



Town of Kirkwood

US Route 11
Corridor Study

Prepared by:

BMTS

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INTRODUCTION

US Route 11, commonly referred to as Upper Court Street, is an important gateway for the Town of Kirkwood. It serves as a primary corridor for Kirkwood's residents and neighbors traveling between the urban and rural areas of Broome County. Further, it is along this corridor that many travelers form their first impressions of Kirkwood and the region. The US Route 11 Corridor Plan aims to provide a framework for the coordination of private and public investments that accommodate safe and efficient travel for all users and create an enjoyable experience for visitors and residents.

Chapter One: Purpose and Overview

PURPOSE

The Town of Kirkwood’s 2016 Comprehensive Plan identifies US Route 11 as a priority for future improvements and recommends that BMTS conduct a corridor study of the area. This study, the US Route 11 Corridor Study, will serve as a guide for future improvements along a 1.1-mile segment of the corridor from Colesville Road to the Binghamton city line.

With an emphasis on mobility and revitalization, the study provides guidance for future enhancements within the vicinity of the corridor and for roadway design that will support existing and future users of the corridor. The Plan reinforces the function of US Route 11 as a primary travel way through Kirkwood with the goal of increasing safety and mobility for motorists, pedestrians and cyclists. The study examines access management, right of way encroachment, bicycle and pedestrian accommodations, and aesthetic improvements for the area.



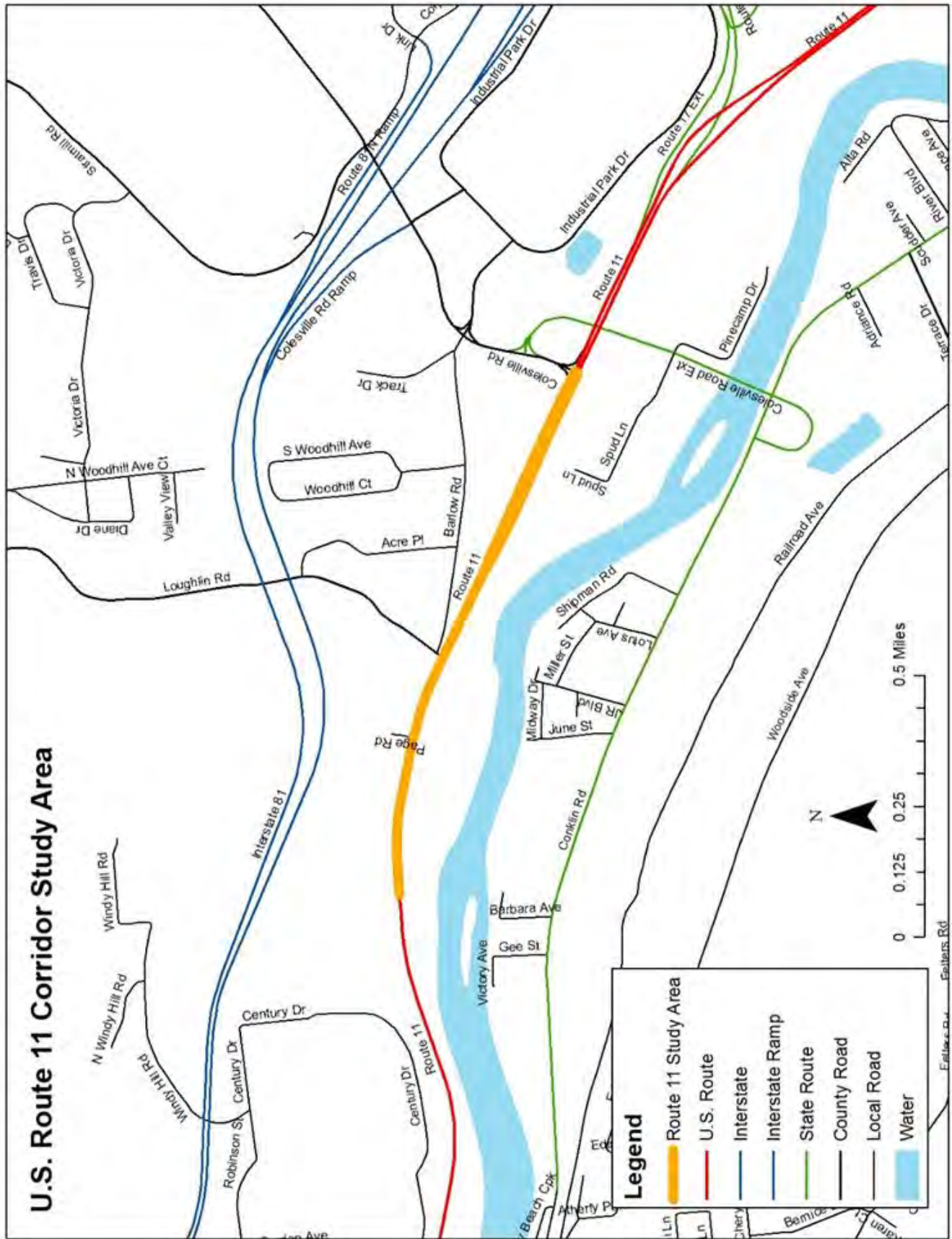
Image 1.1: Cyclist along Route 11

Corridor Context. U.S. Route 11 (Route 11), which runs from Louisiana to the Canadian border, is part of the U.S. Highway System. The 1.1-mile segment of Route 11 subject to this study is bound to the west by the City of Binghamton line and to the east by Colesville Road. The corridor serves as a gateway into the town of Kirkwood from the west and as a connector to Route 17 and Interstates 81 and 86. It is a designated state bike route, connecting to the Route 17 state bike route and the BMTS regional bike route system.



Image 1.2: Highway Directional Signage

U.S. Route 11 Corridor Study Area



PLANNING INFLUENCES

The following plans and studies were used to guide the development of the US Route 11 Corridor Study.

Town of Kirkwood 2016 Comprehensive Plan.

The Kirkwood Comprehensive Plan states “current conditions in the corridor do not reflect positively on the Town or the region”. The Plan includes the following recommendations for the Route 11 corridor:

Intensify Code Enforcement

- Address the encroachment of development along Route 11
- Eliminate the use of temporary concrete construction barriers as permanent fencing and screening
- Improve the function and appearance of parking lots by citing property owners when their sidewalks, driveways and parking spaces are not in a “proper state of repair, and maintained free from hazardous conditions” (Section 302.3 of the Property Maintenance Code)
- Reduce visual clutter by more strictly regulating signage within the corridor

Practice Better Access Management

- Reduce the total number of curb cuts
- Require defined curb cuts
- Encourage shared access by neighboring commercial properties during site plan review

Complete Streets and Connectivity

- Recognize bicycling and walking as forms of transportation as well as recreation
- Attend Complete Streets training for local decision makers
- Adopt a Complete Streets policy for the Town
- Require bike and pedestrian amenities during site plan review



49 percent of Kirkwood’s comprehensive plan survey respondents agreed that:

Including pedestrian and bicycle amenities such as convenient sidewalks, benches and bike racks as part of development projects is ‘Important’ or ‘Very Important’. 31 percent agreed that it is 'somewhat important'.

Looking Forward 2040: The Greater Binghamton Transportation Plan. This plan sets forth goals, objectives, and transportation projects and actions built around five guiding principles: sustainability, accessibility, mobility, safety, and system preservation. Certain goals and objectives are highlighted below:

Enhance the livability of the region with appropriate transportation investment

- Construct sidewalks to ensure connectivity
- Overcome barriers to bicycle use

Ensure that the regional transportation system provides convenient mode-neutral access to destination including employment, education and services

- Construct sidewalks where gaps are identified
- Install pedestrian signal technology at existing and new installations
- Overcome barriers to bicycle use
- Maintain access for motor vehicles and truck freight delivery

Create a regional transportation system of Complete Streets that provide safe and secure travel for all users and all modes

- Study and propose countermeasures for high crash locations
- Install bus shelters at key locations
- Improve safety for pedestrians and cyclists

Maintain the regional transportation system in a state of good repair

- Invest to maintain pavement sufficiency on both the state system and local arterial roadways

BMTS Bicycle Plan, 2015 and the Pedestrian Plan, 2013: The primary goal of these plans is to increase the safety of all persons traveling on foot or bicycle, as measured by reduction in the number of accidents, while increasing the number of trips made by these modes. These plans include the following recommended actions and objectives:

- Improve bicycle infrastructure and the core bicycle route system as appropriate
- Include appropriate bicycle design elements in all programmed projects
- Develop projects as candidates for Federal Transportation funding
- Coordinate with the New York State Department of Transportation’s regional and statewide pedestrian and bicycle plans.

BMTS Complete Streets Policy, 2016: This policy aims to design, build, and maintain roads that safely and comfortably accommodate all users of roadways, including motorists, motorcyclists, bicyclists, pedestrians, transit and school bus riders, delivery and service personnel, freight haulers, and emergency responders. BMTS *requires* that all local projects receiving BMTS allocated federal funding adhere to this policy. Projects utilizing any other funding sources are also encouraged to adhere to this policy.

New York State Complete Streets Legislation, 2012: This Legislation requires state, local and county officials to consider all modes of travel when designing transportation projects that receive state or federal funding. The New York State Department of Transportation provides a Complete Streets Checklist to assist local governments with the planning and design of their roadways.

Existing Conditions

Road Characteristics. This segment of Route 11 is a four-lane minor arterial road. Minor arterials are roadways that link cities and towns forming an integrated network of interstate and intercounty connectivity. The roadway is owned and maintained by the New York State Department of Transportation (NYSDOT).

From the Binghamton city line heading southeast for just over half a mile Route 11 consists of four undivided travel lanes, two northbound and two southbound. The remaining segment consists of four travel lanes that are semi-divided with sections of guide rail that limits left turns to southbound traffic. The total right-of-way width varies between 50 and 130 feet. The vehicle travel lanes are twelve feet wide. The corridor includes two signalized intersections, at Colesville Road and at a driveway to a truck repair facility. The Norfolk Southern Railway runs along the southwest side of the corridor. Overhead power lines and streetlights are located on both sides of the road.

Route 11 serves as New York State Bike Route 11 providing direct connections to other state and regional bike routes. Paved shoulders, approximately 8 feet wide, are located along both sides of the roadway. Sidewalks and marked bicycles facilities are not present in the study area. NYSDOT included sidewalks in a roadway improvement project along Route 11 in Binghamton, but were terminated at the Binghamton city line in anticipation of a future project to extend sidewalks through Kirkwood to Colesville Road.

Land Use and Development Pattern. Pursuant to the Town of Kirkwood Zoning Ordinance the majority of corridor falls within the Business Two Zoning District, with a Planned Unit Development at the northwest corner of Route 11 and Colesville Road. Uses permitted within the Business Two District include truck-stops, hotels and motels, wholesale, and restaurants. Existing land uses along the corridor are primarily automobile-oriented commercial, including gasoline stations/convenience markets, used automobile sales and repair shops. The southern end of the study area primarily caters to interstate travelers and the trucking industry.

Buildings along the corridor are primarily one-story commercial, setback from the roadway, and surrounded by paved parking with little to no landscaping. Most of the land area adjoining the corridor is underutilized and dominated by pavement, leaving opportunity for improvement and revitalization. Most of the parcels adjoining the corridor lack curbs and defined driveways and instead have their entire frontage open to the street. These driveways do not conform to NYSDOT's Policy and Standards for Entrances to State Highways. Concrete highway barriers and similar barriers are utilized on some parcels to delineate the road from private property, some of which encroach into the right-of-way of Route 11. The lack of curbs and driveway delineation has resulted in traffic safety problems throughout the study area.



Image 1.3: Commercial site with open frontage on Rt. 11

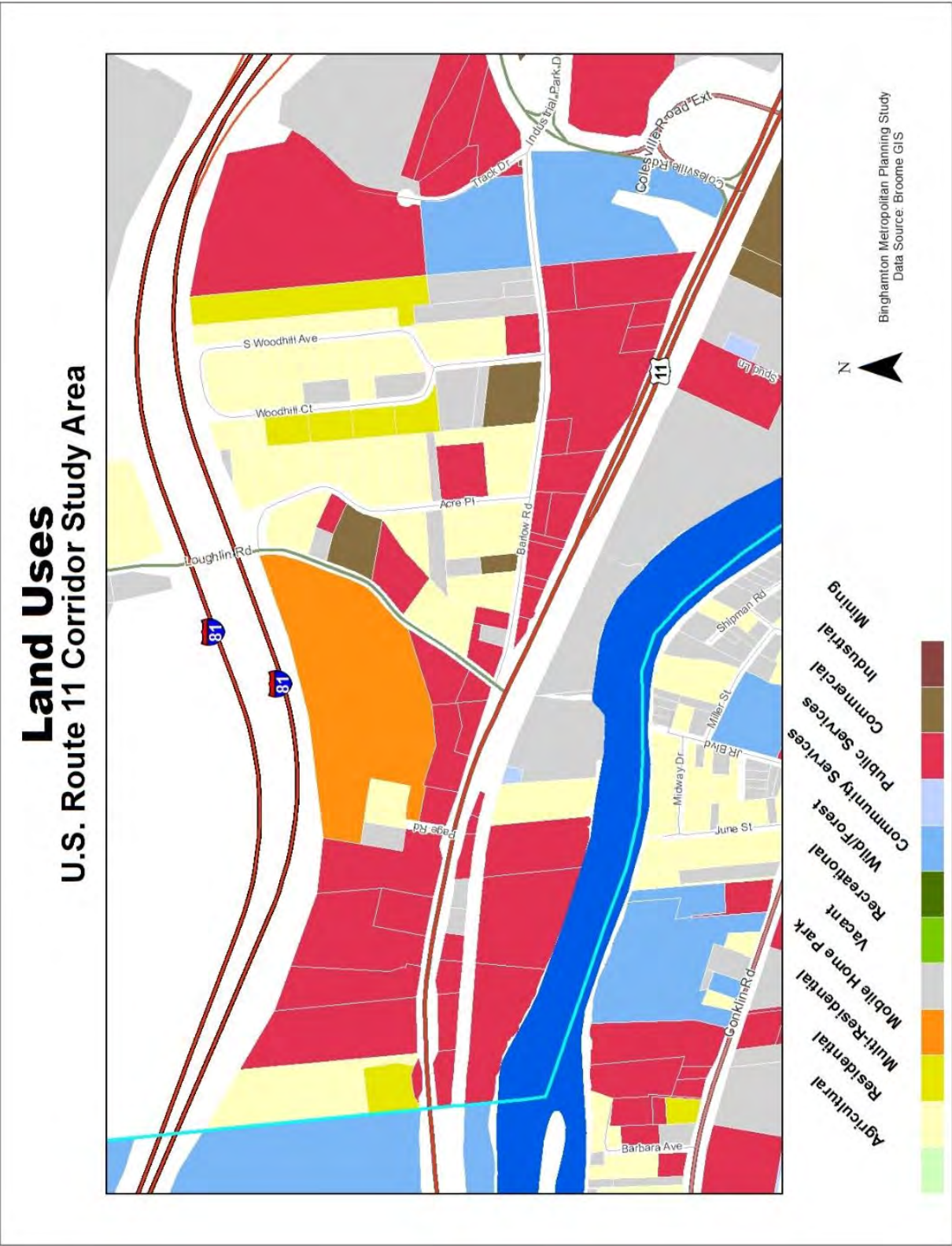


Figure1.1: Land Uses

Traffic Volumes. Route 11 is one of the most trafficked roads in Kirkwood, aside from the interstates that pass-through town. Figure 1.2 illustrates the average annual daily traffic (AADT) between 2002 and 2015.

