



Tazewell County Roadway Infrastructure Prioritization Study

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Prepared By:





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Executive Summary

Cape sealing and sealing coating is a less expensive alternative in the short term compared to milling and overlaying a roadway. However, these applications only treat the surface and do not provide any additional structural support for the roadway. As a result, the roadway will need to be completely reconstructed more frequently. Over the life cycle, this procedure could end up costing approximately 4% more than a traditional mill and overlay program.

Benefit-cost ratios were calculated for ten infrastructure projects in Tazewell County. Five of these projects are on the county highway system under the jurisdiction of Tazewell County and five are on the township road system under the jurisdiction of various township road districts. There are six bridge replacements, three roadway reconstruction projects, and one shoulder widening and resurfacing project. The ten projects may need to be funded in the upcoming years, and Tazewell County desires to establish an unbiased methodology for allocating limited funds. The numerical benefit-cost ratios accounted for:

- Improvements in public safety,
- Limiting effects of adverse travel,
- Initial capital costs,
- Life-cycle costs, and
- Salvage value associated with a 50 year life cycle.

In addition to the quantitative factors, qualitative information was gathered through coordination with the Tazewell County Highway Department. Available funding was a consideration when prioritizing projects.

The recommendations are as follows:

- Wagonseller Road Bridge and Toboggan Avenue Bridge should be the highest priorities for Tazewell County.
- Bridge improvements generally provided a higher benefit-cost ratio than the identified roadway improvements.
- Broadway Road shoulder and pavement improvements should be the highest priority of the identified roadway projects.
- All identified projects have a benefit-cost ratio greater than 1, which shows the importance of the identified projects.

Tazewell County Engineer's Funding Analysis

Every mile of Tazewell County highway was an HMA (hot-mix asphalt) surface until 2014. For the first time in history, the county has had to reduce the surface type provided on the county highway system and chip seal or seal coat lower volume roadways because the county highway system and township road systems are significantly underfunded.



The State of Illinois collects highway user fees from traffic upon the public road system in Illinois. These highway user fees are MVR (Motor Vehicle Revenue) which is collected by the Secretary of State for such things as motor vehicle registrations, driver's licenses and titles; and, MFT (Motor Fuel Tax) which is collected from wholesale fuel distributors and paid by motorists at the pump as a flat excise tax per gallon of motor fuel sold. These fees were originally implemented and had always served as a revenue sharing mechanism to reinvest into all public roads in an equitable and sustainable fashion. That equitable and sustainable revenue sharing mechanism is broken.

Interstate Highways, U.S. Highways and State Highways are the responsibility of IDOT (the state's Illinois Department of Transportation). County Highways, Township and Road District Roads, and City and Village Streets collectively constitute Local Roads. The traffic carried by public roads in Illinois has historically been and remains today at 60% IDOT / 40% Local Roads and the highway user fee revenue sharing mechanism had returned the highway user fees to IDOT and Local Roads very near to that 60/40 ratio prior to 1983. A drastic shift away from the 60/40 revenue sharing between IDOT and Local Roads occurred in 1983 when the state increased the maximum vehicle size and weight on state highways to the 80,000 pound truck and that shift continues to this day to lower the share of highway user fee revenue returned to Local Roads. In 2014, the revenue sharing was 56% IDOT / 21.5% Local Roads with 22.5% of the highway user fees not being deposited in IDOT accounts or distributed to Local Roads. In addition, the demand on Local Roads was significantly increased in 2009 when the state legislature and governor passed legislation to increase the maximum vehicle size and weight to the 80,000 pound truck. This shift is due primarily to the funding structure. Local Roads receive a share of MFT only. They receive no direct share of the MVR collected by the state. MFT had historically been the larger source of revenue but it has not been increased since 1990 whereas MVR has been increased on more than one occasion since 1990 and is now the much larger source of revenue. In addition, consumption of motor fuel has not grown quite as quickly as it had grown historically whereas vehicle registrations, titles and driver's licenses continue to grow very near the rate at which they had grown historically. Structurally, Local Roads are sharing only the smaller highway user fee revenue source, MFT, which is currently growing at the slightly lower rate.

The MFT which Local Roads receive is the primary funding source for basic maintenance for the vast majority of Local Roads. The more rural the unit of local government, the more highly dependent their Local Roads are on MFT for maintenance as their only other funding source is the levy of real estate taxes on the total EAV (Equalized Assessed Value) within that unit of local government. Highly rural townships/road districts with very low EAV are entirely dependent on MFT for any maintenance to occur on their roads.

Historic increases have occurred over the last 10 to 15 years in the cost to perform basic maintenance on the Local Road system. The IACE (Illinois Association of County Engineers) have studied the maintenance costs awarded through the competitive bid process versus the MFT received. The study utilizes 2000 as the base year as it was the last year that Local Roads received an increase in their share of MFT to compensate for the fact that MVR was raised as part of the Illinois First capital program. The study shows that for the average Illinois county the maintenance cost per square yard in 2014 was 2.48 times the maintenance cost per square yard in 2000. The study shows that for the average Illinois township/road district the maintenance cost per square yard in 2014 was 2.39 times the maintenance cost per square yard in 2000. MFT distributed to Local Roads dropped 1.3% over that same time span. The net result is a 60% loss in purchasing power to perform basic county highway maintenance for the average county and a 59% loss in purchasing power to perform basic township/road district road maintenance for the average township/road district. This means that



counties and township/road districts in Illinois could only afford to maintain 4 miles in 2014 for every 10 miles they maintained in 2000.

Tazewell County has fared even worse with a maintenance cost per square yard in 2015 that was 3.19 times the maintenance cost per square yard in 2000. Tazewell County's share of MFT dropped 17.3% over that same time span. The net result is a 74% loss in purchasing power to perform basic county highway maintenance which means Tazewell County could only afford to maintain 2.6 miles in 2014 for every 10 miles they maintained in 2000. The picture for the township road districts in Tazewell County is very similar with a maintenance cost per square yard in 2014 that was 3.19 times the maintenance cost per square yard in 2000, however, their share of MFT increased 16.8% over that same time span. The net result is a 63% loss in purchasing power to perform basic township/road district road maintenance for the average township/road district in Tazewell County. This means that they could only afford to maintain 3.7 miles in 2014 for every 10 miles they maintained in 2000.

In order for Tazewell County to maintain HMA surfaces for the 204 miles of county highway, 17 miles of roadway must be resurfaced every year. At a price of \$270,000 per mile, the county must spend \$4,590,000. All federal, state and local funds provided \$2,400,000 for the FY2016 surface maintenance program, which left a shortfall of \$2,190,000.

The Road Districts in Tazewell County face a funding situation that is even worse than the County. The significant shortfall of funding to perform the most basic level of maintenance and preserve the system as it currently exists is forcing townships to return roadway surfaces to gravel. The vast majority of township roads are sealcoat over an unsubstantial gravel base upon native compacted earth. In the absence of basic maintenance to preserve the sealcoat surface, moisture can penetrate the supporting aggregate base and earth subgrade creating a saturated condition, which weakens its ability to properly support traffic and leads to failures. In this condition, a road can quickly be reduced to gravel and from there it is highly susceptible to returning to earth or mud as the gravel is pushed down into the fine grains of the highly productive Illinois soil.

All people and businesses rely on the Local Road system. Each trip to a home, a business, a farm, or any other location, usually starts and ends on the Local Road system. The ability for agricultural products to remain competitive in the global market is highly reliant on the Local Road system. The ability for emergency service providers to reach locations of crisis is reliant on the Local Road system. The ability for people to get to work or school is reliant on the Local Road system. Providing adequate roadway structure and surfaces for all these trips directly impacts the quality of life for the people of Tazewell County.

Tazewell County has taken measures to provide the best use of available funding to its constituents, but the process is not sustainable. Changes to the state highway user fee revenue sharing mechanism in order to return 40% to Local Roads through the MFT distribution formula is justified and required. For example, with no indication of increased return of state or federal funding for bridges, the County Board would need to raise the County Bridge Fund levy to close that gap. Tazewell County has a PTELL (Property Tax Extension Limitation), which would make such an increased levy unlikely.



Introduction

The mission of any county highway department is to create and maintain a safe and efficient network of roads and bridges. In Tazewell County, the county highway system accounts for 11.4% of the total miles of public roads. Table 1 shows the breakdown of road miles by jurisdiction (State, County, Township, and Municipal) and shows that local road jurisdictions are responsible for 90.1% of the total road miles in Tazewell County. These statistics underscore the importance of maintaining and improving the local system.

Table 1: Mileage of Highways and Streets

ILLINOIS DEPARTMENT OF TRANSPORTATION
 Office of Planning and Programming - Planning & Systems Section

TABLE HS-4 DECEMBER 2014

District 4 Tazewell County	STATE HIGHWAY SYSTEMS				LOCAL HIGHWAY SYSTEMS			Total (A) thru (F)	
	Primary (A)	Supple- mentary (B)	Total (A) and (B)	Toll (C)	County (D)	Township (E)	Municipal (F)		
Total All Systems	Rural	88.55	1.70	90.25	0.00	192.51	714.05	87.49	1,084.30
	Urban	82.95	3.48	86.43	0.00	12.08	92.90	520.35	711.76
	Total	171.50	5.18	176.68	0.00	204.59	806.95	607.84	1,796.06

Since funding for projects is limited and maintaining mobility on a majority of the transportation system is a priority, Tazewell County officials have determined that it is necessary to identify the most beneficial and efficient ways to invest available funds. This study evaluates the life cycle of potential pavement preservation strategies and determines the benefit-cost ratio for infrastructure projects based on safety improvements, adverse travel analyses, initial costs, and life cycle costs. The benefit-cost ratios can help Tazewell County policy makers prioritize roadway infrastructure improvements and determine the appropriate pavement maintenance policies.

Different funding resources are available for urban, rural, roadway, and bridge projects as well as for federal, state, county, municipal and township road district levels of government. The projects were ranked based on these funding opportunities. For example, if the County receives bridge funds, this report identifies which bridge would provide the most benefit for the cost.

This study also creates a repeatable benefit-cost ratio process for specific projects in Tazewell County. The proposed methodologies can prioritize potential projects in the future. Using quantitative and qualitative factors, jurisdictions can confidently defend funding choices to constituents.

Impacts of Insufficient Funding and Alternative Surface Treatments

As a result of the lack of adequate funding, Tazewell County is using cape seal and seal coat treatments on roads that have historically been milled and re-surfaced with HMA. Cape seal and seal coat surfaces do not provide as high a level of service to Tazewell County constituents as HMA roadways, and, over the life-cycle of the roadways, seal coating and cape sealing are actually more expensive.

Cape Seal (Figure 1) and Seal Coat (Figure 2) treatments can be used as an option to treat an HMA surface before it must be milled and overlaid, but, if the surface is not milled and overlaid, the roadway will need to be reconstructed earlier than a roadway that is milled and overlaid throughout its life. This

is because the cape seal and seal coat treatments provide negligible structural integrity to pavement structure.

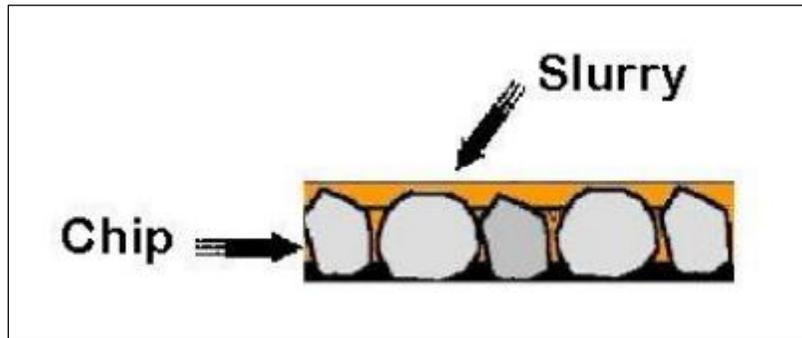


Figure 1: Cape Seal Cross Section

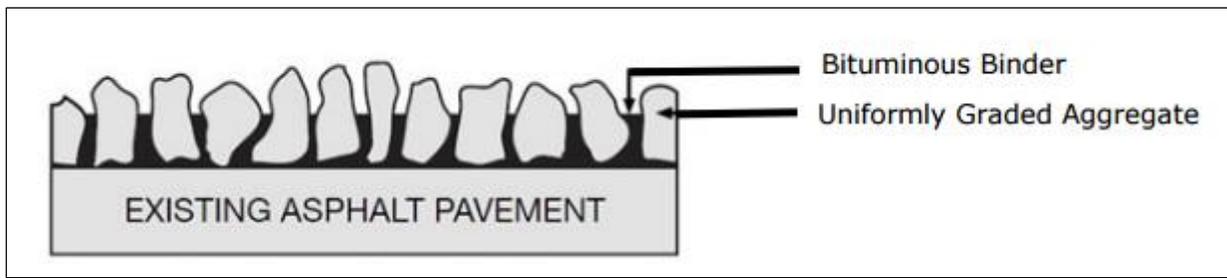


Figure 2: Chip Seal Cross Section

Tazewell County has implemented a policy for surface treatments based on the average daily traffic of the county highways. If the roadway carries less than 400 vehicles per day, then the roadway will be seal coated on average every 5 years. If the roadway carries between 400 and 1,000 vehicles per day, then the roadway will be cape sealed on average every 7 years. If the roadway carries more than 1,000 vehicles, then the roadway will continue to be milled and overlaid with HMA on average every 12 years. Approximately 60% of Tazewell County Highways fall into the high volume category and the other 40% are evenly distributed between the medium and low volume categories. It is assumed that the Tazewell County Highways are fairly evenly distributed within the expected 50 year life cycle, meaning that some roads have been recently redone, some are a couple years away from needing reconstruction, some are coming up soon, and some are in immediate need of reconstruction.

