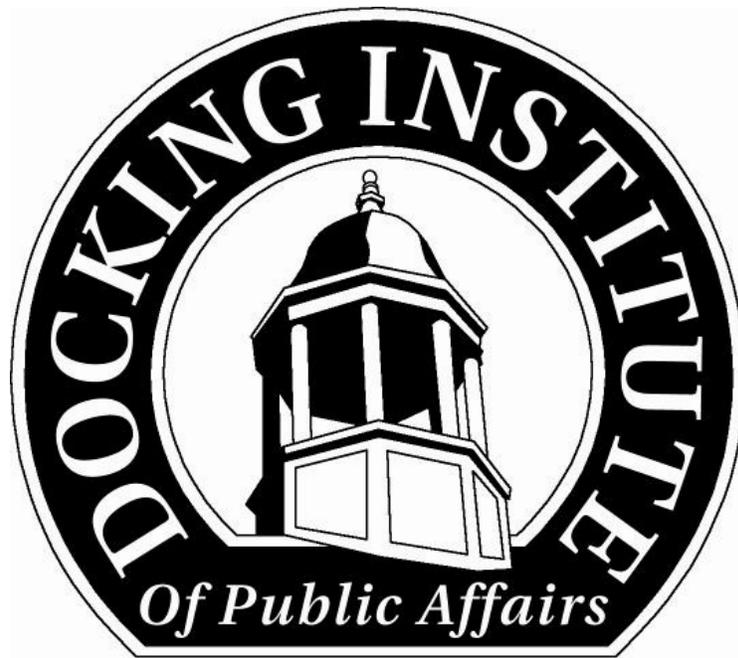
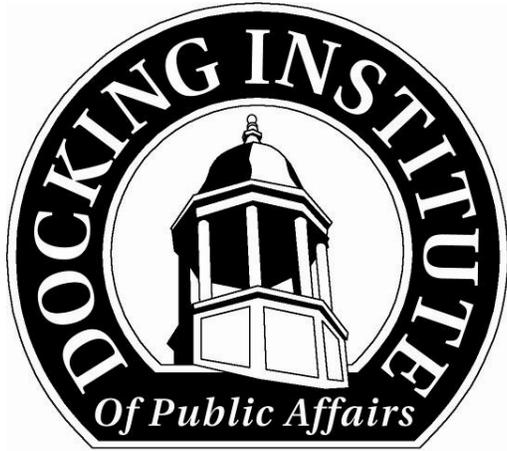


RS 587  
Economic Impact Study



Prepared For  
**Rush County Highway Department**  
Prepared By  
**The Docking Institute of Public Affairs**

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# RS 587

## Economic Impact Study

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### **Prepared For:**

Rush County Highway Department  
In pursuit of  
The Docking Institute's Public Affairs Mission

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## **Executive Summary**

We examined the likely economic consequences of two alternative road surfaces for RS 587. We found that the economic impact from either road surface is substantial because the rebuilding of the highway is a costly undertaking. The general consensus in the literature was that when a road has an AADT (Annual Average Daily Traffic) greater than 200 the road should have an asphalt surface, if possible.

We considered several estimates of the costs of on-going maintenance. These estimates varied widely. The final determinate of maintenance costs is probably the level of quality that the citizens are willing and able to afford.

We conducted a brief telephone survey with some follow up calls to gauge the current use of the highway and potential impact of alternative road surfaces on adjacent landowners. Although the respondents make up only a small portion of users of RS 587, they indicated a strong preference for an asphalt surface.

We looked at summary demographic and business information for Rush County noting a downward trend. This was also reflected in the Rush County Strategic Plan which we examined.

The choice of road surface for RS 587 is, at least in part, dependent upon whether decision makers believe that traffic volumes (AADT) on this road are likely to decrease, remain relatively constant, or increase over the next 20 to 30 years.

The expected economic impact on Rush County from the construction and maintenance of RS 587 lies within a range of \$10.6 million to \$14.8 million depending upon the road surface and level of maintenance.

The following observation from the Rush County Strategic Plan emphasizes the importance of this decision for the current and future citizens of Rush County.

The transportation infrastructure of Rush County is a vital

element in the growth and sustenance of the county. . . .  
Without an adequately maintained transportation system,  
the economic health of our county [will] be threatened and  
the quality of life for our citizens will be diminished. (page  
12)

## **The situation**

Rush County highway 587, also known as Avenue E, is a 13.3 mile blacktop highway connecting KS 4 and US 183. The road surface has deteriorated to the point that repairs are no longer a viable solution.

## **The choices**

The Rush County Highway Department is considering two options to address the situation. They both involve rebuilding the road bed and differ in terms of the road surface. The first option is what is commonly known as a "gravel" road. The second option is generally called a "blacktop" road.

There are non-monetary advantages and disadvantages of both types of road surface.

Other factors that cannot easily be assigned monetary value may also make it wise to pave a gravel road. Benefits include reducing dust, providing a smoother and safer surface, improving vehicle and driver efficiency, redistributing traffic, and potentially increasing the tax base. Some benefits directly affect county budgets while others have an indirect effect.

On the flip side, however, they note that after an aggregate road is paved, maintenance activities shift to those required for maintaining a higher level of service. Increased brush and weed control, traffic services, signage, pavement marking, snow and ice removal, and traffic control devices are typically needed for a heightened level of service.<sup>1</sup>

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<sup>1</sup> When is it Time to Pave a Gravel Road? Local Highway Technical News Vol. 11, No. 9a [www.lhtac.org](http://www.lhtac.org)

Additionally, the time frame used in the analysis can affect the choices because the costs of maintenance for each type differ over time.

Based on studies done in other states and countries a range of traffic volumes can be established where it is less expensive to maintain a gravel, a second range where costs are very similar, and a third range where it is less expensive to maintain a hot mix asphalt (HMA) road. These studies indicate that at traffic volumes of less than 100 vehicles per day (AADT) gravel is the more economical choice. The studies indicate that when more than 200 vehicles per day use the roadway asphalt is the more economical choice. Between 100 and 200 vehicles per day is a toss-up.<sup>2</sup>

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<sup>2</sup> To Pave or Not to Pave? Minnesota Local Technical Assistance Program 2006 [www.mnltap.umn.edu](http://www.mnltap.umn.edu)  
ibid.

## The considerations

### Initial construction

The estimates for the cost of original reconstruction of RS 587 were based on figures provided by John Moeder. These were generated by a consultant who was working with the Rush County Highway Department.