Trips along the corridor are primarily generated by passenger vehicles (See Figures 1.3 and 1.4). Heavy vehicle trips traveling along the corridor decreased from 13.3 percent to 7.4 percent.

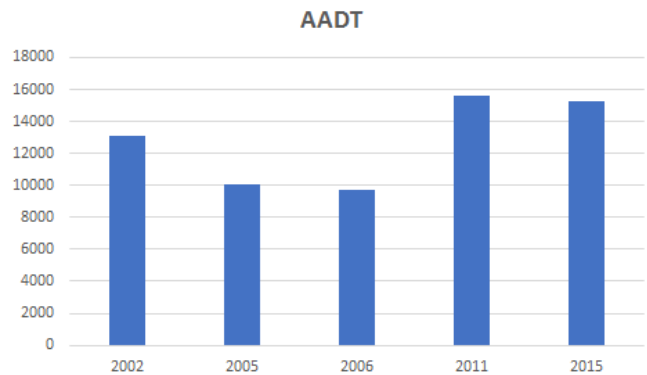
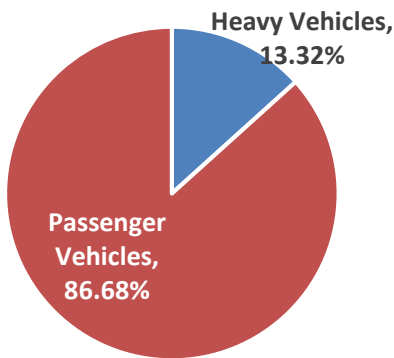
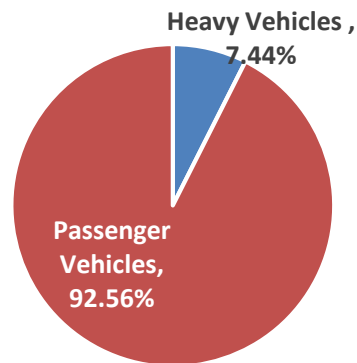


Figure 1.2: Average Annual Daily Traffic

Vehicle Types, 2006



Vehicle Types, 2011



Figures 1.3 and 1.4: Types of Vehicles Traveling along Route 11 (Data Source: NYSDOT)

Vehicle Speeds. The posted speed limit is 45 miles per hour (mph). The latest speed study conducted by NYSDOT in 2012 found that the actual operating speed provided an 85th percentile speed of 50 mph northbound and 47.2 mph southbound.

Crash Data. During the latest reporting period (November 2013-October 2016) 46 total crashes occurred. Accident types were as follows:

| Crash Type | Number of Crashes |
|------------------------------------|-------------------|
| Rear End | 19 |
| Fixed Object or Guide Rail/Curbing | 9 |
| Deer | 7 |
| Left Turn | 5 |

| | |
|--------------|-----------|
| Overtaking | 3 |
| Sideswipe | 1 |
| Total | 46 |

There were seven intersection crashes, six at Coleville Road and one at Loughlin Road. The following figure (Figure 1.6) is map of crash locations along, and within the vicinity of, the corridor. A crash analysis or comparison of accident rates to similar facilities was not conducted.

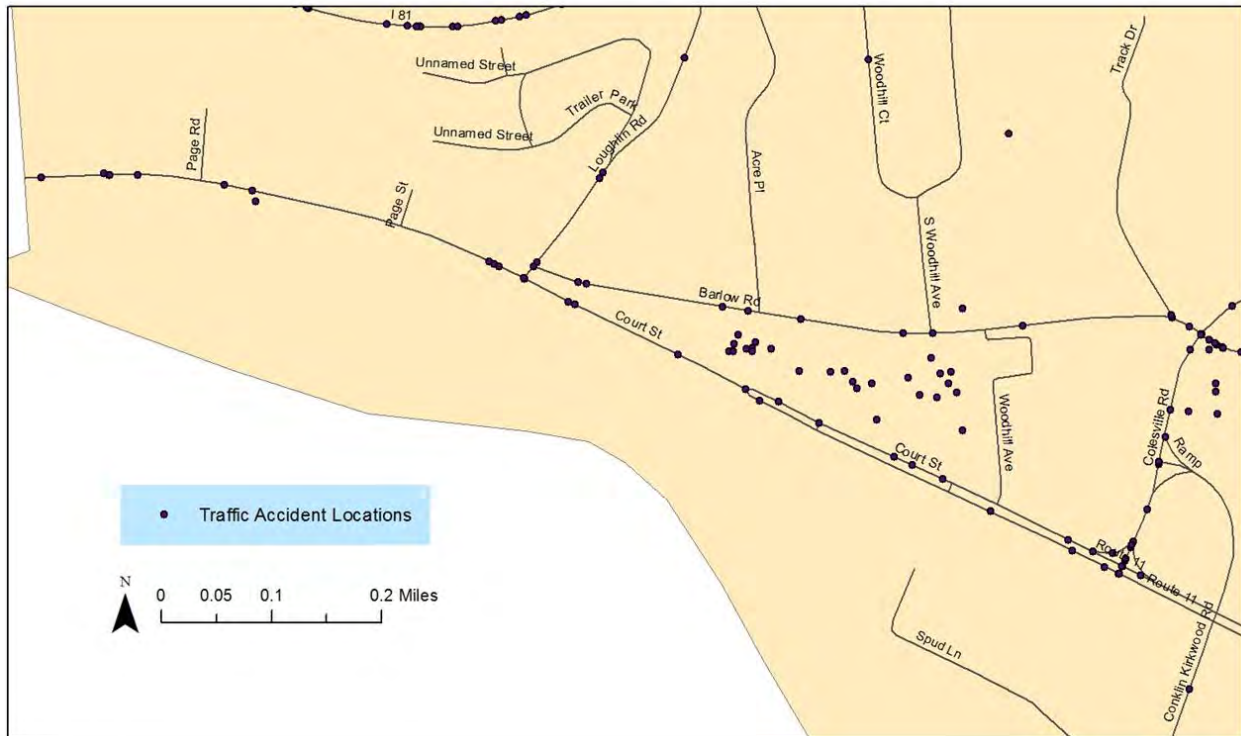


Figure 1.6: Crash Locations, Nov. 2013-Oct. 2016

Level of Service. Level of service (LOS) is a term used to describe the operating conditions of a roadway based on factors such as speed, travel time, maneuverability, delay, and safety. The LOS of a roadway is designated with a letter, A to F, with A representing the best operating conditions and F the worst.

In 2005 NYSDOT conducted a LOS analysis of the portion of Route 11 subject to this study. Although conducted over ten years ago, it is reasonable to assume that this analysis is still valid because the AADT used to determine the future LOS (2027) is consistent with the NYSDOT’s 2015 AADT and the AADT estimated in BMTS’ current 2040 long-range plan (all between 15,000-20,000 AADT). The analysis concluded that the LOS along the corridor in 2027 would operate at a level B and the LOS at the Colesville Road intersection would operate at a level A.

Drainage and Flooding. The study area is not supported by a closed drainage system. Instead, drainage is primarily handled through open ditches that convey water directly to the

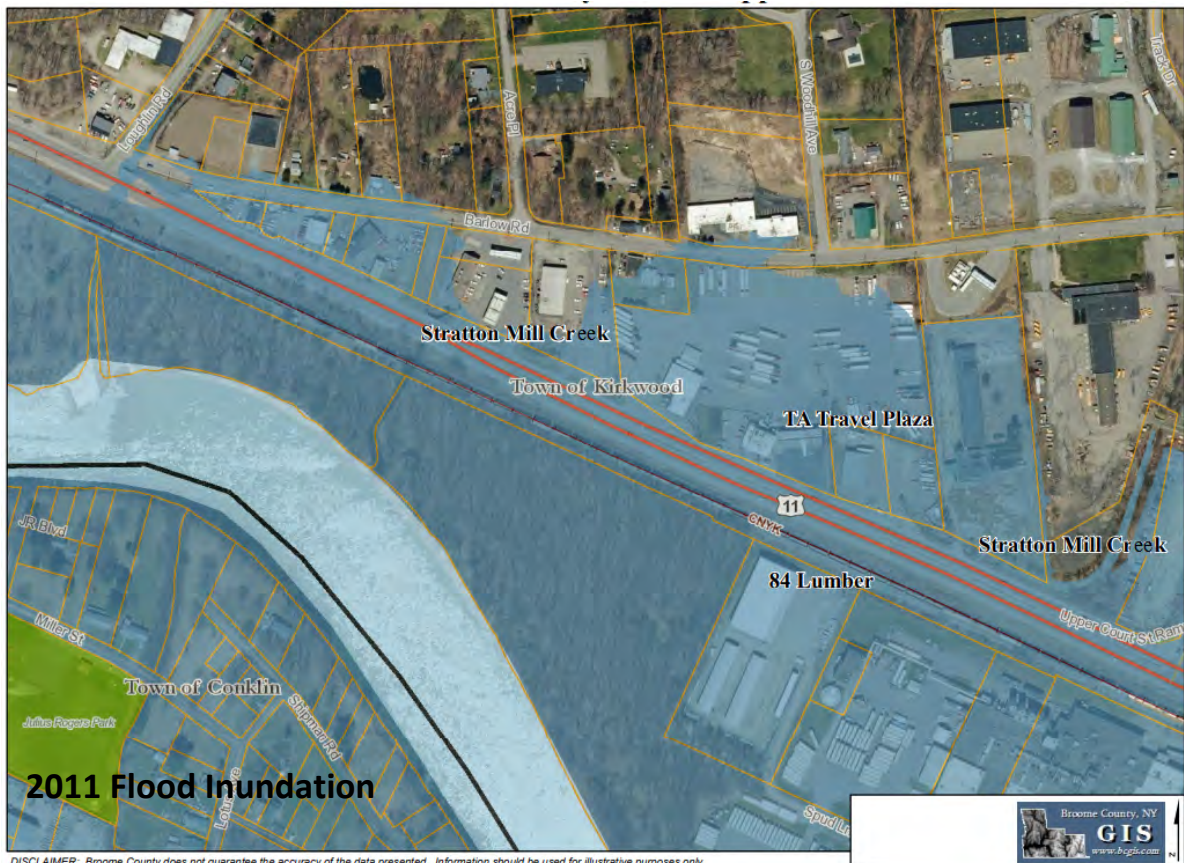
Susquehanna River. Stormwater is also collected by Stratton Mill Creek and Acre Creek. The few drainage structures in the area appear to serve private parking lots.

The study area experiences flooding approximately 4-5 times per year. The Kirkwood Comprehensive Plan attributes this flooding to the lack of a stormwater drainage system. During the 2006 and 2011 floods flood waters completely covered properties and Route 11 within the study area between Loughlin and Colesville Road.



Image 1.4: 2011 Floodwaters covering Rt 11 south of Colesville Rd between 84 Lumber and TA Travel Plaza

As part of the design of a larger reconstruction project, NYSDOT studied the hydraulic capacity at Route 11 over Stratton Mill Creek. This study provided a design for a culvert under Route 11 that would divert some of the Creek into a drainage system under Route 11 and out to the Susquehanna River. This plan was found to primarily benefit adjacent private property owners, and did not address ponding that occurs on US Route 11, so NYSDOT is unable to pursue it with Federal Transportation Funds. The plans were handed over to the Town to seek out alternative fund sources to complete this project.



63 percent of Kirkwood’s comprehensive plan survey respondents stated that potential for future flooding was a major concern.

Chapter Two: Access Management

ACCESS MANAGEMENT

Unregulated street access creates conflicts between turning vehicles, through traffic, pedestrians and cyclists. These conflicts result in accidents and traffic delays. Managing access by defining the location, number, spacing and design of access points from private properties to streets can reduce these conflicts.

What are the benefits of access management?