For our analysis, the following assumptions were made:

- Reconstructing a high volume roadway will cost \$1.5 Million per mile
- Reconstructing a medium or low volume roadway will cost \$750,000 per mile
- Milled and Overlaid High Volume Roadways have a design life of 50 years
- Milled and Overlaid Low or Medium Volume Roadways have a design life of 60 years
- Cape Sealed Roadways will have a design life of 40 years
- Seal Coat Roadways will have a design life of 35 years
- Mill and Overlay costs \$270,000/mile
- Cape Seal costs \$76,500/mile
- Seal Coat costs \$22,500/mile



Since cape sealing and seal coating will not preserve a road as long, the 40% of roadways that are treated with alternative methods will require reconstruction earlier than if the roadways were maintained with HMA surface. Over a 50 year life cycle, a high volume roadway is constructed, milled and overlaid three times and then reconstructed, costing Tazewell County \$46,200 per year per mile. Over a 60 year life cycle, a medium or low volume roadway is constructed, milled and overlaid twice, and then reconstructed. A mile of medium or low volume roadway maintained with HMA surface will cost Tazewell County \$21,500 per year. Over a 40 year life cycle, a cape sealed roadway is constructed, cape sealed five times, and then reconstructed. A mile of roadway maintained with cape seal will cost Tazewell County \$28,313 per year. Over a 35 year life cycle, a seal coat road would be constructed, seal coated six times, and then reconstructed. A mile of roadway maintained with seal coat will cost Tazewell County \$25,286 per year. See Table 2 for a table outlining the assumptions.

Table 2: General Life Cycle Costs

Roadway Type	Roadway Surface	Assumed Life Cycle (Years)	Chip/Cape Seal Applications	Mill/Overlay Applications	Cost (per Year per Mile)
High Volume	Hot-Mix Asphalt	50	-	3	\$46,200
Medium/Low Volume	Hot-Mix Asphalt	60	-	2	\$21,500
Medium Volume	Cape Seal	40	5	-	\$28,313
Low Volume	Chip Seal	35	6	-	\$25,286

Reducing the level of service of a roadway by no longer milling and overlaying the surface and instead cape sealing the surface will increase the cost for a mile of roadway by 15% over its lifetime. However, due to the limited funding for the county, decisions have to be made to get through the short term by reducing the mileage of structural maintenance instead of planning for the long term. Tazewell County needs to resurface 17 miles of county highway each year, as detailed above. If the need this year consisted of 3.4 miles of low volume roadways, 3.4 miles of medium volume roadways, and 10.2 miles of high volume roadways, the county would have to spend \$4.59 million to mill and overlay the entirety, or \$3.09 million to follow the new surface treatment policy. This would be a short-term savings of over \$1.5 million which is hard to ignore when funding is tight; however, it results in a lower level of service on 40% of the system.

The savings may be appealing in the short term, but it must be recognized that mill and overlay HMA roadways can continue with very minimal maintenance for 12 years while cape seal and seal coat require more frequent applications. Additionally, it would be recommended to begin the seal coating or cape sealing process before the roadway would traditionally need milled and overlaid. A seal coat or cape seal does not repair structural damage to the roadway whereas milling and overlaying with HMA replaces the structurally damaged surface layer.

In the end, the larger impact is that the roadways may need reconstructed more frequently.

Assuming, in year one, Tazewell County begins using cape seal and seal coat, by year 13, roadways will begin to need reconstructed, which could have been avoided if they were milled and overlaid when they needed a surface treatment. If the County follows a mill and overlay cycle on all roadways, 3.8 miles would require reconstruction each year. However, with the cape seal and seal coat procedures, in year 13, it is expected that 5.1 miles of roadway will need to be reconstructed. This will increase the construction cost by about \$1 million dollars for this year; however, the savings in surface treatment have already saved the County \$3.7 million up until this point. This advantage flips by year 16, when



the County will have spent a total of \$119 million on the lower quality surface treatments when they could have spent \$118 million with HMA maintenance. The additional miles of roadway needing reconstruction begins to overcome the savings achieved with the lower quality surface treatments.

Prioritization of Identified Projects

Another cost saving measure the County may have to consider is deferring specific surface transportation projects. No longer maintaining a roadway or bridge in any capacity could have major impacts on the county highway system. However, if funding remains well below minimum levels to properly maintain the system, keeping 204 miles of county highway open may become unrealistic.

Types of Projects

The ten projects identified herein generally fall into one of three categories: roadway reconstruction, widening and resurfacing, or bridge projects.

Reconstruction Projects – The reconstruction projects will involve rebuilding roadways with a hot-mix asphalt (HMA) surface. The roadways will be rebuilt to the Illinois Department of Transportation (IDOT) Bureau of Local Roads (BLR) standards, which may involve widening the travel lanes, shoulders, or adjacent drainage ditch.

Widening and Resurfacing Projects – There is one widening and resurfacing project, Broadway Road, which will involve purchasing additional right-of-way to widen the shoulders and move the ditches further from the roadway. This will be followed by milling the surface and overlaying the roadway with HMA.

Bridge Projects – The bridge projects involve either deck replacement or complete bridge replacement. The bridge projects will be constructed to IDOT BLR standards and will be designed to carry 80,000 pound vehicles. These projects may result in more efficient truck routes through the County.

Methodology

The goal of the roadway infrastructure prioritization is to compare many different projects to one another objectively. Big, expensive, urban projects can sometimes overshadow smaller, rural projects. By dividing the benefit by the cost, the relative value of the projects, both smaller and larger, can be recognized. Using a benefit-cost ratio allows the County to provide the most value to its constituents. To determine the benefit-cost ratio, the benefit of improved safety and prevented adverse travel is compared to the cost of the proposed improvement. Project comparisons consisted of the following components:

- Benefits
 - safety improvements
 - preventing adverse travel and associated emissions
- Costs
 - investment cost over the life-cycle
 - salvage value

Benefit of Safety Improvements

To compare the relative safety of an existing transportation facility with the proposed improvement(s), the Highway Safety Manual (HSM) procedures were used. The HSM was developed by the American Association of State Highway and Transportation Officials (AASHTO) and was most recently published in 2010. When considering property damage, lost productive time, emergency response expenses,



medical bills, and other associated costs, the HSM claims that in 2005, each fatal or injury crash costs society \$158,200 and each property-damage-only crash costs society \$7,400. To account for two percent annual inflation from 2005 to 2015, crash cost values of \$192,845 and \$9,020 were used for fatal/injury crashes and property-damage-only crashes, respectively. The benefit of a specific project corresponded to the cost of the crashes prevented by the improvements. Additional information regarding this methodology can be found in Appendix A.

Benefit of Preventing Adverse Travel

When a road or bridge is closed, adverse travel is experienced by the user, and there are costs associated with the added distance and time it takes to detour around the closed roadway network segment. For a bridge, pavement condition is not the limiting factor and there is no industry standard for expected failure based on sufficiency ratings. So, the failure date for bridges was assumed to be 2015 and the benefit-cost ratio represents the value of replacing a bridge right before it must be closed. Both the shortest detour route for passenger vehicles using any public roadways and shortest detour route for heavy vehicles (which must stay on designated truck routes) was determined. Then the average daily traffic (ADT) for both users was multiplied by the increased distance if the roadway was no longer available. The costs associated with adverse travel include:

- \$15 per hour for passenger vehicle time
- \$50 per hour for truck time
- \$0.575 per mile
- 0.000025 tons of Volatile Organic Compound (VOC) pollutants per hour at \$1,813 per ton
- 0.000005 tons of Nitrogen Oxide (NOx) pollutants per hour at \$7,147 per ton

Values for passenger vehicle time, truck time, VOC pollutants, and NOx pollutants are the values recommended for use in the US Department of Transportation (USDOT) TIGER Grant Program, and the mileage value is the 2015 Internal Revenue Service (IRS) reimbursement rate. Additional information regarding this methodology can be found in Appendix B.

Exclusions in the Benefit-Cost Ratio Analysis

A benefit of certain projects that was excluded is the ability to generate additional property tax revenue by developing land that is currently assessed at lower rates. If access is improved and attracts developers to build along a roadway, the property tax revenue collected by the County could increase with the change in assessed evaluation from agricultural uses to commercial, residential, or industrial uses, for example. This may have a direct effect on the County budget and was purposefully excluded for multiple reasons:

- The mission of the County Highway Department is not to attract developers; instead, its purpose is to provide a safe and efficient transportation system.
- The goal of each project was to determine which improvements benefit users most. While the increase in property tax would help the County's bottom line, it would not necessarily help the individual roadway network user.
- The benefit of property tax would significantly outweigh any other benefit metric, thus moving specific projects to the top of the list without guaranteed revenue.
- No data was readily available to compare and recognize the benefits that rural projects would have on County revenues.



Projects

Tazewell County identified ten infrastructure elements on the county highway system and township road system that are expected to require improvements in the next 20 years. The project list includes four roadway segments and six bridges. The total anticipated budget to complete all of the projects is about \$104 million in 2015. However, Tazewell County’s current budget and funding opportunities will not accommodate the immediate completion of all of the projects. The purpose of the benefit-cost ratio analyses is to assist the County with prioritizing the most important projects.

Table 3 provides the opinion of probable cost for each project in the prioritization study, as provided by Tazewell County or calculated based on data provided by the County. A detailed description of how costs equated into a life-cycle cost can be found in Appendix C. Figure 3 shows the general location of the ten proposed improvement projects.

Table 3: Project Costs

Project	County Highway Number	Jurisdiction	Proposed Improvement	Opinion of Probable Cost *
Broadway Road	CH 19	Tazewell County	HMA Resurfacing; Shoulder & Ditch Widening	\$5,665,000
Caterpillar Road Bridge	---	Delevan Road District	Bridge Replacement	\$1,291,000
Locust Road Bridge	---	Hopedale Road District	Bridge Replacement	\$1,451,000
Manito Road	CH 16	Tazewell County	Roadway Reconstruction	\$42,800,000
Manito Road Bridge	CH 16	Tazewell County	Bridge Replacement	\$8,407,000
Spring Creek Road	---	Fondulac Road District & Washington Road District	Roadway Reconstruction	\$32,740,000
Stringtown Road	---	Hopedale Road District & Little Mackinaw Road	Reconstruction with HMA	\$9,200,000
Toboggan Avenue Bridge	CH 14	Tazewell County	Bridge Replacement	\$422,000
Towerline Road Bridge	CH 11	Tazewell County	Bridge Deck Replacement	\$1,495,000
Wagonseller Road Bridge	CH 15	Sand Prairie Road District	Bridge Replacement	\$618,000

* Opinion of Probable Cost provided by, or calculated based on data provided by Tazewell County.

