SOUTHEAST KANSAS HIGHWAYS

prepared by

The Institute for Public Policy and Business Research
The University of Kansas

Norman Clifford, Assistant Professor of Economics
Kathleen Harnish, Research Associate
Anthony Redwood, Professor of Business and Executive Director

Funding for this analysis was provided by the Office of the Governor, State of Kansas. The views expressed herein, however, are solely those of the authors.

June 1987

Report No. 125

EXECUTIVE SUMMARY

This paper raises the question of whether the proposal to build a "high-type two-lane highway" through Southeast Kansas, which would connect Interstate 35 on the east edge of Wichita with Interstate 44 near Joplin, Missouri, should be upgraded to a four-lane highway. After examining the economic development history of the region coupled with the positive factors which poise this region for future economic development, we conclude that the additional cost of a limited access four-lane over a super-two lane highway could be justified by the likely additional benefits. A net present value analysis of the incremental costs and benefits supports this conclusion.

The recent history of the Southeast Kansas region is the history of a region in economic decline. However, we also find that this region has many of the features that make economic development possible -- diversified economic base; well-trained, experienced and relatively inexpensive labor force; availability of vocational training institutions; strong local development efforts and reasonably competitive and improving business costs. The missing ingredient for economic development is the highway transportation system with business site selection surveys confirming the critical nature of a good highway transportation system. For southeast Kansas, this is a "do or die" decision.

Net present value analysis of the incremental costs and benefits accruing from the construction of a four-lane rather than super-two highway

yields incremental tax benefits alone (1992 dollars) equal to 50 percent of the incremental costs (1992 dollars). These additional tax benefits represent only a modest portion of the total benefits that would accrue to the region and reflect a higher cost/benefit ratio due to our incremental methodology than would be obtained if a cost/benefit ratio had been derived for the limited access four-lane highway compared with the present highway.

The positive economic development growth possible with the addition of a four-lane highway within the southeastern region of the state will provide benefits not only felt within the region but also in Wichita, the economic hub of southern Kansas, and within the state. This essay supports the argument that serious consideration should be given to the construction of a four-lane highway in the southeastern region of the state.

RECENT ECONOMIC HISTORY OF THE SOUTHEAST KANSAS REGION

The recent history of the Southeast Kansas region is the history of a region in economic decline. The region developed through railroads, farming, manufacturing, mining, and oil and gas production. Railroads and mining went into sharp decline before World War II, farming and the oil and gas industries have been weakening for the past several decades and manufacturing more recently. The magnitude of the decline of the region in comparison with the rest of the state can be seen in Table 1, which shows Southeast Kansas population, employment and per capita personal income as a percent of state totals. The first line in Table 1 shows that the fraction of Kansas population which resides in the Southeast Kansas region has steadily declined over the 35 year period, beginning at 16.58 percent of total Kansas population in 1950 and declining to 12.22 percent of total Kansas population in 1985. The second line in Table 1 shows that employment in the Southeast Kansas region as a fraction of total employment in Kansas has fallen even more than population, beginning at 15.85 percent of total Kansas employment in 1950 and declining to 11.26 percent of total Kansas population in 1985. The last line in the table shows that per capita personal income in the Southeast region has been about four-fifths of state per capita personal income during the period 1950-1985, and this fraction is also tending to decline in recent years.

Further evidence of the continuing economic decline of the Southeast Kansas region comes from looking at the change in manufacturing employment in the region. In 1977 the region had six of the sixteen counties in the state that had more than one percent of the state's manufacturing

employment. In 1984 the region had only four of the nineteen counties that had more than one percent of the state's manufacturing employment. Furthermore, total manufacturing employment in these four counties declined from 8.06 percent of total manufacturing employment in 1977 to 6.68 percent of

Table 1

YEAR	1950	1960	1970	1980	1985
Southeast Kansas Pop. as a percent of total Kansas Pop.	16.58	13.77	12.52	12.47	12.22
Southeast Kansas Emp. as a percent of total Kansas Emp.	15.85	13.59	12.11	11.62	11.26
Southeast Kansas per capita pers. income as a percent of total Kansas per capita pers. income	81.72	81.77	83.04	74.20	78.71

the state's total manufacturing employment in 1984. To state it another way, for these four counties, employment in manufacturing, as a percentage of total Kansas employment in manufacturing, declined by 17.1 percent in seven years.

