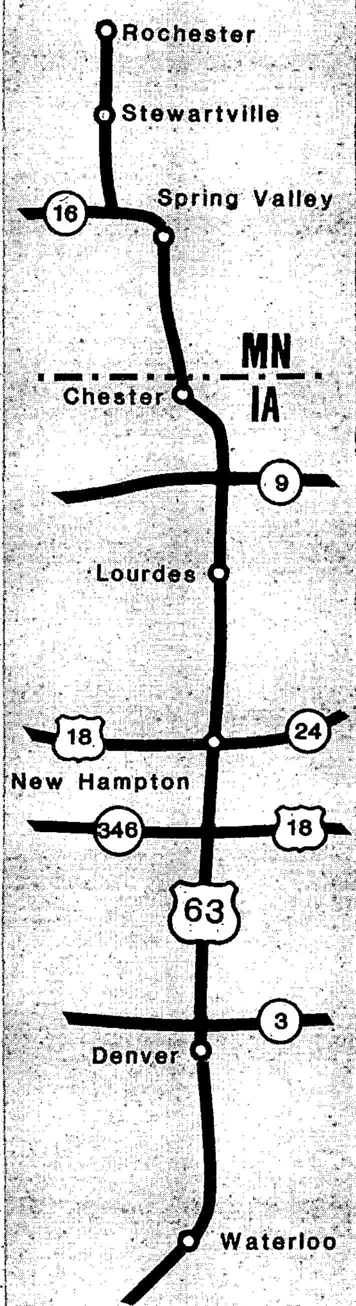


U.S. 63 CORRIDOR STUDY

FINAL REPORT

submitted to:

IOWA DEPARTMENT OF TRANSPORTATION

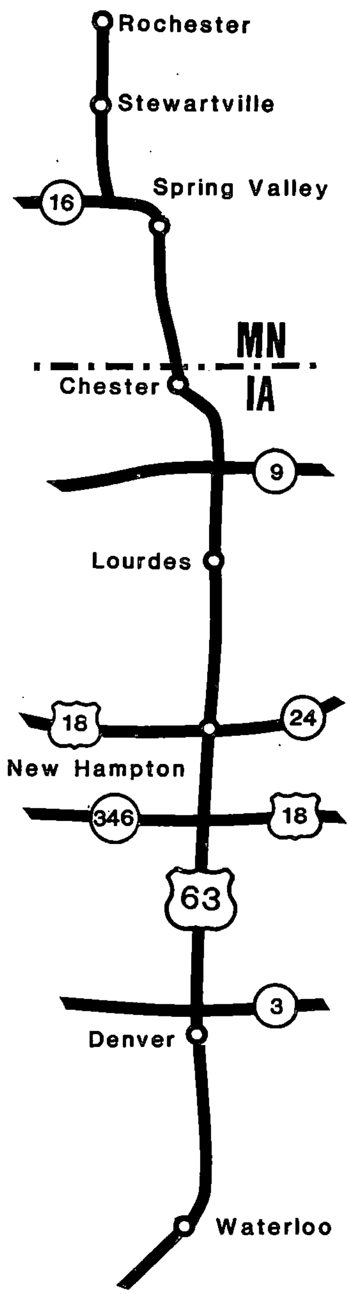
in cooperation with:

MINNESOTA DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

submitted by:

WILBUR SMITH ASSOCIATES and
BRICE, PETRIDES-DONOHUE

1992



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WILBUR
SMITH
ASSOCIATES
ENGINEERS • ARCHITECTS • ECONOMISTS • PLANNERS

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March 6, 1992

Mr. Scott Dockstader
Iowa Department of Transportation
Office of Project Planning
800 Lincoln Way
Ames IA 50010

RE: U.S. 63 Corridor Study - 272800
Final Report

Dear Mr. Dockstader:

Wilbur Smith Associates is pleased to provide 100 copies of the Final Report.

This report describes the U.S. 63 Corridor in terms of its economic and demographic features, the physical characteristics of the existing facility and the traffic it serves. Also, the various improvement alternatives are described and evaluated. These evaluations consider the traffic needs in the time period up to the year 2010, the travel benefits that would derive from alternative improvements to U.S. 63 and the economic development benefits that would be stimulated by such improvements. These benefits are related to the costs of the improvements and various indicators of economic feasibility are provided.

While this report does indicate differences between alternative improvement strategies, we have not recommended a particular alternative. Instead, the report provides information from which decisions can be made.

We appreciate the opportunity to provide our services on this study and to work with the Advisory Committee, the two Departments of Transportation and the Federal Highway Administration on this very interesting assignment.

Respectfully submitted,

WILBUR SMITH ASSOCIATES

James L. Covil, P.E.
Senior Vice President
Transportation Policy and Planning

cc: Mr. Merritt Linzie, Minnesota DOT
Dr. Martha A. Maxon, Brice Petrides-Donohue
Dr. C. Phillip Baumel, Iowa State University
Dr. David J. Forkenbrock, University of Iowa
Dr. Dan Otto, Iowa State University

EXECUTIVE SUMMARY

The U.S. 63 Corridor Study is a joint effort of the Iowa and Minnesota Departments of Transportation and the Federal Highway Administration to study the warrants for improvements in this corridor and their feasibility. The study is a macro-level investigation which has included a broad analysis of the major justifications for upgrading U.S. 63.

STUDY RATIONALE

The reasons for this study are very clear, when one understands the history of this corridor and the perspectives of those involved in making highway corridor investment decisions. The corridor's residents and business community feel that they need a four-lane highway. On the other hand, there are insufficient funds currently available to build all desired highway projects in the two states, and rational and prudent allocation of fund use is therefore requisite. This study was needed to provide information upon which investment decisions for U.S. 63 can be made within the context of other highway needs in the States of Minnesota and Iowa.

SUITABILITY

The suitability of the existing U.S. 63 facility may be characterized as follows:

- **Standards.** Throughout much of its length, the study section of U.S. 63 comprises a high quality two-lane facility. Nevertheless, some sections have narrow shoulders which are a matter of both safety and operational concern. Additionally, passing sight distance restrictions due to alignment limitations result in a significant number of "no passing" zones.

- **Traffic Control.** U.S. 63 passes through some towns where traffic signals are an impedance to through trips. Additionally, four-way stops exist at three major rural intersections, constituting additional impedances.

- **Traffic Safety.** When a long term perspective is taken, U.S. 63 may be characterized as a reasonably safe facility. Long term accident rates and accident severity rates generally are consistent with accident experience on comparable facilities. However, in the period June - December 1991, six tragic accidents occurred which resulted in the loss of 13 lives. These accidents occurred on rural sections of the route.

- **Level of Service.** U.S. 63 provides an acceptable level of service under existing traffic conditions. Congestion is not a major problem at present. However, traffic volumes are forecast to increase in the future to the point where several segments will operate under congested conditions during peak travel periods of the day.

- **Truck Route.** U.S. 63 is a very important truck route today. Also, truck volumes are increasing significantly each year. Given the commercial and economic important of truck travel, it is important to ensure that U.S. 63 provides a high quality of service.

- **Service to Agribusinesses and Industrial Activities.** The economy of the U.S. 63 corridor is highly dependent upon U.S. 63. Again, it will be important for regional economic development that U.S. 63 continue to provide a high level of traffic services.

CONGRESSIONAL SUPPORT FOR IMPROVEMENTS

The Intermodal Surface Transportation Efficiency Act of 1991 was passed by Congress on November 27, 1991 and was signed by the President on December 18, 1991.

Included in this Act is a significant recognition of the importance of U.S. 63. The Act specifically identifies U.S. 63 as an "innovative project" and provides special assistance for its upgrading. The Act authorizes $15.1 million for U.S. 63 improvements between Waterloo and New Hampton, Iowa.

The special funding provided for U.S. 63 is attributable, in large measure, to efforts by Iowa's Congressional delegation to have this project included in the new federal legislation. It also is attributable, in part, to the concerned citizens and public officials who have created significant awareness of the importance of U.S. 63 and its needs. This study is a further step in the process of considering the special needs of U.S. 63 and determining an appropriate improvement program for it.

CORRIDOR DEFINITION

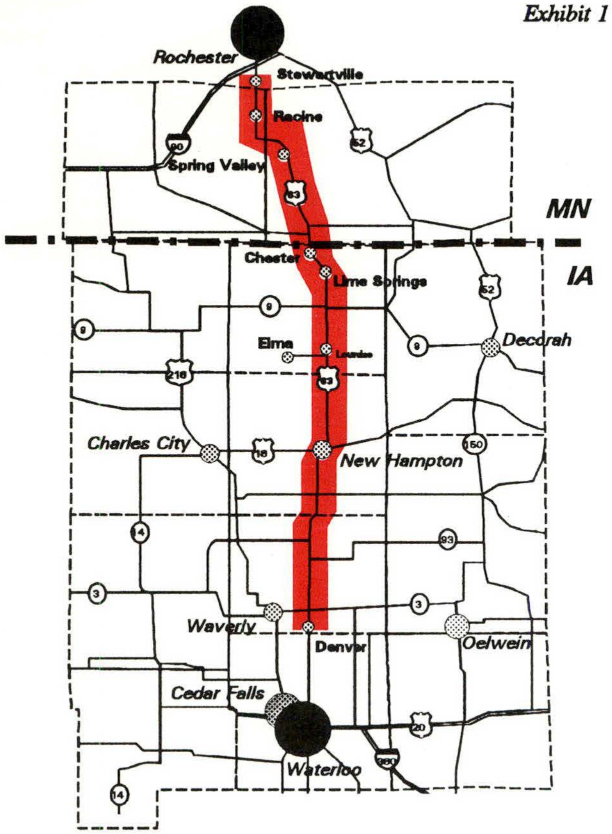
The U.S. 63 Corridor Study focused on the mainly two-lane section from south of Denver to north of Stewartville, with a length of 93 miles. For analysis purposes, the study also included the four-lane section between Stewartville and Rochester, making a total length of 100 miles. (See Exhibit 1).

TRAFFIC CHARACTERISTICS

Depicted in Exhibit 2 are the 1990 annual average daily traffic volumes along the U.S. 63 corridor. The display is based upon traffic counts at the locations indicated and does not reflect the traffic volume at each individual location along the route. For instance, the display does not indicate traffic volumes within New Hampton or the other towns along U.S. 63. Instead, it presents traffic volumes on rural segments.

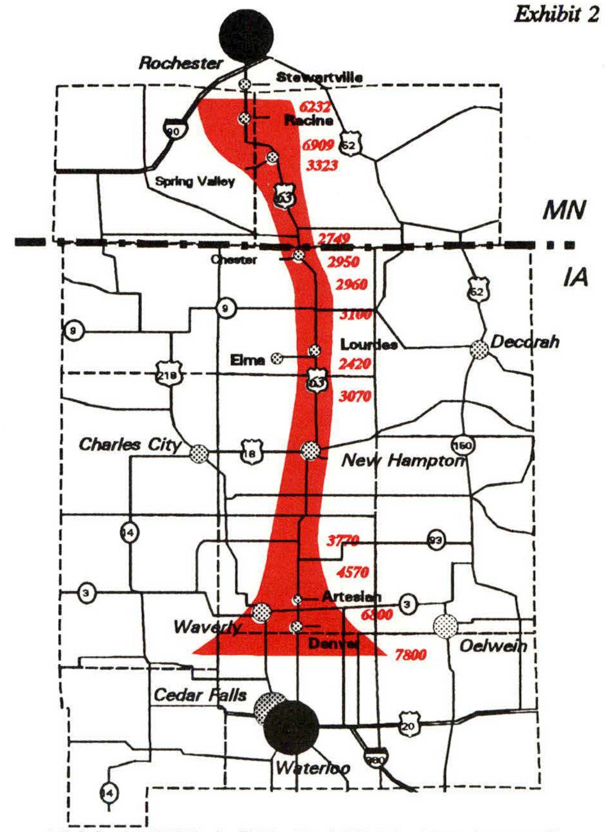
As noted, there is a distinctive pattern of increasing volumes at the northern and southern extremities of U.S. 63 as the route approaches Rochester and Waterloo. Traffic volumes drop to a low of just over 2400 vehicles per day near the Howard/Chickasaw county line.

Exhibit 1



THE U.S. 63 STUDY SECTION

Exhibit 2



1990 AVERAGE DAILY TRAFFIC ALONG U.S. 63 CORRIDOR

A significant proportion of traffic along U.S. 63 is comprised of trucks. Unlike the pattern for total traffic, truck traffic is relatively constant throughout the corridor. The highest volumes occur near the Chickasaw/Bremer county line rather than on the segments approaching Waterloo and Rochester as is the case with total traffic.

Another feature of traffic in the U.S. 63 Corridor is the high proportion of long trips. All of the stations have a high proportion of trips which are classified as through trips. The highest number of through trips occurred for northbound traffic at a station just north of Denver. At this station, 1,759 trips had neither origins or destinations within the study area. This represented just under 40 percent of all northbound trips at this location.

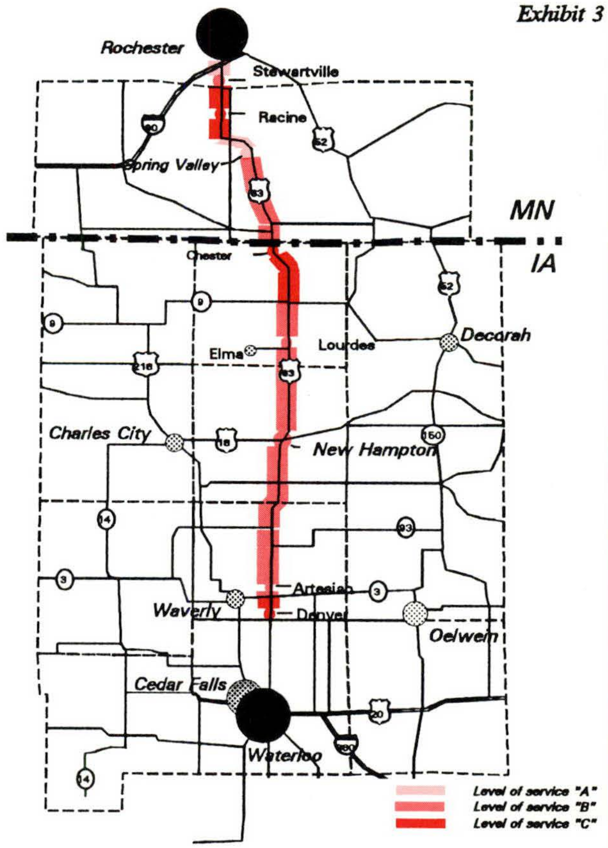
LEVEL OF SERVICE

Traffic level of service is a measure of the quality of the driving experience, i.e., the amount of freedom to travel without being inhibited by other vehicles. As congestion increases, the level of service (that is, the quality of the travel experience) diminishes.

Level of service is expressed as six levels, or "grades." These range from Level of Service A, which represents free flow conditions with low volumes, to Level of Service F, which represents forced flow operations at low speeds and significant stoppages.

Based upon 1990 traffic volumes, the traffic level of service on all Iowa segments is graded as "C" or better (i.e., stable flow conditions) as depicted in Exhibit 3. The most congested sections are in Denver and the road segments just north of there, in Chester and the road segments just south of there.

Exhibit 3



CURRENT TRAFFIC LEVEL OF SERVICE

Congestion is more of a problem on the Minnesota portion of U.S. 63 than is the case in Iowa. Three segments currently operate at Level of Service D during the peak period of the day, with better levels of service at other times. Level of Service D represents conditions approaching unstable flow.

PROGRAMMED IMPROVEMENTS

Improvements are already planned for the existing facility as follows:

- **Minnesota Route 30 to North Limits of Stewartville** - Replace pavement and widen existing short section of 2-lane roadway to four lanes
- **Stewartville** - Widen existing section through town to a 4-lane section with no parking
- **Spring Valley to Minnesota/Iowa State Line** - Reconstruct existing substandard 2-lane section to high quality 2-lane design, including wide paved shoulders and alignment improvements
- **Minnesota/Iowa State Line to State Route 9** - Resurface and reconstruct the 2-lane section in areas of poor vertical and horizontal alignment and provide 10-foot wide granular shoulders
- **State Route 3 to Denver** - Widen existing 2-lane section to four lanes
- **Denver Bypass** - Construct a 4-lane roadway with depressed median

For purposes of the study's analyses, the existing facility with programmed improvements constituted the Base Case. That is, the improvement alternatives consist of additional improvements beyond those already programmed, as identified above.

RANGE OF IMPROVEMENT ALTERNATIVES

The following improvement alternatives were identified for initial consideration:

- Improved Existing Facility
- Improved Existing Facility with Bypasses
- Four Lane Highway
- Four Lane Highway with Bypasses
- Freeway

Each of these alternatives was subjected to a series of evaluations to determine how each would perform regarding:

- Traffic Capacity
- Travel Speeds
- Safety
- Environmental Impacts
- Economic Impacts
- Phasing Opportunities
- Capital Costs

Based on these evaluations, the least promising of the improvement alternatives were identified and eliminated from further study. The reasons for eliminating options are indicated below along with the justifications for retaining the preferred alternatives.

Freeway

The freeway alternative was not considered to be a prime candidate for the following reasons:

- Traffic volumes do not justify the existing facility plus a freeway on new alignment. This option would provide considerable excess capacity.
- Additionally, it is the most expensive alternative in terms of capital costs.
- Further, there could be significant environmental impacts because of constructing a facility on new alignment.
- This alternative also would be disruptive to existing farming activities.
- The improvements in travel operations that a freeway would provide are not likely to compensate for the negative factors mentioned above.

Four-Lane Highway (Without Bypasses)

A very substantial portion of travel on U.S. 63 is long distance, through traffic. A major impediment to such traffic is caused by traveling through the center of the cities and towns on U.S. 63. It would make little sense to improve operations in the rural areas (which now are operating at a reasonable service level) without also providing improvements in the vicinity of cities and towns. Therefore, this alternative was eliminated from further consideration.

Alternatives Retained for Further Study

The three improvement alternatives retained for more detailed study were as follows:

- **Alternative #1: Improved Existing Facility** - Widening of narrow shoulders, provision of passing lanes at selected locations and revision of traffic control measures to give priority to U.S. 63 traffic would provide relatively low cost improvements throughout the corridor segment. Improvements also could include additional turn lanes at major intersections.
- **Alternative #2: Improved Existing Facility with Bypasses** - Improving the existing facility as noted above would primarily affect the rural sections of U.S. 63. Because of the high volume of through traffic, particularly trucks, there may be justification for considering the provision of bypasses around some or all of the cities and towns. Also, benefits to local traffic in towns along the corridor would accompany diversion of through traffic to a bypass.

- **Alternative #3: Four-Lane Highway with Bypasses** - Widening the existing two-lane sections to four lanes and providing bypasses around cities and towns would give this section of Iowa and Minnesota a high quality highway facility. This, in turn, would provide a catalyst for economic development along the route.

These three improvement alternatives were analyzed in greater detail and the results of these analyses are presented below.

FUTURE LEVELS OF SERVICE

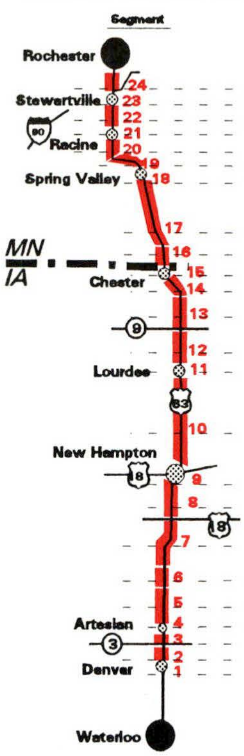
Although congestion is not a major concern at present, the Study included analyses to determine the extent to which congestion would develop in the year 2010. These analyses were performed for the Base Case (i.e., the existing facility with just the currently programmed improvements) and for each of the three finalist improvement alternatives.

As shown in Exhibit 4, if no improvements other than those already committed are undertaken (i.e., the Base Case), 2010 traffic volumes will result in Level of Service D on six segments. With Alternatives #1 and #2, only two segments would operate at Level of Service D.

Exhibit 4

LEVEL OF SERVICE ANALYSIS BY HIGHWAY SEGMENT

2010 Base Case and Three Improvement Alternatives



2010 Level of Services

Segment	Base	Alt#1	Alt#2	Alt#3
24	C	C	C	C
23	C	C	D	B
22	C	C	C	A
21	C	C	C	A
20	C	C	C	A
19	D	D	D	A
18	D	D	C	A
17	C	B	B	A
16	C	B	B	A
15	C	C	C	A
14	D	C	C	A
13	C	C	C	A
12	C	C	C	A
11	C	C	C	A
10	C	C	C	A
9	B	B	A	A
8	C	C	C	A
7	D	C	C	A
6	D	C	C	A
5	D	C	C	A
4	C	C	C	A
3	C	C	C	A
2	A	A	A	A
1	A	A	A	A

Alternative #3 would result in a substantial improvement in traffic level of service throughout the corridor. With the exceptions of the two northernmost segments (Numbers 23 and 24), all segments would operate at Level of Service A.

CAPITAL COSTS

The study's evaluations included estimation of the extra costs associated with each of the three finalist improvement alternatives. The cost estimates establish the rough order-of-magnitude of requirements for each alternative which is adequate for purposes of these feasibility analyses. However, detailed design analyses would be expected to produce more refined cost estimates.

Due to the significant difference in the three improvement alternatives, there is a very wide range in estimated construction costs:

- Alternative #1: $28.4 million
- Alternative #2: $52.9 million
- Alternative #3: $128.9 million

These values include a 15 percent allowance for planning and engineering expenses.

INCREMENTAL MAINTENANCE AND RESURFACING COSTS

From time to time, certain maintenance and repair activities are required which are independent of the alternative being considered. These costs, effectively, are common costs which apply equally to all alternatives. They are excluded from the feasibility analyses.

On the other hand, adding lanes and bypasses increases the surface area to be maintained. Therefore, maintenance costs are expected to be higher in Alternatives #1, #2 and #3 than in the Base Case. The additional annual maintenance costs for the improvement alternatives are estimated to be:

- Alternative #1: $17,500
- Alternative #2: $90,625
- Alternative #3: $191,850

Additional costs also will be incurred to resurface the additional lane miles. Resurfacing costs are assumed to occur every 15 years and total:

- Alternative #1: $665,000
- Alternative #2: $2,897,000
- Alternative #3: $10,587,000

ENGINEERING FEASIBILITY

One "test of feasibility" which any improvement alternative must pass is the ability to physically improve an existing highway through adding lanes or widening shoulders, or alternatively widening the route from two to four lanes, or alternatively constructing bypasses of communities on new alignments. "Ability to physically construct" implies that conditions are such that the proposed construction is practical, at reasonable cost, within a reasonable time span, and without unreasonable adverse implications.

Final determination of engineering feasibility will require detailed alignment investigations and design which are beyond the scope of this planning study. Nevertheless, it was possible to make some general observations as follows:

- **Alternative #1:** The improvements proposed as part of Alternative #1 are constructible, at a relatively low cost, and can be accomplished quickly.

- **Alternative #2:** This alternative provides bypasses of the communities of New Hampton and Chester, Iowa and of Spring Valley, Racine and Stewartville, Minnesota, thereby decreasing delays to traffic passing through such communities. these preliminary analyses indicate that there are options concerning how these communities would be bypassed and that, within the range of options, some could be more easily constructed than others.

- **Alternative #3:** As part of this alternative, 4-lane bypasses will be provided for all communities that would be bypassed as part of Alternative # 2. Between such bypasses, the existing two-lane roadway is proposed to remain in service but as a two-lane, one-way roadway, while a new, two-lane, one-way roadway on additional right-of-way would be constructed either to the east or the west of the existing roadway. Grade separations or interchanges may be needed at some locations. This alternative is physically feasible although it would cause some impacts on existing development alongside the existing facility.

ENVIRONMENTAL FEASIBILITY

Several state and federally protected environmental resources have been identified in the U.S. 63 project corridor between Denver, Iowa and Stewartville, Minnesota which may be impacted by highway development. These resources include wetlands, rivers and streams, protected plant and animal species, parks and recreation areas, state scientific areas, cemeteries, and agricultural and archeological resources.

- **Alternative #1:** This alternative would have the least impact on farmland, wetlands and other environmental resources by avoiding most of the new terrain development of the other alternatives. It also would have the least impact on farming operations by avoiding diagonal severance of agricultural land.

- **Alternative #2:** The bypasses included in this alternative would increase the potential for impacts to wetlands, stream and river crossings, cultural and agricultural resources by crossing new terrain. For purposes of this feasibility study, alternatives on both sides of each community were considered. In most cases, evaluation of which bypass alternative would have the least impact to wetlands is highly dependent on the specific location and, therefore, not possible to evaluate until further design investigations are undertaken.

- **Alternative #3:** This alternative would have the greatest overall impact on environmental resources because of the amount of land required for construction of additional lanes along the existing alignment and the new terrain alignment of bypasses that would be built around each community.

ECONOMIC FEASIBILITY

A primary issue addressed in this study is whether any of the U.S. 63 improvement alternatives are "economically feasible." A major investment such as a U.S. 63 improvement is "economically feasible" if the economy is better off with the highway improvement than without it. Without question, a well planned U.S. 63 investment will be a significant asset to the U.S. 63 region, and will be of help to the economic future of communities and activities located in proximity to the highway. Ample evidence exists to support the contention that the corridor's economy will benefit from the highway.

Definition of Economic Benefits

Economic benefits are defined as "an increase in the prosperity and incomes of people and institutions." Economic benefits of this nature in a given area occurs when the incomes and product generated in the area are caused to increase. Such increases occur as a result of a highway investment in either of two ways:

1. **More Resources** - If output increases in the area, the increased output will require more resources (land, labor, materials, capital) which means that more people are employed, more incomes are earned and more profits are made. If the highway enables the attraction of additional business in the corridor (new firms, or expanded firms), then the highway has aided the economic development process, to the benefit of the corridor area.

2. **Efficiency** - Even if the highway does not help to create increased output, it can still help economic development by causing the area's output to be achieved at less total cost. Reduced transportation costs due to the highway improvement yield increased prosperity and income.

Analyses were undertaken to estimate the extent to which the three improvement alternatives would generate these two broad types of economic benefits as summarized below.

TRAVEL EFFICIENCY ECONOMIC BENEFITS

The travel efficiency benefits of the highway improvements are of three types: vehicle operating cost savings, accident cost savings, and value of travel time savings.

- <u>Vehicle Operating Cost Savings</u> - These cost savings were developed using "consumers surplus analysis techniques," so the cost savings accurately depict savings not only to common traffic (traffic on the route both before and after the highway improvements) but also to diverted traffic (traffic diverted from other regional highways). The vehicle operating cost changes reflect differences in vehicle miles of travel, travel speed changes, curvature and gradient changes, reduced numbers of speed change cycles, and other changes that affect vehicle operations.

- <u>Accident Cost Savings</u> - Road improvements of the types evaluated in this study, including bypasses around towns, will reduce accident potentials. Accident analyses were conducted for three accident types (fatal, injury, property damage).

- <u>Travel Time Savings</u> - All of the improvement alternatives will save car and truck travel time. Consumers surplus techniques were used to develop estimates of travel time savings, with the result that the travel time saved includes both common and diverted traffic. Based on analyses for each of these benefit categories, estimates were derived for the year 2010 as shown in Exhibit 5.

Travel Efficiency Feasibility

The benefits from improved travel efficiency were related to the extra costs incurred to build and maintain the three improvement alternatives. Results of these analyses are shown in Exhibit 6. These statistics suggest a number of conclusions, from the travel efficiency perspective.

- **Alternative #1**, comprising rural passing lanes and turning lanes, does not appear to be a sufficient solution. These improvements yield only 3.2% in economic return.

- **Alternative #2**, comprising the Alternative #1 passing lanes and turning lanes, plus bypasses built around all towns, is economically feasible, yielding a 9% return on the investment. The town bypasses yield considerable operating cost and time savings and some accident savings.

Exhibit 5

ESTIMATED TRAVEL EFFICIENCY ECONOMIC BENEFITS
- YEAR 2010 -

Annual Economic Benefit Types	ANNUAL HIGHWAY USER EFFICIENCIES ($000) Alternative #1: Improved Two-Lane	Alternative #2: With Bypasses	Alternative #3: Four-Lane
Vehicle Operating Cost Savings:			
Automobile	$(17.4)	$334.8	$410.1
Light Truck	(3.1)	61.3	90.1
Heavy Truck	(15.2)	385.9	577.8
Total	$(35.7)	$782.0	$1,078.0
Accident Cost Savings	$824.9	$1,681.3	$6,930.8
Value of Time Savings			
Automobile	$638.5	$2,952.3	$4,523.1
Light Truck	36.6	123.9	201.7
Heavy Truck	210.1	704.9	1,200.7
Total	885.2	$3,781.1	$5,925.5
Total 2010 Road User Benefits	$1,674.4	$6,244.4	$13,934.3

Exhibit 6

TRAVEL EFFICIENCY FEASIBILITY
U.S. 63

ECONOMIC INDICATORS (a)	Alternative #1: Improved Two-Lane	Alternative #2: With Bypasses	Alternative #3: Four-Lane
Net Present Value ($000)	($8,960.3)	$21,151.6	$36,592.4
Internal Rate of Return	3.2%	9.0%	8.1%
Discounted Benefit/Cost	0.69	1.38	1.27

(a) 6% discount rate

- **Alternative #3**, comprising the construction of a four-lane highway all the way from Waterloo to Rochester, is also feasible at the selected discount rate of 6%, yielding a return of 8.1%.
- These statistics suggest that, if the two states have sufficient funds that can be allocated to U.S. 63, that Alternative #3 (four-lane) should be built.
- However, the greatest return on investment (the biggest "bang for the buck") is yielded in Alternative #2. Therefore, if funds are limited, or if there are other worthwhile projects in the two states which yield over 8.1%, then Alternative #2 would be best.
- If funds are limited, implementation of Alternative #2 makes sense, because it would involve a phased construction program which, as funding comes available, could still ultimately lead to an eventual four-lane highway.

ECONOMIC DEVELOPMENT IMPACTS

The U.S. 63 improvements could cause a number of events to occur that will be beneficial to the local and state economies. These events are categorized into four types, and economic development impacts were estimated for each.

- **Act of Highway Construction** - The act of spending money in the corridor to build the improved highway will be of immediate economic benefit to the corridor area. These impacts are temporary in nature, since they exist only during the construction activity and terminate when the road construction is complete (when the highway is open to traffic). These "direct" impacts of highway construction are important but should not be used as evidence that the highway improvements are feasible.
- **Corridor Competitive Position** - An improved highway reduces the cost of transportation. Reductions in trucking time and cost lead to reduced costs of production, which in turn lead to marginally reduced prices and/or increased profits, which can lead to increased production (expansion of existing firm production and/or attraction of new firms), which in turn generates economic impact value. These "competitive position" impacts are calculated.
- **Roadside Service Industries** - A more efficient north-south highway will lead to revised travel patterns involving greater traffic density on U.S. 63. Greater traffic density causes increased sales for roadside businesses (motels, restaurants, gasoline stations, tourist visitation places, others that cater to highway users). These "roadside service industry" impacts are calculated; they are valuable to the route's primary impact

area, although they are largely transfers from other Iowa and Minnesota routes and therefore are less significant net impacts to the two states at the statewide level.

- **Agriculture** - The agriculture sector will benefit from reduced trucking and auto costs. It will also benefit from improved competitive position. In addition, agriculture could benefit if livestock are not damaged during transportation and other beneficial agricultural changes are made.

TOTAL ECONOMIC BENEFITS

Total annual economic benefits of the alternative highway improvements include both the travel efficiency gains as well as the "Personal Income" portion of the economic development benefits. These two are additive because care was taken in the analysis to avoid any type of double counting.

Total Benefits to the Corridor Region

The seven-county primary impact area consists of Olmstead, Mower and Fillmore counties in Minnesota and Howard, Chickasaw, Bremer and Black Hawk Counties in Iowa. Benefits to this area comprise the entire travel efficiency gain plus the full competitive position, roadside business and additional agriculture benefits. These total impacts on the corridor's counties for the three improvement alternatives are presented in Exhibits 7.

In every case the travel efficiency economic gains are greater than the economic development gains. This is not unexpected given the nature of the U.S. 63 improvements being considered.

Total Benefits to the Two States

Exhibit 7 also presents the annual economic benefits accruing to the two states, statewide. In every case the total statewide benefits are less than the benefits to the corridor area. This is because some benefits to the corridor (some competitive position and some roadside business benefits) represent transfers to the corridor region from elsewhere in Iowa and Minnesota. These transfers do not represent net gains to the states; they are only benefits to the corridor region. Nevertheless, the calculations suggest that there are positive statewide impacts from all benefit types.

ECONOMIC DEVELOPMENT FEASIBILITY

The economic development feasibility calculations include the same stream of costs and the same travel efficiency benefits as used in the travel efficiency feasibility assessment; to these are added the economic development impacts. The resulting feasibility indicators are summarized in Exhibit 8.

Exhibit 7

TOTAL ANNUAL ECONOMIC BENEFITS
Alternative #1: Improved Two-Lane
($000)

	IMPACT ON CORRIDOR		IMPACT ON THE TWO STATES	
	1990	2010	1990	2010
TRAVEL EFFICIENCY GAINS				
Vehicle Operating Cost Savings	$(21)	$(36)	$(21)	$(36)
Accident Cost Savings	$532	825	532	825
Value of Time Savings	$501	885	501	885
Total Road User Benefits	$1,012	$1,674	$1,012	$1,674
ECONOMIC DEVELOPMENT GAINS (a)				
Competitive Position	$70	$319	$50	$200
Roadside Business	$330	596	53	95
Additional Agriculture	$20	25	50	56
Total Economic Development	$420	$940	$153	$351
TOTAL ECONOMIC BENEFITS	$1,432	$2,614	$1,165	$2,025

(a) The personal income economic development benefit.

TOTAL ANNUAL ECONOMIC BENEFITS
Alternative #2: With Bypasses
($000)

	IMPACT ON CORRIDOR		IMPACT ON THE TWO STATES	
	1990	2010	1990	2010
TRAVEL EFFICIENCY GAINS				
Vehicle Operating Cost Savings	$518	$782	$518	$782
Accident Cost Savings	$1,102	1,681	1,102	1,681
Value of Time Savings	$2,488	3,781	2,488	3,781
Total Road User Benefits	$4,108	$6,244	$4,108	$6,244
ECONOMIC DEVELOPMENT GAINS (a)				
Competitive Position	$390	$1,776	$273	$1,149
Roadside Business	$819	1,485	124	234
Additional Agriculture	$40	145	100	350
Total Economic Development	$1,249	$3,406	$497	$1,733
TOTAL ECONOMIC BENEFITS	$5,357	$9,650	$4,605	$7,977

(a) The personal income economic development benefit.

TOTAL ANNUAL ECONOMIC BENEFITS
Alternative #3: Four-Lane Highway
($000)

	IMPACT ON CORRIDOR		IMPACT ON THE TWO STATES	
	1990	2010	1990	2010
TRAVEL EFFICIENCY GAINS				
Vehicle Operating Cost Savings	$701	$1,078	$701	$1,078
Accident Cost Savings	$4,549	6,931	$4,549	6,931
Value of Time Savings	$3,777	5,925	$3,777	5,925
Total Road User Benefits	$9,027	$13,934	$9,027	$13,934
ECONOMIC DEVELOPMENT GAINS (a)				
Competitive Position	$630	$2,860	$447	$1,870
Roadside Business	$1,870	3,382	296	532
Additional Agriculture	$60	193	140	451
Total Economic Development	$2,560	$6,435	$883	$2,853
TOTAL ECONOMIC BENEFITS	$11,587	$20,369	$9,910	$16,787

(a) The personal income economic development benefit.

Exhibit 8

ECONOMIC DEVELOPMENT FEASIBILITY
U.S. 63

ECONOMIC INDICATORS (a)	Alternative #1: Improved Two-Lane	Alternative #2: With Bypasses	Alternative #3: Four-Lane
FEASIBILITY FROM CORRIDOR PERSPECTIVE			
Net Present Value ($000)	$306.3	$52,868.1	$94,018.3
Internal Rate of Return	6.1%	13.1%	11.4%
Discounted Benefit/Cost	1.01	1.96	1.69
FEASIBILITY FROM STATEWIDE PERSPECTIVE			
Net Present Value ($000)	($5,970.7)	$35,073.0	$55,558.9
Internal Rate of Return	4.1%	10.9%	9.3%
Discounted Benefit/Cost	.79	1.63	1.41

(a) 6% discount rate

SOURCE: Wilbur Smith Associates

Exhibit 8 statistics suggest a number of conclusions, from the overall economic development perspective.

- From the seven-county corridor perspective, all of the three alternative improvements are economically feasible at the 6% discount rate.
- From the statewide perspective, only Alternatives #2 and #3 are feasible.
- Alternative #2, as was the case with the travel efficiency assessment, generates the greatest return on the investment (Alternative #2 generates 10.9% statewide, Alternative #3 generates 9.3% statewide).
- These statistics suggest that, if the states have sufficient funds, that Alternative #3 (four-lane) should be built. If there are competing highway projects, however, that yield between 9.3% and 10.9%, then Alternative #2 makes the most sense because it yields the greatest return.
- If the states were to select Alternative #2, it should be planned in a way that it could eventually lead to a four-lane highway because of the four-lane highway's feasibility.

THE NEXT STEP

The U.S. 63 Corridor Study was undertaken as a joint effort by the Iowa and Minnesota Departments of Transportation and the Federal Highway Administration to study the warrants for improvements in this corridor and their feasibility. The study has produced findings regarding current and future conditions, examined a range of improvement alternatives and identified three alternatives considered to be most worthy. These three "finalist" alternatives were evaluated regarding traffic operations, safety, costs, engineering feasibility, environmental feasibility, travel economic efficiency, and economic development feasibility. The study identified which alternatives provide the best return on investment as well as the economic impacts which will accompany such improvements.

It was not the purpose of the U.S. 63 Corridor Study to reach decisions about which improvement alternative should be built. Instead, the purpose was to provide information so that investment decisions can be made regarding U.S. 63 within the context of other highway needs in the States of Minnesota and Iowa. Study findings will permit public officials to make decisions on the basis of factual information concerning the need for, feasibility of and benefits from investments in this important highway corridor.

U.S. 63 CORRIDOR STUDY ADVISORY COMMITTEE

- Mr. Herman Meyer
  New Hampton Office of Economic Development
- Mr. Rodney H. Larson
  Iowa Northland Regional Council of Governments
- Mr. Charles Reiter
  Rochester-Olmsted Council of Governments
- Mr. Tom Welch
- Mr. Scott Dockstader
- Mr. Craig O'Riley
  Iowa Department of Transportation
- Mr. Merritt H. Linzie
- Mr. Tony Hames
  Minnesota Department of Transportation
- Mr. Ed Finn
  Federal Highway Administration

CONSULTANT

- Wilbur Smith Associates

ASSISTED BY:

- Brice, Petrides - Donohue
- Specialist Consultants:
  - Dr. C. Philip Baumel
    Iowa State University
    Agriculture Transportation
  - Dr. David Forkenbrock
    University of Iowa
    Economic Principles and Analysis
  - Dr. Dan Otto
    Iowa State University
    Economic Impact Analysis
  - Dr. George Treyz
    Regional Economic Models, Inc.
    Economic Impact Models

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LIST OF EXHIBITS

LIST OF EXHIBITS (continued)

LIST OF EXHIBITS
(continued)

Chapter 1
INTRODUCTION

For many years, much attention has been focused upon the U.S. 63 Corridor from Rochester, Minnesota to Waterloo, Iowa. The route is important to the people who live and work in the corridor and the industries, agriculture and commerce located therein. Additionally, this corridor is important to interregional travel because U.S. 63 serves a large volume of through traffic.

While some parts of U.S. 63 are four lanes, most of it is two lanes. Some portions of the two-lane sections have features which are below modern design standards. Because of the economic and social significance of this important route, there are many concerned public officials and citizens who desire to have it upgraded. The U.S. 63 Corridor Study is a joint effort of the Iowa and Minnesota Departments of Transportation and the Federal Highway Administration to study the warrants for improvements in this corridor and their feasibility. The study is a macro-level investigation which has included a broad analysis of the major justifications for upgrading U.S. 63. The findings of this study provide information that can be used to make decisions about improvement programs for U.S. 63 within the context of other highway needs in the States of Iowa and Minnesota.

U.S. 63 ROLES

U.S. 63 serves many important functions. The following are some of these important functions, but should not be considered to be an exhaustive list. Instead, they give a sense of the multifaceted functions which are served. The roles of U.S. 63 may be summarized as:

- Important north-south route for people living in the corridor and essential to fulfilling many of their social, cultural, educational, economic, health, and other needs;
- Important to the educational system, including school bus operations;
- Important to health service functions, including emergency medical services, and as an access route for people requiring treatment at the Mayo Clinic in Rochester and at health facilities in Waterloo;
- Important for mail delivery and other public services;

- Important to small businesses such as convenience stores, restaurants, service stations, and other commercial establishments;

- Important to small and large industries in the corridor in terms of employee access and receiving and shipping goods;

- Important to small and large agribusinesses in the corridor, including farms, grain elevators, food processors and agriculture equipment dealers;

- Important truck route serving agriculture, industrial, and commercial activities within and outside the corridor;

- Important recreational route for those living in the corridor as well as those using U.S. 63 for all or part of their recreational trips;

- Important regional route, serving a large volume of through trips, including trips by large trucks which find it to be the preferred route to save time and/or distance.

SUITABILITY

The suitability of the existing U.S. 63 facility to serve the multi-faceted functions identified above may be characterized as follows:

- **Standards**. Throughout much of its length, the study section of U.S. 63 comprises a high quality two-lane facility. Nevertheless, some sections have narrow shoulders which are a matter of both safety and operational concern. Additionally, passing sight distance restrictions due to alignment limitations result in a significant number of "no passing" zones.

- **Traffic Control**. U.S. 63 passes through some towns where traffic signals are an impedance to through trips. Additionally, four-way stops exist at three major rural intersections, constituting additional impedances.

- **Traffic Safety**. When a long term perspective is taken, U.S. 63 may be characterized as a reasonably safe facility. Long term accident rates and accident severity rates generally are consistent with accident experience on comparable facilities. However, in the period June - December 1991, six tragic accidents occurred which resulted in the loss of 13 lives. These accidents occurred on rural sections of the route.

- **Level of Service**. U.S. 63 provides an acceptable level of service under existing traffic conditions. Congestion is not a major problem at present. However, traffic volumes are forecast to increase in the future to the point where several segments will operate under congested conditions during peak travel periods of the day.

- **Truck Route.** U.S. 63 is a very important truck route today. Also, truck volumes are increasing significantly each year. Given the commercial and economic important of truck travel, it is important to ensure that U.S. 63 provides a high quality of service.

- **Service to Agribusinesses and Industrial Activities.** The economy of the U.S. 63 corridor is highly dependent upon U.S. 63. Again, it will be important for regional economic development that U.S. 63 continue to provide a high level of traffic services.

CONGRESSIONAL SUPPORT FOR IMPROVEMENTS

The Intermodal Surface Transportation Efficiency Act of 1991 was passed by Congress on November 27, 1991 and was signed by the President on December 18, 1991.

Included in this Act is a significant recognition of the importance of U.S. 63. The Act specifically identifies U.S. 63 as an "innovative project" and provides special assistance for its upgrading. The Act authorizes $15.1 million for U.S. 63 improvements between Waterloo and New Hampton, Iowa.

The special funding provided for U.S. 63 is attributable, in large measure, to efforts by Iowa's Congressional delegation to have this project included in the new federal legislation. It also is attributable, in part, to the concerned citizens and public officials who have created significant awareness of the importance of U.S. 63 and its needs. This study is a further step in the process of considering the special needs of U.S. 63 and determining an appropriate improvement program for it.

STUDY RATIONALE

The reasons for this study are very clear, when one understands the history of this corridor and the perspectives of those involved in making highway corridor investment decisions. The corridor's residents and business community feel that they need a four-lane highway; also clearly, there are insufficient funds currently available to build all desired highway projects in the two states, and rational and prudent allocation of fund use is therefore requisite. This study was needed to provide information upon which investment decisions for U.S. 63 can be made.

Corridor History

From Rochester to the Twin Cities, U.S. 52 is four lanes; between Stewartville and Rochester, U.S. 63 is four lanes; south of Iowa Route 3, U.S. 63 soon will be four lanes; and I-380 south of Waterloo is four lanes. A major segment of U.S. 63, however, between Stewartville and Iowa Route 3, is a two lane highway. It is this two lane segment, which passes directly through a number of Iowa and Minnesota communities, that is the subject of this corridor study.

The corridor's residents have long sought highway improvements on this segment. U.S. 63 ranked second in the St. Louis - St. Paul ("Avenue of the Saints") study which, ultimately, selected U.S. 218/18 to Mason City rather than the more direct route (U.S. 63). While U.S. 63 was not selected in the 1990 five state "Avenue" study, the perceived needs remain and, ultimately, improvements to each route must be decided on their own merits. Therefore, the need for this U.S. 63 Corridor Study is so that U.S. 63 needs can be assessed independent of the "Avenue of the Saints" project.

The Corridor Perspective

Residents of the U.S. 63 Corridor, and others, have long wanted an improved north-south four-lane highway. The corridor residents envision great benefits from such a highway -- increased intercity mobility, vehicular safety, increased tourism, improved goods transport, more efficient transport, better access to certain places and, most important, economic development. Many advocates of the corridor believe that the economic development benefits will exceed the costs associated with the road project, and that a four-lane highway must therefore be warranted and economically feasible. The St. Louis - St. Paul "Avenue of the Saints" Study indicated that the corridor's residents would indeed be better off with an improved four-lane highway. It is also felt that such a roadway would give Rochester better ties to the south, and Waterloo/I-380 would have better ties to the north.

The Two States' Perspectives

The States need to make certain that limited highway monies are programmed for the most warranted, most beneficial highways, highway corridors, and projects. This corridor therefore is, in a sense, in competition with other highway corridors and corridor projects for limited funding. Because they are responsible for state highway funds administration, Iowa DOT and Minnesota DOT must make certain that a major investment in the corridor is prudent and that the State and regional economies will be better off with the investment than without the investment. There are economic penalties associated with either underinvesting, or overinvesting, in highways. Therefore, the States must identify those highway projects, project types and investment levels that are most warranted and most efficient.

The U.S. 63 Corridor Study was structured to provide sufficient analyses, information and insights to enable a series of decisions to be made, and to facilitate development of a consensus. The principal questions posed in the study were:

1. Is the lack of a four-lane highway on this segment a significant problem for the corridor's communities? In what ways?

2. If a four-lane highway were completed, would the travel efficiency benefits be sufficient to justify the improvement? Would there be sufficient economic development impacts to justify the improvement? How many of those benefits would represent net increases in economic value?

3. If the four-lane highway is economically feasible, can it be built without significant environmental harm? How can it best be built to support the local communities without doing much harm (environmentally) to them?

4. What standards and/or improvement types are feasible?

5. What course of action is the correct course of action? What considerations should enter into decisions about the proper course of action?

As reported subsequently, the study has determined whether it makes sense to invest funds in the corridor. The study focused upon travel demands and travel patterns, conceptual design, costs, benefits, impacts and implications. It considered impacts pertaining to development, the economy, the environment, and to the area's general well being. The study identified what improvement type would provide the best return on investment, as well the economic impacts which would accompany such improvements.

STUDY APPROACH

The most recent previous study to explore this route segment was the "St. Louis to St. Paul Corridor Feasibility and Necessity Study" by Wilbur Smith Associates. In that study, U.S. 63 was one of 36 route options, and it eventually was ranked #2. However, the St. Louis to St. Paul study asked slightly different questions than were posed in the U.S. 63 study, and the Saints analyses were very broad in nature compared with the U.S. 63 analyses. While the U.S. 63 Corridor Study is a macro-level analysis, nevertheless, the analyses were much more focused and were more reflective of localized issues and opportunities than was possible in the Saints study.

The U.S. 63 Study was divided into five study tasks. Each task was designed to yield specific needed study products. The five work tasks were as follows.

Task A: Evaluation of Existing U.S. 63. The initial task developed background information, reported results of special surveys, and evaluated the existing highway. The task focused upon the question:

> *"Does existing U.S. 63 provide adequate services, have adequate capacity, and serve the corridor transportation needs of businesses and individuals?"*

Task B: Future Capacity and Service Needs. This task dealt with the future of the corridor. It included various types of forecasts to the Years 2000 and 2010, and determined whether or not major highway improvements will be needed in the future. The task dealt with the question:

> *"Might major highway investments in this corridor be needed in order to serve future travel needs and/or future economic activity needs?"*

Task C: Screening of the Various Highway Improvement Options. This task identified, described and evaluated the entire set of alternatives based on a consistent set of evaluation criteria. The evaluation was carried to the point where some alternatives were accepted as good candidate solutions and others were eliminated from further consideration. Task C answered the question:

> *"Which strategic highway improvement alternatives make the most sense in this corridor?"*

Task D: Evaluation of the Finalist Options. In this task, evaluations were made of the engineering, economic, and environmental implications of the Finalist Options. Task D answered the question:

> *"How do the alternative solutions compare, one with the other, in terms of costs, economic feasibility, environmental issues, and reasonableness?"*

Task E: Interpretation and Conclusions. In this task the alternatives were reviewed, and interpretations were made to facilitate a prudent decision. The task answered the question:

> *"Which solutions and highway treatments are most feasible, according to the evaluation criteria?"*

STUDY PARTICIPANTS

The U.S. 63 Corridor Study was conducted as a joint effort by the Iowa and Minnesota Departments of Transportation with support and participation by the Federal Highway Administration. The Iowa Department of Transportation served as the lead agency and as the contract administrator for consultant services.

Advisory Committee

An Advisory Committee reviewed the study work plan and all interim and final study products. This Committee provided information and guidance based on the member's intimate knowledge and understanding of conditions and needs within the corridor. The Advisory Committee was composed of the following persons:

- Mr. Herman Meyer
  New Hampton Office of Economic Development

- Mr. Rodney H. Larson
  Iowa Northland Regional Council of Governments

- Mr. Charles Reiter
  Rochester-Olmsted Council of Governments

- Mr. Tom Welch
  Mr. Scott Dockstader
  Mr. Craig O'Riley
  Iowa Department of Transportation

- Mr. Merritt H. Linzie
  Mr. Tony Hames
  Minnesota Department of Transportation

- Mr. Ed Finn
  Federal Highway Administration

U.S. 63 Association

During the course of the study, an open dialogue was maintained with the U.S. 63 Association. This Association comprises public officials, businesses and private citizens concerned about U.S. 63. In addition to correspondence and discussions with individuals participating in the Association, three public meetings were held at which information concerning the study was shared and comments, suggestions and insights were exchanged. These meetings were held at:

- Rochester, Minnesota;
- New Hampton, Iowa; and
- Waterloo, Iowa.

Corridor Business and Agriculture Interests

Because of the economic implications of improvements to U.S. 63, significant efforts were exerted to obtain insights about the way the route serves existing businesses and agriculture enterprises and the benefits that would derive from improvements to the route. Meetings were held in New Hampton and Waterloo with local business and agriculture interests. Also, visits were made to selected business and agriculture interests and others were contacted by mail and telephone. These discussions provided important information useful to the economic analysis conducted as part of this study.

Consultants

A competitive evaluation process resulted in the selection of Wilbur Smith Associates to conduct the U.S. 63 Corridor Study and to work with the other participants in establishing a sound foundation of information and evaluations regarding the need for and feasibility of improvements to the route.

Wilbur Smith Associates was assisted by the firm of Brice, Petrides-Donohue which conducted environmental assessments and developed cost estimates for the improvement alternatives along with various other matters. In turn, Brice, Petrides-Donohue was assisted by Robinson Engineering.

Four specialist consultants also assisted Wilbur Smith Associates in the performance of the U.S. 63 Corridor Study.

- Dr. C. Phillip Baumel, Iowa State University - agriculture transportation
- Dr. David Forkenbrock, University of Iowa - economic principles and analysis
- Dr. Dan Otto, Iowa State University - economic impact analysis
- Dr. George Treyz, Regional Economic Models, Inc. - economic impact models

Chapter 2
CORRIDOR DESCRIPTION

The U.S. 63 Corridor Study focused on the highway segment, between Rochester, Minnesota, and Waterloo, Iowa. This Chapter defines the section of U.S. 63 included in this study and describes some of the features of the current facility.