- Improves safety
- Enhances public investment in infrastructure
- Enhances private investment in properties
- Enhances the beauty of the street and adjoining properties
- Provides a more efficient and predictable experience for motorists, pedestrians and cyclists
- Reduces traffic delays
- Improves access to businesses



Image 2.2: Corridor without access management (Source: WSDOT)



Upper Court Visual Survey

This image was strongly preferred (88%) over the image to the left.

Image 2.3: Corridor in Image 1 after implementing access management (Source: WSDOT)

Effective access management can achieve:

25-31% reduction in severe crashes along urban/suburban arterial roads

Source: FHWA

Who benefits from access management?

- | | | |
|-------------------|---------------|-------------------|
| ✓ Motorists | ✓ Pedestrians | ✓ Cyclists |
| ✓ Business Owners | ✓ Communities | ✓ Property Owners |

MANAGING ACCESS ALONG UPPER COURT STREET

Upper Court Street has very few curbs and virtually no driveway delineation between the right-of-way and adjoining properties. The entire frontage of most properties is open to the street, allowing vehicles to access sites at any point (see Images 2.4-2.7).



Images 2.4-2.7: Examples along Route 11

The examples of unmanaged street access along Route 11 shown in the above images results in the following impacts:

- Creates traffic conflicts due to the uncontrolled and unpredictable nature of vehicular ingress and egress onto the street
- Makes Upper Court Street less walkable because pedestrians are unaware of where vehicles may enter or exit the street
- Leads to lack of curb appeal and cluttered appearance of many properties along the corridor

Access management, a traffic engineering technique, can be used along the corridor to address these impacts by regulating intersections and driveways. Access management facilitates roadway safety by reducing vehicle, pedestrian, and bike conflicts, increasing driver sight distances and increasing the time in which drivers can make decisions. Access management can also improve traffic flows and make the roadway function more efficiently.

Relationship between Driveway Density and Crash Rates

| Driveways per mile | Crash Rate per mile* | Increase in crashes associated with higher driveway density |
|--------------------|----------------------|-------------------------------------------------------------|
| Under 20 | 3.4 | - |
| 20 to 40 | 5.9 | +74% |
| 40 to 60 | 7.4 | +118% |
| Over 60 | 9.2 | +171% |

*For a multi-lane, undivided roadway
Source: MDOT Access Management Guidebook, 2001

The takeaway: *the more places vehicles can enter and exit onto a roadway the less safe it is.*

ZONING REGULATIONS

Zoning is a set of regulations adopted by a municipality that defines how land can be used and developed. According to Kirkwood’s Comprehensive Plan the town’s zoning regulations contain omissions and deficiencies that negatively affect the outcome of development and do not adequately address the appearance and function of Upper Court Street. Specific zoning regulations can be adopted to control the location and design of driveways and parking lots, as well as to establish standards for setbacks and landscaping that address the visual characteristics of development along the corridor.

Corridor overlay zones can be used to establish access management standards along corridors. This involves overlaying a special set of requirements onto an existing zoning district, while retaining the underlying zoning and its associated requirements. Text that specifies standards for the access management in the overlay district is included in the zoning code and corridors subject to the overlay district are designated on the zoning map. Overlay requirements may address any issues of concern such as joint access, driveway spacing and widths, limitations on new driveways, landscaping, setbacks and parking lot configurations.

RECOMMENDATIONS

This plan’s recommendations seek a corridor access management approach that would establish a balance between the safety and mobility of roadway users with the access needs of adjacent land uses, while enhancing the visual appeal of the study area. Establishing requirements for managing street access and development standards for private property and making improvements in the public right-of-way are key to striking this balance. Further, rather than assigning land uses to specific parcels within the corridor, which is a local land use decision based on local priorities and market conditions, this strategy presents a suite of development best practices that the town should incorporate into its zoning regulations and consider when reviewing new development.

The Town of Kirkwood has authority over adopting and enforcing regulations on private property and NYSDOT has authority over roadway geometry and design as well as granting access to the roadway from private properties. The Town and NYSDOT will need to coordinate and cooperate during site plan review to ensure consistency of projects and conditions of approval. Private development projects along the corridor that would trigger site plan review or other zoning action would be subject to General Municipal Law Section 239 l, m, and n. The Broome County Planning Department facilitates coordination and cooperation between municipalities, NYSDOT and BMTS on projects that may impact state roadways, such as Route 11, during the 239 process.

Recommendation 1: *Update the Town of Kirkwood’s Zoning Ordinance to establish an overlay zone for the US Route 11 study area that specifies code language for the following access management techniques and development standards for any project subject to site plan review pursuant to Section 502 of the Kirkwood Zoning Ordinance. (In addition to any standards adopted by the Town, all altered or new driveways would also be required to be designed and constructed or reconstructed in accordance to NYSDOT’s Standard Design for Driveway Access to State Roadways, which can be found at www.dot.ny/permits.)*

1.1: *Require a curb line and buffer strip.* Each lot, building or group of buildings and its parking or service areas should be physically separated from the street by a curb and planting strip to control motor vehicle access, except for authorized access points. Establishing a curb line will provide separation between the vehicular travel lanes, sidewalks and private properties and provide a mechanism by which driveways can be delineated along the street frontage.

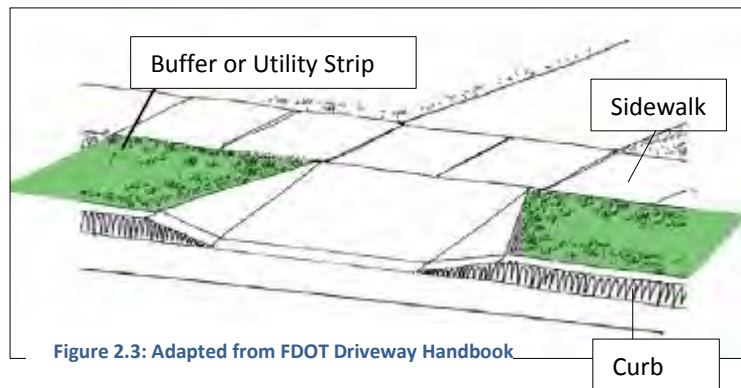


Figure 2.3: Adapted from FDOT Driveway Handbook

1.2: *Driveway spacing, location and design.* Traffic entering and exiting developments creates potential conflicts with vehicles traveling on the roadway. Appropriate driveway design can improve safety. Driveways should be designed to allow vehicles to enter and exit the roadway quickly and safely with minimum impact to the traffic on the roadway. Design considerations include number and spacing of driveways, turning radii, driveway width and driveway throat length and must meet NYSDOT requirements as stated above.

| Length of Frontage | Maximum Number of Driveways |
|----------------------|---------------------------------------------------|
| 500 feet or less | 1 |
| 500+ to 1,000 feet | 2 |
| 1,000+ to 1,500 feet | 3 |
| 1,500+ to 2,000 feet | 4 |
| More than 2,000 feet | 4 plus 1 per each additional 500 feet of frontage |

Table 2.1: Number of Driveways Allowed per Street Frontage (Source: TRB Access Management Manual)

One access point to a property should be allowed. Additional access points may be allowed provided that a properties frontage exceeds 500 feet (see Table 1) subject to approval by NYSDOT. Joint access driveways should be encouraged for small parcels with less than 500 feet of frontage. The total number of driveways should be limited to the minimum number necessary to provide adequate access to a property. Driveways should be spaced at a minimum between 300 and 500 feet apart. On properties that do have curbs and defined driveways, excess curb cuts should be removed.

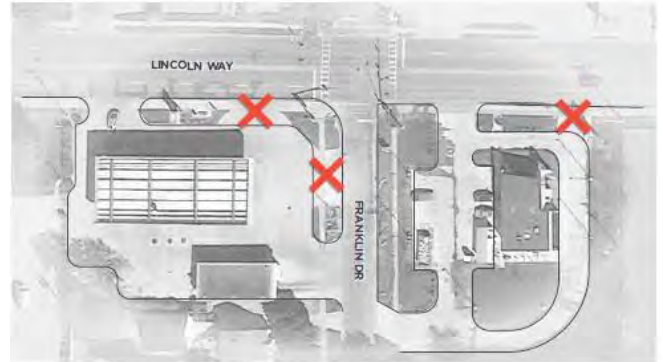


Figure 2.3: Remove redundant driveways and create shared access driveways. (Source: Ames Lincoln Corridor Plan)

Driveway throats are the portion of the driveway entrance that helps delineate the driveway and provides space to store entering and exiting vehicles (See Figure 4). Access control between the parking areas and the edge of the driveway throat should be achieved using curbing, wide turfed areas, shrubs, median barrier, or other physical means (i.e., pavement markings and signs are not enough). The length selected for a driveway (measured along the driveway centerline) should be based on operational, safety, and construction costs. The entrance should allow all entering traffic to pull off the highway before stopping. The exit throat length should prevent exiting vehicles from obstructing entering traffic, which could cause entering traffic to queue back onto the highway. The driveway throat should extend beyond the roadway right of way line, if necessary.

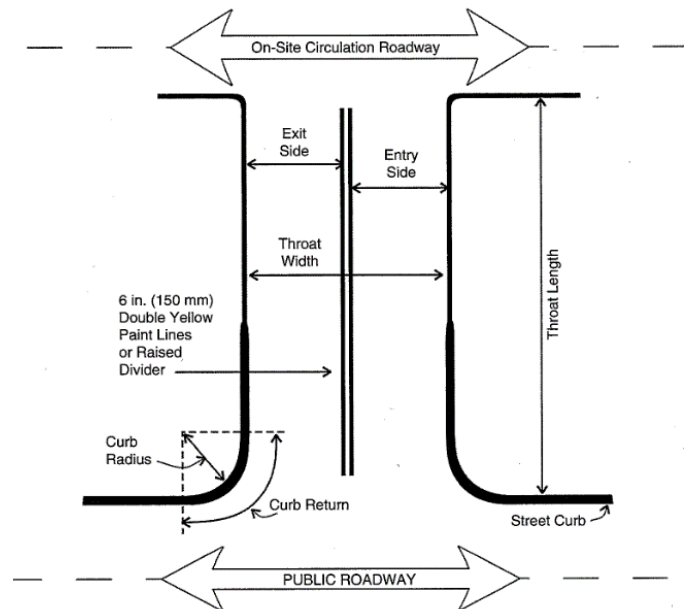


Figure 2.4: Driveway elements (Source: Transportation Research Board TRB)

A driveway's curb radius should equal the minimum inside turning radius of the vehicle type a driveway is designed to be used by. Driveway throat width and curb radius are interdependent. For example, when the radius is less than the minimum inside turning radius of a vehicle, vehicles are displaced to the left in the driveway when making a right turn into the driveway. Table 2 below provides guidance on the minimum combined requirements for throat width and radius.

| Table 2: Combined Requirements for Throat Width and Radius (Source: TRB) | | |
|---------------------------------------------------------------------------------------------------------|---------------|---------------------|
| Driveway Type | Radius (feet) | Throat Width (feet) |
| Roadway Without a Bike Lane: | | |
| Single-lane exit, entering passenger car must wait until an existing vehicle clears the driveway | 15 | 25 |
| Simultaneous entry and exit by passenger cars | 15 | 35 |
| Simultaneous exit by passenger car and entry by single-unit truck | 25 | 40 |
| Separate left-turn and right-turn exit lanes for passenger cars and simultaneous entry by passenger car | 20 | 43 |
| Roadway With a Bike Lane: | | |
| Entering passenger car must wait until existing vehicle clears the driveway | 10 | 25 |
| Simultaneous exit and entry by passenger cars | 15 | 30 |
| Simultaneous exit by passenger car and entry by single-unit truck | 25 | 40 |
| Separate left-turn and right-turn exit lanes for passenger cars and simultaneous entry by passenger car | 15 | 40 |
| Simultaneous entry and exit by single-unit trucks | 25 | 40 |

1.3: Prioritize shared access. A system of shared access driveways with cross access easements should be established wherever feasible. Shared driveways serve two or more adjacent properties that may or may not be comprised of land from each property. Shared driveways allow for larger driveway spacing and improved management of traffic entering and exiting a development.

Cross access driveways interconnect the parking facilities of two or more abutting properties. Cross access driveways provide an opportunity for vehicles to move between developments without using the roadway. Cross access driveways reduce traffic on the roadway and reduce the potential for conflict between entering, exiting, and through traffic. The land comprising the shared or cross access driveways should be recorded as an easement and serve as a covenant attached to the properties. Joint maintenance agreements should also be incorporated into the property deeds. Linkages requiring mutually executed easements should be required between adjoining properties to provide movement without requiring a return to the public roadway.

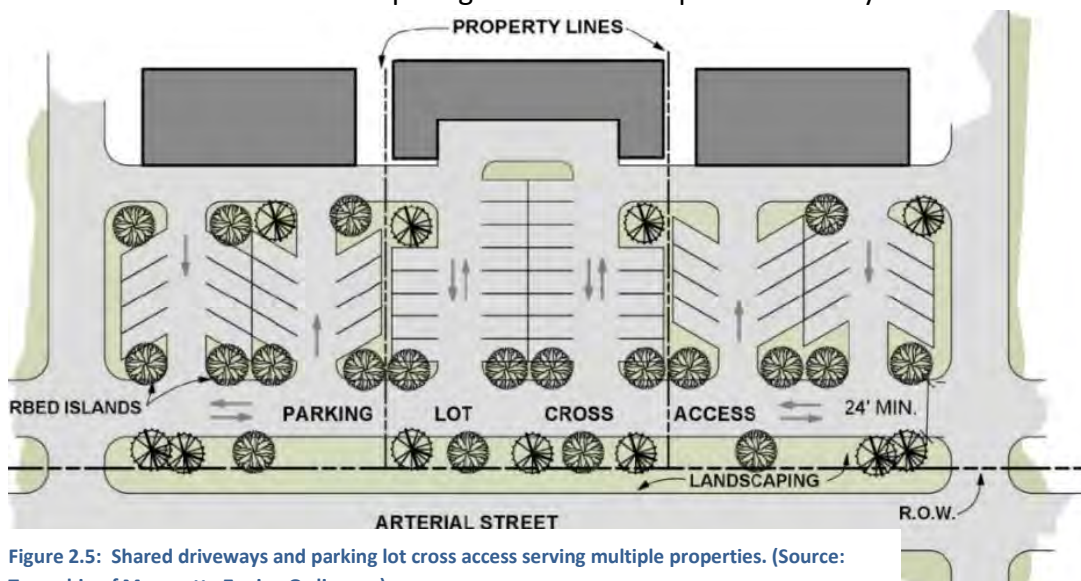


Figure 2.5: Shared driveways and parking lot cross access serving multiple properties. (Source: Township of Marquette Zoning Ordinance)

To complement shared vehicular access, pedestrian links (i.e. interior sidewalks or painted crosswalks) to adjoining properties should be required. In addition, provisions for future connections (i.e. stubbed out drives) should be provided to adjacent properties that are not developed or are viable for future redevelopment.

