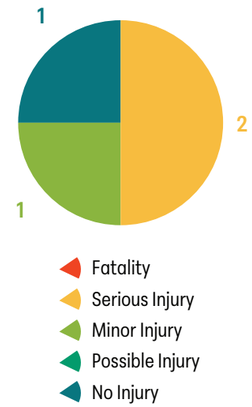
Crash Data



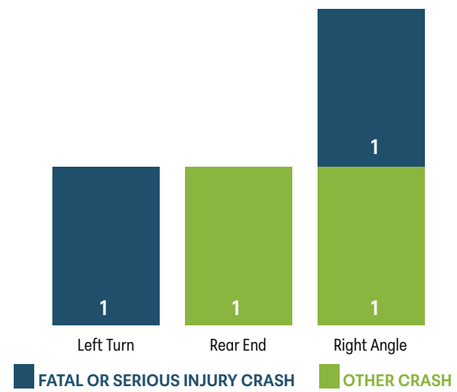
Contributing Factors

- Faded crosswalk striping on minor approaches
- Uncontrolled pedestrian crossing
- Tight turning radii with on street parking

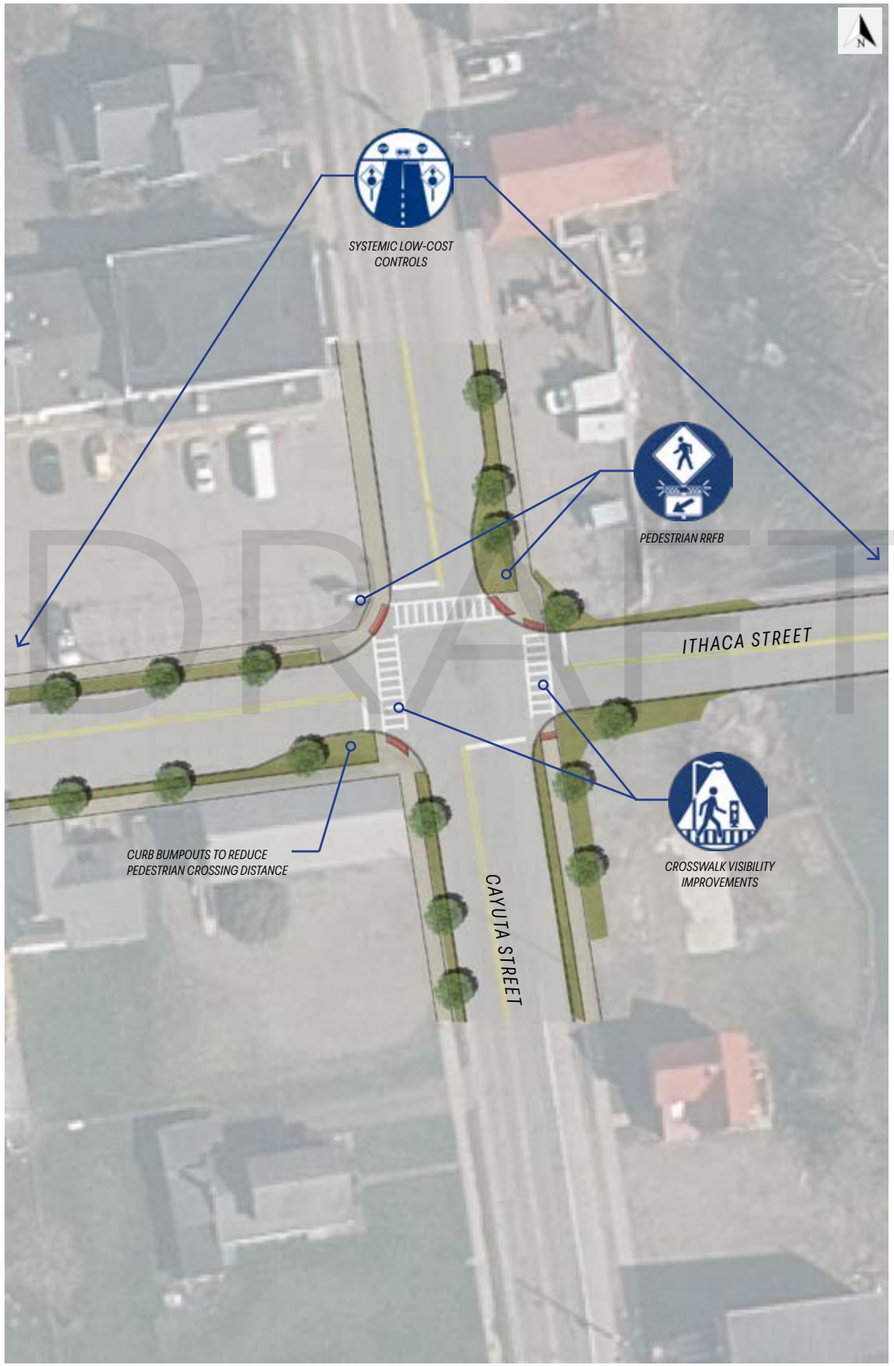
Crash Severity



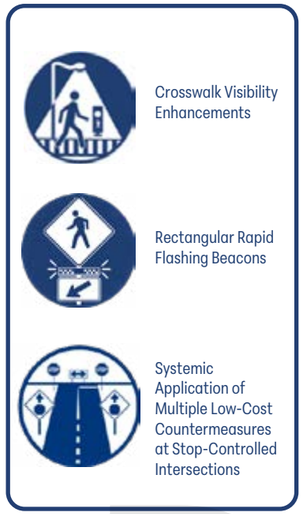
Most Frequent Collision Type



Proposed Improvements



Proposed Countermeasures



Contributing factors at Cayuta Avenue and Ithaca Street included faded crosswalk striping on minor approaches, uncontrolled pedestrian crossing, and tight turning radii with on street parking. Potentially relevant safety countermeasures at this intersection include, installation of high visibility crosswalks and stop bars, installation of a rectangular rapid flashing beacon (RRFB) for the uncontrolled crossing, installation of stop ahead warning signage, and curb bump outs at multiple corners of the intersection. High visibility crosswalks and stop bars would be installed at all approaches to the intersection with supporting signage. An RRFB would be installed at the southbound approach on Cayuta Avenue to provide increased visibility for the uncontrolled crossing. Stop ahead warning signage would be installed at both approaches on Ithaca Street to provide increased awareness of the upcoming stop control intersection. Given this intersection's location, drivers may not anticipate the upcoming stop sign creating a potentially dangerous situation where a driver needs to stop abruptly. This additional warning signage provides extra protection for potential pedestrians crossing the intersection, as well as vehicles currently stopped at the intersection. Curb bump outs would be installed in the northeast and southwest corners of the intersection to shorten the crossing distances for crosswalk users. Along with these curb bump outs would be some minor sidewalk reconstruction creating an improved walking and riding surface for vulnerable road users. The systemic application of multiple safety countermeasures at this stop controlled intersection provides cost effective solutions to the current safety issues present and reducing the risk of any future fatal or serious injury crashes.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Type LS Crosswalk	90.00	LF	$24.00	$2,160.00
Stop Bar Striping	25.00	LF	$12.00	$300.00
Curb Ramp	3.00	EACH	$10,000.00	$30,000.00
Granite Curb	165.00	LF	$80.00	$13,200.00
Concrete Sidewalk	10.00	CY	$1,500.00	$15,000.00
Rectangular Rapid Flashing Beacon (RRFB)	2.00	EACH	$15,000.00	$30,000.00
Stop Warning Signage	2.00	EACH	$1,250.00	$2,500.00
			Construction Total	$93,160.00
			Contingency / Inflation (20%)	$18,700.00
			Subtotal	$111,900.00
			Work Zone Traffic Control (10%)	$11,200.00
			Mobilization (4%)	$4,500.00
			Survey (2%)	$2,300.00
			Engineering Design (10%)	$11,200.00
			Construction Inspection (15%)	$16,800.00
			Grand Total	**$157,900.00**

Intersection Tioga County

PRIORITY 2

Broad St. & Fulton St.

Town of Barton

Existing Conditions

The intersection of Broad Street and Fulton Street is located within the Village of Waverly, just north of the Pennsylvania/ New York State line. The surrounding area is both commercial and residential with numerous businesses in close proximity to the intersection while many of the surrounding side streets have mostly residential housing.

A total of 21 crashes occurred during the study period between 2019 and 2023, with 5 of these crashes resulting in injury. The majority of all crashes within the study period at this intersection were right angle crashes. One of crashes that occurred at the intersection during the study period involved a pedestrian. The intersection features stop control at the eastbound, westbound, and southbound approaches while the northbound approach is uncontrolled. The eastbound, westbound, and southbound approaches to the intersection maintains one travel lane in each direction with parking on both sides of the road. The northbound approach maintains one travel lane in each direction.

Curb ramps and sidewalks are present at all approaches to the intersection, but all of the curb ramps are not ADA compliant due to the presence of plastic detectable warning units in lieu of cast iron detectable warning units.

Type LS crosswalks are present at the two approaches on Broad Street while Type S crosswalks are present at the two Fulton Street approaches. The intersection is well lit due the presence of street lighting on both side of the road at all approaches.

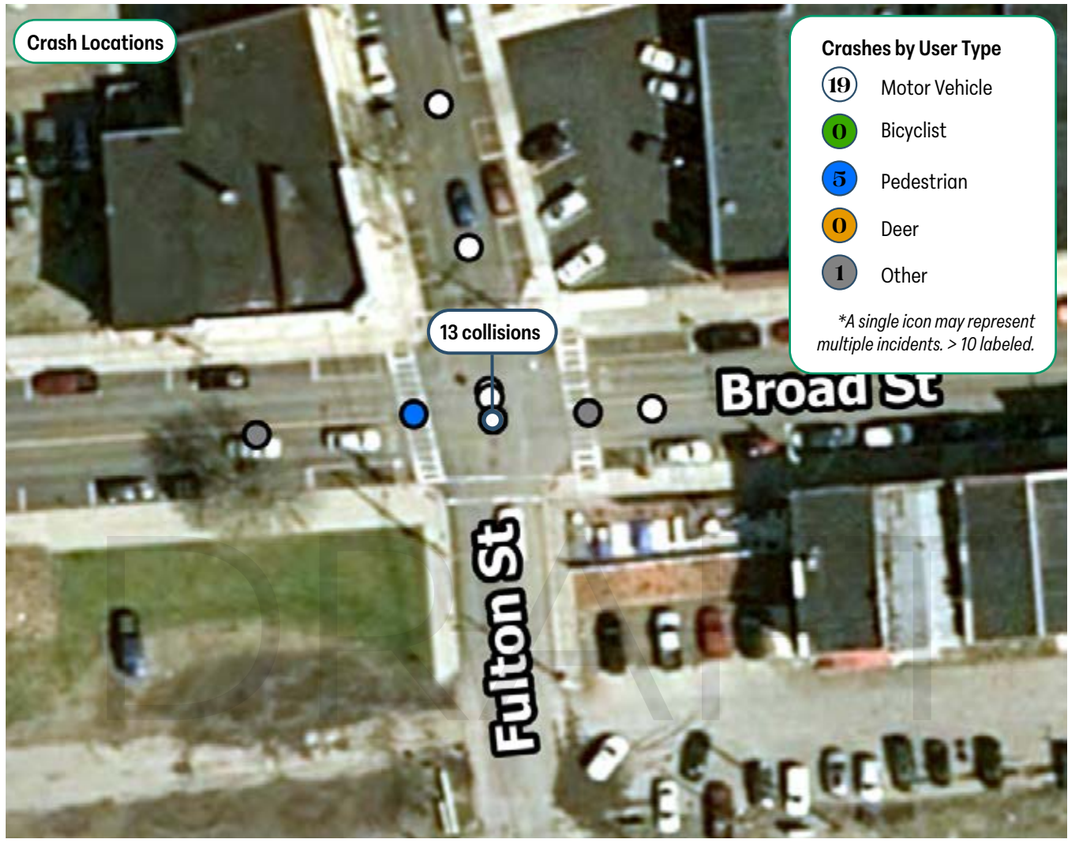
Highway Characteristics

Owner	Village of Waverly
Intersection Type	Urban 4-leg stop control, northbound approach uncontrolled
Traffic Control	Stop Control
Speed Limit	30 mph
AADT (Fulton St.)	4,683 VPD
AADT (Broad St.)	3,653 VPD
Functional Class (Fulton St.)	(17) Major Collector
Functional Class (Broad St.)	(17) Major Collector
LOSS	3
HRN Score	2
Equity Rank	Top 20

Photo 1: Northwest corner looking southeast

Photo 2: Southeast corner looking northwest

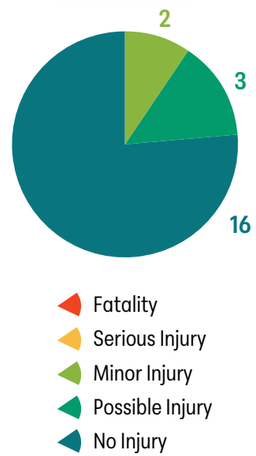
Crash Data



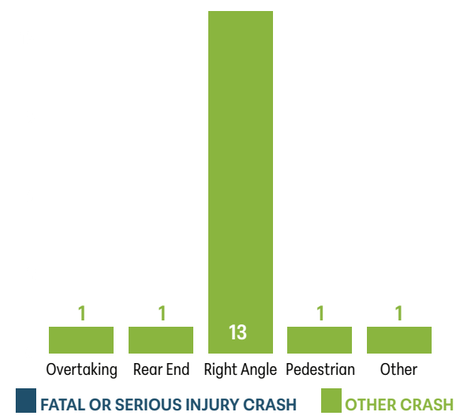
Contributing Factors

- Faded striping and poor sight distance from stopping locations
- One approach is uncontrolled while the other three are stop controlled
- Tight turning radii with on street parking