CORRIDOR DEFINITION

The section of U.S. 63 studied is depicted in Exhibit 2.1. It consists of the mainly two-lane section from south of Denver to north of Stewartville, with a length of 93 miles. For analysis purposes, the study also included the four-lane section between Stewartville and Rochester, making a total length of 100 miles.

For purposes of this study, two definitions were used for the study area. The first definition encompassed all counties through which U.S. 63 passes between Rochester, Minnesota, and Waterloo, Iowa. This includes Olmsted, Fillmore, and Mower Counties in Minnesota and Howard, Chickasaw, Bremer, and Black Hawk Counties in Iowa.

Additionally, as shown in Exhibit 2.2, a wider corridor definition was used for some of the analyses. In such situations, the counties of Buchanan, Fayette, Winneshiek, Mitchell, Floyd, Butler and Grundy were added to the study area.

ROADWAY SEGMENTS

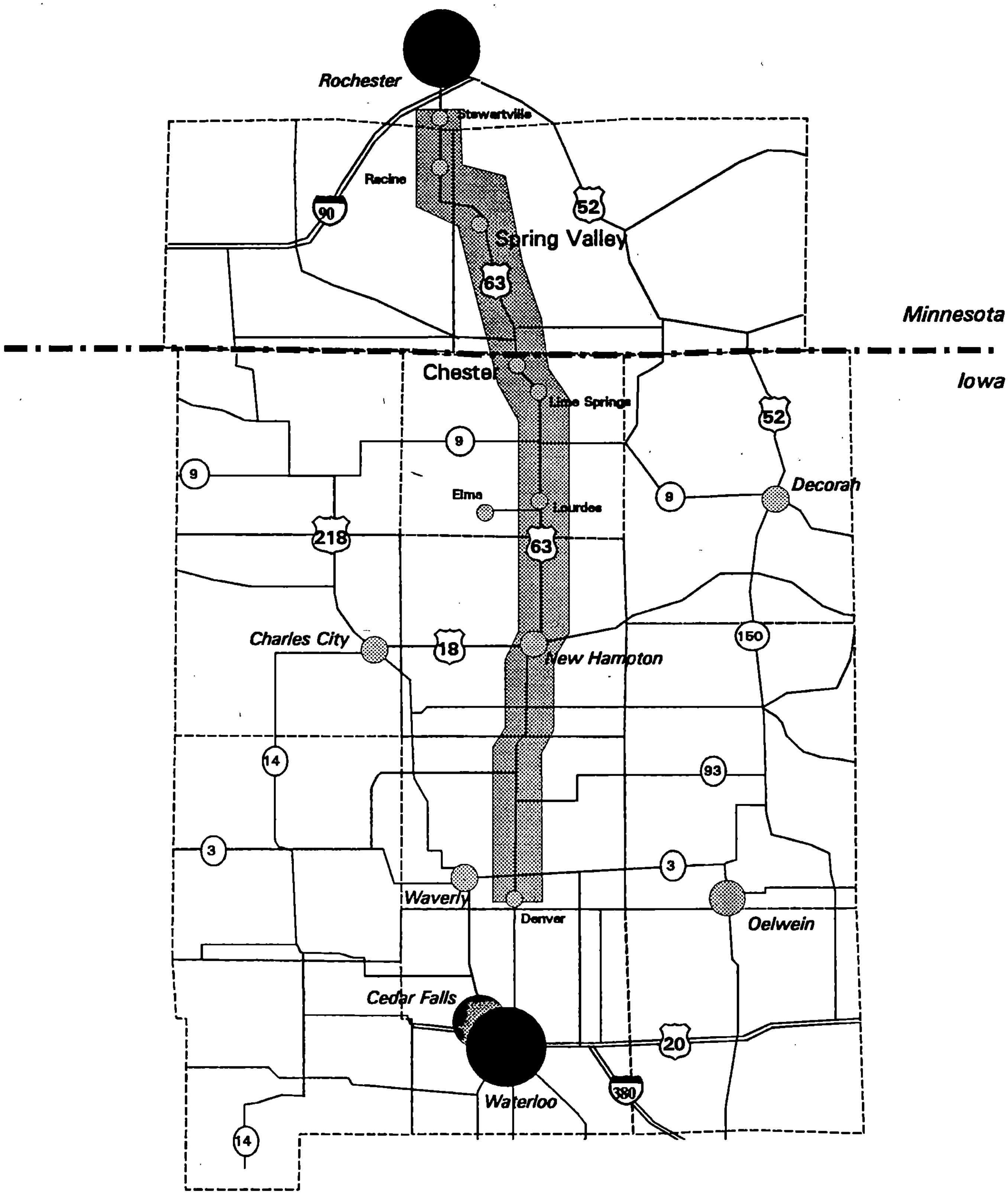
To facilitate the compilation of data, U.S. 63 was divided into 24 route segments. These segments are identified in Exhibit 2.3. It should be noted that Segment 24 encompasses the four-lane section on the northern portion of the corridor. The corresponding four-lane section on the southern portion of the corridor leading into Waterloo was not included in the segment plan.

PHYSICAL FEATURES

For each segment, information describing the physical features of the existing route were obtained from the Iowa Department of Transportation and the Minnesota Department of Transportation. The main features of the route are described below.

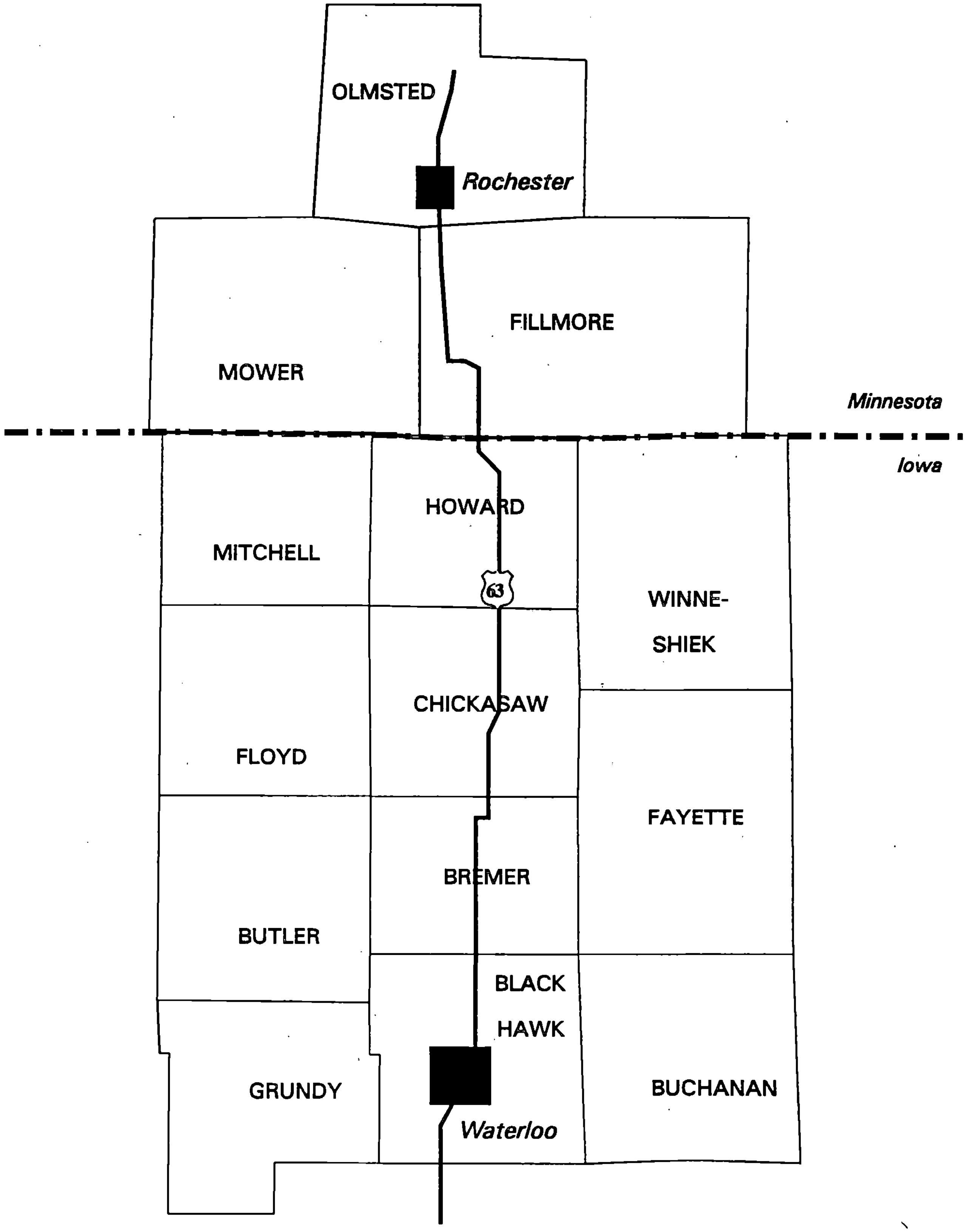
Shoulders

For a good portion of its total length, existing U.S. 63 has fairly wide shoulders which conform to modern design standards. Nevertheless, there are some segments which contain sections of road with shoulders which are less than 10 feet in width. In fact, in some locations, shoulders are quite narrow and provide little opportunity for a vehicle to pull off the travelway in the case of an operational problem or in an emergency situation.



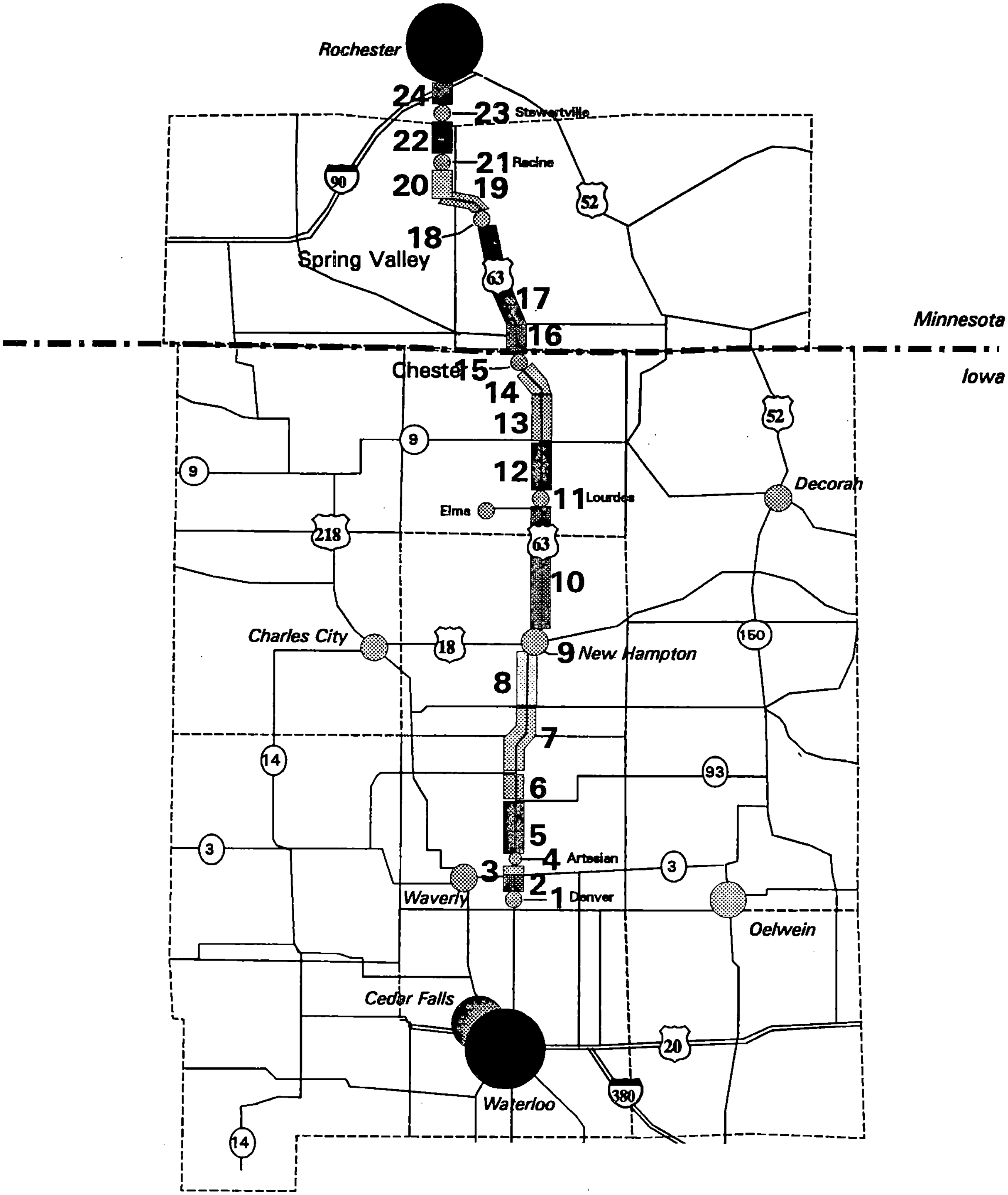
THE U.S. 63 STUDY SECTION

Exhibit 2.1



U.S. 63 STUDY AREA

Exhibit 2.2



U.S. 63 CORRIDOR SEGMENT PLAN

Exhibit 2.3

In Exhibit 2.4, the segments which contain cross sections with less than 10-foot shoulders are indicated. The presentation does not imply that the entire segment length is under 10 feet, but indicates instead that at least a section of the road has narrow shoulders.

Grades

Terrain features along U.S. 63 comprises undulating, rolling topography. Consequently, some sections of the road have grades which can affect vehicle operations. In particular, heavy trucks are affected by long, steep grades.

Shown in Exhibit 2.5 are the steepest grades within the study section of U.S. 63. As noted, some roadway segments have sections with grades of six percent or more.

Curves

Generally, U.S. 63 has a fairly straight horizontal alignment. However, some segments contain curves which can affect vehicle operations. Exhibit 2.6 indicates the segments which have significant curves within their limits.

For reference purposes, the degree of curvature shown in Exhibit 2.6 may be related to approximate vehicle running speeds as follows:

Degree of Curvature	Miles Per Hour
5.5	47
4.5	50
3.0	60

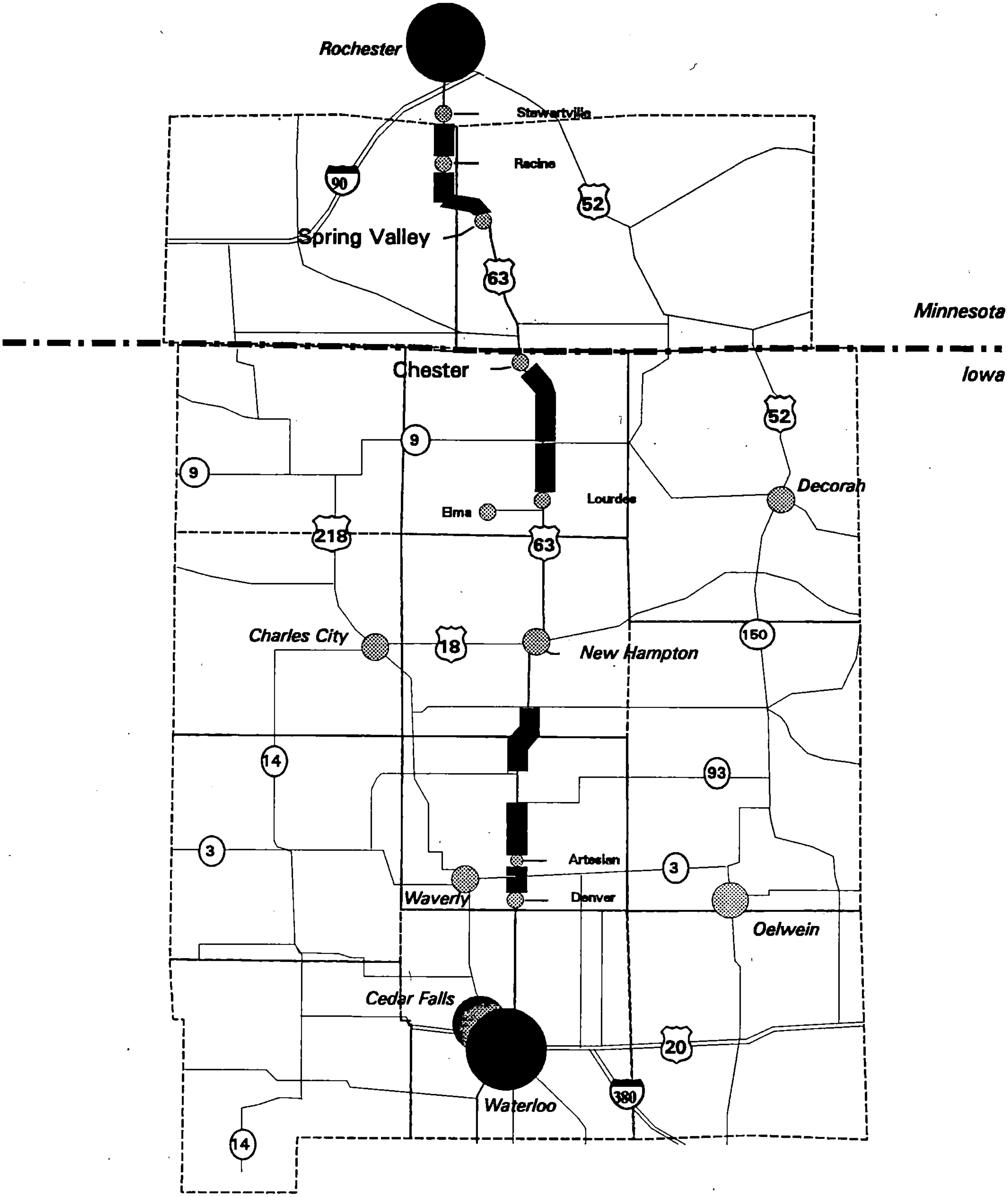
Speed Limits

The physical features of U.S. 63 are such that, for most of its length, speed limits are posted as 55 miles per hour. Nevertheless, there are some sections where lower speed limits are posted. As shown in Exhibit 2.7, these speed limit reductions occur in the towns along U.S. 63 and also in the route segment which includes a sweeping "S" curve and a bridge across the Wapsipinicon River at the Chickasaw/Bremer county line.

Passing Sight Distance Restrictions

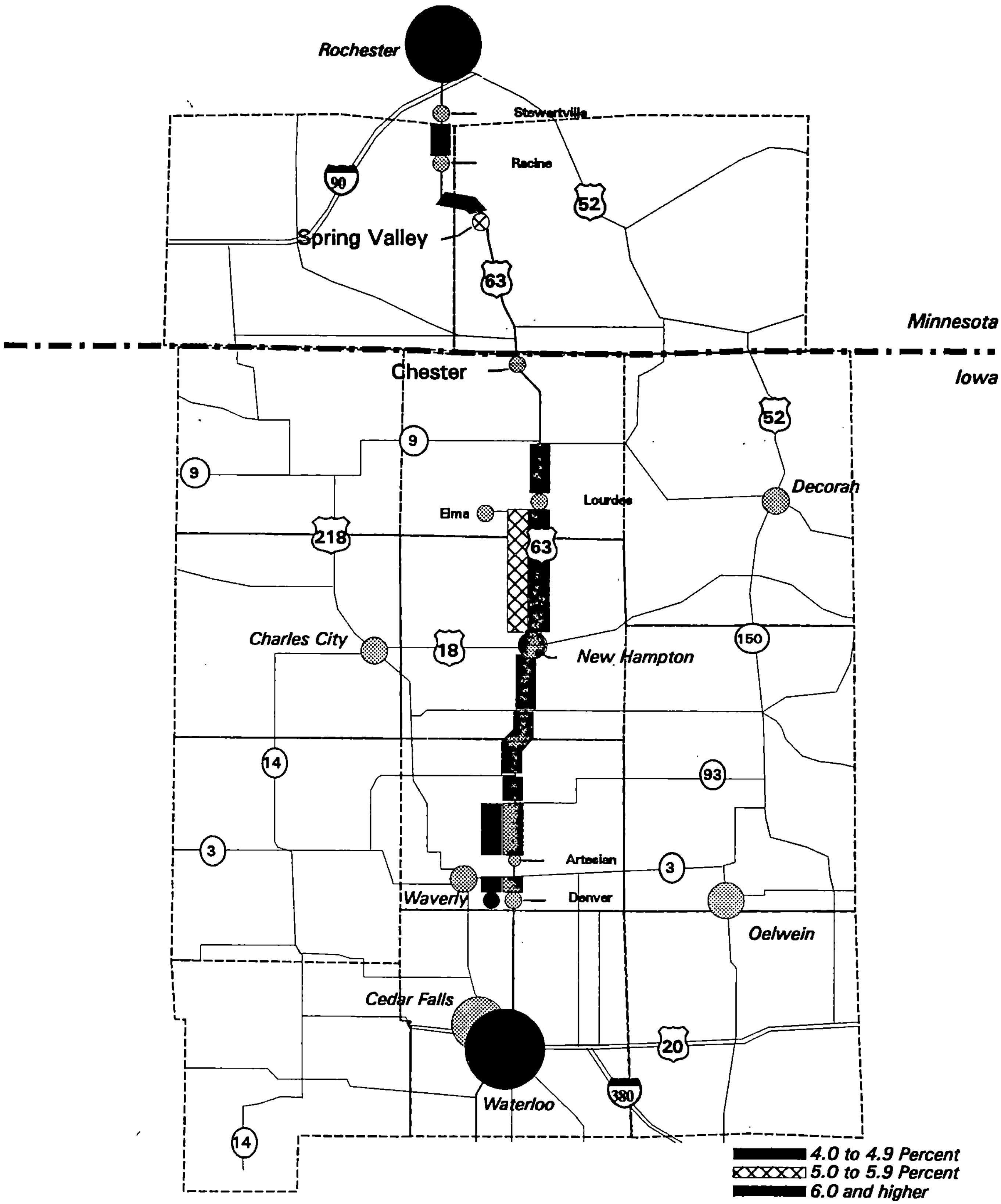
Horizontal (curves) and vertical (grade) alignments are principal features which restrict, from a geometric standpoint, passing opportunities. At various locations along U.S. 63, "no passing" zones are marked. These "no passing" zones occur on the rural sections of U.S. 63 and are not applicable within the towns along the route.

As presented in Exhibit 2.8, passing sight distance restrictions sometimes result in "no passing" zones which cover 50 percent or more of a route segment. Additionally, "no passing" zones occur along each rural segment, although, in some cases, this is for a relatively small portion of the route segment length.



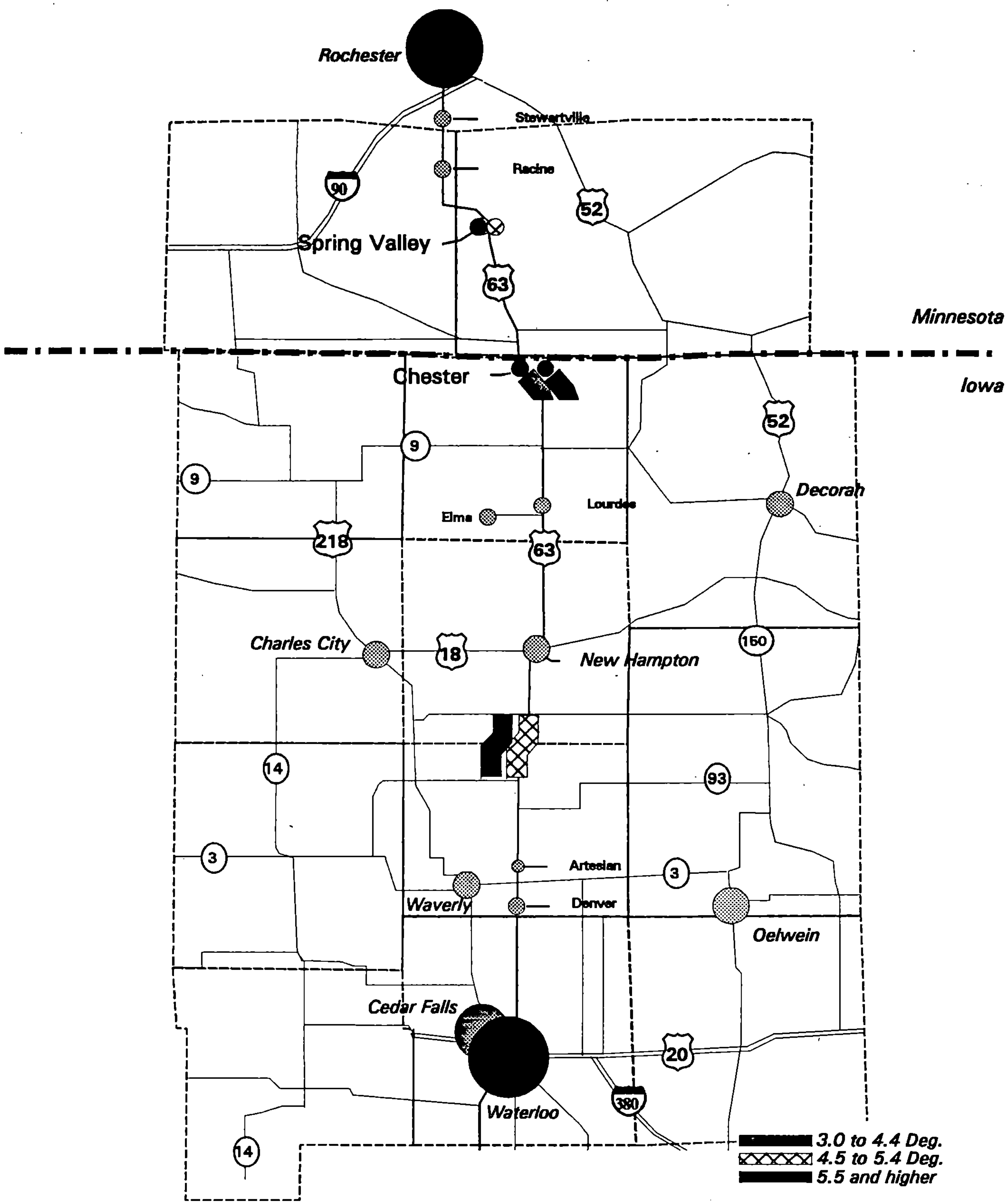
NARROW SHOULDERS

Exhibit 2.4



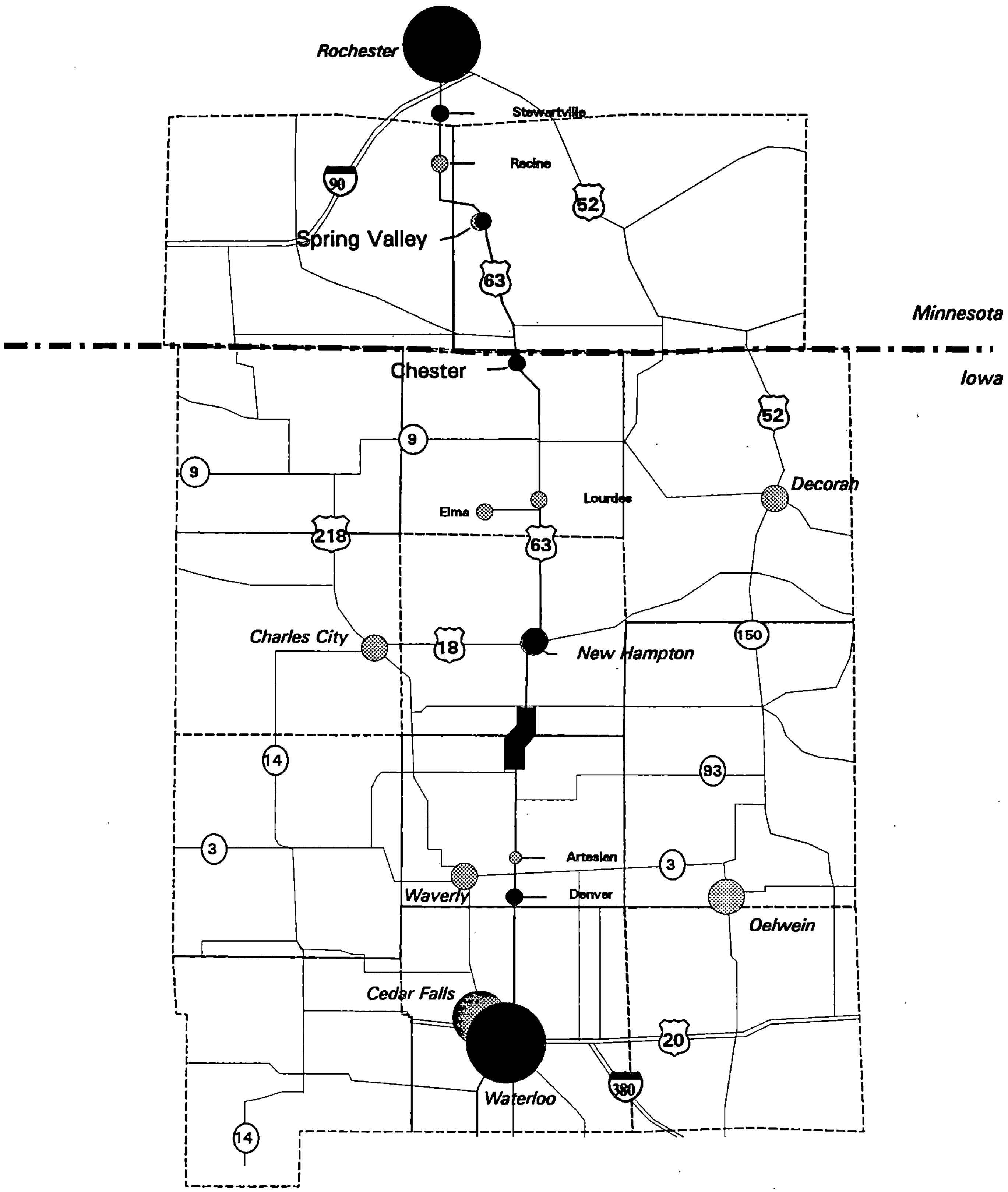
GRADES

Exhibit 2.5



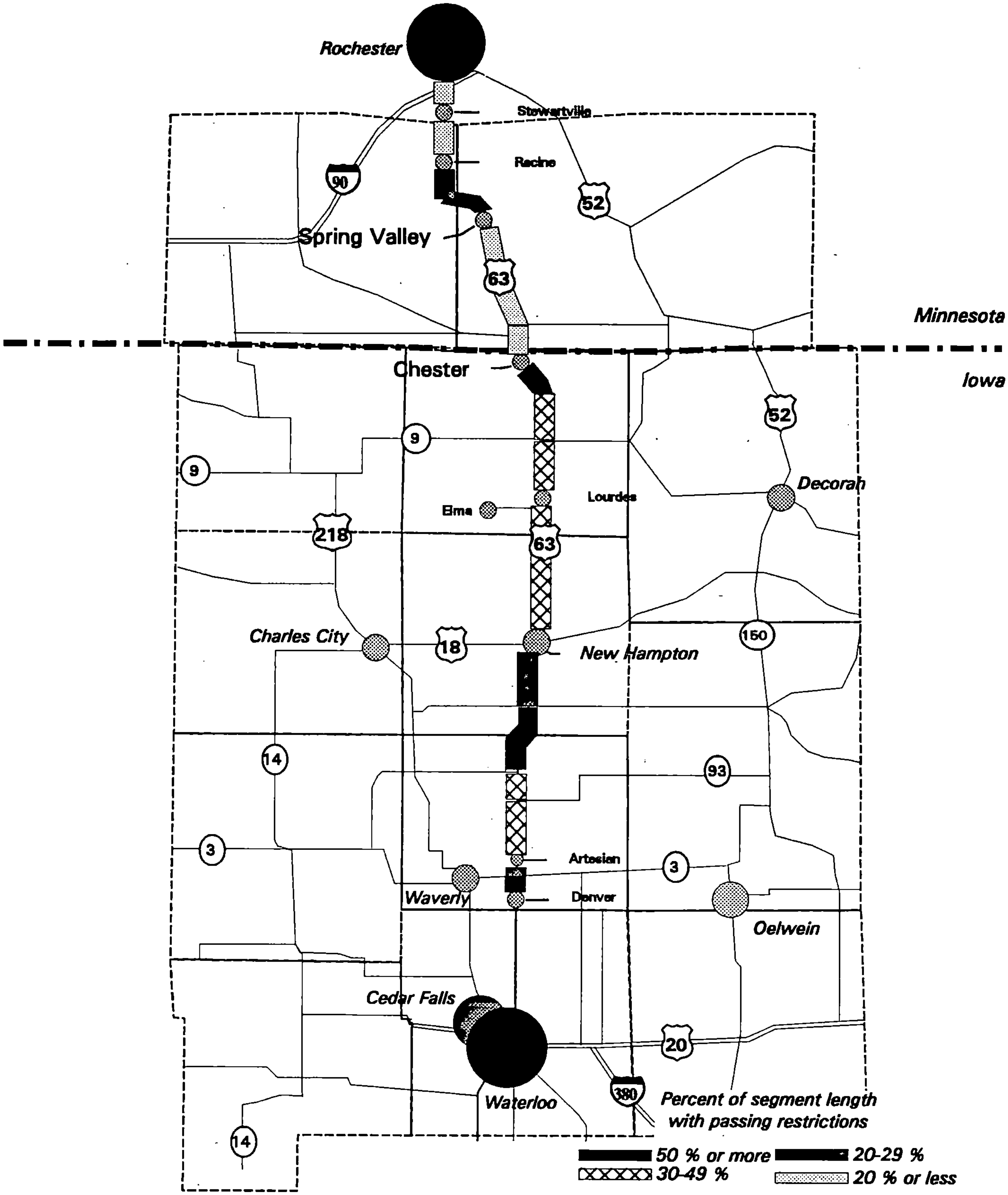
CURVES

Exhibit 2.6



OCCURRENCE OF BELOW 55 Mph SPEED

Exhibit 2.7

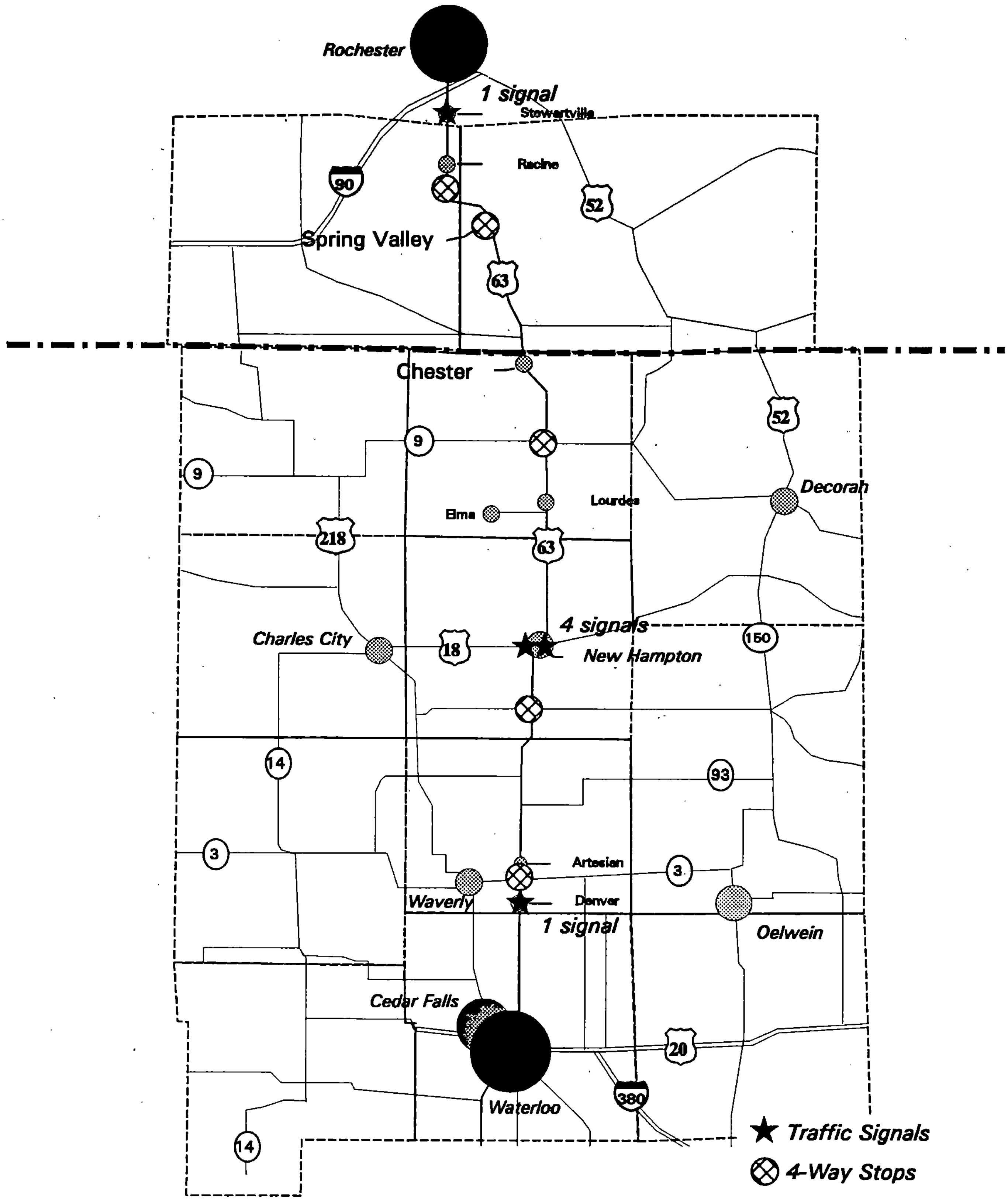


PASSING RESTRICTIONS

Exhibit 2.8

Traffic Control Devices

Another physical feature that affects operations along U.S. 63 are the traffic controls that apply. These include traffic signals and stop signs. As noted in Exhibit 2.9, there are six traffic signals along the route -- one in Denver, four in New Hampton, and one in Stewartville. Additionally, four-way stops are located at the intersections with State Route 3 (north of Denver), State Route 18 (south of New Hampton) and State Route 9 (south of Chester). Two-way stop signs are located on U.S. 63 at the junction with State Route 16 in Spring Valley and a second junction with State Route 16 between Spring Valley and Racine.



TRAFFIC CONTROLS

Exhibit 2.9

Chapter 3
TRAFFIC CHARACTERISTICS

Considerable insights and understanding were gained regarding the traffic characteristics along U.S. 63. This was achieved through collection and analysis of available traffic count data and the performance of special traffic surveys. The results of these analyses are reported in this section.

TRAFFIC VOLUMES

Depicted in Exhibit 3.1 are the 1990 annual average daily traffic volumes along the U.S. 63 corridor. The display is based upon traffic counts at the locations indicated and does not reflect the traffic volume at each individual location along the route. For instance, the display does not indicate traffic volumes within New Hampton or the other towns along U.S. 63. Instead, it presents traffic volumes on rural segments.

As noted, there is a distinctive pattern of increasing volumes at the northern and southern extremities of U.S. 63 as the route approaches Rochester and Waterloo. Traffic volumes drop to a low of just over 2400 vehicles per day near the Howard/Chickasaw county line.

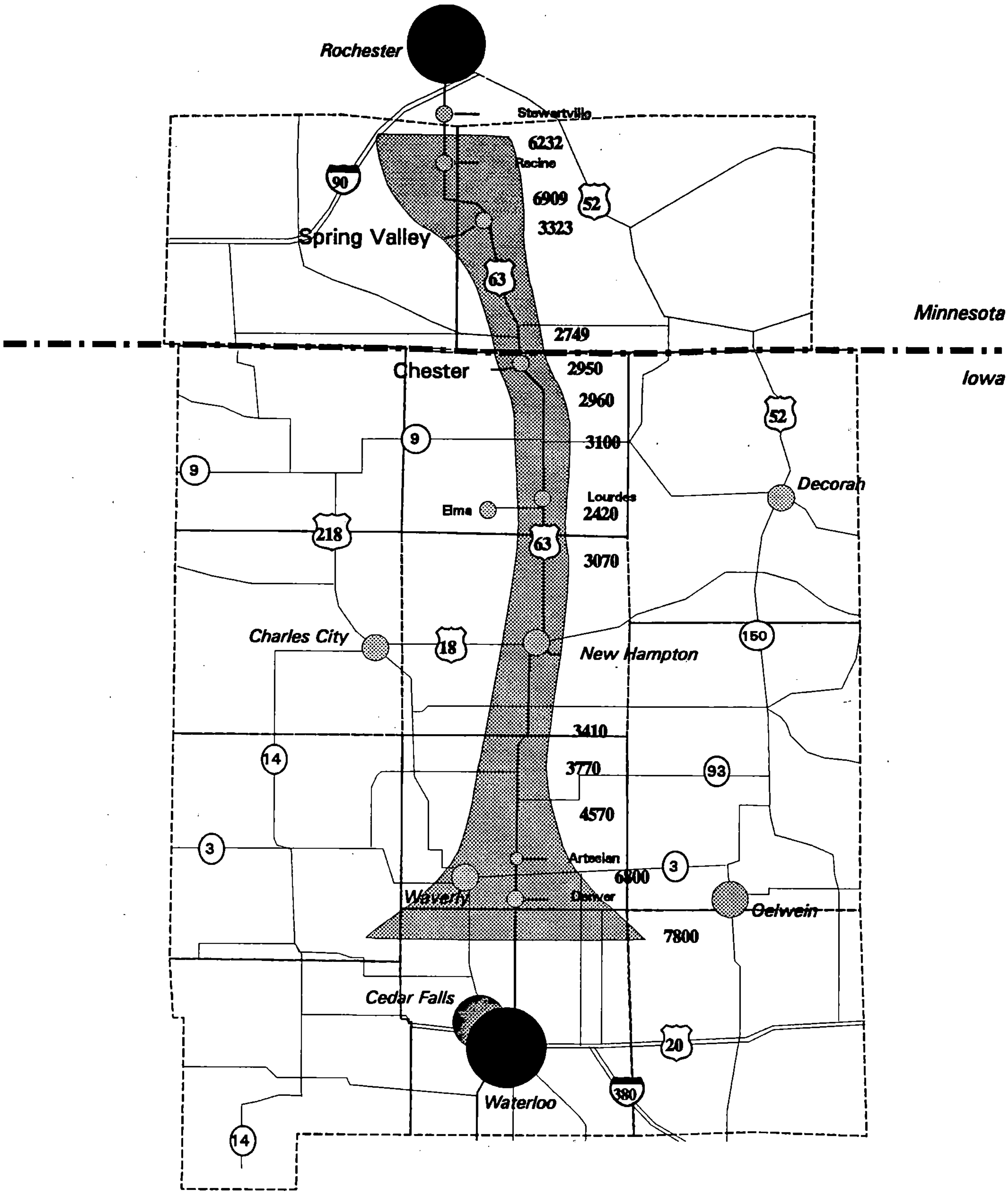
A significant proportion of traffic along U.S. 63 is comprised of trucks. Truck volumes are presented in Exhibit 3.2. For purposes of this display, the truck category includes both light and heavy trucks, i.e., two-axle, six-tire trucks and larger trucks.

Unlike the pattern for total traffic, truck traffic is relatively constant throughout the corridor. The highest volumes occur near the Chickasaw/Bremer county line rather than on the segments approaching Waterloo and Rochester as is the case with total traffic.

TRAFFIC VOLUME TRENDS

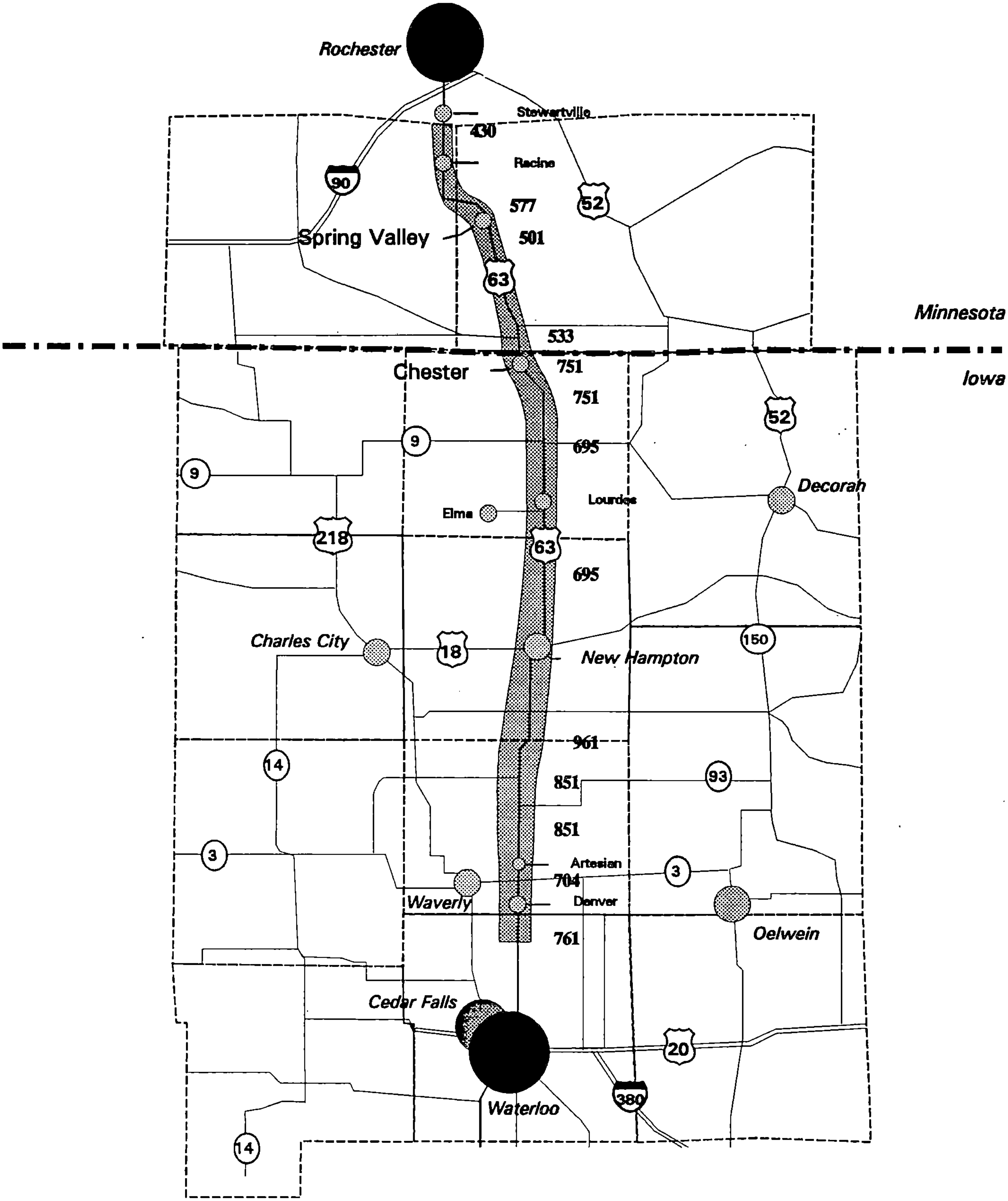
The pattern for total traffic shown in Exhibit 3.1 is replicated in Exhibit 3.3 which presents total traffic for the years 1986, 1988, and 1990. Again, the data do not indicate traffic within the major towns such as New Hampton. The pattern indicates increasing volumes at each end of the corridor with the lowest volumes occurring between the Chickasaw/Howard county line and just south of Spring Valley. The other pattern indicated by Exhibit 3.3 is the fact that traffic volumes have increased each year.

To obtain a clearer picture of traffic characteristics, the information in Exhibit 3.3 was separated into two components. The first of these includes cars, vans, and pickups. Traffic



1990 AVERAGE DAILY TRAFFIC ALONG U.S. 63 CORRIDOR

Exhibit 3.1



1990 TRUCK VOLUMES ALONG U.S. 63 CORRIDOR

Exhibit 3.2

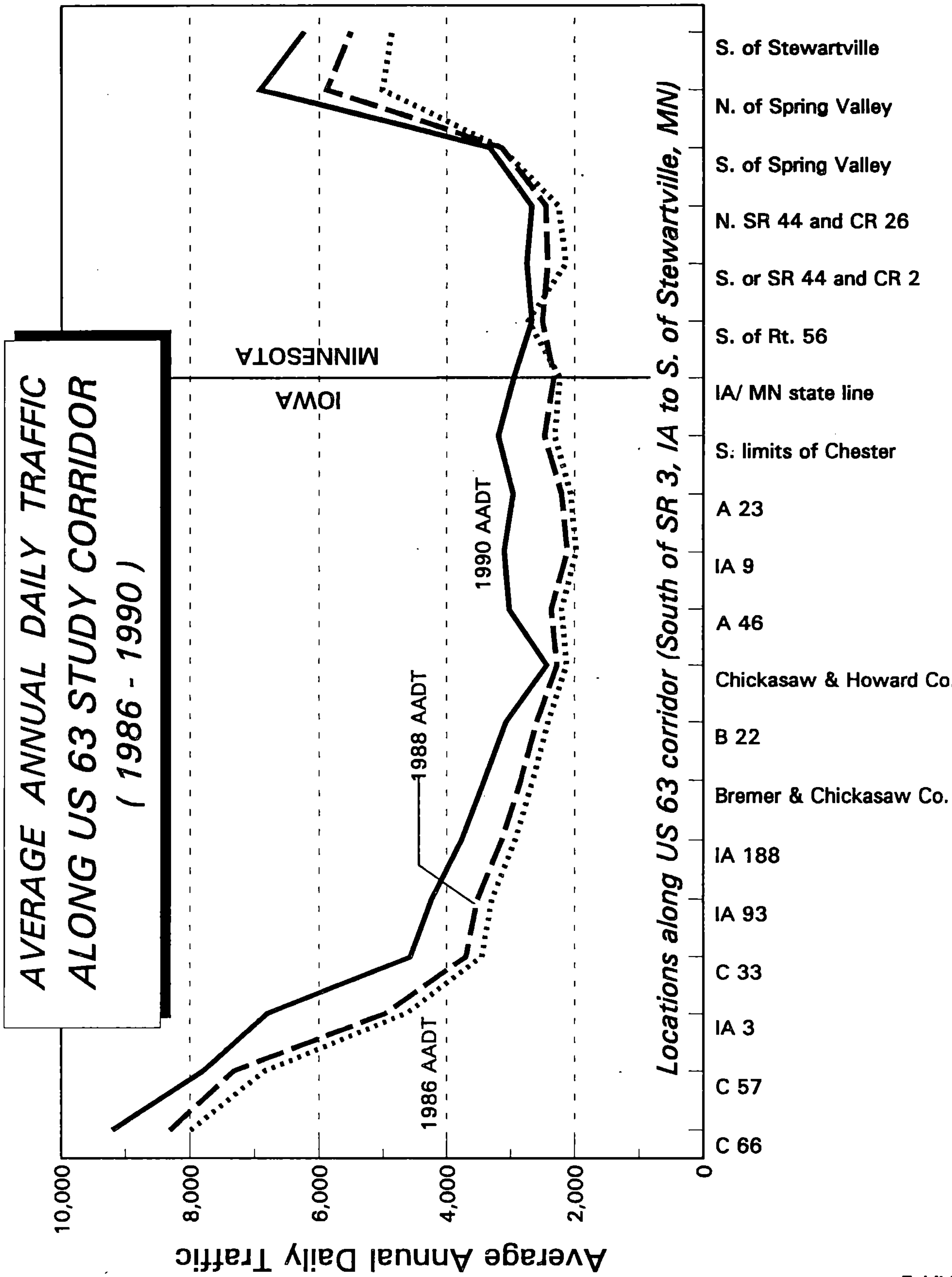

AVERAGE ANNUAL DAILY TRAFFIC
ALONG US 63 STUDY CORRIDOR
(1986 - 1990)
Locations along US 63 corridor (South of SR 3, IA to S. of Stewartville, MN)
S. of Stewartville
N. of Spring Valley
S. of Spring Valley
N. SR 44 and CR 26
S. or SR 44 and CR 2
S. of Rt. 56
IA/ MN state line
S. limits of Chester
A 23
IA 9
A 46
Chickasaw & Howard Co.
B 22
Bremer & Chickasaw Co.
IA 188
IA 93
C 33
IA 3
C 57
C 66
MINNESOTA
IOWA
1990 AADT
1988 AADT
1986 AADT
10,000
8,000
6,000
4,000
2,000
0
Average Annual Daily Traffic

Exhibit 3.3

volumes for these vehicles are shown in Exhibit 3.4. It can be observed that the pattern for light vehicles is very similar to that for total traffic, reflecting the fact that light vehicles are a large proportion of total traffic. Again, it may be noted that traffic volumes have increased in the four years represented by these data.