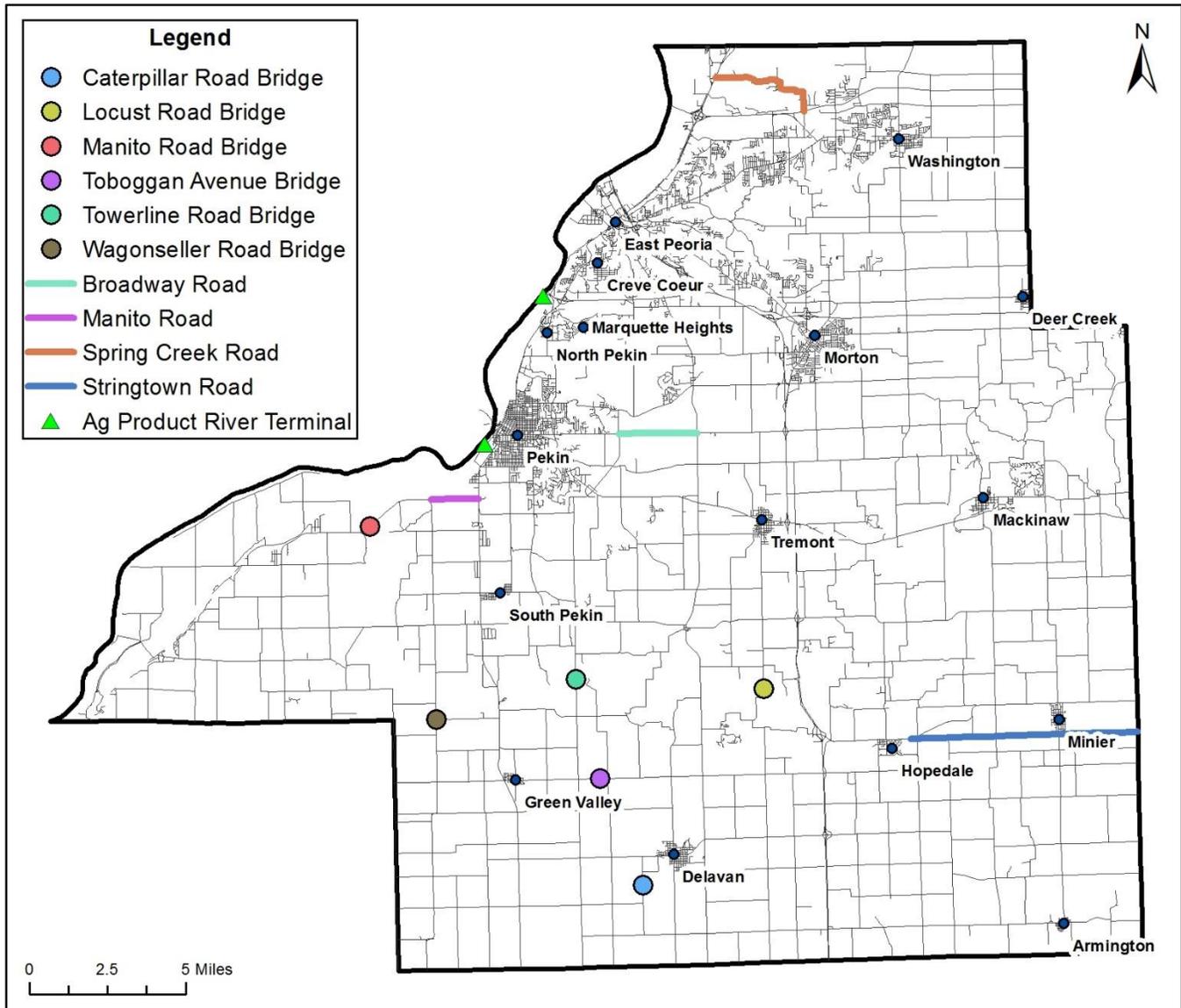


Figure 3: Tazewell County Roadway Infrastructure Projects

Broadway Road

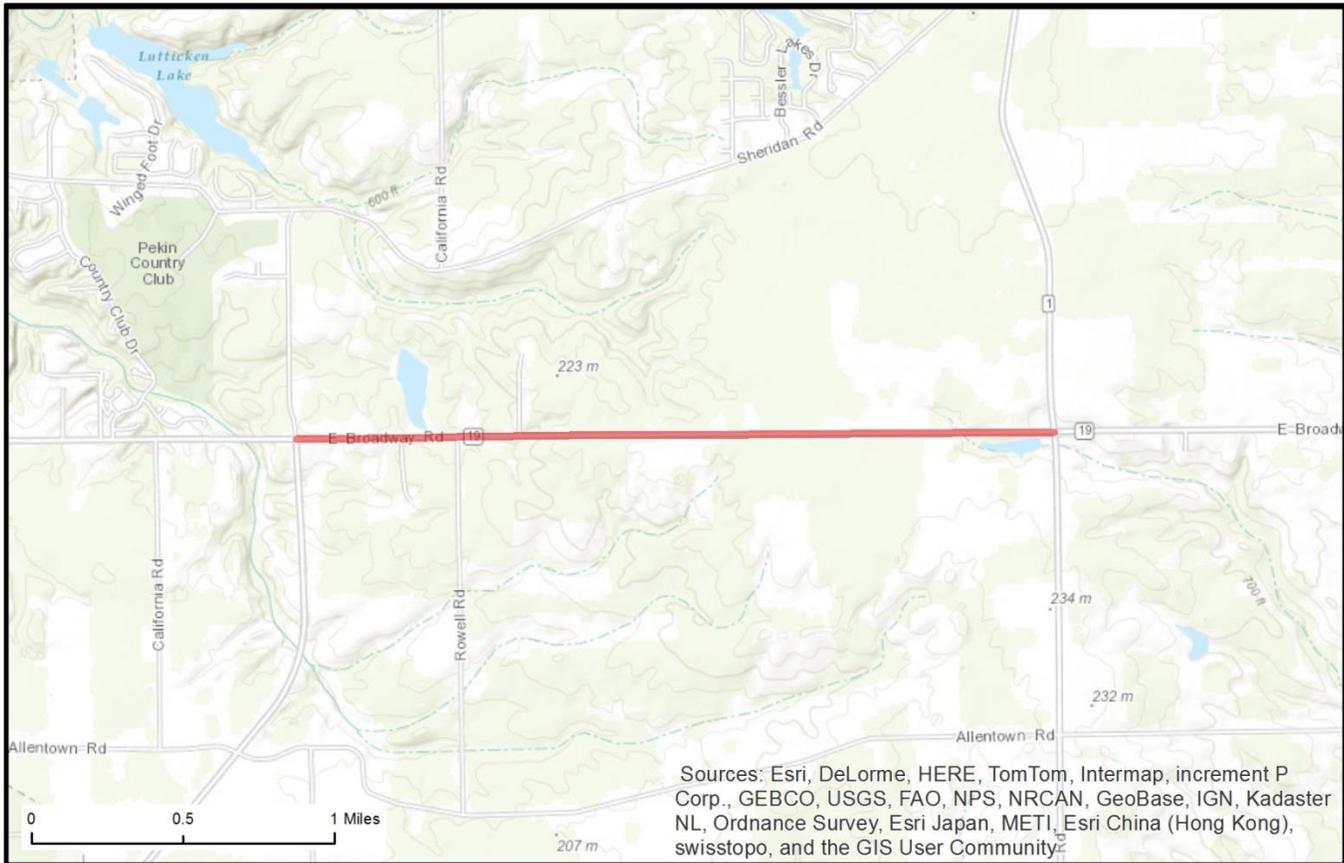


Figure 4: Broadway Road Location & Limits

Existing Conditions

This project is generally located east of Pekin in west-central Tazewell County. Broadway Road (County Highway 19, or CH 19), from Veterans Drive to Springfield Road, is classified as a Major Collector roadway, with a speed limit of 55 mph and a 2014 annual average daily traffic (AADT) volume of 6,200 vehicles. It is currently configured as an undivided 2-lane roadway, with one 11-foot lane in each direction, and 1-foot paved shoulders. Tazewell County has rated the pavement in this section as a 6 out of 10. This segment of Broadway Road is not a designated truck route. Broadway Road, west of Veterans Drive and east of Springfield Road, was previously improved with wider paved shoulders and ditches, which leaves this portion to be improved. The intersection at Veterans Drive is signalized, all four approaches have left-turn lanes, and the eastbound approach has a right-turn lane. The intersection at Springfield Road is all-way stop control (AWSC), no approaches have left-turn lanes, and all approaches except the eastbound approach have right-turn lanes. Lighting is present at both intersections but not throughout the roadway segment. Within the project limits, adjacent properties are almost exclusively agricultural land use.

Proposed Improvements

The Broadway Road project proposes to resurface the roadway with HMA, as well as widening the shoulders and the roadside drainage ditch. It will remain an undivided 2-lane roadway and the lanes will



not be widened. Construction of the 2.5-mile project is expected to cost approximately \$5,665,000. It is the current Tazewell County plan to complete the project in 2019-2020.

Safety

The widened shoulders proposed as part of the Broadway Road project is anticipated to increase safety along the roadway segment, and an improvement in the Roadside Hazard Rating (RHR) is also expected. These safety improvements are anticipated to result in an annual societal savings of about \$66,400 for fatality/injury (FI) and property-damage-only (PDO) crashes combined.

Adverse Travel

The closure of Broadway Road results in an annual increase of 109,500 miles and 27,740 hours of travel, which would cost society approximately \$540,200 annually and \$41,497,000 over the 50-year life-cycle.

Benefit-Cost Ratio

The Broadway Road project has a benefit-cost ratio of 6.6, if the improvements are constructed in 2019 as anticipated.

Caterpillar Road Bridge

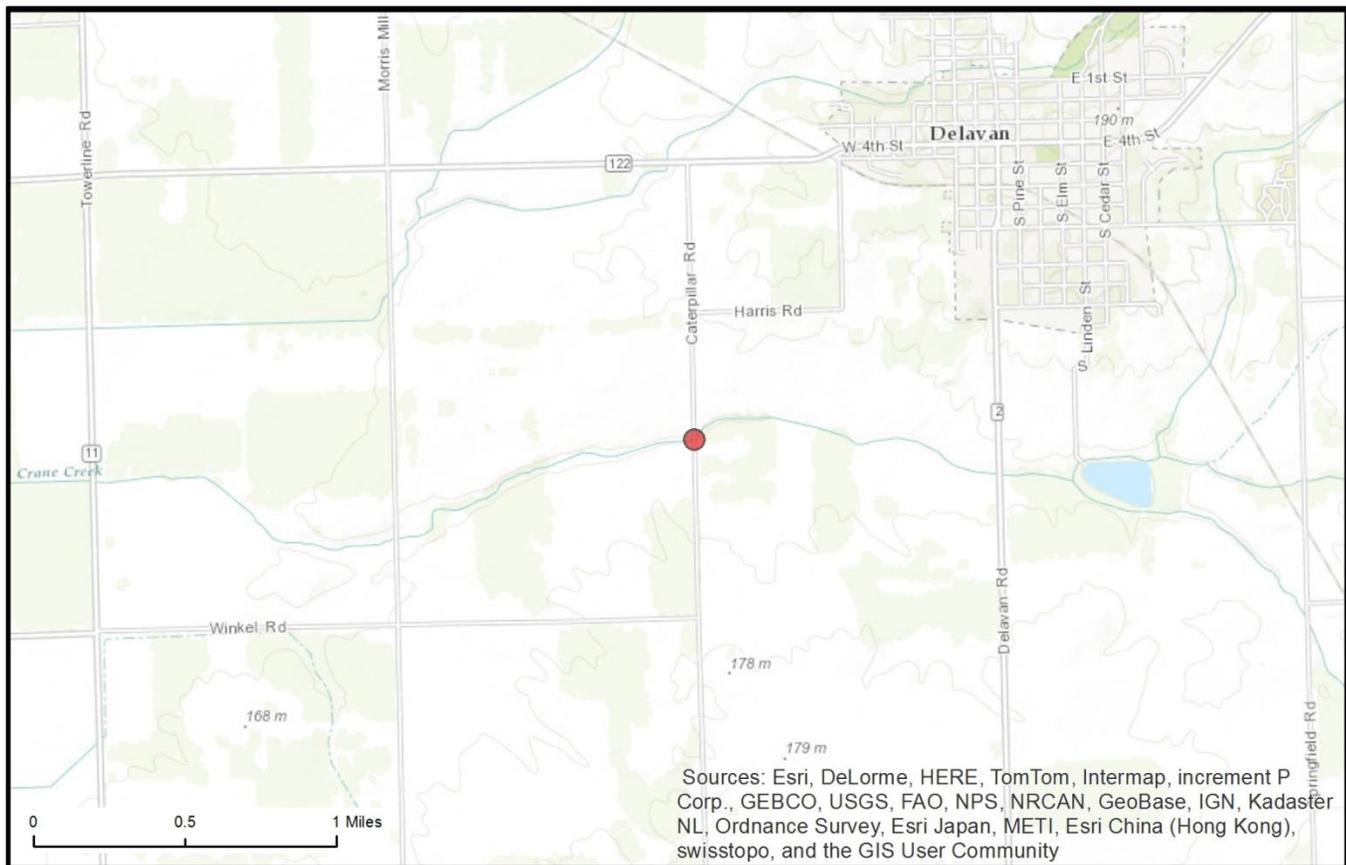


Figure 5: Caterpillar Road Bridge Location

Existing Conditions

This project is generally located in south-central Tazewell County. Caterpillar Road is a township road that is classified as a Local Road, with a statutory speed limit of 55 mph and a 2014 AADT volume of 350 vehicles in the vicinity of the subject bridge. This segment of Caterpillar Road is not a designated truck route. However, it was upgraded to serve as the designated haul route for Caterpillar’s supply yard, located on Caterpillar Road just north of the intersection with Winkel Road, and as such, carries a significant amount of heavy truck traffic. The truck traffic also uses IL 122 for arriving and departing shipments. The Caterpillar Road Bridge (Structure Number, or SN 090-3094), which was constructed in 1957 and crosses over Crane Creek, is currently configured as an undivided 2-lane roadway, with one 12-foot lane in each direction and 1-foot paved shoulders. No lighting is present on the bridge. As of 2015, the bridge was not listed as Structurally Deficient or Functionally Obsolete. It has a Sufficiency Rating of 49.9 and had been rated and posted for “One Truck at a Time” even though it is serving a road that carries two-way traffic. The bridge is generally in fair condition.