The brief history that we have given paints a vivid picture of a continually deteriorating economic situation in the Southeast Kansas region. The questions which we must face now are do we wish to abandon the Southeast Kansas region, and, if not, is it possible to do anything to change the direction of economic development in the region. We assume that the answer to the first question is no. We turn then to a brief analysis of the prospects for economic development in the region.

POTENTIAL FOR ECONOMIC DEVELOPMENT OF THE SOUTHEAST KANSAS REGION

In examining the Southeast Kansas region we find that it has many of the features that make economic development possible. It is already an important manufacturing area relative to the state of Kansas as a whole. Of the regions of the state, it is the third highest in manufacturing base with 11.6 percent. Overall, the economic base is more diversified than most other regions of the state. This means that there is already present the core of a well-trained, experienced and relatively inexpensive labor force. Furthermore, seven of the state's nineteen community colleges providing vocational training are located within the region, and Pittsburg State University has oriented its programs successfully to serve the needs of regional industry.

When we look at the region's proximity to markets, we see that it is near the metropolitan areas of Joplin and Wichita. It also has access to the markets of southern Missouri and northeastern Oklahoma and the many small urban areas within the region.

It is generally agreed that the state's business climate is improving rapidly, and that the local business climate of the region is very positive to development. Local development efforts appear to be strong, evidenced in part by the existence of local development professionals in many of the communities of the region. Finally, business costs would appear to be reasonably competitive and improving.

The major missing ingredient for economic development in Southeast Kansas is the highway transportation system. Surveys and other studies of firms' location decisions have repeatedly shown that transportation, especially highway transportation, is an important factor in firms'

decisions to locate in an area. In particular, firms want to be linked to the Federal interstate highway system and also to some extent to have access to air transportation. The Southeast region is served by airports in both Wichita and Joplin and the proposed Southeast Kansas highway would link the region to both Interstate 44, near Joplin and Interstate 35, near Wichita. It is clear that Southeast Kansas has been severely handicapped by its highway infrastructure. It is also evident that unless an appropriate highway transportation system is developed, Southeast Kansas will not experience economic growth. The proper highway system will not guarantee economic development, but it is a necessary condition for it to occur.

To summarize, the Southeast Kansas region has potential for economic development. The major missing ingredient is a good highway system in the region which links up to the interstate system. Given its history of economic decline, we must say that we now have a do or die situation in the region. Either we do something now about economic development in the region, or we are forced to admit that we are abandoning this part of the state's economy. Of course, in the ultimate the demise of the southeast region would be harmful to the whole state, and to Wichita in particular. We turn in the next two sections to the question of whether the additional economic benefits from constructing a four-lane highway instead of a super-two justify the additional expense.

Benefits from a Four-Lane Highway

Surveys of businesses, as well as of professional site consultants, show that highway transportation is an important factor in location decisions for a substantial number of firms, and that for a significant