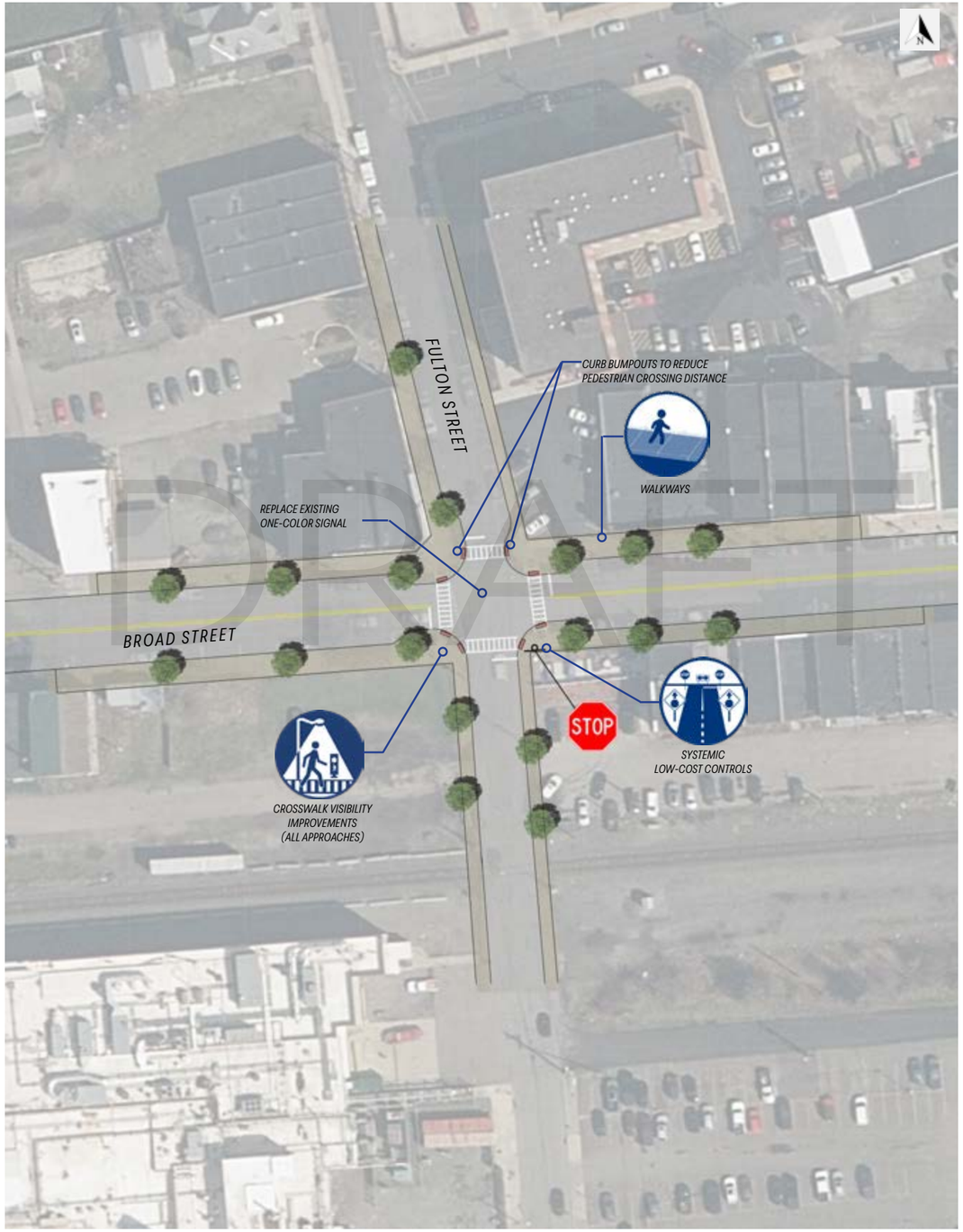
Crash Severity



Most Frequent Collision Type



Proposed Improvements



Proposed Countermeasures

Contributing factors at Broad and Fulton Streets included faded striping and poor sight distance from stopping locations, one approach is uncontrolled while the other three are stop controlled, and tight turning radii with on street parking. Potentially relevant safety countermeasures at this intersection include, making the intersection an all-way stop, installation of high visibility crosswalks, stop bars, curb bump outs at all corners of the intersection, and replacing the existing intersection control beacon with an all-red intersection control beacon. Transitioning the intersection from a three-way stop with the northbound approach being uncontrolled to an all-way stop will help to limit the right angle crashes which were the main accident type at this intersection. High visibility crosswalks and stop bars would be installed at all approaches to the intersection with supporting signage. Curb bump outs would be installed in all corners of the intersection to shorten the crossing distance for crosswalk users. Replacing the existing intersection control beacon will update the intersection to all-way stop control and allow roadway users approaching the intersection to recognize the stop control from each direction.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Type LS Crosswalk	110.00	LF	$24.00	$2,640.00
White Striping	300.00	LF	$2.00	$600.00
Yellow Striping	200.00	LF	$2.00	$400.00
Curb Ramp	8.00	EA	$10,000.00	$80,000.00
Granite Curb	280.00	LF	$80.00	$22,400.00
Concrete Sidewalk	120.00	CY	$1,500.00	$180,000.00
Remove Existing Intersection Control Beacon	1.00	LS	$2,000.00	$2,000.00
Install All-Red Intersection Control Beacon	1.00	EA	$3,000.00	$3,000.00
			Construction Total	$291,040.00
			Contingency / Inflation (20%)	$58,300.00
			Subtotal	$349,400.00
			Work Zone Traffic Control (10%)	$35,000.00
			Mobilization (4%)	$14,000.00
			Survey (2%)	$7,000.00
			Engineering Design (10%)	$35,000.00
			Construction Inspection (15%)	$52,500.00
			Grand Total	**$492,900.00**

Intersection Tioga County

PRIORITY 8

NY 17C & Talmadge Hill Rd.

Town of Barton

Existing Conditions

The intersection of NY 17C and Talmadge Hill Road is located within the Village of Waverly. The surrounding area is largely commercial with the State Line Auto Auction located to the north of, contributing to the majority of trips to this intersection. The close proximity to the auto auction results in a higher than usual traffic volume and a larger percentage of trucks compared to other intersections nearby.

A total of 4 crashes occurred during the study period between 2019 and 2023, with 3 of these crashes resulting in injury. The collision types documented during the study period were left turn and right-angle crashes with two serious injuries resulting from separate right-angle collisions. This signifies vehicles are having trouble with turning movements at the intersection. The intersection is two-way stop controlled, featuring stop signs at the northbound (Ellistown Rd) and southbound (Talmadge Hill Rd) approaches while the eastbound and westbound approaches of Route 17C are uncontrolled. The speed limit on Route 17C is 45 mph for both approaches. The northbound approach on Ellistown Rd has a posted speed limit of 45 mph and the southbound approach on Talmadge Hill Rd has a speed limit of 40 mph. The northbound and southbound approaches to the intersection on Talmadge Hill Road maintain one travel lane in each direction.

The travel lanes are separated by a full barrier, double yellow line which is extremely faded on the existing pavement. The eastbound and westbound approaches to the intersection on NY 17C maintain one travel lane in each direction with a striped shoulder. Neither intersecting corridor featuring supporting pedestrian infrastructure. The intersection lacks any street lighting in close proximity to the intersection, creating dangerous situations during darker times of day.

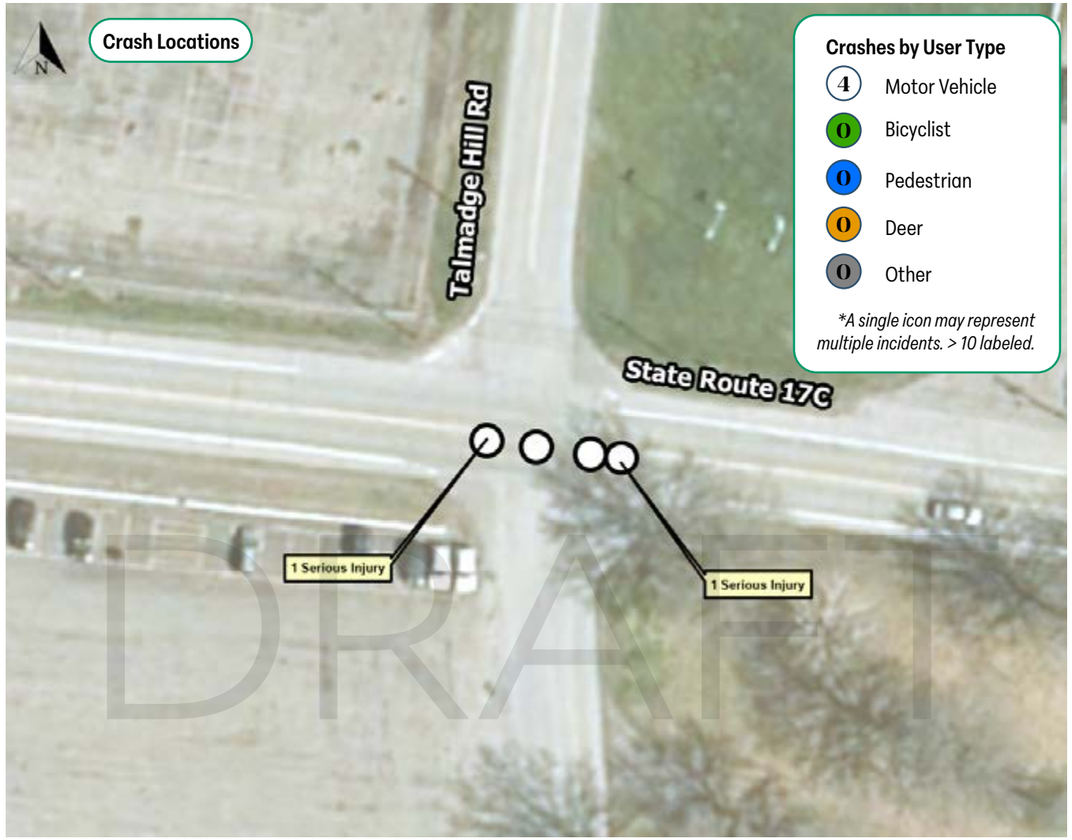
Highway Characteristics

Owner	NYSDOT / Town of Barton
Intersection Type	Urban 4-leg with stop control on Talmadge Hill Rd
Traffic Control	Stop Control
Speed Limit	30 mph
AADT (NY-17C)	4,157 VPD
AADT (Talmadge Hill Rd)	3,653 VPD
Functional Class (NY-17C)	(16) Minor Arterial
Functional Class (Talmadge Hill Rd)	(17) Major Collector
LOSS	3
HRN Score	3
Equity Rank	None
Adjacent Lane Use	Urban

Photo 1: Southbound approach looking north

Photo 2: Middle of intersection looking east

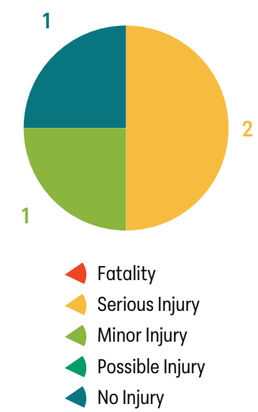
Crash Data



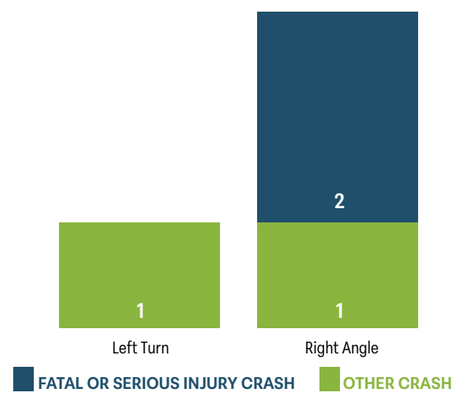
Contributing Factors

- Two-way stop with two uncontrolled approaches
- Faded striping
- Limited sight distance

Crash Severity

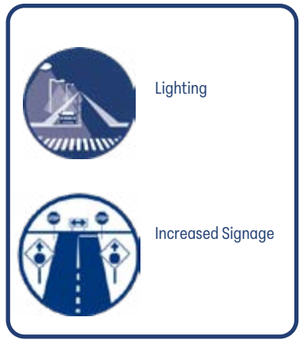


Most Frequent Collision Type



Proposed Improvements

Proposed Countermeasures



Contributing factors at NY 17C and Talmadge Hill Road included a two-way stop with two uncontrolled approaches, faded striping, and limited sight distance. Potentially relevant safety countermeasures at this intersection include, converting the intersection from two-way stop control to all-way stop control, installation of stop bars and new epoxy striping, installation of new stop signage as well as stop ahead warning signage, and adding lighting improvements. The intersection would be converted from two-way stop control to all-way stop control in an effort to reduce right angle and left turn crashes. With the existing two-way stop condition, vehicles turning onto Route 17C are exposed to oncoming traffic from both directions traveling at higher speeds that does not have to stop. To provide increased awareness of the newly established all-way stop controlled intersection, and ensure drivers from the east and westbound approaches are prepared to stop, stop ahead warning signs will be added on Route 17C. New 12" thick white epoxy stop bars will be added to all approaches of the intersection so drivers are familiar with where to stop and position themselves appropriately so that turning vehicles have adequate space. New street lighting improvements will be installed to provide increased visibility and enhance safety at the intersection.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Stop Bar Striping	65.00	LF	$12.00	$780.00
White Striping	430.00	LF	$2.00	$860.00
Yellow Striping	400.00	LF	$2.00	$800.00
Stop & Warning Signage	8.00	EA	$1,250.00	$10,000.00
Lighting Improvements	1.00	LS	$25,000.00	$25,000.00
			Construction Total	$37,440.00
			Contingency / Inflation (20%)	$7,500.00
			Subtotal	$45,000.00
			Work Zone Traffic Control (10%)	$4,500.00
			Mobilization (4%)	$1,800.00
			Survey (2%)	$900.00
			Engineering Design (10%)	$4,500.00
			Construction Inspection (15%)	$6,800.00
			Grand Total	**$63,500.00**

Intersection Tioga County

PRIORITY 4

Chemung St. & Cayuta Ave.

Town of Barton

Existing Conditions

The intersection of Chemung Street (NY 17C) and Cayuta Avenue (NY 34) is located within the Village of Waverly. The surrounding area is both commercial and residential with multiple businesses and residential houses in close proximity to the intersection.

A total of 6 crashes occurred during the study period between 2019 and 2023, with 2 of these crashes resulting in injury. The crash types within the study period at this intersection were rear end and right-angle crashes. The intersection exists on a significant skew between the approaches which creates sight distance issues and challenging turning movements. The intersection features stop control at the northbound and southbound approaches while the eastbound and westbound approaches are uncontrolled. To support the two-way stop control, a one-color signal exists that is flashing yellow for each of the Chemung St approaches and it is flashing red for the Cayuta Ave approaches. The northbound approach to the intersection maintains one travel lane in each direction with parking on the east side of the road. When stopped at the intersection on the northbound approach it is difficult to see traffic traveling east on Chemung St. There is a steep hill on the eastbound approach which results in both vertical and horizontal sight distance obstruction. The southbound, eastbound, and westbound approach maintains one travel lane in each direction with a minimal shoulder.

Curb ramps and sidewalks are present at all approaches to the intersection with the exception of sidewalks going up the southbound approach. All curb ramps at the intersection have NYSDOT standard cast iron detectable warning units. Type LS crosswalks are present at the northbound and southbound approaches on Cayuta Avenue. The intersection features street lighting on the northwest corner and along the east side of Cayuta Avenue and the south side of Chemung Street. Signage on Chemung St indicates the State Route 17 bike path proceeds to the east and west.