### On-going maintenance

The following estimates of the on-going maintenance costs of RS 587 by type of road surface come from three sources. The gravel surface cost is reported by Babcock for a gravel road in Kansas that is used by grain trucks. The volume of traffic was not specified. There was no estimate for asphalt surfaced roadways. The Minnesota data is for AADT of 200 to 249 vehicles. The Minnesota Department of Transportation has collected data at the county level by road type and volume for many years. The Rush County data is based on the 28 months that a computer database has been established.

**Table 1 On Going Maintenance Costs, per mile per year**

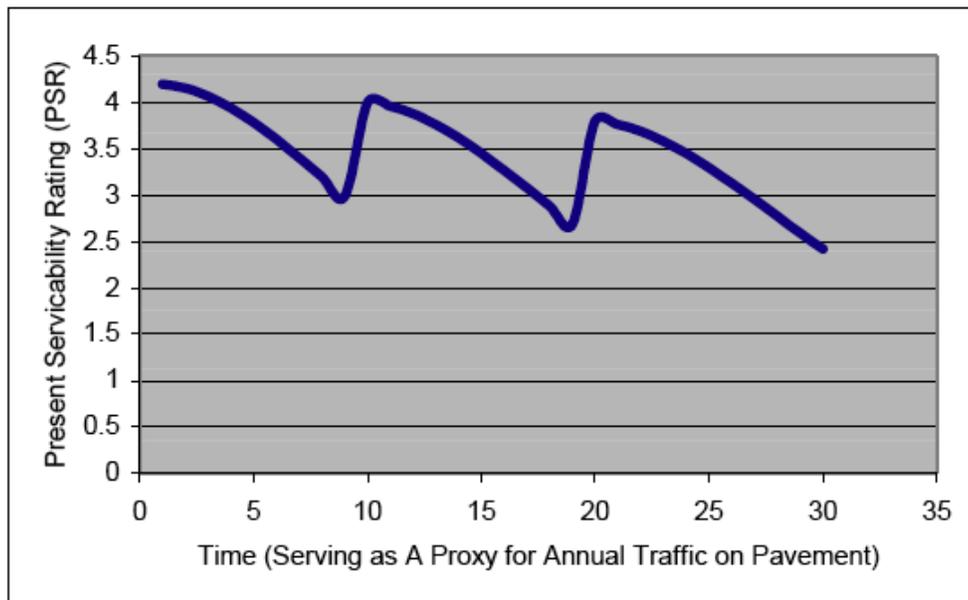
Surface Type	Babcock	Minnesota	Rush County
Gravel	\$7,000	\$2,500	\$712
Asphalt		\$1,500	\$2,907

## Reconditioning cycle for asphalt surface

An asphalt surfaced roadway requires periodic reconditioning in order to extend its useful life. The following graph shows a ten year reconditioning cycle and a thirty year useful life. However, the reconditioning cycle is in part dependent on the traffic volume and the type of vehicle (and its weight). Both heavier vehicles and greater quantities of vehicles tend to shorten the reconditioning cycle.

### **Figure 1 Asphalt Pavement Life Cycle**

Figure 4  
Pavement Life Cycle



## Data & Analysis

Table 2 shows the traffic counts for RS 587 at the western end where it connects with KS 4, at the west and east center, and at the eastern end where it connects with US 183. Although there are no heavy vehicles listed in the AADT (and a sign posted at the western end that commercial vehicles are prohibited on RS 587), anecdotal evidence suggests that there is some heavy truck traffic on RS 587. Additionally, there is some seasonal agricultural use of the road by heavy trucks moving harvested crops and livestock to market.

The local traffic numbers are derived from a telephone survey of residents along RS 587. These local residents account for less than 7 percent of the traffic along the road. Finally, the traffic count numbers at the western end of RS 587 reveal that more than 25 percent of the traffic is associated with travel along KS 4 to/from the west.

**Table 2 AADT Counts (2009), RS 587**

	West End	West Center	East Center	East End
AADT	219	214	233	280
Local	14			19
	6.2%			6.8%
KS4 W	60			
	27.4%			