1.4: *Require the installation of curbs and sidewalks.* If development occurs on a property prior to the installation of curbs and sidewalks along the corridor through a capital improvement project, the developer should be required to install sidewalks as part of site plan approval. This approach has been used along other major local thoroughfares in Broome County (see Images 7 and 8 below). While this approach would result in incremental improvements along the corridor, it would begin to fill in gaps in the short term and reduce public expenditures for these improvements in the long term.



Image 2.7: 2545 Vestal Parkway E prior to redevelopment (Source: Bing Maps, 2015)

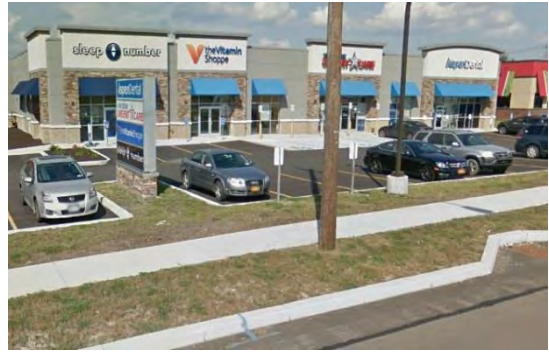


Image 2.8: Redevelopment of 2545 Vestal Parkway E with curb, sidewalks and parking lot setback (Source: Google Earth, 2015)

1.5: *Require front setbacks for parking lots.* Minimize street facing parking lots and encourage parking to be located to the side or rear of buildings. At a minimum parking lots should be setback from the front property line along Upper Court Street. Current zoning along the corridor requires between a 10 and 30-foot front setback. A single minimum setback standard should be imposed. The minimum setback should be wide enough to accommodate adequate landscaping and screening. Front setback standards need not apply to buildings to encourage the placement of buildings closer to the street with parking to the side and rear.

1.6: *Minimize front setbacks for buildings.* Encourage minimal setbacks from buildings to the right-of-way to encourage a sense of character along the street.

1.7: *Require landscaping in setback areas.* All required setback areas should be landscaped. Considerations for plant species should include tolerance for flooding and salt. The size of plant species should be chosen to help screen parking areas from the public right of way and to provide visual interest. Trees should be required to adsorb stormwater, to provide shade and to reduce the heat island effect of paved surfaces.

1.8: *Require parking lot landscaping.* Provide shade trees and landscape islands throughout parking lots to improve aesthetics, create shade, and reduce the urban heat

island effect. Specific standards should be included in the zoning code that define the number and location of landscape islands and the type of landscaping required. Use of native landscaping materials, which can result in lower water use, lower maintenance, and a lower impact on water resources when compared to turf grass, should be prioritized. (See also Recommendation 7)

1.9: *Continue sidewalks through driveways.* Require that sidewalk paving materials be continued across driveways to maintain and prioritize pedestrian access.

1.10: *Require bicycle parking.* In addition to parking for motorized vehicles, development projects should be required to provide bicycle parking to support travel by bicycle. Standards should be developed by the town and included in the zoning code. For example, the City of Binghamton requires four bicycle parking spaces for every twenty vehicle parking spaces.

Recommendation 2: *Implement design standards during site plan review and develop a supplemental access management checklist to aid in review.* Through site plan review, the Town of Kirkwood can greatly affect the quality, appearance and traffic safety of individual development projects and preserve the safety and functionality of Route 11. A checklist would help to improve transparency and expedite the site plan review process by explaining to applicants in advance of a public hearing the access management requirements that must be met for a site plan to be approved. Prior to the submittal of an application for site plan approval, the checklist could be provided to developers, property owners and business owners to guide the development of their site plans. Further, the checklist can be used by the Town Board during the site plan review and approval process to ensure a level planning field for those subject to access management requirements along the corridor.

Example access management checklist questions:

| |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Is other access to the property available in addition to Route 11 access? |
| Is interconnection provided between properties? |
| Is there proper spacing between driveways on the highway? Driveway spacing on the order of 300 feet to 500 feet is desirable to reduce accidents and maintain the flow of traffic. |
| Will a turning lane be required? (consult with NYSDOT) |
| Can the proposed driveway be combined/shared with an existing driveway? |
| Is the proposed access aligned with a street or drive across the roadway? |
| Is there more than one driveway requested per lot? If so, why? |
| Is the proposed driveway near an intersection (min. 660-ft separation recommended; consult NYSDOT)? Will the drive be blocked by intersection traffic? |
| Is there a rear access drive provided? |
| Is the best design used for the access (i.e. right turn only exit, slope, drainage, radius, clear vision and pedestrian/bicycle considerations)? |
| Are there any known plans for adjacent properties? |

STORMWATER MANAGEMENT

During the floods of 2006 and 2011 water completely covered properties along Route 11 between Loughlin and Colesville Roads. Kirkwood's Comprehensive Plan attributes flooding within the study area to the lack of a stormwater drainage system. The plan further states that a potential repeat of the record floods of 2006 and 2011 continues to be a significant concern of Kirkwood's residents. NYSDOT studied the hydraulic capacity at Route 11 over Stratton Mill Creek and developed a design to divert stormwater to the Susquehanna River via a culvert.



Image 3.1: Route 11 Flooding, 2011

Stormwater can be managed with green infrastructure and/or grey infrastructure. Green infrastructure includes a variety of decentralized site design techniques and structural practices that can be used by communities, businesses, homeowners and others to manage stormwater. Green infrastructure practices include preserving and recreating natural landscape features and minimizing impervious surfaces to allow water to infiltrate the ground. Conversely, grey infrastructure relies on engineered centralized systems, involving a collection of pipes, channels and conduits, typically maintained by a municipality. Grey infrastructure conveys stormwater away from impervious surfaces and into wastewater plants or directly into watercourses.

The Environmental Protection Agency (EPA) recommends that communities consider green infrastructure as an alternative to grey infrastructure because it is often cheaper, less impactful to the environment, and more aesthetically pleasing than grey infrastructure. Further, the New York State Stormwater Design Manual states that green infrastructure results in the following benefits:

- Reduce or eliminate the need for expensive underground collection, conveyance and treatment systems to manage stormwater
- Minimize stormwater impacts on the surrounding area
- Mitigate or prevent localized flooding
- Improve aesthetics
- Improve groundwater recharge
- Protect downstream water resources, including wetlands
- Provide water quality improvements/reduced treatment costs
- Reduce pollution
- Improve wildlife habitat

Types of Green Infrastructure Practices

- **Bioswales** – broad and shallow vegetated, mulched, or channels that provide stormwater treatment and retention. They slow water flows and allow for infiltration, thereby filtering stormwater flows. Appropriate along streets and parking lots.
- **Planter Boxes** – structures with vertical walls and open or closed bottoms filled with gravel, soil and vegetation that collect and absorb runoff. They are ideal for space-limited sites in dense urban areas.
- **Rain Gardens** – also known as bioretention or bioinfiltration cells, these are shallow, vegetated basins that collect and absorb runoff by infiltration and evapotranspiration. They can be installed in nearly any unpaved space.
- **Rainwater Harvesting** – systems that collect and store rainfall for later use. These systems provide a renewable water supply and can slow and reduce runoff. Such systems can reduce demands on increasingly limited water supplies in arid regions. An example is downspout disconnection, where rooftop drainage pipes are rerouted to permeable pavements, rain gardens, and cisterns.
- **Tree Canopy** – trees intercept rain in their leaves and branches thereby reducing and slowing stormwater runoff.
- **Permeable Pavements** – porous paved surfaces that allow rain to infiltrate into soils. Permeable pavements can be constructed from various materials such as pervious concrete, porous asphalt, and permeable interlocking pavers.

Given that efforts to improve stormwater management through grey infrastructure have gone unfunded and flooding remains a significant concern, the Town of Kirkwood should consider green infrastructure as an alternative. While a detailed analysis and evaluation of hydrologic conditions of the study area is beyond the scope of this study, the best practices listed in the Recommendations section below should be considered during any rehabilitation or reconstruction of Route 11 and during any redevelopment of private property.

68 percent of Kirkwood’s comprehensive plan survey respondents agreed that:

Requiring the use of green infrastructure/stormwater management is ‘Very Important’ or ‘Important’ when reviewing development proposals.

COMMUNITY CHARACTER

Surface parking lots are a dominant characteristic of the study area. Many of these parking lots were developed without consideration for stormwater, landscaping, lighting, or overall design quality. While parking lots are necessary in the study area, their large expanses of asphalt generate stormwater runoff, air and water pollution, flooding, excess heat and, in most cases,

are unsightly. Further, most lack safe pedestrian connections, energy efficient lighting, and effective landscaping that could enhance the study area.

As new parking lots are built and existing parking areas are reconstructed, opportunities to create greener parking lots emerge, helping to create more sustainable, pedestrian-friendly, and more attractive community. Using innovative site design, such as best practices in stormwater management, consideration for community character, placing parking to the side and rear of buildings, and making safer pedestrian connections, parking lots can be transformed in ways that over time will result in positive impacts upon the character of the study area.



Image 3.5: Development pattern along Route 11 (Source: Google Earth)

RECOMMENDATIONS

Recommendation 3: *Correct conditions of Upper Court Street through aggressive code enforcement of existing town laws and ordinances including:*

- eliminate use of temporary concrete construction barriers as permanent fencing and screening;
- eliminate illegal encroachments within the public right of way;
- repair or replace sidewalks, walkways, stairs, driveways, parking spaces and similar areas that are not kept in a proper state of repair, or maintained free from hazardous conditions (Section 302.3 of the Property Maintenance Code).

Recommendation 4: *Update the town of Kirkwood's Stormwater Management and Erosion and Sediment Control Local Law to reduce the threshold for a Land Development Activity and to incorporate the use of green infrastructure to manage stormwater.* Kirkwood's current law defines a Land Development Activity as new construction or redevelopment activity that disturbs one acre or more of land area. Many of the parcels along the corridor are less than one acre and therefore not subject to the town's stormwater management requirements. Reducing the size threshold for a Land Development Activity would require more projects to meet the town's stormwater management requirements. Requiring more on-site stormwater management practices would over time address localized flooding impacts along the corridor.

4.1: Incorporate 'Green Street' stormwater management practices along Route 11. A green street is a stormwater management approach that incorporates vegetation, soil, and reductions in impervious surfaces to slow, filter, and cleanse stormwater runoff from a roadway. Green streets are designed to capture rainwater where rain falls, whereas, a traditional street is designed to direct stormwater runoff into storm sewer systems through a series of catch basins and pipes. In areas where stormwater water sewer systems are not present, such as Route 11, water is left to collect on roadways and adjoining properties. Arterial streets, such as Route 11, are often characterized by wide expanses of pavement, little greenery, and a lack of pedestrian amenities. These characteristics provide opportunities for green infrastructure that can address stormwater management and aesthetics with landscaping.

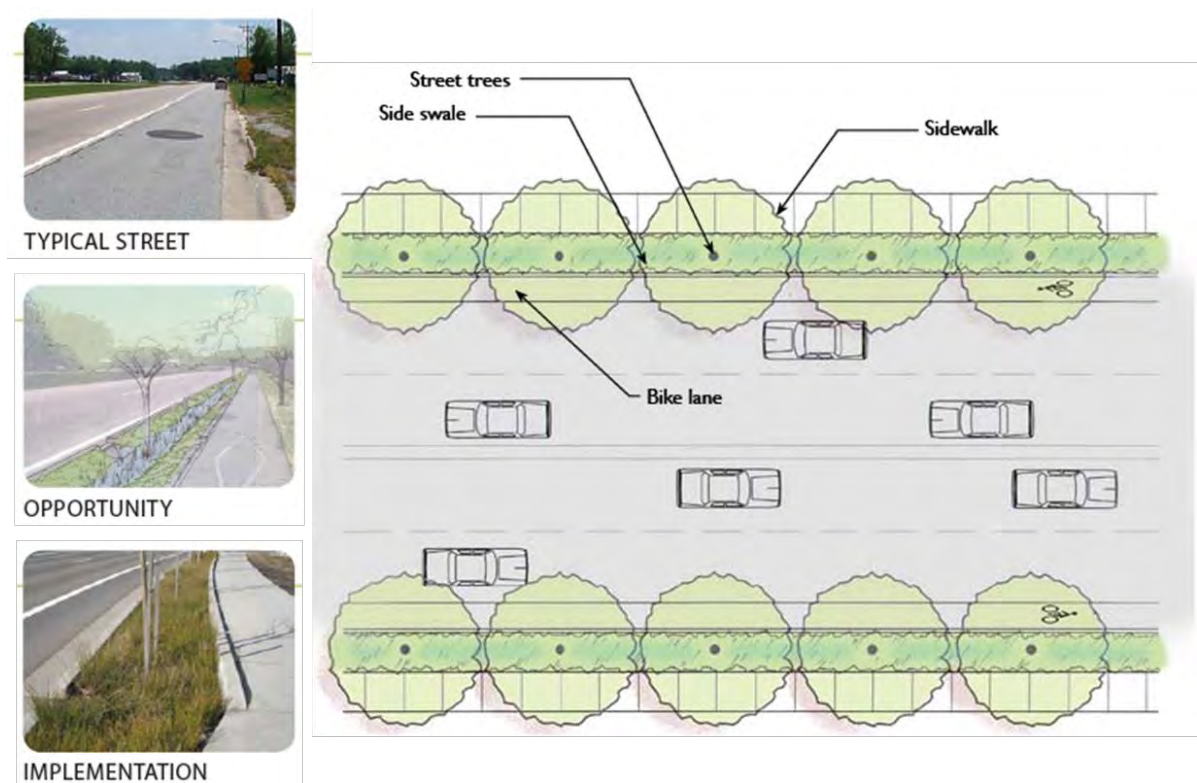


Figure 3.4: Green Infrastructure Design and Implementation (Source: US EPA)

Kirkwood's Comprehensive Plan states:

The town should encourage best management practices for reduction of impervious surfaces and development of green infrastructure.