Highway Characteristics

Owner	NYSDOT
Intersection Type	Urban 4-leg with stop control on Cayuta Ave
Traffic Control	Stop Control
Speed Limit	30 mph
AADT (Chemung St)	5,606 VPD
AADT (Cayuta Ave)	11,666 VPD
Functional Class (Chemung St)	(16) Minor Arterial
Functional Class (Cayuta Ave)	(16) Minor Arterial
LOSS	3
HRN Score	3
Equity Rank	Top 20
Adjacent Lane Use	Urban

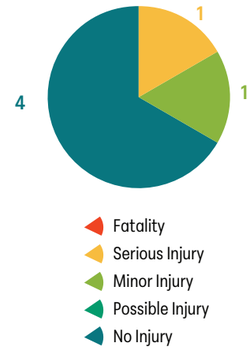
Photo 1: Chemung St and Cayuta Ave southwest corner looking east

Crash Data

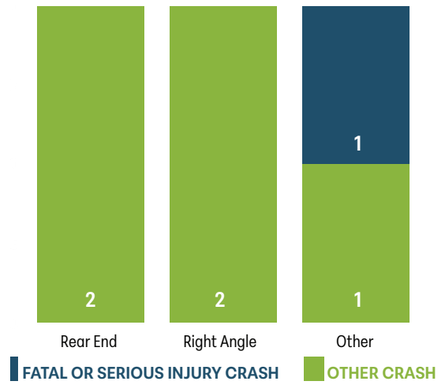
Contributing Factors

- Skewed approaches to intersection
- Tight turning radii with on street parking
- Obstructed sight distance

Crash Severity



Most Frequent Collision Type



Proposed Improvements

Proposed Countermeasures

Contributing factors at Chemung Street and Cayuta Avenue included skewed approaches to intersection, tight turning radii with on street parking, and obstructed sight distance. Potentially relevant safety countermeasures at this intersection include, the installation of high visibility crosswalks and stop bars, converting the intersection from stop control to traffic signal control, installing backplates with retroreflective borders, lighting improvements, and a curb bump out in the southeast corner of the intersection. The existing type LS crosswalks would be replaced with high visibility crosswalks to enhance drivers' ability to see the crosswalks and pedestrians crossing the intersection. 12" thick white epoxy stop bars would be installed at all approaches to the intersection along with the necessary supporting signage. The existing two-way stop would be converted to signal controlled, with the installation of 3-color traffic signals along each of the approaches. With these new traffic signals, pedestrian signal infrastructure will be installed at each of the crossings to give pedestrians guidance on when it is safe for them to cross. Implementing pedestrian signals enhances safety for both road users and pedestrians. Lighting improvements will be installed at the intersection to provide increased visibility of the intersection. The curb in the southeast corner of the intersection will be bumped out in order to shorten the crossing distance for crosswalk users. The new curb alignment will require some reconstruction of the side and installation of a new curb ramp with a cast iron detectable warning surface.

Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Type LS Crosswalk	150.00	LF	$24.00	$780.00
Curb Ramp	1.00	EA	$10,000.00	$10,000.00
Granite Curb	105.00	LF	$80.00	$8,400.00
Concrete Sidewalk	10.00	CY	$1,500.00	$15,000.00
Lighting Improvements	1.00	LS	$25,000.00	$25,000.00
Pedestrian Signals	6.00	EA	$6,000.00	$36,000.00
Traffic Signal Infrastructure	1.00	LS	$250,000.00	$250,000.00
			Construction Total	$348,000.00
			Contingency / Inflation (20%)	$69,600.00
			Subtotal	$417,600.00
			Work Zone Traffic Control (10%)	$41,800.00
			Mobilization (4%)	$16,800.00
			Survey (2%)	$8,400.00
			Engineering Design (10%)	$41,800.00
			Construction Inspection (15%)	$62,700.00
			Grand Total	**$589,100.00**

Appendix 2
High Injury Network Methodology

10. High Injury Network Methodology

Based on the highest injury severity level reported in the crash record, each collision with at least one injury (i.e. non-PDO) was assigned a maximum injury value (i.e., K, A, B or C). Like the crash analysis in Chapter 3, crashes occurring along interstate facilities and limited-access highways were filtered out from the underlying dataset that was used as the core input for the networks that follow.

10.1 Weighting by Injury Severity

Each crash was assigned a weighting score based on the maximum injury severity for all parties involved, as shown in **Table 49**.

Table 49. High Injury Network – Injury Severity Weighting Scheme (Corridors & Intersections)

Crash Injury Severity Code	Severity Description	Other Terms Often Used	HIN Weight Applied
K	Fatal Injury	Killed	15
A / SI	Serious Injury	Incapacitating Injury	5
B	Minor Injury	Non-Incapacitating injury	2
C	Possible Injury	Complaint of Injury	1
O	No Injury	Property Damage Only	0

This methodology leverages the general approach found in Federal Highway Administration's *Crash Costs for Highway Safety Analysis* (FHWA-SA-17-071, 2018) –comparatively evaluating the relative cost of an injury crash based on its comprehensive crash costs (i.e., tangible or "economic" costs, plus intangible costs or "quality-adjusted life years") – with a few notable changes.

- In divergence from an equivalent property damage only (EPDO) based scheme, where property damage serves as the base weight value (1), all values were re-indexed to equivalent injury level (i.e., baseline of 1 was defined as the lowest injury level, C). Assigning a zero weight to non-injury crashes reflects the goals of Vision Zero and active pursuit of a Safe System Approach.
- Weighting for fatal crashes can vary depending upon the weighting scheme utilized. For this Safety Action Plan, fatal crashes were assigned a weight value of 15. When fatal crashes are assigned a weight that is substantially higher than the baseline (possible injury), the resulting High Injury Network converges towards a simple hotspot map consisting of isolated, limited samples of fatal crashes. Weighting fatal crashes to a value of 15 continues to reflect their severity compared to all other crashes, while providing a network that can be better leveraged en route to developing capital projects.

10.2 Separating Intersection and Corridor Crashes (Location Type)

Recognizing the unique characteristics of collisions that occur at intersections versus along segments (corridors), each crash was designated as either an intersection or a corridor collision based on information recorded in the crash report. As discussed in Section 3.3.3 (Crash Location), the NYSDOT dataset included a designation for the physical location of each crash in relation to a designated intersection – "At-Intersection", "Intersection-Related", or "Not at an Intersection". After analysis of crash data and the typical geography of the locations for each designation, it was determined that the overall High Injury Network (HIN) would be separated into two discreet components: segment-based High Injury Corridors (HIC), which would incorporate "Not at an Intersection" and "Intersection-Related" crashes, and High Injury Intersections (HII), which would account for the "At-Intersection" crash group component of this reactive network.

10.3 Corridor Crashes

According to the NYSDOT CLEAR crash records, 63% of injury crashes had characteristics that led them to be assigned to the Corridor subset of crashes, as opposed to the Intersection subset. Each of these crashes was assigned to a segment of roadway in GIS using NYSDOT's Road Inventory shapefile. To verify each location, in addition to roadway proximity, crashes were also assigned to a roadway segment by matching roadway name data native to the crash report with roadway name data from the official roadway inventory. This enhanced the crash assignment process, allowing for a more accurate accounting of crashes along each respective roadway segment.

While corridor crashes are geocoded at one specific point, the factors that contribute to those crashes often cascade from one roadway segment to the next. For that reason, the High Injury Corridor portion of the HIN employed a "sliding window" analysis, which synthesizes crash data from neighboring segments in addition to the primary crash segment, allowing for a more holistic view of crash trends along a given corridor (compared to a point-based sample along a single block or segment).

As such, specific key variables were aggregated to the segment level, including counts of crash-related injuries by severity, the types of modes involved in each collision (i.e., motorist, pedestrian, or bicyclist), information on operating conditions and maneuvers at the time of collision, and the assigned crash weight based on the rubric shown previously (Table 49).

An injury score was calculated for each segment, based on the aggregated crash weights normalized by overall segment length across the "sliding window" of analysis. From this injury score, three models spanning a wide range of scales were developed – an absolute rank across the two-county study area,

a county-level rank, and a municipal-level individual ranks. Recognizing the fundamental differences between the counties outlined in Chapter 3 – Crash Analysis, the subsequent sections showcase High Injury Corridors based on the county-level ranks for injury score.

10.4 Intersection Crashes

At a regional level, 38% of injury crashes were explicitly designated “At-Intersection” crashes within the crash reports summarized by the NYSDOT database. These Intersection subset crashes were spread across just 713 of the 6,395 total roadway junctions in the two-county public roadway network. Unlike segment-based crashes, which require more refined analysis (e.g., smoothing via “sliding window”), intersections were treated as individual points in the road network.

Intersection points were created based on NYSDOT's Roadway Inventory shapefile. These intersection points were then cleaned to remove false positives, such as overpasses, underpasses and cul-de-sacs. Each intersection was then buffered and crashes within the buffer were assigned to the given location. Similar to the approach for each corridor, key variables were then aggregated at each intersection based on the crash history, including counts of crash-related injuries by severity, the types of modes involved in each collision, information on operating conditions and angle of collision, and the assigned crash weight based on the rubric shown previously (Table 49).

Intersections with overlapping buffers were dissolved to form a single intersection. For the limited set of crashes outside of any buffer, the individual crash record was examined to determine the most relevant intersection to which the crash was then assigned.

Appendix 3
Systemic Analysis

11. Systemic Analysis

11.1 Systemic Factors – All Injury Crashes

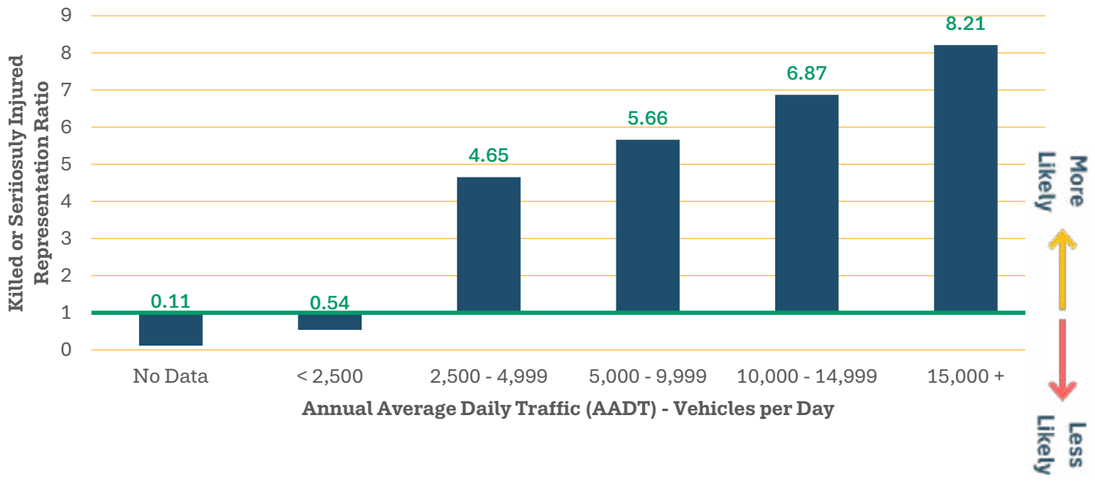
11.1.1 Daily Vehicle Volumes (AADT)

Broome County

Table 50. Systemic Analysis (Broome County) – Daily Auto Volumes (Source: Replica, Typical Weekday, Fall 2024)

	LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Daily Auto Volumes / AADT	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
No Data	5%	2	1%	0.11	14	1%	0.15
< 2,500	85%	152	46%	0.54	653	36%	0.43
2,500 - 4,999	4%	64	19%	4.65	232	13%	3.10
5,000 - 9,999	3%	65	20%	5.66	355	20%	5.68
10,000 - 14,999	2%	39	12%	6.87	396	22%	12.83
15,000 +	< 1%	9	3%	8.21	150	8%	25.16
TOTAL	**100%**	**331**	**100%**	**1.00**	**1,800**	**100%**	**1.00**

Figure 64. KSI Crash Representative Ratios (Broome County) – Daily Auto Volumes (Source: Replica, Typical Weekday, Fall 2024)

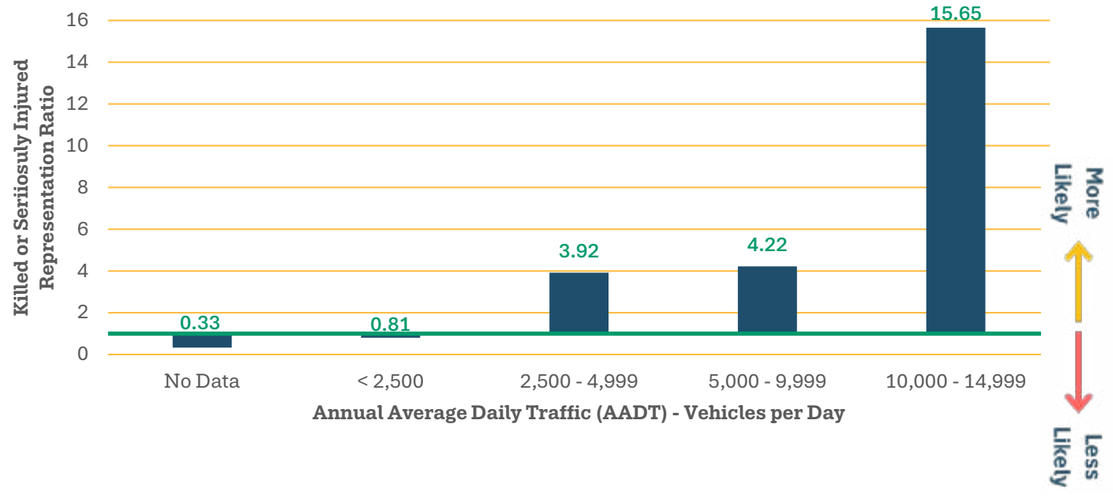


Tioga County

Table 51. Systemic Analysis (Tioga County) – Daily Auto Volumes (Source: Replica, Typical Weekday, Fall 2024)

	LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Daily Auto Volumes / AADT	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
No Data	19%	9	6%	0.33	26	4%	0.23
< 2,500	73%	85	59%	0.81	298	48%	0.66
2,500 - 4,999	6%	36	25%	3.92	195	32%	4.96
5,000 - 9,999	1%	9	6%	4.22	67	11%	7.34
10,000 - 14,999	< 1%	5	3%	15.65	30	5%	21.95
TOTAL	**100%**	**331**	**100%**	**1.00**	**1,800**	**100%**	**1.00**

Figure 40. KSI Crash Representative Ratios (Tioga County) – Daily Auto Volumes (Source: Source: Replica, Typical Weekday, Fall 2024)



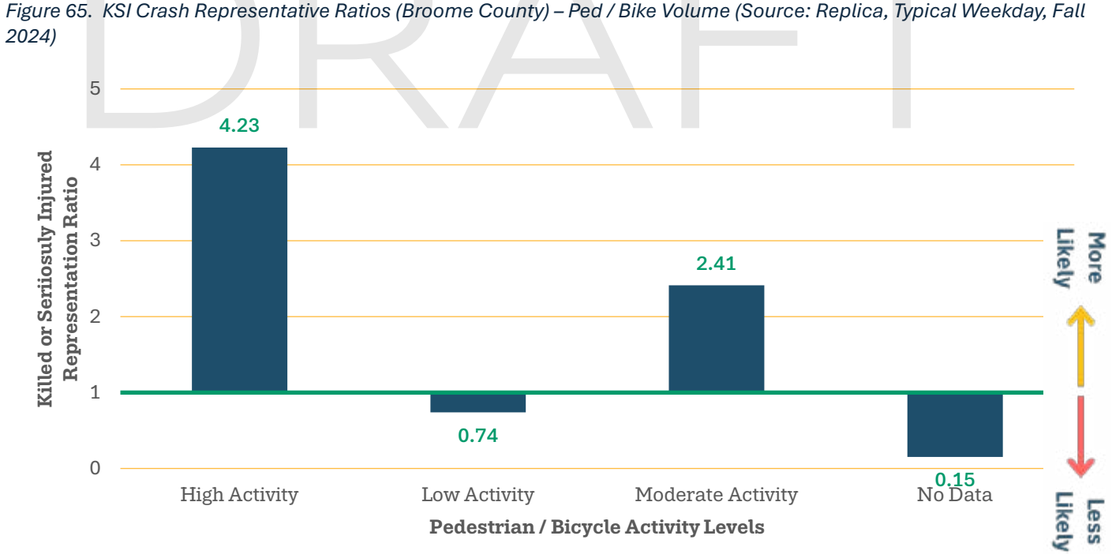
11.1.2 Pedestrian / Bicycle Activity Levels