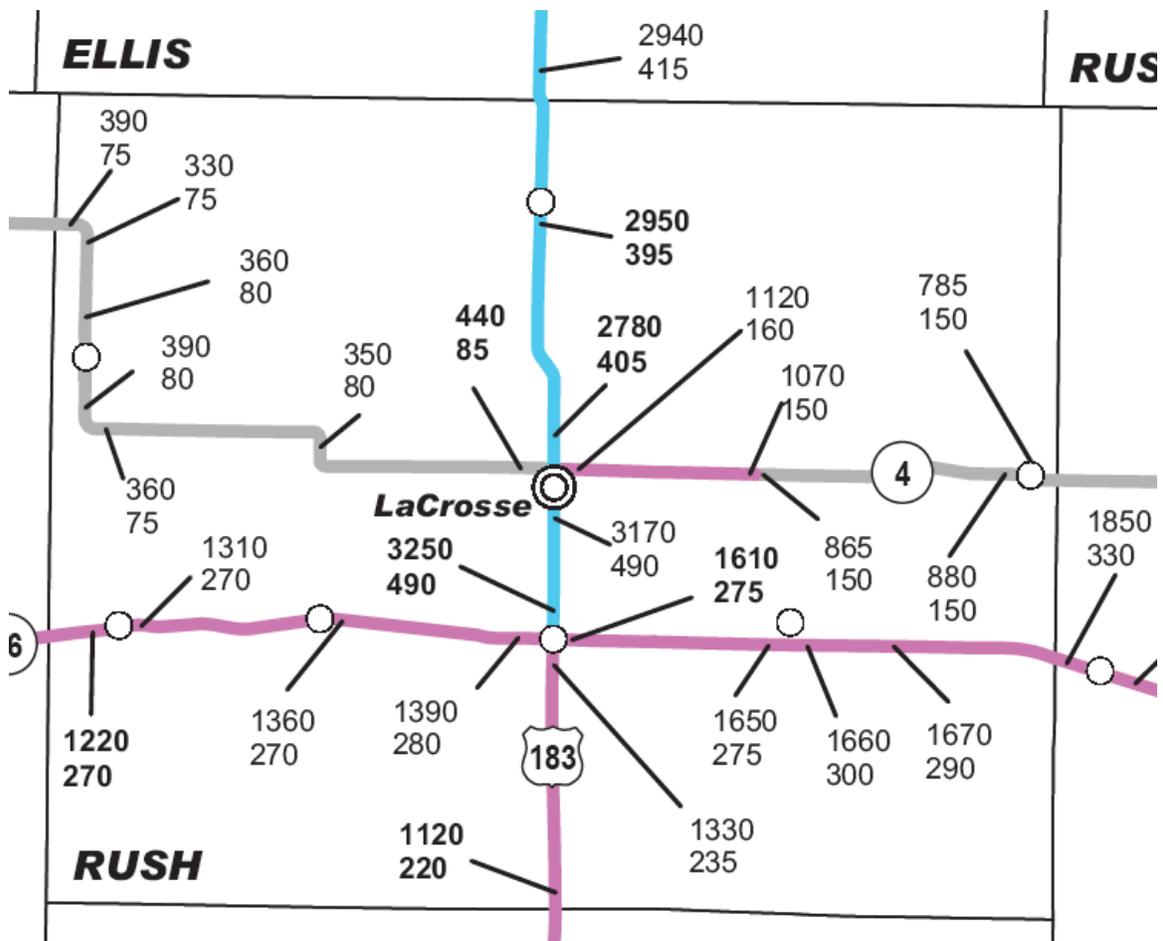
**Table 3 AADT Counts (2009), KS 4**

	KS 4 West	KS 4 South
AADT	390	330
Heavy	75	75

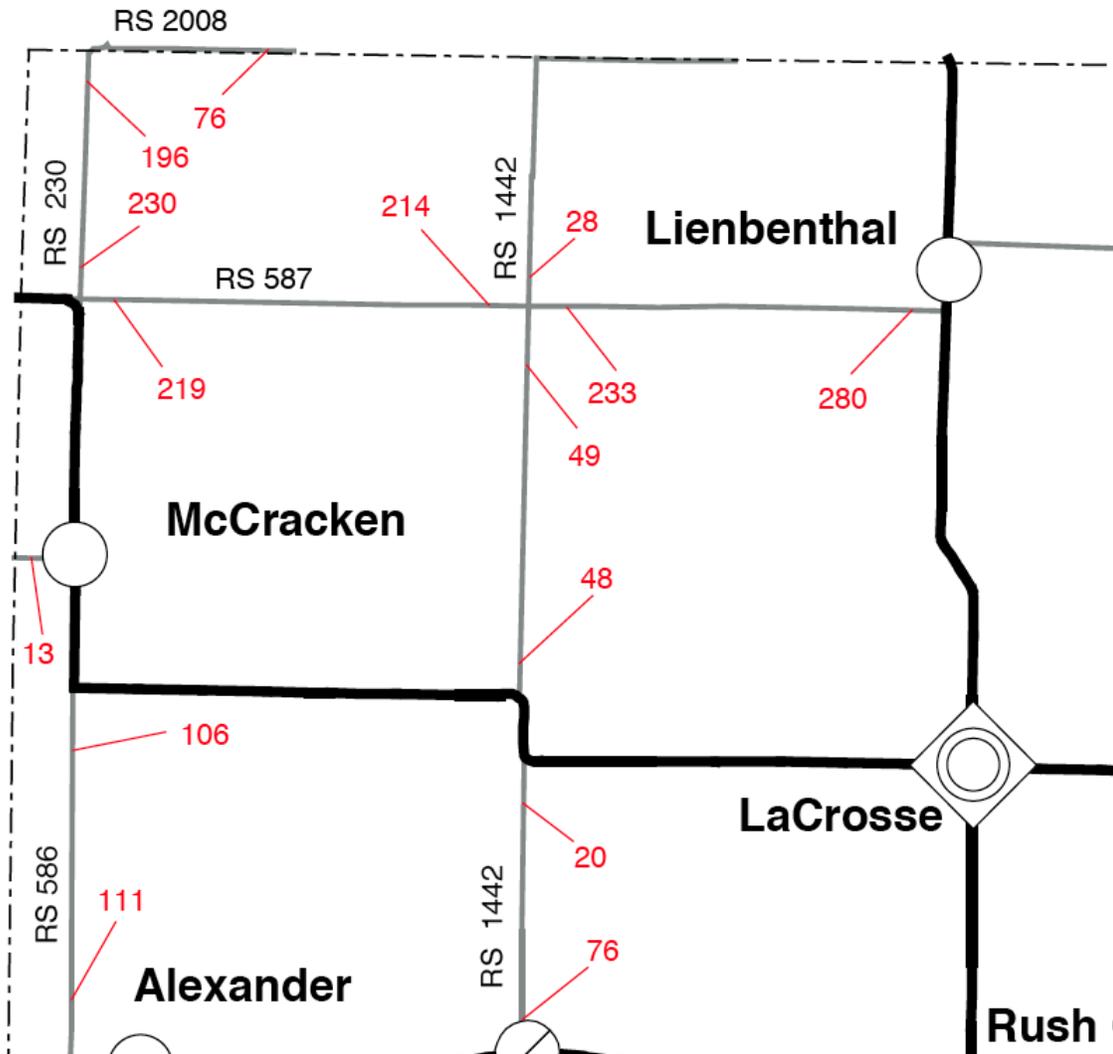
**Table 4 AADT Counts (2009), US 183**

	US 183 North	US 183 South
AADT	2950	2780
Heavy	395	405

**Map 1 Rush County AADT, State and Federal Roads**



## Map 2 Rush County AADT, County Roads

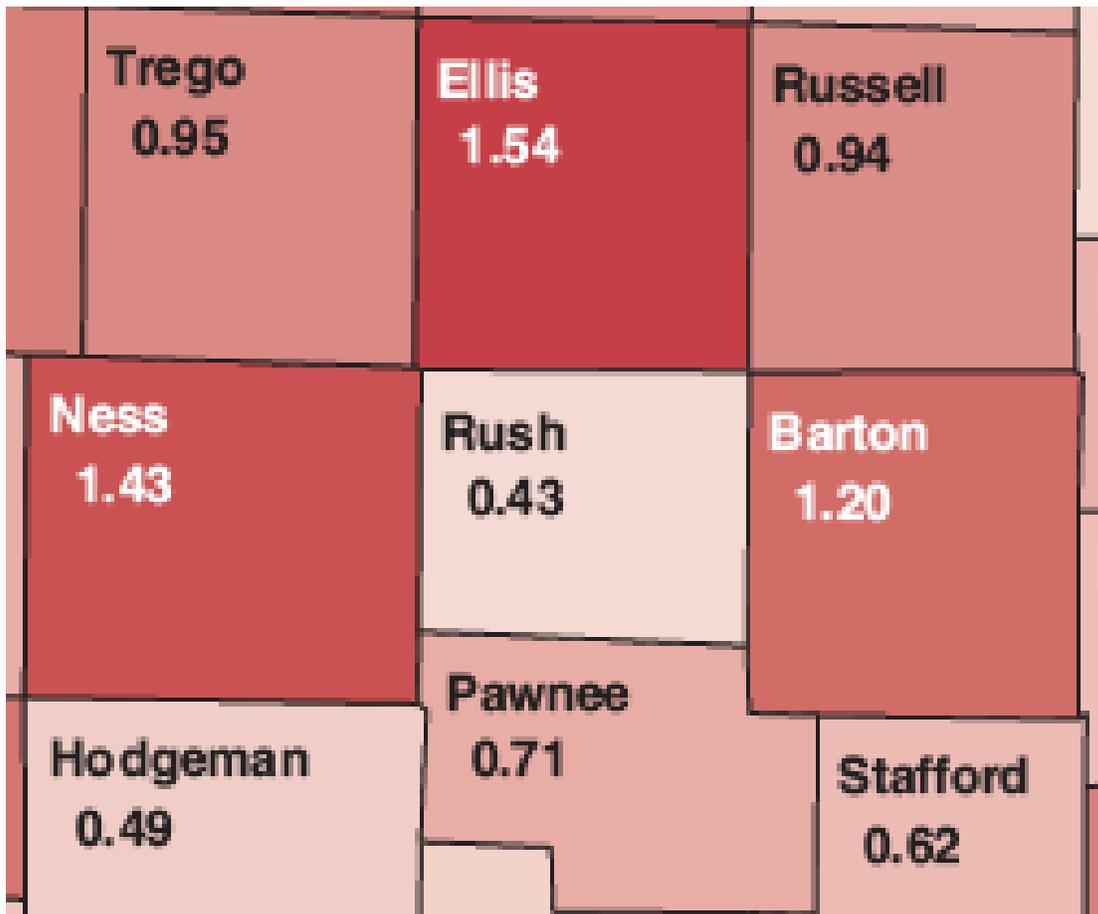


RS 230 is an approximately 4 mile gravel road that connects with Ellis Avenue (at the county line). Ellis Avenue is a black top (Ellis) county road that runs parallel to US 183. Drivers of about 120 vehicles (196-76) AADT chose this route from the western intersection of RS 587 and KS 4. How many of these drivers might choose to use RS 587 if it were improved with a black top surface, or how many current drivers on RS 587 might choose to use RS 230 if RS 587 has a

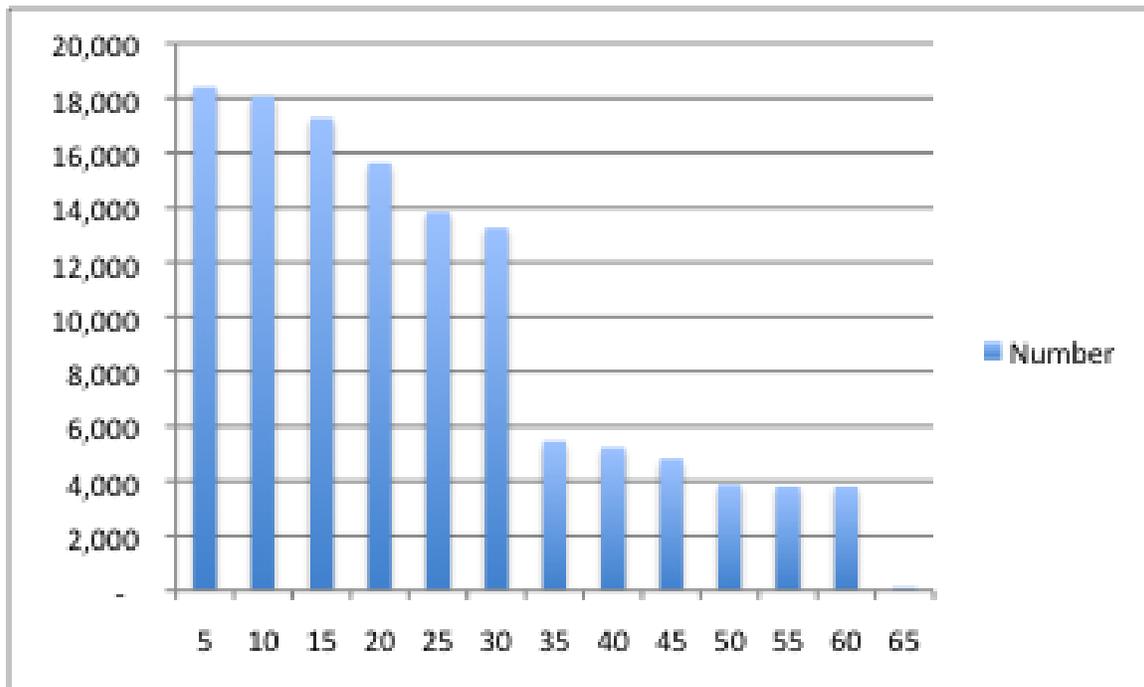
gravel surface is not known. Clearly from this intersection there are two possible routes to the north, one directly north (RS 230) and one east (RS 587) and then north (US 183).

### Demographic Data

Trade pull factors are useful for indicating where retail trade is concentrated. Map 3 shows that Rush County residents purchase more goods in the surrounding counties than Rush County merchants sell to the residents of the surrounding counties. This means that the benefits of new economic activity in Rush County tend to "leak out" to the surrounding counties.