Patterns for light and heavy trucks, as a group, are quite different, a point indicated in Exhibit 3.5. The main observations from Exhibit 3.5 are that there is greater uniformity in truck volumes through the corridor than is the case for light vehicles; and there is a higher growth rate in truck traffic volumes than is the case for cars/vans/pickups.

ORIGIN/DESTINATION SURVEYS

To gain further insights regarding traffic characteristics within the U.S. 63 corridor, special purpose origin/destination surveys were conducted at eight stations. These eight locations are indicated in Exhibit 3.6 and are described below:

SURVEY LOCATIONS

Station #	Station Location
1	US 52N (South of IA/MN State line)
2	SR 150 (approx. 1 mile north of jct with 187)
3	U.S. 63S (between SR 93 and SR 3)
4	US 218S (between Waverly and SR 188)
5	SR 14 (between SR 3 and CR 23)
6	US 218N (2 miles south of IA/MN State line)
7	U.S. 63N (2.5 miles north of SR 9)
8	CRV49 (north of Denver)

Traffic was surveyed in one direction at each of these locations. That is, southbound traffic was surveyed at stations 1, 6, and 7, while northbound traffic was surveyed at stations 2, 3, 4, 5, and 8. Surveys were conducted in the period from 7 a.m. to 7 p.m. Surveys were conducted during the period June 18 through June 25.

As a part of the survey, vehicles were stopped and information was obtained regarding:

- Trip origin;
- Trip destination;
- Trip purpose; and,
- Type of vehicle.

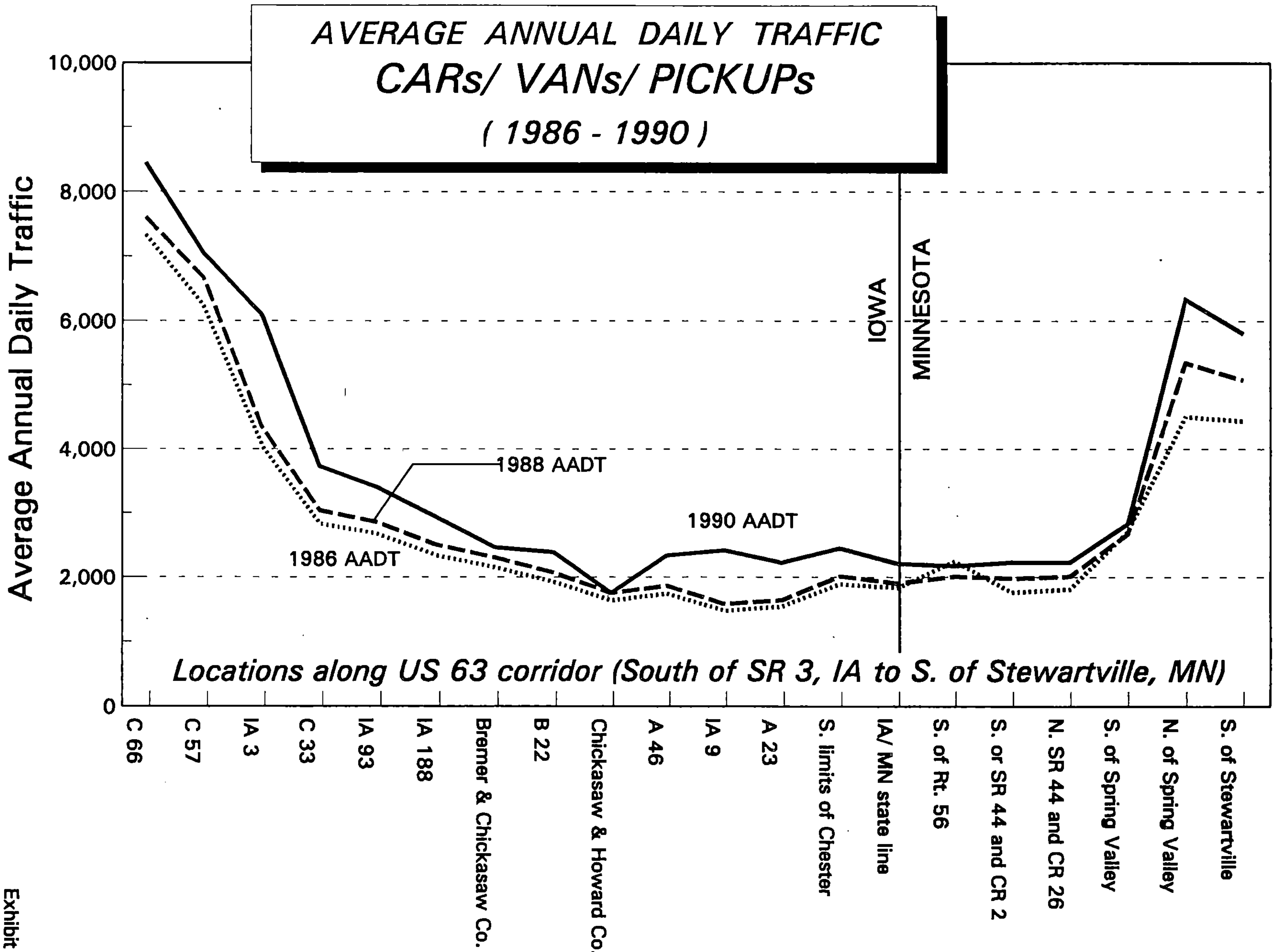

AVERAGE ANNUAL DAILY TRAFFIC
CARs/ VANs/ PICKUPs
(1986 - 1990)
Average Annual Daily Traffic
10,000
8,000
6,000
4,000
2,000
0
1988 AADT
1990 AADT
1986 AADT
IOWA
MINNESOTA
Locations along US 63 corridor (South of SR 3, IA to S. of Stewartville, MN)
C 66
C 57
IA 3
C 33
IA 93
IA 188
Bremer & Chickasaw Co.
B 22
Chickasaw & Howard Co.
A 46
IA 9
A 23
S. limits of Chester
IA/ MN state line
S. of Rt. 56
S. or SR 44 and CR 2
N. SR 44 and CR 26
S. of Spring Valley
N. of Spring Valley
S. of Stewartville

Exhibit 3.4

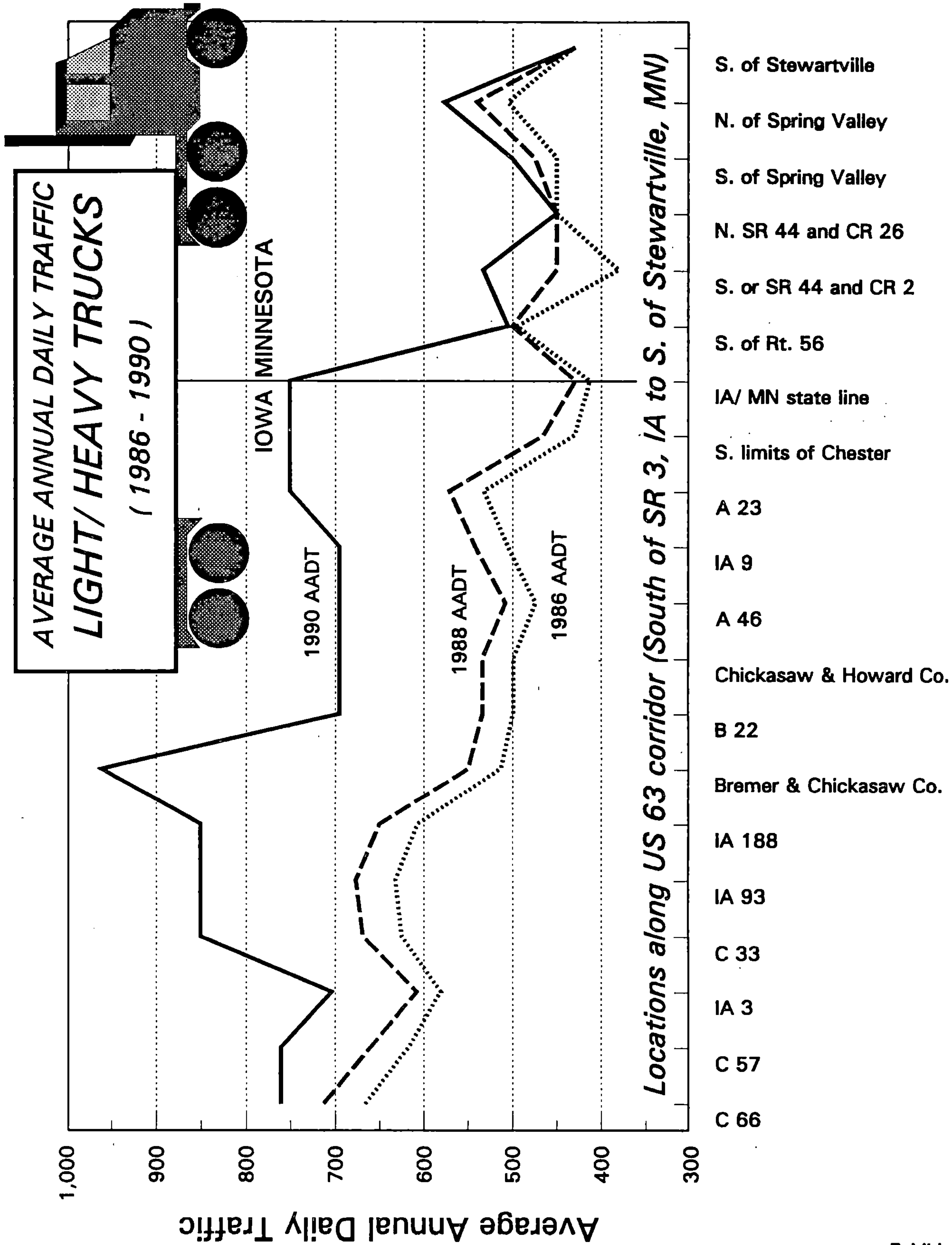
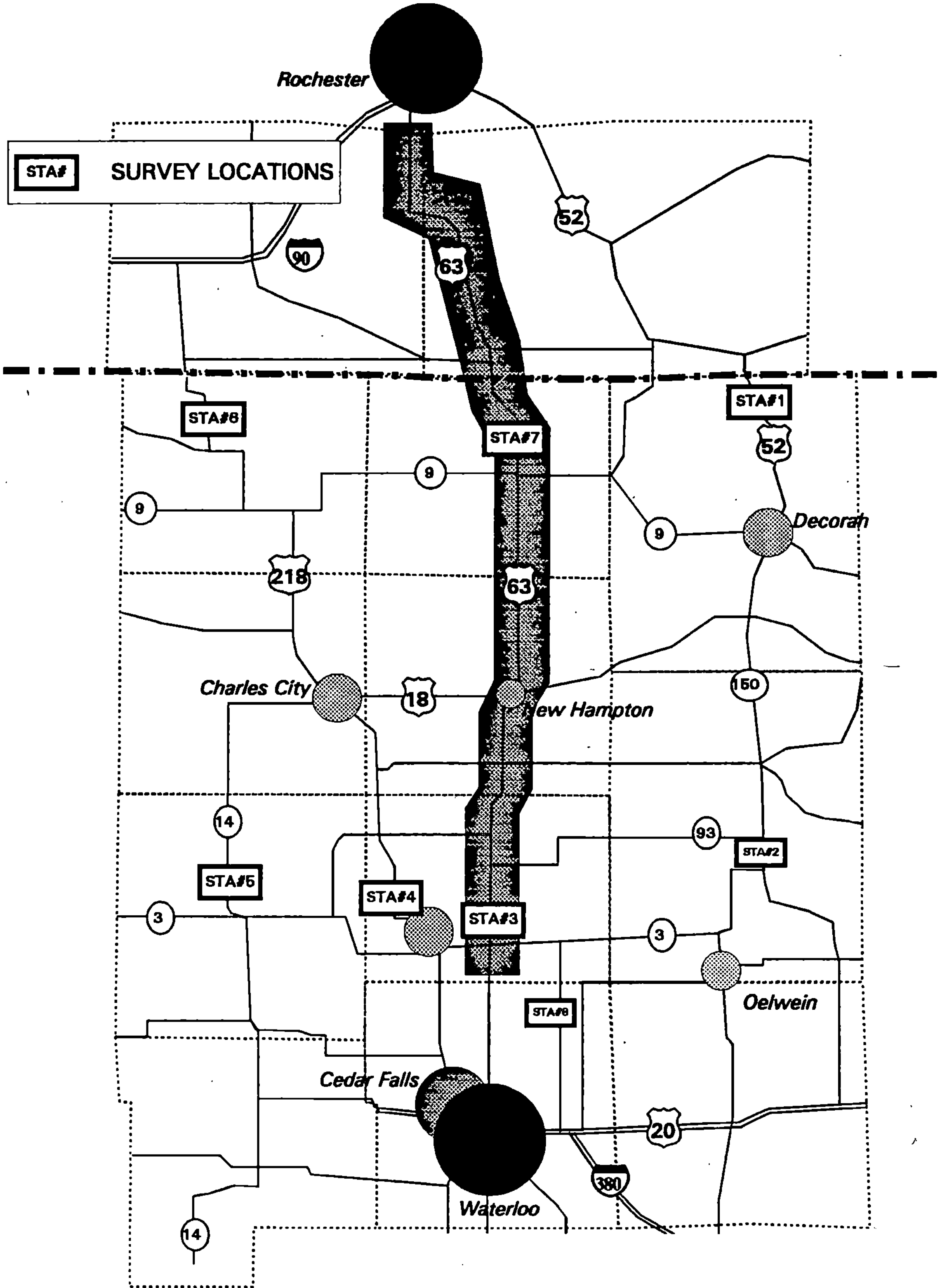

AVERAGE ANNUAL DAILY TRAFFIC
LIGHT/ HEAVY TRUCKS
(1986 - 1990)
IOWA
MINNESOTA
1990 AADT
1988 AADT
1986 AADT
Locations along US 63 corridor (South of SR 3, IA to S. of Stewartville, MN)
S. of Stewartville
N. of Spring Valley
S. of Spring Valley
N. SR 44 and CR 26
S. or SR 44 and CR 2
S. of Rt. 56
IA/ MN state line
S. limits of Chester
A 23
IA 9
A 46
Chickasaw & Howard Co.
B 22
Bremer & Chickasaw Co.
IA 188
IA 93
C 33
IA 3
C 57
C 66
1,000
900
800
700
600
500
400
300
Average Annual Daily Traffic

Exhibit 3.5



U.S. 63 STUDY CORRIDOR ROADSIDE SURVEY STATION LOCATIONS

Exhibit 3.6

Origin/Destination Pattern

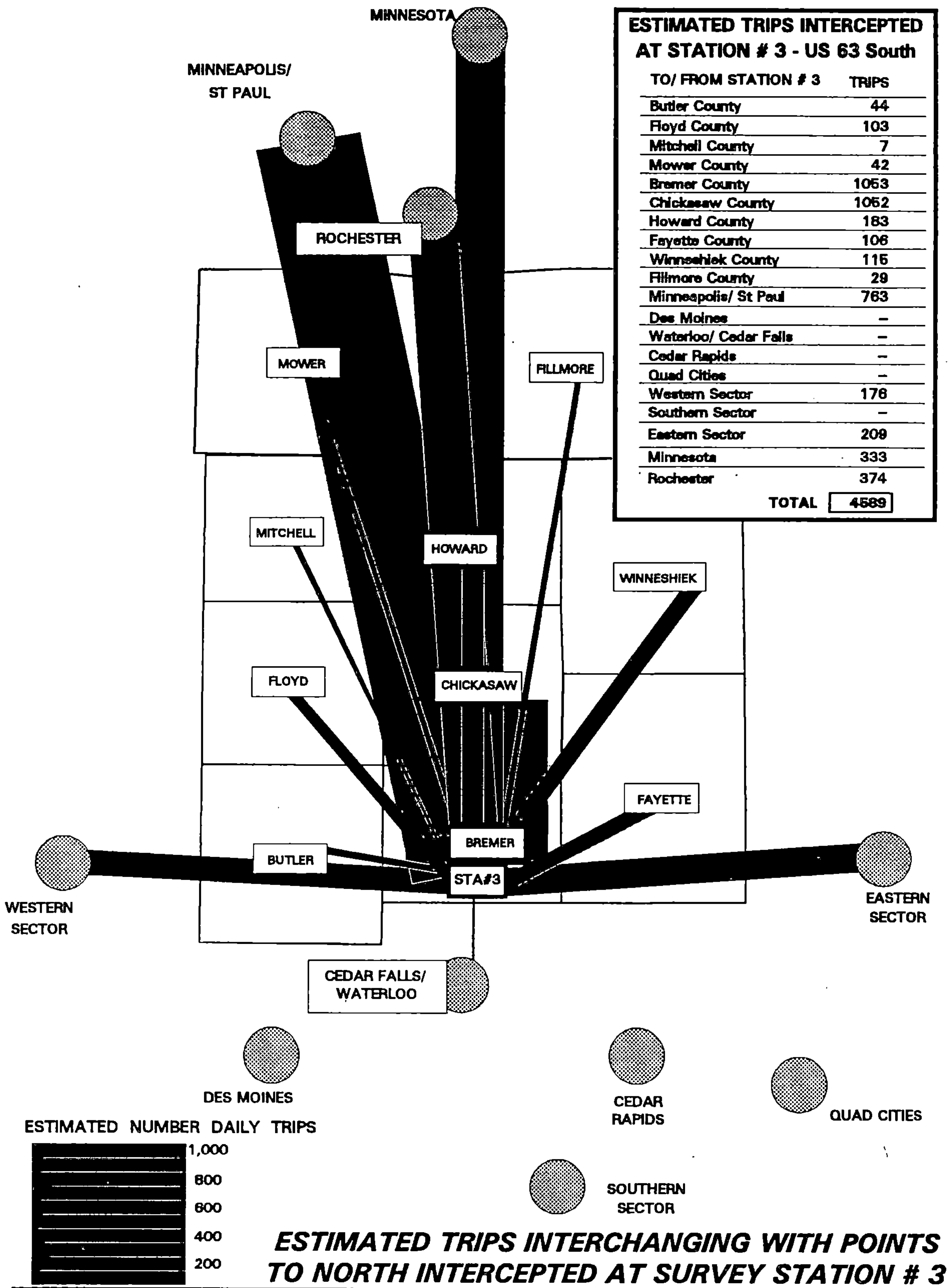
The special purpose surveys provided considerable insights into trip patterns within the U.S. 63 corridor. Some of these characteristics are discussed in this section.

Presented in Exhibit 3.7 is the pattern of trip ends for traffic proceeding northbound through Station 3 (U.S. 63 south of Denver). As noted, a significant portion of the total trips at this location were destined to counties just to the north of the station location. However, it will be noted that there were also significant trips destined for locations even further north, including many trips ending outside the study area. Some eight percent of the total trips surveyed at Station 3 were destined for Rochester, another 17 percent were destined for the Minneapolis/St. Paul area, while another seven percent were destined for other locations in the State of Minnesota. Consequently, the pattern is one of a significant proportion of long trips.

Depicted in Exhibit 3.8 is the distribution of trip destinations passing through Station 7 (U.S. 63 south of the Iowa/Minnesota state line). Again, there is a pattern of trips to adjacent counties. Almost 12 percent of the trips were destined for Waterloo/Cedar Falls. Additionally, there is a significant pattern of trips proceeding further south and east and terminating outside the study area. The high proportion of long trips again is apparent in this presentation.

The high proportion of long trips is depicted in Exhibit 3.9. In this display, through trips are defined as trips which have neither origins or destinations within the "interior" portion of the study area. This interior portion of the study area is defined as Mower and Fillmore Counties in Minnesota and Mitchell, Howard, Winneshiek, Floyd, Chickasaw, Fayette, butler and Bremer Counties in Iowa. Therefore, a trip from Rochester to Waterloo is defined as a through trip but a trip from Spring Valley to Waterloo is not. The "other trips" category includes all trips which begin and end within the 10 interior counties or which have at least one end of the trip within these counties. Some of these trips also would be considered to be long trips but, for purposes of this presentation, they are not classified as through trips.

All of the stations have a high proportion of trips which are classified as through trips. The highest number of through trips occurred for northbound traffic at Station 3 at the south end of U.S. 63. At this station, 1,759 trips had neither origins or destinations within the study area. This represented just under 40 percent of all northbound trips at this location.

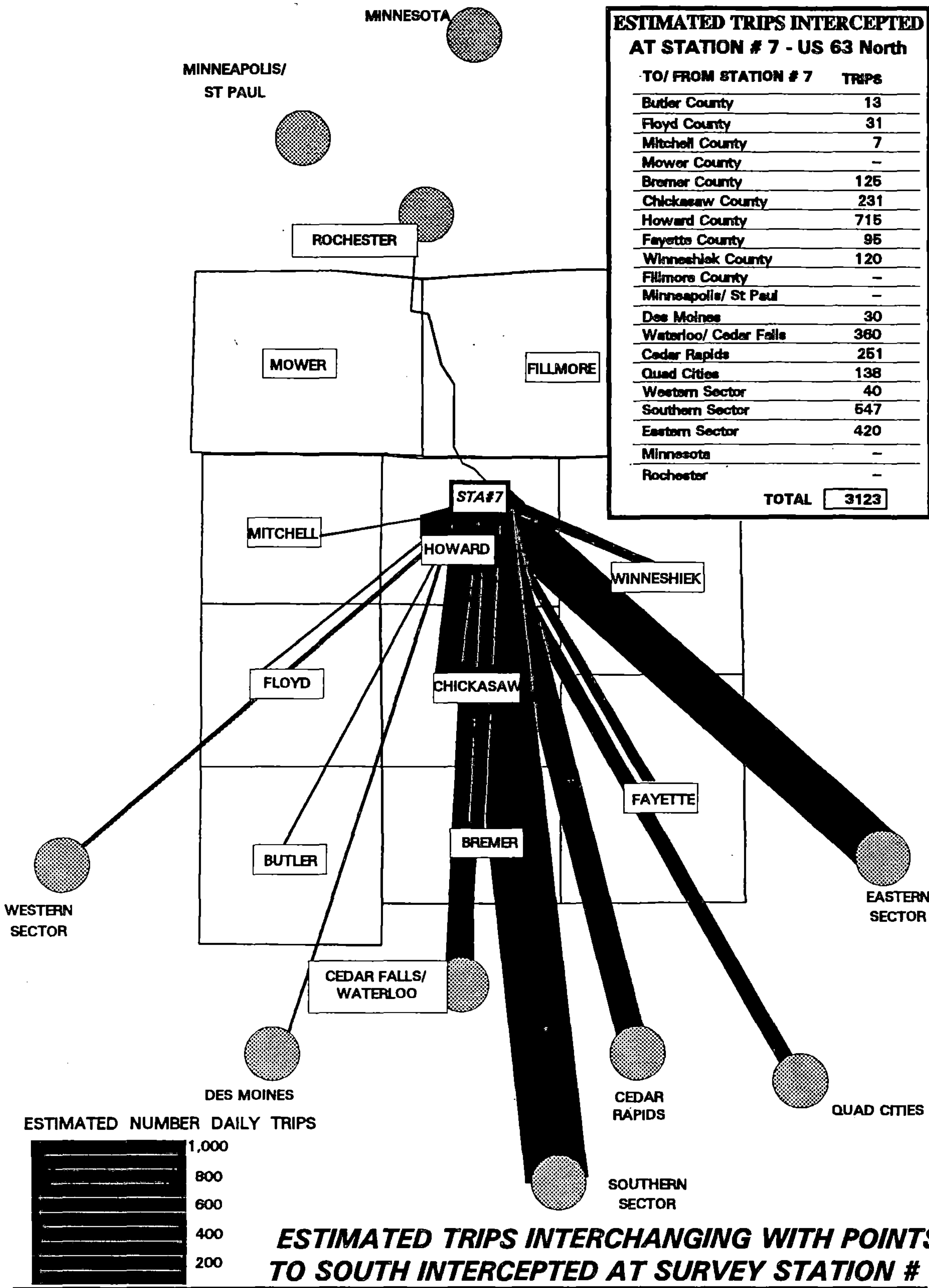


ESTIMATED TRIPS INTERCEPTED AT STATION # 3 - US 63 South

TO/ FROM STATION # 3	TRIPS
Butler County	44
Floyd County	103
Mitchell County	7
Mower County	42
Bremer County	1053
Chickasaw County	1052
Howard County	183
Fayette County	106
Winneshiek County	115
Fillmore County	29
Minneapolis/ St Paul	763
Des Moines	–
Waterloo/ Cedar Falls	–
Cedar Rapids	–
Quad Cities	–
Western Sector	176
Southern Sector	–
Eastern Sector	209
Minnesota	333
Rochester	374
TOTAL	4589

ESTIMATED TRIPS INTERCHANGING WITH POINTS TO NORTH INTERCEPTED AT SURVEY STATION # 3

Exhibit 3.7



ESTIMATED TRIPS INTERCEPTED AT STATION # 7 - US 63 North

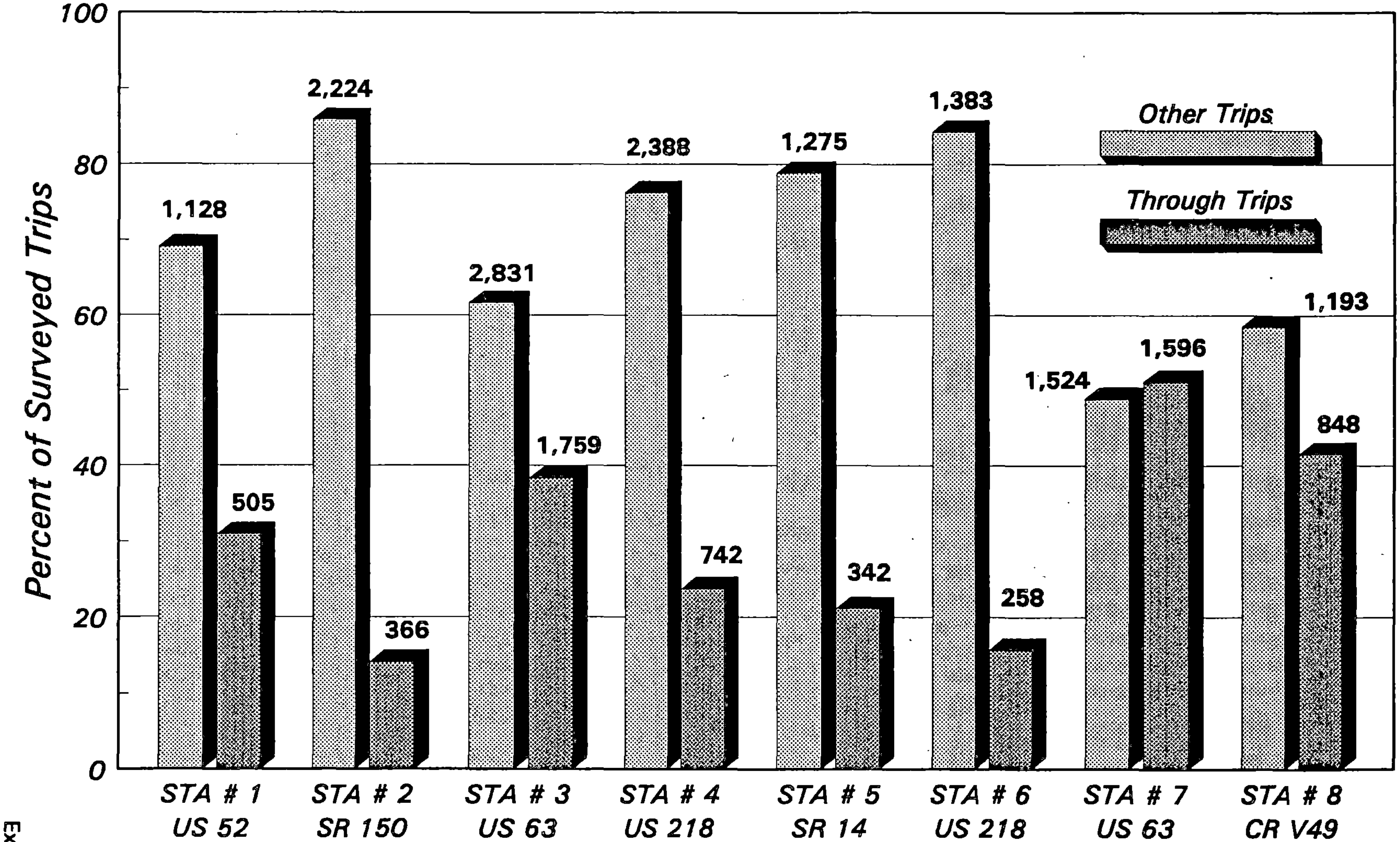
TO/ FROM STATION # 7	TRIPS
Butler County	13
Floyd County	31
Mitchell County	7
Mower County	–
Bremer County	125
Chickasaw County	231
Howard County	715
Fayette County	95
Winneshiek County	120
Fillmore County	–
Minneapolis/ St Paul	–
Des Moines	30
Waterloo/ Cedar Falls	360
Cedar Rapids	251
Quad Cities	138
Western Sector	40
Southern Sector	547
Eastern Sector	420
Minnesota	–
Rochester	–
TOTAL	3123

ESTIMATED TRIPS INTERCHANGING WITH POINTS TO SOUTH INTERCEPTED AT SURVEY STATION # 7

Exhibit 3.8

Exhibit 3.9

DISTRIBUTION OF TRIPS INTERCEPTED AT THE SURVEY LOCATIONS



The highest percentage of through trips occurred at Station 7 which also is located on U.S. 63, just south of the Iowa/ Minnesota state line. Over one-half of the southbound trips at this location were through trips.

Station 8 located on County Road V-49 northeast of Waterloo also had a high proportion of through trips.

Trip Purpose

As a part of the special purpose origin/destination surveys, information was collected regarding trip purpose. The distribution of trips by trip purpose is presented in Exhibit 3.10. Here it can be seen that over 37 percent of all trips were business trips. This includes trips by light vehicles for business purposes as well as truck trips. It may also be noted that almost 18 percent of all trips were for work purposes. That is, the purpose for which the trip was being made was to go to or come from work. Work trips and business trips are highly related to economic activities.

Personal trips accounted for slightly over 31 percent of all trips. Some of these trips are also very important since they include trips to doctors, civic functions, etc.

TRAFFIC FORECASTS

Traffic models were developed to estimate future traffic volumes on U.S. 63 for the Base Case and for the three finalist improvement alternatives (which are described in Chapter 4, page 4-10). These models contained separate procedures for auto and truck traffic and for three separate types of trips (through trips, internal-to-internal zone trips and external-to-internal zone trips). The TRANPLAN transportation modeling software was used to simulate traffic on the road network.

Shown in Exhibit 3.11 are the estimated traffic volumes by highway segment for two years, 1990 and 2010. The values for 1990 are hypothetical because they reflect the volumes that would have used the Base Case facility and the three finalist improvement alternatives if they had been in place in that year. These values were used in assessing the trends in traffic volumes over the 1990 to 2010 time period as part of the study's economic analysis, reported subsequently.

It should be noted that the volumes shown are those which would use the road sections designated as U.S. 63. In particular, for those sections with bypasses, the values shown are for the bypass rather than the segment through the particular town. Traffic destined to the particular town would, in many cases, continue to use the existing road whereas through traffic often would use the bypass.

Exhibit 3.10

DISTRIBUTION OF TRIP PURPOSES

(Percent of total trips intercepted at eight survey loactions)

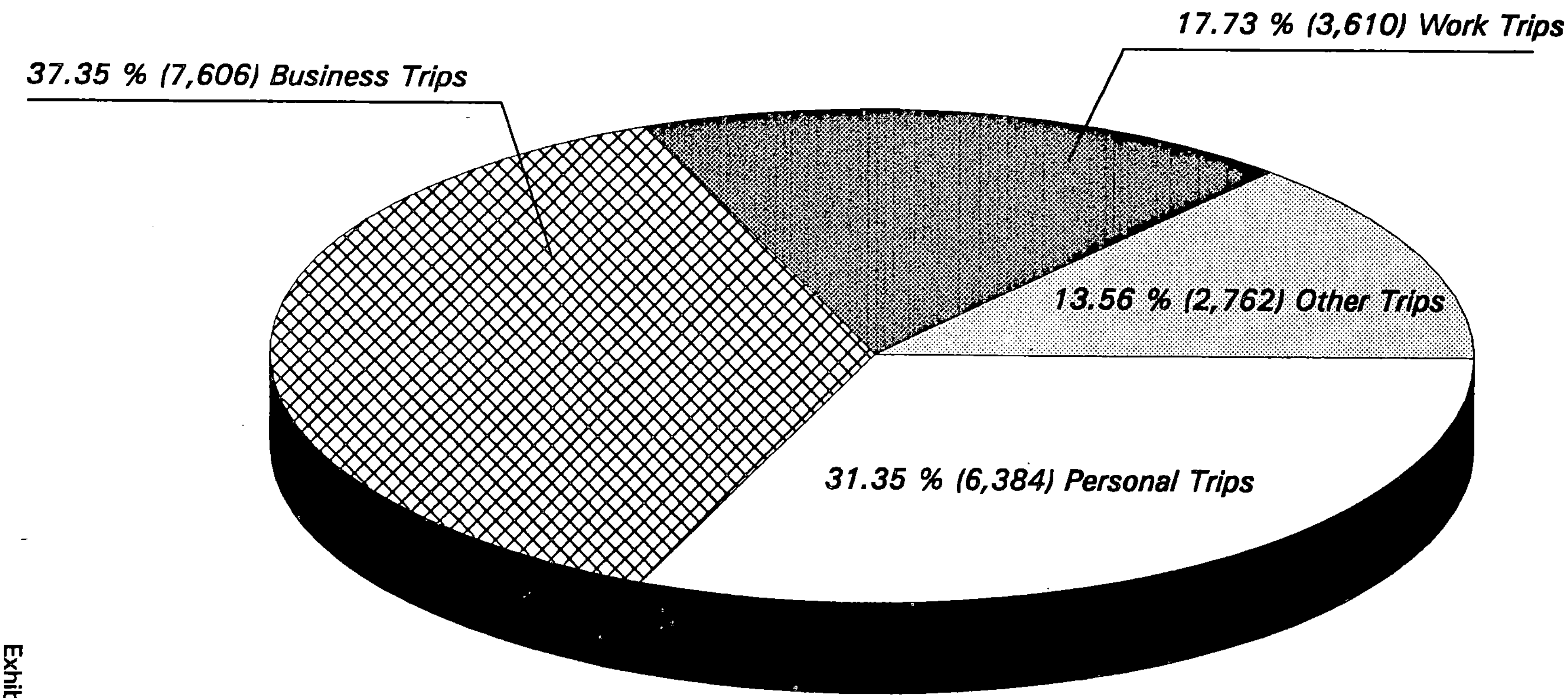
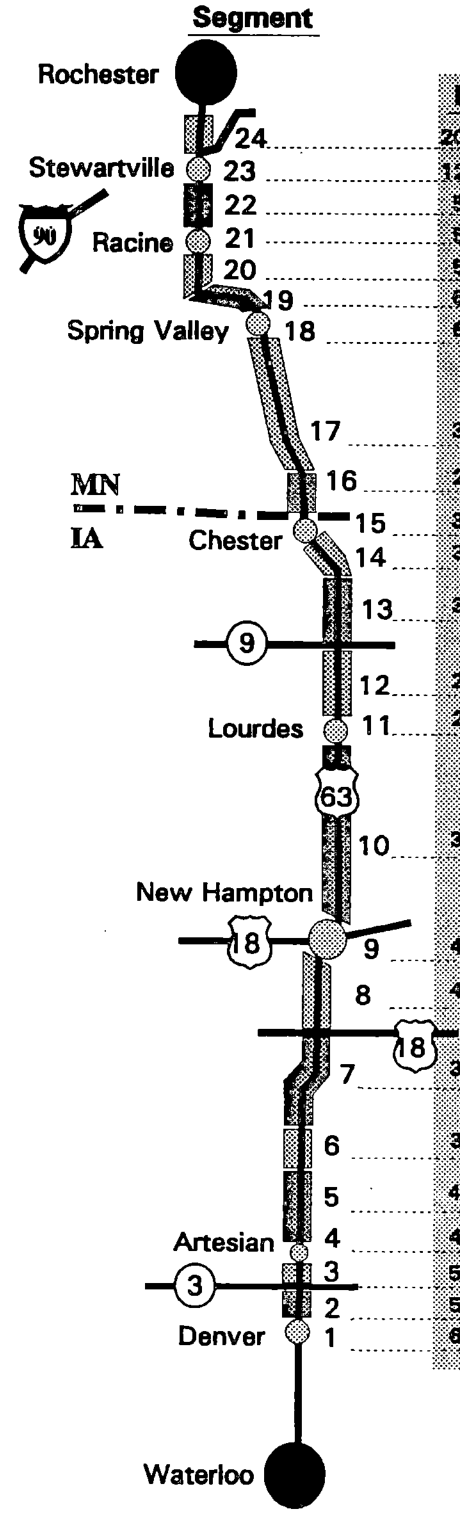


Exhibit 3.11

ESTIMATED DAILY TOTAL VOLUMES by HIGHWAY SEGMENT 1990 and 2010



Segment	Total ADT 1990 Base	Alt#1	Alt#2	Alt#3	Total ADT 2010 Base	Alt#1	Alt#2	Alt#3
24	20,000	22,149	22,392	22,823	25,800	25,879	26,167	26,688
23	12,000	13,320	13,559	13,805	15,085	15,157	15,321	15,614
22	5,900	5,962	6,086	6,222	8,904	8,972	9,043	9,234
21	5,900	5,962	6,075	6,211	8,902	8,970	9,036	9,227
20	5,200	5,255	5,370	5,505	8,125	8,192	8,264	8,453
19	6,000	6,073	6,160	6,302	9,026	9,098	9,166	9,350
18	6,900	6,979	6,915	7,054	9,977	10,048	10,033	10,211
17	3,300	3,336	3,447	3,485	6,314	6,381	6,527	6,695
16	2,658	2,688	2,761	3,114	6,016	6,082	6,150	6,633
15	3,085	3,122	3,157	3,556	6,510	6,583	6,611	7,143
14	3,117	3,158	3,236	3,635	6,552	6,630	6,706	7,238
13	3,092	3,140	3,219	3,640	6,309	6,394	6,468	7,002
12	2,845	2,871	2,977	3,181	5,688	5,722	5,827	6,077
11	2,653	2,678	2,780	2,978	5,688	5,722	5,827	6,077
10	3,424	3,459	3,580	3,812	5,995	6,034	6,141	6,400
9	4,675	4,731	3,707	3,952	7,377	7,424	6,263	6,502
8	4,392	4,416	4,543	4,809	7,186	7,216	7,324	7,605
7	3,407	3,583	3,793	4,070	6,630	6,873	7,202	7,543
6	3,783	3,983	4,243	4,589	6,623	6,870	7,269	7,763
5	4,240	4,470	4,761	5,141	6,961	7,208	7,607	8,105
4	4,222	4,467	4,762	5,158	6,895	7,138	7,535	8,007
3	5,132	5,442	5,800	6,261	7,925	8,166	8,562	9,027
2	5,487	5,858	6,236	6,770	8,061	8,299	8,680	9,169
1	6,837	7,314	7,796	8,468	9,711	9,949	10,429	11,013

Exhibit 3.11

LEVEL OF SERVICE

Traffic level of service is a measure of the quality of the driving experience, i.e., the amount of freedom to travel without being inhibited by other vehicles. As congestion increases, the level of service (that is, the quality of the travel experience) diminishes.

Level of service is expressed as six levels, or "grades." These may be described as:

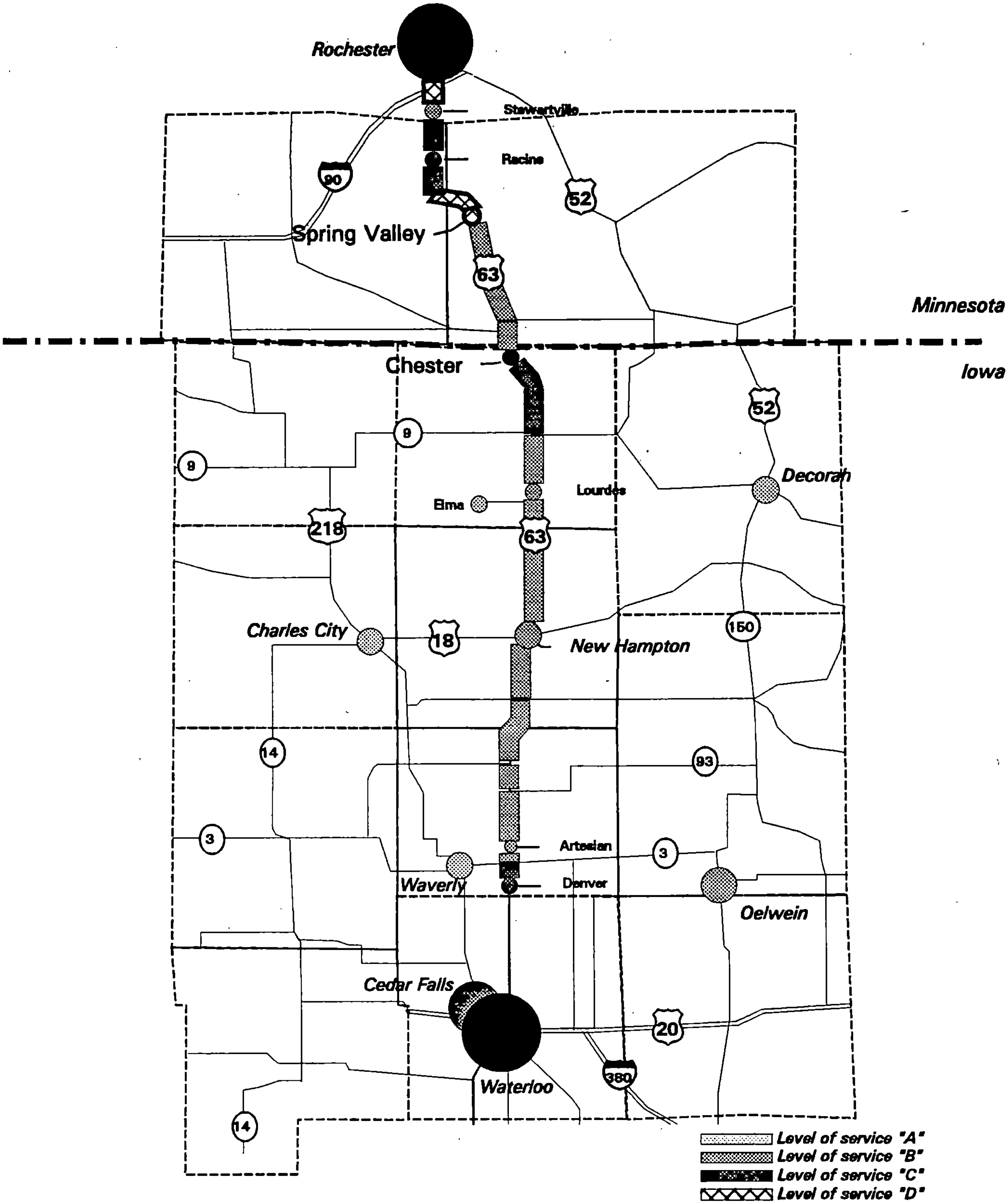
- Level of Service A. Free flow conditions with low volumes, high speeds and few restrictions in speed or maneuverability.
- Level of Service B. Stable flow with operating speed and maneuverability only modestly restricted by traffic conditions.
- Level of Service C. Stable flow but with most drivers being somewhat restricted in their freedom to select speed or to pass other vehicles.
- Level of Service D. Approaching unstable flow. Tolerable operating speeds but little freedom to select speed or to maneuver.
- Level of Service E. Unstable flow with low operating speeds and momentary stoppages.
- Level of Service F. Forced flow operations at low speeds and significant stoppages.

Exhibit 3.12 indicates the level of service on different segments of U.S. 63 based upon 1990 traffic volumes. As noted, the traffic level of service on all Iowa segments is graded as "C" or better. The most congested sections are in Denver and the road segments just north of there, in Chester and the road segments just south of there.

Congestion is more of a problem on the Minnesota portion of U.S. 63 than is the case in Iowa. Three segments currently operate at Level of Service D during the peak period of the day, with better levels of service at other times.

Future Levels of Service

As noted, traffic volumes are forecast to increase in the future. Although congestion is not a major concern at present, the Study included analyses to determine the extent to which congestion would develop in the year 2010. Exhibit 3.13 presents the results of these analyses for the Base Case and for each of the three finalist improvement alternatives.



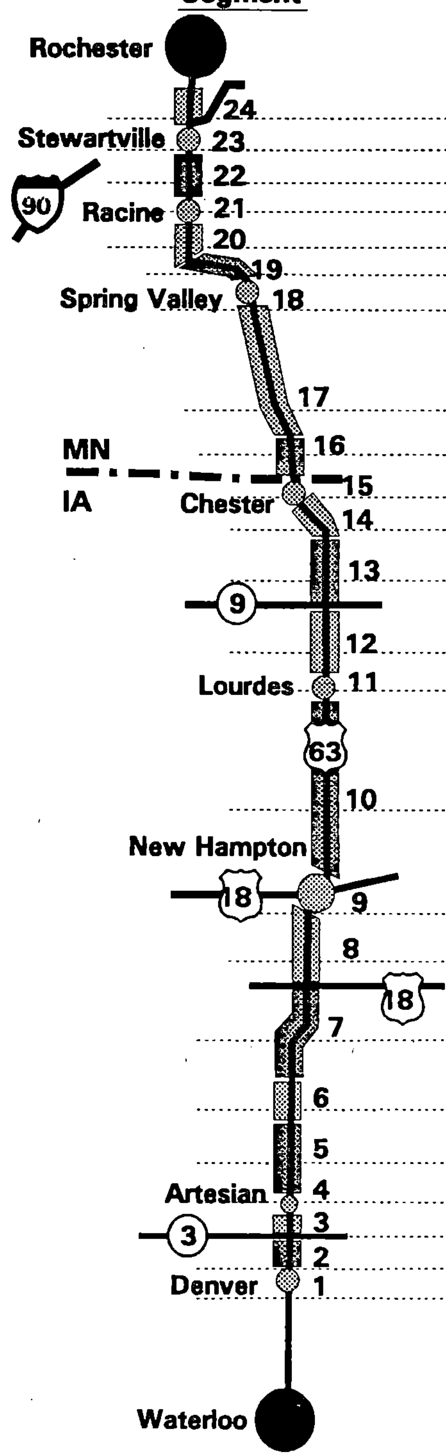
CURRENT TRAFFIC LEVEL OF SERVICE

Exhibit 3.12

Exhibit 3.13

LEVEL OF SERVICE ANALYSIS BY HIGHWAY SEGMENT

2010 Base and Three Alternatives



Segment	2010 Level of Services: Base	Alt#1	Alt#2	Alt#3
24	C	C	C	C
23	C	C	D	B
22	C	C	C	A
21	C	C	C	A
20	C	C	C	A
19	D	D	D	A
18	D	D	C	A
17	C	B	B	A
16	C	B	B	A
15	C	C	C	A
14	D	C	C	A
13	C	C	C	A
12	C	C	C	A
11	C	C	C	A
10	C	C	C	A
9	B	B	A	A
8	C	C	C	A
7	D	C	C	A
6	D	C	C	A
5	D	C	C	A
4	C	C	C	A
3	C	C	C	A
2	A	A	A	A
1	A	A	A	A

Exhibit 3.13

As noted, if no improvements other than those already committed are undertaken (i.e., the Base Case), 2010 traffic volumes will result in Level of Service D on six segments. With Alternatives #1 and #2, only two segments would operate at Level of Service D.

Alternative #3 would result in a substantial improvement in traffic level of service throughout the corridor. With the exceptions of the two northernmost segments (Numbers 23 and 24), all segments would operate at Level of Service A.

Exhibit 3.14 shows the length of the route that would operate in 2010 at different levels of service for the Base Case and the three improvement scenarios. In the 2010 Base Case, 64.23% (65.14 miles) would operate at Level of Service C while 29.60% (30.02 miles) would operate at Level of Service D. In Alternative #1 only 6.11% (6.20 miles) of the route would operate at Level of Service D and 75.99% (77.06 miles) would operate at Level of Service C. The level of service provided by Alternative #2 does not vary significantly from the level of service provided by Alternative #1. Alternative #3, with 4 lanes and expressway standards, would provide a Level of Service A on 90.13% (94.96 miles), a Level of Service B on 2.85% (3.00 miles) and a Level of Service C on 7.02% (7.40 miles) of the route.

Exhibit 3.14

LENGTH OF CORRIDOR AT DIFFERENT LEVELS OF SERVICE IN 2010

		BASE	IMPROVEMENTS		
		CASE	Alt. #1	Alt. #2	Alt. #3
Level of Service A:	(length)	4.51	4.51	10.01	94.96
	(percent)	4.45	4.45	9.50	90.13
Level of Service B:	(length)	1.74	13.64	10.02	3.00
	(percent)	1.72	13.45	9.51	2.85
Level of Service C:	(length)	65.14	77.06	80.31	7.40
	(percent)	64.23	75.99	76.22	7.02
Level of Service D:	(length)	30.02	6.20	5.02	0.00
	(percent)	29.60	6.11	4.76	0.00

Chapter 4
IMPROVEMENT ALTERNATIVES

This Chapter presents the range of alternatives initially considered for the U.S. 63 Corridor and presents the results of a screening of these alternative improvement solutions. The purpose of the screening process was to identify the two or three preferred "strategic" alternatives. These alternatives then were analyzed in greater detail as reported in subsequent chapters of this Report.

EXISTING FACILITY WITH PROGRAMMED IMPROVEMENTS

Improvements are already planned for the existing facility as follows:

- Minnesota Route 30 to North Limits of Stewartville
  Replace pavement and widen existing short section of 2-lane roadway to four lanes (1992)

- Stewartville
  Widen existing section through town which has two lanes and parking to a 4-lane section with no parking (1994-1995)

- Spring Valley to Minnesota/Iowa State Line
  Reconstruct existing substandard 2-lane section to high quality 2-lane design, including wide paved shoulders and alignment improvements (1994)

- Minnesota/Iowa State Line to State Route 9
  Resurface and reconstruct the 2-lane section in areas of poor vertical and horizontal alignment and provide 10-foot wide granular shoulders

- State Route 3 to Denver
  Widen existing 2-lane section to four lanes

- Denver Bypass (from south of Denver to north of Denver, 1½ miles)
  Construct a 4-lane roadway with depressed median (1992-1993)

For purposes of the study's analyses, the existing facility with programmed improvements constituted the Base Case. That is, the improvement alternatives consist of additional improvements beyond those already programmed, as identified above.

RANGE OF IMPROVEMENT ALTERNATIVES

The following improvement alternatives were identified for initial consideration:

- Improved Existing Facility
- Improved Existing Facility with Bypasses
- Four Lane Highway
- Four Lane Highway with Bypasses
- Freeway

Improved Existing Facility

The following design features could be applicable, at various locations, for this alternative:

- Altering traffic controls, particularly at intersections with four-way stop signs, to give priority to U.S. 63 traffic
- Provision of left-turn lanes at major intersections
- Widening and/or paving narrow, gravel shoulders
- Adding passing lanes at various locations
    - This could include provision of passing lanes, 0.75 to 1.0 miles long, spaced about 5 to 7 miles apart
- Horizontal and vertical alignment improvements at certain locations

Improved Existing Facility with Bypasses

In addition to the design features mentioned above, this alternative could include bypasses at some or all of the following communities:

- **New Hampton** - alternative easterly and westerly bypasses are possible
- **Chester** - bypasses are possible on either side of Chester
- **Spring Valley** - bypass opportunities exist on the west side of the community
- **Stewartville** - alternative easterly and westerly bypasses are possible

Bypasses generally would be on new alignment, although some use of existing roads may be appropriate. Control of driveway access is assumed in order to protect the service quality of new bypasses. This alternative could include either at-grade intersections with other public roads or grade-separated interchanges.

Four-Lane Highway

This alternative could involve the following features:

- Adding two additional lanes alongside the existing roadway
- Priority assigned to U.S. 63 traffic at intersections with other public roads
- Control of driveway access, such as separating access points by at least 1,000 feet

Four-Lane Highway with Bypasses

This alternate could include the features described above, plus bypasses of some or all of the five communities where bypasses are a possibility.