Scope of Improvements

The Caterpillar Road Bridge project proposes to replace the structure. The replacement bridge is expected to meet current design standards, which includes one 12-foot lane in each direction and 2-foot paved shoulders. Construction is expected to cost approximately \$1,291,000.



Safety

The replacement of the Caterpillar Road Bridge is anticipated to increase safety along the roadway segment by widening the shoulders and improving the RHR. However, no crashes were reported in this area during the three years of crash data analyzed (2011-2013), thus the safety benefit calculation results for this project were negligible.

Adverse Travel

The closure of Caterpillar Road Bridge results in an annual increase of 182,500 miles and 2,555 hours of travel, which would cost society approximately \$168,700 annually and \$14,270,000 over the 50-year life-cycle.

Although there are two alternative routes (west on Winkel Road to Towerline Road (CH 11) to IL 122; or, South on Caterpillar Road to Armington Road to Delavan Road (CH 2) to IL 122, the township routes in either of those directions, Winkel Road or Caterpillar Road, would need to be upgraded to serve the intended truck traffic. These improvements would be expected to cost approximately \$1,500,000 for 2.0 miles of Winkel Road or \$750,000 for 1.0 mile of Caterpillar Road.

Benefit-Cost Ratio

The Caterpillar Road Bridge project has a benefit-cost ratio of 16.61.

Locust Road Bridge (Waltmire Bridge)

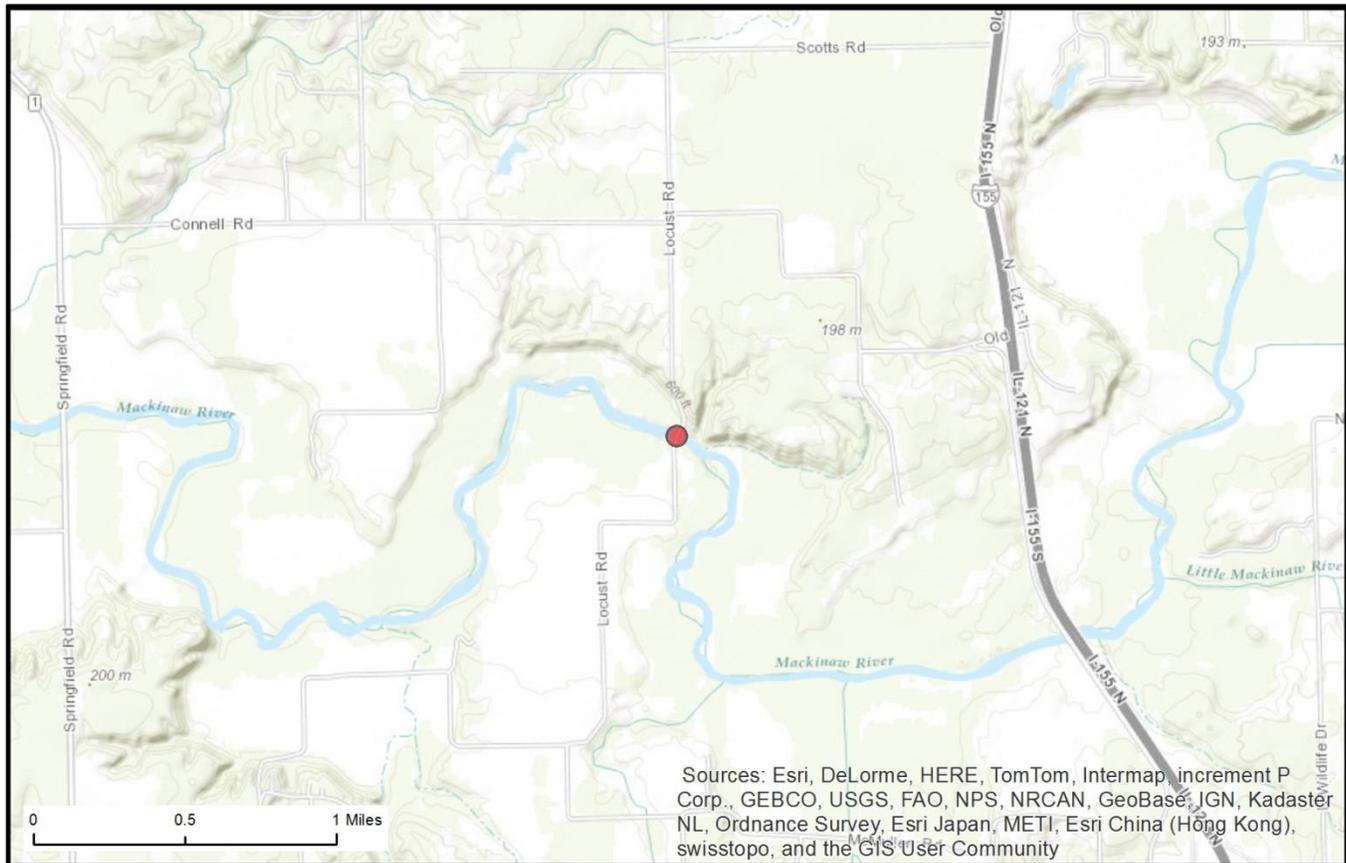


Figure 6: Locust Road Bridge Location

Existing Conditions

This project is generally located in south-central Tazewell County. Locust Road is a township road that is classified as a Local Road, with a statutory 55 mph speed limit. In 1998, the AADT volume was 125 vehicles, but the bridge is currently closed. Research indicates the Locust Road Bridge (formerly SN 090-3105), also known as the Waltmire Bridge, was originally constructed in 1910. The bridge crosses over the Mackinaw River and it was closed in January 2001 due to its generally poor condition (Structurally Deficient). The estimated current AADT volume across a proposed structure at this location would be approximately 150.

Scope of Improvements

The Locust Road Bridge project proposes to replace the structure. The replacement bridge is expected to meet current design standards, which includes one 12-foot lane in each direction and 2-foot paved shoulders. Construction is expected to cost approximately \$1,451,000.

Safety

It is unknown whether opening the bridge would provide safety benefits to the network since the existing bridge is closed to traffic. Therefore, safety benefits were not added to this project.



Adverse Travel

Due to the bridge closure, traffic that once crossed the structure now travels either west or east to use Springfield Road or IL 155 to cross the Mackinaw River as there is a weight restriction on Old IL 121 to the east. Since the closure of the structure in 2001, the population of the subdivisions of Vanado Lakes and Hills of Argyle have increased as has the area locally known as Tullimore (a.k.a. Lusherville). Many residents of these areas to the southwest and south of this structure commute east, primarily to Bloomington, Illinois, Emergency services from Tremont assist initial responses from Delavan, which is difficult due to the bridge closure. Grain that went to Tremont has been impacted and pumpkins, which must be delivered to Morton, experience adverse travel. The alternative routes east and west feature several narrow and sharp turns with limited visibility.

Benefit-Cost Ratio

The Locust Road Bridge project has a benefit-cost ratio of 3.76.

Manito Road

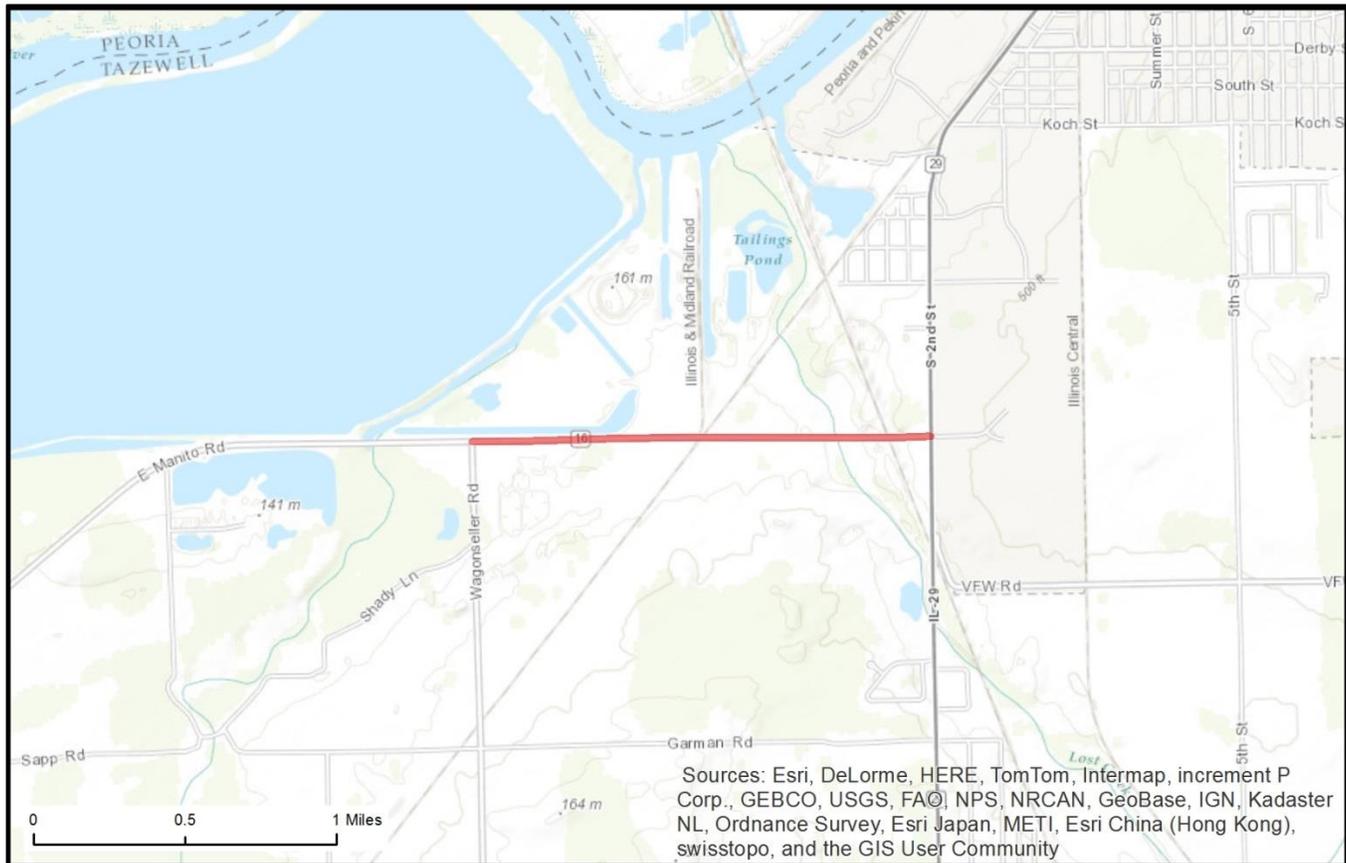


Figure 7: Manito Road Location & Limits

Existing Conditions

This project is generally located southwest of Pekin in west-central Tazewell County. Manito Road (CH 16), from Wagonseller Road to Illinois Route 29 (IL 29), is classified as a Major Collector roadway, with a statutory speed limit of 55 mph and a 2014 AADT volume range of 5,600 to 6,200 vehicles. It is currently configured as an undivided 2-lane roadway, with one 11-foot lane in each direction, and 2-foot paved shoulders. Tazewell County rated the roadway surface a 7 out of 10. This segment of Manito Road is not a designated truck route although it serves a heavy industrial area and large grain elevator in the vicinity from Wagonseller Road to IL 29. The intersection at Wagonseller Road is a T-intersection, with stop-control for Wagonseller Road and free-flow for Manito Road. Both Manito Road and Wagonseller Road have left turn lanes at their intersection. The intersection at IL 29 is signalized, the northbound and southbound approaches have left-turn lanes, and all approaches have right-turn lanes. Lighting is present at the IL 29 intersection but not throughout the roadway segment or at the Wagonseller Road intersection. Within the project limits, adjacent properties include a power plant, sand and gravel pit, industry, undeveloped land, and agricultural land use.