**Map 3 County Trade-Pull Factors, 2008**

Although the following information (Figure 2) is from a 2004 Labor Basin Study for Ellis County, it holds some value for the RS 587 question. First, Rush County was included in the labor basin. Second, worker preferences are slow to change. The importance of this information for the RS 587 study is that McCracken is just within the 30 minute time frame if RS 587 is an asphalt road, but is beyond it if the surface is gravel for those who want to commute to Hays.

**Figure 2 Preferred Commuting Time**

Source: Ellis County Labor Basin Study

The population density for Rush County is 4.9 persons per square mile. There are two households per mile of county road in Rush County. The median household income (2008) was \$39,197. Nearly 11 percent of the population is below the poverty level.

**Table 5 Business QuickFacts for Rush County**

Private nonfarm establishments, 2007	95
Private nonfarm employment, 2007	832
Private nonfarm employment, % change 2000-2007	-10.8%
Non-employer establishments, 2007	266
Total number of firms, 2002	341
Manufacturers' shipments, 2002 (\$1000)	NA
Wholesale trade sales, 2002 (\$1000)	29,726
Retail sales, 2002 (\$1000)	26,181
Retail sales per capita, 2002	\$7,547
Accommodation and food services sales, 2002 (\$1000)	1,243
Building permits, 2009	4

Source: US Department of Commerce

The demographic and business data paint a somber picture for the people of Rush County. This view of the future is also reflected in the Rush County Strategic Plan. (Sections relevant to transportation are in the appendix to this report.)