Freeway

Building a four-lane freeway on the existing right-of-way would be very disruptive to houses, farms, commercial establishments and public facilities located adjacent to the existing facility. Consequently, all or a large portion of a freeway in this corridor likely would be built on new location. A freeway could include Interstate System design features such as the following:

- Four lanes
- Interchanges with major public roads
- Full control of access

Multiple Design Option

Ultimately, study findings may well justify multiple design options in which different segments are constructed with different design features. For purposes of this feasibility and necessity analysis, it was not necessary to define the specific design features appropriate for each segment.

SCREENING OF IMPROVEMENT ALTERNATIVES

The range of alternatives described above were evaluated on the basis of relevant criteria. The evaluation carried the analysis to the point where some of the alternatives were considered to be most worthy of further study and the remaining alternatives were eliminated from further consideration. The criteria utilized in this screening analysis are described herein.

Traffic Capacity

Traffic capacity is a measure of the ability of a facility to accommodate travel volumes. As indicated in Chapter 3, the existing facility provides a good level of service throughout the length of the study section (i.e., Stewartville to Denver). None of the study section falls below Level of Service C, indicating reasonably high quality traffic conditions and no significant congestion problems.

For purposes of these evaluations, the impact on capacity of the different alternatives was judged to be as follows:

- **Improved Existing Facility** - Widening of shoulders and the addition of passing lanes will only increase capacity modestly. Revisions in traffic control measures to give priority to U.S. 63 traffic would have a modest, site-specific impact. Provision of turning lanes at major intersections would add capacity at these locations but these intersections do not, at present, constitute a capacity problem.

- **Improved Existing Facility with Bypasses** - Traffic signals in the town and cities along U.S. 63 constitute a constriction of capacity. Bypasses would eliminate these constrictions so long as U.S. 63 traffic is given priority at intersections with other facilities.

- **Four-Lane Highway** - In rural areas, a four-lane highway would have a capacity which is 3 to 3.5 times that of a two-lane highway.

- **Four-Lane Highway with Bypasses** - This alternative would provide four-lane bypasses around towns and cities. The amount of access control and treatment of intersections with other highways will affect the capacity of bypass facilities.

- **Freeway** - A four-lane freeway would have a capacity which is about 10 to 20 percent greater than a four-lane highway without full access control. Additionally, the existing two-lane facility would provide capacity in this alternative.

Travel Speeds

Speeds on highways are influenced by a number of factors, including posted speed limits, alignment constrictions, passing opportunities, and the number and type of traffic control devices. The quality of travel is influenced by both the average overall speed and the extent to which changes in speed are imposed upon the road user. The improvement alternatives would affect travel speeds as follows:

- **Improved Existing Facility** - Provision of passing lanes would improve speeds significantly and would reduce driver frustration. Passing lanes break up platoons of vehicles caused by slow-moving vehicles and these benefits extend 2 to 5 miles downstream.

- **Improved Existing Facility with Bypasses** - Improvements in travel speed would result from the elimination of conflicts with traffic inside cities and towns and the reduction or elimination of traffic signals and stop signs.

- **Four-Lane Highway** - This alternative would improve travel speeds by providing additional passing opportunities in rural areas.

- **Four-Lane Highway with Bypasses** - Travel speeds around cities and town would be improved with this alternative.

- **Freeway** - Impedances caused by traffic entering and leaving via driveways would be eliminated.

Safety

Safety is a matter of considerable concern to people who live in the corridor and those who use U.S. 63. In certain locations, accident rates on U.S. 63 exceed the average rate for comparable two-lane highways.

One of the principal purposes of improvements to U.S. 63 would be to create a safer facility and reduce the potential for accidents. With regard to the various alternative improvements, the following points are relevant to this screening process:

- **Improved Existing Facility** - Widening of shoulders would reduce the potential for accidents. Provision of passing lanes would reduce driver frustration which sometimes results in risk-taking when following slow-moving vehicles. Passing lanes would provide for safer passing operations by reducing the threat of meeting an upcoming car.

- **Improved Existing Facility with Bypasses** - Through traffic, particularly large trucks, are of concern within towns. This includes the threat of out-of-control vehicles to the school playground adjacent to U.S. 63 in New Hampton. By putting through traffic on a bypass, travel within towns in the corridor would be safer.

- **Four-Lane Highway** - Four-lane highways tend to be safer than two-lane highways. This is due to passing opportunities which do not require entering the opposing traffic lane plus the wider maneuvering area on four-lane facilities.

- **Four-Lane Highway with Bypasses** - The combination of bypasses around towns with a four-lane cross-section would provide a safer situation.

- **Freeway** - Control of access eliminates the potential for accidents caused by vehicles entering or leaving a roadway from driveways, access roads or other places.

Environmental Impacts

This Study did not include site specific environmental assessments. Instead, the analysis was concerned with broad environmental issues and the impacts that different improvement alternatives might have. These are summarized as follows:

- **Improved Existing Facility** - Very little environmental impacts are anticipated with the provision of passing lanes and changes in traffic operations.

- **Improved Existing Facility with Bypasses** - An east bypass of New Hampton will encounter some environmentally sensitive areas. Likewise, a bypass to the east of Stewartville will have similar challenges.

- **Four-Lane Highway** - Widening the existing facility to four lanes would be disruptive to developments which currently are adjacent to the right-of-way.

- **Four-Lane Highway with Bypasses** - Environmental impacts would occur due to widening of the roadway along the existing right-of-way and along bypasses around Waterloo, New Hampton, Chester, Spring Valley and Stewartville.

- **Freeway** - A freeway likely would be constructed on a new location. Consequently, environmentally sensitive areas could be encountered. Additionally, interchange requirements could cause even more environmental impacts.

Economic Impacts

At the early stage in the Study when the screening analysis was done, it was not possible to conduct detailed economic analyses regarding user costs or the impacts of an improved U.S. 63 on economic activities in the corridor. Nevertheless, it was important that these factors be considered in a general sense for the screening exercise. For purposes of screening improvement alternatives, the following points were relevant:

- **Improved Existing Facility** - Would modestly reduce user costs because of fewer stops and slow-downs. Would reduce shrink losses for farm animals being transported to market.

- **Improved Existing Facility with Bypasses** - Would result in additional improvements due to freer flow speeds around cities and towns. Would be disruptive to existing developments within the rights-of-way of new bypasses.

- **Four-Lane Highway** - Increased benefits would accrue to users of the facility due to improved traffic operations.

- **Four-Lane Highway with Bypasses** - The addition of bypasses would provide increased benefits to users and open new areas for development. Conversely, it would produce negative impacts on existing developments along the U.S. 63 facility. An improved facility could encourage new economic development.

- **Freeway** - Benefits to users would result from the higher speeds and freer flowing traffic conditions. Greater economic development could be encouraged. Nevertheless, it should be noted that construction of a facility on a new alignment would be disruptive to agricultural operations and other activities within the new right-of-way.

Phasing Opportunities

Constraints on funding availability make it impractical to upgrade U.S. 63 for its entire length between Denver and Stewartville as a single project. Consequently, phased implementation will be required. It will be important that any segments that are upgraded be usable to the majority of traffic traveling on U.S. 63 and that such segments provide the maximum possible benefits. The following points are relevant:

- **Improved Existing Facility** - Phased development could be achieved easily. This could commence with changes in traffic control devices and implementation, on a selected basis, of passing lanes and/or shoulder improvements.

- **Improved Existing Facility with Bypasses** - Bypasses of cities and towns can be undertaken one at a time, facilitating phased development.

- **Four-Lane Highway** - One approach to phased development would be to extend existing four-lane sections, thereby achieving continuity in design. The highest traffic volumes on the existing facility are encountered on the northern and southern extremities, suggesting that this approach would serve the greatest amount of traffic. Nevertheless, it is noted that trucking interests emphasize the greatest needs for improvements on the section from Waterloo to New Hampton.

  A second alternative would be to build initially short four-lane sections at intervals so as to provide additional passing opportunities. As a part of the phased development concept, the four-lane sections could be made continuous when conditions warrant/permit such actions.

- **Four-Lane Highway with Bypasses** - Phased development would suggest building bypasses first, followed by development of the four-lane sections in rural area. This approach would provide early improvements to through traffic movements, particularly for trucks which have a high proportion of long trips.

- **Freeway** - Phasing opportunities would be more difficult than with the preceding alternatives due to the need to build on new right-of-way. As a minimum, complete sections between major east-west facilities would have to be completed before they can be usable by significant traffic volumes. Initially constructing two lanes on four-lane right-of-way also is a possibility. The interchanges required for a freeway could be added later.

Capital Costs

If costs were not a factor, it would be possible to build a facility that would meet everyone's wishes. However, costs are a major factor because (1) funds are limited and (2) wise use must be made of all resources. For purposes of screening the improvement alternatives, cost estimates were not available for the various alternatives. Nevertheless, the relative costs of the various alternatives were approximated by considering the costs per mile for different types of improvements. The following data were the most current (May 1991) and are from the Iowa DOT.

- **Improved Existing Facility** - Widening existing 4-foot shoulders to 10 feet with a granular surface would cost approximately $160,000 per mile. Providing a short section with a passing lane in each direction probably would cost about $225,000 to over $300,000, depending on the length of the section (say, 0.75 to 1.0 miles).

- **Improved Existing Facility with Bypasses** - A two lane bypass on new alignment would cost about $785,000 per mile, including right-of-way (limited access control). A four-lane bypass would cost about $1,500,000 per mile. Construction costs, inclusive of bridges (but excluding interchanges if full access control is provided), were roughly estimated to be in the following ranges, depending upon which alternative bypass is selected:

  * Stewartville
    - Two-lane:$4.1 to $4.7 million
    - Four-lane: $8.0 to $9.0 million

  * Spring Valley
    - Two-lane:$3.9 to $6.8 million
    - Four-lane: $7.5 to $15.0 million

* Chester
  - Two-lane:$2.9 to $6.3 million
  - Four-lane: $5.5 to $12.0 million

* New Hampton
  - Two-lane:$4.4 to $4.9 million
  - Four-lane: $8.5 to $9.5 million

- **Four-Lane Highway** - Widening the existing two lane facility to four lanes on the present alignment in rural areas, exclusive of right-of-way, would cost about $650,000 per mile.

- **Four-Lane Highway with Bypass** - As indicated, widening of the two-lane facility to four lanes in rural areas would cost about $650,000 per mile, plus about $1,500,000 per mile for four-lane bypasses (including right-of-way with limited access control).

- **Freeway** - A four-lane rural roadway on new alignment would cost about $1,300,000 per mile. In addition, approximate right-of-way costs for a four-lane rural access control facility is approximately $280,000 per mile. A typical diamond interchange, including right-of-way, costs about $1,600,000 (with paved shoulders); while a typical cloverleaf interchange costs about $4,300,000 per mile (again, with paved shoulders).

FINALIST ALTERNATIVES

Based upon the screening process, the least promising of the improvement alternatives were identified and eliminated from further study. The reasons for eliminating options are indicated below along with the justifications for retaining the preferred alternatives.

Freeway

The freeway alternative was not considered to be a prime candidate for the following reasons:

- Traffic volumes do not justify the existing facility plus a freeway on new alignment. This option would provide considerable excess capacity.

- Additionally, it is the most expensive alternative in terms of capital costs.

- Further, there could be significant environmental impacts because of constructing a facility on new alignment.

- This alternative would also be disruptive to existing farming activities.

- The improvements in travel operations that a freeway would provide are not likely to compensate for the negative factors mentioned above.

It is noted that the Avenue of the Saints Study also found that the freeway alternative was not economically justifiable.

Four-Lane Highway (Without Bypasses)

A very substantial portion of travel on U.S. 63 is long distance, through traffic. A major impediment to such traffic is caused by traveling through the center of the cities and towns on U.S. 63. It would make little sense to improve operations in the rural areas (which now are operating at a reasonable service level) without also providing improvements in the vicinity of cities and towns. Therefore, this alternative was eliminated from further consideration.

Alternatives Retained for Further Study

The three improvement alternatives retained for more detailed study were as follows:

- **Alternative #1: Improved Existing Facility** - The existing facility provides fairly good quality services with existing traffic volumes. However, there are some situations which could be improved. Widening of narrow shoulders, provision of passing lanes at selected locations and revision of traffic control measures to give priority to U.S. 63 traffic would provide relatively low cost improvements throughout the corridor segment. Improvements also could include additional turn lanes at major intersections.

- **Alternative #2: Improved Existing Facility with Bypasses** - Improving the existing facility as noted above would primarily affect the rural sections of U.S. 63. Because of the high volume of through traffic, particularly trucks, there may be justification for considering the provision of bypasses around some or all of the cities and towns. While the cost per mile of bypasses is not inconsequential, their short length would keep total costs down.

- **Alternative #3: Four-Lane Highway with Bypasses** - Widening the existing two-lane sections to four lanes and providing bypasses around cities and towns would give this section of Iowa and Minnesota a high quality highway facility. This, in turn, could provide a catalyst for economic development along the route. The provision of a high quality highway could attract new industries and encourage existing industries to expand their operations. Also, it would provide benefits to existing agricultural, commercial and industrial activities, particularly in terms of reduced trucking costs. The Avenue of the Saints study determined that bypasses tend to generate significant economic benefits. Also, benefits to local traffic in towns along the corridor would accompany diversion of through traffic to a bypass.

These three improvement alternatives were analyzed in greater detail and the results of these analyses are presented in subsequent Chapters.

REVIEW OF POTENTIAL WATERLOO BYPASS

This Corridor Study examined possible improvements (beyond those already programmed) for the section of U.S. 63 between Stewartville, MN and State Route 3 north of Denver. All of the Study's detailed analyses, as reported in subsequent sections of this report, pertain to this section of U.S. 63. Located south of the study section is Waterloo, IA through which long distance traffic on U.S. 63 must pass. To make U.S. 63 as efficient as possible, a bypass of Waterloo may be a worthy undertaking. Therefore, a limited review was made of a potential bypass in the northeast quadrant of Waterloo. The following comments derive from this review.

Description

There are several alternatives that could be considered for a connection between U.S. 63 on the north of Waterloo and I-380 and/or U.S. 20 to the southeast of Waterloo. Starting at U.S. 63, there are possibilities of locating an east-west portion of the bypass along either County Roads C66 or C57. These east-west segments could connect to either of three possible north-south segments along State Route 281 or to the east or west of Route 281. These north-south segments would interchange with I-380 or U.S. 20.

A detailed location study will be required to determine which alignment would be most suitable for the bypass.

Capital Costs

A cursory analysis indicates that the capital costs for a bypass in this area would vary significantly depending on the alignment found to be most appropriate as well as the design standards for the facility. For instance, a two-lane facility could cost between $0.8 and $15.6 million, inclusive of bridges but excluding interchanges, depending on which alignment is selected. Likewise, a four-lane facility would cost between $10.0 and $38.0 million (exclusive of interchanges), depending on where it is built.

Traffic Services

In a similar manner, it is estimated that traffic volumes would vary substantially, depending upon which alignment alternative was selected. For instance, an alternative close to Waterloo will attract more local traffic than one which is located further away. The choice of alignment also will affect the extent to which the bypass would serve traffic generators located in this area.

For instance, the 1990 opening of the IBP hog slaughtering plant in Waterloo has had a dramatic effect on livestock transportation. The new plant is located on N. Elk Run Road just south of the Chicago and North Western Transportation Company railroad tracks. Southbound livestock trucks on U.S. 63 typically take a county road or E. Donald Street east to N. Elk Run to reach the IBP plant. This involves substantial traffic congestion and stopping and starting which increases trucking costs and animal shrink. Thus, a bypass in this area could be of significant benefit to the IBP plant, as well as others, depending on its location.

One of the locations at which special origin/destination surveys were conducted as part of this study was on County Road V49. Data collected at this survey location indicated that the predominant traffic flow is to U.S. 63 on the north. It is highly likely that much of this traffic would use a bypass if it were built.

Economic Feasibility

A more detailed investigation will be required to determine the economic feasibility of the Waterloo Bypass. This investigation will require a more definitive analysis of preferred alignments and must address the matter of how the Bypass might interchange with either I-380 or U.S. 20. This, in turn, will permit development of more refined cost estimates. Also, analyses are required to determine the amount of traffic that would use the Bypass, including through traffic, as well as local traffic. With these more detailed analyses, the economic feasibility of the Bypass can be determined.

It should be noted, however, that both this study and the Avenue of the Saints study have found that bypasses can produce substantial benefits in terms of travel efficiency, depending upon the traffic volumes and traffic composition (cars, trucks) which use them. While no conclusion can be made at this point concerning the economic feasibility of the Waterloo Bypass, there are a number of factors, as discussed above, which suggest it is worthy of further consideration.

Chapter 5
COSTS, CONSTRUCTABILITY & ENVIRONMENTAL FEASIBILITY

The study's evaluations included estimation of the extra costs associated with each of the finalist improvement alternatives, an assessment of the constructability of each alternative and a general analysis of the environmental implications of each alternative. These analyses are reported in this Chapter.

CAPITAL COSTS

Capital costs were estimated on the basis of the improvement assumptions for each of the finalist improvement alternatives. Unit costs provided by the Iowa Department of Transportation were utilized in developing the cost estimates. A summary of unit costs is presented in Exhibit 5.1.

The cost estimates establish the rough order-of-magnitude of requirements for each alternative which is adequate for purposes of these feasibility analyses. However, detailed design analyses would be expected to produce more refined cost estimates.

Shown in Exhibits 5.2, 5.3 and 5.4 are the construction costs for the three improvement alternatives. For each segment, costs of the three improvement alternatives are summarized in Exhibit 5.5. As noted, there is a very wide range in estimated construction costs:

- Alternative #1: $24.7 million
- Alternative #2: $46.0 million
- Alternative #3: $112.1 million

That is, Alternative #2 is almost twice as expensive as Alternative #1. Alternative #3 is almost five times as expensive as Alternative #1.

PLANNING AND ENGINEERING COSTS

In addition to the construction costs discussed above, expenditures will be incurred for planning and engineering. These were estimated to be 15 percent of construction costs, bringing total capital costs to:

- Alternative #1: $28.4 million
- Alternative #2: $52.9 million
- Alternative #3: $128.9 million

Exhibit 5.1

SUMMARY OF UNIT COSTS

(1991 Dollars)

IMPROVEMENT TYPE	UNIT COST
Shoulder improvements	$160,000/mile
Turn lanes	$35,000 each
Passing lanes	$330,000/mile
Reconstruct urban 2-lane	$1,150,000/mile
Reconstruct modern 2-lane	$710,000/mile
Overlay and minor reconstruction	$575,000/mile - urban $355,000/mile - rural
Concrete unbonded overlay	$190,000/mile
Bridges (2-lane)	$403,000 each
Construct 4-lane bypass	$1,300,000/mile
Construct 2-lane bypass	$710,000/mile
Right-of-way:	
4-lane limited access	$280,000/mile
4-lane	$200,000/mile
2-lane	$75,000/mile
Interchanges (Diamond)	$1,500,000 each
RR grade separation	$750,000 each
Maintenance:	
4-lane paved	$5,000/mile/year
2-lane paved	$3,650/mile/year

Exhibit 5.2

U.S. 63 CAPITAL COST ESTIMATE

Alternative #1: Improved Two–Lane Highway

Segment	Length Miles	Improved Shoulder	Turn Lanes	Passing Lanes	Mainline Interchanges	Bridges	Reconstruct Urban 2–Lane	Reconstruct Modern 2–Lane	Overlay & Minor Reconst.	Concrete Unbonded Overlay	Total Cost
1 Denver	3.00										0
2 N. Denver to SR 3	1.51										0
3 SR 3 to S. Artesian	0.47	56,000	35,000		1,500,000						1,591,000
4 Town of Artesian	0.57										0
5 N. Artesian to SR 93	4.93	22,400	105,000	660,000		408,000					1,195,400
6 SR 93 to SR 188	3.21		70,000			408,000					478,000
7 SR 188 to US 18	12.04	1,272,000	210,000	660,000							2,142,000
8 US 18 to S. New Hampton	4.22	110,400	105,000								215,400
9 New Hampton	5.50					816,000					816,000
10 N. New Hampton to S. Lourdes	11.67		210,000	660,000							870,000
11 Town of Lourdes	0.41	17,600									17,600
12 N. Lourdes to SR 9	8.02	8,000	105,000	660,000							773,000
13 SR 9 to SR 157	5.53		140,000			408,000					548,000
14 SR 157 to S. Chester	3.64		35,000	660,000		408,000					1,103,000
15 Chester	2.00										0
Iowa Total	66.72	1,486,400	1,015,000	3,300,000	1,500,000	2,448,000	0	0	0	0	9,749,400
16 N. Chester to SR 44	2.50		105,000								105,000
17 SR 44 to S. Spring Valley	7.52		175,000	660,000		408,000					1,243,000
18 Spring Valley	6.00					0	2,760,000				2,760,000
19 N. Spring Valley to CR 16	2.02		35,000			0		2,698,000			2,733,000
20 SR 16 to S. Racine	4.20	208,000	35,000	660,000		816,000			1,491,000		3,210,000
21 Racine	1.50		70,000			0			460,000		530,000
22 N. Racine to S. Stewartville	4.50	224,000				0		1,420,000	887,500		2,531,500
23 Stewartville	3.00					408,000					408,000
24 N. Stewartville to S. Rochester	7.40									1,406,000	1,406,000
Minnesota Total	38.64	432,000	420,000	1,320,000	0	1,632,000	2,760,000	4,118,000	2,838,500	1,406,000	14,926,500
Study Area Total	105	1,918,400	1,435,000	4,620,000	1,500,000	4,080,000	2,760,000	4,118,000	2,838,500	1,406,000	24,675,900

Exhibit 5.3

U.S. 63 CAPITAL COST ESTIMATE

Alternative #2: Improved Two-Lane with Bypasses

Segment	Length Miles	Improved Shoulder	Turn Lanes	Passing Lanes	Mainline Inter-changes	Bridges	Purchase 4-Lane ROW	Reconstruc Modern 2-Lane	Overlay & Minor Reconst.	Unbonded Overlay	Construct Bypasses Limited Access 4-Lane	2-Lane	Total Cost
1 Denver	3.00												0
2 N. Denver to SR 3	1.51												0
3 SR 3 to S. Artesian	0.47	56,000	35,000		1,500,000								1,591,000
4 Town of Artesian	0.57												0
5 N. Artesian to SR 93	4.93	22,400	105,000	660,000		408,000							1,195,400
6 SR 93 to SR 188	3.21		70,000			408,000							478,000
7 SR 188 to US 18	12.04	1,272,000	210,000	660,000									2,142,000
8 US 18 to S. New Hampton	4.22	110,400	105,000										215,400
9 New Hampton	5.50					408,000	1,540,000				12,400,000		14,348,000
10 N. New Hampton to S. Lourdes	11.67		210,000	660,000									870,000
11 Town of Lourdes	0.41	17,600											17,600
12 N. Lourdes to SR 9	8.02	8,000	105,000	660,000									773,000
13 SR 9 to SR 157	5.53		140,000			408,000							548,000
14 SR 157 to S. Chester	3.64		35,000	660,000		408,000							1,103,000
15 Chester	2.00					408,000	150,000					1,420,000	1,978,000
Iowa Total	66.72	1,486,400	1,015,000	3,300,000	1,500,000	2,448,000	1,690,000	0	0	0	12,400,000	1,420,000	25,259,400
16 N. Chester to SR 44	2.50		105,000										105,000
17 SR 44 to S. Spring Valley	7.52		175,000	660,000		408,000							1,243,000
18 Spring Valley	6.00						450,000					4,260,000	4,710,000
19 N. Spring Valley to CR 16	2.02		35,000					1,434,200					1,469,200
20 SR 16 to S. Racine	4.20	208,000	35,000	660,000		816,000			1,491,000				3,210,000
21 Racine	1.50		70,000				112,500		532,500			1,065,000	1,780,000
22 N. Racine to S. Stewartville	4.50	224,000						1,420,000	887,500				2,531,500
23 Stewartville	3.00					408,000	225,000					3,630,000	4,263,000
24 N. Stewartville to S. Rochester	7.40									1,406,000			1,406,000
Minnesota Total	38.64	432,000	420,000	1,320,000	0	1,632,000	787,500	2,854,200	2,911,000	1,406,000	0	8,955,000	20,717,700
Study Area Total	105	1,918,400	1,435,000	4,620,000	1,500,000	4,080,000	2,477,500	2,854,200	2,911,000	1,406,000	12,400,000	10,375,000	45,977,100

Exhibit 5.4

U.S. 63 CAPITAL COST ESTIMATE

Alternative #3: Four-Lane Highway with Bypasses

Segment	Length Miles	2 Lanes Improved Shoulder	Purchase 4-Lane ROW	2-Lane Concrete Unbonded Overlay	Construct 4-Lane Bypass	Construct 2 Additiona Lanes	Mainline Inter-changes	Bridges	Total Cost
1 Denver	3.00								0
2 N. Denver to SR 3	1.51								0
3 SR 3 to S. Artesian	0.47	56,000	58,750			333,700	1,500,000		1,948,450
4 Town of Artesian	0.57		71,250			404,700			475,950
5 N. Artesian to SR 93	4.93	22,400	616,250			3,500,300		408,000	4,546,950
6 SR 93 to SR 188	3.21		401,250			2,279,100			2,680,350
7 SR 188 to US 18	12.04	1,272,000	1,505,000			8,548,400		408,000	11,733,400
8 US 18 to S. New Hampton	4.22	110,400	527,500			2,996,200			3,634,100
9 New Hampton	5.50		1,540,000		12,400,000				13,940,000
10 N. New Hampton to S. Lourdes	11.67		1,458,750			8,285,700			9,744,450
11 Town of Lourdes	0.41	17,600	51,250			291,100			359,950
12 N. Lourdes to SR 9	8.02	8,000	1,002,500			5,694,200	1,500,000	408,000	8,612,700
13 SR 9 to SR 157	5.53		691,250			3,926,300			4,617,550
14 SR 157 to S. Chester	3.64		455,000			2,584,400			3,039,400
15 Chester	2.00		400,000		2,600,000			816,000	3,816,000
Iowa Total	66.72	1,486,400	8,778,750	0	15,000,000	38,844,100	3,000,000	2,040,000	69,149,250
16 N. Chester to SR 44	2.50		312,500			1,775,000			2,087,500
17 SR 44 to S. Spring Valley	7.52		940,000			5,339,200		408,000	6,687,200
18 Spring Valley	6.00		1,200,000		10,800,000				12,000,000
19 N. Spring Valley to CR 16	2.02		252,500			1,434,200			1,686,700
20 SR 16 to S. Racine	4.20	208,000	525,000			2,982,000		816,000	4,531,000
21 Racine	1.50		300,000		1,950,000				2,250,000
22 N. Racine to S. Stewartville	4.50	224,000	562,500			3,195,000			3,981,500
23 Stewartville	3.00		600,000		6,900,000			816,000	8,316,000
24 N. Stewartville to S. Rochester	7.40			1,406,000					1,406,000
Minnesota Total	38.64	432,000	4,692,500	1,406,000	19,650,000	14,725,400	0	2,040,000	42,945,900
Study Area Total	105	1,918,400	13,471,250	1,406,000	34,650,000	53,569,500	3,000,000	4,080,000	112,095,150

Exhibit 5.5

U.S. 63 CAPITAL COST SUMMARY

By Segment

Segment	Length Miles	Alternative #1	Alternative #2	Alternative #3
1 Denver	3.00	0	0	0
2 N. Denver to SR 3	1.51	0	0	0
3 SR 3 to S. Artesian	0.47	1,591,000	1,591,000	1,948,450
4 Town of Artesian	0.57	0	0	475,950
5 N. Artesian to SR 93	4.93	1,195,400	1,195,400	4,546,950
6 SR 93 to SR 188	3.21	478,000	478,000	2,680,350
7 SR 188 to US 18	12.04	2,142,000	2,142,000	11,733,400
8 US 18 to S. New Hampton	4.22	215,400	215,400	3,634,100
9 New Hampton	5.50	816,000	14,348,000	13,940,000
10 N. New Hampton to S. Lourdes	11.67	870,000	870,000	9,744,450
11 Town of Lourdes	0.41	17,600	17,600	359,950
12 N. Lourdes to SR 9	8.02	773,000	773,000	8,612,700
13 SR 9 to SR 157	5.53	548,000	548,000	4,617,550
14 SR 157 to S. Chester	3.64	1,103,000	1,103,000	3,039,400
15 Chester	2.00	0	1,978,000	3,816,000
Iowa Total	66.72	9,749,400	25,259,400	69,149,250
16 N. Chester to SR 44	2.50	105,000	105,000	2,087,500
17 SR 44 to S. Spring Valley	7.52	1,243,000	1,243,000	6,687,200
18 Spring Valley	6.00	2,760,000	4,710,000	12,000,000
19 N. Spring Valley to CR 16	2.02	2,733,000	1,469,200	1,686,700
20 SR 16 to S. Racine	4.20	3,210,000	3,210,000	4,531,000
21 Racine	1.50	530,000	1,780,000	2,250,000
22 N. Racine to S. Stewartville	4.50	2,531,500	2,531,500	3,981,500
23 Stewartville	3.00	408,000	4,263,000	8,316,000
24 N. Stewartville to S. Rochester	7.40	1,406,000	1,406,000	1,406,000
Minnesota Total	38.64	14,926,500	20,717,700	42,945,900
Study Area Total	105	24,675,900	45,977,100	112,095,150

INCREMENTAL MAINTENANCE AND RESURFACING COSTS

From time to time, certain maintenance and repair activities are required which are independent of the alternative being considered. These costs, effectively, are common costs which apply equally to all alternatives. They are excluded from the feasibility analyses.

On the other hand, adding lanes and bypasses increases the surface area to be maintained. Therefore, maintenance costs are expected to be higher in Alternatives #1, #2 and #3 than in the Base Case. Shown in Exhibit 5.6 are the additional maintenance costs for the improvement alternatives.

Exhibit 5.6

ESTIMATED INCREASE IN ANNUAL MAINTENANCE COSTS *

ALTERNATIVE	IOWA	MINNESOTA	TOTAL
1	$12,500	$5,000	$17,500
2	$47,300	$43,325	$90,625
3	$111,350	$80,500	$191,850

** Above Base Condition*

Additional costs also will be incurred to resurface the additional lane miles. Resurfacing costs are assumed to occur every 15 years and total:

- Alternative #1: $665,000
- Alternative #2: $2,897,000
- Alternative #3: $10,587,000

ENGINEERING FEASIBILITY

One "test of feasibility" which any improvement alternative must pass is the ability to physically improve an existing highway through adding lanes or widening shoulders, or alternatively widening the route from two to four lanes, or alternatively constructing bypasses of communities on new alignments. "Ability to physically construct" implies that conditions are such that the proposed construction is practical, at reasonable cost, within a reasonable time span, and without unreasonable adverse implications.

Final determination of engineering feasibility will require detailed alignment investigations and design which are beyond the scope of this planning study. Nevertheless, it is possible to make some general observations. To gauge the engineering feasibility in the physical sense, references were made to U.S.G.S. and wetland mapping, the routes were observed by driving them, several analyses were conducted, and the routes were discussed with relevant state engineering personnel and others.

Alternative #1

Widening of shoulders is anticipated to occur within the existing highway rights-of-way, which construction may include flattening of roadway foreslopes, ditch drainage modifications, culvert extensions, widening of bridges, guardrail modifications and other items.

Construction of passing lanes and turning lanes likewise is anticipated to occur within existing rights-of-way. Relatively minor amounts of right-of-way may need to be acquired at specific locations to improve sight distances, provide flatter roadway slopes or for other criteria determined during the project design phase. Very few residential or commercial developments were observed to occur in the vicinities of proposed intersections where turning lane construction is proposed. The construction of passing lanes and turning lanes is anticipated to require modifications of affected side road and private access connections.

The proposed reconstruction of U.S. 63 from north of Spring Valley to the junction with MN Route 16 and of two miles of U.S. 63 between Racine and Stewartville, to current design standards, will require the acquisition of additional rights-of-way in order to provide for improvements in horizontal and vertical roadway geometrics and sight distances. This reconstruction will also include grading, drainage and intersection construction.

The improvements proposed as part of Alternative #1 are constructible, at a relatively low cost, and can be accomplished quickly.

Alternative #2

This alternative provides bypasses of the communities of New Hampton and Chester, Iowa and of Spring Valley, Racine and Stewartville, Minnesota, thereby decreasing delays to traffic passing through such communities.

<u>New Hampton Bypass</u> - A four-lane, controlled access highway is proposed to bypass this community, which includes interchanges, one railroad grade-separation, one river crossing and other drainage structures. Transitions to existing two-lane roadways will be constructed both north and south of the community. Right-of-way will have to be acquired for this bypass. In addition, frontage roads and additional right-of-way may be required to maintain existing commercial, industrial and agricultural property access.

Several routes were preliminarily investigated and such a bypass is physically feasible and constructible, and will improve traffic operations. Though traffic on the bypass will avoid delays caused by traveling through the community along the existing route, including reduced speed limits, 4 traffic signalized intersections, one railroad crossing and one additional primary highway junction. Traffic to and from the community will have access to the nearby bypass at interchanges with major routes.

Chester Bypass - A two-lane at-grade bypass of this community is proposed, along with a 4-lane right-of-way. The bypass will connect to the existing highway in Iowa to the southeast of Chester and to the existing highway in Minnesota to the north of Chester. The existing highway between these two termini will be connected via at-grade intersections to provide continued access to the community from the nearby bypass.

This bypass, on a new alignment, will include a new crossing of the Upper Iowa River and its floodplain. Traffic delays associated with traveling 1.5 miles through this small community will be avoided with this alternative. Several alignment alternatives were investigated and all are physically feasible.

Spring Valley Bypass - A two-lane at-grade bypass of this community is proposed, with a proposed two-lane right-of-way. Several route alternatives were investigated for this bypass, all being located to the west of the community, due to the 4.5-mile westerly shift in the location of U.S. 63 from south of the community to northwest of the community. The routes that are located closer to the community make more use of existing U.S. 63 from the community northwest to the junction of MN Route 16. This roadway is proposed to be reconstructed as part of Alternative #1 and is usable as part of Alternative #2. The use of this route, however, requires U.S. 63 traffic to negotiate a 90 degree change of direction at the junction of U.S. 63 and MN Route 16. A more westerly bypass of the community, aligned to cross MN Route 16 at a southerly extension of U.S. 63, would provide better route continuity for U.S. 63 with improved geometrics but would include a longer length of roadway, all of which would require new right-of-way. The latter alternative is expected to involve considerably higher right-of-way costs and somewhat higher construction costs than bypass alternatives using greater lengths of the proposed reconstructed U.S. 63 easterly of its junction with MN Route 16.

Racine Bypass - Racine is proposed to be bypassed with a two-lane at-grade roadway on new location, with two-lane right-of-way to be acquired. Alternative routes were investigated both east and west of Racine. Both locations are physically feasible, although a route to the east is expected to be longer in length and higher in cost than a route located just west of Racine. The location of the east route must consider the location of the Racine Scientific and Natural Area, which is located north of Racine and along the east side of existing U.S. 63.

Stewartville Bypass - A two-lane at-grade bypass on new two-lane right-of-way is proposed to route through traffic away from the business district of this community. The reduced speed limits through Stewartville and one signalized intersection in the downtown area result in delays in the movement of through traffic on U.S. 63.

Two route locations were investigated for bypassing this community. Bypassing the community along its western side was not possible due to the presence of Lake Florence and other constraints. The only feasible route to the west includes the construction of a bypass roadway from south of Stewartville northwesterly to the High Forest Interchange with Interstate 90 and then routing traffic along I-90 to the interchange with U.S. 63. Another route, to the east of the community, would tie into U.S. 63 to the south of Stewartville and rejoin U.S. 63 south of the I-90 interchange.

The existing roadway of U.S. 63 between the north and south termini of these two routings would be accessible from the bypass to provide traffic service to the central portion of the community.

Both routes are physically feasible and are of approximately equal length and cost for the two-lane roadways. I-90 interchanges may require some modifications relative to the west route.

Alternative #3

As part of this alternative, 4-lane bypasses will be provided for all communities that would be bypassed as part of Alternative # 2. Between such bypasses, the existing two-lane roadway is proposed to remain in service but as a two-lane, one-way roadway, while a new, two-lane, one-way roadway on additional right-of-way would be constructed either to the east or the west of the existing roadway. The resulting four-lane roadway is proposed to have a depressed rural median, 64 feet (minimum) width between edges of opposing traffic lanes, and at-grade intersections. Grade separations or interchanges may be needed at some locations. It is anticipated that the new two-lane roadway will be designed for 65 miles per hour geometric criteria.

In order to avoid or reduce impacts on such existing features as cemeteries, churches, recreation areas, farmsteads and commercial and industrial areas, it is anticipated that the new two-lane roadway will not be located along the same side of the existing roadway throughout the project, but that crossovers will be provided to minimize adverse impacts of the roadway. Additionally, construction of the new 4-lane roadway should consider the replacement and/or upgrading of selected sections of the existing two-lane roadway to higher standards of design whenever possible, in order to provide a safer facility.

This alternative is physically feasible and will provide a roadway that is capable of moving traffic more efficiently and safer than Alternatives #1 and #2, although its construction and right-of-way costs will be correspondingly higher.

ENVIRONMENTAL FEASIBILITY

Several state and federally protected environmental resources have been identified in the U.S. 63 project corridor between Denver, Iowa and Stewartville, Minnesota which may be impacted by highway development. These resources include wetlands, rivers and streams, protected plant and animal species, parks and recreation areas, state scientific areas, cemeteries, and agricultural and archeological resources. State and federal regulations that protect these resources are listed in Exhibit 5.7.

Each of these environmental issues is briefly discussed below followed by a comparison of potential impacts to these resources by each of the three improvement alternatives, Alternatives #1, #2 and #3. More detailed alignment and impact studies will be required in the future to define the specific impacts of the recommended route.

Information for this evaluation was gathered from contacts with government agencies and private organizations and a background data review. A one-day cursory field inspection also was conducted to inventory these resources. The location of natural resources and cemeteries by project segment is given in Exhibit 5.8.

Wetlands, Streams and Rivers

Wetlands occur almost continually throughout the project corridor and range from less than one acre in size to several acres. The majority of these wetlands have natural vegetation and a few are farmed wetlands. They are seasonally flooded or lacking prolonged or permanent standing water. Many of these would be protected by federal law, but not by Minnesota or Iowa law. Most of these wetlands are located within the flood plains of intermittent streams, creeks and rivers, particularly along the major waterways listed below:

Exhibit 5.7

LIST OF ENVIRONMENTAL ISSUES AND LAWS

Issue	Law
General	National Environmental Policy Act of 1969
Farmland	Federal Farmland Protection Policy Act Iowa Code, Chapter 306.9 - Diagonal Roads, Restoring and Improving Existing Roads
Park & Recreation Areas	Section 4(f) of the U.S. DOT Act of 1966
Wetlands and Protected Waters	Section 404 of the Federal Clean Water Act of 1977; Executive Order 11990, Protection of Wetlands; Iowa Code, Chapter 108.13, Protection of Wetland; Minnesota Statutes, Chapter 105, Protected Waters and Wetland Permit Program
Cultural and Historical Resources	Section 106, National Historic Preservation Act of 1966; Section 4(f) of the U.S. DOT Act of 1966
Coal and Mineral Resources	Federal Surface Mining Control and Reclamation Act of 1977
Endangered and Threatened Species	Section 7 of the Federal Endangered Species Act of 1973; Iowa Code, Chapter 109A, Management and Protection of Endangered Plants and Wildlife; Minnesota Statutes 84.0895, Protection of Endangered and Threatened Species
State Preserves and Areas	Minnesota Statutes 86A.05, Subd. 5, Memorandum of Scientific Understanding by and Between Minnesota Department of Transportation and Scientific and Natural Areas Program, Minnesota Department of Natural Resources

Exhibit 5.8

SUMMARY OF LOCATIONS OF NATURAL RESOURCES AND CEMETERIES BY ROAD SEGMENT U.S. 63 CORRIDOR[1]

Segment	Native Prairie	Protected Species	Managed Areas [2]	Number of Wetlands [3]	No. Stream and River Crossings	Cemetery
1				*	1	
2				*		
3				4	1	
4				1		
5				16		1
6				5	1	1
7	X			14	1	1
8				*		
9				*		
10	X	X		*	3	
11			1	0		
12	X	X		15		
13				5		
14	X			*	1	
15	X		2	*	1	
16	X			*	**	
17	X	X		*	1**	
18				*	1**	1
19	X			*	1	
20	X			10	2	
21				2		
22	X	X	1	11	**	
23			1	15	2**	

1 Within 1,000-foot corridor along existing U.S. 63, except for bypasses (listed below) where approximately 1 square mile each side of town was inventoried.

2 Includes state scientific areas, parks, recreational trails.

3 Wetlands were evaluated by number of wetlands along the existing alignment, as indicated by this column, or by relative potential to encounter wetlands along the bypass alternatives, as indicated in the next footnote.

* Bypass alternates with greatest potential to encounter wetlands
- Segments 1, 2 - Denver, Iowa - East or West
- Segments 8-10 - New Hampton, Iowa - East
- Segments 14-16 - Chester, Iowa - Northeast
- Segments 17-19 - Spring Valley, Minnesota - East or West
- Segments 20-22 - Racine, Minnesota - East or West
- Segments 22-23 - Stewartville - East or West

** Minnesota protected waterway within 1 mile of project corridor.

SEGMENT	RIVER
1 and 2	Quarter Section Run
6	Crane Creek
7	Wapsipinicon River
10	East Fork Wapsipinicon River
10	Crane Creek
14, 15 and 16 *	Upper Iowa River
17 *	South Branch Root River
18 *	Spring Valley Creek
20	Deer Creek
21	Bear Creek
22 and 23 *	Carey Creek and North Branch Root River

Several rivers and streams in Minnesota are designated protected waters. These are located in the asterisked segments listed above and are subject to Minnesota statutes, Section 105.42 which requires that a permit be obtained before making any alteration in the course, current or cross-section of these waters. Lake Florence in Stewartville (Segments 22 and 23) is also included as a protected water. Exhibit 5.9 also lists these protected water areas.

Prairie Remnants and Scientific Natural Areas

U.S. 63 is well known among prairie biologists in Iowa and Minnesota for remnant tracts of virgin prairie. These native prairie remnants include a diversity of native prairie species and some provide habitat for rare and protected species.

In Iowa, several stretches of native prairie, often a mile or longer, occur within the existing highway right-of-way, particularly in the northeast corner of the junction of U.S. 63 and County Road V5C west of Fredericka (Segment 7) and along the right-of-way of Segments 10, 12, 14, 15 and 16.

In Minnesota, prairie remnants occur in Segments 17, 19, 20 and 22. One of these areas includes the Racine Scientific and Natural Area in Segment 22 in the north half of Sections 22 and 23 T104N R14W. Several records of Minnesota protected and rare plant and animal species have been reported from this site. Scientific Natural Areas (SNA) offer the strongest protection possible at the state level for habitats of rare and endangered species. According to the Minnesota DNR, expansion of the U.S. 63 right-of-way to the east at the Racine Prairie would not be permitted by Minnesota law. In addition, a 1983 Memorandum of Understanding (MOU) between the Minnesota DOT and the SNA program specifies that "The Minnesota DOT right-of-way within the posted SNA will be administered consistently with SNA rules and regulations and Department policy on SNAs." This MOU calls for the Minnesota DOT to inform the SNA program of any planned or anticipated activities that would affect the SNA or adjoining right-of-way. The process of considering an encroachment on a SNA involves a formal public hearing with a hearing and examiner.

Exhibit 5.9
MINNESOTA PROTECTED WATERS
U.S. 63 CORRIDOR

			From			To	
Name	**Segment**	**Section**	**Township**	**Range**	**Section**	**Township**	**Range**
Upper Iowa River	16	34	101	13	34	101	13
Unnamed to South Branch Root River	17	28	102	13	27	102	13
Unnamed to Spring Valley Creek	18	5	102	13	33	103	13
Florence Lake	22,23	33,34	105	14			
Carey Creek	22	4	104	14	33	105	14
N. Branch Root River	23	6	104	15	36	105	12

Protected Plant and Animal Species

Exhibit 5.10 lists records of protected plant and animal species within and adjacent to the project corridor. Known occurrences of protected species are recorded for Segments 12, 17 and 22. Surveys may be required by the Iowa DNR and Minnesota DNR to determine potential project impacts on these species and the potential for other protected species to occur within the project area.

Cultural Resources

A limited 1982 cultural resources survey was conducted along the right-of-way of existing U.S. 63 between Waterloo and New Hampton (Perry, 1982). This study was conducted by the Office of State Archaeologist for Iowa DOT as part of the planning for shoulder improvements and resurfacing. This study found one historical archaeological site.

There is a good potential for additional archaeological and historic resources to occur within the project corridor (according to the Office of State Archaeologist, Iowa City, Iowa). This issue will need to be addressed during future project phases.

Parks, Recreation Areas and Cemeteries

Other environmental resources in the project area include parks, recreation areas and cemeteries. These are listed below. Several of these are located adjacent to the existing highway as indicated by the asterisk:

Segment	Park or Recreation Area	Cemetery Name
5		St. Paul Church*
6		Siegel St. Paul Church*
7		Alcock*
9		St. Joseph
11	McBride County Park* Lourdes, IA	Our Lady of Lourdes Cemetery*
15	Snowmobile Trail* City Park, Chester, IA	
18	Lake Florence Park Stewartville, MN	Spring Valley

Agricultural Resources

The rural lands in the project corridor are primarily used for row-crop agriculture. Impacts to agricultural lands, farm operations and agricultural drainage systems must be addressed in the location/EIS phase of the project. Midwestern farmers have been especially concerned about diagonal crossings of farm fields as these severances hinder farm operations and result in unusable parcels. Coordination with SCS and compliance with state and federal regulations protecting farmland will be required.

Exhibit 5.10
RARE ELEMENTS WITHIN AND ADJACENT TO THE U.S. 63 CORRIDOR

Scientific Name	Common Name	Legal Status	Last Seen	Town	Range	Sec.	Segment
IOWA							
Lycopodium digitatum	Crowfoot Clubmoss	E	1925	T95N	R12W	5	10**
Equisetum sylvaticum	Woodland Horsetail	E	1926	T95N	R12W	5	10**
Cypripedium reginae	Showy Lady's Slipper	E	1926	T95N	R12W	5	10**
Betula pumila	Bog Birch	T	1990	T95N	R12W	5	10**
Betula pumila	Bog Birch	T	1990	T96N	R12W	32	10***
Spilogaic putorius	Eastern Spotted Skunk	T	1987	T98N	R12W	30	12
Wet Loams Prairie			1984	T98N	R12W	30	12
Mesic Loams Prairie			1983	T98N	R12W	30	12
MINNESOTA							
Parthenium integrifolium	Wild Quinine	T	--	T104N	R14W		22+
Taenida integerrima	Yellow Pimpernel	None	1941	T103N	R14W	SE SW14	22
Acris crepitans	Northern Cricket Frog	SC	1939	T104N	R14W		22
Eryngium yuccifolium	Rattlesnake Master	SC	1980	T104N	R14W	SW NW11	22
Eryngium yuccifolium	Rattlesnake Master	SC	1982	T104N	R14W	NE NE22	22+
Valeriana edulis ssp. ciliata	Vaterian	T	1982	T104N	R14W	NE SE15	22
Baptisia alba var. macrophylia	White False Indigo	None	1982	T104N	R14W	NE NE22	22+
Oxypolis rigidor	Cowbane	None	1982	T104N	R14W	NE NE22	22+
Silphium laciniatum	Compass Plant	None	1982	T104N	R14W	NE NE22	22+
Napaca dioica	Glade Mallow	T,P	--	T102N	R14W	E1/2 21; W1/2 22	17++

SOURCE: Bureau of Preserves and Ecological Services, IDNR. Natural HeriNatural Heritage Program, MnDNR. Information

*Legal Status: E = State Endangered
T = State Threatened
SC = State Special Concern
P = Proposed for Federal Listing

Other elements are race but have no special legal protection.
** Located approximately .5 miles east of U.S. 63 corridor, New Hampton, Iowa.
*** Located approximately 1 mile east of U.S. 63 corridor, New Hampton, Iowa.
* Racine Prairie Scientific Natural Area, Mower County, Minnesota
** Information on Glade Mallow Provided by Kathy Bolin, MnDNR.

Alternative #1

Alternative #1 maintains U.S. 63 as a two-lane facility with the addition of passing and turning lanes and shoulder improvements. This alternative would have the least impact on farmland, wetlands and other environmental resources by avoiding most of the new terrain development of the other alternatives. It also would have the least impact on farming operations by avoiding diagonal severance of agricultural land. However, the proposed highway improvements may impact several sensitive areas adjacent to the existing alignment. In Iowa these include prairie remnants Segments 7, 10, 12, 14 and 15. In Minnesota prairie remnants occur along Segments 16, 17, 19, 20 and 22. This includes the Racine Scientific Natural Area located on the east side of the highway in Segment 22. These prairie remnant areas have high potential for state and federally listed rare plants and animals. Known occurrences of protected species are recorded for Segments 12, 17 and 22.

Because this alternative does not include bypasses, it may impact parks, recreation areas and cemeteries located adjacent to communities.

At least one county park, McBride Park in Howard County, Iowa, is located adjacent to U.S. 63 in Segment 11. A city park is located in Chester, Iowa, adjacent to U.S. 63 on the north side of town (Segment 15).

In addition to these parks, two rest stops are located adjacent to U.S. 63 in Segments 5 and 13.

Just south of Chester (Segment 15) a recreation trail used for biking and snowmobiling is located. These trails are leased and managed by Howard County snowmobile clubs, with assistance from the Recreational Programs Bureau of the Iowa DNR. Several other snowmobile crossings and highway right-of-way trails are located elsewhere along U.S. 63 in Iowa.

Most of the cemeteries listed in Exhibit 5.8 are located adjacent to the highway and are about an acre or less in size.

Alternative #2

Alternative #2 is similar to Alternative #1 with the addition of several bypasses around the communities of New Hampton and Chester, Iowa and Spring Valley, Racine, and Stewartville, Minnesota. These bypasses would avoid many of the potential impacts to the parks, recreation areas and cemetery locations described above for Alternative #1. However, some of these are located outside of the existing corridor and will need to be considered during bypass design. Lake Florence Park (Segment 23) is located on the west side of Stewartville, Minnesota, approximately 1/4 mile from U.S. 63. St. Joseph Cemetery in New Hampton, Iowa, (Segment 9) and Spring Valley Cemetery, Spring

Valley, Minnesota, are each located about .5 mile east of the highway.

Most impacts to prairie remnants and to known and potential protected species habitat described for Alternative #1 would be similar for Alternative #2. In addition to these areas, two privately-owned fens (a unique wetland type in Iowa) are located 0.5 and 1 mile east of New Hampton and may be impacted by bypass design. The Iowa Department of Natural Resources has records of protected species at these sites (Exhibit 5.10). In addition to these impacts, the Alternative #2 bypasses would also increase the potential for impacts to wetlands, stream and river crossings, cultural and agricultural resources by crossing new terrain.

Bypasses are proposed around the communities of New Hampton and Chester in Iowa, and around Spring Valley, Racine and Stewartville in Minnesota. For purposes of this feasibility study, alternatives on both sides of each community were considered. In most cases, evaluation of which bypass alternative would have the least impact to wetlands is highly dependent on the specific location and, therefore, not possible to evaluate until further design investigations are undertaken. This is the case at Spring Valley, Racine and Stewartville where wetland clusters are located on both sides of town. At Chester, most wetlands are clustered along the Upper Iowa River. A northwest bypass of this community would have greater potential to impact wetlands along the Upper Iowa River than a southwest bypass which would avoid most of the Upper Iowa River. At New Hampton, a new alignment crossing of the East Fork of the Wapsipinicon River to the northeast of town would impact more wetlands than a western bypass which utilizes the existing alignment at the East Fork Wapsipinicon River.

With the exception of two privately owned fens located .5 and 1 mile east of New Hampton, no other high quality natural areas are known to occur in the vicinity of Alternative #2.