Broome County

Table 52. Systemic Analysis (Broome County) – Ped / Bike Volume (Source: Replica, Typical Weekday, Fall 2024)

	LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Pedestrian / Bicycle Activity Level	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
High Activity	4%	59	18%	4.23	383	21%	5.05
Low Activity	76%	185	56%	0.74	819	46%	0.60
Moderate Activity	10%	82	25%	2.41	585	33%	3.17
No Data	10%	5	2%	0.15	13	1%	0.07
TOTAL	**100%**	**331**	**100%**	**1.00**	**1,800**	**100%**	**1.00**

Figure 65. KSI Crash Representative Ratios (Broome County) – Ped / Bike Volume (Source: Replica, Typical Weekday, Fall 2024)

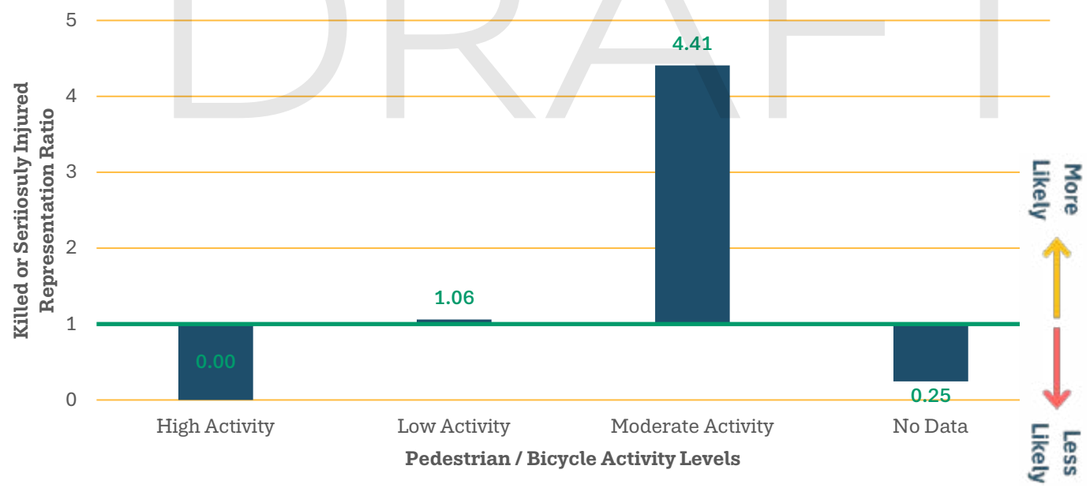


Tioga County

Table 53. Systemic Analysis (Tioga County) – Ped / Bike Volume (Source: Replica, Typical Weekday, Fall 2024)

	LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Pedestrian / Bicycle Activity Level	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
High Activity	-	-	-	-	-	-	-
Low Activity	81%	123	85%	1.06	521	85%	1.05
Moderate Activity	2%	15	10%	4.41	79	13%	5.43
No Data	17%	6	4%	0.25	16	3%	0.15
TOTAL	**100%**	**331**	**100%**	**1.00**	**1,800**	**100%**	**1.00**

Figure 66. KSI Crash Representative Ratios (Tioga County) – Ped / Bike Volume (Source: Replica, Typical Weekday, Fall 2024)



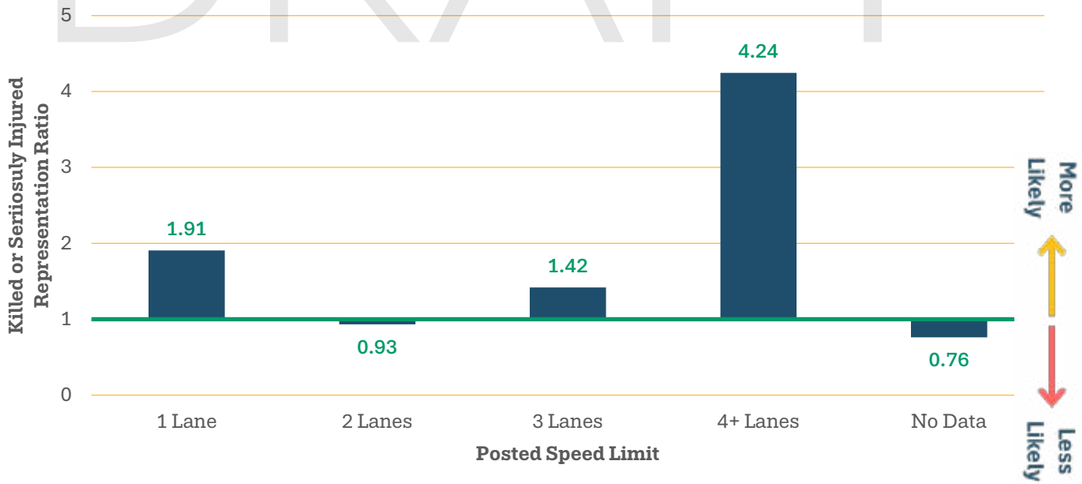
11.1.3 Posted Speed Limit

Broome County

Table 54. Systemic Analysis (Broome County) – Speed Limit (Source: NYSDOT CLEAR Crash Data Viewer)

	LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Posted Speed Limit	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
< 30 mph	39%	128	39%	0.99	788	44%	1.12
30 - 39 mph	8%	28	8%	1.01	201	11%	1.33
40 - 49 mph	6%	52	16%	2.51	309	17%	2.74
50+ mph	43%	114	34%	0.80	429	24%	0.56
No Data	3%	9	3%	0.80	73	4%	1.20
TOTAL	**100%**	**331**	**100%**	**1.00**	**1,800**	**100%**	**1.00**

Figure 67. KSI Crash Representative Ratios (Broome County) – Speed Limit

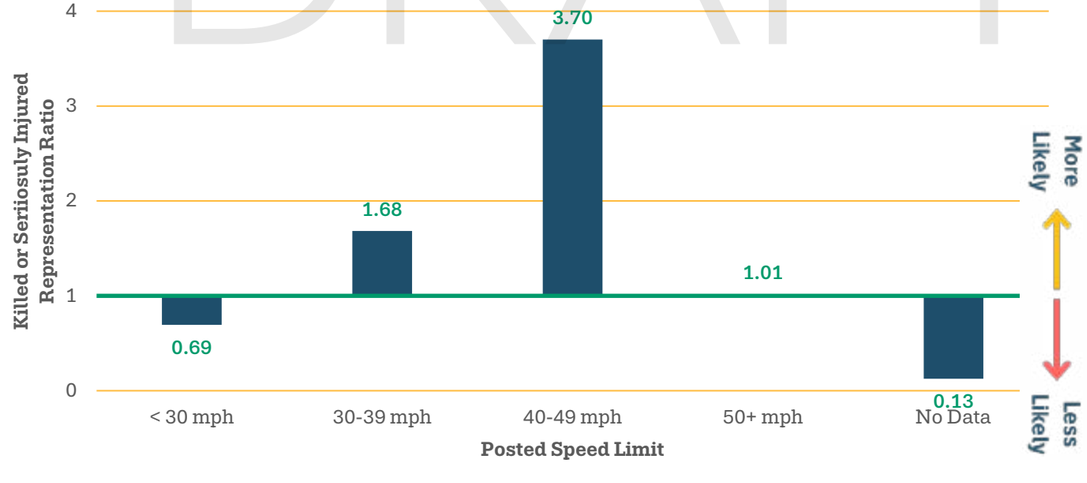


Tioga County

Table 55. Systemic Analysis (Tioga County) – Speed Limit (Source: NYSDOT CLEAR Crash Data Viewer)

	LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Posted Speed Limit	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
< 30 mph	12%	12	8%	0.69	66	11%	0.89
30 - 39 mph	4%	9	6%	1.68	66	11%	2.89
40 - 49 mph	2%	10	7%	3.70	47	8%	4.07
50+ mph	77%	112	78%	1.01	421	68%	0.89
No Data	6%	1	1%	0.13	16	3%	0.47
TOTAL	**100%**	**331**	**100%**	**1.00**	**1,800**	**100%**	**1.00**

Figure 68. KSI Crash Representative Ratios (Tioga County) – Speed Limit



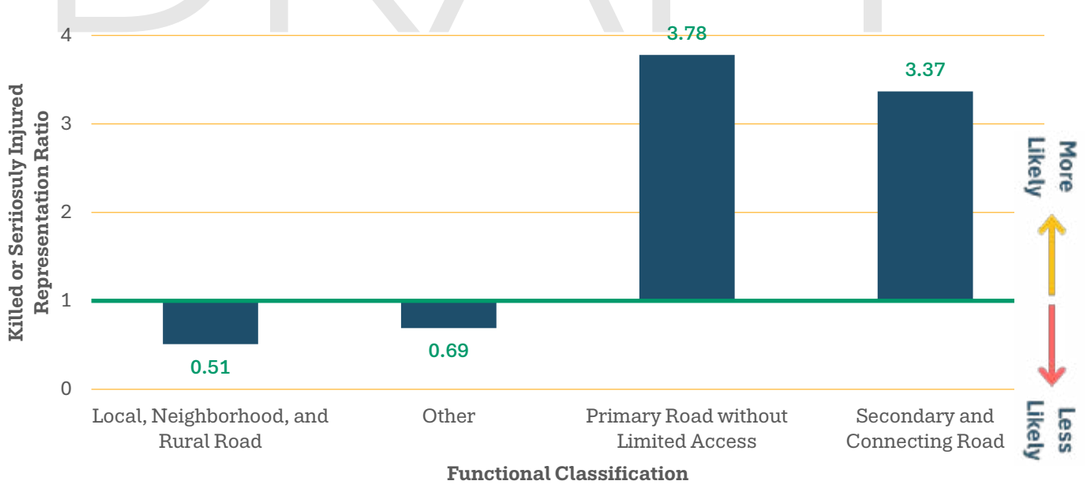
11.1.4 Functional Classification

Broome County

Table 56. Systemic Analysis (Broome County) – Functional Class (Source: NYSDOT CLEAR Crash Data Viewer)

	LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Functional Classification	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
Local, Neighborhood, and Rural Road	81%	137	41%	0.51	612	34%	0.42
Other	2%	5	2%	0.69	20	1%	0.51
Primary Road without Limited Access	2%	31	9%	3.78	179	10%	4.01
Secondary and Connecting Road	14%	158	48%	3.37	989	55%	3.88
TOTAL	**100%**	**331**	**100%**	**1.00**	**1,800**	**100%**	**1.00**

Figure 69. KSI Crash Representative Ratios (Broome County) – Functional Class Representation Ratios

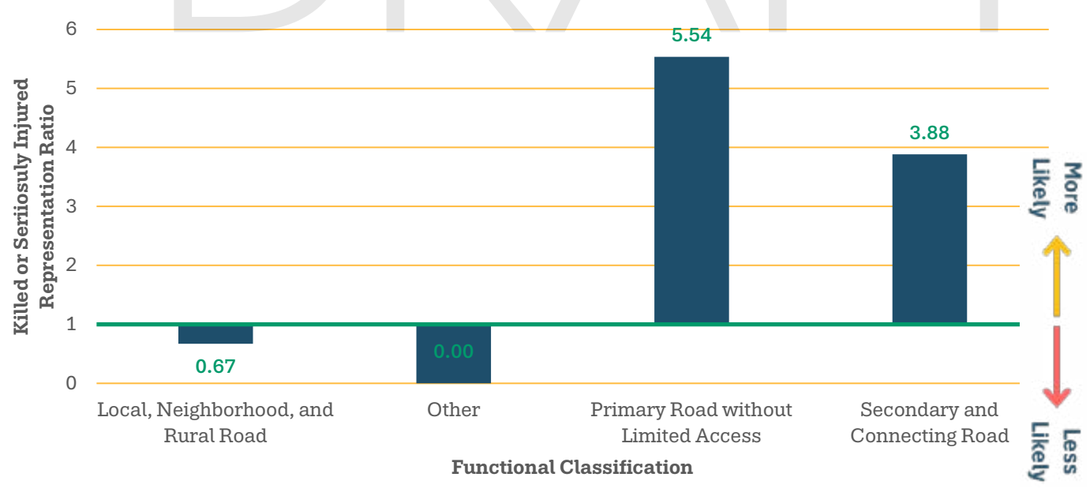


Tioga County

Table 57. Systemic Analysis (Tioga County) – Functional Class (Source: NYSDOT CLEAR Crash Data Viewer)

	LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Functional Classification	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
Local, Neighborhood, and Rural Road	83%	80	56%	0.67	285	46%	0.56
Other	6%	0	0%	0.00	0	0%	0.00
Primary Road without Limited Access	2%	12	8%	5.54	63	10%	6.79
Secondary and Connecting Road	9%	52	36%	3.88	268	44%	4.68
TOTAL	**100%**	**331**	**100%**	**1.00**	**1,800**	**100%**	**1.00**

Figure 70. KSI Crash Representative Ratios (Tioga County) – Functional Class Representation Ratios.