**Table 6 Vehicles/Drivers, RS 587 Landowner Survey**

	Licensed Vehicles	Licensed Drivers
Maximum	11	3
Average	5.83	2.00
Minimum	2	1

Table 6 shows the number of licensed vehicles and drivers per residence. As most of the respondents are involved in agriculture it was expected that there are more vehicles than drivers.

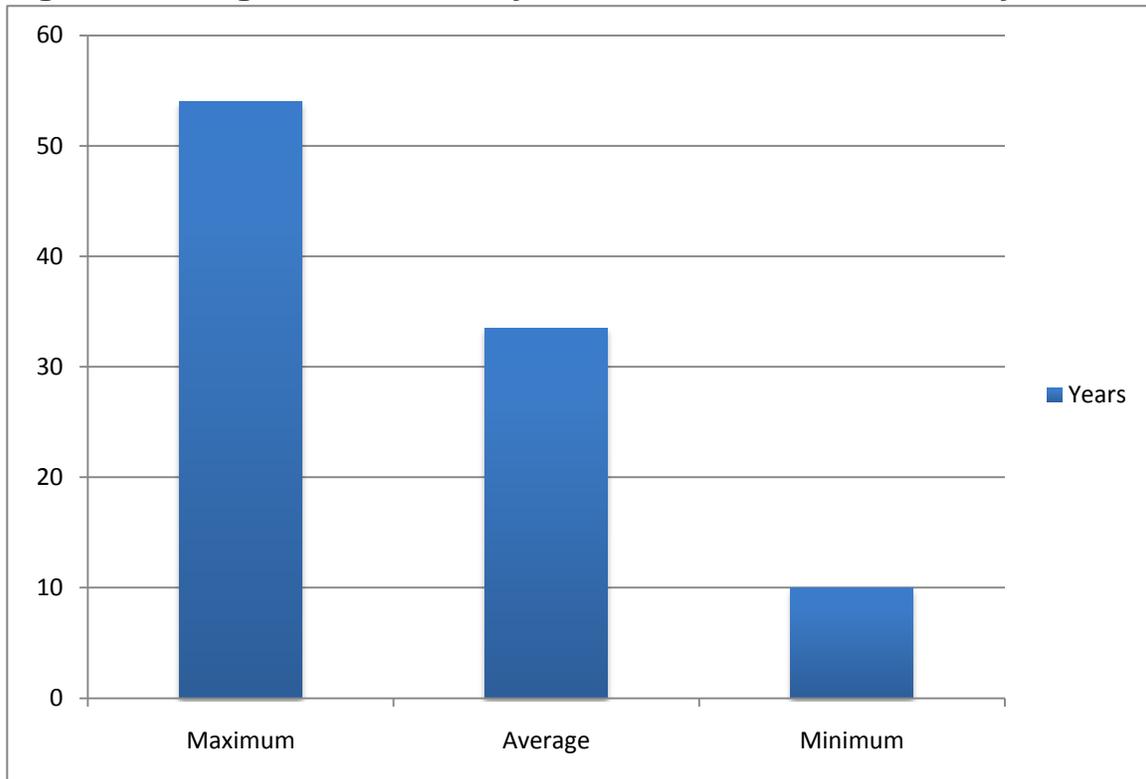
**Figure 3 Length of Residency, RS 587 Landowner Survey**

Figure 3 shows the length of residency for respondents to the landowner survey. Again, the data show a relatively long tenure which is typical of agriculture.