4.2: Incorporate green infrastructure stormwater management practices on private property. The case study below illustrates how an existing parking lot can be retrofitted to incorporate green infrastructure. These strategies, if replicated within the study area, would address standing water/localized flooding issues and would improve community character.



Parking lot without green infrastructure



Parking lot after installation of green infrastructure

Green Parking Lot Case Study

Location: County Office Building Ulster County, New York

Project Description: Convert section of existing asphalt into bioretention area containing native perennial plants and trees

Project Benefits: Reduces localized flooding in parking lot and adjoining street; captures stormwater runoff from parking lot which infiltrates the ground and nourishes plants; improves aesthetics

Project Costs: \$16,000 for plants and construction materials, \$6,000 for professional services, in-kind labor

Maintenance: Weeding, watering and mulching

Source: New York Department of Environmental Conservation



Image 3.3: Lack of stormwater management along Route 11.



Image 3.4: Bioswale collecting water from a parking lot.

Upper Court Visual Survey

This image was strongly preferred (91%) over the image to the left.

Recommendation 5: *Plant street trees as part of street rehabilitation projects and during site plan review.* The corridor is heavily paved and lacks tree cover. According to a USDOT Federal Highway Administration and NYSDOT study of the I-81 viaduct project in Syracuse, street trees have the following benefits:

- Streets with tree canopies are documented to be from 5 to 15 degrees cooler than those without a tree canopy.
- When it rains, a tree's leaves directly absorb the first 30 percent of the precipitation. Once the leaves are saturated, up to 30 percent more of the rain seeps into the soil; the roots then absorb the water back up into the tree. Through this process, a mature tree absorbs about half an inch of water from every rainfall.
- Street trees close to traffic are ten times more effective than more distant vegetation at capturing car exhaust and absorbing carbon dioxide.
- Studies show increased property values where there are mature trees and increased income to businesses located on tree-lined streets.

Recommendation 6: *Encourage placement of parking to the side and rear of buildings and increase screening and landscape buffers along the street.* Ideally parking should be placed to the side and rear of buildings so they become a less dominant visual feature within the study area.

Recommendation 7: *Require parking lot landscaping.* The town should either update its zoning code or adopt parking lot landscaping design guidelines that define parking landscaping requirements. There are many example zoning ordinances and design guidelines available online (for example see Glenview Illinois's Parking Lot Landscaping Ordinance and Design Guidelines https://glenview.il.us/government/Documents/Parking_Lot_Landscaping.pdf).



Image 3.5: Parking lot along Route 11 without landscaping (Source: Google)



Image 3.6: Parking lot with landscaping (Source: City of Glenview, Ill.)

Recommendation 8. *Require snow storage areas.* Areas for snow storage should be delineated on site plans generally outside of setbacks and landscape islands.

Chapter Four: Streetscape Improvements

NYSDOT ACCESS MANAGEMENT INITIATIVE

The New York State Arterial/Access Management Initiative is a state and local collaborative process combining transportation planning and local land-use planning tools to protect the functional integrity of the highway network and provide safe and efficient access and mobility (Source: NYSDOT'S *Standard Design for Driveway Access to State Roadways Manual*). The major elements of Arterial/Access Management include a combination of:

- Access management
- Land use planning and controls
- Corridor preservation
- Transportation improvements
- Finance techniques

The NYSDOT driveway access manual states that access points are a major source of accidents and congestion on roadways with abutting commercial strip development. The manual includes recommended techniques, such as spacing driveways between 300 and 500 feet and consolidating access to multiple sites, to improve safety and functionality. Further, the manual states that these and other access management techniques are typically implemented over time, in cooperation with local government, as a part of local access management plans and can be included as elements of NYSDOT capital projects.

COMPLETE STREETS

Complete streets are roadways designed to safely and comfortably accommodate all users, including, but not limited to motorists, bicyclists, pedestrians, transit and school bus riders, delivery and service personnel, freight haulers, and emergency responders. "All users" includes people of all ages and abilities. This definition can be translated to include (but not limited to) the following improvements in roadway projects:

- Sidewalks and curb ramps (ADA compliant)
- Bicycle lanes, cycle tracks, shoulders design for bicycles
- Street furniture (benches and bike racks)
- Bus shelters
- Street trees and landscaping
- Access management
- Traffic calming elements



Image 4.1: Upper Front Street, Town of Chenango

ROAD DIET

According to the Federal Highway Administration (FHWA) four-lane undivided highways have a history of crashes, due to motorists sharing the inside lane for higher speed through movements and left turns. Additionally, as active transportation increases, communities desire more livable spaces, pedestrian and bicycle facilities, and transit options. However, these improvements \are not easily accommodated on a 4-lane undivided roadway (Source: FHWA, Road Diet Case Studies).

FHWA recommends Road Diets to accommodate multiple modes of transportation. Road Diets typically involve reconfiguring a roadway by removing vehicle lanes and reallocating the extra space for other uses or travelling modes, such turn lanes, sidewalks, bicycle lanes, transit use, parking, medians or pedestrian refuge islands. Road Diets have the potential to improve safety, provide operational benefits, and increase the quality of life for all road users. Road Diets can be relatively low cost since many Road Diet elements only require restriping.

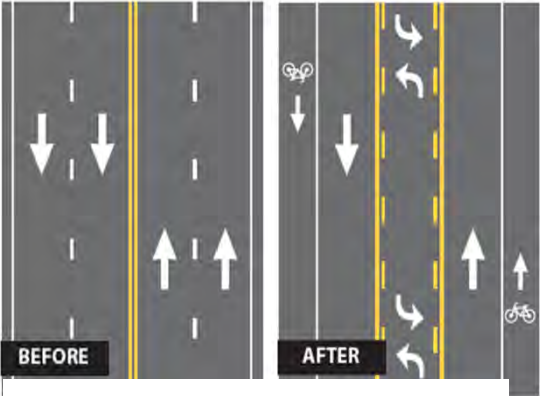


Image R.1: Before and After Road Diet

The FHWA Road Diet Informational Guide states that: “roadways with ADT of 20,000 vehicles per day or less may be good candidates for a Road Diet and should be evaluated for feasibility”. At this volume, two lanes provide sufficient capacity. Four lanes provide enough capacity for up to around 40,000 ADT. The Average Annual Daily Traffic (AADT) of Route 11 is between 15,000 and 20000 vehicles per day, making it a potential candidate for a road diet. Accident types, peak hour volumes, heavy vehicle percentages, signalized operations, etc., are other factors to consider for road diets.

BIKE ROUTE ACCOMODATIONS

Bicycle routes are designated and signed as preferred routes through high demand corridors. Route 11 is a designated state bike route. It connects to the Route 17 state bike route and the BMTS regional bike route system. Signage, bicycle lanes and paved shoulders should be used to facilitate the use of bicycle routes.

PREVIOUS NYSDOT ANALYSIS FOR ROUTE 11

In 1999 NYSDOT began an analysis of potential improvements to the 1.12 miles of Route 11 between the city line and Colesville Road (the portion roadway subject to this study). This analysis included addressing access management with new driveways and curbs, pavement deficiencies, capacity, safety, drainage, and bicycle and pedestrian accommodations. Subsequently, an arterial reconstruction project was included for funding in BMTS’ 2006-2010 Transportation Improvement Program (TIP).

Design Alternatives

NYSDOT'S analysis included the following alternatives deemed feasible, in addition to no-build and preventative maintenance alternatives. Each alternative included the following improvements:

- curbing
- 3.3-foot snow storage area (north side of roadway)
- 5-foot sidewalk and curb ramps (north side of the roadway)
- bicycles accommodated on approximately 8-foot wide shoulders
- new driveway entrances for commercial properties in conformance with NYSDOT standards
- left turn lane for eastbound Route 11 traffic entering Loughlin Road
- removal of the acceleration lane for westbound Route 11 traffic from Colesville Road
- raised medians with left hand turn lanes at the eastern segment of the roadway

Additional details for each alternative include:

Alternative 1, four lane option: Two travel lanes in each direction (total of four travel lanes), with no median from the town line to approximately to the TA travel plaza. A median would be included from the TA plaza to Colesville Road. Left turn lanes would be included at key locations, including Loughlin Road, the TA travel plaza and at Colesville Road.

Approximately 4,000 square feet of strip right-of-way takings would be required along the north side, impact three properties. The used car dealership at 573 Court Street may need to be relocated to accommodate the sidewalk. To avoid bridge widening, snow storage areas over the Stratton Mill Creek bridge would not be provided.

Alternative 2, five lane option: Two travel lanes in each direction with a center turn lane. Approximately 12,000 square feet of strip right-of-way takings would be acquired from 8 properties. The used car dealership at 573 Court Street may need to be relocated to accommodate the sidewalk.

Bridges over Stratton Mill Creek and Acre Creek would be widened to provide for sidewalks, but not snow storage areas.

Alternative 3, three lane option: One travel lane in each direction with a center turn lane. This alternative includes options to reconstruct the intersection of Loughlin and Barlow Roads.

Approximately 5,000 square feet of strip right-of-way takings would be acquired from 2 properties. The used car dealership at 573 Court Street may need to be relocated to accommodate the sidewalk.

This option would not require bridge widening.

Each of these alternatives would be consistent with:

- 1. NYSDOT's Access Management Initiative**
- 2. BMTS' Complete Street Policy**
- 3. Recommendations in Kirkwood's Comprehensive Plan**
- 4. Major goals of this study to increase mobility and safety within the corridor**
- 5. Recommendations in this study including sidewalks, bicycle accommodations, and managing access through the installation of new driveways and curbs**
- 6. Accommodate biking along a designated state bike route**

RECOMMENDATIONS

Recommendation 9: *A road diet should be considered for Route 11. An operational evaluation should be completed to determine feasibility of undertaking a road diet along the corridor. Trade-offs should be considered during the evaluation including increased safety, increased mobility opportunities to pedestrians and bicycles, and possibilities in delays. (NOTE: NYSDOT's Design Alternative 3 is essentially a road diet and has been evaluated).*

Recommendation 10: *Design a project consistent with the recommendations of this plan and place it on the Transportation Improvement Program for funding and completion.*

Recommendation 11: *Facilitate the use of the Route 11 State Bike Route by providing accommodations for bicycles.*

11.1: *Install signs along route including bike route signs and destination distance signs.*

11.2: *Install bike lanes or improve shoulders (or a combination) to better accommodate cyclists. Note that each of NYSDOT's 2005 design alternatives for the roadway include 8-foot wide shoulders. See the 2015 BMTS Bicycle Plan and AASHTO Guide for design standards/consideration for shoulders and bike lanes.*

Recommendation 12: *Install sidewalks.*

Recommendation 13: *To enhance walkability and visual appeal of the corridor include streetscape amenities in roadway improvement projects, including landscaping, street trees, benches and bike racks.*

Chapter Five: Implementation Plan

IMPLEMENTATION PLAN

Improved mobility, safety and corridor beautification were the primary drivers that guided the development of this Implementation Plan. An overview of potential funding opportunities for recommendations that require funding is provided however specific funding sources for each recommendation is not included due to the many variables and the uncertainty associated with funding sources and schedules for projects. While funding is always a consideration and was factored into the evaluation criteria, funding availability was not a primary driver for the development of the study recommendations. It is acknowledged that the recommendations presented herein represent a significant investment in potential transportation-related infrastructure. These projects represent an investment in total that exceeds available funding as currently programmed, however a list of possible future funding options is included for consideration. The advancement of the recommendations developed as part of this study will require prioritization by, and coordination between, the Town of Kirkwood, NYSDOT, BMTS and other stakeholders to address current fiscal constraints and the development of grant applications to overcome these constraints. Besides prioritization, identification of potential funding sources and availability to leverage funding could alter priorities.