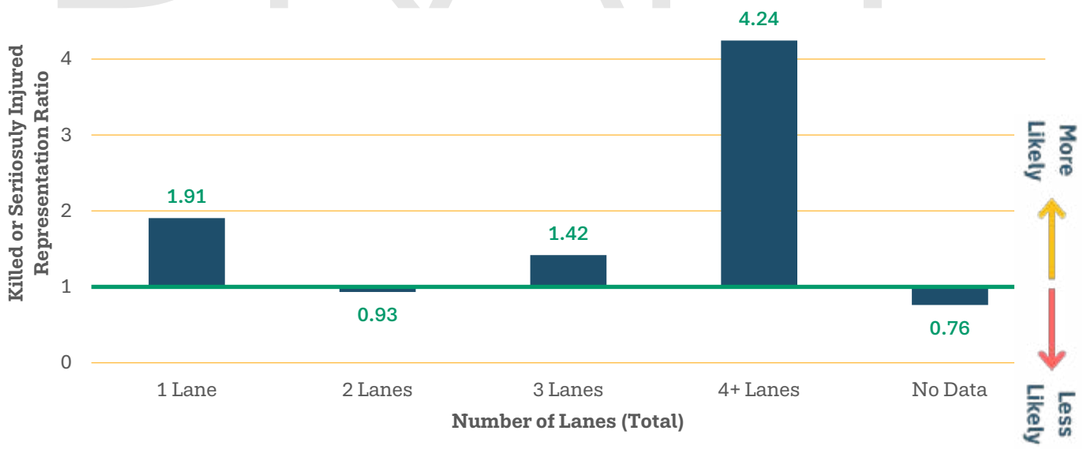
11.1.5 Total Number of Vehicle Lanes

Broome County

Table 58. Systemic Analysis (Broome County) – Total Number of Lanes (Source: NYSDOT CLEAR Crash Data Viewer)

	LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Total Vehicle Travel Lanes	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
1 Lane	1%	9	3%	1.91	71	4%	2.77
2 Lanes	93%	288	87%	0.93	1,391	77%	0.83
3 Lanes	1%	4	1%	1.42	51	3%	3.33
4+ Lanes	2%	23	7%	4.24	243	14%	8.25
No Data	3%	7	2%	0.76	44	2%	0.88
TOTAL	**100%**	**331**	**100%**	**1.00**	**1,800**	**100%**	**1.00**

Figure 71. KSI Crash Representative Ratios (Broome County) – Total Number of Lanes

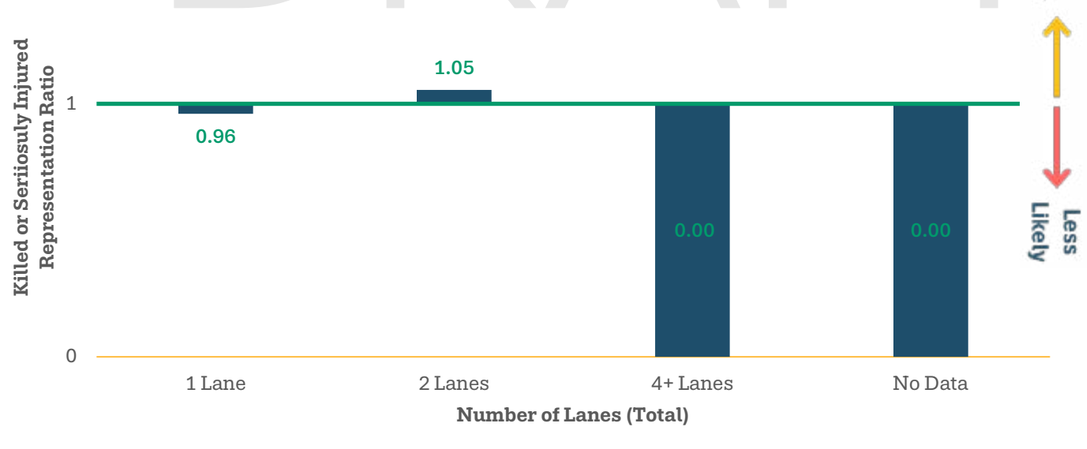


Tioga County

Table 59. Systemic Analysis (Tioga County) – Total Number of Lanes (Source: NYSDOT CLEAR Crash Data Viewer)

	LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Total Vehicle Travel Lanes	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
1 Lane	3%	4	3%	0.96	14	2%	0.79
2 Lanes	92%	140	97%	1.05	588	95%	1.04
3 Lanes	-	-	-	-	-	-	-
4+ Lanes	< 1%	0	0%	0.00	8	1%	13.09
No Data	5%	0	0%	0.00	6	1%	0.20
TOTAL	**100%**	**331**	**100%**	**1.00**	**1,800**	**100%**	**1.00**

Figure 72. KSI Crash Representative Ratios (Tioga County) – Total Number of Lanes



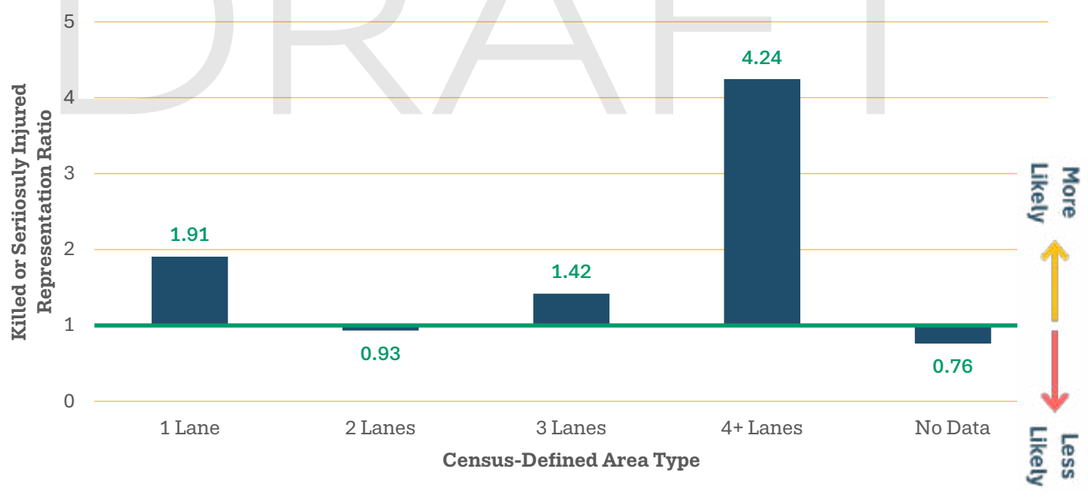
11.1.6 Area Type

Broome County

Table 60. Systemic Analysis (Broome County) – Area Type (Source: Census)

	LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Census-Defined Area Type	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
Rural	59%	116	35%	0.60	438	24%	0.42
Urban	41%	215	65%	1.57	1,362	76%	1.83
TOTAL	**100%**	**331**	**100%**	**1.00**	**1,800**	**100%**	**1.00**

Figure 73. KSI Crash Representative Ratios (Broome County) – Area Type (Source: Census)

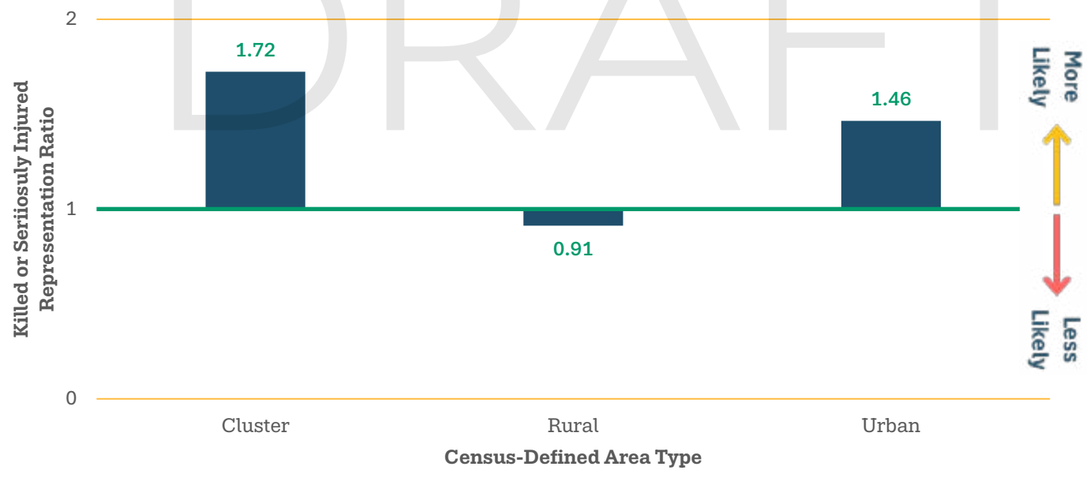


Tioga County

Table 61. Systemic Analysis (Tioga County) – Area Type (Source: Census)

	LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Census-Defined Area Type	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
Cluster	7%	18	13%	1.72	103	17%	2.31
Rural	88%	115	80%	0.91	443	72%	0.82
Urban	5%	11	8%	1.46	70	11%	2.18
TOTAL	**100%**	**331**	**100%**	**1.00**	**1,800**	**100%**	**1.00**

Figure 74. KSI Crash Representative Ratios (Tioga County) – Area Type (Source: Census)



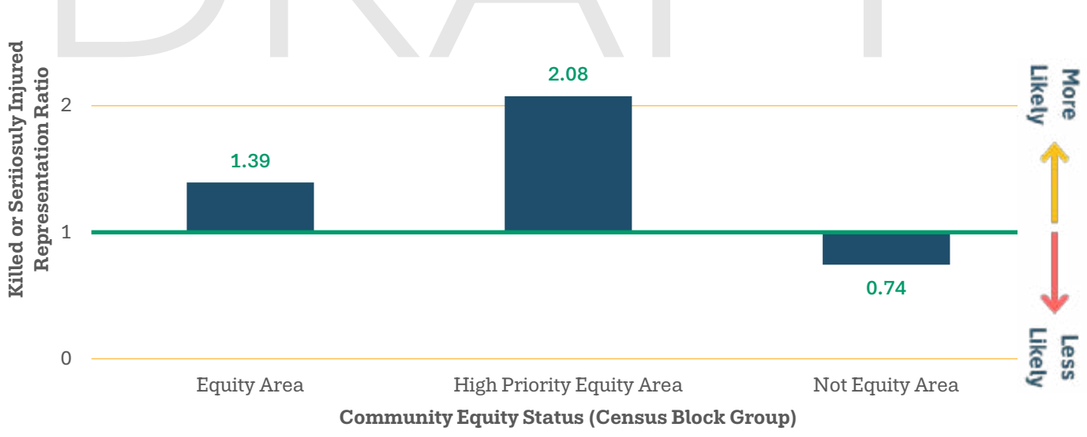
11.1.7 Community Equity Status

Broome County

Table 62. Systemic Analysis (Broome County) – Community Equity Status (Source: WSP, Census)

	LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Community Equity Status	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
Equity Area (Top 21-40%)	18%	83	25%	1.39	482	27%	1.49
High Priority Equity Area (Top 20%)	10%	72	22%	2.08	510	28%	2.70
Not Equity Area	72%	176	53%	0.74	808	45%	0.63
TOTAL	**100%**	**331**	**100%**	**1.00**	**1,800**	**100%**	**1.00**

Figure 75. KSI Crash Representative Ratios (Broome County) – Community Equity Status (Source: WSP, Census)

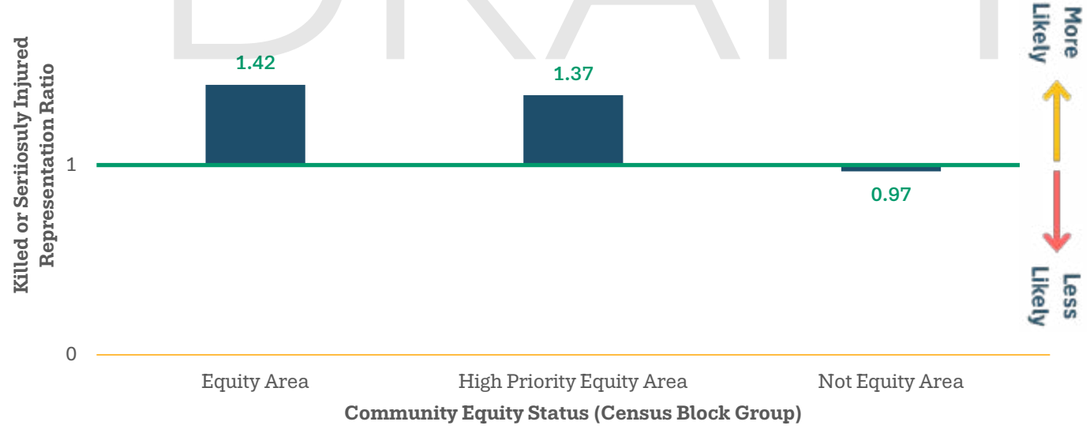


Tioga County

Table 63. Systemic Analysis (Tioga County) – Community Equity Status (Source: WSP, Census)

	LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Community Equity Status	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
Equity Area (Top 21-40%)	6%	12	8%	1.42	43	7%	1.19
High Priority Equity Area (Top 20%)	2%	3	2%	1.37	21	3%	2.24
Not Equity Area	93%	129	90%	0.97	552	90%	0.97
TOTAL	**100%**	**331**	**100%**	**1.00**	**1,800**	**100%**	**1.00**

Figure 76. KSI Crash Representative Ratios (Tioga County) – Community Equity Status (Source: WSP, Census)



11.2 Systemic Factors – Pedestrian-Involved Crashes

Broome County

Table 64. Systemic Analysis (Broome County) – Pedestrian-Involved Crashes – Primary Risk Factors

		LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Variable Assessed	**Risk Factor**	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
Equity	*Not Equity Area*	77%	29	34%	0.44	90	25%	0.33
	Equity Area (Top 21-40%)	9%	45	52%	5.70	209	59%	6.42
	High Priority (Top 20%)	13%	12	14%	1.04	56	16%	1.17
Posted Speed Limit	*< 30 mph*	39%	63	73%	1.87	284	80%	2.05
	30 - 39 mph (*)	8%	6	7%	0.83	26	7%	0.87
	40 - 49 mph (*)	6%	7	8%	1.30	17	5%	0.76
	50+ mph (*)	43%	7	8%	0.19	20	6%	0.13
	No Data (*)	3%	3	3%	1.03	8	2%	0.66
Func-tional Classif-ication	*Primary Road without Limited Access (*)*	2%	5	6%	2.35	28	8%	3.18
	Secondary and Connecting Road	14%	44	51%	3.61	139	39%	2.76
	Local, Neighborhood, and Rural Road	81%	35	41%	0.50	181	51%	0.63
	Other (*)	2%	2	2%	1.06	7	2%	0.90
Ped / Bike Activity Levels	*No Data (*)*	10%	3	3%	0.35	5	1%	0.14
	Low Activity	76%	19	22%	0.29	67	19%	0.25
	Moderate Activity	10%	33	38%	3.74	134	38%	3.68
	High Activity	4%	31	36%	8.55	149	42%	9.96
Area Type	*Rural*	59%	12	14%	0.24	20	6%	0.10
	Urban	41%	74	86%	2.08	335	94%	2.28
Number of Lanes	*1 Lane (*)*	1%	6	7%	4.89	14	4%	2.76
	2 Lanes	93%	66	77%	0.82	296	83%	0.89
	3 Lanes (*)	1%	4	5%	5.46	9	3%	2.98
	4+ Lanes (*)	2%	9	10%	6.39	31	9%	5.33
Daily Auto Volumes (AADT)	*No Data (*)*	5%	1	1%	0.22	4	1%	0.21
	Less than 2,500	85%	28	33%	0.38	146	41%	0.48
	2,500 - 4,999	4%	13	15%	3.64	51	14%	3.46
	5,000 - 9,999	3%	31	36%	10.39	108	30%	8.77
	10,000 - 14,999 (*)	2%	11	13%	7.46	38	11%	6.24
	15,000 or More (*)	<1 %	2	2%	7.02	8	2%	6.80
TOTAL	***ALL***	**100%**	**86**	**100%**	**1.00**	**355**	**100%**	**1.00**

(*) – Limited crash data available to confidently generalize this particular representation ratio.

Table 65. Systemic Analysis (Broome County) – Pedestrian-Involved Crashes – Other Risk Factors

		LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Variable Assessed	**Risk Factor**	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
Transit Proximity	*Not Near Transit*	86%	24	28%	0.33	77	22%	0.25
	Near Transit Stop	14%	62	72%	5.00	278	78%	5.43
Juris-diction	*State Road*	11%	36	42%	3.75	124	35%	3.13
	County Road (*)	17%	7	8%	0.47	12	3%	0.20
	Other	72%	43	50%	0.70	219	62%	0.86
School Proximity	*Not Near School*	96%	70	81%	0.85	264	74%	0.78
	Near School	4%	16	19%	4.24	91	26%	5.84
	No Data (*)	3%	1	1%	0.42	5	1%	0.51
Direction	*One Way*	3%	11	13%	3.84	43	12%	3.63
	Two Way	97%	75	87%	0.90	312	88%	0.91
TOTAL	***ALL***	**100%**	**86**	**100%**	**1.00**	**355**	**100%**	**1.00**

(*) – Limited crash data available to confidently generalize this particular representation ratio.