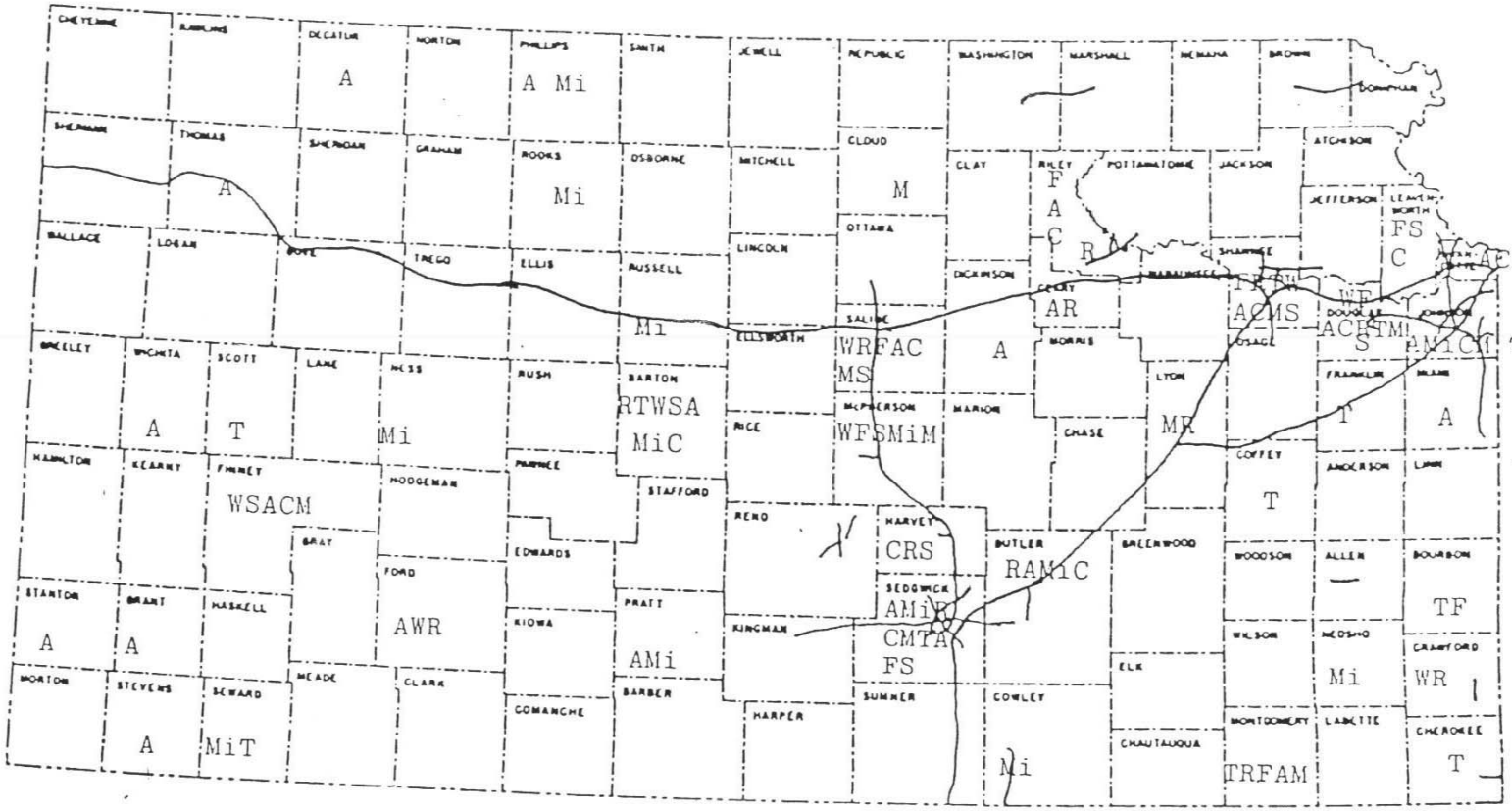
number of these, proximity to a four-lane highway is decisive. We have the strong impression that firms tend to cluster about four-lane highways. Some evidence of this is provided by Figure 1. The figure shows the counties in Kansas with the largest percentage of the state's employment in the various economic sectors, totalling 75 percent of the state's totals in those industries, and it shows the state's major four-lane highways. This figure clearly suggests that economic development in general takes place around four-lane highways.

Further evidence for the proposition that a substantial increment in economic development benefits will result from constructing a four-lane instead of a super-two lane highway comes from the study completed by the Task Force on the Southeast Freeway, which included Emporia State University, University of Kansas, Pittsburg State University, and Wichita State University. The Task Force estimated the economic benefits from an interstate quality freeway, and then estimated the amount by which those benefits would be reduced for an open-access four-lane highway and for a super-two highway. They estimated that in the Southeast region the benefits for a super-two highway would be 50 percent of the benefits from an interstate quality freeway, and that the benefits from an open access four-lane would be 70 percent of an interstate quality freeway, whereas in Sedgwick County the benefits from the four-lane open access would be 70 percent of the benefits of an interstate quality freeway and there would be no benefits from a super-two lane highway. If one believes that the future growth of Wichita lies in its role as the economic hub of southern Kansas, then these benefits could be substantially understated.

Tables 2 to 5 show the Task Force's estimates of the cumulative twenty

Statwide Economic Activity 1984

Following the KDED map for 1974, areas of concentration were identified as those counties that had the largest percentage of employment in that sector until 75% of the total state employment in that sector was accounted for (except for mining which only reached 63% since counties with less than 1% were not counted).



A = agriculture
C = construction
F = financial
M = manufacturing
Mi = mining
R = retail
S = services
T = transportation
W = wholesale

—— Principal 4-Lane Highways - 1986

FIGURE 1

year effects of an open access four-lane highway and a super-two lane highway on population, employment, retail sales and personal income in both the fourteen county Southeast region and in Sedgwick County. The low end of the range of benefits for the Southeast region represents the estimate if development efforts are at a "typical" or "normal" level, i.e., relatively modest in scope and intensity, while the high end of the range for the Southeast region represents the estimate if local development efforts are at a high level.