Alternative #3

This option assumes a four-lane facility including four-lane bypasses around all communities. It would avoid the parks, recreation areas and cemeteries described under Alternative #1. However, this alternative would have the greatest overall impact on environmental resources because of the amount of land required for construction of additional lanes along the existing alignment and the new terrain alignment of bypasses that would be built around each community.

Chapter 6
APPROACH TO ECONOMIC FEASIBILITY

A primary issue addressed in this study is whether any of the U.S. 63 improvement alternatives are "economically feasible." A major investment such as a U.S. 63 improvement is "economically feasible" if the economy is better off with the highway improvement than without it. Without question, a well planned U.S. 63 investment will be a significant asset to the U.S. 63 region, and will be of help to the economic future of communities and activities located in proximity to the highway. Ample evidence exists to support the contention that the corridor's economy will benefit from the highway.

One of the reasons that the States of Iowa and Minnesota have been asked to invest in the U.S. 63 corridor is for "economic development" reasons. The rationale, and it is correct from the corridor perspective, is that the U.S. 63 area will be better off due to greater transport efficiency, the possible attraction of new businesses, and the overall improved ability of the corridor region to compete for economic activity. If the improved corridor economy is sufficient to cause the overall economy to be better off, and that economic improvement is greater than the cost of the highway, then the highway project is an "economically feasible" investment.

DEFINITION OF ECONOMIC DEVELOPMENT

For purposes of the U.S. 63 study, economic development is defined as "an increase in the prosperity and incomes of people and institutions". Economic development of this nature in a given area occurs when the incomes and product generated in the area are caused to increase. Such increases occur as a result of a highway investment in either of two ways:

1. <u>More Resources</u> - If output increases in the area, the increased output will require more resources (land, labor, materials, capital) which means that more people are employed, more incomes are earned and more profits are made. If the highway enables the attraction of additional business in the corridor (new firms, or expanded firms), then the highway has aided the economic development process, to the benefit of the corridor area.

2. <u>Efficiency</u> - Even if the highway does not help to create increased output, it can still help economic development by causing the area's output to be achieved at less total cost. Reduced transportation costs due to the highway improvement yield increased prosperity and income.

This U.S. 63 Corridor Study suggests that an improved U.S. 63 will do both: it will enable the attraction of "more resources" and it will create greater "efficiency". As a result, the highway improvement will have very definite "economic development" roles to play. The issue addressed herein, however, is whether the economic benefits are greater than the economic costs.

ECONOMIC BASIS FOR A FEASIBLE U.S. 63 INVESTMENT

U.S. 63 is essentially a "tool," used in transporting goods and people from one place to another. Investment in U.S. 63 improvements contributes to economic development by lowering transportation and logistics costs and by improving people's perceptions of the corridor area, thereby causing them to want to settle and/or invest there. Such changes are realized in numerous ways, including improved travel safety, decreases in fuel consumption and other vehicle operations costs, revised logistics or agricultural patterns, and reductions in noise or air pollution. However, in the final analysis, all of the direct benefits of the highway, and therefore the justification for investing in it, flow from using it for transportation.

Benefits from a U.S. 63 improvement may not only accrue to persons and businesses whose vehicles use the highway. Lower transportation costs may be passed on to consumers as lower prices for consumer goods, to workers as higher wages, or to owners of businesses as higher net income. Persons may thus benefit from a U.S. 63 investment without traveling on it.

It is important to keep in mind that for any of these benefits to occur, the highway investment must either enable significant reductions in transportation costs or cause revised perceptions of the area. If the amount of these savings is small for each trip, if the number of vehicles using the highway is not sufficiently large, or if people's perceptions do not change dramatically, the investment will not produce benefits that exceed its cost. The U.S. 63 investment must therefore be based on reasonable estimates of traffic volumes they will service, the cost savings travelers and trucks will experience, and a realistic assessment of revised perceptions.

Investing in a highway improvement that produces benefits which are less than the associated costs of the improvement operates counter to economic development. The costs will be paid by users and other taxpayers in the form of higher taxes than otherwise would be the case. These higher taxes work against economic growth within the taxing jurisdiction because they reduce post-tax return to businesses and households. Therefore it is imperative that the U.S. 63 investment be economically feasible; if it is not, it is economically counterproductive.

THE ECONOMIC IMPACT AREA

The U.S. 63 investment will contribute to economic development if it significantly reduces transportation costs, making it possible for businesses to obtain a better return. By improving the return relative to that at competing locations, the investment helps attract new businesses. If the impact area of interest is a rather narrow corridor along the highway (e.g., counties adjacent to it), an increase in economic activity is almost certain.

If, instead, the impact area of interest is the entire State of Iowa or Minnesota, the overall amount of economic development resulting from the highway investment might be less. A certain number of businesses within the region, especially those that are relatively mobile, could relocate to higher access sites along the U.S. 63 corridor. While an increase in economic activity may be evident near the highway, it often is not a net gain to the State if it is only a relocation from within the State.

From a state perspective, the highway investment contributes to economic growth if travel costs within the State are reduced. Lower travel costs help improve productivity which, in turn, increases income to firms and individuals. Productivity gains also help enable Iowa and Minnesota produced goods to be more competitive in other states and even in international markets. The key point here is that for a highway investment to contribute to state economic growth, it must significantly reduce transportation costs or otherwise change peoples' perceptions of the region.

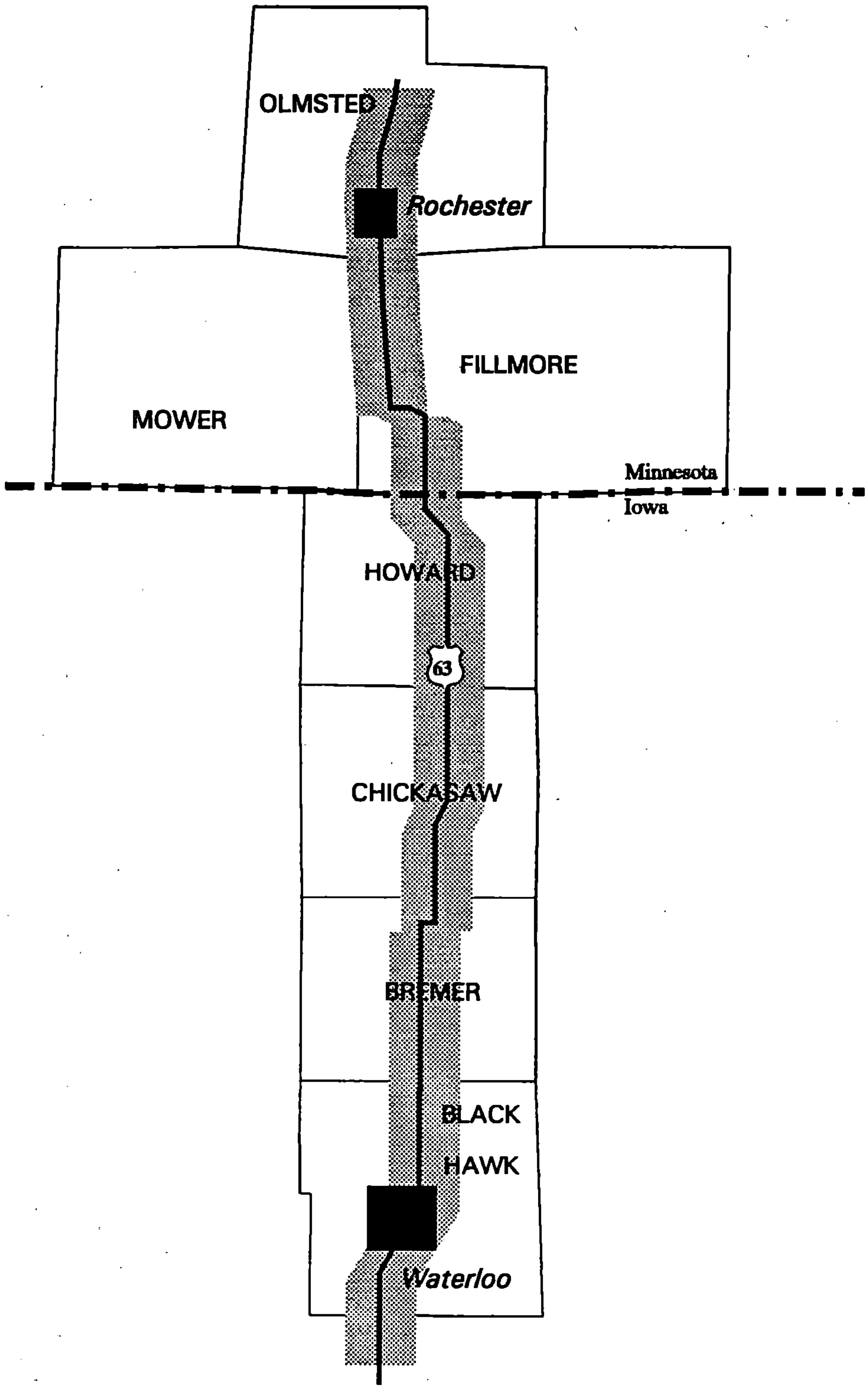
Impact Area Definitions

For purposes of the U.S. 63 study two "impact areas" are used -- the "corridor primary impact area," and the two states. In this way the analysis is able to indicate how the corridor region might benefit and how the states might benefit. Because of the way in which the economic model is configured, the economic impacts are initially calculated according to six impact regions:

1. Primary impact area in Iowa (4 counties)
2. Primary impact area in Minnesota (3 counties)
3. Total primary impact area (7 counties)
4. Remainder of Iowa (all other Iowa counties)
5. Remainder of Minnesota (all other Minnesota counties)
6. Both states, combined

Corridor Primary Impact Area

The "Primary Impact Area" comprises those counties in proximity to the highway itself. This is the area (people, farms, businesses) that would benefit the most. This impact area comprises the seven counties depicted on Exhibit 6.1.



U.S. 63 PRIMARY ECONOMIC IMPACT AREA

Exhibit 6.1

ECONOMIC IMPACT CAUSES

While the transportation function is the cause of all of the economic impacts, the impacts occur in a number of ways. All of the impact types accrue to the corridor's primary impact area, while only some of them accrue at the statewide level.

Economic Benefits to the Corridor Economy

The 7-county Primary Impact Area will economically benefit from the improved highway in a number of ways.

- <u>Travel Efficiency</u> - Vehicle users will benefit due to faster average travel speeds (time savings), reduced accident rates (safety), and improved traffic flow (vehicle operating costs). Truck travel will similarly be faster, cheaper and more reliable.

- <u>Improved Competitive Position</u> - Such transportation improvements will remove one impediment to industrial and service industries attraction and growth. Reduced transportation costs should enable the corridor area to better compete for economic activities, meaning that business activity will be expanded in, or otherwise attracted to, the local economy.

- <u>Roadside Business</u> - The highway improvement will divert traffic to the corridor, and this additional traffic will increase the revenues of such roadside businesses as gasoline stations, motels, restaurants and others.

- <u>Agriculture Savings</u> - Agriculture will benefit from the faster and less expensive transportation costs, including carrying commodities and livestock.

All of the above are of economic value to the Primary Impact Area economy, all have economic development implications, and all are included in this study at the local economy level.

Economic Benefits To The Two State Economies

Sometimes benefits to the local economies may also benefit the state economies, but only when they comprise net increases in state economic development (travel efficiency and/or more resources). Improved travel efficiency is, without question, of value to the economies of the two states, regardless of where in the states the travel efficiency gains occur. This means that resources are used more productively and that statewide prosperity and incomes (economic development) are therefore increased. Similarly, revised logistics patterns or agricultural changes might also be of value statewide.

The other elements of local economic development (improved competitive position and roadside businesses) that are of benefit to the local corridor economy do not necessarily improve the state economies. Some may benefit the state economies, others are more localized in nature.

- **Improved Competitive Position** - The communities along U.S. 63 compete with other communities for manufacturing plants and other forms of economic activity. If the highway causes a plant to locate along the route rather than in some other Minnesota or Iowa community, the net result on the state economies usually will be zero. For example, relocation of a business from I-35 in Iowa to U.S. 63 in Iowa is not necessarily a net gain to Iowa. Only if there is a net gain in productivity does the state economy benefit. Therefore, while improved competitive position is certainly a proper criterion at the local level, it is not a state criterion unless it causes the state to be more competitive in the U.S. economy, or unless there are other Iowa or Minnesota objectives that would favor one corridor region over another region.

- **Roadside Businesses** - Similarly, diversion of traffic from I-35 or a county road to the improved highway will yield benefits to the U.S. 63 businesses which serve the traffic such as gasoline stations, motels, etc., but at a loss to similar businesses on I-35 or the county road. Consequently, the roadside business impact is valuable at the local corridor level, but less so at the state level.

ECONOMIC EVALUATION PRINCIPLES

The principles used in assessing the economic feasibility of the U.S. 63 alternatives are standard to the highway planning industry, with the addition of several economic development methods.

Comparisons with "Do Nothing" Base Case

To calculate each improvement alternatives' costs and benefits, the "improved case" is compared with the "base case" (the base case is the existing highway plus programmed improvements). The benefits for each individual improvement option are calculated by comparing that highway's "improved case" with the highway's "base case." In this manner each improvement option's "feasibility" is determined and, implicitly, the improvement options can be compared one with the other.

Treatment of "Transfer" Impacts

This study distinguishes impacts by different impact areas by estimating economic feasibility at two different levels: the state level, and the local level. Only "net" changes are recognized. Transfers of economic value from one part of Iowa or Minnesota to another part of Iowa or Minnesota (from one group of people or firms to another) are excluded from the state calculations. Similarly, transfers from one part of the corridor to another part of the corridor are excluded.

Underinvestment vs. Overinvestment

One objective of this study is to determine that level of highway investment that is warranted. There are economic consequences of either underinvesting or overinvesting in the U.S. 63 corridor. If the States underinvest in the corridor, economic development will be inhibited because real and perceived travel costs will be greater, competitive position will be retarded, etc. There is therefore an economic cost associated with underinvestment in the highway. If the states overinvest in the corridor, overall efficiency will suffer because those funds could have been put to better use elsewhere (put to more efficient use). There is therefore an economic cost associated with overinvestment in U.S. 63.

Recognizing these facts, this study seeks to define those highway investments, and those levels of investment, that are efficient (neither underinvested nor overinvested). This implies efficient and feasible use of tax dollars. The proper level of investment is calculated first in terms of travel efficiency, second in terms of economic development, and third, a combination of the two.

Indicators of "Economic Feasibility"

To determine which of the U.S. 63 investments are economically feasible, the costs of building and operating the highway improvements are compared with the economic benefits estimated to be attributable to the highway improvements. This cost and benefit comparison yields three indicators of "economic feasibility:"

- **Net Present Value** - All costs and benefits in future years are discounted back to the 1991 base year using a discount rate of 6 percent. The future stream of discounted costs are subtracted from the future stream of discounted benefits. When the sum of the discounted benefits is greater than the sum of the discounted costs, the "net present value" is positive and the highway improvement is deemed to be "economically feasible."

- **Discounted Benefit/Cost Ratio** - After the future streams of costs and benefits are discounted, the sum of the discounted benefits are divided by the sum of the discounted costs. When the result is 1.0 or greater, the highway improvement is "economically feasible."

- **Internal Rate of Return** - This calculation determines that discount rate at which the net present value difference between costs and benefits is zero. When the rate of return, expressed as a percentage, is equal to or greater than the discount rate, then the highway improvement is deemed to be "economically feasible."

Included in the above economic feasibility calculations are all quantifiable public sector financial costs attributable to the highway project (cost of planning, designing, building and maintaining the road improvements) and all quantifiable economic benefits including road user benefits (vehicle operating costs savings, value of time savings, accident cost savings) and also including economic development benefits (competitive advantage benefits and roadside business benefits). Excluded from the cost-benefit calculations are road improvement implications that cannot accurately be tabulated in monetary terms (environmental or social implications, impacts on other modes of transportation, etc.). As a result, the economic feasibility calculation should be important to the improvement and investment decisions, but should not be viewed as the only criterion.

Discount Rate

As is standard practice, benefits and costs (present and future) in this study are presented in constant dollars (inflation is not factored in). At the same time, it is important to recognize that future benefits and costs do not have the same value in the future as they do today. Therefore, all future costs and benefits are "discounted back" to 1991. Because future inflation is not included, the selected discount rate also excludes future price level changes (inflation). After considerable discussion and research, a rate of six percent was selected for use.

Residual Value

A 30-year future study period was used. However, many components of the highway improvements last longer than 30 years. To recognize this, the highway lifespans were estimated, and the highway elements that will last longer than 30 years were added as economic benefits in the year 2020. For example, the right-of-way has an assumed life of 100 years and has a residual value equal to 70/100'ths of its original price. Similarly, the earthworks, bridges and others have considerable remaining life for residual purposes, while the pavement has little or no residual value.

TRAVEL EFFICIENCY EVALUATION

Transportation efficiency is a legitimate local corridor, regional, state and even national goal. If the U.S. 63 improvement creates road user cost savings that, over time, exceed the cost of the road improvement, then that road improvement should be implemented. Therefore, travel efficiency is relevant to the funding decision for FHWA, the Iowa DOT, the Minnesota DOT, and local agencies.

Road Improvement Costs

The cost side of the cost-benefit calculation includes two costs: 1) the "capital costs" of constructing the highway, and 2) the annual change in maintenance costs and eventual resurfacing costs. Only the costs attributable to the road sections that are not yet programmed or committed for improvement are included.

- **Capital Costs** - Capital costs comprise the cost of improving the "not programmed" road sections including right-of-way acquisition, planning, design, and construction.

- **Road Maintenance Cost** - Once the road sections are improved, there will be more road to maintain than previously. However, that will be "new" road conditions which will reduce requirements for certain types of maintenance. The resulting net change in maintenance cost is included as a cost in the feasibility calculation.

Travel Efficiency Economic Benefits

The travel efficiency benefits of the highway improvements are of three types: vehicle operating cost savings, accident cost savings, and value of travel time savings. Such benefits were calculated for three vehicle types: cars, light trucks, and heavy trucks. All benefits were assumed to start in the study's base year (the first year following the capital cost outlays) and were then expressed by year of occurrence. The network model was used to estimate travel efficiency benefits in 1990 and 2010; intermediate year benefits were interpolated between the two analysis years in straight line fashion, and benefits beyond 2010 were extrapolated in straight line fashion.

- **Vehicle Operating Cost Savings** - Car, light truck and heavy truck operating cost savings estimates were made using the FHWA "Highway Investment Analysis Package" (HIAP), as modified by Wisconsin DOT to replicate conditions in the Upper Midwest. The cost savings were developed using "consumers surplus" analysis techniques, so the cost savings accurately depict savings not only to common traffic (traffic on the route both before and after the highway improvements) but also to diverted traffic (traffic diverted from other regional highways). The vehicle operating cost changes reflect differences in vehicle miles of travel, travel speed changes, curvature and gradient changes, reduced numbers of speed change cycles, and other changes that affect vehicle operations.

- **Accident Cost Savings** - Road improvements of the types evaluated in this study, including bypasses around towns, will reduce accident potentials. Changes in accident rates were established by highway type based on accident histories provided by Iowa and Minnesota DOT's. Accident rates were established for three accident types (fatal, injury, property damage), with appropriate monetary values established. Accident values provided by FHWA were used in the analyses.

- **Travel Time Savings** - All of the alignment and investment options, if improved, will save car and truck travel time. Consumers surplus techniques were used to develop estimates of travel time savings, with the result that the travel time saved includes both common and diverted traffic. Time values as suggested by FHWA were utilized.

Travel Efficiency Sensitivity Tests

The travel efficiency feasibility tests were based on forecasts and assumptions, any one of which might be inaccurate. Five such estimates or assumptions are particularly important:

- **Discount Rate** - A six percent discount rate was used in the tests of economic feasibility. To illustrate the importance of the discount rate, a discount rate of 10 percent also was used.

- **Capital Cost** - This study's estimates of capital costs do not have the benefit of detailed design analyses. Therefore, the cost estimates might be somewhat inaccurate. To gauge the impact of imprecise cost estimates, the estimated costs were increased by 20 percent in a sensitivity test.

- **Traffic Volumes** - Traffic volumes on U.S. 63 are forecast to increase; in addition, an improved U.S. 63 is expected to divert some traffic from other highways, and some generated traffic is a possibility. For sensitivity test purposes, a worst case also was used, wherein it was assumed that no traffic growth and no traffic diversion would occur.

- **Accident Rates** - The accident savings were based on accident histories through the year 1990. In 1991, however, a dramatic increase in fatalities occurred on U.S. 63. For sensitivity purposes, the 1991 fatalities were added to the accident history.

- **Value of Time** - For feasibility purposes, time savings were expressed in monetary terms. Such values are somewhat subjective. For sensitivity purposes, the time values used for auto drivers and passengers were reduced by two-thirds.

ECONOMIC IMPACT EVALUATION

A highway improvement of the type envisaged for the U.S. 63 corridor will make travel faster, easier and more efficient. In the process it will divert traffic from various roads to U.S. 63, it could generate traffic, and transportation will be generally more efficient. All of these events will be most welcome, not only because of the travel efficiencies and the improved perception of the area but also because of what these travel efficiencies and perceptions could mean to the economies along the highway.

It is widely believed by corridor residents and by the U.S. 63 business community that the corridor area will be better off economically with the highway improvements than without them. Most certainly this is true; the issues are: 1) what magnitude of economic impact can be expected? 2) should the economic impact benefits be added to the travel efficiency benefits? and 3) is that impact sufficient cause to warrant major investments in U.S. 63?

Economic Impact Model

The economic impact portion of this study relied on an interregional model of the counties in the U.S. 63 corridor. The "REMI" set of models are private sector models owned by Regional Economic Models, Inc. of Amherst, Massachusetts. This model package has also been applied to a number of highway corridor evaluations, and this model package has the advantage that it is dynamic in nature. The REMI model was selected for the U.S. 63 because its use might produce different findings than were found when the IMPLAN model was used on the Avenue of the Saints Study.

The REMI model is a comprehensive forecasting and simulation system useful for policy analysis in a wide array of issues. The REMI model does have some similarities to Input-Output models. The model is structured to incorporate inter-industry transactions along with feedback from final demand activities. The proportion of intermediate and final demand that is fulfilled by producers in the region is determined by the model. Demand not fulfilled by local production leads to imports. The REMI model differs from regular Input-Output models in its ability to allow substitution among factors of production in response to changes in relative factor costs over time. Within the model, wages are responsive to changes in labor market conditions, migration is responsive to changes in expected income, and the share of local and export markets responds to changes in regional profitability and export costs.

Simulations with the model can be used to estimate the economic and demographic effects of policy interventions such as economic development programs, infrastructure investments including new highway construction, energy and natural resource conservation programs, state and local tax changes, and other policies. The policy simulation compares the performance of a region after a policy intervention with the projected performance of the region based on national forecasts of industry growth, changing technology and estimates of the shifting competitive position of each industry in the region compared to that industry elsewhere in the country.

Indicators of Economic Impact

The U.S. 63 improvements could yield many different forms of benefit to local economies. In order to recognize these diverse impacts in a consistent fashion, a single set of "indicators of impact" and a single set of definitions were used throughout the economic impact calculations. The economic impacts were expressed in terms of six "indicators of economic impact:"

- **Economic Activity (Output)** - Defined as "Gross Output", Economic Activity is the value of the final demand created by the highway improvements, plus the sum of all of the intermediate goods and services needed to produce that final demand, plus the induced impacts of increased household consumption (respending). Total economic activity is the total value of each good or service produced by the industry during the year (intermediate inputs plus value added) as a result of highway construction and highway use.

- **Value Added** - The value of the corridor area's firms output minus the value of the inputs they purchase from other firms. In the corridor study it is the value added by firms located in the defined corridor impact areas, including employee compensation, proprietary income, indirect business taxes, and other property income.

- **Personal Income** - Total increases in payroll costs (wages and salaries and benefits) paid by local industries due to the improved highways, plus income from self-employment, other property income (interest and corporate profit), and transfer payments. In this study when economic impact benefits are added to the travel efficiencies, it is the "personal income" impact which is added to the travel efficiencies.

- **Salaried Wages and Proprietary Income** - Increases in payroll costs (wages and salaries) plus income from self-employment.

- **Employment** - Job impacts are expressed as jobs, not "full-time equivalent" jobs, and include the number of person job years due to road construction and road use, plus the share of those that are employed in sectors that directly or indirectly support the construction process, the road users, and the firms that might expand in or locate to the corridor region.

- **Population** - Additional population that is attracted to the area as a result of the improved highway.

Economic Development Impact Types

U.S. 63 improvements could cause a number of events to occur that will be beneficial to the local economies. These events are categorized into four types, and are evaluated in terms of their likely magnitude.

- **Act of Highway Construction** - The act of spending money in the corridor to build the improved highway will be of immediate economic benefit to the corridor area. These impacts are temporary in nature, since they exist only during the construction activity and terminate when the road construction is complete (when the highway is open to traffic). These "direct" impacts of highway construction are estimated but should not be used as evidence that the highway improvements are feasible.

- **Corridor Competitive Position** - An improved highway reduces the cost of transportation. Reductions in trucking time and cost lead to reduced costs of production, which in turn lead to marginally reduced prices and/or increased profits, which can lead to increased production (expansion of existing firm production and/or attraction of new firms), which in turn generates economic impact value. These "competitive position" impacts are calculated.

- **Roadside Service Industries** - A more efficient north-south highway will lead to revised travel patterns involving greater traffic density on U.S. 63. Greater traffic density causes increased sales for roadside businesses (motels, restaurants, gasoline stations, tourist visitation places, others that cater to highway users). These "roadside service industry" impacts are calculated; they are valuable to the route's primary impact area, although they might be transfers from other Iowa and Minnesota routes and therefore would not comprise net impacts to the two states.

- **Agriculture** - The agriculture sector will benefit from reduced trucking and auto costs. In addition, agriculture could benefit if livestock are not damaged during transportation.

Economic Impacts of Highway Construction

The U.S. 63 improvements will cost millions of dollars to build, depending on which option is selected. The very act of spending large sums of construction money in an area is of economic value to that area, since contractors and construction workers are hired, gravel is purchased, etc. Economic value that is created in the corridor due to the act of spending such construction funds in the corridor were estimated.

Each option's capital costs were estimated in terms of construction cost and right-of-way cost. The construction costs were treated as increases in final demand and input into the REMI model. The right-of-way costs were treated as transfers and not included in the economic impact calculation as benefits. The construction costs were assumed to be spent, initially, within the corridor's defined impact area. The economic impacts due to the act of construction comprise the monies spent in the corridor and the flow of those monies in terms of respending. The impacts include the labor and expenses associated with planning, design and construction, plus the respending of those funds to the extent that such respending occurs within the corridor.

However, the construction impacts should only be used to indicate the extent to which the U.S. 63 primary impact area might benefit economically from the expenditure of construction monies in that region. Once the construction is complete, these construction impacts no longer occur. In addition, the construction impacts should not be used as indicators of road improvement "feasibility" or "justification". This is because the "Economic Activity" impacts caused by construction costs are always greater than the construction costs themselves (due to the respending of the funds). The construction impacts merely show that the corridor's residents are better off, and by how much, if money from outside (state and/or federal funds) is spent in the U.S. 63 impact area.

Impact on U.S. 63 Region's Competitive Position

Given the trends in the corridor's economy, there is a need for the region to expand existing businesses, to attract new businesses, and to diversify the area's economic base. To attract business, the corridor must be competitive with other areas.

The question arises as to whether and to what extent an upgraded highway along the corridor would benefit the businesses already in the corridor. A related question is what the highway could do to help foster growth of other, emerging industries. It is clear that competition will be great among regions to maintain as high a level of manufacturing and other industries as possible and to attract activities demonstrating growth potential nationally. Keeping transportation costs as low as possible is one of the most effective actions government can take to make any corridor competitive.

Stated differently, the major economic transition that is taking place nationally creates unique opportunities because previous centers of economic activity will not necessarily continue to dominate. By reducing the cost of doing business, a state or region strengthens its business climate. Facilitating faster, safer travel along the corridor represents a logical means for increasing the competitive advantage of communities along it.

The ability to attain such economic growth is a function of many things, one of which is the ability of the area to compete for such diversification and growth. The ability to compete is also a function of many things, one of which is the cost of doing business in the corridor, and the cost of doing business is a function of many things, one of which is the cost of transportation. By tracing this relationship, it is apparent that transportation does have a role in achieving the U.S. 63 area's economic development goals.

All areas of the corridor already have street and highway access. Therefore, lack of access is not the issue; rather, the issue is the efficiency of that access, and whether improved efficiency might lead to some degree of increased economic development.

Exhibit 6.2 presents a sequential flow of activities involved in moving from the highway improvement itself to the economic impact of that improvement in terms of what it does for competitive position. The activities themselves are described as follows:

1. <u>The Highway Improvement</u> - The act of building the U.S. 63 improvement has a short-term economic impact; that impact is assessed.

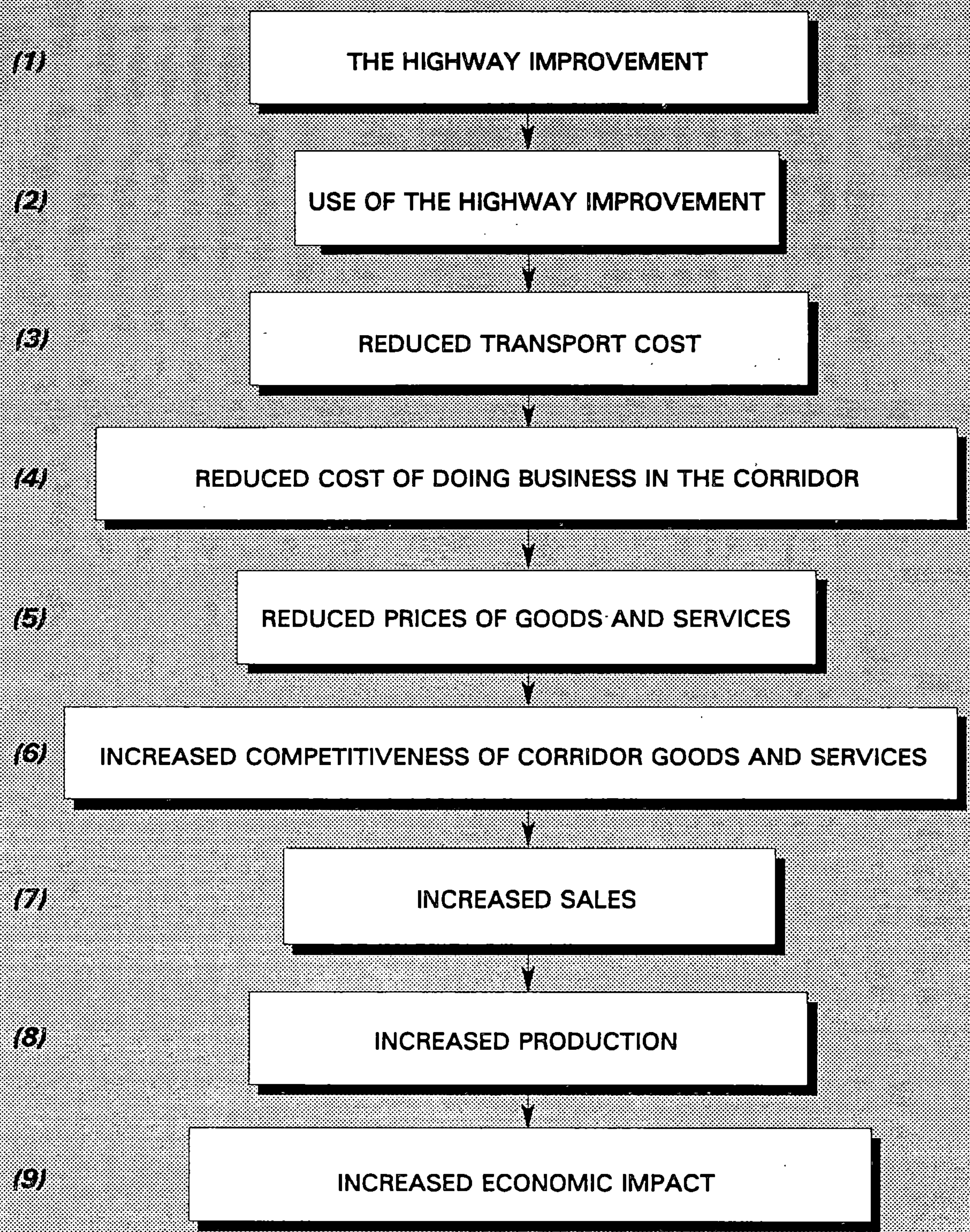
2. <u>Use of the Improved Highway</u> - The improved highway will be used by existing and diverted and possibly induced traffic. The transportation model quantifies the estimated use of each alternative highway improvement.

3. <u>Reduced Transportation Cost</u> - The highway improvements lead to increased travel efficiency in the form of reduced travel time, increased travel reliability, reduced accidents and revised vehicle operating costs. The efficiencies themselves are quantified in the "user analyses" for cars and trucks.

4. <u>Reduced Costs of Doing Business in Corridor</u> - Transportation cost is one factor in the cost of doing business in the corridor. If transportation costs, especially trucking costs, decline in the corridor, this means that the total cost of doing business in the corridor will also slightly decline.

Exhibit 6.2

COMPETITIVE POSITION PRINCIPLES



5. **Reduced Prices of Goods and Services** - If costs of production decline due to transportation cost reductions, the result will be reduced prices of goods and services, or increased profits, or both. Such reductions apply to goods produced in the corridor as well as goods shipped into the area.

6. **Increased Competitiveness of Corridor's Goods and Services** - With slightly reduced costs and therefore prices, the goods and services produced in the corridor should be slightly more competitive with the improved highway than without it.

7. **Increased Sales** - If the region's goods and services become more competitive due to price decreases, the region's businesses should be able to make additional sales of those goods and services.

8. **Increased Production** - If sales increase, production of goods and services will increase by a like amount.

9. **Increased Economic Impact** - Increased production generally implies increased payroll, additional jobs, increased tax revenue and increased value added and output.

The above sequence makes sense, and it does occur. It should be emphasized, however, that the highway improvements are "incremental," in that they only improve transportation to an area that already has transportation service. Therefore, the impacts are somewhat modest.

U.S. 63 Impacts Due to Increased Traveler Expenditures

In addition to development caused by improved competitive position, the improved highway could also increase business for businesses along the highway that cater to traffic. For economic evaluation purposes, "roadside services" are defined as businesses that serve the cars and trucks and their drivers/passengers such as gasoline stations, hotels/motels, restaurants, gift shops, etc., and that are located within sight distance of the highway. There is a general relationship between traffic density (volume), trip characteristics, and the number of roadside service establishments that exist, e.g., the higher the traffic volume, the greater the number of motels, etc. Selection of any of the highway improvements will cause greater traffic density and consequently the attraction of additional roadside services to serve those increased traffic volumes.

Since U.S. 63 already has gasoline station, motel, and restaurant development, the issue to consider is, what increase might be expected due to new/diverted traffic associated with the highway improvement and whether that development represents a net increase suitable for use in the economic impact calculations.

Roadside business increases will be due to traffic increases. Over the next 30 years there will be normal traffic change, even if the road improvements are not made. In addition, there will be increased traffic due to the road improvement, which will principally be diverted from other regional highways. Using the study's traffic model, the change in vehicle miles of travel (VMT) for each option were calculated. The traffic changes will bring with them comparable increases in roadsi$e "usi.ess in the form of increased roadside gas station, motel and restaurant activities. This increase could involve the attraction of new businesses, or could accrue in the form of increased sales by existing businesses, or both. In either event, however, the business increases are drawn from other regional highways and therefore from other regional businesses.

The direct impacts caused by increased traveler expenditures were run through the REMI model, to gauge the value of those expenditures to the local (primary impact area) economy.

Much of the traffic increases are due to traffic diversion from other routes in Iowa and Minnesota to U.S. 63. As a result, the business that is gained along the route is lost business elsewhere. This implies a transfer from one beneficiary (business) to another, and does not represent a net increase in total Iowa or Minnesota impact. Consequently, such travel expenditure impacts are important to the U.S. 63 "primary impact area," but are generally in-state "transfers."

IMPACT ON EMPLOYMENT

The retention of existing jobs and the attraction of new job opportunities is an important goal of all jurisdictions along U.S. 63. An improved U.S. 63 will aid in the achievement of this jobs goal, at least for the "primary impact area." Jobs will be created in the impact area in four ways.

- Construction Jobs - The firms engaged to construct the highway will spend large sums of money in the area. These expenditures will be used to pay contractors, subcontractors and suppliers of goods and services. These construction caused jobs will exist only during the construction process itself.

- Competitive Position Jobs - By making the corridor area more competitive, output will increase and with it existing firms might be expanded and new firms attracted. Both forms of business activity expansion will employ additional people.

- **Traveler Expenditure Jobs** - Increased traffic volumes on the improved route will lead to increased business along the route for businesses that cater to vehicular traffic. These businesses will therefore employ increasing numbers of people.

- **Consumer Respending Jobs** - In each of the above three cases, the people in the new jobs (or higher pay jobs) will spend much of their income within the corridor. This respending will in turn create additional jobs.

TOTAL ECONOMIC BENEFITS OF THE U.S. 63 IMPROVEMENT OPTIONS

The total quantifiable economic benefit of investing in U.S. 63 comprises five benefit types:

1. **Travel Efficiency Benefits** - These are economic resource benefits that are of benefit to state and local economies and therefore represent "net" benefits to the economy.

2. **Construction Expenditure Benefits** - These are benefits that accrue to the local "primary impact area" economies when construction dollars are spent locally. They are relevant locally, some may be relevant at the state level, but they should never be used to justify the highway improvement because they are "transfers."

3. **Competitive Position Benefits** - These are benefits that accrue to the U.S. 63 "primary impact area" economies when improved transport efficiency reduces the total cost of doing business in the corridor. They comprise increases in manufacturing activity and other activities and they are benefits at the local level, and some could be construed as benefits to the Iowa and Minnesota statewide economies.

4. **Traveler Expenditure Benefits** - These are roadside business benefits that also accrue to the "primary impact area" economies. They are legitimate economic benefits at the local level, and portions might be legitimate at the state level.

5. **Additional Agriculture Impacts** - Changes to the highway can lead to greater agricultural changes in addition to the trucking savings estimated above. These are net efficiencies, valuable at the local corridor level and the state and national levels.

Chapter 7
TRAVEL EFFICIENCY FEASIBILITY

Travel on a higher class of highway is economically more efficient than is the case on a highway of lower quality. By adding passing lanes and turning lanes, traffic delay and vehicular speed change cycles are reduced as is traveler irritation. By building bypasses around towns, through traffic trip delays are reduced, as are vehicle operating costs. If a four-lane highway is built, travel is even more efficient.

In the travel efficiency assessment, highway user efficiency is measured in terms of vehicle operating cost (fuel, tires, vehicle maintenance, etc.) value of travel time saved, and accident reduction. All three are calculated in terms of money.

Transportation efficiency is a legitimate local corridor, state and national goal. If a road improvement creates road user cost savings that, over time, exceed the cost of the road improvement, then that road improvement should be implemented. Therefore, travel efficiency is relevant to the funding decision for FHWA, the state highway agencies, and local agencies.

Complicating the investment decision, however, is the likelihood that highway agencies seldom have sufficient funds to build every highway project that might be deemed "feasible." Typically the highway agencies must select between numerous highway projects, all of which would be built if there were sufficient funds. Generally, the highway agency should select that combination of projects which, within the funding constraints, yield the greatest return on the money spent. Under this scenario, some feasible projects are deferred and, conceivably, some may not be built for many years.

To gauge the travel efficiency economic feasibility of each improvement option, conventional benefit/cost indicators are used.

ECONOMIC COSTS

The cost side of the benefit/cost calculation comprises the costs to the highway agency that is responsible for building and maintaining the highway. Since U.S. 63 is a state-administered highway, the costs are those that would be incurred by the Iowa and Minnesota Departments of Transportation -- regardless of the source of the funds.

Capital Costs

Capital costs comprise the cost of improving the "not programmed" road sections, including right-of-way acquisition, planning, design, and construction. The capital costs associated with the "Not Programmed" sections, as presented earlier in this report, are summarized on Exhibit 7.1.

Exhibit 7.1

CAPITAL COST SUMMARY

	ESTIMATED CAPITAL COST ($000)		
	Alternative #1: Improved Two-Lane	**Alternative #2: With Bypasses**	**Alternative #3: Four-Lane**
Iowa	$9,749.4	$25,259.4	$69,149.3
Minnesota	14,926.5	20,717.4	42,945.9
Subtotal	$24,675.9	$45,977.1	$112,095.2
Planning & Engineering	3,701.4	6,896.6	16,814.3
TOTAL	**$28,377.4**	**$52,873.7**	**$128,909.5**

SOURCE: Brice, Petrides-Donohue

The planning and engineering costs are estimated at 15 percent of the construction costs, excluding the cost of right-of-way acquisition. To ensure that the Benefit/Cost analysis allows an equitable treatment of all three improvement options, the capital costs were all assumed to be spent in the study's initial analysis year (1991). When the impacts of construction are estimated, the construction expenditures are assumed to be spent over a six-year period.

The analysis period was 30 years (1991-2020). By 2020 some of the highway improvements will be depreciated (used some or all of their useful life) while other elements have longer lifespans. To recognize this, a residual value was assigned in the year 2020 as a benefit. The residual lives for each improvement cost component were as follows:

Cost Element	Useful Life
Right-of-Way	100 years
Bridges and Structures	60 years
Earthworks	100 years
Road Base	50 years
Pavement	30 years

The total residual values, taken as an economic benefit in the year 2020, are as follows:

	YEAR 2020 RESIDUAL VALUE
Alternative #1: Improved Two-Lane	$3,853,520
Alternative #2: With Bypasses	16,227,100
Alternative #3: Four-Lane	50,022,100

Annual Maintenance and Resurfacing Costs

By constructing passing lanes, turning lanes, town bypasses and four-lane highways, the state DOT's will have more highway to maintain. These incremental maintenance costs, as presented earlier, are specified by year through the 30 year forecast period. The annual estimated incremental maintenance costs are:

	ANNUAL INCREMENTAL MAINTENANCE COST
Alternative #1: Improved Two-Lane	$17,500
Alternative #2: With Bypasses	90,600
Alternative #3: Four-Lane	191,900

In addition, the two states will have to periodically resurface the additional lane miles. The estimated resurfacing costs are assumed to occur every 15 years, and total:

	INCREMENTAL RESURFACING COSTS
Alternative #1: Improved Two-Lane	$665,000
Alternative #2: With Bypasses	2,897,000
Alternative #3: Four-Lane	10,587,800

TRAVEL EFFICIENCY ATTRIBUTABLE TO HIGHWAY IMPROVEMENTS

By investing in U.S. 63, the two states will save the traveling public time, cost and accident risk. The travel efficiency benefits of the highway improvements are of three types: vehicle operating cost savings, accident cost savings, and value of travel time savings. Such benefits were calculated for three vehicle types: cars, light trucks, and heavy trucks. The road user benefits are estimated for U.S. 63 using consumers surplus techniques to ensure that the economic evaluation does not penalize the project due to higher traffic volumes.

Traffic that is already using U.S. 63 will benefit by the full vehicle operating cost, travel time and accident savings. Traffic that is diverted to the highway will not benefit by the full amount. For diverted traffic, "consumers surplus" techniques were used to calculate the travel efficiency gains for those vehicles.

Vehicle Operating Cost

Car, light truck and heavy truck operating cost savings estimates were made using the FHWA "Highway Investment Analysis Package" (HIAP), as modified by Wisconsin DOT to replicate conditions in the Upper Midwest. The vehicle operating cost changes reflect differences in vehicle miles of travel, travel speed changes, curvature and gradient changes, reduced numbers of speed change cycles, and other changes that affect vehicle operations.

The estimated motor vehicle operating cost changes attributable to the improvement alternatives are depicted on Exhibit 7.2.

Exhibit 7.2

ESTIMATED ANNUAL VEHICLE OPERATING COST SAVINGS
U.S. 63
Years 1990 and 2010

	ESTIMATED OPERATING COST SAVINGS ($000)		
	Alternative #1: Improved Two-Lane	Alternative #2: With Bypasses	Alternative #3: Four-Lane
Year 1990:			
Automobiles	$(9.4)	$237.6	$282.1
Light Trucks	(2.2)	43.8	64.5
Heavy Trucks	(9.3)	236.5	354.0
Total	$(20.9)	$517.9	$700.6
Year 2010:			
Automobiles	$(17.4)	$334.8	$410.1
Light Trucks	(3.1)	61.3	90.1
Heavy Trucks	(15.2)	385.9	577.8
Total	$(35.7)	$782.0	$1,078.0

SOURCE: Wilbur Smith Associates

For Alternative #1 the vehicle operating costs increase by small amounts (an economic cost). The reason is that the costs of motor vehicle operation are greater at 55 mph than they are at 45 mph, e.g., they consume more fuel per mile. Therefore, from a vehicle operating cost viewpoint, it is more efficient to operate at lower speeds (30-35 mph is the speed of maximum efficiency). By building passing lanes, "free flow" speeds will increase, resulting in higher vehicle operating costs (but also resulting in time savings, which is an economic benefit).

In Alternative #2 the vehicle operating cost savings turn positive (an economic benefit) because the town bypasses cause vehicles to move at free flow conditions on the bypasses rather than in stop and go conditions through the towns. From a vehicle operating cost perspective, it is more expensive to pass through a town than to bypass it.

In Alternative #3 the vehicle operating cost savings are also positive because vehicle speed change cycles (braking, accelerating) are greatly reduced, due to the continuous four-lane facility through the corridor.

Travel Time Savings

All three improvement options will increase travel speeds in the corridor. Alternative #1 will reduce delays by enabling vehicles to pass slower moving vehicles by using the passing lanes, and by avoiding delays due to vehicles that are turning at major intersections. In addition, Alternative #2 will allow vehicles to bypass the in-town posted speed limits. Alternative #3, being a four-lane highway, will virtually eliminate delays due to slow vehicles and should yield higher speeds throughout.

All highway segments have speed limits which, while not always obeyed, tend to reduce speeds compared to the speeds that would occur if such speed limits were absent. This study's analysis used actual speeds, rather than the speed limits, in an attempt to be most realistic. Average speeds, on rural segments, were 56 to 60 mph, depending on the type and condition of the road segment.

The estimated annual vehicle hours saved, by vehicle type, are listed on Exhibit 7.3. These hours are based on estimated speeds, on a segment-by-segment basis.

The monetary value to be assigned to travel time saved is subject to some debate. For analysis purposes, FHWA suggests that the methods contained in the AASHTO publication "A Manual on User Benefit Analysis of Highway and Bus-Transit Improvements" be used. In 1989 those values were $8.00 per hour for automobiles and $15.00 per hour for trucks. These values were updated to 1991 price levels and, for trucks, disaggregated to truck size based on estimates provided by the trucking industry. These values were checked for applicability to the Iowa and Minnesota region and were found to be appropriate. For the U.S. 63 study, the hourly values are:

Exhibit 7.3
ESTIMATED TRAVEL TIME SAVED ON U.S. 63
Years 1990 and 2010

	ANNUAL VEHICLE HOURS SAVED (000)		
	Alternative #1: Improved Two-Lane	Alternative #2: With Bypasses	Alternative #3: Four-Lane
Year 1990:			
Automobiles	40.07	226.22	333.06
Light Trucks	1.88	6.95	11.31
Heavy Trucks	7.92	26.58	45.27
Total	49.87	259.75	389.64
Year 2010:			
Automobiles	73.39	339.34	519.90
Light Trucks	2.87	9.72	15.82
Heavy Trucks	12.93	43.38	73.89
Total	89.18	392.44	609.61

SOURCE: Wilbur Smith Associates

	VALUE OF ONE HOUR TRAVEL TIME (1991 $)
Automobiles	$8.70
Light Trucks	12.75
Heavy Trucks	16.25

Applying these hourly values to the estimated travel time savings yields the Exhibit 7.4 economic savings due to travel time savings.

Exhibit 7.4

ESTIMATED VALUE OF TRAVEL TIME SAVED ON U.S. 63

Years 1990 and 2010

	ANNUAL VALUE OF TIME SAVED ($000)		
	Alternative #1: Improved Two-Lane	Alternative #2: With Bypasses	Alternative #3: Four-Lane
Year 1990:			
Automobiles	$348.6	$1,968.1	$2,897.6
Light Trucks	24.0	88.6	144.2
Heavy Trucks	128.7	431.9	735.7
Total	$501.3	$2,488.6	$3,777.5
Year 2010:			
Automobiles	$638.5	$2,952.3	$4,523.1
Light Trucks	36.6	123.9	201.7
Heavy Trucks	210.1	704.9	1,200.7
Total	$885.2	$3,781.1	$5,925.5

SOURCE: Wilbur Smith Associates

Accident Cost Savings

While no highway improvement can entirely eliminate traffic accidents and fatalities, the various improvement alternatives being considered should reduce accident risk. Alternative #1 with its passing lanes, turning lanes, improved shoulders and partial reconstruction should reduce accident rates. Alternative #2 will reduce traffic through the towns, thereby reducing accident rates in the towns, and Alternative #3 being a four-lane expressway should dramatically improve accident risk.

To enable the accident calculations, accident information was obtained from Iowa DOT and Minnesota DOT for U.S. 63. Iowa data included the numbers of property damage accidents and total accidents, and the number of deaths and personal injuries for the period 1988 to 1990. Fatal or injury accidents were calculated by taking the difference between total and property damage accidents. If no deaths occurred in the fatal/injury category, then all accidents were reclassified as injury accidents. If one or more deaths occurred, one fatal accident was added to the fatal category and one accident was subtracted from the fatal/injury category. Minnesota data included numbers of accidents classified by fatal, injury, property damage accidents and total for the years 1986 to 1990.

Average annual accidents categorized by type and state were then computed. Exhibit 7.5 presents the accident data by U.S. 63 section in Iowa and on a total basis in Minnesota, together with their annual averages.

These statistics suggest that, in a "typical year" (1988-1990), there is one fatal accident per year in Iowa (two fatalities) and one fatal accident per year in Minnesota on the relevant sections of U.S. 63. It is these average statistics that were used in the study's analyses.

In the year 1991, however, the fatality rate on the Iowa portion of U.S. 63 escalated dramatically. In that year alone, 13 fatalities occurred, as listed in Exhibit 7.6.

The sudden occurrence of 13 fatalities on a predominantly rural, two-lane highway in rolling terrain is impossible to explain. They point out the fact that accident rates vary dramatically from year to year; hence, the need to utilize average rates, over a multiple year timeframe. Furthermore, high accident locations should not be used to justify the feasibility of an entire corridor.

To conduct the feasibility assessment, the average rates through 1990 were used. Then, a sensitivity test was conducted which included the high fatality year of 1991.

To enable accidents to be included in the economic evaluation, a monetary value was placed on accidents, by accident type. The FHWA analyzed the issue of assigning monetary values to accidents and issued a directive (FHWA Technical Advisory T 7570.1, June 30, 1988) which recommended specific monetary values to be used. These monetary values are listed on Exhibit 7.7, and were utilized in the U.S. 63 study.

Exhibit 7.5
U.S. 63 ACCIDENT HISTORY

IOWA ACCIDENTS (1988-1990)

	NUMBER OF PEOPLE		NUMBER OF ACCIDENTS				
U.S. 63 SEGMENT	*FATALITIES*	*INJURIES*	*FATALITIES*	*INJURIES*	FATALITIES/ *INJURIES*	PROPERTY *DAMAGE*	*TOTAL*
1, 2	0	10	0	7	0	40	47
3,4,5	3	18	1	0	8	8	17
6	2	10	1	0	2	6	9
7	0	2	0	2	0	2	4
8	0	27	0	18	0	46	64
9	1	24	1	0	18	42	61
10	0	3	0	1	0	11	12
11,12	0	6	0	5	0	16	21
13	0	10	0	5	0	11	16
14,15	0	12	0	5	0	17	22
TOTAL	6	122	3	43	28	199	273
AVERAGE ANNUAL			1.00	14.33	9.33	66.33	91.00

MINNESOTA ACCIDENTS (1986-1990)

	NUMBER OF ACCIDENTS			
	FATALITIES	*INJURIES*	PROPERTY *DAMAGE*	*TOTAL*
TOTAL	6	318	741	1,065
AVERAGE ANNUAL	1.20	63.60	148.20	213.00

SOURCE: Iowa Department of Transportation
Minnesota Department of Transportation
Wilbur Smith Associates

Exhibit 7.6
U.S. 63 FATALITIES IN 1991

DATE	NUMBER OF FATALITIES	APPROXIMATE LOCATION
June 30	1	1/2 mile south of C-16
June 10	2	2 miles south of New Hampton
Sept. 28	3	4 miles north of New Hampton
Nov. 6	4	2 miles south of New Hampton
Nov. 20	2	3 miles north of Iowa 9
Dec. 20	1	1 mile south of Iowa 188
	13	

Exhibit 7.7

UNIT ACCIDENT COSTS

	FATAL	INJURY	FATAL OR INJURY	PROPERTY DAMAGE
Per Accident	$1,700,000	$14,000	$47,000	$3,000
Per Fatality	$1,500,000			

SOURCE: Federal Highway Administration, FHWA Technical Advisory T 7570.1

The next analysis step was to determine how much money the accidents on U.S. 63 are costing society at large. To estimate this cost, the per accident and per fatality costs were multiplied by the average annual accident rates. As depicted on Exhibit 7.8, the "typical year" accidents are estimated to cost $7.2 million annually.