Within the project limits, there is a 315-foot bridge over the Illinois & Midland Railroad (IMRR) tracks (SN 090-0113), a 105-foot bridge over a small creek (SN 090-3203), and the Union Pacific Railroad (UP) bridge (SN 090-9905) over Manito Road. The highway bridges over IMRR and the creek have sufficiency ratings of 78.6 and 86.0, respectively, and sufficiency rating for the UP Bridge is not reported. At the highway underpass location, the roadway narrows significantly and the vertical



clearance is a substandard 14'-3". Additionally, horizontal clear width between the bridge abutments is substandard.

Scope of Improvements

The Manito Road project proposes to reconstruct the roadway to better accommodate the heavy truck loads associated with industrial properties in the vicinity. It will remain an undivided 2-lane roadway. The project will include bridge reconstruction for all three bridges in order to handle industrial deliveries to the area. Construction of the 1.5-mile project is expected to cost approximately \$42,800,000.

Safety

The reconstruction of Manito Road is anticipated to increase safety along the roadway segment by improving the RHR. This safety improvement is anticipated to result in an annual societal savings of about \$44,500 for FI and PDO crashes combined.

Adverse Travel

The closure of Manito Road results in an annual increase of 4,197,500 miles and 79,205 hours of travel, which would cost society approximately \$4,223,000 annually and \$313,895,000 over the 50-year life-cycle.

Benefit-Cost Ratio

The Manito Road project has a benefit-cost ratio of 7.3, if the improvements are constructed in 2020. A 2020 construction date was used to calculate life cycle costs and quantify benefits for this project to help show the relative importance to projects that are currently programmed.

This benefit-cost ratio should be interpreted as the benefit for keeping the roadway, and bridge structures, open to all traffic. The benefit cost ratio methodology cannot specify the benefits of creating a new truck route through the county. The benefit-cost ratio indicates that the roadway is very important to the network, and if any of the three mentioned structures becomes in danger of restricting access to Manito Road, the County should consider the bridge a high priority.

Manito Road Bridge



Figure 8: Manito Road Bridge Location

Existing Conditions

This project is generally located southwest of Pekin in west-central Tazewell County, about 2.25 miles southwest of the Manito Road project described in the preceding section. Manito Road (CH 16) is classified as a Major Collector, with a statutory 55 mph speed limit and a 2014 AADT volume of 4,250 vehicles in the vicinity of the subject bridge. This segment of Manito Road is not a designated truck route. The Manito Road Bridge (SN 090-3001), which was constructed in 1941 and crosses over the Mackinaw River, is currently configured as an undivided 2-lane roadway, with one 11-foot lane in each direction and 2-foot paved shoulders. No lighting is present on the bridge. As of 2013, the bridge was listed as both Structurally Deficient and Functionally Obsolete, and it had a Sufficiency Rating of 41. This indicates the bridge is generally in poor condition.

Scope of Improvements

The Manito Road Bridge project proposes to replace the structure. The replacement bridge is expected to meet current design standards, which includes one 12-foot lane in each direction and 6-foot paved shoulders. Construction is expected to cost approximately \$8,407,000.

Safety

The replacement of the Manito Road Bridge is anticipated to increase safety along the roadway segment by widening the travel lanes, widening the shoulders, and improving the RHR. These safety



improvements are anticipated to result in an annual societal savings of about \$12,000 for FI and PDO crashes combined.

Adverse Travel

The closure of the Manito Road Bridge results in an annual increase of 4,088,000 miles and 70,080 hours of travel, which would cost society approximately \$3,995,000 annually and \$327,317,000 over the 50-year life-cycle.

Benefit-Cost Ratio

The Manito Road Bridge project has a benefit-cost ratio of 60.0, if the improvements are constructed in 2017 as anticipated.

Spring Creek Road

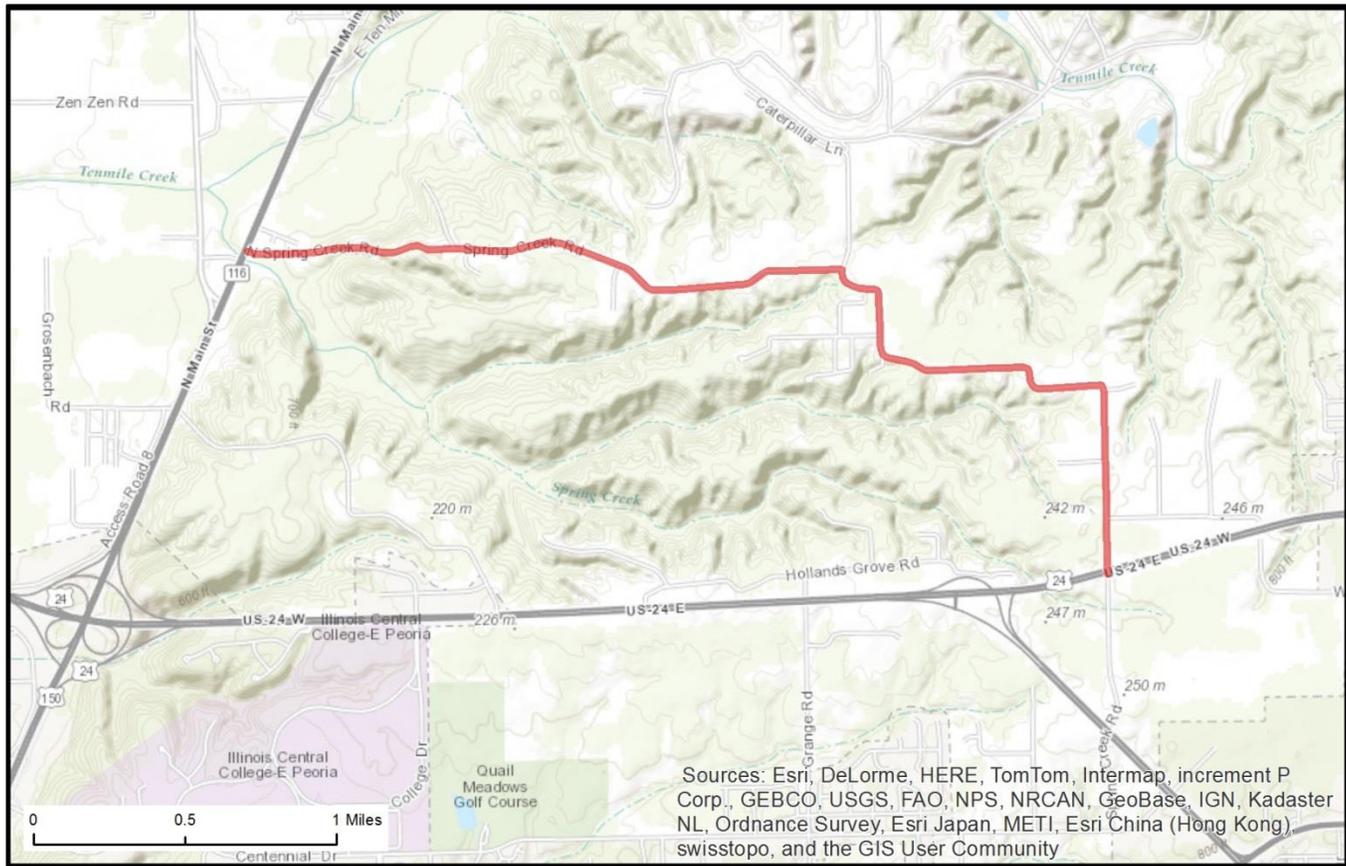


Figure 9 – Spring Creek Road Location & Limits

Existing Conditions

This project is generally located in north-central Tazewell County. Spring Creek Road, from IL 116 to US 24, is a township road that is classified as a Major Collector roadway, with a speed limit of 40 mph and a 2014 AADT volume range of 650 to 1,600 vehicles. It is currently configured as an undivided 2-lane roadway, with one 11-foot lane in each direction, and 2-foot grass shoulders. This segment of Spring Creek Road is not a designated truck route. The intersection at IL 116 is a T-intersection, with stop-control for Spring Creek Road and free-flow for IL 116. The IL 116 northbound and southbound approaches have right-turn and left-turn lanes, respectively, but Spring Creek Road does not have turn lanes. Midway through the segment, the intersection at Caterpillar Lane is also a T-intersection, with AWSC and no turn lanes. The intersection at US 24 is two-way stop control (TWSC), with stop-control for Spring Creek Road and free-flow for US 24. The US 24 approaches have left and right-turn lanes, and the Spring Creek Road approaches have channelized right-turn lanes. Lighting is present at the US 24 intersection only. Within the project limits, adjacent properties consist of undeveloped land and residential land use.

Scope of Improvements

The Spring Creek Road project is expected to meet current design standards, which includes one 11-foot lane in each direction and 6-foot shoulders. The project proposes to resurface the roadway with HMA and remain an undivided 2-lane roadway. Construction of the 3.8-mile project is expected to cost



approximately \$32,740,000 and may include realigning the intersection and adding left turn lanes to improve safety but specific improvements must be studied further.

Safety

The reconstruction of Spring Creek Road is anticipated to increase safety along the roadway segment by widening the shoulders and converting the shoulders from turf to paved and improving the RHR. These safety improvements are anticipated to result in an annual societal savings of about \$82,100 for FI and PDO crashes combined. Any safety benefits associated with the potential intersection realignment or left turn lane construction at the IL 116 intersection were not included in the safety analyses since they are unknown.

Adverse Travel

The closure of the Spring Creek Road results in an annual increase of 2,044,000 miles and 85,410 hours of travel, which would cost society approximately \$2,841,000 annually and \$211,171,000 over the 50-year life-cycle. The extremely high adverse travel associated with the closure of Spring Creek Road is most likely due to the lack of alternate routes for origins and destinations located along the highway. The travel demand model works by loading trips from a transportation analysis zone (TAZ) onto the system with a connector. For Caterpillar, which is located on the roadway, if the roadway closed, the TDM assumes all the trips would be loaded on a different road. Since Spring Creek Road is the only point of access for the Caterpillar facility, it is unlikely that the model mimics real world impacts, however, since the roadway is a single point of access for Caterpillar, and some homes, the closure of Spring Creek Road is likely to have costly consequences.

Benefit-Cost Ratio

The Spring Creek Road project has a benefit-cost ratio of 6.2, if the improvements are constructed in 2020. A 2020 construction date was used to calculate life cycle costs and quantify benefits for this project to help show the relative importance to projects that are currently programmed.