Tioga County

Table 66. Systemic Analysis (Tioga County) – Pedestrian-Involved Crashes – Primary Risk Factors

		LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Variable Assessed	**Risk Factor**	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
Equity	*Not Equity Area (+)*	55%	7	78%	1.42	17	44%	0.79
	Equity Area (Top 21-40%) (+)	10%	0	0%	0.00	13	33%	3.23
	High Priority (Top 20%) (+)	35%	2	22%	0.64	9	23%	0.66
Posted Speed Limit	*< 30 mph (+)*	12%	0	0%	0.00	15	38%	3.21
	30 - 39 mph (+)	4%	2	22%	5.99	3	8%	2.07
	40 - 49 mph (+)	2%	2	22%	11.84	4	10%	5.47
	50+ mph (+)	77%	5	56%	0.72	15	38%	0.50
	No Data (+)	6%	0	0%	0.00	2	5%	0.93
Func-tional Classif-ication	*Primary Road without Limited Access (+)*	2%	0	0%	0.00	3	8%	5.11
	Secondary and Connecting Road (+)	9%	7	78%	8.36	20	51%	5.51
	Local, Neighborhood, and Rural Road (+)	83%	2	22%	0.27	16	41%	0.50
	Other (+)	6%	0	0%	0.00	0	0%	0.00
Ped / Bike Activity Levels	*No Data (+)*	17%	0	0%	0.00	0	0%	0.00
	Low Activity (+)	81%	8	89%	1.10	26	67%	0.83
	Moderate Activity (+)	2%	1	11%	4.70	13	33%	14.10
	High Activity (+)	-	-	-	-	-	-	-
Area Type	*Rural (+)*	88%	5	56%	0.63	16	41%	0.47
	Cluster (+)	7%	2	22%	3.06	18	46%	6.36
	Urban (+)	5%	2	22%	4.26	5	13%	2.46
Number of Lanes	*No Data (+)*	5%	0	0%	0.00	2	5%	1.06
	1 Lane (+)	3%	0	0%	0.00	1	3%	0.89
	2 Lanes (+)	92%	9	100%	1.09	34	87%	0.95
	4+ Lanes (+)	< 1%	0	0%	0.00	2	5%	51.67
Daily Auto Volumes (AADT)	*No Data (+)*	19%	0	0%	0.00	0	0%	0.00
	Less than 2,500 (+)	73%	3	33%	0.46	18	46%	0.63
	2,500 - 4,999 (+)	6%	4	44%	6.96	13	33%	5.22
	5,000 - 9,999 (+)	1%	2	22%	15.00	8	21%	13.85
	10,000 - 14,999 (+)	< 1%	0	0%	0.00	0	0%	0.00
TOTAL	***ALL***	**100%**	**9**	**100%**	**1.00**	**39**	**100%**	**1.00**

(+) – Limited crash data available to confidently generalize for all pedestrian-involved representation ratios in Tioga County.

Table 67. Systemic Analysis (Tioga County) – Pedestrian-Involved Crashes – Other Risk Factors

		LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Variable Assessed	**Risk Factor**	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
Transit Proximity	*Not Near Transit (+)*	99%	9	100%	1.01	36	92%	0.93
	Near Transit Stop (+)	1%	0	0%	0.00	3	8%	13.77
Juris-diction	*State Road (+)*	10%	6	67%	6.61	19	49%	4.83
	County Road (+)	11%	1	11%	1.00	4	10%	0.92
	Other (+)	79%	2	22%	0.28	16	41%	0.52
School Proximity	*Not Near School (+)*	98%	9	100%	1.02	39	100%	1.02
	Near School (+)	2%	0	0%	0.00	0	0%	0.00
Direction	*One Way (+)*	< 1%	0	0%	0.00	3	8%	19.45
	Two Way (+)	100%	9	100%	1.00	36	92%	0.93
TOTAL	***ALL***	**100%**	**9**	**100%**	**1.00**	**39**	**100%**	**1.00**

(+) – Limited crash data available to confidently generalize for all pedestrian-involved representation ratios in Tioga County.

11.3 Systemic Factors – Bicyclist-Involved Crashes

Broome County

Table 68. Systemic Analysis (Broome County) – Bicyclist-Involved Crashes – Primary Risk Factors

		LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Variable Assessed	**Risk Factor**	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
Equity	*Not Equity Area (*)*	77%	8	22%	0.28	53	23%	0.30
	Equity Area (Top 21-40%)	9%	20	54%	5.89	135	59%	6.40
	High Priority (Top 20%) (*)	13%	9	24%	1.80	42	18%	1.35
Posted Speed Limit	*< 30 mph*	39%	33	89%	2.28	188	82%	2.09
	30 - 39 mph (*)	8%	1	3%	0.32	7	3%	0.36
	40 - 49 mph (*)	6%	1	3%	0.43	16	7%	1.11
	50+ mph (*)	43%	2	5%	0.13	14	6%	0.14
	No Data (*)	3%	0	0%	0.00	5	2%	0.64
Func-tional Classif-ication	*Primary Road without Limited Access (*)*	2%	2	5%	2.18	21	9%	3.68
	Secondary and Connecting Road	14%	21	57%	4.00	110	48%	3.37
	Local, Neighborhood, and Rural Road	81%	14	38%	0.47	97	42%	0.52
	Other (*)	2%	0	0%	0.00	2	1%	0.40
Ped / Bike Activity Levels	*No Data (*)*	10%	0	0%	0.00	0	0%	0.00
	Low Activity (*)	76%	6	16%	0.21	35	15%	0.20
	Moderate Activity	10%	14	38%	3.69	88	38%	3.73
	High Activity	4%	17	46%	10.90	107	47%	11.04
Area Type	*Rural (*)*	59%	2	5%	0.09	3	1%	0.02
	Urban	41%	35	95%	2.28	227	99%	2.38
Number of Lanes	*No Data (*)*	3%	0	0%	0.00	3	1%	0.47
	1 Lane (*)	1%	1	3%	1.89	6	3%	1.83
	2 Lanes	93%	29	78%	0.84	178	77%	0.83
	3 Lanes (*)	1%	3	8%	9.52	8	3%	4.08
	4+ Lanes (*)	2%	4	11%	6.60	35	15%	9.30
Daily Auto Volumes (AADT)	*No Data (*)*	5%	0	0%	0.00	3	1%	0.25
	Less than 2,500	85%	12	32%	0.38	77	33%	0.39
	2,500 - 4,999 (*)	4%	7	19%	4.55	31	13%	3.24
	5,000 - 9,999	3%	14	38%	10.91	71	31%	8.90
	10,000 - 14,999 (*)	2%	4	11%	6.30	37	16%	9.38
	15,000 or More (*)	< 1%	0	0%	0.00	11	5%	14.44
TOTAL	***ALL***	**100%**	**37**	**100%**	**1.00**	**230**	**100%**	**1.00**

(*) – Limited crash data available to confidently generalize this particular representation ratio.

Table 69. Systemic Analysis (Broome County) – Bicyclist-Involved Crashes – Other Risk Factors

		LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Variable Assessed	**Risk Factor**	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
Transit Proximity	*Not Near Transit (*)*	86%	9	24%	0.28	39	17%	0.20
	Near Transit Stop	14%	28	76%	5.25	191	83%	5.76
Juris-diction	*State Road*	11%	14	38%	3.39	94	41%	3.66
	County Road (*)	17%	1	3%	0.16	8	3%	0.20
	Other	72%	22	59%	0.83	128	56%	0.78
School Proximity	*Not Near School*	96%	29	78%	0.82	185	80%	0.84
	Near School (*)	4%	8	22%	4.93	45	20%	4.46
Direction	*One Way (*)*	3%	4	11%	3.24	26	11%	3.39
	Two Way	97%	33	89%	0.92	204	89%	0.92
TOTAL	***ALL***	**100%**	**37**	**100%**	**1.00**	**230**	**100%**	**1.00**

(*) – Limited crash data available to confidently generalize this particular representation ratio.

Tioga County

Table 70. Systemic Analysis (Tioga County) – Bicyclist-Involved Crashes – Primary Risk Factors

		LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Variable Assessed	**Risk Factor**	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
Equity	*Not Equity Area (+)*	55%	0	0%	0.00	4	25%	0.45
	Equity Area (Top 21-40%) (+)	10%	3	75%	7.27	10	63%	6.06
	High Priority (Top 20%) (+)	35%	1	25%	0.72	2	13%	0.36
Posted Speed Limit	*< 30 mph (+)*	12%	3	75%	6.25	11	69%	5.73
	30 - 39 mph (+)	4%	0	0%	0.00	2	13%	3.37
	40 - 49 mph (+)	2%	0	0%	0.00	1	6%	3.33
	50+ mph (+)	77%	1	25%	0.33	2	13%	0.16
	No Data (+)	6%	0	0%	0.00	0	0%	0.00
Func-tional Classif-ication	*Primary Road without Limited Access (+)*	2%	0	0%	0.00	1	6%	4.15
	Secondary and Connecting Road (+)	9%	1	25%	2.69	5	31%	3.36
	Local, Neighborhood, and Rural Road (+)	83%	3	75%	0.91	10	63%	0.75
	Other (+)	6%	0	0%	0.00	0	0%	0.00
Ped / Bike Activity Levels	*No Data (+)*	17%	0	0%	0.00	0	0%	0.00
	Low Activity (+)	81%	2	50%	0.62	7	44%	0.54
	Moderate Activity (+)	2%	2	50%	21.16	9	56%	23.80
	High Activity (+)	-	-	-	-	-	-	-
Area Type	*Rural (+)*	88%	2	50%	0.57	5	31%	0.36
	Cluster (+)	7%	2	50%	6.89	11	69%	9.48
	Urban (+)	5%	0	0%	0.00	0	0%	0.00
Number of Lanes	*No Data (+)*	5%	0	0%	0.00	0	0%	0.00
	1 Lane (+)	3%	0	0%	0.00	0	0%	0.00
	2 Lanes (+)	92%	4	100%	1.09	15	94%	1.02
	4+ Lanes (+)	< 1%	0	0%	0.00	1	6%	62.98
Daily Auto Volumes (AADT)	*No Data (+)*	19%	0	0%	0.00	0	0%	0.00
	Less than 2,500 (+)	73%	3	75%	1.02	10	63%	0.85
	2,500 - 4,999 (+)	6%	1	25%	3.92	1	6%	0.98
	5,000 - 9,999 (+)	1%	0	0%	0.00	5	31%	21.10
	10,000 - 14,999 (+)	< 1%	0	0%	0.00	0	0%	0.00
TOTAL	***ALL***	**100%**	**4**	**100%**	**1.00**	**16**	**100%**	**1.00**

(+) – Limited crash data available to confidently generalize for all bicyclist-involved representation ratios in Tioga County.

Table 71. Systemic Analysis (Tioga County) – Bicyclist-Involved Crashes – Other Risk Factors

		LENGTH	FATAL OR SERIOUS INJURY (KSI) CRASHES			ALL INJURY (KABC) CRASHES		
Variable Assessed	**Risk Factor**	Share of Roads	Crash Count	Share of Crashes	Represent. Ratio	Crash Count	Share of Crashes	Represent. Ratio
Transit Proximity	*Not Near Transit (+)*	99%	4	100%	1.01	15	94%	0.94
	Near Transit Stop (+)	1%	0	0%	0.00	1	6%	11.19
Juris-diction	*State Road (+)*	10%	1	25%	2.48	5	31%	3.10
	County Road (+)	11%	0	0%	0.00	0	0%	0.00
	Other (+)	79%	3	75%	0.95	11	69%	0.87
School Proximity	*Not Near School (+)*	98%	4	100%	1.02	16	100%	1.02
	Near School (+)	2%	0	0%	0.00	0	0%	0.00
Direction	*One Way (+)*	0%	0	0%	0.00	0	0%	0.00
	Two Way (+)	100%	4	100%	1.00	16	100%	1.00
TOTAL	***ALL***	**100%**	**4**	**100%**	**1.00**	**16**	**100%**	**1.00**

(+) – Limited crash data available to confidently generalize for all bicyclist-involved representation ratios in Tioga County.

Appendix 4
Project Development & Prioritization

12. Project Development & Prioritization

12.1 Project Development

12.1.1 Identifying Potential Project Locations

The results of the prior analyses presented in this Action Plan provided several tangible data sets (e.g., High Injury Corridors and Intersections, High Risk Network, NYSDOT CLEAR data, etc.) to inform the development of potential implementation project locations. The objectives contributing to project identification include:

- Promoting safety to prevent fatal and serious injuries on public roadways;
- Employing low-cost, high-impact strategies that improve safety over wide geographic areas;
- Ensuring equitable investment in the safety needs of underserved communities which include both urban and rural communities;
- Incorporating evidence-based projects and strategies and adopt innovative technologies; and
- Demonstrating engagement with a variety of public and private stakeholders.

Potential projects were initially identified by performing an analysis of available crash data. The High Injury Network (HIN) was initially utilized because it represents empirical data of where the most frequent and severe crashes occurred during the analysis period.

This analysis was compartmentalized into both key intersections and corridors within Broome and Tioga Counties. The result being a paired down list of priority intersections and corridors with the highest number of KSI crashes warranting further evaluation. In total, 26 corridors and 15 intersections were identified in Broome County and similarly 16 corridors and 20 intersections within Tioga County.

To understand the nature of the safety issues present at each of the 42 corridors and 35 intersections initially considered, a comprehensive review of crash characteristics (via NYSDOT CLEAR) was conducted for each potential priority location. This CLEAR-based exploratory analysis provided further context for each location regarding typical crash types, common collision types, and frequent contributing actions. This records-based screening served to narrow the list of potential locations to focus on sites where infrastructure changes had the greatest potential to affect safety outcomes.

Further GIS evaluation was performed for each potential implementation location. This included analyzing each location with respect to:

1. High Injury Network
2. High Risk Network
3. Regional Equity Data
4. NYSDOT CLEAR Level of Service of Safety (LOSS) Metrics
5. Public Outreach Survey Results

Following these initial screenings, coordination meetings were held with the Project Steering Committee (PSC) to solicit feedback and review pre-existing planned improvements projects within both counties. Feedback from the PSC, NYSDOT in particular, informed the development of specific project limits, as well as potential countermeasures.

Site visits were performed at each approved project location to "ground truth" the feasibility of potentially relevant safety countermeasures. Existing site conditions, such as highway geometry (e.g., horizontal / vertical curves, lane configurations, shoulder conditions), right-of-way, intersection sight distance, traffic signal inventory, pedestrian and bicycle infrastructure, and presence of utilities, were recorded for future project development.