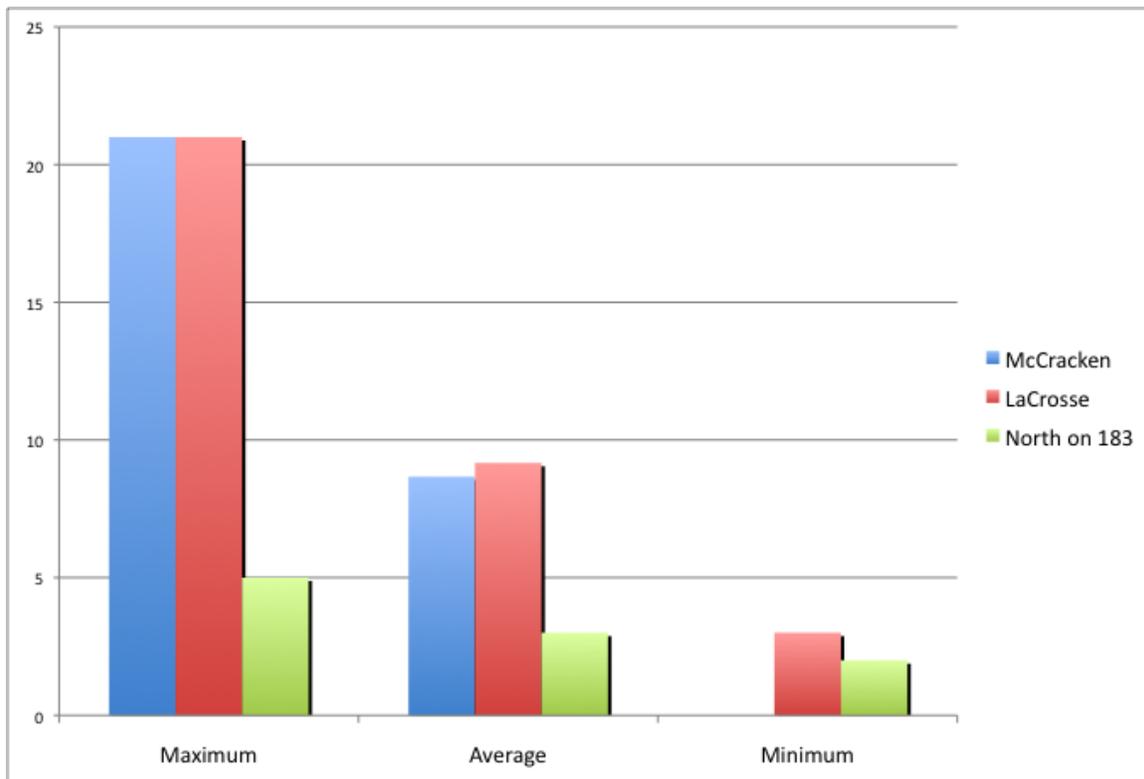
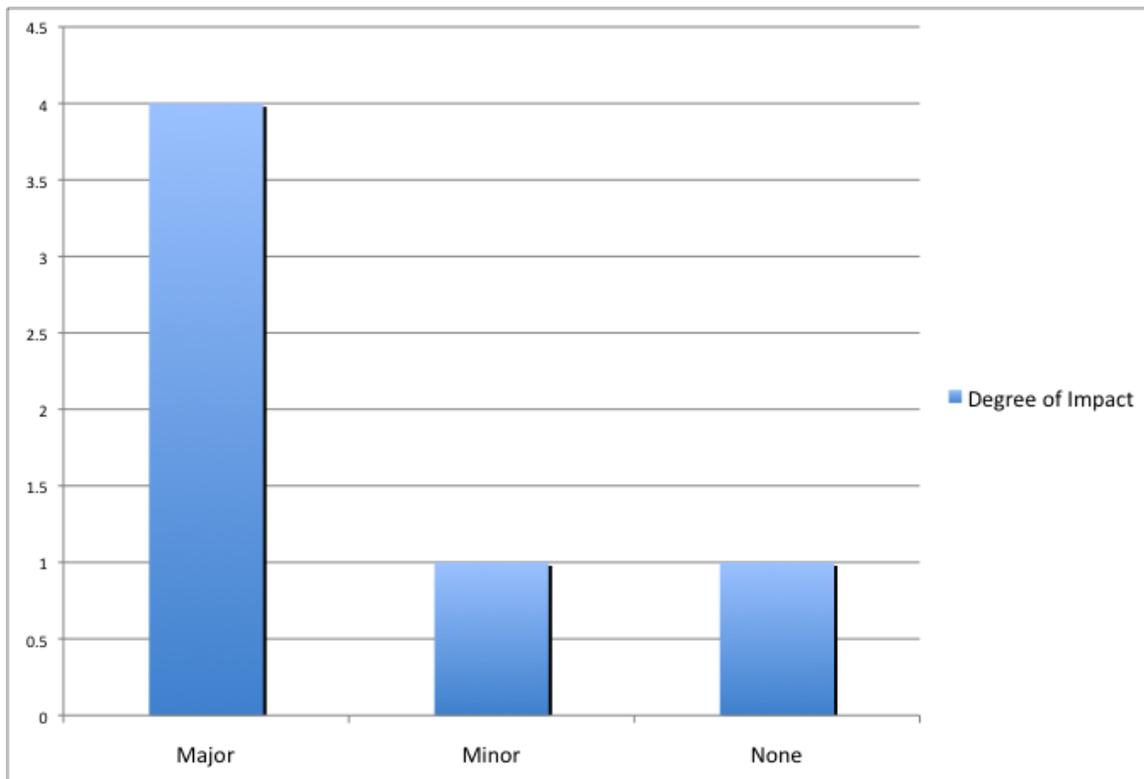
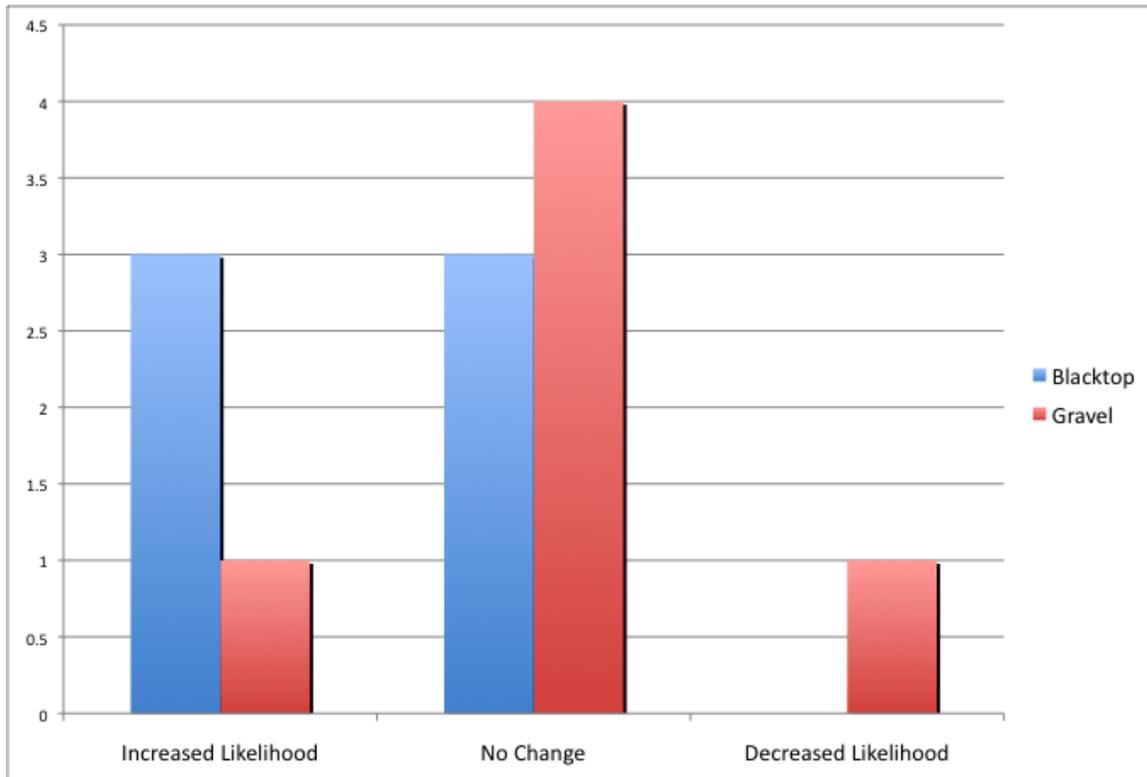
**Figure 4 Weekly Destination, RS 587 Landowner Survey**

Figure 4 shows the number of trips per week that respondents made to McCracken, LaCrosse, or north on US 183. There was one respondent that did not travel to McCracken; however, the most common destinations were either LaCrosse or McCracken (with almost no difference in number of trips).

**Figure 5 Degree of Impact on Current Business**

The landowner survey also asked respondents to gauge the impact of the road surface on their current business. Two thirds (4) of the respondents indicated that the road surface had a major impact. Only one respondent indicated that it had no impact.

**Figure 6 Likelihood of New Business**

Finally, respondents were asked about the likelihood of starting a new business based on whether RS 587 were "an all weather blacktop" or a "sand highway". The results suggest that a black top highway is preferred.