Short-term recommendations (0-2 years)

Recommendation 1 (1.1-1.11 inclusive): *Update the Town of Kirkwood's Zoning Ordinance to establish an overlay zone for the US Route 11 study area that includes specific code language for the access management techniques and development standards (see recommendations 1.1-1.11) for any project subject to site plan review pursuant to Section 502 of the Kirkwood Zoning Ordinance.*

Recommendation 2: *Implement design standards during site plan review and develop a supplement access management checklist to aid in review.*

Recommendation 3: *Correct conditions of Upper Court Street through aggressive code enforcement of existing town laws and ordinances*

Mid-term recommendations (0-5 years)

Recommendation 4 (4.1-4.2 inclusive): *Update the town of Kirkwood's Stormwater Management and Erosion and Sediment Control Local Law to reduce the threshold for a Land Development Activity and to incorporate the use of green infrastructure to manage stormwater.*

Recommendation 5: *Plant street trees (during street rehabilitation projects and for site plan review for new development and redevelopment projects).*

Recommendation 6: *Encourage placement of parking to the side and rear of buildings and increase screening and landscape buffers along the street during site plan review for new construction/reconstruction projects.*

Recommendation 7: *Require parking lot landscaping.*

Recommendation 8. *Require snow storage areas.*

Recommendation 11.1: *Facilitate the use of the Route 11 State Bike Route by installing signs along route including bike route signs and destination distance signs.*

Mid- to long-term recommendations (0-10 years)

Recommendation 9: *A road diet should be considered for Route 11.*

Recommendation 10: *Design a project consistent with the recommendations of this plan and place it on the Transportation Improvement Program for funding and completion. See possible funding options below.*

Recommendation 11.2: *Facilitate the use of the Route 11 State Bike Route by installing bike lanes or improve shoulders (or a combination) to better accommodate cyclists.*

Recommendation 12: *Install sidewalks.*

Recommendation 13: *To enhance walkability and visual appeal of the corridor include streetscape amenities in roadway improvement projects, including landscaping, street trees, benches and bike racks.*

Funding

Transportation Improvement Plan – The federally-mandated Transportation Improvement Program (TIP) outlines federally-funded transportation projects, voted on and approved for the BMTS Planning Area over a five- year period. Eligible transportation projects can receive federal and state roadway funding if the project is selected by BMTS’ Policy Committee. Selection is based on an evaluation and prioritization of all eligible projects and includes municipal and public feedback. Any project receiving federal funding is included in the TIP. The follow programs are specifically programmed on through the TIP:

- **Surface Transportation Block Grant program (STBG)** – Flexible federal funding that may be used by states and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects, including intercity bus terminals.

- **Highway Safety Improvement Program (HSIP)** – Federal funding to advance engineering solutions at intersections and other locations with high numbers of crashes. Eligible projects include sidewalks, street crossings/crosswalks, shoulder improvements, pedestrian countdown timers, and other improvements.

Better Utilizing Investments to Leverage Development (BUILD) – The USDOT BUILD Discretionary Grant program invests in road, rail, transit and port projects. BUILD replaces the pre-existing TIGER grants program, however eligible costs and project types have not changed. Like TIGER, BUILD Transportation Grants are for investments in surface transportation infrastructure and are to be awarded on a competitive basis for projects that will have a significant local or regional impact. The program gives special consideration to projects which emphasized improved access to reliable, safe, and affordable transportation for communities in *rural areas*, such as projects that improved infrastructure condition, addressed public health and safety, promoted regional connectivity, or facilitated economic growth or competitiveness. Several complete street corridor projects which included sidewalks, bicycle amenities and green infrastructure were most recently funded under the program.

Transportation Alternatives Set-Aside – Federal funding (FHWA) for programs and projects defined as **transportation alternatives**, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities such as historic preservation and vegetation management, and environmental mitigation related to stormwater and habitat connectivity; recreational trail projects; safe routes to school projects; and projects for planning, designing, or constructing boulevards and other roadways largely in the right-of-way of former divided highways.

New York State Pedestrian Safety Action Plan (PSAP)– This 5-year multi-agency \$110 million initiative takes a three-pronged approach to improving safety. It is being implemented cooperatively by the New York State Department of Transportation focusing on engineering improvements, the State Department of Health conducting public education and awareness campaigns, and the Governor’s Traffic Safety Committee coordinating increased law enforcement.

Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program – Helps communities implement hazard mitigation measures following a Presidential major disaster declaration. This is a federal grant that is administered by the state. May fund green infrastructure if a benefit-cost analysis shows that the damages saved from the project exceed the cost of the project.

Water Quality Improvement Project (WQIP) Program – NYSDEC Division of Water competitive, reimbursement grant program for projects that reduce polluted runoff, improve water quality and restore habitat. Requests for Proposals (RFP) for previous rounds have included funding for green infrastructure projects.

Urban and Community Forestry Program Cost Share Grants – NYSDEC Division of Lands and Forests program providing assistance to communities in comprehensive planning, management,

and education to create healthy urban and community forests. Street tree plantings are an eligible project type.

Green Innovation Grant Program – NYS Environmental Facilities Corporation program supporting projects that utilize unique stormwater infrastructure design and create cutting-edge green technologies. Funding for eight specific green infrastructure practices.

EPA Urban Waters Small Grants – U.S. Environmental Protection Agency (EPA) funding to improve urban water quality through activities that also support community revitalization and other local priorities. RFPs may include green infrastructure.

U.S. Forest Service Urban and Community Forestry Challenge Cost Share Grant Program – Funding for program development, study, and collaboration that will launch some of the strategies in the (2016-2026) Ten Year Urban Forestry Action Plan. Green infrastructure projects have been eligible for funding in previous RFPs.

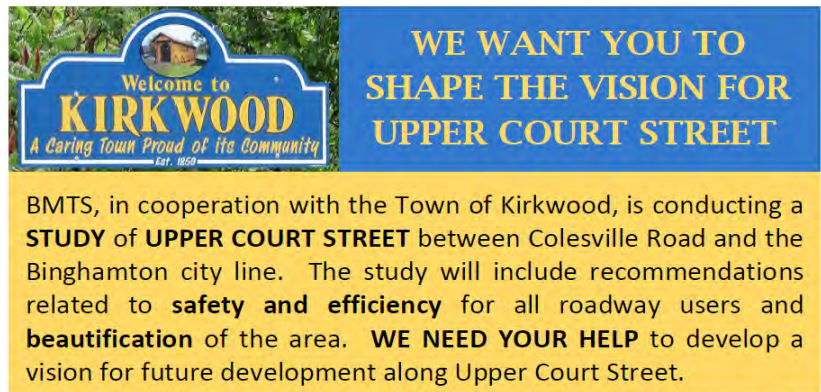
VISUAL PREFERENCE SURVEY

An online visual preference survey released on Jan 29, 2018. Approximately 500 postcards were mailed to property owners and businesses within the vicinity of Route 11. Additionally, a link to the survey was posted to the Town of Kirkwood website and the Kirkwood Happenings, BMTS, and the Broome County Planning Department Facebook pages.

The survey received 200 responses. This represents a 40 percent response rate based upon the number of mailed post cards (we are unable to quantify how many responses may have been promoted by the Facebook postings alone).

The survey used images to represent the potential options for the corridor that were reflective in recommendations for Kirkwood’s Comprehensive Plan, including access management, complete streets elements and green infrastructure, and compares them to images that were representative of existing conditions of the corridor. The survey was comprised of a total of 13 pairs of images. Survey respondents were asked to compare two side by side images and select the image they preferred. The full results of the survey are attached as Appendix B.

The survey illustrates a strong preference for access management, complete streets elements, and favors reducing through travel lanes to gain improvements such as a center turn lane, bicycle lanes and sidewalks. The following examples illustrates that 88 percent respondents preferred Image 2 below.



WE WANT YOU TO
SHAPE THE VISION FOR
UPPER COURT STREET

BMTS, in cooperation with the Town of Kirkwood, is conducting a **STUDY** of **UPPER COURT STREET** between Colesville Road and the Binghamton city line. The study will include recommendations related to **safety and efficiency** for all roadway users and **beautification** of the area. **WE NEED YOUR HELP** to develop a vision for future development along Upper Court Street.

To participate please take our **visual survey** by going to the link or scanning the code.

<http://uppercourt.questionpro.com/>

For a paper copy of the survey call 778-2443.



Image 1



Image 2

| Chose the image you prefer: | Percent of times image was chosen |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Image 1 Commercial properties with unrestrictive access to the street, potentially resulting in conflicts between vehicles entering and exiting the street at multiple location. | 12.02% |
| Image 2 Same street, with defined driveways that restrict street access but reduce conflict points between vehicles and pedestrians, sidewalks and landscaping. | 87.98% |
| Total | 100% |

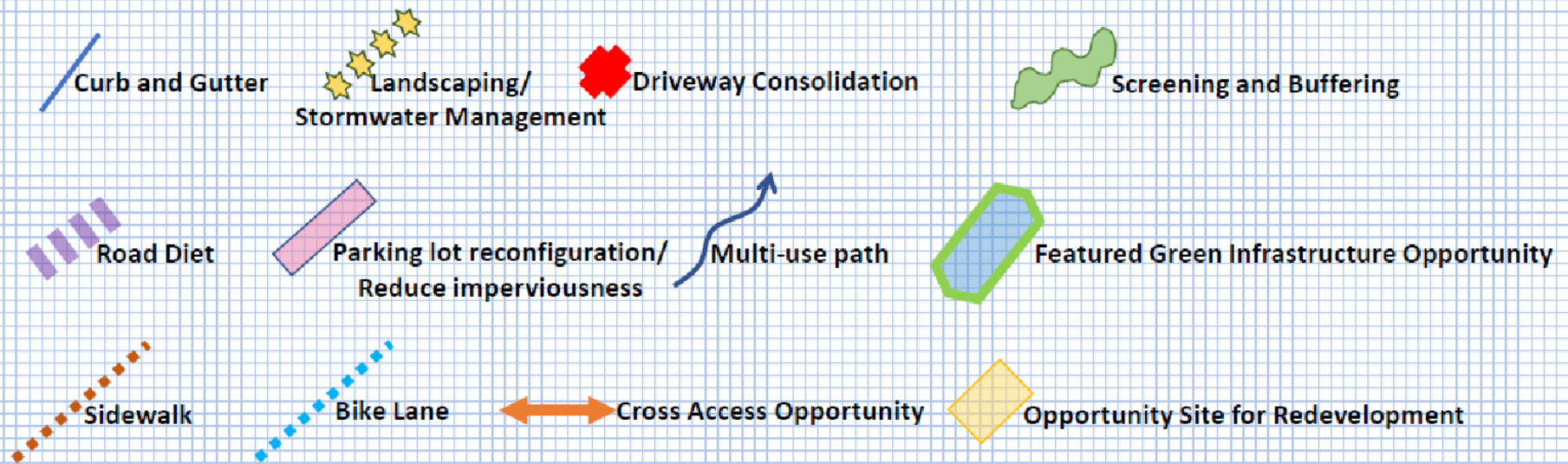
Table 1: Survey Responses for Images 1 and 2 above

Overall, the results of the survey are strongly consistent with survey responses received during Kirkwood’s Comprehensive Plan update. The recommendations of this study were guided by the results of the survey, as well as recommendations from the Comprehensive Plan.