The next issue was how much of the $7.2 million in accidents could be reduced if U.S. 63 were improved. To accomplish this, average accident rates per "hundred million vehicle miles of travel" were obtained for Iowa and Minnesota for various highway types. These values, inclusive of some interpolation, are depicted in Exhibit 7.9. As a general rule, the higher types of highway have lower accident rates.

To estimate how much of the $7.2 million might be saved, percentage changes in accident rates were used. For example, Exhibit 7.9 suggests that 10 percent of the fatalities could be saved in building the Alternative #1 improvements, i.e., passing lanes and turning lanes on rural sections (reducing the fatality rate from 2.40 to 2.16). This 10 percent savings was applied to the fatalities portion of the $7.2 million on a segment by segment basis.

Accident reductions for traffic that is on U.S. 63 both with and without the highway improvement (common traffic) are as shown in Exhibit 7.9. For example, in Alternative #1 the improved highway route is 2.16 and the existing highway rate is 2.40, for a 10 percent savings in accidents. Traffic that is diverted from other roads would utilize the "diverted traffic" rates, e.g., if diverted from a four-lane highway, the fatality rates increases from 1.00 to 2.16 for Alternatives #1 and #2; if diverted from a county road, the accident rate declines from 3.66 to 2.16. The greatest accident savings occur if a four-lane highway were built.

Exhibit 7.8

AVERAGE ANNUAL ACCIDENT COSTS ON EXISTING U.S. 63

NUMBER OF AVERAGE ANNUAL ACCIDENTS	FATALITIES	INJURIES	FATALITIES/ INJURIES	PROPERTY DAMAGE	TOTAL
MINNESOTA	1.20[a]	63.60	0.00	148.20	213.00
IOWA	2.00[b]	14.33	9.33	66.33	92.00

	FATALITIES	INJURIES	FATALITIES/ INJURIES	PROPERTY DAMAGE
COST PER ACCIDENT	$1,700,000	$14,000	$47,000	$3,000

AVERAGE ANNUAL ACCIDENT COSTS	FATALITIES	INJURIES	FATALITIES/ INJURIES	PROPERTY DAMAGE	TOTAL
MINNESOTA	$2,040,000	$890,400	$ —	$444,600	$3,375,000
IOWA	3,000,000	200,667	438,667	199,000	3,838,333
TOTAL	$5,040,000	$1,091,067	$438,667	$643,600	$7,213,333

(a) Number of fatal accidents
(b) Number of fatalities

SOURCE: Federal Highway Administration
Wilbur Smith Associates

Exhibit 7.9

ESTIMATED ACCIDENT RATES

1991

	ACCIDENT RATE PER HUNDRED MILLION VMT			
	Fatality	Injury	Property	Total
Two-Lane Rural Primary (Base)	2.40	38	91.6	132
Two-Lane Rural Improved (Alt. 1 &2)	2.16	34	82.84	119
4-Lane Expressway (Alt. 3)	1.00	15	39.4	55.4
2-Lane Town Primary (Base & Alt. 1)	2.10	169	394.9	566
Town Bypass (Alt. 2)	1.54	80	193	274.54
Diverted Traffic From 4-Lanes	1.00	15	39.4	55.40
Diverted Traffic From County Roads	3.66	98	164.34	266.0

SOURCE: Iowa, Minnesota, National accident experience
Wilbur Smith Associates

Such calculations were made segment by segment, and the estimated monetary savings are listed in Exhibit 7.10. If any of the U.S. 63 alternatives are built in their entirety, the estimated annual savings are:

- Alternative #1: Estimated to save $532,300 (9% of the $7.2 million)
- Alternative #2: Estimated to save $1,101,600 (15% of the $7.2 million)
- Alternative #3: Estimated to save $4,549,300 (63% of the $7.2 million)

These estimates indicate that no highway improvement can eliminate all accidents; they also indicate that the Alternative #1 passing and turning lanes will only save a small portion, and the Alternative #2 town bypasses also save only a portion (since most of the fatalities are located on rural sections rather than on the segments that would be bypassed).

Total Travel Efficiency Economic Benefits

The total travel efficiency economic benefits estimated for the years 1990 and 2010 are listed in Exhibit 7.11 for each of the three highway improvement alternatives. These assume that the highway improvements are already in place. Intermediate year benefits were then interpolated in straight-line fashion, and benefits 2011-2020 were extrapolated in straight-line fashion.

TRAVEL EFFICIENCY FEASIBILITY

To calculate the economic feasibility in travel efficiency terms, all costs and benefits in constant dollars were determined by year, 1991 through 2020 and then discounted back to 1991. The benefits were then compared with the costs using the conventional feasibility indicators. The initial decision was to use FHWA procedures (values of travel time, values of accidents, etc.) and a constant price level discount rate of six percent. Utilizing those assumptions, the Exhibit 7-12 indicators of feasibility were determined.

The Exhibit 7.12 statistics suggest a number of conclusions, from the travel efficiency perspective.

- Alternative #1, comprising rural passing lanes and turning lanes, does not appear to be a sufficient solution. These improvements yield only 3.2% in economic return.
- Alternative #2, comprising the Alternative #1 passing lanes and turning lanes, plus bypasses built around all towns, is economically feasible, yielding a 9% return on the investment. The town bypasses yield considerable operating cost and time savings and some accident savings.

Exhibit 7.10

ESTIMATED ACCIDENT COST SAVINGS
U.S. 63
Year 1990 and 2010
($ Thousands)

	Alternative #1: Improved Two-Lane	Alternative #2: With Bypasses	Alternative #3: Four-Lane
Year 1990			
Iowa			
Fatal	214.3	330.5	1,841.0
Injury	48.9	126.0	422.3
Property	13.1	44.5	134.1
Total	276.3	501.0	2,397.4
Minnesota			
Fatal	173.6	243.8	1,194.2
Injury	56.4	242.3	647.0
Property	26.0	114.5	310.7
Total	256.0	600.6	2,151.9
Total Corridor			
Fatal	387.9	574.3	3,035.2
Injury	105.3	368.3	1,069.3
Property	39.1	159.0	444.8
Total	532.3	1,101.6	4,549.3
Year 2010			
Iowa			
Fatal	353.4	539.5	2,943.9
Injury	80.6	205.6	675.4
Property	21.6	72.7	214.5
Total	455.6	817.8	3,833.8
Minnesota			
Fatal	250.4	350.5	1,718.8
Injury	81.3	348.3	931.1
Property	37.6	164.7	447.1
Total	369.3	863.5	3,097.0
Total Corridor			
Fatal	603.8	890.0	4,662.7
Injury	161.9	553.9	1,606.5
Property	59.2	237.4	661.6
Total	824.9	1,681.3	6,930.8

SOURCE: Wilbur Smith Associates

Exhibit 7.11

ESTIMATED TRAVEL EFFICIENCY ECONOMIC BENEFITS

U.S. 63

Years 1990 and 2010

Annual Economic Benefit Types	ANNUAL HIGHWAY USER EFFICIENCIES ($000)		
	Alternative #1: Improved Two-Lane	Alternative #2: With Bypasses	Alternative #3: Four-Lane
Year 1990:			
Vehicle Operating Cost Savings:			
Automobile	$(9.4)	$237.6	$282.1
Light Truck	(2.2)	43.8	64.5
Heavy Truck	(9.3)	236.5	354.0
Total	$(20.9)	$517.9	$700.6
Accident Cost Savings	$532.3	$1,101.6	$4,549.3
Value of Time Savings			
Automobile	$348.6	$1,968.1	$2,897.6
Light Truck	24.0	88.6	144.2
Heavy Truck	128.7	431.9	735.7
Total	$501.3	$2,488.6	$3,777.5
Total 1990 Road User Benefits	$1,012.7	$4,108.1	$9,027.4
Year 2010:			
Vehicle Operating Cost Savings:			
Automobile	$(17.4)	$334.8	$410.1
Light Truck	(3.1)	61.3	90.1
Heavy Truck	(15.2)	385.9	577.8
Total	$(35.7)	$782.0	$1,078.0
Accident Cost Savings	$824.9	$1,681.3	$6,930.8
Value of Time Savings			
Automobile	$638.5	$2,952.3	$4,523.1
Light Truck	36.6	123.9	201.7
Heavy Truck	210.1	704.9	1,200.7
Total	885.2	$3,781.1	$5,925.5
Total 2010 Road User Benefits	$1,674.4	$6,244.4	$13,934.3

Note: The above benefits were calculated for the base year (1990) and forecast year (2010) as if all of the road improvements were open by 1990. Intermediate and future year benefits were then interpolated based on these 1990 and 2010 calculations. Excluded are the highway "economic development impact" benefits.

SOURCE: Wilbur Smith Associates

Exhibit 7.12

TRAVEL EFFICIENCY FEASIBILITY

U.S. 63

ECONOMIC INDICATORS (a)	Alternative #1: Improved Two-Lane	Alternative #2: With Bypasses	Alternative #3: Four-Lane
Net Present Value ($000)	($8,960.3)	$21,151.6	$36,592.4
Internal Rate of Return	3.2%	9.0%	8.1%
Discounted Benefit/Cost	0.69	1.38	1.27

(a) 6% discount rate

SOURCE: Wilbur Smith Associates

- Alternative #3, comprising the construction of a four-lane highway all the way from Waterloo to Rochester, is also feasible at the selected discount rate of 6%, yielding a return of 8.1%.

- These statistics suggest that, if the two states have sufficient funds that can be allocated to U.S. 63, that Alternative #3 (four-lane) should be built.

- However, the greatest return on investment (the biggest "bang for the buck") is yielded in Alternative #2. Therefore, if funds are limited, or if there are other worthwhile projects in the two states which yield over 8.1%, then Alternative #2 would be best.

- If funds are limited, implementation of Alternative #2 makes sense, because it would involve a phased construction program which, as funding comes available, could still ultimately lead to an eventual four-lane highway.

COMPARISON WITH "AVENUE OF THE SAINTS"

In 1990 a highway feasibility study was conducted between St. Louis, MO, and St. Paul, MN. One of the routes that was considered was Option "C", a portion of which was U.S. 63 between Waterloo and Rochester. That study analyzed the four-lane option (both expressway and freeway standards) and included a travel efficiency economic feasibility assessment. The route included four-laning of U.S. 63 in Iowa and Minnesota as well as four-laning south through Mount Pleasant and south through Missouri. It evaluated the entire route between St. Louis and St. Paul; it did not specifically analyze individual route segments.

Exhibit 7.13 compares the travel efficiency results found in this current U.S. 63 Corridor Study with results of the "Saints" study. The indicators of feasibility were calculated using a 6% discount rate, and the U.S. 63 study results are at 1991 price levels while the Saints results are at 1989.

The results of the two studies are remarkably similar and supportive, each study tending to confirm results from the other study.

- <u>**Rate of Return**</u> - Economic returns on the investment capital are nearly identical (7.8% and 8.1%) and indicate feasibility assuming a discount rate of 6%.

- <u>**Benefit/Cost Ratio**</u> - The discounted benefit/cost ratios also are almost identical (1.24 and 1.27) and indicate feasibility at the 6% discount rate.

- <u>**Net Present Value**</u> - Both are positive, indicating project feasibility. The Saints NPV of $94.7 million is three times that of the U.S. 63 segment simply because it is a much larger project.

- <u>**Capital Cost**</u> - The estimated U.S. 63 cost of $128.9 million is only 28.2% that of the Saints Route C expressway.

- <u>**Vehicle Operating Costs**</u> - The U.S. 63 cost savings are much less than was the case with the Saints, due to the quality and rural nature of existing U.S. 63.

- <u>**Accident Savings**</u> - The U.S. 63 estimated accident savings of $6.93 million annually are proportionately greater per mile than was the case on the entire St. Louis to St. Paul study, due to the higher accident rate on U.S. 63. The same monetary value per accident was used in the two studies.

- <u>**Time Savings**</u> - The U.S. 63 annual time savings value of $6.93 million is 27% of that found all the way from St. Louis to St. Paul. This is proportionate to the cost and new construction lengths.

Exhibit 7.13
TRAVEL EFFICIENCY COMPARISON WITH "AVENUE OF THE SAINTS"

	FOUR-LANE RESULTS		
	Alternative #3 U.S. 63	Alternative C Ave. of Saints [a]	Percent of Saints
FEASIBILITY			
Rate of Return	8.1%	7.8%	
Discounted Benefit/Cost [b]	1.27	1.24	
Net Present Value ($ Million) [b]	$36.6	$94.7	38.6%
CAPITAL COST ($ Million)	$128.9	$457.6	28.2%
EFFICIENCY BENEFITS (Year 2010)			
Vehicle Operating Cost ($ Million)	$1.08	$8.72	12.4%
Accident Savings ($ Million)	6.93	17.27	40.1%
Time Savings ($ Million)	5.92	21.91	27.0%
Total Year 2010 Benefits	$13.93	$47.90	29.1%
LENGTH (Miles)	105	504	20.8%

(a) "St. Louis to St. Paul Corridor Feasibility and Necessity Study," March 1990

(b) 6 percent discount rate

SOURCE: Wilbur Smith Associates

- <u>Route Length</u> - The U.S. 63 length is 105 miles (Alternative 3) while the entire St. Louis to St. Paul length is 504 miles (although the new construction length is considerably less).

Overall, the U.S. 63 study, which is more in-depth than was the Avenue of the Saints study, supports the Saints findings regarding this specific route.

TRAVEL EFFICIENCY SENSITIVITY TESTS

The economic feasibility findings in this study, while valid, are nevertheless dependent on a series of assumptions and decisions which could have a bearing on what the two states ultimately decide to do on U.S. 63. To assist in this decision process, a number of "sensitivity tests" were conducted, to depict how sensitive the study findings are to the assumptions. Five sensitivity tests were conducted.

- <u>Discount Rate</u> - The study used a 6% constant dollar rate. A sensitivity test was done using a 10% rate.

- <u>Capital Costs</u> - The estimated capital costs were increased by 20%, to see how sensitive study conclusions are to the cost estimates.

- <u>Traffic Volumes</u> - To ensure that the states' decisions are not based on overly optimistic traffic forecasts, a sensitivity test assuming no traffic growth was done.

- <u>Accident Rates</u> - The accident analyses were done based on accident experiences through the year 1990. Since 1991 had such a dramatic increase in fatalities in Iowa, a sensitivity test was conducted to gauge the impact of this high fatality rate on study findings.

- <u>Value of Time</u> - The FHWA suggested monetary value of time was used in the study. For sensitivity test purposes, a rate of one-third that value was also used for automobiles.

The results of these sensitivity tests are presented in Exhibit 7.14.

Sensitivity to Discount Rate

With a 6% discount rate, the study found that Alternatives #2 and #3 are "economically feasible." However, if a 10% discount rate were used, no alternative is feasible, since they return only 3.2%, 9.0% and 8.1% respectively. Therefore, study conclusions are completely dependent on the chosen discount rate. This Consultant Team feels that the 6% discount rate is proper, in today's financial environment.

Exhibit 7.14
TRAVEL EFFICIENCY SENSITIVITY TESTS
U.S. 63

	ECONOMIC FEASIBILITY INDICATORS		
	Alternative #1 Improved Two-Lane	Alternative #2 With Bypasses	Alternative #3 Four-Lane
OVERALL FEASIBILITY AT 6%			
Net Present Value ($ Million)	($9.0)	$21.2	$36.6
Benefit/Cost Ratio	.69	1.38	1.27
Internal Rate of Return (%)	3.2%	9.0%	8.1%
SENSITIVITY FEASIBILITY			
Discount Rate (10%):			
Net Present Value ($ Million)	($15.8)	($4.8)	($22.2)
Benefit/Cost Ratio	.45	.91	.83
Internal Rate of Return (%)	3.2%	9.0%	8.1%
Capital Cost (20% increase)			
Net Present Value ($ Million)	($11.8)	$15.9	$23.7
Benefit/Cost Ratio	.63	1.26	1.16
Internal Rate of Return (%)	2.6%	8.1%	7.3%
Traffic (no growth, no diversion)			
Net Present Value ($ Million)	($14.4)	$3.6	($3.8)
Benefit/Cost Ratio	.50	1.06	.97
Internal Rate of Return (%)	.7%	6.6%	5.7%
Accidents (4 years, including 1991)			
Net Present Value ($ Million)	($3.9)	$31.5	$79.3
Benefit/Cost Ratio	.86	1.57	1.58
Internal Rate of Return (%)	4.8%	10.4%	10.5%
Value of Time (1/3 wage for autos)			
Net Present Value ($ Million)	($13.7)	$2.1	$1.4
Benefit/Cost Ratio	.53	.96	1.01
Internal Rate of Return (%)	1.4%	5.7%	6.1%

SOURCE: Wilbur Smith Associates

Sensitivity to Capital Cost

If the Consultant's capital cost estimate were too low, e.g., if actual costs were 20% higher than estimated, such an error would still yield a feasible Alternative #2 and #3. This indicates that the study's findings are not swayed by an overly optimistic cost estimate.

Sensitivity to Traffic Forecasts

There is some debate concerning future traffic growth in the U.S. 63 area of Iowa and Minnesota. To test this study's forecasts, traffic volumes were held at their 1990 observed levels through the year 2020. Under this scenario, Alternative #2 remains feasible with a return of 6.6%, while the four-lane option (Alternative #3) becomes infeasible. Therefore, if traffic volumes fail to achieve those estimated by the Consultant, then Alternative #2 becomes the best option.

Sensitivity to Accident Rates

If the high fatality rates of 1991 reflect an emerging trend (this is by no means certain), then the four-lane alternative becomes the best solution because its return of 10.5% starts to exceed that of Alternative #2. The study's conclusions, therefore, are quite sensitive to the accident situation on U.S. 63. If the high fatality rate of 1991 becomes the norm, then the four-lane alternative is best. If 1991 is an atypical year that will not continue in the future, then Alternative #2 is the more feasible option.

Sensitivity to Value of Time

An hourly wage rate suggested by FHWA and somewhat reflective of Iowa and Minnesota conditions was used in the study. This monetary value of travel time was instrumental in the study's feasibility conclusions. To test the conclusion's sensitivity to this value, a sensitivity test used one-third that value for automobiles. Using this reduced rate, the four-lane alternative remains feasible with a 6.1% return, and Alternatives #1 and #2 are not feasible. Therefore, the study's conclusions are sensitive to the time value.

INCREMENTAL BENEFIT/COST

The analyses suggest that the states should select between Alternatives #2 and #3. These two options differ dramatically in terms of investment magnitude, with the four-lane alternative costing a great deal more than the two-lane alternative, with bypasses. To gauge what is gained by investing the additional money in Alternative #3, an incremental benefit/cost analysis was conducted.

The travel efficiency costs and benefits of Alternative #2 were subtracted from Alternative #3, and the differences were used to run the incremental test. The results are depicted in Exhibit 7.15. The tabulations are in Appendix Tables C.18 and C.19.

Exhibit 7.15

INCREMENTAL BENEFIT/COST

Alternative #3 Less Alternative #2

U.S. 63

Net Incremental Benefits ($000)[a]	$95,880.9
Net Incremental Costs ($000)[a]	80,440.0
Net Present Value ($000)[a]	$15,440.9
Internal Rate of Return	7.5%
Discounted Benefit/Cost[a]	1.19

(a) Discounted at 6%.

SOURCE: Wilbur Smith Associates

These calculations suggest that the additional investment in Alternative #3 is economically feasible, at 6 percent discount. They also suggest that the return on the additional investment (7.5 percent) is less than is the return on the less expensive option (9.0 percent for Alternative #2).

TRAVEL EFFICIENCY FINDINGS

Travel efficiency is only one indicator of project feasibility. To be added to it are engineering, environmental, funding availability, and other criteria. Travel efficiency is equally relevant, however, at the local corridor, state, and federal levels. Therefore, any project that is feasible from a travel efficiency perspective should be a serious contender for funding.

This study suggests that the states should select either Alternative #2 or #3, depending on funding availability and the feasibility of U.S. 63 compared with other highway projects elsewhere in the states.

Chapter 8
ECONOMIC DEVELOPMENT FEASIBILITY

Any of the highway improvement alternatives envisaged for U.S. 63 will make travel safer, faster, and easier. In the process it will divert traffic from various roads, it could generate traffic, and transportation will be more efficient. All of these events would be most welcome, not only because of the travel efficiencies (Chapter 7) but also because of what these travel efficiencies could mean to corridor and state economies.

It is widely believed by corridor residents and by the corridor's agriculture and business community that the corridor area will be better off economically with the highway improvements than without them. Most certainly this is true; the issues are:

1) what magnitude of economic impact can be expected?

2) should the economic impact benefits be added to the travel efficiency benefits?, and

3) is that impact sufficient cause to warrant major investments in U.S. 63?

IMPACT REGIONS

The economic development impacts are estimated for four regions, as follows:

1. The seven-county primary impact area
   a. For four Iowa counties
   b. For three Minnesota counties

2. The two states statewide (inclusive of the primary impact area)
   a. Iowa statewide
   b. Minnesota statewide

ECONOMIC IMPACT MODEL

To gauge the impact of the highway improvements on the corridor's economy and on each State's economy, the study used the REMI Model. The model was applied on a consistent basis to each improvement alternative. The model utilized price levels and output levels for the year 1982; all results were then increased to 1991 price levels utilizing appropriate producer price deflators.

The multi-regional version of the REMI model provides several advantages over a single region model. In addition to analyzing the impacts of a policy change or a governmental investment in a region, the multi-region REMI model predicts impacts to other regions from the initial policy change in the corridor region.

The counties along U.S. 63 form the corridor region and the focus of investment activity in this study. The rest of Iowa becomes the secondary region for the Iowa counties in the highway corridor and the rest of Minnesota becomes the secondary region for corridor counties in Minnesota. For example, the improved transportation facilities in the corridor will stimulate that region, but it will also mean an increase in demand for inputs from the other regions. These other regions, in turn, will need inputs to fulfill the new demand requirements, some of which will come from the corridor region. Thus, the region in the highway corridor is stimulated a second time and its increase in economic activity is greater than from a single region model of the corridor. The REMI multi-region model captures this difference. A change in any one area will have effects that spread to other areas included in the model. All of the areas continue to interact with each other until a full simultaneous solution to the model is reached. As with the single region model, the results of the policy evaluation represent a deviation from the baseline forecast for the region.

The counties in the U.S. 63 corridor do not include the major economic and population centers of either State. As a result, the regions formed by the rest of the two states provide many inputs to the corridor region after the initial stimulus.

SIX INDICATORS OF ECONOMIC IMPACT

The U.S. 63 improvements could yield many different forms of benefit to local economies. In order to recognize these diverse impacts in a consistent fashion, a single set of "indicators of impact" and a single set of definitions were used throughout the economic impact calculations. The economic impacts were expressed in terms of six "indicators of economic impact:"

- **Economic Activity (Output)** - Defined as "Gross Output", Output is the value of the final demand created by the highway improvements, plus the sum of all of the intermediate goods and services needed to produce that final demand, plus the induced impacts of increased household consumption (respending). Total output is the total value of each good or service produced by the industry during the year (intermediate inputs plus value added) as a result of highway construction and highway use.

- **Value Added** - The value of the corridor's firms output minus the value of the inputs they purchase from other firms. In the corridor study, it is the value added by firms located in the defined corridor impact areas, including employee compensation, proprietary income, indirect business taxes, and other property income.

- **<u>Personal Income</u>** - This measure consists of the total increases in payroll costs (wages and salaries and benefits) paid by local industries due to the improved highway, plus income from self-employment, other property income (interest and corporate profit), and transfer payments. In this study, when economic impact benefits are added to the travel efficiencies, it is the "personal income" impact which is added to the travel efficiencies.

- **<u>Salaried Wages and Proprietary Income</u>** - This measure includes increases in payroll costs (wages and salaries) plus income from self-employment.

- **<u>Employment</u>** - Job impacts are expressed as jobs, not "full-time equivalent" jobs, and include the number of person job years due to road construction and road use, plus the share of those that are employed in sectors that directly or indirectly support the construction process, the road users, and the firms that might expand in or locate to the corridor region.

- **<u>Population</u>** - Additional population that is attracted to the area as a result of the improved highway constitutes another economic indicator.

These indicators are all produced by the REMI Model, and they should not be added together.

FOUR ECONOMIC DEVELOPMENT CAUSES

The U.S. 63 improvements could cause a number of events to occur that will be beneficial to the local and state economies. These events are categorized into four types, and economic development impacts were estimated for each.

- **<u>Act of Highway Construction</u>** - The act of spending money in the corridor to build the improved highway will be of immediate economic benefit to the corridor area. These impacts are temporary in nature, since they exist only during the construction activity and terminate when the road construction is complete (when the highway is open to traffic). These "direct" impacts of highway construction are important but should not be used as evidence that the highway improvements are feasible.

- **<u>Corridor Competitive Position</u>** - An improved highway reduces the cost of transportation. Reductions in trucking time and cost lead to reduced costs of production, which in turn lead to marginally reduced prices and/or increased profits, which can lead to increased production (expansion of existing firm production and/or attraction of new firms), which in turn generates economic impact value. These "competitive position" impacts are calculated.

- **Roadside Service Industries** - A more efficient north-south highway will lead to revised travel patterns involving greater traffic density on U.S. 63. Greater traffic density causes increased sales for roadside businesses (motels, restaurants, gasoline stations, tourist visitation places, others that cater to highway users). These "roadside service industry" impacts are calculated; they are valuable to the route's primary impact area, although they are largely transfers from other Iowa and Minnesota routes and therefore are less significant net impacts to the two states at the statewide level.

- **Agriculture** - The agriculture sector will benefit from reduced trucking and auto costs. It will also benefit from improved competitive position. In addition, agriculture could benefit if livestock are not damaged during transportation and other beneficial agricultural changes are made.

ECONOMIC IMPACT OF HIGHWAY CONSTRUCTION

The U.S. 63 highway improvements are estimated to cost between $25 million and $112 million, at 1991 price levels, depending on which alternative is selected. The very act of spending large sums of construction money in an area is of economic value to that area, since contractors and construction workers are hired, gravel is purchased, etc.

To gauge the construction impacts, each alternative's costs were estimated, and the costs were input into the REMI model. That model was used to estimate the economic impacts.

Project Construction Costs

Each alternative's capital costs were estimated in terms of construction cost and right-of-way cost. The construction costs were treated as increases in final demand and were input into the REMI Model. The right- of-way costs were treated as transfers and were not included. The construction costs were assumed to be spent, initially, within the corridor's primary impact area. For analysis purposes, it was assumed that it will take six years to complete each alternative, and that the construction expenditures will be spent in equal amounts per year. The per year construction costs, over the six year period, exclusive of right-of-way, are:

- Alternative #1: $4,112,650
- Alternative #2: $7,249,933
- Alternative #3: $16,437,316

Construction Impacts on Corridor Area

The economic impacts due to the act of construction comprise the monies spent in the corridor and the flow of those monies in terms of respending. The impacts include the labor and expenses associated with planning, design and construction, plus the respending of those funds to the extent that such respending occurs within the corridor.

Exhibit 8.1 lists the estimated construction impacts within the seven-county primary impact area. The construction period was assumed to take six years, so the annual impacts occur in each of the six years. In year seven, when the highway improvements are complete and open to traffic, the construction impacts essentially cease to exist because those expenditures no longer occur.

As shown, the greater the construction cost, the greater the impact on the local economy. Alternative #2, with an annual cost of $7.2 million, yields $5.5 million in annual value added, including $4.4 million in wages, and creates 156 jobs. These jobs and these impacts include not only those engaged in the construction project itself, but also include the respending of those funds, e.g., at food stores, housing, construction supplies, etc. Accompanying those impacts will be the in-migration of a few people, with 32 new corridor residents estimated to accompany Alternative #2. The jobs that would be created during the construction process, by industry type, are listed on Exhibit 8.2.

Construction Impacts on States

While the corridor's primary impact area will benefit a great deal from the localized construction expenditures, this is not necessarily the case statewide. If U.S. 63 were to not be improved, many of those funds could be spent elsewhere in the same state. This is the case with all state money and with all federal formula money. If the choice is to spend the funds on U.S. 63 versus some other place in Iowa or Minnesota, the impact of those construction funds is the same at the state level, regardless of where they are spent. In this sense they are not attributable to U.S. 63.

The only construction funds wherein the impact is proper at the statewide level is the "new" discretionary or demonstration federal money that is attracted to the state by the specific highway project. At this point it is impossible to know how much of the funding will be borne by such federal money. Given this unknown, Exhibit 8.3 is presented which depicts the statewide impacts associated with each $1 million of "new" federal money brought into the State as a result of the U.S. 63 project. Each $1 million generates $1.4 million in value added, including $1.05 million in wages, 37 jobs, etc. Therefore, the two states can benefit from additional federal spending attracted to them.

Exhibit 8.1

HIGHWAY CONSTRUCTION ECONOMIC DEVELOPMENT IMPACTS
Impact on the Corridor Primary Impact Area

	ANNUAL ECONOMIC IMPACT					
	Impact Per Year for Six Years			Total Construction Period Impact		
	Iowa	*Minnesota*	*Total*	*Iowa*	*Minnesota*	*Total*
ALTERNATIVE #1: IMPROVED TWO-LANE						
Annual Output ($000)	$2,420	$3,900	$6,320	$14,520	$23,400	$37,920
Value Added ($000)	$1,200	1,980	3,180	7,200	11,880	19,080
Personal Income ($000)	$800	1,380	2,180	4,800	8,280	13,080
Wages ($000)	$950	1,640	2,590	5,700	9,840	15,540
Employment (jobs)	36	52	88	36	52	88
Population (people)	7	10	17	7	10	17
ALTERNATIVE #2: WITH BYPASSES						
Annual Output ($000)	$5,780	$5,250	$11,030	$34,680	$31,500	$66,180
Value Added ($000)	$2,870	2,670	5,540	17,220	16,020	33,240
Personal Income ($000)	$1,910	1,860	3,770	11,460	11,160	22,620
Wages ($000)	$2,270	2,210	4,480	13,620	13,260	26,880
Employment (jobs)	86	70	156	86	70	156
Population (people)	18	14	32	18	14	32
ALTERNATIVE #3: FOUR-LANE						
Annual Output ($000)	$14,730	$11,014	$25,744	$88,380	$66,084	$154,464
Value Added ($000)	$7,310	5,160	12,470	43,860	30,960	74,820
Personal Income ($000)	$4,880	3,590	8,470	29,280	21,540	50,820
Wages ($000)	$5,800	4,270	10,070	34,800	25,620	60,420
Employment (jobs)	221	134	355	221	134	355
Population (people)	45	27	72	45	27	72

SOURCE: Wilbur Smith Associates

Exhibit 8.2

CORRIDOR AREA JOBS ATTRIBUTABLE TO CONSTRUCTION PROCESS

INDUSTRY TYPE	JOBS DUE TO EACH ALTERNATIVE Alternative #1 Improved Two-Lane	Alternative #2 With Bypasses	Alternative #3 Four Lane
Manufacturing	0	0	1
Construction	48	86	194
Transport, Utilities	2	3	7
Finance, Insurance	3	5	11
Retail Trade	12	20	46
Wholesale Trade	2	3	9
Services	20	37	83
Government	2	2	4
Total Jobs	88	156	355

SOURCE:REMI Model
Wilbur Smith Associates

Exhibit 8.3

HIGHWAY CONSTRUCTION ECONOMIC DEVELOPMENT IMPACTS IMPACT ON THE TWO STATES STATEWIDE

	ECONOMIC IMPACT PER $1 MILLION FEDERAL DOLLARS ATTRACTED TO STATES
Annual Output	$2,801,000
Value Added	$1,415,00
Personal Income	$926,000
Wages	$1,048,000
Employment (jobs)	37
Population (people)	8

Note: These economic impacts depict the statewide impacts for each $1 million in new federal highway money attracted to the states. If $15 million in federal money were attracted, multiply all numbers on this exhibit by 15.

SOURCE: Wilbur Smith Associates

Construction Impacts Not to be Used for Feasibility Purposes

The construction impacts should only be used to indicate the extent to which the local region or state might benefit economically from the expenditure of construction monies in that region. Once the construction is complete, these construction impacts no longer occur.

In addition, the construction impacts should not be used as indicators of road improvement "feasibility" or "justification." This is because the construction- cost-caused "Output" impacts are always greater than the construction costs themselves (due to

the respending of the funds). The construction impacts merely show that the local corridor (and to a lesser extent the State) is better off, and by how much, if money from outside is spent in the local area.

COMPETITIVE POSITION ECONOMIC DEVELOPMENT IMPACTS

Of the U.S. 63 primary impact area's seven counties, six have experienced population decline since 1980. Only Olmstead County, where Rochester is located, experienced population growth. While there are many reasons for these declines, the dominant reason is a decline in employment opportunities. Agricultural employment has declined in every county, and manufacturing and service employment have declined in many places.

A key issue confronting this region is, therefore, its ability to compete with other regions of the states and elsewhere. The region's residents desire and need for the region to expand its existing businesses, to attract new businesses, and to diversify the area's economic base. To expand its economic base, the region must be able to compete with other regions.

As discussed in Chapter 6, a highway improvement is one way that public sector investment can help to make a region more competitive. By making the region more accessible, and by reducing the costs of conducting business in the corridor, the highway makes the corridor region's goods and services relatively more competitive and makes the region relatively more attractive for investment.

To quantify the anticipated economic development impacts due to reduced costs of doing business in the corridor, results of the Transportation Model and the REMI model were used. The highway improvement's most direct impact concerning the cost of doing business in the corridor is the effect which the improvement has on logistics cost. The cost savings accruing to trucking were calculated in the travel efficiency analysis.

These reduced costs of doing business in the region were input into the REMI model, to gauge how the region's reduced costs might create a relative competitive advantage, and what that might mean in terms of economic impact. Exhibits 8.4, 8.5, and 8.6 present the results for the three improvement alternatives.

Competitive Position Impacts on the Corridor Region

The top half of each exhibit presents the impacts on the primary impact area (four Iowa counties and three Minnesota counties). The REMI model suggests that the improved highway could attract some employment opportunities and create monetary impacts, with Alternative #3 (four-lane) being more effective in this respect than either of the two-lane alternatives. Alternative #1 is estimated to create or attract 11 jobs by the year 2010, Alternative #2 would attract 60 jobs, and Alternative #3 would attract 97 jobs to the corridor region. Associated with these job impacts are increased value added, wages and other impacts.

Exhibit 8.4
COMPETITIVE POSITION ECONOMIC DEVELOPMENT IMPACTS
Alternative #1: Improved Two-Lane

	1991			2010		
	Iowa	*Minnesota*	*Total*	*Iowa*	*Minnesota*	*Total*
ECONOMIC IMPACT ON CORRIDOR IMPACT AREA						
Annual Output ($000)	$150	$62	$212	$590	$276	$866
Value Added ($000)	$87	37	124	351	163	514
Personal Income ($000)	$50	20	70	225	94	319
Wages ($000)	$50	20	70	189	78	267
Employment (jobs)	3	1	4	8	3	11
Population (people)	2	1	3	12	5	17
ECONOMIC IMPACT ON ENTIRE STATES						
Annual Output ($000)	$79	$71	$150	$297	$255	$552
Value Added ($000)	$50	37	87	180	134	314
Personal Income ($000)	$27	23	50	122	78	200
Wages ($000)	$27	23	50	99	78	177
Employment (jobs)	2	1	3	4	3	7
Population (people)	1	1	2	6	3	9

SOURCE: REMI Model
Wilbur Smith Associates

Exhibit 8.5

COMPETITIVE POSITION ECONOMIC DEVELOPMENT IMPACTS
Alternative #2: With Bypasses

	1991			2010		
	Iowa	Minnesota	Total	Iowa	Minnesota	Total
ECONOMIC IMPACT ON CORRIDOR IMPACT AREA						
Annual Output ($000)	$564	$677	$1,241	$2,240	$2,720	$4,960
Value Added ($000)	$326	388	714	1,330	1,580	2,910
Personal Income ($000)	$190	200	390	858	918	1,776
Wages ($000)	$200	210	410	721	773	1,494
Employment (jobs)	10	10	20	29	31	60
Population (people)	8	7	15	47	48	95
ECONOMIC IMPACT ON ENTIRE STATES						
Annual Output ($000)	$351	$481	$832	$1,287	$1,730	$1,730
Value Added ($000)	$205	267	472	770	977	1,747
Personal Income ($000)	$123	150	273	532	617	1,149
Wages ($000)	$127	163	290	432	537	969
Employment (jobs)	5	6	11	16	19	35
Population (people)	4	4	8	26	28	54

SOURCE: REMI Model
Wilbur Smith Associates

Exhibit 8.6

COMPETITIVE POSITION ECONOMIC DEVELOPMENT IMPACTS
Alternative #3: Four-Lane Highway

	1991			2010		
	Iowa	Minnesota	Total	Iowa	Minnesota	Total
ECONOMIC IMPACT ON CORRIDOR IMPACT AREA						
Annual Output ($000)	$1,080	$903	$1,983	$4,270	$3,610	$7,880
Value Added ($000)	$627	530	1,157	2,530	2,110	4,640
Personal Income ($000)	$370	260	630	1,640	1,220	2,860
Wages ($000)	$390	280	670	1,380	1,035	2,415
Employment (jobs)	18	13	31	56	41	97
Population (people)	15	10	25	90	64	154
ECONOMIC IMPACT ON ENTIRE STATES						
Annual Output ($000)	$627	$728	$1,355	$2,310	$2,523	$4,833
Value Added ($000)	$364	407	771	1,373	1,433	2,806
Personal Income ($000)	$220	227	447	947	923	1,870
Wages ($000)	$223	247	470	774	805	1,579
Employment (jobs)	9	9	18	29	27	56
Population (people)	7	6	13	80	41	121

SOURCE: REMI Model
Wilbur Smith Associates

Competitive Position Impacts on the Two States

By becoming more competitive, the corridor region is able to better compete not only with other states but also with other areas of Iowa and Minnesota. To the extent that jobs and economic activity are attracted from other states, the impacts are statewide. However, if jobs and activity are diverted from other locations in Iowa and Minnesota, the impacts are proper in the primary corridor area but constitute a transfer effect at the state level. As a result, the impacts on the two states are less than the impacts on the corridor region.

ROADSIDE BUSINESS ECONOMIC DEVELOPMENT IMPACTS

At the same time that the improved U.S. 63 will enable the region to enhance its competitive position vis-a-vis other regions of the Upper Midwest, the highway improvement will also benefit businesses along the highway that cater to travelers. For economic evaluation purposes "roadside services" are defined as businesses that serve the cars and trucks and their drivers/passengers such as gasoline stations, hotels/motels, restaurants, gift shops, etc., and that are located within sight distance of the highway. There is a general relationship between traffic density (volume), trip characteristics, and the number of roadside service establishments that exist, e.g., the higher the traffic volume, the greater the number of motels, etc. and the greater the sales volume at those businesses.

As evidenced by the traffic forecasts and assignments, any of the improvement alternatives will create additional traffic on U.S. 63. Such traffic increases will create additional sales volume for existing and potential roadside businesses which in turn leads to increased jobs, wages, profits and tax base.

Since U.S. 63 already has gasoline station, motel, and restaurant development, the issue to consider is what increase might be expected due to new/diverted traffic associated with the highway improvement and whether that development represents a net increase suitable for use in the economic impact calculations.

Roadside business increases will be due to traffic increases. Between 1990 and 2010 there will be normal traffic growth, even if the road improvements are not made. In addition, there will be increased traffic due to the road improvement, which will principally be diverted from other regional highways. Using this study's traffic model, the change in vehicle miles of travel (VMT) for each improvement option due specifically to the highway improvements were summarized and are shown in Exhibit 8.7.

Exhibit 8.7

ANNUAL VEHICLE MILES OF TRAVEL ON U.S. 63

1990 AND 2010

	VMT ON EACH OPTION (000 MILES)			
	Base Case	#1 Improved Two-Lane	#2 With Bypasses	#3 Four-Lane
1990 VMT				
Iowa	87,918	90,220	93,389	100,493
Minnesota	108,089	108,805	110,395	112,828
Total	196,007	199,025	203,784	213,321
2010 VMT				
Iowa	156,997	159,976	164,062	172,900
Minnesota	156,038	156,976	158,734	162,392
Total	313,035	316,952	322,796	335,292

SOURCE: Traffic estimates
Wilbur Smith Associates

According to Exhibit 8.7, the VMT increases due to traffic diversion are between 1.1 percent and 8.8 percent in the year 2000, depending on the improvement option. These increases will bring with them comparable percent increases in roadside business in the form of increased roadside gas station, motel and restaurant activities. Such increases could involve the attraction of new businesses, or could accrue in the form of increased sales by existing businesses, or both. In either event, the business increases are largely drawn from other regional highways and therefore from other regional businesses.

Direct Roadside Expenditure Increases

To calculate the direct expenditure impacts attributable to the increased roadside sales, unit expenditure rates were established for Iowa/Minnesota conditions. These comprised per vehicle mile expenditures based on actual sales along other highways in the Iowa-Minnesota region. These comparable situations suggest that local business sales total approximately 16.7 cents per vehicle mile of travel. Applying this expenditure rate to the increases in VMT attributable to the highway improvements yields the direct expenditure impacts depicted in Exhibit 8.8.

Exhibit 8.8

ESTIMATED DIRECT IMPACTS FROM INCREASED TRAVELER EXPENDITURES ON U.S. 63

1990 AND 2010

	ANNUAL TRAVELER EXPENDITURE INCREASE ($000)		
	#1 Improved Two-Lane	#2 With Bypasses	#3 Four-Lane
1990			
Iowa	$384.5	$913.7	$2,100.0
Minnesota	119.5	385.0	791.5
Total	504.0	$1,298.7	$2,891.5
2010			
Iowa	$497.4	$1,179.8	$2,655.8
Minnesota	156.7	450.3	1,061.1
Total	$654.1	$1,630.1	$3,716.9

SOURCE: Wilbur Smith Associates

These statistics suggest that, by improving U.S. 63, the businesses that cater to the traffic on the highway will benefit from increased sales. The more effective that the highway improvement is in attracting traffic, the greater the direct impact within the corridor region. Such an inflow of roadside sales to the corridor region is then translated into increased total economic impact. To ascertain the total impact expected to accrue due to the roadside sales, the sales increases were run through the REMI model.

Roadside Business Impacts on the Corridor Region

Exhibits 8.9, 8.10 and 8.11 present the REMI model results for the Traveler Expenditure impacts. The top half of each table depicts the estimated impacts on the seven-county "Primary Impact Area." The estimates indicate that the seven counties expect to gain handsomely from traveler expenditures if U.S. 63 is improved. These impacts are due to the traffic that will be diverted to the highway. These benefits are greatest if the four-lane alternative is built, because Alternative #3 will divert the most traffic to the corridor region.

Exhibit 8.9
TRAVEL EXPENDITURE ECONOMIC DEVELOPMENT IMPACTS
Alternative #1: Improved Two-Lane

	1991			2010		
	Iowa	Minnesota	Total	Iowa	Minnesota	Total
ECONOMIC IMPACT ON CORRIDOR IMPACT AREA						
Annual Output ($000)	$510	$175	$685	$580	$260	$840
Value Added ($000)	$290	100	390	340	150	490
Personal Income ($000)	R250	80	330	455	141	596
Wages ($000)	$290	90	380	406	129	535
Employment (jobs)	14	4	18	19	6	25
Population (people)	5	1	6	22	6	28
ECONOMIC IMPACT ON ENTIRE STATES						
Annual Output ($000)	$72	$47	$119	$97	$77	$174
Value Added ($000)	$41	25	66	57	45	102
Personal Income ($000)	$35	18	53	62	33	95
Wages ($000)	$37	20	57	53	30	83
Employment (jobs)	2	1	3	2	1	3
Population (people)	1	0	1	3	1	4

SOURCE: REMI Model
Wilbur Smith Associates

Exhibit 8.10
TRAVEL EXPENDITURE ECONOMIC DEVELOPMENT IMPACTS
Alternative #2: With Bypasses

	1991			2010		
	Iowa	Minnesota	Total	Iowa	Minnesota	Total
ECONOMIC IMPACT ON CORRIDOR IMPACT AREA						
Annual Output ($000)	$1,230	$577	$1,807	$1,370	$702	$2,072
Value Added ($000)	$690	313	1,003	820	413	1,233
Personal Income ($000)	$590	229	819	1,083	402	1,485
Wages ($000)	$725	281	1,006	966	362	1,328
Employment (jobs)	33	13	46	44	16	60
Population (people)	13	5	18	53	19	72
ECONOMIC IMPACT ON ENTIRE STATES						
Annual Output ($000)	$177	$133	$310	$225	$187	$412
Value Added ($000)	R100	71	171	136	107	243
Personal Income ($000)	$81	43	124	151	83	234
Wages ($000)	$93	53	146	128	101	229
Employment (jobs)	4	2	6	6	3	9
Population (people)	2	1	3	7	3	10

SOURCE: REMI Model
Wilbur Smith Associates

Exhibit 8.11
TRAVEL EXPENDITURE ECONOMIC DEVELOPMENT IMPACTS
Alternative #3: Four-Lane Highway

	1991			2010		
	Iowa	Minnesota	Total	Iowa	Minnesota	Total
ECONOMIC IMPACT ON CORRIDOR IMPACT AREA						
Annual Output ($000)	$2,821	$1,191	$4,012	$3,097	$1,643	$4,740
Value Added ($000)	$1,580	652	2,232	1,843	940	2,783
Personal Income ($000)	$1,360	510	1,870	2,440	942	3,382
Wages ($000)	$1,570	600	2,170	2,175	858	3,033
Employment (jobs)	75	13	88	100	16	116
Population (people)	30	5	35	120	19	139
ECONOMIC IMPACT ON ENTIRE STATES						
Annual Output ($000)	$405	$283	$688	$509	$426	$935
Value Added ($000)	$228	154	382	303	242	545
Personal Income ($000)	$189	107	296	339	193	532
Wages ($000)	$203	121	324	288	174	462
Employment (jobs)	8	2	10	11	3	14
Population (people)	4	1	5	14	3	17

SOURCE: REMI Model
Wilbur Smith Associates

Roadside Business Impacts on the Two States

While the seven corridor counties will gain, most of those gains are at the expense of other counties in Iowa and Minnesota. This is because the vast majority of cars and trucks diverted to U.S. 63 are diverted from other highways in Iowa and Minnesota. Business that is gained along U.S. 63 is business that is lost along I-35, the county roads, and others.

The impacts on the bottom half of Exhibits 8.9, 8.10 and 8.11 are those expected to comprise net gains statewide. As shown, the statewide benefits are considerably less than in the corridor region, due to this transfer effect (from one place in the two states to the corridor region economies). Therefore, while the corridor area counties will benefit by a great deal, the two states will benefit, but by a much lesser amount.

AGRICULTURE ECONOMIC DEVELOPMENT IMPACTS

Because agriculture is such a major industry in the U.S. 63 region, it is agriculture that will receive much of the benefit. The improved highway will create the travel efficiencies calculated earlier, and many of those efficiencies will accrue to truckers hauling agricultural supplies or products. Many of the auto travel efficiencies will accrue to farmers. In addition, the competitive position impacts calculated earlier include the ability of the region's agri-industry to compete.

Review of Impacts by Product Type

To gauge additional impacts not accounted for in the previous calculations, each principal agricultural product was analyzed.

__Grain__ - Upgrading U.S. 63 will have little impact on the transport costs of raw corn and soybeans other than from the reduced trucking costs from fewer stops and starts and higher speeds. Most of the grain moves east by truck to McGregor and Clayton, Iowa and to Winona, Minnesota. Some corn and soybeans move south on U.S. 63 during the winter months to Cedar Rapids and some soybean meal moves north on U.S. 63 from Cedar Rapids. However, the quantities moving over U.S. 63 are small relative to the total quantities moving over other highways.

__Livestock__ - U.S. 63 is more important for livestock shipments than for grain shipments. The 1990 opening of the IBP hog slaughtering plant in Waterloo dramatically changed the importance of U.S. 63 for livestock. Most of the hogs purchased by hog buying stations owned by IBP, Monfort (Marshaltown), Excell (Ottumwa), Hormel (Austin), and FDL (Dubuque) in the U.S. 63 corridor and in southeast Minnesota move over U.S. 63. In addition to lower trucking costs, an upgraded U.S. 63 is likely to result in reduced shrink (weight loss) in the live animals during transport. Shrink is caused by the stress to the animals from being mixed with different animals and crowded into a truck. The amount of shrink is related to the distance hauled and the amount of time the animals are in the truck, the ambient temperature and the amount of jostling caused as the truck starts, stops, slows down and speeds up, and from the roughness of the road surface.

A second major issue in the transport of hogs over U.S. 63 is access to the new IBP plant at Waterloo. The new plant is located on N. Elk Run Road just south of the Chicago and North Western Transportation Company railroad tracks. South bound livestock trucks on U.S. 63 typically take a county road or E. Donald Street east to N. Elk Run Road to reach the IBP plant. This involves substantial traffic congestion and stopping and starting which increases trucking costs and animal shrink. Thus, an improved eastbound access off U.S. 63 would likely have substantial benefits. An alternative would be to improve U.S. 63 south to the Sixth Street Extension for access to the IBP plant.

__Cattle__ - Cattle transport would also benefit from an upgraded U.S. 63 because of reduced shrink and from the decreased trucking costs associated with fewer stops, starts and higher speeds. However, there are substantially fewer trucks hauling cattle over U.S. 63 than hauling hogs.

Milk - The amount of milk moving over the Minnesota portion of U.S. 63 is declining. Nevertheless, milk haulers would benefit from upgrading U.S. 63. A stretch of the road north of the Iowa border usually has weight restrictions during the spring thaw. When this occurs, milk haulers must reduce the amount hauled by each truck. This adds one additional trip per day during the period that weights are restricted.

Egg Production - The perishability and breakability of eggs means that smooth, nonstop highways are of value to the egg industry. With the expected increase in egg production in the area during the 1990's, an upgraded U.S. 63 would be of substantial value to the fledgling egg industry in the corridor.

Fresh Vegetables - Because of the perishability of fresh fruits and vegetables, the movement of these products into Rochester is extremely time sensitive. The value of time savings is much greater for these products than for non-perishable products like grain. Therefore, bypasses around small towns or a four-lane highway would be very valuable to the movement of these products.

Fertilizer - A large portion of the fertilizer deliveries occur during March, April and May. This is the same time that weight restrictions apply to a section of U.S. 63 just north of the Iowa border. Thus, the fertilizer industry would benefit from the upgrading of this section of road as well as from the lower trucking costs from upgrading the entire corridor.

For the most part, the economic impacts accruing to each of the above farm products were included in the travel efficiency and competitive position benefits.

Additional Agriculture Impacts in the Corridor

In addition to the large agriculture impacts included in the previous calculations, there are other lesser ways that the farms themselves might benefit. These were estimated and the results are listed on the top half of Exhibits 8.12, 8.13, and 8.14. These statistics, as low as they are, imply that the real benefits of U.S. 63 improvements to agriculture are in the previous trucking efficiency and competitive position impacts.

Additional Agriculture Impacts on the States

The bottom half of Exhibits 8.12, 8.13 and 8.14 present the additional impacts on the entire two states. Once again these impacts are quite nominal, indicating that most of the agri-business impacts are already included in the transportation cost savings and competitive position impact statistics.