Thus, we can see from Tables 2 to 5 that if we use the high level estimates for the Southeast region and Sedgwick County we find that the cumulative twenty-year incremental increase in population from building a four-lane instead of a super-two would be 12,655; in employment would be 6809; in personal income would be $1.599 billion; and in retail sales would be $715 million. Thus the economic benefits from building a four-lane instead of a super-two lane would be substantial according to the results of this study. Furthermore, we believe that the Task Force might be conservative in its estimate of the impact of an open access four-lane. We have no quarrel with the estimate of 50 percent of the benefits of an interstate quality freeway for a super-two lane highway, but our reading of the literature on firms' location decisions leads us to believe that the impact of an open access four-lane might be greater than 70 percent of the impact of an interstate quality freeway. For our part however, we would argue for some degree of limited access for the four-lane to achieve maximum benefit; enough so that commercial traffic could be assured of a smooth flow through the area. Given some degree of limited access, we would contend that a

Table 2

Estimated Impact of Two- and Four-Lane Highways on Population and Employment in Fourteen Southeast Kansas Counties 1992-2012

Highway Types	Current Level (thousands)	Range of Increase	Range of Percentage Increase
		Population	
Open-Intersection, Four-Lane	318.7	9,200 - 34,600	2.9 - 10.9
Super Two-Lane	318.7	6,600 - 24,700	2.1 - 7.8
Incremental Increase		2,600 - 9,900	.8 - 3.1
		Employment	
Open-Intersection, Four-Lane	129.8	7,500 - 19.300	5.8 - 14.9
Super Two-Lane	129.8	5,400 - 13,800	4.2 - 10.6
Incremental Increase		2,100 - 5,500	1.6 - 4.3

Table 3

Estimated Impact of Two- and Four-Lane Highways on Personal Income and Retail Sales in Fourteen Southeast Kansas Counties 1992-2012

Highway Types	Current Level (billions)	20 - Year Cumulative Increase (billions)	20 - Year Percentage Growth
		Personal Income	
Open-Intersection, Four-Lane	$3.41	$1.54 - $4.47	4.3 - 12.7
Super Two-Lane	$3.41	$1.10 - $3.17	3.1 - 9.1
Incremental Increase		$ .44 - $1.30	1.2 - 3.6
		Retail Sales	
Open-Intersection, Four-Lane	$1.26	$ .47 - $1.34	3.6 - 10.3
Super Two-Lane	$1.26	$ .34 - $ .96	2.6 - 7.4
Incremental Increase		$ .13 - $ .38	1.0 - 2.9

Table 4

Estimated Impact of Two- and Four-Lane Highways on Population and Employment in Sedgwick County
1992-2012

Highway Types	Current Level (thousands)	Increase (thousands)	Percentage Increase
		Population	
Open-Intersection, Four-Lane	393.5	2,755	.7
Super Two-Lane	393.5	0	0
Incremental Increase		2,755	.7
		Employment	
Open-Intersection, Four-Lane	187.0	1,309	.7
Super Two-Lane	187.0	0	0
Incremental Increase		1,309	.7

Table 5

Estimated Impact of Two- and Four-Lane Highways on Personal Income and Retail Sales in Sedgwick County
1992-2012

Highway Types	Current Level (millions)	20-Year Cumulative Increase (millions)	20 -Year Percentage Growth
		Personal Income	
Open-Intersection, Four-Lane	$5,432.7	$299.1	.52
Super Two-Lane	$5,432.7	0	0
Incremental Increase		$299.1	.52
		Retail Sales	
Open-Intersection, Four-lane	$3,042.3	$334.7	1.10
Super Two-Lane	$3,042.3	0	0
Incremental Increase		$334.7	1.10

figure of 85 percent is the appropriate estimate of the percentage of interstate impacts that would occur if a four-lane were built.

Since the economic effects from constructing a four-lane are so great compared to the economic benefits from constructing a super-two lane, we recommend that serious consideration be given to the construction of a four-lane highway with some degree of limited access. In the next section, we calculate the increased tax revenues accruing from the construction of a four-lane rather than a super-two lane highway and show that a consideration of the tax benefits further supports the construction of a four-lane highway in Southeast Kansas.