12.1.2 Developing Relevant Countermeasures for Selected Locations

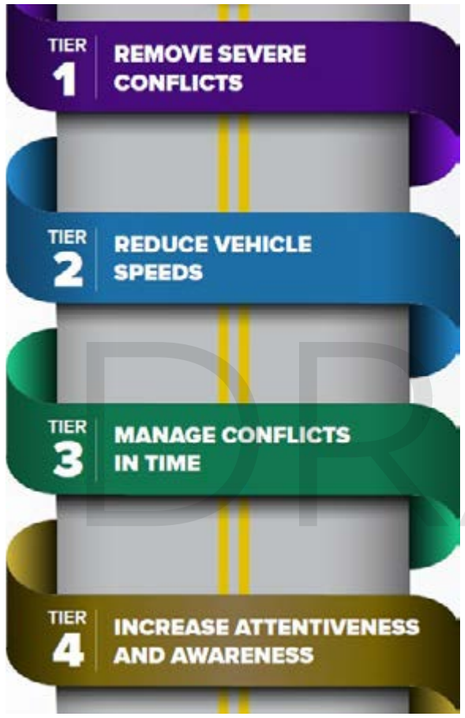
The U.S. Department of Transportation's Federal Highway Administration (FHWA) has issued its Proven Safety Countermeasures initiative (PSCi), a collection of 28 countermeasures and strategies effective in reducing roadway fatalities and serious injuries, was consulted to guide the development of relevant countermeasures, and ultimately the basis of potential implementation projects. Each PSCi countermeasure addresses at least one safety focus area (e.g., speed management, intersection safety, roadway departures, or pedestrian/bicyclist safety). A comprehensive review of crash data, contributing actions, GIS analysis, public and stakeholder feedback, and existing site conditions were leveraged to evaluate the feasibility of each PSCi countermeasure for a given location.

An AutoCAD layout for each project was developed to establish baseline existing conditions and identify appropriate locations for safety countermeasures. The strategies and countermeasures proposed seek to address site-specific safety concerns. For example, roadway departure countermeasures were predominantly proposed for rural corridors whereas medians and pedestrian refuge islands were proposed at intersections with a history of crashes involving vulnerable road users.

The countermeasures proposed align with the USDOT's Safe System Roadway Design Hierarchy, which is summarized in **Figure 77**. The hierarchy assigns a tier rating to each potential safety countermeasure based on the extent to which it reduces the likelihood of a severe injury crash through physical separation (e.g., sidewalks, dedicated turn lanes), lower vehicle speeds (e.g., infrastructure and

operations), temporal separation (e.g., exclusive or leading phase for vulnerable road users), and boosting user attentiveness and awareness (e.g., signage).

Figure 77. Safe System Roadway Design Hierarchy (Source: USDOT FHWA)



Project costs inclusive of implementation costs (i.e. construction), as well as soft costs (e.g., engineering design, planimetric surveys, and construction inspection), were estimated to inform a benefit-cost analysis, as well as anticipated project timeframes (i.e., short-, mid-, and long-term).

12.1.3 Caveats and Exclusions for Costs and Implementation Timelines

Anticipated total project costs (TPC) are presented within the tables of Section 6.2 (Project List), as well as the individual project profiles that conclude this chapter. The following assumptions and limitations apply to the capital cost estimates developed for this study:

- Unit costs for individual implementation/construction items were based on trends over the past five years (as of 2025).
- It is assumed that federal / state funding will be secured for implementation. As such, unit costs consistent with federal / state specifications were assumed, alongside prevailing wages.
- Materials and construction costs will fluctuate in the future and may increase or decrease based on the availability of materials, global market conditions (e.g., tariffs), and influence of competing projects.
- Costs for work zone traffic control, survey, engineering design, and construction inspection efforts, are based on industry standards set forth by NYSDOT.
- Project costs associated with right-of-way, environmental screenings / permits, and utility alterations are NOT included. These costs are typically established during preliminary design once a survey has been performed to quantify project impacts.
- To account for potential cost increases, a 20% contingency / inflation factor was incorporated.

12.2 Prioritization Framework

Table 72 outlines the evaluation rubric used within this prioritization scheme. The prioritized list of capital projects presented in the next section accounts for each location's crash history (HIN), relative risk (HRN and LOSS), potential to impact vulnerable road users, and proximity to equity communities, as well as the relative competitiveness of each project based on estimates of capital cost and the expected crash reduction benefits triggered by the safety countermeasures proposed at that particular location. This prioritization scheme awarded a total of 100 points across four categories and eight evaluation criteria, as summarized below.

1) Safety Impacts (50%)
2) Project Competitiveness (20%)
3) Vulnerable Road User & Community Facilities (15%)
4) Equity (15%)

Table 72. Prioritization Score Evaluation Rubric

Category / Theme	Category Weight	Prioritization Criteria	Criteria Weight	Rankings / Classifications	Points Awarded
Safety Impact	50%	High Injury Network Ranking (Corridors / Intersection)	30%	Top 1% / Top 3	30 / 30
				Top 3% / Top 5	25 / 24
				Top 5% / Top 10	20 / 18
				Top 10% / Top 15	15 / 12
				Top 15% / Top 20	10 / 6
				Top 25% / Not Top 20	5 / 0
		High Risk Network Score	15%	Highest (Top 3%)	15
				Higher (Top 5%)	12
				High (Top 10%)	9
				Moderate (Top 25%)	6
				Low (Top 50%)	3
		CLEAR Level of Safety Service (LOSS)	5%	Highest (4)	5
				2nd Highest (3)	3
Project Competitiveness	20%	Benefit-Cost Ratio	20%	45	20.0
				15	13.3
				3	6.7
VRU & Community Facilities	15%	Vulnerable Road User Injury Crashes (KABC)	10%	2	10
				1	5
		Proximity to Schools & Parks	5%	Within 1/8 Mile	5
Equity	15%	Vulnerable Community Analysis	10%	High Priority (Top 20%)	10
				Priority (Top 21-40%)	5
		Federal Designation (Underserved)	5%	Meets Federal Criteria	5
4 Categories	100%	8 Evaluation Criteria	100%	MAX SCORE	100

Reflecting half the weight of the prioritization scheme (50%), the **Safety Impacts** category utilized the High Injury Network, the High Risk Network, and NYSDOT CLEAR's Level of Safety Service (LOSS) rating, which compares the expected crash frequency to the predicted crash frequency based on vehicle volumes, to assess the extent of the safety issue at each location. Within this category, most of the weight (60% in this category, 30% overall) was based on the reactive High Injury Network, with points assigned for any facility within the Top 25% of the High Injury Corridors or the Top 20 among the High Injury Intersections. To incorporate an assessment of future crash risk, up to 15 points were assigned for facilities that ranked within the Top 50% of the study's High Risk Network. In addition, up to 5 points were allocated whenever a facility was rated as a 4 (10th percentile) or 3 (10th to 50th percentile) within NYSDOT CLEAR's LOSS ratings system.[3]

The **Project Competitiveness** category, which was evaluated via project-specific estimates of crash reduction benefits stemming from the safety countermeasures depicted in this chapter, constituted 20% of the total prioritization score. For more information on the benefit-cost analysis, please refer to APPENDIX – Benefit-Cost Analysis.

Accounting for 15% of the total score, the **Vulnerable Road Users & Community Facilities** category seeks to guide investment towards locations where injury crashes involving pedestrians and cyclists have already occurred and/or project areas that are proximate to schools and/or public parks. VRU crash history was awarded up to 10 points if the location had a documented history of injury crashes involving pedestrians or cyclists over the five-year study period. Five points were assigned whenever a school or public park was found to lie within one-eighth of a mile.

The **Equity** category blends the vulnerable community analysis (Chapter 2) with federally-issued assessments of whether a community is traditionally underserved to award up to 15% of the prioritization score. Using the study-specific designations of High Priority Equity Area (Top 20%) and Priority Equity Area (Top 21-40%), a project was awarded 10 or 5 points, respectively, based on its overlap with the highest-rated (i.e., most vulnerable) block group traversed. A project earned an additional five points if it traversed a tract that was defined as an "Underserved Community" within the USDOT's FY 2025 SS4A Underserved Communities online tool.

12.2.1 Determining Tiebreaks for Rankings

En route to developing a prioritized list of safety priorities, the total prioritization score was used as the primary ranking metric. In cases where two or more projects earned the same total prioritization score, first order ties were decided by comparing the prioritization score component for High Injury Network Ranking, with the project location that received the higher HIN-based score ranked first. When necessary, second order ties were broken based on the benefit-cost ratio, with the project that had the higher BCR ranked first.

[3] *Highway Safety Improvement Program Procedures and Techniques (aka "Red Book").* New York State Department of Transportation. 2023. Page 37.

12.2.2 Project Timeframe

Recognizing the trade-offs between filling a critical funding gap and accepting a substantial administrative burden with regard to administering federal / state grant awards, this study sought to define project implementation timeframes based on the overall magnitude of the anticipated cost. **Table 73** shows the capital cost breakpoints that were used to define the implementation timeframe for each project proposed.

Table 73. Project Timeframes & Capital Cost Thresholds

PROJECT TIMEFRAME / TYPE	INTERSECTION	CORRIDOR
Short-Term	< $175,000	< $500,000
Mid-Term	< $400,000	< $1,000,000
Long-Term	≥ $400,000	≥ $1,000,000

This approach effectively creates different time-based bins of investment priorities. With this information, BMTS can quickly understand its most promising safety projects based on the extent to which the construction effort could be funded through primarily local means (short-term) or may require a mix of outside funding from state/federal partners (mid- or long-term).

Appendix 5
Benefit-Cost Analysis

13. Benefit-Cost Analysis

In developing conceptual engineering approaches to addressing roadway safety issues for the Priority Projects, the suite of countermeasures reviewed in Chapter 6 (Capital Projects to Address the High Injury Network) was utilized. A team of planners and engineers used aerial imagery, professional judgment, and federal guidance related to anticipated crash reduction factors[4] to assign relevant countermeasures, estimate their potential safety, and compute a high-level, 20-year benefit-cost ratio (BCR). The BCR was used within the prioritization process as a proxy for project competitiveness, serving to supplement the other heavily location-based prioritization metrics.

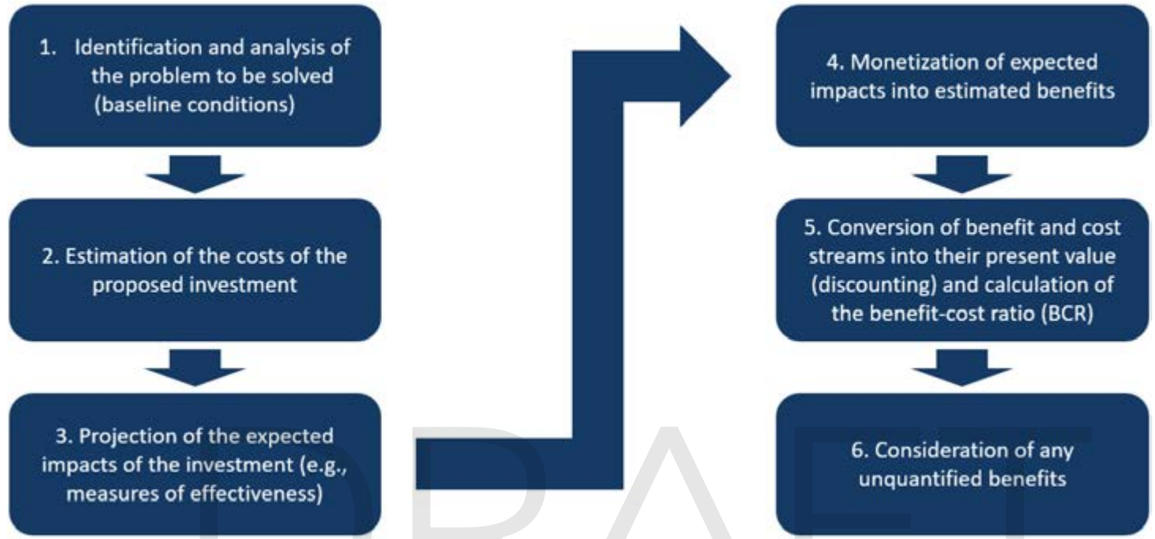
13.1 Benefit-Cost Analysis Overview

As summarized below, the process used to estimate safety-related benefits is aligned closely with the core components of FHWA's Benefit-Cost Analysis (BCA) methodology. [5]

1. Service life of the improvement of 20 years
2. Use of Crash Modification Factors (CMFs) from the CMF Clearinghouse that are applied to relevant crashes (e.g., all injury severity crashes, correct context – corridor versus intersection, high confidence or star rating on the CMF, etc.)
3. Use of historical crash records to estimate safety-related benefits from expected crash reductions
4. Applying a discount rate of approximately 7%

The general process used to conduct a BCA, as depicted by the USDOT in the May 2025 guidance, is shown in **Figure 78**. In line with previous SS4A Notice of Funding Opportunity (NOFO) announcements, this plan, which is published ahead of the FY 2026 NOFO, reports project both project costs and benefits in 2025 dollars.

Figure 78. Benefit-Cost Analysis – Process Overview (Source: USDOT, May 2025, pg. 7)



13.2 Estimating Benefits from Relevant Countermeasures

For each capital project shown in Chapter 6, crash data spanning from 2019-2023 was analyzed via NYSDOT's CLEAR portal. This was used to identify any crash clusters, such as a particular curve, intersection, or driveway, and the associated manners of collision in which roadway crashes were reported to occur. Based on this review, relevant safety countermeasures were suggested to address existing crash histories at these particular locations.

With an understanding of the crash histories within a given project area and a conceptual approach to addressing safety issues via the proposed countermeasures, safety-related benefits for each capital project were estimated using the following process:

1. Separated the segment- and intersection-related crashes into two distinct groups, then performed the routines below within each grouping
    a. Counted the number of crash events (i.e., crashes or persons injured) by severity

[4] Crash Modification Factors (CMFs) were retrieved from the USDOT-funded Crash Modification Factors Clearinghouse, with a preference for those that were readily generalizable (i.e., they pertained to All crash types and related to either All or All Injury severity types).

[5] USDOT. "Benefit-Cost Analysis Guidance for Discretionary Grant Programs." May 2025. Available at https://www.transportation.gov/sites/dot.gov/files/2025-05/Benefit%20Cost%20Analysis%20Guidance%202025%20Update%20II%20%28Final%29.pdf

b. Calculated the total value of all collisions by multiplying the (corridor- or intersection-level) severity-based crash counts by the USDOT-informed values for each severity type (**Table 74**)
c. Estimated the combined crash reduction factor associated with the suite of countermeasures using the dominant common residuals method, which can be used to control for the influence of potential overlapping effects among similar countermeasures
d. Generated the economic value of the crash reductions by multiplying the total value of all collisions (b) and the combined crash reduction factor (c)

2. Estimated the safety-related benefit for the project as a whole by adding the corridor- and intersection-level values above (d)

Table 74. Monetized Value of Reduced Fatalities, Injuries, and Crashes (Source: Table A-1, USDOT BCA Guidance, May 2025)

Crash Type / BASIS OF BENEFITS	PER CRASH	PER PERSON INVOLVED
Killed (K)	$14,806,000	$13,200,000
Serious Injury (A)	$329,500	$1,254,700
Minor Injury (B)	$329,500	$246,900
Possible Injury (C)	$329,500	$118,000
Property Damage Only (O)	$9,500	$5,300

13.3 Capital Costs

The development of capital costs is described in APPENDIX – Project Development & Prioritization.