Stringtown Road

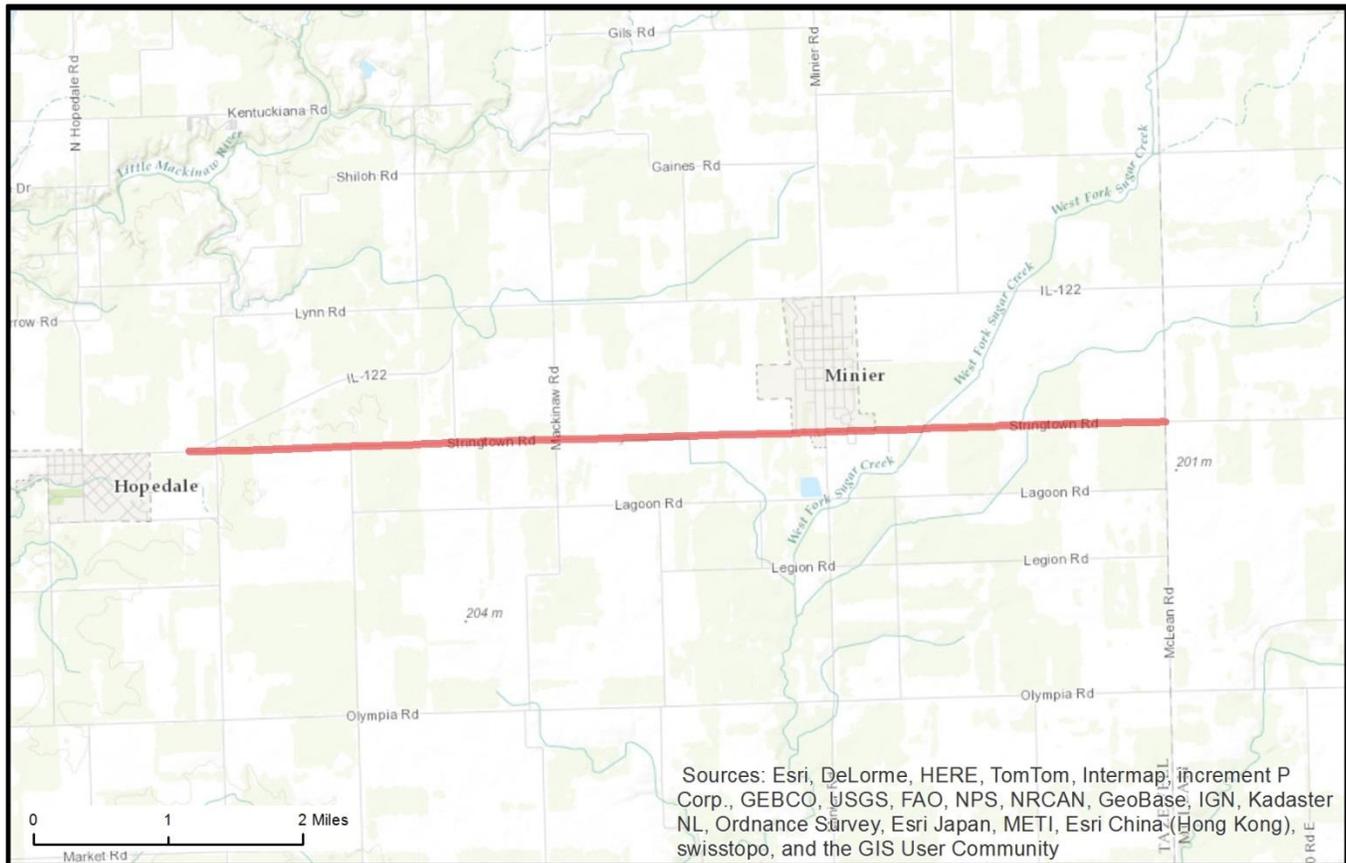


Figure 10: Stringtown Road Location & Limits

Existing Conditions

This project is generally located in southeast Tazewell County. Stringtown Road, from IL 122 to McLean Road (the Tazewell/McLean County Line), is a township road that is classified as a Local Road, with a statutory speed limit of 55 mph through most of the segment and a 2014 AADT volume range of 700 to 1,000 vehicles. It is currently configured as an undivided 2-lane roadway, with one 10-foot lane in each direction and 1-foot gravel shoulders. This segment of Stringtown Road is not a designated truck route. The intersection at IL 122 is a Y-intersection, with stop-control for Stringtown Road and free-flow for IL 122. No intersection approaches have turn lanes. The intersection at McLean Road is assumed to be TWSC, with stop-control for McLean Road and free-flow for Stringtown Road. No intersection approaches have turn lanes. Lighting is not present at the intersections or throughout the roadway segment, except at the intersection with Minier Road along the southern limits of the Village of Minier. Within the project limits, adjacent properties are almost exclusively agricultural land use.

Scope of Improvements

The Stringtown Road project proposes to reconstruct the roadway with HMA, as well as widening the travel lanes and shoulders to meet current design standards, which includes one 11-foot lane in each direction and 6-foot shoulders. It will remain an undivided 2-lane roadway. Construction of the 7.25-mile project is expected to cost approximately \$9,198,000.



Safety

The widened travel lanes and shoulders proposed as part of the Stringtown Road project is anticipated to increase safety along the roadway segment, and an improvement in the RHR is also expected. These safety improvements are anticipated to result in an annual societal savings of about \$42,000 for FI and PDO crashes combined.

Adverse Travel

The Travel Demand Model (TDM) can sometimes be less reliable near the boundary since the network is loaded from external stations. The TDM results show negligible additions in travel times if Stringtown road is closed. These results seem inaccurate since Stringtown Road provides a continuous route to Stanford, the location of Olympia High School, and the City of Bloomington. Instead, the adverse travel was estimated by determining the additional route length the 1000 vehicles would have to travel to arrive at the same destinations. It was estimated to take approximately 2.5 miles of adverse travel to reach Bloomington and approximately 1.75 miles to reach Olympia High School. Therefore, it was assumed that the closure of Stringtown Road would result in an annual increase of 775,625 miles and 14,100 hours of travel, which would cost society approximately \$771,355 annually and \$57,335,000 over the 50-year life cycle.

Benefit-Cost Ratio

The Stringtown Road project has a benefit-cost ratio of 5.1, if the improvements are constructed in 2020. A 2020 construction date was used to calculate life cycle costs and quantify benefits for this project to help show the relative importance to projects that are currently programmed.

Toboggan Avenue Bridge



Figure 11: Toboggan Avenue Bridge Location

Existing Conditions

This project is generally located in southwest Tazewell County. Toboggan Avenue (CH 14) is classified as a Major Collector, with a statutory speed limit of 55 mph and a 2014 AADT volume of 1,150 vehicles in the vicinity of the subject bridge. This segment of Toboggan Avenue is not a designated truck route. The Toboggan Avenue Bridge (SN 090-3170), which was constructed in 1973 and crosses over Dry Creek, is currently configured as an undivided 2-lane roadway, with one 10-foot lane in each direction and 3-foot paved shoulders. No lighting is present on the bridge. The bridge is listed as Structurally Deficient and has a Sufficiency Rating of 37.6, which indicates the bridge is generally in poor condition. It has been structurally rated as Legal Load Only due to its state of deterioration. *Scope of Improvements*

The Toboggan Avenue Bridge project proposes to replace the structure. The replacement bridge is expected to meet current design standards, which includes one 11-foot lane in each direction and 4-foot paved shoulders. Construction is expected to cost approximately \$422,000.

Safety

The replacement of the Toboggan Avenue Bridge is anticipated to increase safety along the roadway segment by widening the travel lanes, widening the shoulders, and improving the RHR. However, no



crashes were reported in this area during the three years of crash data analyzed (2011-2013), thus the safety benefit calculation results for this project were negligible.

Adverse Travel

The closure of the Toboggan Avenue Bridge results in an annual increase of 328,500 miles and 10,220 hours of travel, which would cost society approximately \$397,900 annually and \$33,650,000 over the 50-year life-cycle.

Benefit-Cost Ratio

The Toboggan Avenue Bridge project has a benefit-cost ratio of 119.9, if the improvements are constructed in 2016.

Towerline Road Bridge



Figure 12: Towerline Road Bridge Location

Existing Conditions

This project is generally located in southwest Tazewell County. Towerline Road (CH 11) is classified as a Major Collector, with a statutory speed limit of 55 mph and a 2014 AADT volume of 1,650 vehicles in the vicinity of the subject bridge. This segment of Towerline Road is not a designated truck route. The Towerline Road Bridge (SN 090-3029), which was constructed in 1967 and crosses over the Mackinaw River, is currently configured as an undivided 2-lane roadway, with one 11-foot lane in each direction and 1-foot paved shoulders. No lighting is present on the bridge. As of 2013, the bridge was listed as Functionally Obsolete and had a Sufficiency Rating of 79. This indicates the bridge is generally in fair condition, but certain characteristics do not meet current design standards (shoulder width, for example). In addition, the bridge deck has substantial deterioration and must be replaced.

Scope of Improvements

The Towerline Road Bridge project proposes to replace only the bridge deck. The bridge deck replacement is expected to meet current design standards, which includes one 12-foot lane in each direction and 3-foot paved shoulders. Construction is expected to cost approximately \$1,495,000.

Safety

The replacement of the Towerline Road Bridge is anticipated to increase safety along the roadway segment by widening the travel lanes, widening the shoulders, and improving the RHR. These safety



improvements are anticipated to result in an annual societal savings of about \$1,500 for FI and PDO crashes combined.

Adverse Travel

The closure of the Towerline Road Bridge results in an annual increase of 949,000 miles and 24,090 hours of travel, which would cost society approximately \$1,058,000 annually and \$89,512,000 over the 50-year life-cycle.

Benefit-Cost Ratio

The Towerline Road Bridge project has a benefit-cost ratio of 24.1, if the improvements are constructed in 2016 as anticipated.

Wagonseller Road Bridge

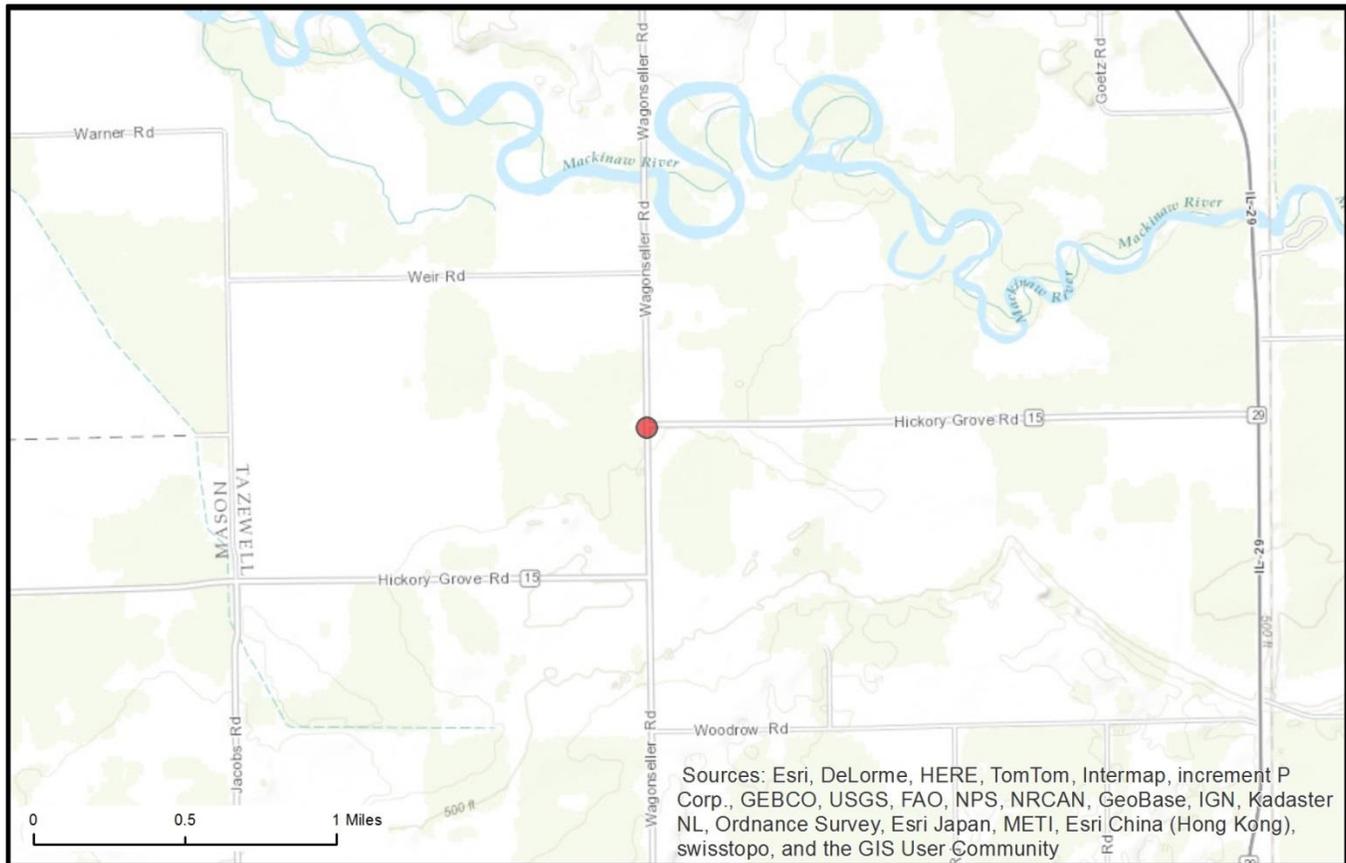


Figure 13: Wagonseller Road Bridge Location

Existing Conditions

This project is generally located in southwest Tazewell County. Wagonseller Road, at this location, is a county highway (CH 15) that is classified as a Minor Collector, with a statutory speed limit of 55 mph and a 2014 AADT volume of 900 vehicles in the vicinity of the subject bridge. This segment of Wagonseller Road is not a designated truck route. The Wagonseller Road Bridge (SN 090-3250, formerly SN 090-3039), which crosses over a drainage ditch, was reconstructed in 2013. In 2015, the sufficiency rating was reported at 86.2. The bridge is currently configured as an undivided 2-lane roadway, with one 11-foot lane in each direction and 3-foot paved shoulders. No lighting is present on the bridge.