Calculation of Tax Benefits from Building Four-Lane

The real measure of the benefits from building a four-lane highway in Southeast Kansas instead of a super-two lane is the increase in the well-being of the citizens of Southeast Kansas and the surrounding counties. As we have seen, there is solid evidence for the proposition that building a four-lane instead of a super-two lane will have a substantial impact on employment, retail sales and personal income in the region. Since increases in employment, retail sales and personal income increase the well-being of the region's citizens, it would be appropriate to assign a dollar measure to the increase in well-being of the citizens from building a four-lane and compare that with the increase in cost from building a four-lane. If the incremental benefit from building the four-lane were greater than the incremental cost, then it would be appropriate to upgrade to the four-lane. Since, however, it is difficult to assign a dollar value to the increase in well-being of the citizens of the region, we look instead at the increase in

tax revenues that can be expected as a result of the construction of the four-lane. These increased tax revenues, of course, are only a modest portion of the total benefits that will accrue. Nevertheless, we will see that these tax benefits alone are a significant fraction of the additional cost of constructing the four-lane.

Table 6 provides estimates of the tax benefits resulting from constructing the four-lane rather than the super-two lane highway in Southeast Kansas. The values of the additional tax revenues over the period 1992 to 2012 from constructing a four-lane instead of a super-two lane are discounted back to 1992. The incremental cost figure is also shown in 1992 dollars for comparison. These increases in tax benefits alone amount to 50 percent of the additional cost of building the four-lane. It should be emphasized that these increases in tax revenues are not the result of any new taxes; they are simply the increases in revenues from taxes that are already in place due to increases in economic activity in the Southeast Kansas and adjacent areas. In addition, had the question to be addressed been the analysis of a limited access four-lane highway over the present situation, the cost/benefit ratio would have been lower. The incremental methodology used here (super-two lane over four-lane) results in the diminishing of the incremental benefits accruing from the four-lane due to the large percentage of total benefits attributed to the super-two lane highway.

Table 6

INCREASE IN VALUE OF TAXES AND COSTS FROM CONSTRUCTING A FOUR-LANE RATHER THAN A SUPER-TWO LANE HIGHWAY IN SE KANSAS (1992 DOLLARS)

Personal Income Tax	$ 14,964,280
Sales Tax	21,208,840
Individual Property Tax	11,585,250
Business Income Tax	34,610,100
Business Property Tax	136,414,700
Total Incremental Taxes	$218,783,100 (1992 $)
Total incremental Cost*	$436,113,200 (1992 $)
	$368,000,000 (1986 $)

* The total incremental cost is taken to be $368 million as calculated in the HNTB study. This figure is spread over the five year construction period and compounded to get the 1992 value of the cost.

CONCLUSIONS

The Southeast Kansas region is in a situation of serious economic decline. Yet the region has most of the features that are associated with potential economic growth. The one essential factor that is missing is a good highway transportation system. Such a system needs to be put in place now if we are not to abandon the Southeast region of the state. The calculation of the economic benefits to the citizens of the region as well as the calculations of the tax benefits that will accrue from economic development supports the argument that serious consideration should be given to the construction of a four-lane highway in the region.

APPENDIX

Calculation of Net Present Value of Incremental Tax Benefits

This appendix describes the method used to estimate the net present value of the increment in tax benefits that will accrue from building a four-lane highway rather than a "super-two" lane highway in Southeast Kansas. The increment in the tax benefits can be broken down into five parts: the incremental increase in the personal income tax, the incremental increase in the sales tax, the incremental increase in the property tax paid by individuals, the incremental increase in the income tax paid by businesses, and the incremental increase in the property tax paid by businesses. The estimate of the increase in each of these revenues is calculated by beginning with the estimates of changes in employment and retail sales which are estimated for the fourteen county Southeast region and Sedgwick County in "Southeast Kansas Turnpike/Freeway - Wichita to Joplin: Economic Impact and Benefits Study" assembled by the Emporia State University, University of Kansas, Pittsburg State University, Wichita State University Task Force, hereafter referred to as the Task Force Report. The Task Force Report gives, for the period 1992-2012, a high/low range for the impact of an interstate quality expressway on employment and retail sales in the fourteen county region and a point estimate of the same impacts for Sedgwick County. The "low" figure for the fourteen county region is based upon "normal" or "typical" local efforts with regard to economic development, while the "high" figure is based upon "vigorous and effective" local initiatives with regard to economic development. We have chosen to use the "high" figures from the Task Force Report, since we feel that the