Exhibit 8.12

AGRICULTURE ECONOMIC DEVELOPMENT IMPACTS
Alternative #1: Improved Two-Lane

	1991			2010		
	Iowa	Minnesota	Total	Iowa	Minnesota	Total
ECONOMIC IMPACT ON CORRIDOR IMPACT AREA						
Annual Output ($000)	$25	$12	$37	$88	$50	$138
Value Added ($000)	$13	12	25	50	25	75
Personal Income ($000)	$10	10	20	16	9	25
Wages ($000)	$10	10	20	10	5	15
Employment (jobs)	1	0	1	1	1	2
Population (people)	1	0	1	3	1	4
ECONOMIC IMPACT ON ENTIRE STATES						
Annual Output ($000)	$50	$49	$99	$151	$113	$264
Value Added ($000)	$38	24	62	90	65	155
Personal Income ($000)	$20	30	50	26	30	56
Wages ($000)	$20	30	50	40	35	75
Employment (jobs)	1	0	1	2	2	4
Population (people)	1	0	1	4	3	7

SOURCE: REMI Model
Wilbur Smith Associates

Exhibit 8.13

AGRICULTURE ECONOMIC DEVELOPMENT IMPACTS
Alternative #2: With Bypasses

	1991			2010		
	Iowa	Minnesota	Total	Iowa	Minnesota	Total
ECONOMIC IMPACT ON CORRIDOR IMPACT AREA						
Annual Output ($000)	$75	$50	$125	$238	$138	$376
Value Added ($000)	$50	25	75	150	88	238
Personal Income ($000)	$30	10	40	97	48	145
Wages ($000)	$20	10	30	60	32	92
Employment (jobs)	2	1	3	4	2	6
Population (people)	2	1	3	8	4	12
ECONOMIC IMPACT ON ENTIRE STATES						
Annual Output ($000)	$138	$163	$301	$415	$401	$816
Value Added ($000)	$87	88	175	250	228	478
Personal Income ($000)	$60	40	100	165	185	350
Wages ($000)	$40	40	80	116	141	257
Employment (jobs)	3	2	5	6	5	11
Population (people)	3	2	5	11	10	21

SOURCE: REMI Model
Wilbur Smith Associates

Exhibit 8.14
AGRICULTURE ECONOMIC DEVELOPMENT IMPACTS
Alternative #3: Four-Lane Highway

	1991			2010		
	Iowa	Minnesota	Total	Iowa	Minnesota	Total
ECONOMIC IMPACT ON CORRIDOR IMPACT AREA						
Annual Output ($000)	$88	$63	$151	$320	$188	$508
Value Added ($000)	$63	38	101	200	113	313
Personal Income ($000)	$40	20	60	129	64	193
Wages ($000)	$30	10	40	85	28	113
Employment (jobs)	2	1	3	5	3	8
Population (people)	3	2	5	10	5	15
ECONOMIC IMPACT ON ENTIRE STATES						
Annual Output ($000)	$176	$201	$377	$581	$514	$1,095
Value Added ($000)	$126	125	251	338	289	627
Personal Income ($000)	$70	70	140	214	237	451
Wages ($000)	$60	60	120	153	165	318
Employment (jobs)	3	3	6	8	7	15
Population (people)	4	4	8	14	12	26

SOURCE: REMI Model
Wilbur Smith Associates

TOTAL ECONOMIC DEVELOPMENT BENEFITS

Total annual economic benefits of the alternative highway improvements include both the travel efficiency gains as well as the "Personal Income" portion of the economic development benefits. These two are additive because care was taken to avoid any type of double counting in the calculations.

Total Benefits to the Corridor Region

The seven-county primary impact area benefits by the entire travel efficiency gain plus the full competitive position, roadside business and additional agriculture benefits. These total impacts on the corridor's counties for the three improvement alternatives are presented in Exhibits 8.15, 8.16 and 8.17.

In every case the travel efficiency economic gains are greater than the economic development gains. This is not unexpected given the nature of the U.S. 63 improvements being considered.

Total Benefits to the Two States

The three exhibits also present the annual economic benefits accruing to the two states, statewide. In every case the total statewide benefits are less than the benefits to the corridor area. This is because some benefits to the corridor (some competitive position and some roadside business benefits) represent transfers to the corridor region from elsewhere in Iowa and Minnesota. These transfers do not represent net gains to the states; they are only benefits to the corridor region. Nevertheless, the calculations suggest that there are positive statewide impacts from all benefit types.

Exhibit 8.15
TOTAL ANNUAL ECONOMIC BENEFITS
Alternative #1: Improved Two-Lane
($000)

	IMPACT ON CORRIDOR		IMPACT ON THE TWO STATES	
	1990	2010	1990	2010
TRAVEL EFFICIENCY GAINS				
Vehicle Operating Cost Savings	$(21)	$(36)	$(21)	$(36)
Accident Cost Savings	$532	825	532	825
Value of Time Savings	$501	885	501	885
Total Road User Benefits	$1,012	$1,674	$1,012	$1,674
ECONOMIC DEVELOPMENT GAINS [(a)]				
Competitive Position	$70	$319	$50	$200
Roadside Business	$330	596	53	95
Additional Agriculture	$20	25	50	56
Total Economic Development	$420	$940	$153	$351
TOTAL ECONOMIC BENEFITS	$1,432	$2,614	$1,165	$2,025

(a) The personal income economic development benefit.
SOURCE: Wilbur Smith Associates

Exhibit 8.16
TOTAL ANNUAL ECONOMIC BENEFITS
Alternative #2: With Bypasses
($000)

	IMPACT ON CORRIDOR		IMPACT ON THE TWO STATES	
	1990	2010	1990	2010
TRAVEL EFFICIENCY GAINS				
Vehicle Operating Cost Savings	$518	$782	$518	$782
Accident Cost Savings	$1,102	1,681	1,102	1,681
Value of Time Savings	$2,488	3,781	2,488	3,781
Total Road User Benefits	$4,108	$6,244	$4,108	$6,244
ECONOMIC DEVELOPMENT GAINS [(a)]				
Competitive Position	$390	$1,776	$273	$1,149
Roadside Business	$819	1,485	124	234
Additional Agriculture	$40	145	100	350
Total Economic Development	$1,249	$3,406	$497	$1,733
TOTAL ECONOMIC BENEFITS	$5,357	$9,650	$4,605	$7,977

(a) The personal income economic development benefit.
SOURCE: Wilbur Smith Associates

Exhibit 8.17
TOTAL ANNUAL ECONOMIC BENEFITS
Alternative #3: Four-Lane Highway
($000)

	IMPACT ON CORRIDOR		IMPACT ON THE TWO STATES	
	1990	2010	1990	2010
TRAVEL EFFICIENCY GAINS				
Vehicle Operating Cost Savings	$701	$1,078	$701	$1,078
Accident Cost Savings	$4,549	6,931	$4,549	6,931
Value of Time Savings	$3,777	5,925	$3,777	5,925
Total Road User Benefits	$9,027	$13,934	$9,027	$13,934
ECONOMIC DEVELOPMENT GAINS (a)				
Competitive Position	$630	$2,860	$447	$1,870
Roadside Business	$1,870	3,382	296	532
Additional Agriculture	$60	193	140	451
Total Economic Development	$2,560	$6,435	$883	$2,853
TOTAL ECONOMIC BENEFITS	$11,587	$20,369	$9,910	$16,787

(a) The personal income economic development benefit.
SOURCE: Wilbur Smith Associates

ECONOMIC DEVELOPMENT FEASIBILITY

The economic development feasibility calculations include the same stream of costs and the same travel efficiency benefits as used in the travel efficiency feasibility assessment; to these are added the economic development impacts. The year by year cost and benefit totals are in Appendix C, Exhibits C.10 through C.17. The resulting feasibility indicators are summarized in Exhibit 8.18 below.

Exhibit 8.18
ECONOMIC DEVELOPMENT FEASIBILITY
U.S. 63

ECONOMIC INDICATORS (a)	Alternative #1: Improved Two-Lane	Alternative #2: With Bypasses	Alternative #3: Four-Lane
FEASIBILITY FROM CORRIDOR PERSPECTIVE			
Net Present Value ($000)	$306.3	$52,868.1	$94,018.3
Internal Rate of Return	6.1%	13.1%	11.4%
Discounted Benefit/Cost	1.01	1.96	1.69
FEASIBILITY FROM STATEWIDE PERSPECTIVE			
Net Present Value ($000)	($5,970.7)	$35,073.0	$55,558.9
Internal Rate of Return	4.1%	10.9%	9.3%
Discounted Benefit/Cost	.79	1.63	1.41

(a) 6% discount rate
SOURCE: Wilbur Smith Associates

Exhibit 8.18 statistics suggest a number of conclusions, from the overall economic development perspective.

- From the seven-county corridor perspective, all of the three alternative improvements are economically feasible at the 6% discount rate.

- From the statewide perspective, only Alternatives #2 and #3 are feasible.

- Alternative #2, as was the case with the travel efficiency assessment, continues to generate the greatest return on the investment (Alternative #2 generates 10.9% statewide, Alternative #3 generates 9.3% statewide).

- These statistics suggest that, if the states have sufficient funds, that Alternative #3 (four-lane) should be built. If there are competing highway projects, however, that yield between 9.3% and 10.9%, then Alternative #2 makes the most sense because it yields the greatest return.

- If the states were to select Alternative #2, it should be planned in a way that it could eventually lead to a four-lane highway because of the four-lane highway's feasibility.

APPENDICES

Appendix A
REGIONAL CHARACTERISTICS

This Appendix explains the base year population and employment characteristics and selected trends for the study area. It also presents the forecasts of population and employment utilized in the study.

POPULATION

The populations of cities and towns in the U.S. 63 study area are graphically depicted in Exhibit A.1.

Minnesota

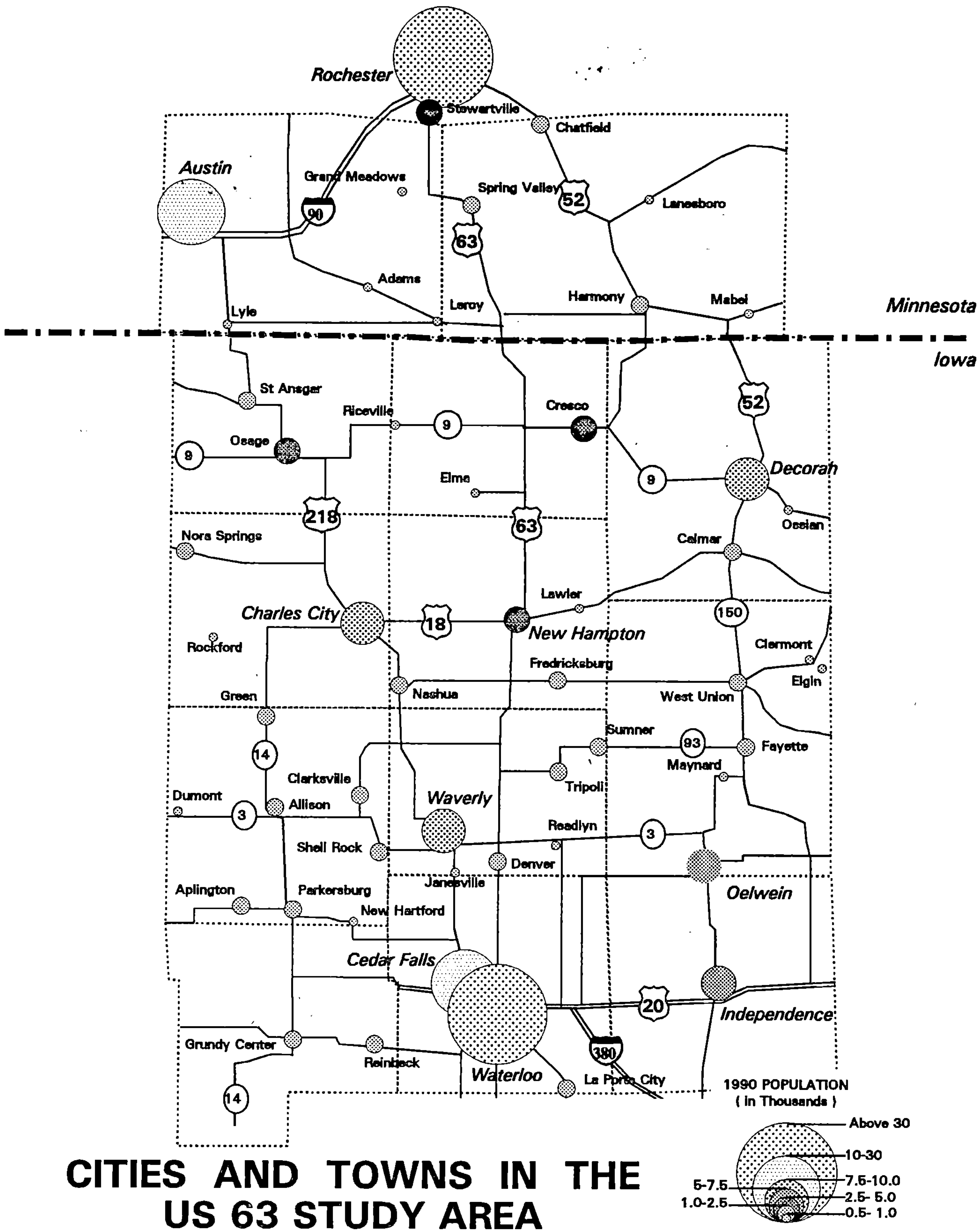
Minnesota's population as of April 1, 1990, was 4,375,099, an increase of 7.3 percent since the 1980 census. The State's rate of growth was slightly faster than the 7.1 percent increase during the 1970s. See Exhibit A.2.

During the 1980s, economic conditions resulted in many people losing their farms, forcing them to migrate out of the State or move to larger metropolitan areas. This particular phenomenon explains the loss in population for Fillmore and Mower Counties. Mower County also has experienced more recent population decline due to significant lay-offs at the Hormel Plant in Austin. Olmsted County on the other hand, has experienced just the opposite trend. Olmsted County has seen an increase of 9.4 percent in its population from 1970 to 1980 and a 15.7 percent increase between 1980 to 1990. Much of the population increase is attributed to the IBM facility and the Mayo Clinic, both located in Rochester.

Iowa

Iowa's population as of 1990 was 2,771,960. This represents a 4.84 percent loss since the 1980 census. The State grew by 2.9 percent between 1970 and 1980.

All of the 11 Iowa counties within the study area lost population during the 1980-1990 period. The declines range from 4.7 percent in Winneshiek County to 16.2 percent in Grundy County. Economic downturns in agriculture and farming activities are a significant reason for population loss in this area of Iowa. Population loss for both Black Hawk and Bremer Counties is also attributed to the closing of Rath Meat Packing Plant and the heavy layoffs at the John Deere farm machinery operation, both located in Waterloo.



CITIES AND TOWNS IN THE US 63 STUDY AREA

Exhibit A.1

Exhibit A.2

IOWA/MINNESOTA POPULATION CHANGES 1970-1990

County	1970	1980	1990	% Change 1970-1980	% Change 1980-1990
IOWA*					
Black Hawk	132,916	137,961	123,798	3.8	-10.27
Bremer	22,737	24,820	22,813	9.2	-8.09
Buchanan	21,762	22,900	20,844	5.2	-8.98
Butler	16,953	17,668	15,731	4.2	-10.96
Chickasaw	14,969	15,437	13,295	3.1	-13.88
Fayette	26,898	25,488	21,843	-5.2	-14.30
Floyd	19,860	19,597	17,058	-1.3	-12.96
Grundy	14,119	14,366	12,029	1.7	-16.27
Howard	11,442	11,114	9,809	-2.9	-11.74
Mitchell	13,108	12,329	10,928	-5.9	-11.36
Winneshiek	21,758	21,876	20,847	0.5	-4.70
11-County Total	316,522	323,556	288,995	8.6	-10.6
State Total	2,830,780	2,913,190	2,771,960	2.9	-4.84
MINNESOTA**					
Fillmore	21,916	21,930	20,777	0.06	-5.26
Mower	44,919	40,390	37,385	-10.08	-7.44
Olmsted	84,104	92,006	106,470	9.40	15.72
3-County Total	150,939	154,326	164,632	2.2	6.6
State Total	3,806,103	4,075,970	4,375,099	7.1	7.3

SOURCE:

*U.S. Bureau of the Census and State Data Center at Iowa State Library of Iowa and Iowa Department of Transportation Final Population Counts.
**Minnesota State Demographer's Office.

Other Trends

Exhibit A.3 presents other aspects of population trends for Iowa and Minnesota, specifically the components of change in terms of births, deaths and net migration. In Minnesota, natural change (i.e., births minus deaths) has ranged between about 31,000 and 33,000 in recent years. In Iowa, natural change has added about 10,000 to 13,000 people each year.

Exhibit A.4 provides an age breakdown for the study area. As noted, there is a distinctive pattern toward an aging population. In fact, every county in the study area lost population in the 0 to 19 year age group between 1970 and 1990. Conversely, every county experienced an increase in persons 65 years or older.

Presented in Exhibit A.5 is the rural/urban population breakdown. Olmsted County experienced an absolute growth between 1980 and 1990 in its urban population while the other two Minnesota counties, Fillmore and Mower, experienced decreases. The breakdown of urban and rural populations for Iowa counties for 1990 is not available at this time.

Forecasts

The year 2010 forecasts for the U.S. 63 Study Area relied on the 1991 Woods and Poole Economics, Inc. projections which include the 1990 Census data for total population. The specific economic forecasting models used by Woods and Poole Economics, Inc. to generate employment forecasts for each county follow a standard economic base approach. The methodology employs a comprehensive county base which integrates the economic activities of each county to capture regional flows.

<u>Minnesota</u> - Minnesota's 1990 population of 4,375,099 is projected to increase at an 8.9 percent rate of growth during the next decade (1990-2000) and a 7.8 percent rate of growth between 2000 and 2010. Overall, Minnesota population is predicted to increase by 17.4 percent between 1990 and 2010, an average annual rate of 0.8 percent.

Olmsted County is forecast to follow this same pattern of growth in population between 1990 and 2010 and is predicted to experience a 25.9 percent increase or 1.2 percent annually. Fillmore is projected to barely change at all during the next 20 years. Mower is projected to experience an 16.2 percent decline in its population during the same time period (Exhibit A.6).

<u>Iowa</u> - Iowa's 1990 population of 2,776,755 is projected to increase by 2.2 percent between 1990 and 2000 and 3.1 percent between 2000 and 2010. This will result in a population of 2,924,750 by the year 2010. This reflects a 5.3 percent increase in population for the State between 1990 and 2010, or an average annual increase of 0.3 percent.

Exhibit A.3

IOWA/MINNESOTA POPULATION TRENDS, 1985-89

Year	Population	Population Change From Year Ago	Actual Births	Actual Deaths	Natural Change (Births-Deaths)	Net Migration***
IOWA*						
1985	2,881,000	(23,000)	41,182	27,810	13,372	(36,372)
1986	2,840,000	(41,000)	38,748	27,021	11,727	(52,727)
1987	2,822,000	(18,000)	37,866	27,213	10,653	(28,653)
1988	2,830,000	8,000	38,070	27,851	10,219	(2,219)
1989	2,840,000	10,000	36,454	24,783	11,671	(1,671)
MINNESOTA**						
1985	4,192,973	31,509	67,412	34,793	32,619	(1,110)
1986	4,214,013	21,040	65,766	35,070	30,696	(9,656)
1987	4,245,870	31,857	65,168	34,512	30,656	1,201
1988	4,306,550	60,680	66,745	35,436	31,309	29,371
1989	4,353,000	46,450	67,490	34,263	33,227	13,223

SOURCE:

*U.S. Department of Commerce, Bureau of the Census. 1991 Statistical Profile of Iowa. Iowa Department of Economic Development.

**Minnesota State Demographer's Office.

***Net Migration = Population Change Minus Natural Change.

( ) = Loss or Negative Number.

Exhibit A.4

TOTAL POPULATION: AGE BREAKDOWN

County	0-19 1970	0-19 1980	0-19 1990	Percent Change 1970-1990	20-64 1970	20-64 1980	20-64 1990	Percent Change 1970-1990	65+ 1970	65+ 1980	65+ 1990	Percent Change 1970-1990
IOWA												
Black Hawk	53,550	45,550	36,360	-32.1	67,370	78,230	70,060	3.9	12,090	14,120	16,890	39.7
Bremer	8,820	8,400	7,010	-20.5	11,190	13,150	12,010	7.3	2,740	3,270	3,730	36.13
Buchanan	9,150	8,460	7,160	-21.7	10,080	11,670	10,250	1.6	2,500	2,810	3,170	26.8
Butler	6,200	5,610	4,530	-26.9	8,320	9,120	8,060	-3.1	2,450	2,920	3,090	26.1
Chickasaw	6,120	5,390	3,910	-36.1	6,770	7,800	7,050	4.1	2,020	2,240	2,270	12.3
Fayette	10,430	8,360	6,600	-36.7	12,600	12,920	11,010	-12.6	3,850	4,160	4,140	7.5
Floyd	7,470	6,350	4,820	-35.4	9,910	10,180	9,030	-8.8	2,720	3,030	3,140	15.4
Grundy	5,090	4,490	3,420	-32.8	7,170	7,610	6,170	-13.9	1,860	2,250	2,390	28.49
Howard	4,290	3,550	2,810	-34.4	5,250	5,420	4,920	-6.2	1,870	2,140	2,060	10.16
Mitchell	5,170	3,940	3,150	-39.0	5,800	6,040	5,420	-6.5	2,100	2,310	2,330	10.9
Winneshiek	8,870	7,500	6,690	-24.5	10,000	11,290	11,020	-10.2	2,920	3,110	3,090	5.8
11-County Total	125,160	107,600	86,460	-30.9	154,460	173,430	155,000	0.3	37,120	42,360	46,300	24.7
State Total	1,081,520	938,030	803,660	-25.6	1,399,550	1,586,170	1,544,390	10.3	349,700	388,990	423,910	21.2
MINNESOTA												
Fillmore	8,180	6,990	6,150	-24.8	10,220	10,950	10,420	1.9	3,550	4,000	4,210	18.5
Mower	18,230	12,600	10,920	-40.0	21,660	21,300	19,150	-11.5	4,920	6,380	7,260	47.5
Olmsted	34,750	30,750	30,610	-11.9	42,390	52,870	64,780	52.8	7,190	8,630	11,290	57.0
3-County Total	61,160	50,340	47,680	-22.0	74,270	85,120	94,350	27.0	15,660	19,010	22,760	45.3
State Total	1,524,340	1,333,640	1,300,470	-14.6	1,882,700	2,266,420	2,522,920	34.0	408,340	481,860	558,860	36.8

Source:

Historical Data 1970-1988 From U.S. Department of Commerce. Projected Data, 1989-2015 Woods & Poole, Copyright 1991.

Exhibit A.5

IOWA/MINNESOTA URBAN/RURAL POPULATION BREAKDOWN

County	1970				1980				1990			
	Total	Urban	%	Rural	Total	Urban	%	Rural	Total	Urban	%	Rural
IOWA												
Black Hawk	132,916	112,881	84.9	20,035	137,961	120,290	87.2	17,671	123,798	NA	NA	NA
Bremer	22,737	7,205	31.6	15,532	24,820	8,444	34.0	16,376	22,813	NA	NA	NA
Buchanan	21,762	5,910	27.1	15,836	22,900	6,360	27.8	16,540	20,844	NA	NA	NA
Butler	16,953	---	---	16,953	17,668	---	---	17,668	15,731	NA	NA	NA
Chickasaw	14,969	3,621	24.1	11,348	15,437	3,940	25.5	11,497	13,295	NA	NA	NA
Fayette	26,898	10,359	38.5	16,539	25,488	10,347	40.6	15,141	21,843	NA	NA	NA
Floyd	19,860	9,268	46.6	10,592	19,597	8,778	44.8	10,819	17,058	NA	NA	NA
Grundy	14,119	2,712	19.2	11,407	14,366	2,880	20.1	11,486	12,029	NA	NA	NA
Howard	11,442	3,927	34.3	7,515	11,114	3,860	34.7	7,254	9,809	NA	NA	NA
Mitchell	13,108	3,815	29.1	9,293	12,329	3,718	30.2	8,611	10,928	NA	NA	NA
Winneshiek	21,758	7,458	34.2	14,300	21,876	7,991	36.5	13,885	20,847	NA	NA	NA
11-County Total	316,522	167,156	52.8	149,350	323,556	176,608	54.5	146,948	288,995	NA	NA	NA
State Total	2,825,041	1,616,405	57.2	1,207,971	2,913,808	1,708,232	58.6	1,205,576	2,771,960	NA	NA	NA
MINNESOTA												
Fillmore	21,916	NA	NA	NA	21,930	10,152	46.2	11,778	20,777	9,818	47.2	10,959
Mower	43,783	NA	NA	NA	40,390	28,673	70.9	11,717	37,385	27,366	73.2	10,019
Olmsted	84,104	NA	NA	NA	92,006	65,660	71.3	26,346	106,470	80,297	75.4	26,173
3-County Total	149,803	NA	NA	NA	154,326	104,485	67.7	49,841	164,632	117,481	71.3	47,151
State Total	3,806,103	NA	NA	NA	4,075,970	2,053,939	50.3	1,350,768	4,375,099	NA	NA	NA

SOURCE:

1980 Census of Population and Housing, March, 1981. Compiled by Iowa Development Commission.
NA - Not Available.

Exhibit A.6

IOWA/MINNESOTA POPULATION PROJECTIONS 1990 – 2010

County	Year 1990	Year 2000	Year 2010	Avg. Annual Growth Rate	% Change 1990–2010
IOWA					
Black Hawk	123,798	151,510	177,540	1.82%	43.41%
Bremer	22,813	28,850	32,850	1.84%	44.00%
Buchanan	20,844	20,790	20,660	−0.04%	−0.88%
Butler	15,731	15,080	14,560	−0.39%	−7.44%
Chickasaw	13,295	14,240	15,280	0.70%	14.93%
Fayette	21,843	20,650	20,090	−0.42%	−8.03%
Floyd	17,058	16,010	15,290	−0.55%	−10.36%
Grundy	12,029	11,640	11,510	−0.22%	−4.31%
Howard	9,809	9,710	9,500	−0.16%	−3.15%
Mitchell	10,928	10,790	10,500	−0.20%	−3.92%
Winneshiek	20,847	21,650	22,280	0.33%	6.87%
Iowa Study Area Total	288,995	320,920	350,060	0.96%	21.13%
Iowa Statewide Total	2,776,755	2,837,850	2,924,750	0.26%	5.33%
MINNESOTA					
Fillmore	20,777	20,830	20,890	0.03%	0.54%
Mower	37,385	33,800	31,310	−0.88%	−16.25%
Olmstead	106,470	121,330	134,080	1.16%	25.93%
Minnesota Study Area Total	164,632	175,960	186,280	0.62%	13.15%
Minnesota Statewide Total	4,375,099	4,764,840	5,136,600	0.81%	17.41%

SOURCES:

Projected Data 1990–2010 From Woods and Poole, Copyright 1991
U.S. Census Bureau

Population growth is projected to occur in four of the counties included in this Study Area -- Black Hawk, Bremer, Chickasaw and Winneshiek. Both Black Hawk and Bremer Counties are expected to increase approximately 44 percent between 1990 and 2010. Chickasaw and Winneshiek Counties are projected to experience a more moderate rate of growth between 1990 and 2010, increasing at 14.9 and 6.9 percent respectively. The remaining counties are projected to steadily lose population. Between 1990 and 2010, Floyd County is expected to decline the most (10.4 percent) and Buchanan County the least (0.9 percent).

EMPLOYMENT

Minnesota

Minnesota experienced substantial employment growth between 1970 and 1990. There have been substantial gains in some industries--notably service, retail and finance--at the time that farm and mining employment have declined.

Manufacturing and employment trends in Minnesota compare favorably with similar trends on a national scale. Between 1970 and 1990, Minnesota manufacturing employment increased by 27.3 percent as indicated in Exhibit A.7. Both Fillmore and Olmsted Counties experienced steady increases of 98.1 and 66.2 percent, respectively, for the same time period. Mower experienced a 56 percent decline during the same time period.

Between 1970 and 1990, Minnesota experienced a 62.6 percent increase in wholesale trade. All three study area counties experienced growth in wholesale trade. In these counties, increases in wholesale trade ranged from 6.1 percent in Mower County to 104.3 percent in Fillmore County. Olmsted County's 64.4 percent increase was comparable to the statewide growth pattern.

Only a few major agriculture-related industries recorded actual declines in employment during 1977 and 1988. The largest drop was in farm employment where 14,000 jobs were lost during the decade, a 10 percent decline. The depressed agricultural economy of the 1980s led many farmers to leave farming, continuing a long-term historical trend. Farm consolidation and subdivision of farm land for residential use reduced the number of farms and the number of farmers and farm workers.

Printing and publishing, lumber and wood products, and instruments are some of the Minnesota manufacturing industries that have been growing. Several of these types of firms are located in the three Minnesota counties included in the Study Area. IBM, Hormel & Company, and Crenlo (sheet metal fabrication) are the three largest manufacturing employers located in Mower and Olmsted Counties. Fillmore County has relative few manufacturing firms.

Exhibit A.7

IOWA/MINNESOTA MANUFACTURING, AGRICULTURE AND WHOLESALE TRADE EMPLOYMENT (ANNUAL AVERAGES)

County	Manufacturing 1978	Manufacturing 1985	Manufacturing 1990	Manufacturing % Change 1978-90	Manufacturing % Change 1985-90	Agriculture*** 1978	Agriculture*** 1985	Agriculture*** 1989	Agriculture*** % Change 1978-89	Agriculture*** % Change 1985-90	Wholesale Trade 1978	Wholesale Trade 1985	Wholesale Trade 1990	Wholesale Trade % Change 1978-90	Wholesale Trade % Change 1985-90
IOWA*															
Black Hawk	24,000+	13,900+	16,500+	-31.2	18.7	2,010	1,830	1,693	-15.7	-7.4	3,230+	2,900+	3,300+	2.1	13.7
Bremer	24,000+	13,900+	16,500+	-31.2	18.7	1,750	1,591	1,474	-15.7	-7.3	3,230+	2,900+	3,300+	2.1	13.7
Buchanan	610	490	740	21.3	51.0	1,924	1,758	1,628	-15.3	-7.3	400	390	390	-2.5	0
Butler	330	200	310	-6.0	55.0	1,958	1,791	1,660	-15.2	-7.3	540	380	390	-27.7	0.25
Chickasaw	1,180	1,320	1,430	21.1	8.3	1,558	1,496	1,387	-10.9	-7.2	470	360	330	-29.7	-8.3
Fayette	920	860	1,060	15.2	23.2	2,647	2,326	2,165	-18.2	-6.9	850	690	710	-16.4	2.8
Floyd	1,840	800	1,550	-15.7	93.7	1,607	1,420	1,313	-18.2	-7.5	290	290	280	-3.4	-3.4
Grundy	480	460	480	0	4.3	1,748	1,482	1,369	-21.6	-7.6	410	370	440	7.3	18.9
Howard	350	450	720	105.7	60.0	1,508	1,372	1,273	-15.5	-7.2	310	300	240	-22.5	-20.0
Mitchell	200	370	660	230.0	78.3	1,512	1,323	1,226	-18.9	-7.3	320	240	280	-12.5	16.6
Winneshiek	730	920	1,410	93.1	53.2	2,673	2,507	2,334	-12.6	-6.9	390	460	440	12.8	-4.3
11-County Total	30,640	19,770	24,860	-18.8	25.7	20,895	18,896	17,522	-16.1	-7.2	7,210	6,380	6,800	-5.6	6.5
State Total	252,500	204,700	235,800	-6.6	15.1	167,997	149,295	138,215	-17.7	-7.4	75,900	72,400	75,800	-0.13	4.6
	1970	1980	1990	1970-90	1980-90	Farm*** 1970	Farm*** 1980	Farm*** 1990	Farm*** 1970-90	Farm*** 1980-90	1970	1980	1990	1970-90	1980-90
MINNESOTA**															
Fillmore	550	710	1,090	98.1	53.5	2,980	2,960	2,580	-13.4	-12.8	230	590	470	104.3	-20.3
Mower	4,920	3,050	2,160	-56.0	-29.1	2,270	2,230	1,810	-20.2	-18.8	490	850	520	6.1	-38.8
Olmsted	6,790	10,320	11,290	66.2	9.3	2,160	2,330	2,140	-0.9	-8.1	900	1,560	1,480	64.4	-5.1
3-County Total	12,260	14,080	14,540	18.5	3.2	7,410	7,520	6,530	-11.8		1,620	3,000	2,470	52.4	-17.6
State Total	321,740	382,910	409,800	27.3	7.0	135,050	138,770	120,280	-10.9	-13.3	85,430	124,200	138,970	62.6	11.8

SOURCE:

*Ann Wagner, Iowa Department of Employment Services. Labor Market Information Unit in Cooperation with the U.S. Department of Labor. Bureau of Labor Statistics. Bench Mark Month, March, 1989, for 1978-1985. 1990 Based on Bench Mark March, 1990. Both Used Place of Work Concept.
Mark Imerman, Rural Data Project, Iowa State University (No Date). Based on Bureau of Economic Analysis Data.

**Woods and Poole: Historical Data 1970-1988 From U.S. Department of Commerce; Projected Data 1989-2015 From Woods and Poole.

+Bremer and Black Hawk County Data Combined After 1982 Due to the Significant Commuting Pattern From Bremer County Into Black Hawk County. For Purposes of Calculating Percent Change, 1978 Data Was Also Combined.

***Agriculture = Includes farm owners, operators and employees.
Farm = Includes all establishments such as farms, orchards, greenhouses and nurseries primarily engaged in the production of crops, plants, vines, trees (excluding forestry operations), specialties such as sod, bulbs and flower seed, ranches, dairies, feedlots, egg production facilities, poultry hatcheries primarily engaged in the keeping, grazing or feeding of cattle, hogs, sheep, goats, poultry of all kinds, and special animals such as horses, bees, pets and fish in captivity.

Iowa

The State of Iowa and each of the 11 counties in the study area experienced a decrease in agricultural employment between 1978 and 1989. For the State, manufacturing decreased 6.6 percent between 1978 and 1990 while wholesale trade was virtually unchanged.

Manufacturing employment has increased since 1985 in the State of Iowa and each of the 11 Iowa counties within the Study Area have experienced the same trend. Overall, seven of the counties experienced a decrease in manufacturing between 1978 and 1985, and recovered between the years 1985 and 1990. Of these seven counties, Black Hawk and Bremer Counties experienced the greatest loss in manufacturing employment (31.2 percent) between 1978 and 1990. (NOTE: Employment data for these two counties are combined after 1982 into the Black Hawk SMSA.) The losses occurred primarily in the meat packing and farm equipment sectors. Since 1985, manufacturing employment has started to slowly recover in the Black Hawk SMSA counties partly because in 1989 a new IPB meat packing plant opened in Waterloo.

Chickasaw, Howard, Mitchell, and Winneshiek Counties experienced an increasing trend in manufacturing employment between 1978 and 1990. Chickasaw County showed a steady increase due to the expansion of industries like Sara Lee, Beatrice Cheese and other smaller firm start-ups within the County. Winneshiek experienced an expansion in non-farm industries since 1978, particularly with the addition of the Rockwell Collins International plant. Other new openings within the County include Yoder, Incorporated and Camcar. Yoder is in food products and Camcar produces durable goods. Three heavy road construction companies are located within Winneshiek County--Fred Carlson Company, Holland Brothers and Reilly Construction. All three companies work on a statewide basis and employ large numbers of construction workers. Both Howard and Mitchell Counties have maintained steady increases in manufacturing during 1978-1990. Possible reasons for this include a healthy livestock trailer business and the Donaldson Company in Cresco.

The State experienced a 4.6 percent decline in wholesale trade employment between 1978-1985 and almost completely recovered that loss between 1985-1990. Winneshiek County is the only county in the Study Area that showed an increase in wholesale trade between 1978-1985. Between 1985 and 1990, the 11 counties experienced a random employment pattern.

Overall, the State of Iowa experienced a 17.7 percent loss in agriculture employment between 1978 and 1989. This trend is also reflected in each of the 11 Study Area counties. Grundy County realized the greatest loss (21.6 percent) and Chickasaw County the least (10.9 percent).

Minnesota Forecasts

Manufacturing - The State is projected to experience an increase of 17.8 percent in manufacturing employment between 1990 and 2010. Fillmore and Olmsted are predicted to experience similar increases of 27.5 and 23.8 percent, respectively. Mower is predicted to realize a 34.7 percent loss in manufacturing employment between 1990 and 2010 (Exhibit A.8).

Agriculture - The State and all three counties in the Study Area are forecasted to continue to experience a decline in the number of people employed in the agriculture sector between 1990 and 2010. According to the Woods and Poole forecast, the State of Minnesota will experience a decline of 7.8 percent. Fillmore, Mower and Olmsted Counties will also realize declines of 8.5, 14.9 and 0.9 percent, respectively.

Wholesale Trade - The State and each county in the Study Area are predicted to experience an increase in wholesale trade employment between 1990 and 2010. Growth for this time period ranges from 34 percent for both Fillmore and Mower Counties and 50 percent for Olmsted. The State is projected to increase wholesale trade employment by 17.2 percent during the same time period.

Change in Total Employment 1990-2015 - The forecast change in total employment for Minnesota between 1990 and 2010 is summarized in Exhibit A.9. Olmsted and Fillmore are predicted to have positive increases in total employment of 18,620 (24.3 percent) and 600 people (5.7 percent), respectively. Mower's future is not so bright, with a predicted decline in total employment of 2,080 people (-12.0 percent).

Iowa Forecasts

Manufacturing - Between 1990 and 2010, the State of Iowa is expected to realize a slight (3.7 percent) increase in manufacturing employment, as are eight of the 11 counties in the Study Area. Mitchell is predicted to experience the greatest increase of 88.1 percent and Fayette the least with 13.0 percent. Butler, Floyd and Grundy are each predicted to experience a decline in manufacturing employment of 14.8, 34.4 and 14.6 percent, respectively.

Agriculture - Since 1978, agriculture employment has declined and, according to forecasts, will continue to decline between 1990 and 2010 for not only the State (17.8 percent) but for each of the 11 counties in the study area. Grundy is predicted to experience the greatest decline (23.6 percent) and Winneshiek the least (12.9 percent).

Wholesale Trade - Overall, the State of Iowa is predicted to experience a gradual increase in wholesale trade employment of 13.9 percent between 1990 and 2010. Seven counties included in

Exhibit A.8
IOWA/MINNESOTA MANUFACTURING, AGRICULTURE AND WHOLESALE TRADE EMPLOYMENT PROJECTIONS
1990 – 2010

County	MANUFACTURING				AGRICULTURE/FARM				WHOLESALE TRADE			
	1990	2010	Avg. Annual Growth Rate	Percent Change 1990–2010	1990	2010	Avg. Annual Growth Rate	Percent Change 1990–2010	1990	2010	Avg. Annual Growth Rate	Percent Change 1990–2010
IOWA												
Black Hawk	14,000	16,890	0.9%	20.6%	1,570	1,300	–0.9%	–17.2%	2,650	3,270	1.1%	23.4%
Bremer	2,500	3,710	2.0%	48.4%	1,380	1,140	–1.0%	–17.4%	570	680	0.9%	19.3%
Buchanan	840	1,200	1.8%	42.9%	1,520	1,280	–0.9%	–15.8%	440	450	0.1%	2.3%
Butler	270	230	–0.8%	–14.8%	1,550	1,280	–1.0%	–17.4%	370	360	–0.1%	–2.7%
Chickasaw	1,430	2,350	2.5%	64.3%	1,300	1,110	–0.8%	–14.6%	370	420	0.6%	13.5%
Fayette	920	1,040	0.6%	13.0%	2,010	1,650	–1.0%	–17.9%	790	810	0.1%	2.5%
Floyd	1,540	1,010	–2.1%	–34.4%	1,220	960	–1.2%	–21.3%	360	350	–0.1%	–2.8%
Grundy	480	410	–0.8%	–14.6%	1,270	970	–1.3%	–23.6%	660	910	1.6%	37.9%
Howard	680	1,200	2.9%	76.5%	1,190	990	–0.9%	–16.8%	340	340	0.0%	0.0%
Mitchell	590	1,110	3.2%	88.1%	1,140	920	–1.1%	–19.3%	280	270	–0.2%	–3.6%
Winneshiek	1,250	1,770	1.8%	41.6%	2,170	1,890	–0.7%	–12.9%	470	530	0.6%	12.8%
Iowa Study Area Total	24,500	30,920	1.2%	26.2%	16,320	13,490	–0.9%	–17.3%	7,300	8,390	0.7%	14.9%
Iowa Statewide Total	230,570	239,120	0.2%	3.7%	129,740	106,710	–1.0%	–17.8%	87,820	100,070	0.7%	13.9%
MINNESOTA												
Fillmore	1,090	1,390	1.2%	27.5%	2,580	2,360	–0.4%	–8.5%	470	630	1.5%	34.0%
Mower	2,160	1,410	–2.1%	–34.7%	1,810	1,540	–0.8%	–14.9%	520	700	1.5%	34.6%
Olmstead	11,290	13,980	1.1%	23.8%	2,140	2,120	–0.0%	–0.9%	1,480	2,220	2.0%	50.0%
Minnesota Study Area Total	14,540	16,780	0.7%	15.4%	6,530	6,020	–0.4%	–7.8%	2,470	3,550	1.8%	43.7%
Minnesota Statewide Total	409,800	482,940	0.8%	17.8%	120,280	110,390	–0.4%	–8.2%	138,970	162,820	0.8%	17.2%

SOURCE:
Copyright 1991, Woods and Poole, Inc.

Exhibit A.9

IOWA/MINNESOTA TOTAL EMPLOYMENT
1990 – 2010

County	1990	2010	Change	Avg. Annual Growth Rate	Percent Change 1990–2010
IOWA					
Black Hawk	71,700	95,000	23,300	1.4%	32.5%
Bremer	12,870	15,390	2,520	0.9%	19.6%
Buchanan	8,410	8,220	(190)	−0.1%	−2.3%
Butler	6,050	5,530	(520)	−0.4%	−8.6%
Chickasaw	7,110	9,070	1,960	1.2%	27.6%
Fayette	10,830	9,600	(1,230)	−0.6%	−11.4%
Floyd	8,830	7,530	(1,300)	−0.8%	−14.7%
Grundy	5,840	5,450	(390)	−0.3%	−6.7%
Howard	5,400	5,600	200	0.2%	3.7%
Mitchell	5,380	5,320	(60)	−0.1%	−1.1%
Winneshiek	12,800	14,120	1,320	0.5%	10.3%
Iowa Study Area Total	155,220	180,830	25,610	0.8%	16.5%
MINNESOTA					
Fillmore	10,610	11,210	600	0.3%	5.7%
Mower	17,290	15,210	(2,080)	−0.6%	−12.0%
Olmstead	76,690	95,310	18,620	1.1%	24.3%
Minnesota Study Area Total	104,590	121,730	17,140	0.8%	16.4%

SOURCE:

Copyright 1991, Woods and Poole, Inc.

the Study Area are projected to follow this same trend, with increases ranging from 2.3 percent for Buchanan to 37.9 percent for Grundy. Three other counties are predicted to experience declines ranging from 2.7 percent for Butler to 3.6 percent for Mitchell. Howard County is projected to experience no change in wholesale trade employment.

Change in Total Employment 1990-2015 - The predicted change in total employment for Iowa between 1990-2010 is summarized in Exhibit A.9. Black Hawk, Bremer, Chickasaw, Howard and Winneshiek Counties are all projected to increase. The ranges vary from 23,300 people or a 32.5 percent increase for Black Hawk County to only an increase of 200 people or 3.7 percent for Howard County. The remaining counties are projected to experience declines in total employment, ranging from a 1,300 person decline for Floyd County (-14.7 percent) to only a 60 person decline for Mitchell County (-1.1 percent).

INCOME

Minnesota

Per capita personal income for the State of Minnesota in 1990 was $14,005. Of the three study area counties, Olmsted County had the greatest per capita income ($15,294) and Fillmore County the lowest ($11,336).

Of the three study area counties, Olmsted County had the greatest total personal income at $1,631,000,000 and Fillmore the least with $235,000,000.

Both per capita personal income and total personal income have increased steadily for both the State of Minnesota and the three Study Area counties between 1970 and 1990 as shown in Exhibit A.10.

Iowa

Of the 11 Study Area counties, only Grundy County had a per capita income above the average for the State of Iowa. Per capita income in Grundy County in 1987 was $15,861, the highest within the Study Area. Winneshiek County had the lowest at $11,800.

Of the 11 Study Area counties, Black Hawk County had the greatest total personal income and Howard the least. Overall, total personal income increased slightly in the 11 counties between 1985 and 1987.

Exhibit A.10
IOWA/MINNESOTA TOTAL PERSONAL INCOME AND PER CAPITA PERSONAL INCOME BY COUNTY, 1985-1987

County	Total Personal Income (Millions of Dollars)			Per Capita Personal Income (Dollars)			State Rank in
	1985	1986	1987	1985	1986	1987	1987
IOWA*							
Black Hawk	$ 1,569	$ 1,569	$ 1,676	$11,939	$12,289	$13,323	64
Bremer	290	296	313	11,904	12,384	13,316	65
Buchanan	232	247	265	10,290	11,316	12,315	88
Butler	195	202	210	11,446	12,082	12,842	80
Chickasaw	176	186	197	11,667	12,522	13,535	57
Fayette	256	271	288	10,588	11,557	12,469	85
Floyd	215	226	240	11,277	12,229	13,069	72
Grundy	186	192	207	13,703	14,585	15,861	3
Howard	121	136	143	11,147	12,774	13,515	58
Mitchell	141	154	162	11,978	13,173	13,994	38
Winneshiek	220	243	256	9,914	11,105	11,800	96
11-County Total	$3,601	$3,722	$3,957	$11,441	$12,365	$13,276	--
State Total	$36,217	$38,017	$40,329	$12,569	$13,341	$14,230	--
	1970	1980	1990	1970	1980	1990	1990
MINNESOTA**							
Fillmore	$ 169	$ 214	$ 235	$ 7,702	$ 9,772	$11,336	57
Mower	448	455	448	10,007	11,301	12,005	36
Olmsted	826	1,149	1,631	9,797	12,462	15,294	5
3-County Total	$1,443	$1,818	$2,314	$9,168	$11,178	$12,878	--
State Total	$36,380	$47,794	$61,374	$ 9,535	$11,709	$14,005	--

SOURCE:
*Survey of Current Business, April, 1989, U.S. Department of Commerce, Bureau of Economic Analysis. 1991 Statistical Profile of Iowa. Iowa Department of Economic Development.
**Woods and Poole: Historical Data 1970-1988 From U.S. Department of Commerce; Projected Data 1989-2015 From Woods and Poole (1982 $).

R/Hwy63/AA4-2

VEHICLE REGISTRATION

Minnesota

Minnesota's total number of registered vehicles increased by 17 percent between 1985 and 1990. All three counties in the Study Area experienced similar increases as indicated in Exhibit A.11.

Iowa

The number of total vehicles registered in the State of Iowa increased only slightly (.12 percent) between 1985 and 1990. Of the 11 counties in the Study Area, only three--Buchanan, Butler and Chickasaw--experienced an increase.

Exhibit A.11

IOWA/MINNESOTA MOTOR VEHICLE REGISTRATIONS BY COUNTY, 1990

County	Total No. of Registrations 1985	1990
IOWA*		
Black Hawk	131,415	122,376
Bremer	26,020	25,735
Buchanan	22,766	22,969
Butler	19,604	19,989
Chickasaw	16,350	16,935
Fayette	25,623	25,146
Floyd	21,533	20,369
Grundy	15,696	15,146
Howard	12,205	11,875
Mitchell	13,735	13,199
Winneshiek	22,430	21,578
11-County Total	327,377	315,317
State Total	3,064,031	3,067,837
MINNESOTA**		
Fillmore	20,068	21,901
Mower	38,069	38,828
Olmsted	95,122	107,506
3-County Total	153,259	168,235
State Total	3,866,646	4,375,283

SOURCE:

*Iowa Department of Transportation, Office of Vehicle Registration as of December, 1990. 1991 Statistical Profile of Iowa, Iowa Department of Economic Development.

**Minnesota Department of Public Safety. Motor Vehicle Section as of December, 1990.

Appendix B

AGRICULTURE IN THE U.S. 63 CORRIDOR

Agriculture is a prominent activity in the U.S. 63 corridor and the route is important to the well being of agriculture in this area. Some key features of agriculture within the Corridor are presented herein.

TRENDS IN AGRICULTURAL FREIGHT MOVEMENTS

Corn

Exhibit B.1 shows that the average annual corn production in the US 63 study corridor from 1985-1989 was about 113.5 million bushels. Production in 1988 was excluded from the average because of the severe drought in that year. Most of the variation in year-to-year production was the result of weather and federal government acreage set-aside-programs.

Exhibit B.1

Corn Production in the U.S. 63 Study Corridor
1985-1990
in thousands of bushels

STATE	COUNTY	1985	1986	1987	1988	1989	1990	AVERAGE *
Iowa								
	Black Hawk	21,268	20,935	16,901	9,659	14,032	18,712	18,369
	Bremer	16,458	15,381	11,878	6,578	10,648	15,390	13,951
	Chickasaw	16,169	17,418	14,261	7,193	11,268	15,808	14,984
	Howard	13,038	13,915	10,994	5,634	12,647	13,847	12,888
Minnesota								
	Fillmore	18,522	21,276	17,685	7,895	17,370	18,520	18,674
	Mower	20,545	21,112	19,880	13,584	23,026	24,408	21,794
	Olmstead	12,181	12,616	11,730	6,428	13,594	14,013	12,826
Total		**118,181**	**122,653**	**103,329**	**56,971**	**102,585**	**120,698**	**113,486**

* Excludes 1988 because of the severe drought.

Corn sales, shown in Exhibit B.2, are defined as production minus the amount of corn fed to livestock. Since 1986, corn sales have declined more than corn production because of increases in livestock consumption, primarily by hogs. On average, the US 63 study corridor has sold approximately 89 million bushels of corn per year. However, there were fewer bushels of corn available to be transported out of the U.S. 63 corridor in the late 1980s than during the mid-1980s.

Exhibit B.2

Corn Sales in the U.S. 63 Study Corridor 1985-1990

in thousands of bushels

STATE	COUNTY	1985	1986	1987	1988	1989	1990	AVERAGE *
Iowa								
	Black Hawk	13,307	18,014	17,438	12,551	5,212	8,258	13,914
	Bremer	10,363	13,847	12,643	8,583	3,410	7,156	10,518
	Chickasaw	10,352	12,796	13,876	10,031	2,736	8,375	11,086
	Howard	10;254	10,985	11,830	8,074	2,474	9,864	10,201
Minnesota								
	Fillmore	16,378	13,661	16,787	13,368	3,080	13,069	14,652
	Mower	17,414	17,472	17,534	16,526	9,799	19,624	17,714
	Olmstead	12,657	10,137	10,163	9,089	3,514	11,073	10,623
Total		**90,726**	**96,913**	**,10,0273**	**78,223**	**30,226**	**77,421**	**88,711**

* Excludes 1989 because of the severe drought.

Soybeans

Exhibit B.3 shows soybean production in the US corridor since 1985. On average, the counties in the corridor produced about 19 million bushels of soybeans per year. Thus, corn production was over 6 times greater than soybean production. However, almost no soybeans are fed to livestock.

Grain Movements

Most of the corn moving out of the Minnesota portion of the US 63 study corridor is hauled by truck over I-90 to Winona, Minnesota for barge movement to New Orleans.

Exhibit B.3
Soybean Production in the U.S. 63 Study Corridor
1985-1990
in thousands of bushels

STATE	COUNTY	1985	1986	1987	1988	1989	1990	AVERAGE *
Iowa								
	Black Hawk	3,554	4,068	4,531	2,332	3,144	3,766	3,812
	Bremer	2,178	2,633	2,589	1,409	1,867	2,432	2,339
	Chickasaw	1,740	2,406	2,292	1,583	2,189	2,595	2,244
	Howard	1,950	2,770	2,861	1,689	2,554	2,620	2,551
Minnesota								
	Fillmore	1,212	1,124	1,357	1,094	1,668	1,432	1,358
	Mower	3,973	4,918	5,822	4,376	5,527	4,834	5,014
	Olmstead	1,007	1,554	1,894	1,009	1,439	1,342	1,447
Total		**15,614**	**19,473**	**21,346**	**13,492**	**18,388**	**19,021**	**18,768**

* Excludes 1988 because of the severe drought.