## Expected Economic Impacts

The construction phase provides a one-time economic boost to the local economy of Rush County. This boost comes from the purchase of materials and supplies in the local areas, as well as, some labor. The construction workers may also be purchasing housing, food, and fuel while they are in the area. The costs of highway construction can be broadly divided into 25% labor costs, 25% equipment costs, 40% materials costs, and 10% overhead costs<sup>3</sup>. The labor costs include some locally based labor, but most of the workers will be temporarily in the area. These temporary workers may, however, have local housing, food, and fuel expenses. The equipment costs are remitted outside the study area for the most part. Some local subcontractors may have locally remitted equipment costs. The materials costs will be spent locally to the extent that required materials can be acquired locally. Most of the overhead expenses will be remitted outside the study area. All of the direct economic impacts within Rush County are further enhanced by the induced and indirect economic impacts that subsequently occur in the local economy.

**Table 7 Estimated Construction Costs**

	Total	Per Mile
Gravel	11,250,000	\$865,385
Paved	15,000,000	\$1,153,846

<sup>3</sup> These categories and amounts were provided to one of the authors by individuals who are in the highway construction business. Obviously, construction techniques and requirements may change before the actual contracts are let. Babcock and Bratsberg (1997) and Babcock *et al.* (1996) estimated wages and salaries at 20.9% and 22.6% respectively with a range of 14% to 38%.

The direct impact is the originating source of the economic impact from rebuilding RS 587. This direct impact is a measure of the amount of expenditures made by the contractors and their employees for locally provided goods and services. The measure of direct impact excludes expenditures made for non-locally provided goods and services or goods/services purchased outside Rush County.

While the direct impact is the originating force, the impact of the direct expenditures listed above generates a “multiplier effect” that expands the direct impact into a total impact that is a multiple of the direct impact.<sup>4</sup> This multiplier effect is the result of both an indirect and an induced impact. The indirect impact can be explained as follows. Because of the local sales that will occur as a result of the direct impact, business establishments in the study area will purchase additional goods and services from other local sources in order to support their new increased level of business. These additional goods and services could range from office supplies to professional accounting services or renovation and expansion. It is estimated that for every dollar of direct expenditures an additional \$0.11 worth of purchases ultimately occurs in the study region. The indirect impact is a measure of the business-to-business secondary impacts.

The induced impact arises from the income received by local business establishments as a result of the direct expenditures of contractors rebuilding RS 587. A portion of these receipts received

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<sup>4</sup> Throughout our analysis we use RIMS II based multipliers. RIMS II multipliers are sector-based multipliers calculated for specific regions by the Bureau of Economic Analysis. In this section we use the RIMS II multipliers for the construction industry in Kansas.

by local businesses will in turn be distributed to local residents in the form of wages, salaries, commission fees, profits, or other types of income. A part of this distribution will in turn be used to make "second round" local purchases, which in turn becomes additional income to local residents and thus sets off a "third round" of expenditures, etc. It is estimated that for every dollar of direct expenditures an additional \$0.375 worth of local business activity is ultimately generated. The induced impact is a measure of the secondary effects arising from the consumer sector.

The total multiplier effect of both the indirect and induced impact is estimated at 0.485 (.11 + .375). This means that for every dollar of direct spending to rebuild RS 587, \$0.485 of additional business activity will ultimately be generated in Rush County.

**Table 8 Potential Economic Impact From Reconstruction of RS 587**

	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Gravel	\$4,837,500	\$1,237,500	\$4,218,750	\$10,293,750
Paved	\$6,450,000	\$1,650,000	\$5,625,000	\$13,725,000

Because our focus is on a single county within Kansas our multiplier estimates are more conservative than those of some researchers who have estimated that the subsequent economic activity at the state level is two to four times the direct impact spending.<sup>5</sup> Much of the spending that we have excluded from our analysis (because it

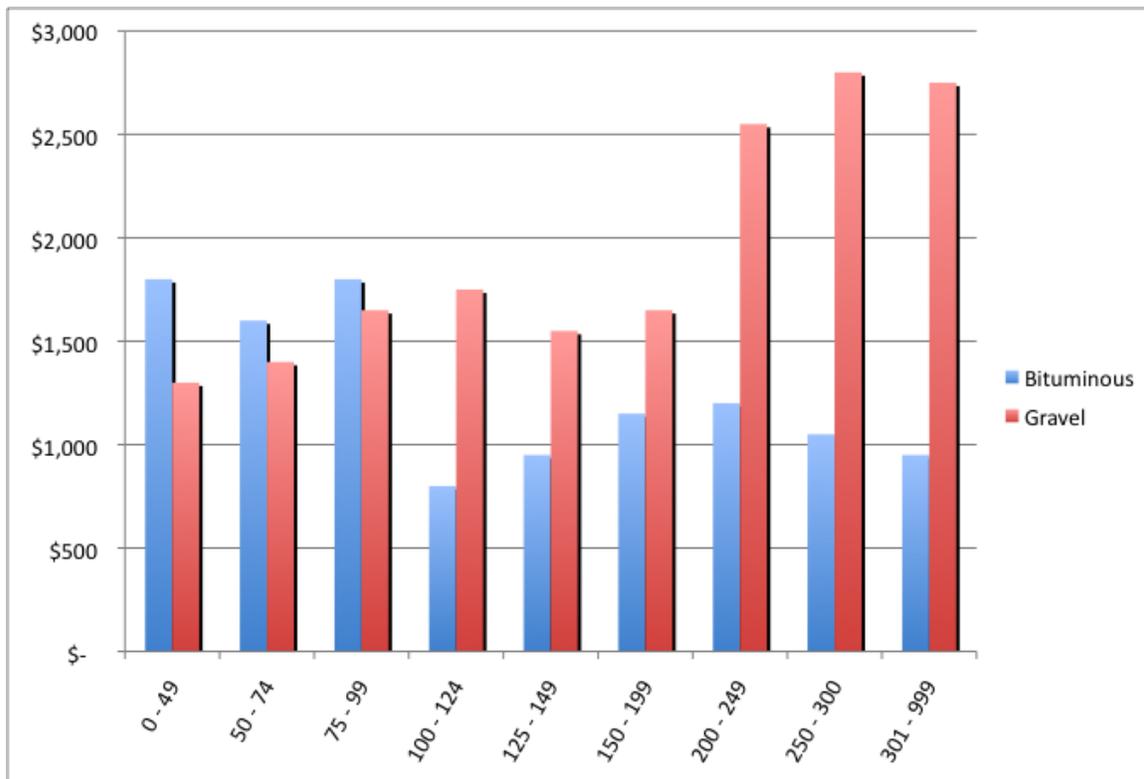
<sup>5</sup> Our regional multipliers are considerably less than the state level multipliers for Kansas estimated by Babcock and Bratsberg (2.47), Babcock et al. (2.55), and Burress and Oslund (at least 3).

occurs outside Rush County) and the subsequent spending that will be generated from it will occur within Kansas.