region should be viewed as one that is already in a position to make a strong economic development effort. The Task Force estimates the impacts from the super-two highway and the open access four-lane highway as percentages of the impacts from an interstate quality expressway. They estimate the impact of a super-two highway to be 50 percent of the impact of an interstate quality expressway for the fourteen county region and 0 percent of the impact of an interstate quality expressway for Sedgwick County. They estimate the impact of an open access four-lane to be 70 percent of the impact of an interstate quality four-lane for both the fourteen county region and Sedgwick County. We have no quarrel with the estimates for the impacts of the super-two, but we have used a figure of 85 percent of the impact of an interstate quality expressway for the impacts of the four-lane. We feel justified in doing this for two reasons. First, as we have argued in the text, we think that the marginal impact of the 4-lane over a super-two is much greater than the 20 percent differential of the report would indicate. Second, we would argue, as we have in the text, that the four-lane should be built with some degree of limited access. We assume that the estimated impacts accrue exponentially over the twenty year period, just as the Task Force report did. Finally, we use a discount rate of 7.5 percent to discount increments in tax revenues in each year back to 1992. We turn now to the methods used in estimating the incremental effects on each of the five taxes from building a four-lane rather than a super-two lane highway.

To calculate the increase in the personal income tax paid by employees we use figures and methods generated in "Costs and Benefits of

Business Tax Incentives in Kansas" prepared by Shirley Sicilian. Using data from the Kansas Department of Economic Development, Sicilian found that the average annual wage for workers in new and expanding industries is $18,000, and that in 1984 the average income tax liability for Kansas individual income tax returns with incomes in the $14,000 to $20,000 range was $310.12. Thus we calculated the increment in personal income tax paid by employees for each year to be the increment in employment for that year times $310.12.

To calculate the change in the sales tax revenue we added the average sales tax rate in the 14 Southeast Kansas counties, .443 percent to the state sales tax rate of 4 percent and multiplied the resulting average rate times the increment in retail sales in the fourteen Southeast Kansas counties for the year. We then added the county sales tax rate of 1 percent in Sedgwick County to the state sales tax rate and multiplied the sum times the increment in retail sales in Sedgwick County.

To calculate the change in property tax revenues from individuals, we multiplied an average per capita revenue from taxes on rural and subdivision real estate, urban residential real estate, city and township personal property, and motor vehicle registration and taxes of $240, calculated by Sicilian, times the increment in employment.

To calculate the change in the income tax paid by business, we divided the change in employment by an average figure of 11.6 employees per firm to get an estimate of the change in the number of firms. We then multiplied this number by the average corporate income tax liability for Kansas corporations to get an estimate of the change in business income tax revenue. Treating all firms as corporations means that we are using the income tax liability of corporations to get a rough estimate of the income

tax paid by the owners of firms which are organized in other than the corporate form.

To calculate the change in business property tax we used an average figure of $235,175 of capital investment for each job in new and expanding manufacturing firms in Kansas, calculated by Sicilian from Kansas Department of Economic Development data. This number was multiplied by the estimated change in employment to give an estimate of the change in capital investment. The change in capital investment was then multiplied by the FY 85 average assessment ratio on real and tangible personal property of 10.44 percent and the Kansas 1985 average tax rate of 11.51 percent on assessed real and tangible personal property to estimate the change in business property tax revenue.

The 1992 present values of the increments in the five categories of taxes were added together to give a 1992 present value of the total increment in taxes. To get a comparison figure for the costs of the project, we took from the engineering study done by Howard Needles Tammen and Bergendorf a figure of $368 million as the increment in costs from going from the super-two to the four-lane. We assumed that these costs would be distributed over the 1987-1991 construction period as follows: 5 percent in 1987, 10 percent in 1988, 25 percent in 1989, 30 percent in 1990 and 30 percent in 1991. We then used the discount rate of 7.5 percent to compound these costs forward to 1992.

In order to see how sensitive the estimates are to our assumptions, we recalculated the tax benefits assuming that the four-lane would produce 80 percent of the benefits of an interstate quality expressway, rather than 85 percent, and assuming that the benefits produced would be 80% of the high

level benefits in the Task Force study, instead of 100 percent. The results of those calculations are given in Table A1.

Table A1

ALTERNATIVE ESTIMATE OF INCREASED VALUE OF TAXES AND COSTS FROM CONSTRUCTING A FOUR-LANE RATHER THAN A SUPER-TWO LANE HIGHWAY IN SE KANSAS (1992 DOLLARS)

Personal Income Tax	$ 10,403,810
Sales Tax	15,125,820
Individual Property Tax	8,054,560
Business Income Tax	24,062,420
Business Property Tax	94,841,310
Total Incremental Taxes	$152,487,900 (1992 $)
Total Incremental Costs	$436,113,200 (1992 $)
	$368,000,000 (1986 $)