Scope of Improvements

The Wagonseller Road Bridge project proposes to replace the structure. The replacement bridge is expected to meet current design standards, which includes one 11-foot lane in each direction and 4-foot paved shoulders. Construction is expected to cost approximately \$618,000.

Safety

The replacement of the Wagonseller Road Bridge is anticipated to increase safety along the roadway segment by widening the shoulder and improving the RHR. These safety improvements are anticipated to result in an annual societal savings of about \$700 for FI and PDO crashes combined.



Adverse Travel

The closure of the Wagonseller Road Bridge results in an annual increase of 730,000 miles and 18,980 hours of travel, which would cost society approximately \$822,000 annually and \$69,492,000 over the 50-year life-cycle.

Benefit-Cost Ratio

The Wagonseller Road Bridge project has a benefit-cost ratio of 169.3. The bridge is not currently programmed for Tazewell County. Although replacement is not currently scheduled, the benefit-cost ratio was done for 2016 in order to indicate the value whenever the bridge is replaced, assuming there is not a significant amount of salvageable life left.



Summary of Benefit-Cost Ratio Results

Table 4 shows the ten projects ranked by benefit-cost ratio.

Table 4: Benefit-Cost Ratio of Tazewell County Projects

All Tazewell County Projects	
Project	B/C Ratio
Wagonseller Rd. Bridge	169.25
Toboggan Ave. Bridge	119.88
Manito Rd. Bridge	60.00
Towerline Rd. Bridge	24.06
Caterpillar Rd. Bridge	16.61
Manito Rd.	7.28
Broadway Rd.	6.61
Spring Creek Rd.	6.23
Stringtown Rd.	5.10
Locust Rd. Bridge	3.76

The benefit-cost ratio is not an indication of exactly where funding should be prioritized in the upcoming years; rather it is an indication of how valuable the proposed improvement is when the project becomes necessary. For example, if a bridge that has a lower benefit-cost ratio than another, but is in a higher danger of failing, the lower benefit-cost ratio bridge can be prioritized ahead of the higher benefit-cost ratio bridge. The rearranging is advised as long as funding will be available when the higher benefit-cost ratio bridge will need reconstruction.

Funding Options

The benefit-cost ratio should serve as a guideline for choosing important projects for the County. However, that does not necessarily indicate that the highest ranked project must be improved before a lower ranked project. If funding assistance is available for a specific project and not another, the County may want to pursue the funding opportunity, as it could significantly decrease the local share of the project cost.

Traditional Funding

Traditional funding options for county highways, township roads and the bridges they contain in Tazewell County include:

- Tazewell County Highway Department’s County Highway Funds
- Tazewell County Highway Department’s Matching Tax Funds
- Tazewell County Highway Department’s County Bridge Funds
- Township General Road Funds
- Township Permanent Road Funds
- Township Joint Bridge Funds
- County Motor Fuel Taxes (County MFT)



- Township Motor Fuel Taxes (Township MFT)
- Surface Transportation Urban (STU)
- Surface Transportation Rural (STR)
- Surface Transportation Program – Bridge (STP-Bridge)
- Major Bridge Funds
- Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grant
- Highway Safety Improvement Project (HSIP)

Each funding option may be available for several different projects. Likewise, each project may be eligible for several different funding sources. Table 7 and the section entitled “Flexibility of Prioritization Process” shows the degree of complexity involved due to the variety of projects and funding sources.

Tazewell County’s County Highway Funds

The Tazewell County Board has the ability to allocate a portion of the County Highway Fund for county highway operational, maintenance and improvement costs. This fund provides Tazewell County the greatest flexibility to meet the county highway road and bridge needs. The County Board can choose to spend these funds on any county highway project or as any part of the local match portion of a county highway project that uses other funding opportunities. In order for more funds to be available, the County Board would need to change the way funds are currently appropriated. The County Board could raise the County Highway Fund levy in order to generate more revenue to address any funding shortfall. Tazewell County has a PTELL (Property Tax Extension Limitation), which makes such a proposition quite difficult at best.

Tazewell County’s Matching Tax Funds

The Tazewell County Board has the ability to allocate a portion of the collected Matching Tax Fund to match state or federal funds for county highway maintenance and improvement projects. In order for more funds to be available, the County Board would have to change the way funds are currently appropriated. The County Board could raise the Matching Tax Fund levy to generate more revenue to address any funding shortfall. Tazewell County has a PTELL (Property Tax Extension Limitation), which makes such a proposition quite difficult at best.

Tazewell County’s County Bridge Funds

The Tazewell County Board has the ability to allocate a portion of the collected County Bridge taxes for the construction or repair of any bridge, culvert, or drainage structure on the county highway and township road system. In order for more funds to be available, the County Board would have to change the way funds are currently appropriated. The County Board could raise the County Bridge Fund levy to generate more revenue to address any funding shortfall. Tazewell County has a PTELL (Property Tax Extension Limitation), which makes such a proposition quite difficult at best.

Tazewell County’s General Corporate Funds

The Tazewell County Board has the ability to allocate a portion of the collected general corporate taxes for county highway operational, maintenance and improvement costs.



County Motor Fuel Taxes (County MFT)

Tazewell County receives a portion of the state collected MFT each year. The County can choose to spend these funds on any project on the county highway system listed in this study or use the funds as the local match portion of such eligible projects using other funding opportunities.

Township General Road

Each road district has the ability to allocate a portion of the collected General Road taxes for township road operational, maintenance and improvement costs. This fund provides each Road District the greatest flexibility to meet their township road and bridge needs. The Highway Commissioner can choose to spend these funds on any township road project or as any part of the local match portion of a township road project using other funding opportunities. The Township Board could raise the General Road levy to generate more revenue to address the funding shortfall. Tazewell County has a PTELL (Property Tax Extension Limitation), which makes such a proposition quite difficult at best.

Township Permanent Road

Each road district has the ability to allocate a portion of the collected Permanent Road taxes for township road maintenance and improvement costs. The Highway Commissioner can choose to spend these funds on any township road project or as any part of the local match portion of a township road project using other funding opportunities. The Township Board could raise the Permanent Road levy to generate more revenue to address the funding shortfall. Tazewell County has a PTELL (Property Tax Extension Limitation), which makes such a proposition quite difficult at best.

Township Joint Bridge Funds

Each road district has the ability to allocate a portion of the collected Joint Bridge taxes for the construction or repair of any bridge, culvert, or drainage structure on their township road system. They may petition or enter into contract with the county in order to gain the assistance of County Bridge funds for qualifying projects, or, when a balance sufficient to meet all commitments to such petitions or contracts with the county has been met or when there are no such commitments, they may allocate such funds towards such projects without county assistance. In order for more funds to be available, the Township Board would have to change the way funds are currently appropriated. The Township Board could raise the Joint Bridge Fund levy to generate more revenue to address the funding shortfall. Tazewell County has a PTELL (Property Tax Extension Limitation), which makes such a proposition quite difficult at best.

Township's General Corporate Funds

Each Township Board has the ability to allocate a portion of the collected General Revenue taxes for township road operational, maintenance and improvement costs.

Township Motor Fuel Taxes (Township MFT)

Tazewell County receives a portion of the state collected MFT each year for each road district to apply towards needs on their respective township roads. Each road district can choose to spend these funds on any project on their township road system, including those listed in this study, or use the funds as the local match portion of such eligible projects using other funding opportunities. These funds are the primary source of funding for the basic maintenance of their township road system.



Other Local Funds

A portion of the Stringtown Road project includes a small portion of village streets in the Village of Minier who could commit some of their local funds to the applicable portion of the project.

Bonding

The County Board and any Township Board has the option to sell bonds to pay for a project. Revenue from selling bonds could be available for use on any project. Due to the lack of revenues to provide for a basic level of maintenance of the county highway system and township road system as noted above, funds to service the bond debts would need to be raised through policy changes that would increase revenue in the form of increased or new user fees or other alternative funding paths.

Surface Transportation Rural (STR)

STR is a part of the federal highway trust fund that is allotted to counties on an annual basis for improvements and qualifying pavement preservation upon only those county highways that are functionally classified as major collector or higher. Projects that qualify for STR funds are shown in Table 5.

Surface Transportation Urban (STU)

Federal money for highways, roads and streets functionally classified as minor collector or higher within an urban area’s planning boundary is distributed to the Metropolitan Planning Organization (MPO). Tazewell County is a member of the Peoria-Pekin Urban Area Transportation Study (PPUATS), which is the region’s MPO. PPUATS awards funds to eligible projects through a competitive process. Approximately 133 miles of the 204 miles of Tazewell County Highways are major collectors within the 20-Year planning boundary and are eligible to compete for Federal STU money distributed through the MPO. Of the projects in the report, Broadway Road, Manito Road and Spring Creek Road are major collectors within the 20-Year planning boundary and eligible to compete for STU funding.

Table 5: Projects Eligible for STR Funding

STR Funding	
Project	B/C Ratio
Toboggan Ave. Bridge	119.88
Manito Rd. Bridge	60.00
Towerline Rd. Bridge	24.06
Manito Rd.	7.28
Broadway Rd.	6.61
Spring Creek Rd.	6.23

Surface Transportation Program – Bridge (STP-Bridge) Funds

The Surface Transportation Program- Bridge (STP-Bridge), formerly known as Highway Bridge Program (HBP), provides federal funds for bridges located on a public road and that are structurally deficient and/or functionally obsolete and, have a sufficiency rating of 50 or less to qualify for



replacement or those that have a sufficiency rating of 80 or less to qualify for rehabilitation. Toboggan Ave. Bridge, Manito Road Bridge and Locust Road Bridge have sufficiency ratings low enough to be eligible for replacement, however, Locust Road Bridge no longer qualifies for STP-Bridge Funds due to its length of closure. Towerline Road Bridge has a sufficiency rating low enough for rehabilitation with Surface Transportation Program STP- Bridge Funds.

Table 6: Projects Eligible for Surface Transportation Program - Bridge Funding

Surface Transportation Program - Bridge (STP-Bridge)	
Project	B/C Ratio
Toboggan Ave. Bridge	119.88
Manito Rd. Bridge	60.00
Towerline Rd. Bridge	24.06

Illinois Major Bridge Program

IDOT dedicates 20% of its HBP fund for a Major Bridge Improvement Program. Bridges must be structurally deficient, eligible for STP-Bridge Funds and have a total project cost of more than \$1 million in order to be eligible for the Major Bridge Program. These funds are awarded on a state-wide project competitive basis. Manito Road Bridge is the only project discussed that currently meets both criteria, and it has been awarded Major Bridge Program funding. The other bridges listed in Table 4 have replacement costs over \$1 million dollars but do not currently have sufficiency ratings less than 50.

Table 7: Projects Eligible for Major Bridge Funding

Illinois Major Bridge Funding	
Project	B/C Ratio
Manito Rd. Bridge	60.00

Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grant

TIGER is a federal grant program that is competitively awarded. The minimum project award amounts that apply for TIGER grants are \$10 million for urban projects and \$1 million for rural projects. Rural projects are defined by “outside the urbanized area.” Most of the projects in the study are outside of the urbanized area and cost more than \$1 million. Projects that qualify for TIGER funds are shown in Table 8.



Table 8: Projects Eligible for TIGER Funding

TIGER Funding	
Project	B/C Ratio
Manito Rd. Bridge	60.00
Towerline Rd. Bridge	24.06
Caterpillar Rd. Bridge	16.61
Manito Rd.	7.28
Broadway Rd.	6.61
Spring Creek Rd.	6.23
Stringtown Rd.	5.10
Locust Rd. Bridge	3.76

Highway Safety Improvement Program (HSIP)

HSIP is federal money that is awarded competitively throughout the state based on the benefit-cost ratio for the proposed safety improvements. The proposed projects’ safety benefit-cost ratios have not been calculated, but the benefit of safety improvements have been calculated and can be used when applying for HSIP grants. The only project with safety improvements is the **Broadway Road** widening and resurfacing project. Since the project has a benefit cost ratio above 1.0, it may be eligible for HSIP funding.