13.4 Benefit-Cost Ratio (BCR)

The Benefit-Cost Ratio (BCR), which was calculated by dividing the countermeasures' anticipated safety-related benefits over a 20-year service life by their estimated capital cost, accounted for 20% of a project's total prioritization score. Projects with a BCR of 1.0 are estimated to produce one dollar of safety-related benefit for every dollar necessary to install the countermeasures. In terms of gauging competitiveness for future grant applications, projects with a BCR greater than 1.0 are expected to generate more safety-related benefits than costs (i.e., public spending could be justified solely based on number of roadway-related injuries and fatalities avoided).

13.5 BCA Approach Caveats

The methodology used to estimate costs and benefits for this plan is a simplification of the process a community would need to undertake in order to submit a benefit-cost analysis for an SS4A Implementation grant. It is only meant to capture an order-of-magnitude sense of the potential costs and safety-related benefits. Recognizing the planning nature of this effort, a more in-depth and technical economic analysis was not completed; however, such an analysis would include the following:

1. Expanded calculation of non-safety related benefits: economic, travel time, state of good repair, operations cost, environmental/emissions, health, etc.
2. Expanded calculation of safety related benefits to capture any crash reduction created as a result of mode shift brought about by the project
3. Detailed argument for the appropriateness of each CMF applied, as it relates to the literature from which it was derived and the methodology of combining CMFs (dominant common residuals)
4. Escalation of crash rates in the no-build, modeled with traffic volumes, declining roadway conditions, etc.
5. Expansion of project costs to capture the true capital cost of construction based on detailed design drawings, and the inclusion of operation and maintenance costs for the useful life of the project
6. Capturing "disbenefits", which were screened out from this analysis
    a. Only sidewalks, which were reset to a CMF of 1
    b. FHWA has guidance on the benefit per mile for certain bicycle and pedestrian facilities, but these need to be modeled subject to their assumptions and diminishing returns
7. Shift to a non-linear estimation of benefits
    a. Crash reduction is uniform over the 20-year period and always matches the CMF value

Appendix 6
State Highway Safety Plan Selected Strategies

NEW YORK STATE

Governor Kathy Hochul
Commissioner Marie Therese Dominguez

Appendix 1: Strategic Highway Safety Plan

2023-2027

STRATEGIES

Reducing the number of intersection-related fatal and serious injury crashes will be achieved through a Safe Systems Approach using strategies that encourage safe road users, safe vehicles, safe speeds, safe roads, and post-crash care to address contributing factors.

This Strategic Highway Safety Plan (SHSP) includes the following strategies to address the Intersections emphasis area:

1. Develop a Statewide Intersection Safety Action Plan.
2. Implement systemic safety improvement projects at intersections.
3. Implement safety countermeasures at intersections based on location-specific crash data.
4. Support policy initiatives to increase intersection safety.
5. Develop educational materials to promote safer travel at intersections.
6. Improve enforcement of traffic laws at intersections

1 Develop a Statewide Intersection Safety Action Plan.

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Determine which intersection countermeasures are effective (targeted and systemic) in New York and should be expanded.	NYS DOT/*All partners*	Enforcement	Safer Speeds
Engage education and enforcement partners in the intersection plan's develeopment, implementation, and outreach.	NYS DOT, *MPOs/All partners*	Enforcement	Safer Vehicles, Safer People

2 Implement systemic safety improvements projects at intersections.

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Identify intersections with high risk roadway features that are correlated with crash types.	NYS DOT, *MPOs/All partners*	Engineering	Safe Roads
Provide training and documentation on the systemic analysis process.	NYS DOT, *MPOs/All partners*	Engineering	Safe Roads
Identify and implement appropriate countermeasures at intersections with risk factors.	No lead agency/*All partners*	Engineering	Safe Roads
Refine the intersection inventory to improve the identification of locations with risk factors on all public roads.	NYS DOT/*All partners*	Engineering	Safe Roads

3 Implement safety countermeasures at intersections based on location-specific crash data.

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Identify intersections safety by implementing Complete Streets roadway designs.	NYS DOT/*All partners*	Engineering	Safe Roads
Improve intersection geometry by supporting innovative intersection designs. (e.g., improve signal detection and signal timing)	NYS DOT/*All partners*	Engineering	Safe Roads
Improve signal operation by encouraging signal timing assessments.	No lead agency/*All partners*	Engineering	Safe Roads
Continue to evaluate the effectiveness of intersection safety projects.	No lead agency/*All partners*	Engineering	Safe Roads

3 Implement safety countermeasures at intersections based on location-specific crash data. (cont'd)

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Improve safety at signalized intersections by adding, upgrading, or removing signals as warranted.	No lead agency/*All partners*	Engineering	Safe Roads
Improve or eliminate highway-railroad grade crossings to reduce the frequency and severity of crashes at grade crossings.	NYS DOT/*All partners*	Engineering	Safe Roads

4 Support policy initiatives that increase intersection safety.

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Support complete streets policy and implementation and livable communities' initiatives in accordance with State law.	*MPOs / All partners*	Engineering	Safe Roads
Facilitate grant application process for municipalities and rural areas not served by MPOs.	NYS DOT, *MPO / All partners*	Education	Safe Roads

5 Develop educational materials to promote safer travel at intersections.

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Encourage the use of the Driver Education Research and Innovation Center model.	NYS DOH, *GTSC/All partners*	Education	Safe Road Users
Develop materials, outreach, and training to educate the public on new traffic control devices.	NYS DOT/*All partners*	Education	Safe Road Users
Promote public awareness of intersection safety issues and provide educational resources for all users on ways to prevent crashes.	NYS DOH/*All partners*	Education	Safe Road Users

6 Improve enforcement of traffic laws at intersections.

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Support the use of intelligent transportation systems to improve safety.	NYS DOT/*All partners*	Enforcement	Safer Vehicles
Support the use of emerging technologies such as connected vehicle technology.	NYS DOT/*All partners*	Enforcement	Safer Vehicles

This Strategic Highway Safety Plan (SHSP) includes the following strategies to support the Vulnerable Road Users emphasis area:

STRATEGIES

Reducing fatal and serious injury crashes involving vulnerable road users will be achieved through multidisciplinary approaches incorporating strategies developed using the Safe System Approach that encourages safe road users, safe vehicles, safe speeds, safe roads, and post-crash care to address contributing factors.

1. Continue implementing infrastructure programs to enhance vulnerable road user safety, especially in High Risk areas.
2. Enhance data processes to easily obtain current vulnerable road user data, especially in High Risk areas.
3. Support policy initiatives to increase vulnerable road user safety, especially in High Risk areas.
4. Continue educational programs for vulnerable road user safety, especially in High Risk areas.
5. Continue to work with vulnerable road user advocates and working groups, especially regarding strategies to address safety in High Risk areas.
6. Enforce safety laws that pertain to vulnerable road users and motorists, especially in High Risk areas.

1 Continue implementing infrastructure programs to enhance vulnerable road user safety especially in High Risk areas.

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Promote work zone safety for highway workers, cyclists, and pedestrians.	GTSC/*All agencies*	Engineering	Safe Roads, Safe Road Users, Safe Speeds
Promote pedestrian and bicycle safety and encourage mobility, especially in disadvantaged communities, by consdiering new or additional pedestrian and bicycle infrastructure.	NYS DOT, MPOs *All partners*	Engineering, Education	Safe Roads, Safe Road Users
Increase pedestrian safety measures, such as extended Leading Pedestrian Intervals (LPIs), curb extensions (on streets with parking), and left turn calming infrastucture where appropriate.	No lead agency/*All partners*	Engineering, Education	Safe Roads, Safe Road Users, Safe Speeds, Safe Vehicles
Construct safe, well-lit crosswalks along bus routes.	No lead agency/*All partners*	Engineering	Safe Roads, Safe Road Users
Encourage passive detection (instead of a button) and universal symbology to trigger the pedestrian signal when someone is waiting.	No lead agency/*All partners*	Engineering	Safe Roads, Safe Road Users
Conduct planning studies to determine the costs and benefits of highway removal projects for vulnerable road users in Special Equity Areas.	NYS DOT, MPOs/*All partners*	Engineering, Education	Safe Roads, Safe Road Users
Consider using the Complete Streets checklist on all projects.	No lead agency/*All partners*	Engineering	Safe Roads, Safe Road Users, Safe Speeds

2 Enhance data processes to easily obtain current vulnerable road user data, especially in High Risk areas.

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Incorporate demographic data, as available and Special Equity Area locations to enhnace the analysis in the Vulnerable Road User Safety Assessment.	NYS DOT/MPOs, *All agencies*	Engineering, Education	Safe Roads, Safe Road Users
Expand data collection, such as AADT, on all public roads.	No lead agency/*All partners*	Engineering	Safe Roads, Safe Road Users
Consolidate pedestrian count data and establish best practices.	NYS DOT, MPO/*All partners*	Engineering, Education	Safe Roads, Safe Road Users
Investigate the use of travel demand models to determine pedestrian and cyclist activity.	NYS DOT, MPO/*All partners*	Engineering, Education	Safe Roads, Safe Road Users
Support collaboration to discuss vulnerable road user data collection strategies and best practices.	NYS DOT, ITSMR, MPOs/*All partners*	Engineering, Education	Safe Roads, Safe Road Users
Continue Crash Location, Engineering Analysis and Reporting (CLEAR) training for NYS DOT staff, local municipalities, MPOs, and Tribal Nations.	NYS DOT/MPOs, *All partners*	Engineering, Education	Safe Roads, Safe Road Users
Consider collecting demographic data on police reports.	NYS DOT, ITSMR/*All partners*	Engineering, Education	Safe Roads, Safe Road Users

3 Support policy initiatives to increase vulnerable road user safety, especially in High Risk areas.

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Continue to support the NY Complete Streets Act.	NYS DOT/*All partners*	Engineering, Education	Safe Roads, Safe Road Users
Develop and implement the recommendations of the Active Transportation Strategic Plan.	NYS DOT/*All partners*	Engineering, Education, Enforcement	Safe Roads, Safe Road Users, Safe Vehicles, Safe Speeds
Analyze the results of smart work zone technologies to prevent crashes involving vulnerable road users in NYS, such as the Automated Work Zone Speed Enforcement program.	NYS DOT/*All partners*	Engineering	Safe Roads, Safe Road Users

4 Continue educational programs for vulnerable road user safety, especially in High Risk areas.

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Continue to promote public awareness of vulnerable user and work zone safety issues through interactive education, training, and outreach programs.	GTSC/*All partners*	Education	Safe Roads, Safe Road Users, Safe Speeds, Safe Vehicles
Ensure educational programs are multilingual and interact with groups like delivery cyclists and children and parents to share information.	GTSC/*All partners*	Education	Safe Roads, Safe Road Users, Safe Speeds, Safe Vehicles
Support educational outreach campaigns, such as Operation Safe Stop and Operation See! Be Seen, Share the Road, Slow Down, etc.	GTSC/*All partners*	Education	Safe Roads, Safe Road Users, Safe Speeds, Safe Vehicles
Provide vulnerable road user safety and enforcement training to police officers. Improve training for enforcement of failure to yield.	GTSC/*All partners*	Education, Enforcement	Safe Roads, Safe Road Users
In Amish communities, educate drivers on sharing the road with buggies or other horse-drawn equipment.	No lead agency/*All partners*	Education	Safe Roads, Safe Road Users
Provide training on best practices for crash analysis using CLEAR.	NYS DOT/*All partners*	Engineering, Education	Safe Roads, Safe Road Users

5 Continue to work with vulnerable road user advocates and working groups, especially in High Risk areas.

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Conduct community engagement training to improve outreach strategies with vulnerable road users, particularly those in High Risk areas.	NYS DOH/*All partners*	Education	Safe Road Users
Improve coordination, communication, and engagement strategies between the State, municipalities, and Tribal Nations.	NYS DOT, MPOs/*All partners*	Education	Safe Roads, Safe Road Users
Support walk or bike audits with stakeholder groups to gather input about pedestrian and bicycle safety issues.	NYS DOH, MPOs/*All partners*	Engineering, Education	Safe Roads, Safe Road Users
Coordinate follow-up stakeholder meetings following the publication of the Strategic Highway Safety Plan.	NYS DOT, MPOs/*All partners*	Engineering, Education	Safe Roads, Safe Road Users

6 Enforce safety laws that pertain to vulnerable road users and motorists, especially in High Risk areas.

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Enforce lower motor vehicle speeds, especially in dense communities where pedestrian facilities traverse public roadways.	Law Enforcement/*All partners*	Enforcement	Safe Roads, Safe Road Users, Safe Speeds
Support community traffic safety programs.	GTSC/*All partners*	Enforcement, Education	Safe Roads, Safe Road Users
Implement Automated Work Zone Speed Enforcement (AWZSE) to reduce speeds and work zone crahses.	NYS DOT, Thruway Authority/ *All partners*	Enforcement	Safe Road Users

STRATEGIES

Decreased fatal and serious injury crashes involving roadway departures will be achieved through strategies developed using the Safe Systems Approach that encourages safe road users, safe vehicles, safe speeds, safe roads, and post-crash care to address contributing factors

This Strategic Highway Safety Plan (SHSP) includes the following strategies to address the Roadway Departures emphasis area:

1. Complete a statewide Roadway Departure Safety Action Plan.
2. Continue enforcement of traffic laws that reduce roadway departure crashes.
3. Develop educational materials related to roadway departure crashes.
4. Implement systemic safety improvements that decrease the severity of roadway departure crashes.
5. Implement safety countermeasures at specific locations based on roadway departure crash data

1 Complete a statewide Roadway Departure Safety Action Plan.

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Determine which roadway departure countermeasures are effective in New York State and should be expanded.	NYS DOT / *All partners*	Engineering	Safe Roads
Engage education and enforcement partners in the development, implementation, and outreach of the Roadway Departure Safety Action Plan.	NYS DOT, MPOs / *All partners*	Engineering	Safe Roads

2 Continue enforcement of traffic laws that reduce roadway departure crashes.

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Increase enforcement, education, and public awareness of the causes of Roadway Departure crashes.	GTSC / *All partners*	Enforcement/ Education	Safe Road Users

3 Develop educational materials related to roadway departure crashes.

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Develop outreach materials and training to educate the public on the major causes of roadway departure crashes.	NYS DOT / *All partners*	Education	Safe Road Users
Conduct outreach to the public.	NYS DOH / *All partners*	Education	Safe Road Users

4 Implement systemic safety improvements that decrease the severity of roadway departure crashes.

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Identify locations with high risk roadway features correlated with roadway departure crashes.	NYS DOT / *All partners*	Engineering	Safe Roads
Install Centerline Audible Roadway Delineators (CARDs) and Shoulder Audible Roadway Delineators (SHARDs) on eligible roadways.	NYS DOT / *All partners*	Engineering	Safe Roads
Support innovative processes and technology such as Intelligent Transportation Systems (ITS) and Traffic Incident Management (TIM).	NYS DOT / *All partners*	Engineering	Safe Road Users

5 Implement safety countermeasures at locations based on roadway departure crash data.

Strategy/Proposed Action	Lead Agency/Partners	Focus	Safe Systems Element
Implement proven countermeasures such as shoulder improvements, roadway delineation, geometric improvements, and reflective line painting.	NYS DOT / *All partners*	Engineering	Safe Roads
Continue to implement the Skid Accident Reduction Program (SKARP).	NYS DOT / *All partners*	Engineering	Safe Roads

DRAFT

BMTS

SAFETY ACTION PLAN