Ongoing maintenance expenses for a twenty year time horizon are dependent on the estimated costs. When based on the maintenance expenses over the 28 months of data shown in Table 9 these costs are more than four times greater for paved roads than gravel ones. When based on data from other states the costs of maintaining gravel roads exceed the costs of paved roads.

**Table 9 Rush County Highway Maintenance Costs**

	Total Miles	Total Cost	Annual Cost/Mile
Sand/Gravel	728	\$1,209,825	\$712
Paved	42	\$284,910	\$2,907

**Figure 7 Annual Maintenance Costs per Mile by AADT**

Source: Local Road Research Board

Data from other jurisdictions indicate that the costs of maintaining gravel roads exceed the costs of maintaining asphalt roads and that this difference increases with increased traffic flow. The Minnesota Department of Transportation has conducted extensive surveys of the costs associated with maintaining county roads based on both the type of road surface and the AADT of the road (Figure 7). Babcock reports that the maintenance costs for a standard 24 foot gravel road in Kansas are approximately \$7,000 per mile per year.<sup>6</sup> These estimates show the great difficulty and wide variation in estimating the maintenance costs for RS 587 over the next 20 years (Table 10).

<sup>6</sup> Impact of Kansas Grain Transportation on Kansas Highway Damage Costs Michael W. Babcock and James L. Bunch March 2002 p72.

If Babcock's estimate is correct, then the costs of maintaining RS 587 as a gravel road are ten times greater than the average costs based on Rush County data. The data from Minnesota which is based on more roads and a longer time frame and traffic levels shows that paved roads are less expensive to maintain than gravel roads at the traffic levels associated with RS 587. This also contradicts the data from Rush County.

**Table 10 Projected Maintenance Costs RS 587, 20 years**

	Babcock	MNDOT	Rush County
Gravel	\$1,820,000	\$650,000	\$185,177
Paved		\$390,000	\$755,884

Table 11 provides estimates of the potential economic impact from maintaining RS 587 using the least costly and most costly estimates for each type of road surface.

**Table 11 Potential Economic Impact from Maintenance of RS 587, 20 years**

	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Gravel (Babcock)	\$1,820,000	\$200,200	\$682,500	\$2,702,700
Gravel (Rush County)	\$185,177	\$20,369	\$69,441	\$274,988
Paved (Rush County)	\$755,884	\$83,147	\$283,457	\$1,122,488
Paved (MNDOT)	\$390,000	\$42,900	\$146,250	\$579,150

The potential economic impact from both the construction phase and the maintenance of RS 587 for twenty years is shown in Table 12.

**Table 12 Potential Total Economic Impact from Construction and Maintenance of RS 587**

	Construction	Maintenance	Total Impact
Gravel (Babcock)	\$10,293,750	\$2,702,700	\$12,996,450
Gravel (Rush County)	\$10,293,750	\$274,988	\$10,568,738
Paved (Rush County)	\$13,725,000	\$1,122,488	\$14,847,488
Paved (MNDOT)	\$13,725,000	\$579,150	\$14,304,150

Although the level of economic activity associated with agriculture and commerce is substantial in the northwest quadrant of Rush County, the changes in economic activity likely to result from the type of road surface are deemed minimal for the county overall. At least one business located along RS 587 is likely to be adversely affected by rebuilding RS 587 as a gravel road. It is also likely that businesses in McCracken will be negatively impacted if a gravel surface is chosen. A paved road is more desirable than a gravel road for those who may want to start or expand a business. More importantly, the intangible effect of reducing the paved county roads in Rush County from 42 miles to 29 miles (minus 31 percent) suggests a negative outlook for the future of Rush County.

## **Appendix: Selections from the Rush County Strategic Plan**

The following is taken directly from the 2008 Revision of the Rush County Strategic Plan.

"The Strategic Planning Steering Committee for Rush County economic development suggests a long-range plan that would serve the need to bring people in the county together as a community, increase the quality of life in order to attract new residents, stimulate business growth and development, and make greater opportunity for youth." page 2

6. Study the transportation infrastructure within the county to locate weaknesses and determine the best possible alternatives for improvement." page 2

### Transportation

Rationale: Adequate and diverse modes of transportation are a vital link for commerce. Railroads, an airport and well-maintained roads all contribute to the maintenance and growth of our county.

### Observations:

The transportation infrastructure of Rush County is a vital element in the growth and sustenance of the county. Transportation through and about the county is provided by state and locally maintained highways, a commercial airport and two short-line railroad lines. Without an adequately maintained transportation system, the economic health of our county [will] be threatened and the quality of life for our citizens will be diminished.

Rush County's grain elevators continue to rely heavily on rail transport of grain. Rail transport is provided to McCracken, La Crosse, Bison, and Otis by the K&O Railroad, a short line that leases a portion of the former Missouri Pacific line from the Union Pacific Railroad. Rail transport to Alexander, Rush Center, and Timken is also provided by the K&O Railroad who acquired the former AT&SF branch line. Following an abandonment proceedings in 2004, the Union Pacific removed rail in northern Ness County from McCracken

west. Many persons are concerned that the remaining line in central Rush County, now partially isolated, is “at risk” for abandonment.

Several years ago, Rush County lost most of its blacktop roads due to the high cost of repair. Over the past few years, the county has "ground up" the blacktop and returned the roads to sand to allow for better and less costly maintenance. The few miles of county blacktop that remain continue to be a financial burden to the county.

#### Prior Project Successes:

The City of LaCrosse utilizes a 1% city sales tax for an annual program of street repair and sealing.

In recent years, the K&O railroad completed upgrades to rail lines through the southern tier of townships.

#### Strategies and Opportunities:

8.1 Continue maintenance of the Rush County Airport. Objective: Although the airport is in good condition at the present, it is necessary to maintain the runway and other facilities to avoid a costly “urgent-need” situation in the future.

8.2 Monitor the status of current and future rail transportation. Objective: Although the status quo no longer compares to that of a few years ago, we must continue to monitor the situation and determine the best course of action to meet needs of grain elevators and to ensure, as best we can, the future of rail transportation through our county. This includes close monitoring of railroad abandonment requests.

8.3 Monitor the condition of remaining county blacktops and other county roads. Objective: The RCED will cooperate with the Rush County Commissioners to seek the most viable and cost effective solution keeping in mind the needs of local citizens and businesses.

8.4 Cooperate with Kansas Department of Transportation and local business and industry for maintenance (seasonal and general) of state highways and areas of ingres[s.] pages 12 & 13