Illinois Commerce Commission (ICC) Grade Crossing Protection Funds (GCPF)

ICC grade crossing protection funds are available to projects improving at-grade or grade-separated rail crossings. The ICC awards these funds on a state-wide project competitive process. **Manito Road** is the only project discussed in this report that crosses an active railroad, and it is grade separated. Since the overpass structures are anticipated to increase the overall cost of the project, this project would be eligible to compete for ICC Grade Crossing Protection Funds.

Non-traditional Options

With most competitively won state and federal funding options, a local agency match is typically required. The match must come from the agencies’ locally generated revenues, the state MFT allocation, or privately held funds. The local match typically varies between 10% and 40% of the total project cost. In order to afford the completion of large projects and/or as many projects as possible, Tazewell County could develop non-traditional sources of funding such as wheel taxes, local gas or sales taxes, infrastructure banks, public/private partnerships, and transportation impact fees.

Jurisdictional Transfer or Vacating Right of Way

It is expensive to maintain roadways and bridges that are no longer useful to the community. When projects have low benefit-cost ratios, the County could consider jurisdictionally transferring the road and its infrastructure, such as bridges, to a township but only in those instances where the Township Road District has more resources to maintain or upgrade such roads and infrastructure. When feasible, this may allow the roadway and any structures along it to be maintained or improved to different standards than the county highways. For most bridges, this would also allow them to be eligible for the Township



Bridge Program. With the Township having control over the roadway, the local community can determine the appropriate way to handle the network. If the roadway would not be critical to the township network, the right of way could be vacated and returned to the adjacent property owners. Some right-of-way (ROW) could become productive farm ground, for example.

Recommendations

Using the collected data and methodologies in the appendix, the recommendations are as follows:

- Wagonseller Road Bridge and Toboggan Avenue Bridge should be the highest priorities for Tazewell County.

The high benefit-cost ratios indicate that users of the system rely heavily on these two bridges. It is our recommendation that money not be allocated to Locust Road Bridge if that action defers construction of either Wagonseller Road Bridge or Toboggan Avenue Bridge. Even though Toboggan Avenue Bridge has a lower sufficiency rating than Manito Road Bridge, Manito Road Bridge should be replaced since the project has been awarded \$7,950,000 in Major Bridge Program Funding. The award of these funds makes the maintenance and/or replacement of all three bridges financially possible in the near term.

- Broadway Road shoulder and pavement improvements should be a high priority.

Broadway Road, Spring Creek Road, and Manito Road have similar benefit cost ratios. Given the scope of improvements, Broadway Road is recommended to be carried forward. Manito Road has slightly better pavement ratings than Broadway Road and can continue to benefit the public while Broadway Road is being improved. However, Manito Road is very significant to the system, and its users, and should remain a high priority.

- Bridge improvements generally provided a higher benefit-cost ratio than the identified roadway improvements.
- All identified projects have a benefit-cost ratio greater than 1, which shows the importance of the identified projects.

Flexibility of Prioritization Process

Analyses herein establish a process that can be recreated by any jurisdiction to prioritize potential improvements. The usage of the results will be determined by the jurisdictions responsible and the potential funding sources for the projects to be compared. An example of the complexity that is involved in identifying funding sources for the ten projects chosen for this study is shown in Table 7. The impact of applying or not applying an individual funding category to one project has an impact on all other potentially eligible projects within Tazewell County's planning horizon, most of which are not included within the scope of this study. As an example, applying County Highway funds to an eligible bridge project on the county highway system reduces the amount available for annual preventive surface maintenance on the county highway system. By combining the use of hard data and subjective knowledge, the process can assist in determining which projects are the most beneficial for a jurisdiction. The data required to compile the benefit-cost ratios included:

- Historic Crashes and/or Roadway Characteristics,
- Increase in VMT and VHT for road closure,



- Pavement Condition Indexes or Structural Sufficiency Ratings, and
- Cost of Improvement.

If this data is available, the methodologies described in this study may be used to determine priorities.

Table 7: Applicable Project Funding Sources

Project	Federal						State			County				Road District				Other
	STU	STR	STP -Bridge	Major Bridge	TIGER	HSIP	Grade Crossing Protection	County MFT	Township MFT	Highway	Matching Tax	Bridge	General Corporate	General Road	Permanent Road	Joint Bridge	General Corporate	Local
Broadway Rd	✓	✓	X	X	?	?	X	✓	X	✓	✓	X	✓	X	X	X	X	X
Manito Rd	✓	✓	X	?	?	?	?	✓	X	✓	✓	✓	✓	X	X	X	X	X
Manito Rd Bridge	X	✓	✓	✓	?	?	X	✓	X	✓	✓	✓	✓	X	X	X	X	X
Toboggan Ave Bridge	X	✓	✓	X	X	?	X	✓	X	✓	✓	✓	✓	X	X	X	X	X
Towerline Rd Bridge	X	✓	✓	X	?	?	X	✓	X	✓	✓	✓	✓	X	X	X	X	X
Caterpillar Rd Bridge	X	X	X	X	X	?	X	X	✓	X	X	✓	✓	✓	X	✓	✓	X
Spring Creek Rd	✓	X	X	X	?	?	X	X	✓	X	X	X	✓	✓	✓	X	✓	X
Stringtown Rd	X	X	X	X	?	?	?	X	✓	X	X	X	✓	✓	✓	?	✓	✓
Wagonseller Rd Bridge	X	X	X	X	X	?	X	X	✓	X	X	✓	✓	✓	X	✓	✓	X
Locust Rd Bridge	X	X	X	X	X	?	X	X	✓	X	X	✓	✓	✓	X	✓	✓	X
	✓ = Applicable		X = Not Applicable			? = Competitive Funding or Potentially Applicable												



Appendix



Appendix A: Benefit of Safety Methodology

Expected Crash Frequency

Two (2) methodologies are typically used to predict crashes:

1. A historic crash frequency could be assumed to directly predict crashes in the future.
2. Site characteristics can be used to predict the number of crashes based on crash rates at sites with similar characteristics.

The Highway Safety Manual (HSM) uses the Empirical Bayes (EB) Method to balance the two methodologies to create a more accurate estimation of expected crashes. Crashes are considered random events, so using only historical data could make a location seem like a high crash area when it is just coincidence that the crash occurrence is high. But, only focusing on quantifiable roadway characteristics could miss a qualitative aspect of the location that is causing an unusually high number of crashes. The EB Method should counteract both biases. The HSM gives guidance on how to follow the procedure, but for this study, an Illinois Department of Transportation (IDOT) spreadsheet application specifically designed for implementing the 2010 HSM methodologies was used. The spreadsheet requires inputs of roadway characteristics and historic crash frequencies, then returns expected crash frequencies.

Crash Modification Factors

After an expected crash frequency is found, Crash Modification Factors (CMF's) can be applied. A CMF is a percentage of crashes that will remain at a location if a change is made to the roadway. For example, if a four-lane road undergoes conversion to a through lane in each direction with a two-way-left-turn lane (TWLTL), 71% of the crashes along the segment will remain (i.e. CMF equals 0.71). A CMF is not always less than one. If a change to the roadway will increase crashes, the CMF would be greater than one. For example, changing from a two-way stop-control intersection to a signalized intersection could increase the number of rear-end crashes at the location, so the CMF for rear-end crashes for that improvement would be greater than one.

CMF's can be found in the HSM or an online CMF clearinghouse. For a few individual cases, a CMF could not be found for a proposed improvement. For example, there is no CMF associated with changing the roadside from shoulders and ditches to curb and gutter. In this and similar instances, no CMF was applied. In situations where the CMF would only apply to a section of the project, the CMF was only used to reduce the expected crashes at the specific location. For example, if a roadway improvement included multiple intersections, but a left turn lane was only added to one intersection, the CMF would only be applied to reduce the expected crashes at that intersection.



Appendix B: Adverse Travel Methodology

When a road or bridge is closed, adverse travel is experienced by the user. Costs are associated with the added distance and time it takes to detour around the closed segment of the roadway network. The following describes the methodology used to determine the cost of adverse travel.

Travel Demand Model

The Tri-County Regional Planning Commission travel demand model (TDM), which models all the traffic patterns in Peoria, Tazewell, and Woodford Counties, was utilized for this project. The counties are broken down into Traffic Analysis Zones (TAZ's) that contain trip producers or attractors. Trip attractors are the places that people are going and the trip producers are the places where trips begin. Using census and employment data, the TDM can determine where the producers and attractors are located and the easiest way for travelers to reach their selected destination. Each proposed improvement was individually removed from the model to calculate the increase in time and miles within the system if the roadway or bridge was impassable, as compared to the base condition with the road or bridge open to travelers. The results from the model are given in Vehicle Miles Traveled (VMT) and Vehicle Hours Traveled (VHT).

Costs of Adverse Travel

In order to compare the benefit of avoiding adverse travel to the cost of a project, dollar amounts must be associated with the added travel time and distance caused by closing a road or bridge. The users of the transportation system experience costs for every mile and hour they spend traveling, including:

- Loss of productive time
- Added vehicle expenses
- Added emissions

If a project goal is to only remove and replace infrastructure, the most economically time to do so is at the exact time that it no longer becomes useable. Due to the lead time required to complete large infrastructure projects, this is generally an unfeasible goal. However, it is unfair to claim the benefit of keeping a road open in 2015 if the road will stay open without improvements until 2024, for example. The expertise of the Tazewell County Highway department were relied upon to determine the expected necessary date for reconstruction through the transportation project plan. A couple bridge projects were not identified, so it was assumed that the bridge would fail either in year zero. The resultant benefit-cost ratio does not indicate that the bridge should be rebuilt this year. Instead, it shows the benefit of rebuilding a bridge before it fails. In other words, it is a demonstration of how risk adverse the County should be about the possibility of a bridge closing.

Programmed and unprogrammed bridges and roads can still be compared to each other. If bridge that has not been programmed has a higher benefit-cost ratio than a bridge scheduled for reconstruction next year, the County should interpret the results to mean that it is more important to the county travelers that the unprogrammed bridge remain open than it is for the programmed bridge to be reconstructed when scheduled.

Loss of Productive Time

The United States Department of Transportation (USDOT) estimates the cost of lost productive time to be \$15 per hour for a passenger vehicle and \$50 per hour for trucks. A regional average for truck traffic



as a percent of total traffic is five percent (5%). These factors were applied to the increases in VHT that each roadway or bridge closure creates, as reported by the TDM.

Added Vehicle Expenses

For every mile that is driven, vehicle value depreciates, maintenance is required, and gasoline is consumed. The added VMT to the system from each project closure, as reported by the TDM, was multiplied by the 2015 IRS reimbursement rate of \$0.575 per mile.

Added Emissions

To account for the emissions added to the atmosphere, the USDOT rate of 0.000025 tons of Volatile Organic Compounds (VOC) per hour at an expense of \$1813 per ton and 0.000005 tons of Nitrogen Oxide (NOx) per hour at an expense of \$7,147 per ton was applied for added delay within the system.



Appendix C: Cost Methodology

Costs of Improvement

The cost applied was the opinion of probable cost to construct each improvement in 2015 provided by, or calculated based on data provided by Tazewell County. For some projects, the amount the County must pay will be a fraction of the total cost, because they will be supplemented with state or federal funds. However, for the purpose of benefit-cost ratio calculation, the total cost was used to represent the benefit to the constituents, since state and federal money is also provided by tax payers. Further, the Spring Creek Road project may be partially funded privately (Caterpillar, Inc.), because they have a significantly-sized complex near the intersection of Spring Creek Road and Caterpillar Lane. However, for purposes of benefit-cost ratio calculation, this project is assumed to be fully funded publicly.

Salvage Value

Another consideration for project cost is design life. Roadways are designed to last between 20 and 40 years, depending on maintenance practices. Bridges are designed to last around 75 years, and a bridge deck replacement typically lasts about 20 years. It is feasible that a road could need to be rebuilt three times by the time a new bridge built at the same time fails. A life cycle of 50 years was used to account for this disparity. Bridges were assumed to last 75 years and roads were assumed to last 27 years.

An example of how salvage value is calculated for a bridge is described below:

- 2016: A bridge is built
- 2017: the bridge is opened
- 2066 (the end of the life cycle): the bridge has 25 years out of the 75 year design life remaining
- 33% of the construction cost is salvaged

In the bridge scenario, the construction cost only occurred once, and the salvage value is a significant percentage. However, an example of how salvage value is calculated for a road is described below:

- 2016: A road is built
- 2017: the road opens
- 2044: the road needs to be rebuilt
- 2045: the road reopens
- 2066 (the end of the life cycle): the road has 6 years out of the 27 year design life remaining
- 22% of the construction cost is salvaged

In the road scenario, the construction cost occurred twice and the salvage value is a smaller portion of the investment.