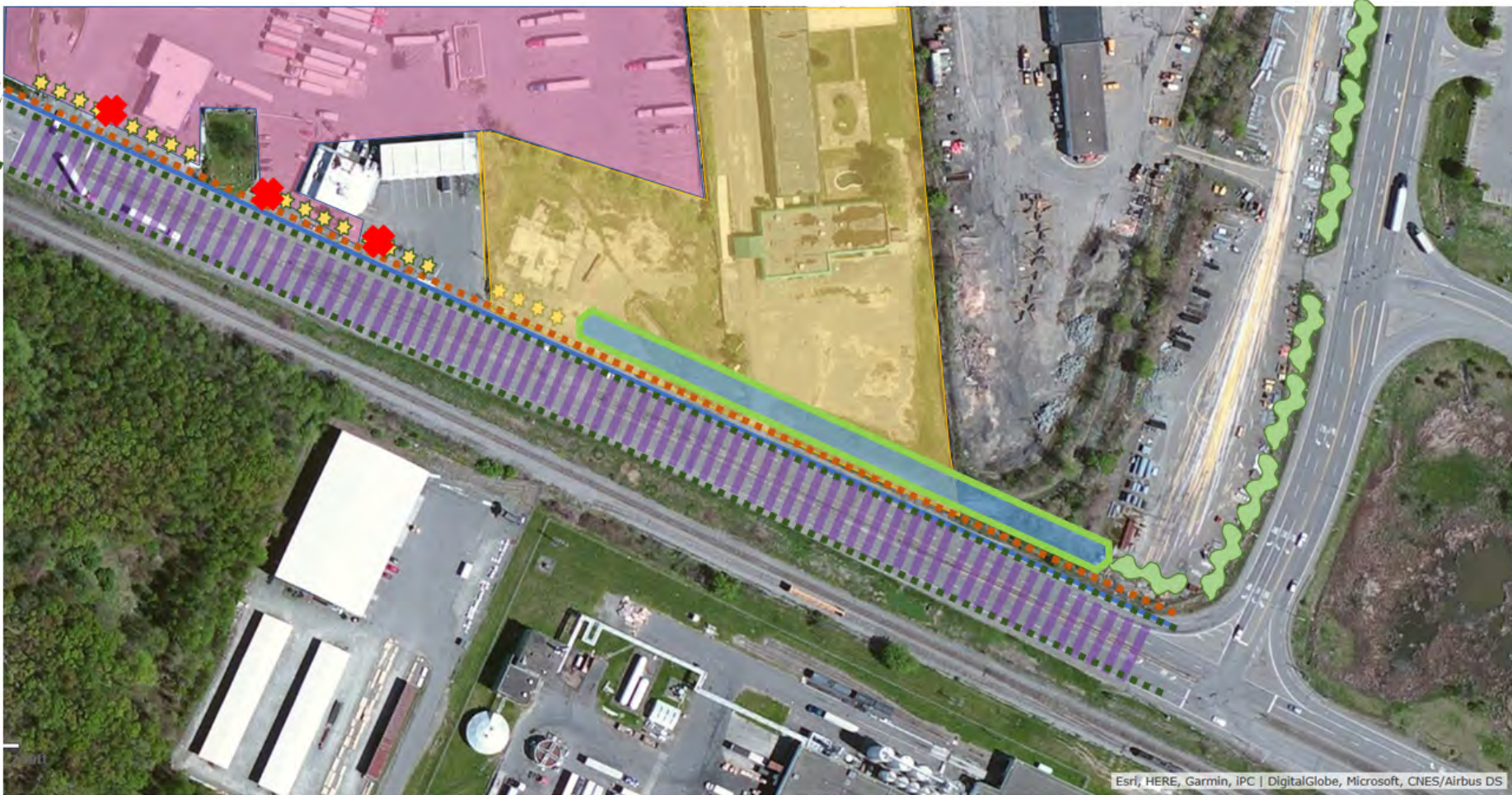
Appendix A

Implementation Toolbox

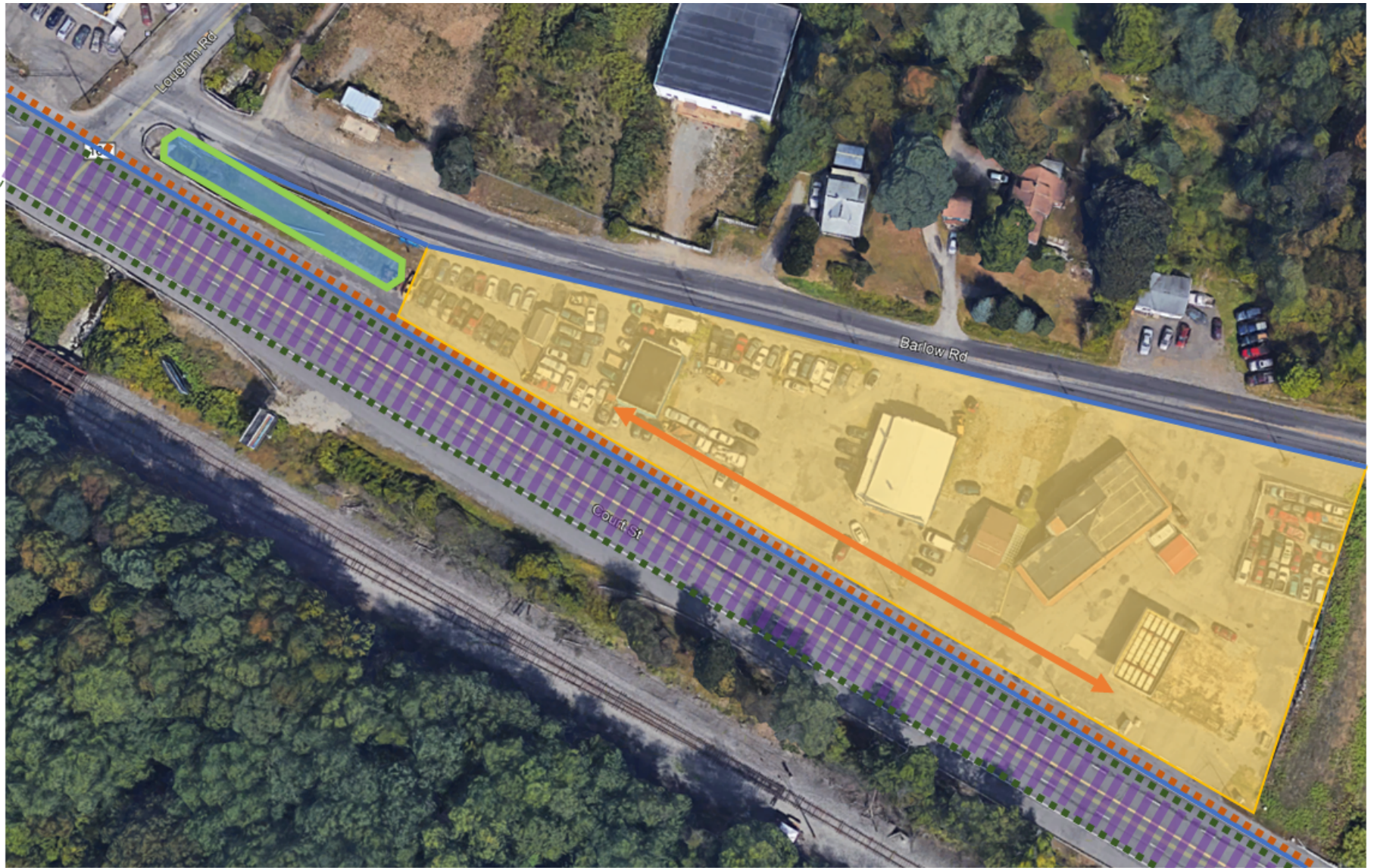
Improvement Toolbox



The following images represent a basic illustration of some potential improvements that could be made within the study area.

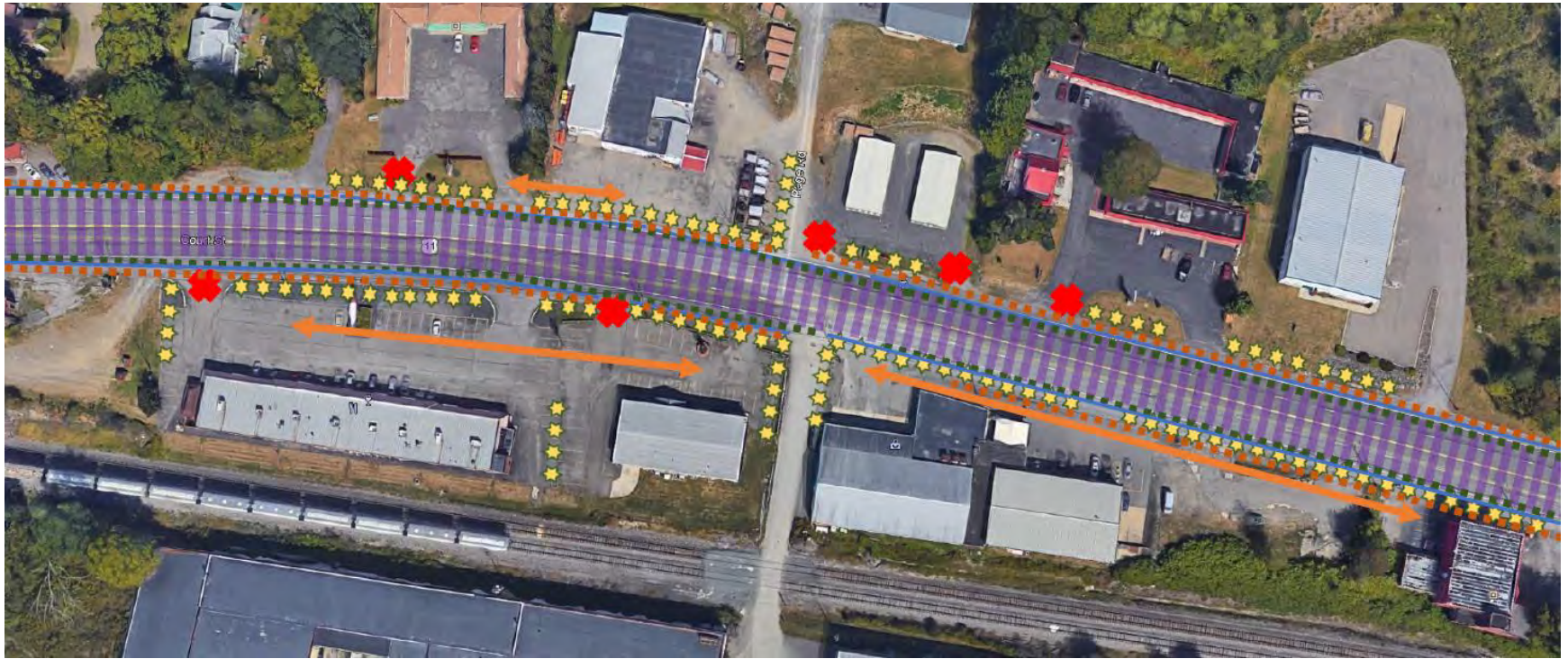


Esri, HERE, Garmin, IPC | DigitalGlobe, Microsoft, CNES/Airbus DS



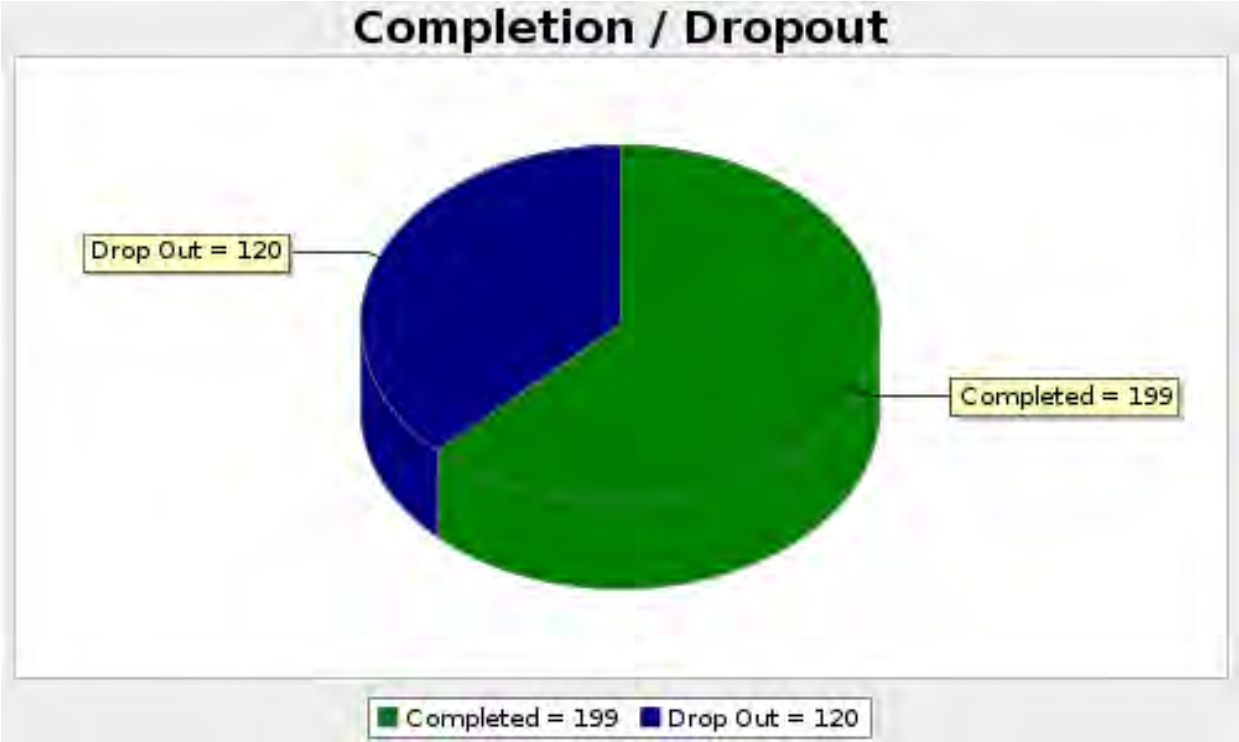






Appendix B:
Upper Court Street Visual Preference Survey

Overview of Survey Participation



| Viewed | Started | Completed | Completion Rate | Drop Outs (After Starting) | Average Time to Complete Survey |
|--------|---------|-----------|-----------------|----------------------------|---------------------------------|
| 1715 | 319 | 199 | 62.38% | 120 | 4 minutes |

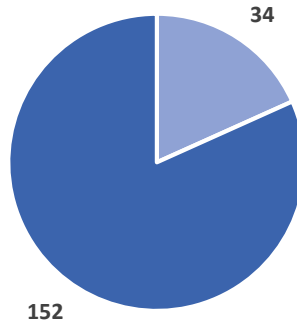
Survey Results



Street with wider vehicle travel lanes (faster traffic speeds), limited or no areas for pedestrians and bikes



Same street with narrower vehicle lanes (slower traffic speeds), center turn lane, bike lanes and sidewalks

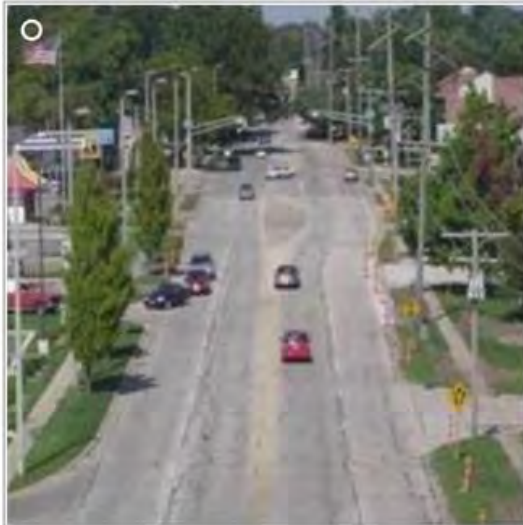


- Street with wider vehicle travel lanes (faster traffic speeds), limited or no area for pedestrians and bikes

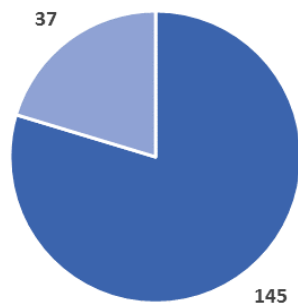
| Answer | Count | Percent |
|---------------------------------------------------------------------------------------------------------------|-------|---------|
| Street with wider vehicle travel lanes (faster traffic speeds), limited or no areas for pedestrians and bikes | 34 | 18.28% |
| Same street with narrower vehicle lanes (slower traffic speeds), center turn lane, bike lanes and sidewalks | 152 | 81.72% |
| Total | 186 | 100% |



Two vehicle travel lanes (may slow traffic), center turn lane (reduces turning conflicts), bike lanes, mid block pedestrian crossing.



Four vehicle travel lanes (faster traffic), no center turn lane (turning conflicts with through traffic), no bike lanes.



- Two vehicle travel lanes (may slow traffic), center turn lane (reduces turning conflicts), bike lanes, mid block pedestrian crossing.
- Four vehicle travel lanes (faster traffic), no center turn lane (turning conflicts with through traffic), no bike lanes.

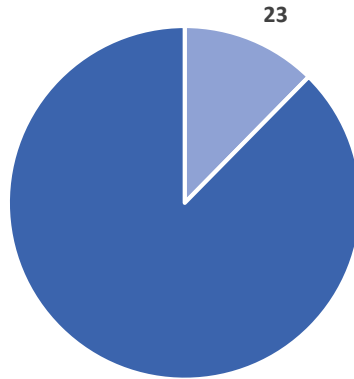
| Answer | Count | Percent |
|---------------------------------------------------------------------------------------------------------------------------------------|-------|---------|
| Two vehicle travel lanes (may slow traffic), center turn lane (reduces turning conflicts), bike lanes, mid-block pedestrian crossing. | 145 | 79.67% |
| Four vehicle travel lanes (faster traffic), no center turn lane (turning conflicts with through traffic), no bike lanes. | 37 | 20.33% |
| Total | 182 | 100% |



Wide shoulders, grassy area for bus pull out and bus stop.



Defined bus pull out and sheltered bus stop, sidewalks and bike lanes.



- Wide shoulders, grassy area for bus pull out and bus stop.
- Defined bus pull out and sheltered bus stop, sidewalks and bike lanes.

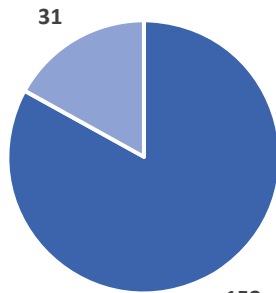
| Answer | Count | Percent |
|------------------------------------------------------------------------|-------|---------|
| Wide shoulders, grassy area for bus pull out and bus stop. | 23 | 12.37% |
| Defined bus pull out and sheltered bus stop, sidewalks and bike lanes. | 163 | 87.63% |
| Total | 186 | 100% |



Shared driveways (requires access easement), landscaping, less direct street access, maintenance of landscaping required.



Cars may access business from anywhere along street, no landscaping, safety impacts from cars backing into street.



- Shared driveways (requires access easement), landscaping, less direct street access, maintenance of landscaping required. 152
- Cars may access business from anywhere along street, no landscaping, safety impacts from cars backing into street. 31

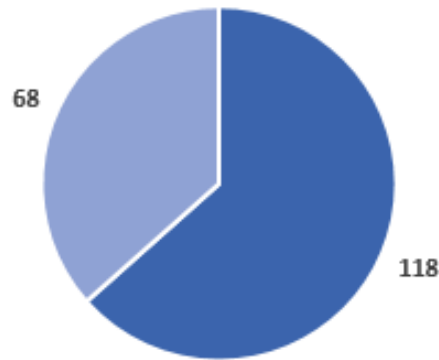
| Answer | Count | Percent |
|---------------------------------------------------------------------------------------------------------------------------|-------|---------|
| Shared driveways (requires access easement), landscaping, less direct street access, maintenance of landscaping required. | 152 | 83.06% |
| Cars may access business from anywhere along street, no landscaping, safety impacts from cars backing into street. | 31 | 16.94% |



Narrower traffic lanes (slower speeds), business landscaping (may reduce amount of parking in front of buildings), bike lanes and sidewalks.



Four vehicle travel lanes and wide shoulders (faster traffic speeds), no landscaping, little maintenance required.



- Narrower traffic lanes (slower speeds), business landscaping (may reduce amount of parking in front of buildings), bike lanes and sidewalks.
- Four vehicle travel lanes and wide shoulders (faster traffic speeds), no landscaping, little maintenance required.

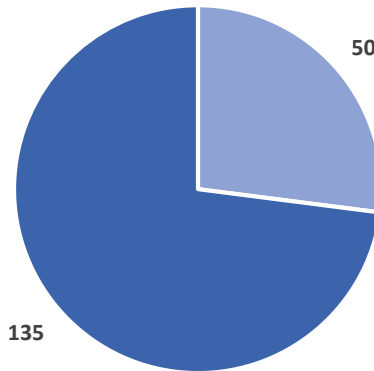
| Answer | Count | Percent |
|----------------------------------------------------------------------------------------------------------------------------------------------|-------|---------|
| Narrower traffic lanes (slower speeds), business landscaping (may reduce amount of parking in front of buildings), bike lanes and sidewalks. | 118 | 63.44% |
| Four vehicle travel lanes and wide shoulders (faster traffic speeds), no landscaping, little maintenance required. | 68 | 36.56% |
| Total | 186 | 100% |



Gas station with multiple wide curb cuts, easy access for vehicles, no landscaping or areas for drainage.



Gas station with few curb cuts, more restrictive street access, landscape buffering and drainage areas.



- Gas station with multiple wide curb cuts, easy access for vehicles, no landscaping or areas for drainage.
- Gas station with few curb cuts, more restrictive street access, landscape buffering and drainage areas.

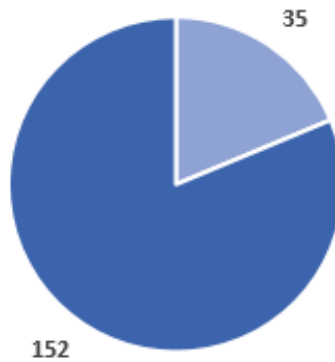
| Answer | Count | Percent |
|-----------------------------------------------------------------------------------------------------------|-------|---------|
| Gas station with multiple wide curb cuts, easy access for vehicles, no landscaping or areas for drainage. | 50 | 27.03% |
| Gas station with few curb cuts, more restrictive street access, landscape buffering and drainage areas. | 135 | 72.97% |
| Total | 185 | 100% |



Street facing parking lot, without landscaping or areas for drainage. Little to no maintenance required except maintaining pavement.



Street Facing parking lot, landscaping requiring maintenance, sidewalks and decorative lighting.



- Street facing parking lot, without landscaping or areas for drainage. Little to no maintenance required except maintaining pavement.
- Street facing parking lot, landscaping requiring maintenance, sidewalks and decorative lighting.

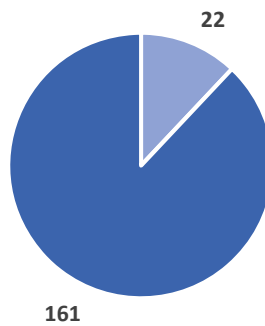
| Answer | Count | Percent |
|--------------------------------------------------------------------------------------------------------------------------------------|-------|---------|
| Street facing parking lot, without landscaping or areas for drainage. Little to no maintenance required except maintaining pavement. | 35 | 18.72% |
| Street facing parking lot, landscaping requiring maintenance, sidewalks and decorative lighting. | 152 | 81.28% |
| Total | 187 | 100% |



Commercial properties with unrestrictive access to the street, potentially resulting in conflicts between vehicles entering and exiting the street at multiple location.



Same street, with defined driveways that restrict street access but reduce conflict points between vehicles and pedestrians, sidewalks and landscaping.



- Commercial properties with unrestrictive access to the street, potentially resulting in conflicts between vehicles entering and exiting the street at multiple location.
- Same street, with defined driveways that restrict street access but reduce conflict points between vehicles and pedestrians, sidewalks and landscaping.

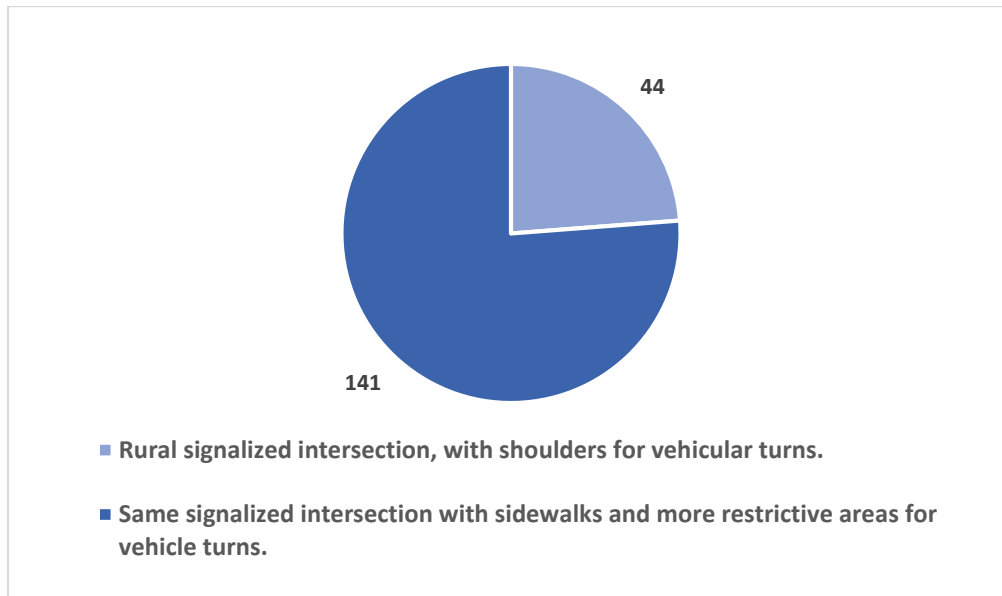
| Answer | Count | Percent |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------|
| Commercial properties with unrestrictive access to the street, potentially resulting in conflicts between vehicles entering and exiting the street at multiple location. | 22 | 12.02% |
| Same street, with defined driveways that restrict street access but reduce conflict points between vehicles and pedestrians, sidewalks and landscaping. | 161 | 87.98% |
| Total | 183 | 100% |



Rural signalized intersection, with shoulders for vehicular turns.



Same signalized intersection with sidewalks and more restrictive areas for vehicle turns.



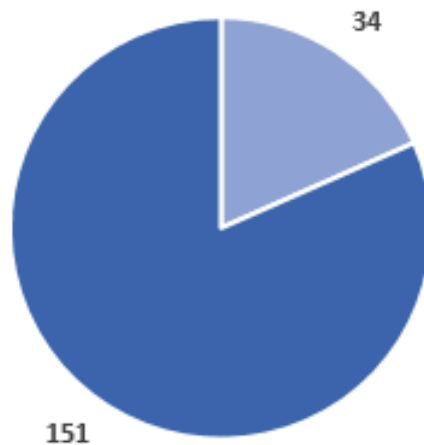
| Answer | Count | Percent |
|-------------------------------------------------------------------------------------------|-------|---------|
| Rural signalized intersection, with shoulders for vehicular turns. | 44 | 23.78% |
| Same signalized intersection with sidewalks and more restrictive areas for vehicle turns. | 141 | 76.22% |
| Total | 185 | 100% |



Roadway with rural character.



Same roadway with center turn lane, bike lane and sidewalks.



- Roadway with rural character.
- Same roadway with center turn lane, bike lane and sidewalks.

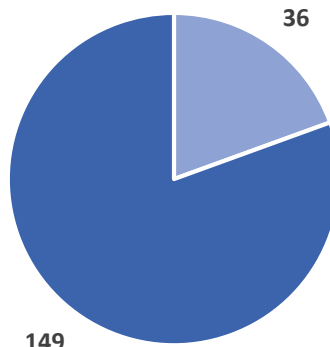
| Answer | Count | Percent |
|--------------------------------------------------------------|-------|---------|
| Roadway with rural character. | 34 | 18.38% |
| Same roadway with center turn lane, bike lane and sidewalks. | 151 | 81.62% |
| Total | 185 | 100% |



Street with wider vehicle lanes, no curbs allows less restrictive vehicle access.



Same street with defined curbs, sidewalks and bike lines, more restrictive vehicular access and narrower travel lanes.



- Street with wider vehicle lanes, no curbs allows less restrictive vehicle access.
- Same street with defined curbs, sidewalks and bike lines, more restrictive vehicular access and narrower travel lanes.

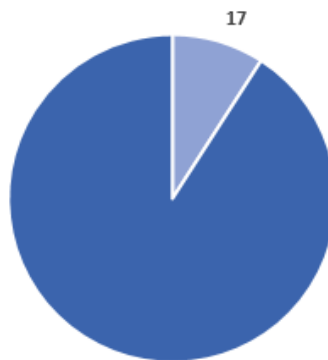
| Answer | Count | Percent |
|------------------------------------------------------------------------------------------------------------------------|-------|---------|
| Street with wider vehicle lanes, no curbs allows less restrictive vehicle access. | 36 | 19.46% |
| Same street with defined curbs, sidewalks and bike lines, more restrictive vehicular access and narrower travel lanes. | 149 | 80.54% |
| Total | 185 | 100% |



Commercial property with open access to street, no curbs and no drainage facilities. No maintenance required but lack of drainage system contributes to flooding.



Defined curbs that allow stormwater to flow and filter into a natural drainage area and away from the street and parking lot. Some maintenance required but localized flooding reduced.



- Commercial property with open access to street, no curbs and no drainage facilities. No maintenance required but lack of drainage system contributes to flooding.
- Defined curbs that allow stormwater to flow and filter into a natural drainage area and away from the street and parking lot; some maintenance required but localized; flooding reduced.

| Answer | Count | Percent |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------|
| Commercial property with open access to street, no curbs and no drainage facilities. No maintenance required but lack of drainage system contributes to flooding. | 17 | 9.09% |
| Defined curbs that allow stormwater to flow and filter into a natural drainage area and away from the street and parking lot. Some maintenance required but localized flooding reduced. | 170 | 90.91% |
| Total | 187 | 100% |