Most of the grain moving out of the Iowa portion of the US corridor moves by truck to McGregor and Clayton, Iowa for barge movement to New Orleans. The major exception is during the winter months when the Mississippi River is frozen. During these months, some corn and soybeans move to Cedar Rapids by truck over US 63. Moreover, some soybean meal is hauled from Cedar Rapids to the southern portion of the US 63 corridor for manufacture into feed. However, most of the raw soybeans are trucked to the Mississippi River and most of the soybean meal originates in Iowa Falls and Mason City. Upgrading US 63 would have only a small impact on grain trucking costs to Cedar Rapids and would be limited to the reduced trucking cost created by higher speeds and fewer stops and starts. The major trucking problem to Cedar Rapids is congestion within Waterloo.

Livestock

Grain Fed Cattle - Exhibit B.4 shows the trends in beef cattle production in the US 63 study corridor. Grain fed cattle production has increased sharply in Bremer, Howard and Chickasaw counties but has decreased in Black Hawk and the Minnesota counties. Total 1990 corridor production was close to the 6-year annual average of about 70,000 head. Most of the marketed grain

Exhibit B.4
Grain-Fed Cattle Marketed in the U.S. 63 Corridor
1985-1990

STATE	COUNTY	1985	1986	1987	1988	1989	1990	AVERAGE
Iowa								
	Black Hawk	16,000	12,300	14,100	6,500	7,000	7,315	10,535
	Bremer	7,200	5,900	6,700	7,100	9,000	9,406	7,551
	Chickasaw	12,400	9,600	11,000	11,500	17,000	17,766	13,211
	Howard	6,200	4,800	5,500	7,400	9,000	9,406	7,051
Minnesota								
	Fillmore	15,800	14,700	13,000	10,500	9,700	9,200	12,150
	Mower	8,800	8,200	6,700	7,300	8,300	7,200	7,750
	Olmstead	12,700	11,200	12,000	14,000	11,500	10,700	12,016
Total		**79,100**	**66,700**	**69,000**	**64,300**	**71,500**	**70,993**	**70,265**

fed cattle are hauled to Des Moines or Joslin, Illinois for slaughter. The cattle destined for Des Moines typically move part of the distance on US 63 while the cattle destined for Joslin move south on US 63 through Waterloo to I-380.

Hogs - Exhibit B.5 shows that hog production was up sharply in Black Hawk and Howard counties since 1986. However, total corridor production has remained relatively stable between 1988 and 1990 at about 1.3 million head. The average production over the 6-year period was just under 1.3 million head.

The major development in the corridor swine industry was the 1990 opening of the new IBP hog slaughter plant on the east side of Waterloo. This new plant has made US 63 a major conduit for animals hauled from hog buying stations located along the corridor and in southeast Minnesota. Most of the animals purchased at IBP hog buying stations are transported to the Waterloo slaughter plant in tractor-semi-trailer trucks which haul 180-200 animals per load. Moreover, the highway also carries tractor-semi-trailer loads of hogs from buying stations located in the US 63 corridor to the Hormel plant in Austin, the Monfort plant in Marshalltown, the Excel plant in Ottumwa and the FDL plant in Dubuque.

Exhibit B.5
Hogs Marketed in the U.S. 63 Corridor
1985-1990
in thousands of head

STATE	COUNTY	1985	1986	1987	1988	1989	1990	AVERAGE
Iowa								
	Black Hawk	194	170	166	254	252	245	213
	Bremer	156	137	133	165	139	135	144
	Chickasaw	210	206	201	242	225	219	217
	Howard	115	115	112	155	169	164	138
Minnesota								
	Fillmore	218	228	233	234	231	226	228
	Mower	222	211	225	226	216	207	217
	Olmstead	90	87	90	106	111	109	98
Total		**1,205**	**1,154**	**1,161**	**1,382**	**1,343**	**1,307**	**1,258**

About half of the hogs delivered to the IBP plant at Waterloo are delivered direct from farms. Except for those farms located on or very near US 63, most farmers deliver hogs in goosenecked trailers pulled by pickup trucks over the county road system. Farmers are increasingly hauling their hogs direct from farms to slaughter plants because of a $2 per hundredweight premium for direct delivery. However, IBP is planning to build new hog buying stations north of Rochester, Minnesota for delivery to Waterloo over US 63. These more distant buying stations will be used to help supply additional hogs needed to increase the daily slaughter at Waterloo from 15,500 to 17,500 head. In addition, the more distant slaughter plants at Austin, Marshalltown, Ottumwa and Dubuque will also use buying stations to purchase hogs from the US 63 corridor. These new buying stations means that in the number of truckloads of hogs moving over US 63 will probably remain at about the current level even though farmers are trending toward more direct deliveries over the county road system.

Milk Cows - Exhibit B.6 shows that total milk cow numbers and, hence, milk production have declined since 1986. Most of the culled cows from the milk herds in the corridor are hauled over US 63 to I-90 to Green Bay Wisconsin for slaughter.

Exhibit B.6
Milk Cow Production in the U.S. 63 Corridor
1985-1990

STATE	COUNTY	1985	1986	1987	1988	1989	1990	AVERAGE
Iowa								
	Black Hawk	4,400	4,800	4,000	4,000	3,100	3,100	3,900
	Bremer	10,400	11,000	8,800	9,100	10,000	10,000	9,883
	Chickasaw	6,200	6,500	5,400	5,400	6,500	6,500	6,083
	Howard	8,800	9,600	7,200	8,000	6,100	6,100	7,633
Minnesota								
	Fillmore	25,300	27,000	24,500	22,200	21,500	20,400	23,483
	Mower	8,700	8,700	8,500	8,100	7,900	7,300	8,200
	Olmstead	20,000	22,000	19,300	16,300	15,900	15,400	18,150
Total		**83,800**	**89,600**	**77,700**	**73,100**	**71,000**	**68,800**	**77,333**

Poultry - Exhibit B.7 shows that poultry numbers in the US 63 corridor have decreased from about 500,000 hens in 1985 to about 360,000 hens in 1990. However, the number of laying hens in the corridor is expected to increase to about 1.5 million hens during the 1990s. An increase of 1 million laying hens generates about 1,500 additional tractor-semi-trailer truckloads of feed per year and about 1,000 additional truckloads of eggs per year. Almost all of the eggs produced in the corridor and most of the feed used in egg production move over US 63.

Fresh Vegetables

Seneca Foods located in Rochester, Minnesota is a large processor of fresh vegetables. The raw products, including sweet corn, peas and lima beans move between mid-June and late October, largely in tractor-semi-trailer and tandem-axle trucks. Approximately 3,000 truck loads of corn, 900 truck loads of peas and 160 loads of lima beans move north on US 63 to Rochester. Time is crucial in the transport of these fresh products and truckers complain of congestion and delays in traveling through small towns.

Fresh Milk

Associated Milk Producers Inc. has dairy plants in Rochester, Minnesota and in Fredericksburg and Arlington, Iowa to receive milk from farms. The milk is picked up at farms by tandem-axle-tank-trucks for delivery to the three plants. About 4 truck loads of milk per day are hauled over US 63 from Chester, Iowa to Rochester. Also, interplant transfers over US 63 average

Exhibit B.7

Hens and Pullets of Laying Age in the U.S. 63 Corridor 1985-1990

in thousands of birds

STATE	COUNTY	1985	1986	1987	1988	1989	1990	AVERAGE
Iowa								
	Black Hawk	89	26	29	37	35	37	42
	Bremer	52	34	39	48	46	49	44
	Chickasaw	73	48	54	68	65	69	63
	Howard	39	45	51	64	61	65	54
Minnesota								
	Fillmore	111	110	99	69	51	47	81
	Mower	123	129	129	114	99	87	114
	Olmstead	24	22	19	11	7	8	15
Total		**511**	**414**	**420**	**411**	**364**	**362**	**414**

about one tractor semi-trailer load per day. In addition, Marigold Foods in Rochester ships about 3 tractor-semi-trailer loads of processed dairy products per day south on US 63 to Waterloo, the Quad Cities and Decorah. These processed product shipments are likely to increase to 4 loads per day in the near future.

Fertilizer

Fertilizers are distributed out of wholesale warehouses in Waterloo and Rochester to retailers who then deliver the fertilizer to farmers. Most of the fertilizers out of these warehouses are hauled in tractor-semi-trailer trucks.

Fertilizer usage is highly related to corn acres. Given federal government set-aside programs, there is a high probability that corn acres will remain around current levels. Therefore, fertilizer consumption is likely to remain near current levels.

IMPACT OF UPGRADING U.S. 63 TO THE CEDAR VALLEY RAILROAD COMPANY

The Cedar Valley Railroad (CVRR) track parallels US 218 between Waterloo and Lyle, Minnesota. Thus, upgrading US 218 will have a much greater impact on the CVRR than upgrading US 63. Currently about half of the grain moving out of the CVRR market area moves to Dubuque and Chicago by rail. The remaining half of the grain moves by truck, primarily to Dubuque during April-December. A small amount of grain moves by truck to Cedar Rapids during the winter months of January-March.

The CVRR is currently operated by the Chicago Central and Pacific Railroad under authorization from the Interstate Commerce Commission because the CVRR is technically bankrupt. It is doubtful that the CVRR will ever be a financial success as an independent short line railroad. Its problem is that it is located too close to the Mississippi River. For example, in July 1991, the truck rate for corn from Staceyville, Iowa to Dubuque was 19 cents per bushel while the rail rate was 20 cents per bushel. Thus, trucks frequently have a rate advantage over the CVRR.

The total rail cars loaded on the CVRR declined 37 percent between 1987 and 1990 as shown in the following data:

YEAR	Total railcar loadings on the CVRR
1987	9,663
1988	9,411
1989	7,241
1990	6,065

Given the truck-rail rate relationships and the financial condition of the CVRR, upgrading US 63 is likely to have little impact on the CVRR.

IMPACTS OF UPGRADING US 63 ON AGRICULTURE

Grain

Upgrading US 63 will have little impact on the transport costs of raw corn and soybeans other than from the reduced trucking costs from fewer stops and starts and higher speeds. Most of the grain moves east by truck to McGregor and Clayton, Iowa and to Winona, Minnesota. Some corn and soybeans move south on US 63 during the winter months to Cedar Rapids and some soybean meal moves north on US 63 from Cedar Rapids. However, the quantities moving over US 63 are small relative to the total quantities moving over other highways.

Livestock

US 63 is more important for livestock shipments than for grain shipments for the following reasons.

The 1990 opening of the IBP hog slaughtering plant in Waterloo dramatically changed the importance of US 63 for livestock. Most of the hogs purchased by hog buying stations owned by IBP, Monfort (Marshalltown), Excell (Ottumwa) Hormel (Austin) and FDL (Dubuque) in the US 63 corridor and in southeast Minnesota move over US 63. In addition to lower trucking costs, an upgraded US 63 is likely to result in reduced shrink (weight loss) in the live animals during transport. Shrink is caused by the stress to the animals from being mixed with different animals and crowded into a truck. The amount of shrink is related to the distance hauled and the amount of time the animals are in the truck, the ambient temperature and the amount of jostling caused as the truck starts, stops, slows down and speeds up, and from the roughness of the road surface.

Estimates of the amount of shrink vary sharply. A study at the University of Missouri indicated the following amounts of liveweight shrink of hogs during cold weather:

Distance hauled	Percent shrink
10	0.9
30	1.2
50	1.5

No estimates have been made of the impact of higher truck speeds and a reduction in the number of stops, starts, slow downs and speed ups. However, officials of hog slaughtering firms guesstimated that the reduction in shrink from a nonstop trip from New Hampton to Waterloo ranged from 0.02 percent to 1.0 percent. A 0.02 percentage point reduction in shrink would amount to a savings of about $5 per tractor-semi-trailer load while a 1.0 percentage point reduction in shrink would result in a savings of $250 per tractor-semi-trailer load. Some officials suggested that a nonstop trip is more important in reducing shrink than the impact of distance.

A second major issue in the transport of hogs over US 63 is access to the new IBP plant at Waterloo. The new plant is located on N. Elk Run Road just south of the Chicago and North Western Transportation Company railroad tracks. South bound livestock trucks on US 63 typically take a county road or E. Donald Street east to N. Elk Run Road to reach the IBP plant. This involves substantial traffic congestion and stopping and starting which increases trucking costs and animal shrink. Thus, an improved eastbound access off US 63 would likely have substantial benefits. An alternative would be to improve US 63 south to the Sixth Street Extension for access to the IBP plant.

Cattle

Cattle transport would also benefit from an upgraded US 63 because of reduced shrink and from the decreased trucking costs associated with fewer stops, starts and higher speeds. However, there are substantially fewer trucks hauling cattle over US 63 than hauling hogs.

Milk

The amount of milk moving over the Minnesota portion of US 63 is declining. Nevertheless, milk haulers would benefit substantially from upgrading US 63. A stretch of the road north of the Iowa border usually has weight restrictions during the spring thaw. When this occurs, milk haulers must reduce the amount hauled by each truck. This adds one additional trip per day during the period that weights are restricted.

Egg Production

The perishability and breakability of eggs means that smooth, nonstop highways are of great value to the egg industry. With the expected increase in egg production in the area during the 1990s, an upgraded US 63 would be of substantial value to the fledgling egg industry in the corridor.

Fresh Vegetables

Because of the perishability of fresh fruits and vegetables, the movement of these products into Rochester is extremely time sensitive. The value of time savings is much greater for these products than for non-perishable products like grain. Therefore, bypasses around small towns would be very valuable to the movement of these products.

Fertilizer

A large portion of the fertilizer deliveries occur during March, April and May. This is the same time that weight restrictions apply to a section of US 63 just north of the Iowa border. Thus, the fertilizer industry would benefit substantially from the upgrading of this section of road as well as from the lower trucking costs from upgrading the entire corridor.

Trucking

During the spring months, the embargoed portion of US 63 is limited to 20,000 pounds per tandem axle compared to the legal limit of 34,000 pounds. Thus, during the spring months, legally loaded trucks must travel over to I-35 to I-90 back to Rochester. This adds substantially to the number of miles driven. Since truckers are typically paid on a mileage basis for the most direct routes as indicated by the Household Movers Guide, additional distance traveled to avoid the embargo adds to trucker costs but not to revenue.

A substantial number of overwidth trucks travel on US 63 between St. Paul and Waterloo. At the present time, any vehicle over 12 feet wide must have an escort vehicle(s). Escort vehicles typically cost 75 cents per mile. Double escorts cost $1.50 per mile. A 4-lane highway can carry a 14 foot wide load without an escort. Therefore, a 4-lane highway would eliminate the cost of an escort for a large number of wide-load trucks.

ECONOMIC BENEFIT/COST TABLES

Exhibit C.1

U.S. 63 BENEFIT/COST ANALYSIS: SUMMARY TABLE

	Alternative 1 Improved Two–lane			Alternative 2 Improved with Bypasses			Alternative 3 Four–Lane with Bypasses		
Year	Net Costs	Net Benefits	Net Flow	Net Costs	Net Benefits	Net Flow	Net Costs	Net Benefits	Net Flow
1991	28,377.4	0.0	(28,377.4)	52,873.7	0.0	(52,873.7)	128,909.5	0.0	(128,909.5)
1992	17.5	1,078.9	1,061.4	90.6	4,321.7	4,231.1	191.9	9,518.1	9,326.2
1993	17.5	1,112.0	1,094.5	90.6	4,428.5	4,337.9	191.9	9,763.4	9,571.5
1994	17.5	1,145.0	1,127.5	90.6	4,535.4	4,444.8	191.9	10,008.8	9,816.9
1995	17.5	1,178.1	1,160.6	90.6	4,642.2	4,551.6	191.9	10,254.1	10,062.2
1996	17.5	1,211.2	1,193.7	90.6	4,749.0	4,658.4	191.9	10,499.5	10,307.6
1997	17.5	1,244.3	1,226.8	90.6	4,855.8	4,765.2	191.9	10,744.8	10,552.9
1998	17.5	1,277.4	1,259.9	90.6	4,962.6	4,872.0	191.9	10,990.2	10,798.3
1999	17.5	1,310.5	1,293.0	90.6	5,069.4	4,978.8	191.9	11,235.5	11,043.6
2000	17.5	1,343.6	1,326.1	90.6	5,176.3	5,085.7	191.9	11,480.9	11,289.0
2001	17.5	1,376.6	1,359.1	90.6	5,283.1	5,192.5	191.9	11,726.2	11,534.3
2002	17.5	1,409.7	1,392.2	90.6	5,389.9	5,299.3	191.9	11,971.5	11,779.6
2003	17.5	1,442.8	1,425.3	90.6	5,496.7	5,406.1	191.9	12,216.9	12,025.0
2004	17.5	1,475.9	1,458.4	90.6	5,603.5	5,512.9	191.9	12,462.2	12,270.3
2005	17.5	1,509.0	1,491.5	90.6	5,710.3	5,619.7	191.9	12,707.6	12,515.7
2006	17.5	1,542.1	1,524.6	90.6	5,817.1	5,726.5	191.9	12,952.9	12,761.0
2007	682.5	1,575.1	892.6	2,987.6	5,924.0	2,936.4	10,779.7	13,198.3	2,418.6
2008	17.5	1,608.2	1,590.7	90.6	6,030.8	5,940.2	191.9	13,443.6	13,251.7
2009	17.5	1,641.3	1,623.8	90.6	6,137.6	6,047.0	191.9	13,689.0	13,497.1
2010	17.5	1,674.4	1,656.9	90.6	6,244.4	6,153.8	191.9	13,934.3	13,742.4
2011	17.5	1,707.5	1,690.0	90.6	6,351.2	6,260.6	191.9	14,179.6	13,987.7
2012	17.5	1,740.6	1,723.1	90.6	6,458.0	6,367.4	191.9	14,425.0	14,233.1
2013	17.5	1,773.7	1,756.2	90.6	6,564.8	6,474.2	191.9	14,670.3	14,478.4
2014	17.5	1,806.7	1,789.2	90.6	6,671.7	6,581.1	191.9	14,915.7	14,723.8
2015	17.5	1,839.8	1,822.3	90.6	6,778.5	6,687.9	191.9	15,161.0	14,969.1
2016	17.5	1,872.9	1,855.4	90.6	6,885.3	6,794.7	191.9	15,406.4	15,214.5
2017	17.5	1,906.0	1,888.5	90.6	6,992.1	6,901.5	191.9	15,651.7	15,459.8
2018	17.5	1,939.1	1,921.6	90.6	7,098.9	7,008.3	191.9	15,897.1	15,705.2
2019	17.5	1,972.2	1,954.7	90.6	7,205.7	7,115.1	191.9	16,142.4	15,950.5
2020	17.5	5,858.8	5,841.3	90.6	23,539.7	23,449.1	191.9	66,409.9	66,218.0

Disc. Rate 6%			
a) Total Net Benefits	19,916.7	76,397.0	172,277.8
b) Total Net Costs	28,877.0	55,245.4	135,685.4
c) B/Cost Ratio	0.69	1.38	1.27
d) Net Present Value	(8,960.3)	21,151.6	36,592.4
	(8,960.3)	21,151.6	36,592.4
Internal Rate of Return	3.2%	9.0%	8.1%

Exhibit C.2

U.S. 63 BENEFIT/COST ANALYSIS
Alternative 1: Improved Two–lane

	Net Costs			Net Benefits				
Year	Capital	Maint	Total	Oper	Acc	Time	R. Value	Total
1990								
1991	28,377.4	0.0	28,377.4					
1992	0.0	17.5	17.5	(22.4)	561.6	539.7	0.0	1,078.9
1993	0.0	17.5	17.5	(23.1)	576.2	558.9	0.0	1,112.0
1994	0.0	17.5	17.5	(23.9)	590.8	578.1	0.0	1,145.0
1995	0.0	17.5	17.5	(24.6)	605.5	597.3	0.0	1,178.1
1996	0.0	17.5	17.5	(25.3)	620.1	616.5	0.0	1,211.2
1997	0.0	17.5	17.5	(26.1)	634.7	635.7	0.0	1,244.3
1998	0.0	17.5	17.5	(26.8)	649.3	654.9	0.0	1,277.4
1999	0.0	17.5	17.5	(27.6)	664.0	674.1	0.0	1,310.5
2000	0.0	17.5	17.5	(28.3)	678.6	693.3	0.0	1,343.6
2001	0.0	17.5	17.5	(29.0)	693.2	712.4	0.0	1,376.6
2002	0.0	17.5	17.5	(29.8)	707.9	731.6	0.0	1,409.7
2003	0.0	17.5	17.5	(30.5)	722.5	750.8	0.0	1,442.8
2004	0.0	17.5	17.5	(31.3)	737.1	770.0	0.0	1,475.9
2005	0.0	17.5	17.5	(32.0)	751.8	789.2	0.0	1,509.0
2006	0.0	17.5	17.5	(32.7)	766.4	808.4	0.0	1,542.1
2007	665.0	17.5	682.5	(33.5)	781.0	827.6	0.0	1,575.1
2008	0.0	17.5	17.5	(34.2)	795.6	846.8	0.0	1,608.2
2009	0.0	17.5	17.5	(35.0)	810.3	866.0	0.0	1,641.3
2010	0.0	17.5	17.5	(35.7)	824.9	885.2	0.0	1,674.4
2011	0.0	17.5	17.5	(36.4)	839.5	904.4	0.0	1,707.5
2012	0.0	17.5	17.5	(37.2)	854.2	923.6	0.0	1,740.6
2013	0.0	17.5	17.5	(37.9)	868.8	942.8	0.0	1,773.7
2014	0.0	17.5	17.5	(38.7)	883.4	962.0	0.0	1,806.7
2015	0.0	17.5	17.5	(39.4)	898.1	981.2	0.0	1,839.8
2016	0.0	17.5	17.5	(40.1)	912.7	1,000.4	0.0	1,872.9
2017	0.0	17.5	17.5	(40.9)	927.3	1,019.6	0.0	1,906.0
2018	0.0	17.5	17.5	(41.6)	941.9	1,038.8	0.0	1,939.1
2019	0.0	17.5	17.5	(42.4)	956.6	1,058.0	0.0	1,972.2
2020	0.0	17.5	17.5	(43.1)	971.2	1,077.2	3,853.5	5,858.8

Exhibit C.3

U.S. 63 BENEFIT/COST ANALYSIS
Alternative 2: Improved Two-lane with Bypasses

Year	Net Costs Capital	Maint	Total	Net Benefits Oper	Acc	Time	R. Value	Total
1990								
1991	52,873.7	0.0	52,873.7					
1992	0.0	90.6	90.6	544.3	1,159.6	2,617.9	0.0	4,321.7
1993	0.0	90.6	90.6	557.5	1,188.6	2,682.5	0.0	4,428.5
1994	0.0	90.6	90.6	570.7	1,217.5	2,747.1	0.0	4,535.4
1995	0.0	90.6	90.6	583.9	1,246.5	2,811.7	0.0	4,642.2
1996	0.0	90.6	90.6	597.1	1,275.5	2,876.4	0.0	4,749.0
1997	0.0	90.6	90.6	610.3	1,304.5	2,941.0	0.0	4,855.8
1998	0.0	90.6	90.6	623.5	1,333.5	3,005.6	0.0	4,962.6
1999	0.0	90.6	90.6	636.7	1,362.5	3,070.2	0.0	5,069.4
2000	0.0	90.6	90.6	650.0	1,391.4	3,134.9	0.0	5,176.3
2001	0.0	90.6	90.6	663.2	1,420.4	3,199.5	0.0	5,283.1
2002	0.0	90.6	90.6	676.4	1,449.4	3,264.1	0.0	5,389.9
2003	0.0	90.6	90.6	689.6	1,478.4	3,328.7	0.0	5,496.7
2004	0.0	90.6	90.6	702.8	1,507.4	3,393.4	0.0	5,603.5
2005	0.0	90.6	90.6	716.0	1,536.4	3,458.0	0.0	5,710.3
2006	0.0	90.6	90.6	729.2	1,565.4	3,522.6	0.0	5,817.1
2007	2,897.0	90.6	2,987.6	742.4	1,594.3	3,587.2	0.0	5,924.0
2008	0.0	90.6	90.6	755.6	1,623.3	3,651.9	0.0	6,030.8
2009	0.0	90.6	90.6	768.8	1,652.3	3,716.5	0.0	6,137.6
2010	0.0	90.6	90.6	782.0	1,681.3	3,781.1	0.0	6,244.4
2011	0.0	90.6	90.6	795.2	1,710.3	3,845.7	0.0	6,351.2
2012	0.0	90.6	90.6	808.4	1,739.3	3,910.4	0.0	6,458.0
2013	0.0	90.6	90.6	821.6	1,768.3	3,975.0	0.0	6,564.8
2014	0.0	90.6	90.6	834.8	1,797.2	4,039.6	0.0	6,671.7
2015	0.0	90.6	90.6	848.0	1,826.2	4,104.2	0.0	6,778.5
2016	0.0	90.6	90.6	861.2	1,855.2	4,168.9	0.0	6,885.3
2017	0.0	90.6	90.6	874.4	1,884.2	4,233.5	0.0	6,992.1
2018	0.0	90.6	90.6	887.6	1,913.2	4,298.1	0.0	7,098.9
2019	0.0	90.6	90.6	900.8	1,942.2	4,362.7	0.0	7,205.7
2020	0.0	90.6	90.6	914.1	1,971.2	4,427.4	16,227.1	23,539.7

Exhibit C.4

U.S. 63 BENEFIT/COST ANALYSIS
Alternative 3: Four-lane with Bypasses

	Net Costs			Net Benefits				
Year	Capital	Maint	Total	Oper	Acc	Time	R. Value	Total
1990								
1991	128,909.5	0.0	128,909.5					
1992	0.0	191.9	191.9	738.3	4,787.5	3,992.3	0.0	9,518.1
1993	0.0	191.9	191.9	757.2	4,906.5	4,099.7	0.0	9,763.4
1994	0.0	191.9	191.9	776.1	5,025.6	4,207.1	0.0	10,008.8
1995	0.0	191.9	191.9	795.0	5,144.7	4,314.5	0.0	10,254.1
1996	0.0	191.9	191.9	813.8	5,263.8	4,421.9	0.0	10,499.5
1997	0.0	191.9	191.9	832.7	5,382.8	4,529.3	0.0	10,744.8
1998	0.0	191.9	191.9	851.6	5,501.9	4,636.7	0.0	10,990.2
1999	0.0	191.9	191.9	870.4	5,621.0	4,744.1	0.0	11,235.5
2000	0.0	191.9	191.9	889.3	5,740.1	4,851.5	0.0	11,480.9
2001	0.0	191.9	191.9	908.2	5,859.1	4,958.9	0.0	11,726.2
2002	0.0	191.9	191.9	927.0	5,978.2	5,066.3	0.0	11,971.5
2003	0.0	191.9	191.9	945.9	6,097.3	5,173.7	0.0	12,216.9
2004	0.0	191.9	191.9	964.8	6,216.4	5,281.1	0.0	12,462.2
2005	0.0	191.9	191.9	983.7	6,335.4	5,388.5	0.0	12,707.6
2006	0.0	191.9	191.9	1,002.5	6,454.5	5,495.9	0.0	12,952.9
2007	10,587.8	191.9	10,779.7	1,021.4	6,573.6	5,603.3	0.0	13,198.3
2008	0.0	191.9	191.9	1,040.3	6,692.7	5,710.7	0.0	13,443.6
2009	0.0	191.9	191.9	1,059.1	6,811.7	5,818.1	0.0	13,689.0
2010	0.0	191.9	191.9	1,078.0	6,930.8	5,925.5	0.0	13,934.3
2011	0.0	191.9	191.9	1,096.9	7,049.9	6,032.9	0.0	14,179.6
2012	0.0	191.9	191.9	1,115.7	7,169.0	6,140.3	0.0	14,425.0
2013	0.0	191.9	191.9	1,134.6	7,288.0	6,247.7	0.0	14,670.3
2014	0.0	191.9	191.9	1,153.5	7,407.1	6,355.1	0.0	14,915.7
2015	0.0	191.9	191.9	1,172.4	7,526.2	6,462.5	0.0	15,161.0
2016	0.0	191.9	191.9	1,191.2	7,645.3	6,569.9	0.0	15,406.4
2017	0.0	191.9	191.9	1,210.1	7,764.3	6,677.3	0.0	15,651.7
2018	0.0	191.9	191.9	1,229.0	7,883.4	6,784.7	0.0	15,897.1
2019	0.0	191.9	191.9	1,247.8	8,002.5	6,892.1	0.0	16,142.4
2020	0.0	191.9	191.9	1,266.7	8,121.6	6,999.5	50,022.1	66,409.9

Exhibit C.5
DISCOUNT RATE SENSITIVITY TEST

Year	Alternative 1 Improved Two-lane Net Costs	Net Benefits	Net Flow	Alternative 2 Improved with Bypasses Net Costs	Net Benefits	Net Flow	Alternative 3 Four-Lane with Bypasses Net Costs	Net Benefits	Net Flow
1991	28,377.4	0.0	(28,377.4)	52,873.7	0.0	(52,873.7)	128,909.5	0.0	(128,909.5)
1992	17.5	1,078.9	1,061.4	90.6	4,321.7	4,231.1	191.9	9,518.1	9,326.2
1993	17.5	1,112.0	1,094.5	90.6	4,428.5	4,337.9	191.9	9,763.4	9,571.5
1994	17.5	1,145.0	1,127.5	90.6	4,535.4	4,444.8	191.9	10,008.8	9,816.9
1995	17.5	1,178.1	1,160.6	90.6	4,642.2	4,551.6	191.9	10,254.1	10,062.2
1996	17.5	1,211.2	1,193.7	90.6	4,749.0	4,658.4	191.9	10,499.5	10,307.6
1997	17.5	1,244.3	1,226.8	90.6	4,855.8	4,765.2	191.9	10,744.8	10,552.9
1998	17.5	1,277.4	1,259.9	90.6	4,962.6	4,872.0	191.9	10,990.2	10,798.3
1999	17.5	1,310.5	1,293.0	90.6	5,069.4	4,978.8	191.9	11,235.5	11,043.6
2000	17.5	1,343.6	1,326.1	90.6	5,176.3	5,085.7	191.9	11,480.9	11,289.0
2001	17.5	1,376.6	1,359.1	90.6	5,283.1	5,192.5	191.9	11,726.2	11,534.3
2002	17.5	1,409.7	1,392.2	90.6	5,389.9	5,299.3	191.9	11,971.5	11,779.6
2003	17.5	1,442.8	1,425.3	90.6	5,496.7	5,406.1	191.9	12,216.9	12,025.0
2004	17.5	1,475.9	1,458.4	90.6	5,603.5	5,512.9	191.9	12,462.2	12,270.3
2005	17.5	1,509.0	1,491.5	90.6	5,710.3	5,619.7	191.9	12,707.6	12,515.7
2006	17.5	1,542.1	1,524.6	90.6	5,817.1	5,726.5	191.9	12,952.9	12,761.0
2007	682.5	1,575.1	892.6	2,987.6	5,924.0	2,936.4	10,779.7	13,198.3	2,418.6
2008	17.5	1,608.2	1,590.7	90.6	6,030.8	5,940.2	191.9	13,443.6	13,251.7
2009	17.5	1,641.3	1,623.8	90.6	6,137.6	6,047.0	191.9	13,689.0	13,497.1
2010	17.5	1,674.4	1,656.9	90.6	6,244.4	6,153.8	191.9	13,934.3	13,742.4
2011	17.5	1,707.5	1,690.0	90.6	6,351.2	6,260.6	191.9	14,179.6	13,987.7
2012	17.5	1,740.6	1,723.1	90.6	6,458.0	6,367.4	191.9	14,425.0	14,233.1
2013	17.5	1,773.7	1,756.2	90.6	6,564.8	6,474.2	191.9	14,670.3	14,478.4
2014	17.5	1,806.7	1,789.2	90.6	6,671.7	6,581.1	191.9	14,915.7	14,723.8
2015	17.5	1,839.8	1,822.3	90.6	6,778.5	6,687.9	191.9	15,161.0	14,969.1
2016	17.5	1,872.9	1,855.4	90.6	6,885.3	6,794.7	191.9	15,406.4	15,214.5
2017	17.5	1,906.0	1,888.5	90.6	6,992.1	6,901.5	191.9	15,651.7	15,459.8
2018	17.5	1,939.1	1,921.6	90.6	7,098.9	7,008.3	191.9	15,897.1	15,705.2
2019	17.5	1,972.2	1,954.7	90.6	7,205.7	7,115.1	191.9	16,142.4	15,950.5
2020	17.5	5,858.8	5,841.3	90.6	23,539.7	23,449.1	191.9	66,409.9	66,218.0

Disc. Rate 6%	Alternative 1	Alternative 2	Alternative 3
a) Total Net Benefits	19,916.7	76,397.0	172,277.8
b) Total Net Costs	28,877.0	55,245.4	135,685.4
c) B/Cost Ratio	0.69	1.38	1.27
d) Net Present Value	(8,960.3)	21,151.6	36,592.4
	(8,960.3)	21,151.6	36,592.4
Internal Rate of Return	3.2%	9.0%	8.1%

Disc. Rate 10%	Alternative 1	Alternative 2	Alternative 3
a) Total Net Benefits	12,846.6	49,571.3	110,836.7
b) Total Net Costs	28,686.1	54,353.1	133,011.7
c) B/Cost Ratio	0.45	0.91	0.83
d) Net Present Value	(15,839.5)	(4,781.8)	(22,175.0)
	(15,839.5)	(4,781.8)	(22,175.0)
Internal Rate of Return	3.2%	9.0%	8.1%

Note: This sensitivity test utilizes a 10% discount rate in place of the 6% discount rate.

Exhibit C.6
CAPITAL COST SENSITIVITY TEST: SUMMARY TABLE

	Alternative 1 Improved Two-lane			Alternative 2 Improved with Bypasses			Alternative 3 Four-Lane with Bypasses		
Year	Net Costs	Net Benefits	Net Flow	Net Costs	Net Benefits	Net Flow	Net Costs	Net Benefits	Net Flow
1991	31,215.1	0.0	(31,215.1)	58,161.1	0.0	(58,161.1)	141,800.5	0.0	(141,800.5)
1992	17.5	1,078.9	1,061.4	90.6	4,321.7	4,231.1	191.9	9,518.1	9,326.2
1993	17.5	1,112.0	1,094.5	90.6	4,428.5	4,337.9	191.9	9,763.4	9,571.5
1994	17.5	1,145.0	1,127.5	90.6	4,535.4	4,444.8	191.9	10,008.8	9,816.9
1995	17.5	1,178.1	1,160.6	90.6	4,642.2	4,551.6	191.9	10,254.1	10,062.2
1996	17.5	1,211.2	1,193.7	90.6	4,749.0	4,658.4	191.9	10,499.5	10,307.6
1997	17.5	1,244.3	1,226.8	90.6	4,855.8	4,765.2	191.9	10,744.8	10,552.9
1998	17.5	1,277.4	1,259.9	90.6	4,962.6	4,872.0	191.9	10,990.2	10,798.3
1999	17.5	1,310.5	1,293.0	90.6	5,069.4	4,978.8	191.9	11,235.5	11,043.6
2000	17.5	1,343.6	1,326.1	90.6	5,176.3	5,085.7	191.9	11,480.9	11,289.0
2001	17.5	1,376.6	1,359.1	90.6	5,283.1	5,192.5	191.9	11,726.2	11,534.3
2002	17.5	1,409.7	1,392.2	90.6	5,389.9	5,299.3	191.9	11,971.5	11,779.6
2003	17.5	1,442.8	1,425.3	90.6	5,496.7	5,406.1	191.9	12,216.9	12,025.0
2004	17.5	1,475.9	1,458.4	90.6	5,603.5	5,512.9	191.9	12,462.2	12,270.3
2005	17.5	1,509.0	1,491.5	90.6	5,710.3	5,619.7	191.9	12,707.6	12,515.7
2006	17.5	1,542.1	1,524.6	90.6	5,817.1	5,726.5	191.9	12,952.9	12,761.0
2007	682.5	1,575.1	892.6	2,987.6	5,924.0	2,936.4	10,779.7	13,198.3	2,418.6
2008	17.5	1,608.2	1,590.7	90.6	6,030.8	5,940.2	191.9	13,443.6	13,251.7
2009	17.5	1,641.3	1,623.8	90.6	6,137.6	6,047.0	191.9	13,689.0	13,497.1
2010	17.5	1,674.4	1,656.9	90.6	6,244.4	6,153.8	191.9	13,934.3	13,742.4
2011	17.5	1,707.5	1,690.0	90.6	6,351.2	6,260.6	191.9	14,179.6	13,987.7
2012	17.5	1,740.6	1,723.1	90.6	6,458.0	6,367.4	191.9	14,425.0	14,233.1
2013	17.5	1,773.7	1,756.2	90.6	6,564.8	6,474.2	191.9	14,670.3	14,478.4
2014	17.5	1,806.7	1,789.2	90.6	6,671.7	6,581.1	191.9	14,915.7	14,723.8
2015	17.5	1,839.8	1,822.3	90.6	6,778.5	6,687.9	191.9	15,161.0	14,969.1
2016	17.5	1,872.9	1,855.4	90.6	6,885.3	6,794.7	191.9	15,406.4	15,214.5
2017	17.5	1,906.0	1,888.5	90.6	6,992.1	6,901.5	191.9	15,651.7	15,459.8
2018	17.5	1,939.1	1,921.6	90.6	7,098.9	7,008.3	191.9	15,897.1	15,705.2
2019	17.5	1,972.2	1,954.7	90.6	7,205.7	7,115.1	191.9	16,142.4	15,950.5
2020	17.5	5,858.8	5,841.3	90.6	23,539.7	23,449.1	191.9	66,409.9	66,218.0

Disc. Rate 6%	Alternative 1	Alternative 2	Alternative 3
a) Total Net Benefits	19,916.7	76,397.0	172,277.8
b) Total Net Costs	31,714.7	60,532.8	148,576.4
c) B/Cost Ratio	0.63	1.26	1.16
d) Net Present Value	(11,798.0)	15,864.2	23,701.4
	(11,798.0)	15,864.2	23,701.4
Internal Rate of Return	2.6%	8.1%	7.3%

Disc. Rate 10%	Alternative 1	Alternative 2	Alternative 3
a) Total Net Benefits	12,846.6	49,571.3	110,836.7
b) Total Net Costs	31,523.8	59,640.5	145,902.7
c) B/Cost Ratio	0.41	0.83	0.76
d) Net Present Value	(18,677.2)	(10,069.2)	(35,066.0)
	(18,677.2)	(10,069.2)	(35,066.0)
Internal Rate of Return	2.6%	8.1%	7.3%

Note: This sensitivity test increases the capital cost by 20% for all options.
Highway maintenance and resurfacing costs and economic benefits are not changed.

Exhibit C.7
TRAFFIC SENSITIVITY TEST: SUMMARY TABLE

	Alternative 1 Improved Two-lane			Alternative 2 Improved with Bypasses			Alternative 3 Four-Lane with Bypasses		
Year	Net Costs	Net Benefits	Net Flow	Net Costs	Net Benefits	Net Flow	Net Costs	Net Benefits	Net Flow
1991	28,377.4	0.0	(28,377.4)	52,873.7	0.0	(52,873.7)	128,909.5	0.0	(128,909.5)
1992	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
1993	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
1994	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
1995	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
1996	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
1997	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
1998	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
1999	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2000	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2001	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2002	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2003	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2004	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2005	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2006	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2007	682.5	1,012.7	330.2	2,987.6	4,108.1	1,120.5	10,779.7	9,027.4	(1,752.3)
2008	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2009	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2010	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2011	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2012	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2013	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2014	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2015	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2016	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2017	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2018	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2019	17.5	1,012.7	995.2	90.6	4,108.1	4,017.5	191.9	9,027.4	8,835.5
2020	17.5	4,866.2	4,848.7	90.6	20,335.2	20,244.6	191.9	59,049.5	58,857.6

Disc. Rate 6%	Alternative 1	Alternative 2	Alternative 3
a) Total Net Benefits	14,474.5	58,826.9	131,920.8
b) Total Net Costs	28,877.0	55,245.4	135,685.4
c) B/Cost Ratio	0.50	1.06	0.97
d) Net Present Value	(14,402.5)	3,581.4	(3,764.6)
	(14,402.5)	3,581.4	(3,764.6)
Internal Rate of Return	0.7%	6.6%	5.7%

Disc. Rate 10%	Alternative 1	Alternative 2	Alternative 3
a) Total Net Benefits	9,731.5	39,514.2	87,736.5
b) Total Net Costs	28,686.1	54,353.1	133,011.7
c) B/Cost Ratio	0.34	0.73	0.66
d) Net Present Value	(18,954.6)	(14,838.8)	(45,275.2)
	(18,954.6)	(14,838.8)	(45,275.2)
Internal Rate of Return	0.7%	6.6%	5.7%

Note: This sensitivity test assumes zero traffic growth on U.S. 63 from 1990–2020, including no traffic diversion.

Exhibit C.8
ACCIDENT RATES SENSITIVITY TEST: SUMMARY TABLE

	Alternative 1 Improved Two-lane			Alternative 2 Improved with Bypasses			Alternative 3 Four-Lane with Bypasses		
Year	Net Costs	Net Benefits	Net Flow	Net Costs	Net Benefits	Net Flow	Net Costs	Net Benefits	Net Flow
1991	28,377.4	0.0	(28,377.4)	52,873.7	0.0	(52,873.7)	128,909.5	0.0	(128,909.5)
1992	17.5	1,373.5	1,356.0	90.6	4,930.2	4,839.6	191.9	12,030.1	11,838.2
1993	17.5	1,414.3	1,396.8	90.6	5,052.2	4,961.6	191.9	12,337.9	12,146.0
1994	17.5	1,455.0	1,437.5	90.6	5,174.2	5,083.6	191.9	12,645.7	12,453.8
1995	17.5	1,495.8	1,478.3	90.6	5,296.2	5,205.6	191.9	12,953.5	12,761.6
1996	17.5	1,536.6	1,519.1	90.6	5,418.3	5,327.7	191.9	13,261.4	13,069.5
1997	17.5	1,577.3	1,559.8	90.6	5,540.3	5,449.7	191.9	13,569.2	13,377.3
1998	17.5	1,618.1	1,600.6	90.6	5,662.3	5,571.7	191.9	13,877.0	13,685.1
1999	17.5	1,658.8	1,641.3	90.6	5,784.3	5,693.7	191.9	14,184.8	13,992.9
2000	17.5	1,699.6	1,682.1	90.6	5,906.4	5,815.8	191.9	14,492.7	14,300.8
2001	17.5	1,740.4	1,722.9	90.6	6,028.4	5,937.8	191.9	14,800.5	14,608.6
2002	17.5	1,781.1	1,763.6	90.6	6,150.4	6,059.8	191.9	15,108.3	14,916.4
2003	17.5	1,821.9	1,804.4	90.6	6,272.4	6,181.8	191.9	15,416.1	15,224.2
2004	17.5	1,862.6	1,845.1	90.6	6,394.5	6,303.9	191.9	15,723.9	15,532.0
2005	17.5	1,903.4	1,885.9	90.6	6,516.5	6,425.9	191.9	16,031.8	15,839.9
2006	17.5	1,944.2	1,926.7	90.6	6,638.5	6,547.9	191.9	16,339.6	16,147.7
2007	682.5	1,984.9	1,302.4	2,987.6	6,760.5	3,772.9	10,779.7	16,647.4	5,867.7
2008	17.5	2,025.7	2,008.2	90.6	6,882.6	6,792.0	191.9	16,955.2	16,763.3
2009	17.5	2,066.4	2,048.9	90.6	7,004.6	6,914.0	191.9	17,263.1	17,071.2
2010	17.5	2,107.2	2,089.7	90.6	7,126.6	7,036.0	191.9	17,570.9	17,379.0
2011	17.5	2,148.0	2,130.5	90.6	7,248.6	7,158.0	191.9	17,878.7	17,686.8
2012	17.5	2,188.7	2,171.2	90.6	7,370.7	7,280.1	191.9	18,186.6	17,994.7
2013	17.5	2,229.5	2,212.0	90.6	7,492.7	7,402.1	191.9	18,494.4	18,302.5
2014	17.5	2,270.2	2,252.7	90.6	7,614.7	7,524.1	191.9	18,802.2	18,610.3
2015	17.5	2,311.0	2,293.5	90.6	7,736.7	7,646.1	191.9	19,110.0	18,918.1
2016	17.5	2,351.8	2,334.3	90.6	7,858.8	7,768.2	191.9	19,417.8	19,225.9
2017	17.5	2,392.5	2,375.0	90.6	7,980.8	7,890.2	191.9	19,725.7	19,533.8
2018	17.5	2,433.3	2,415.8	90.6	8,102.8	8,012.2	191.9	20,033.5	19,841.6
2019	17.5	2,474.0	2,456.5	90.6	8,224.8	8,134.2	191.9	20,341.3	20,149.4
2020	17.5	6,368.3	6,350.8	90.6	24,574.0	24,483.4	191.9	70,671.3	70,479.4

Disc. Rate 6%	Alternative 1	Alternative 2	Alternative 3
a) Total Net Benefits	24,975.1	86,754.3	214,996.3
b) Total Net Costs	28,877.0	55,245.4	135,685.4
c) B/Cost Ratio	0.86	1.57	1.58
d) Net Present Value	(3,902.0)	31,508.9	79,310.9
	(3,902.0)	31,508.9	79,310.9
Internal Rate of Return	4.8%	10.4%	10.5%

Disc. Rate 10%	Alternative 1	Alternative 2	Alternative 3
a) Total Net Benefits	16,186.2	56,419.0	139,084.7
b) Total Net Costs	28,686.1	54,353.1	133,011.7
c) B/Cost Ratio	0.56	1.04	1.05
d) Net Present Value	(12,499.9)	2,065.9	6,073.0
	(12,499.9)	2,065.9	6,073.0
Internal Rate of Return	4.8%	10.4%	10.5%

Note: This sensitivity test includes the 1991 fatalities on U.S. 63 in the calculation of accident savings benefits.

Exhibit C.9

VALUE OF TIME SENSITIVITY TEST

Year	Alternative 1 Improved Two-lane			Alternative 2 Improved with Bypasses			Alternative 3 Four-Lane with Bypasses		
	Net Costs	Net Benefits	Net Flow	Net Costs	Net Benefits	Net Flow	Net Costs	Net Benefits	Net Flow
1991	28,377.4	0.0	(28,377.4)	52,873.7	0.0	(52,873.7)	128,909.5	0.0	(128,909.5)
1992	17.5	827.3	809.8	90.6	2,944.0	2,853.4	191.9	7,478.0	7,286.1
1993	17.5	850.7	833.2	90.6	3,018.0	2,927.4	191.9	7,669.2	7,477.3
1994	17.5	874.2	856.7	90.6	3,092.0	3,001.4	191.9	7,860.3	7,668.4
1995	17.5	897.7	880.2	90.6	3,166.1	3,075.4	191.9	8,051.5	7,859.6
1996	17.5	921.2	903.7	90.6	3,240.1	3,149.5	191.9	8,242.7	8,050.8
1997	17.5	944.6	927.1	90.6	3,314.1	3,223.5	191.9	8,433.8	8,241.9
1998	17.5	968.1	950.6	90.6	3,388.1	3,297.5	191.9	8,625.0	8,433.1
1999	17.5	991.6	974.1	90.6	3,462.1	3,371.5	191.9	8,816.1	8,624.2
2000	17.5	1,015.1	997.6	90.6	3,536.1	3,445.5	191.9	9,007.3	8,815.4
2001	17.5	1,038.5	1,021.0	90.6	3,610.1	3,519.5	191.9	9,198.5	9,006.6
2002	17.5	1,062.0	1,044.5	90.6	3,684.1	3,593.5	191.9	9,389.6	9,197.7
2003	17.5	1,085.5	1,068.0	90.6	3,758.1	3,667.5	191.9	9,580.8	9,388.9
2004	17.5	1,109.0	1,091.5	90.6	3,832.1	3,741.5	191.9	9,771.9	9,580.0
2005	17.5	1,132.4	1,114.9	90.6	3,906.1	3,815.5	191.9	9,963.1	9,771.2
2006	17.5	1,155.9	1,138.4	90.6	3,980.2	3,889.6	191.9	10,154.3	9,962.4
2007	682.5	1,179.4	496.9	2,987.6	4,054.2	1,066.6	10,779.7	10,345.4	(434.3)
2008	17.5	1,202.8	1,185.3	90.6	4,128.2	4,037.6	191.9	10,536.6	10,344.7
2009	17.5	1,226.3	1,208.8	90.6	4,202.2	4,111.6	191.9	10,727.7	10,535.8
2010	17.5	1,249.8	1,232.3	90.6	4,276.2	4,185.6	191.9	10,918.9	10,727.0
2011	17.5	1,273.3	1,255.8	90.6	4,350.2	4,259.6	191.9	11,110.1	10,918.2
2012	17.5	1,296.8	1,279.3	90.6	4,424.2	4,333.6	191.9	11,301.2	11,109.3
2013	17.5	1,320.2	1,302.7	90.6	4,498.2	4,407.6	191.9	11,492.4	11,300.5
2014	17.5	1,343.7	1,326.2	90.6	4,572.2	4,481.6	191.9	11,683.5	11,491.6
2015	17.5	1,367.2	1,349.7	90.6	4,646.3	4,555.7	191.9	11,874.7	11,682.8
2016	17.5	1,390.7	1,373.2	90.6	4,720.3	4,629.7	191.9	12,065.9	11,874.0
2017	17.5	1,414.1	1,396.6	90.6	4,794.3	4,703.7	191.9	12,257.0	12,065.1
2018	17.5	1,437.6	1,420.1	90.6	4,868.3	4,777.7	191.9	12,448.2	12,256.3
2019	17.5	1,461.1	1,443.6	90.6	4,942.3	4,851.7	191.9	12,639.3	12,447.4
2020	17.5	5,338.1	5,320.6	90.6	21,243.4	21,152.8	191.9	62,852.6	62,660.7

Disc. Rate 6%	Alternative 1	Alternative 2	Alternative 3
a) Total Net Benefits	15,177.5	53,168.5	137,111.7
b) Total Net Costs	28,877.0	55,245.4	135,685.4
c) B/Cost Ratio	0.53	0.96	1.01
d) Net Present Value	(13,699.6)	(2,077.0)	1,426.3
	(13,699.6)	(2,077.0)	1,426.3
Internal Rate of Return	1.4%	5.7%	6.1%

Disc. Rate 10%	Alternative 1	Alternative 2	Alternative 3
a) Total Net Benefits	9,764.3	34,188.7	87,635.7
b) Total Net Costs	28,686.1	54,353.1	133,011.7
c) B/Cost Ratio	0.34	0.63	0.66
d) Net Present Value	(18,921.8)	(20,164.4)	(45,376.0)
	(18,921.8)	(20,164.4)	(45,376.0)
Internal Rate of Return	1.4%	5.7%	6.1%

Note: In this sensitivity test the value of an hour's travel time savings is assumed to be one-third that used in the study ($2.90 per hour rather than $8.70) for automobiles.

Exhibit C.10

U.S. 63 ECONOMIC DEVELOPMENT BENEFIT/COST ANALYSIS
CORRIDOR REGION SUMMARY TABLE
($000)

	Alternative 1 Improved Two-lane			Alternative 2 Improved with Bypasses			Alternative 3 Four-Lane with Bypasses		
Year	Net Costs	Net Benefits	Net Flow	Net Costs	Net Benefits	Net Flow	Net Costs	Net Benefits	Net Flow
1991	28,377.4	0.0	(28,377.4)	52,873.7	0.0	(52,873.7)	128,909.5	0.0	(128,909.5)
1992	17.5	1,550.2	1,532.7	90.6	5,786.3	5,695.7	191.9	12,465.2	12,273.3
1993	17.5	1,609.3	1,591.8	90.6	6,000.9	5,910.3	191.9	12,904.3	12,712.4
1994	17.5	1,668.4	1,650.9	90.6	6,215.6	6,125.0	191.9	13,343.4	13,151.5
1995	17.5	1,727.5	1,710.0	90.6	6,430.2	6,339.6	191.9	13,782.5	13,590.6
1996	17.5	1,786.6	1,769.1	90.6	6,644.9	6,554.3	191.9	14,221.6	14,029.7
1997	17.5	1,845.7	1,828.2	90.6	6,859.5	6,768.9	191.9	14,660.7	14,468.8
1998	17.5	1,904.8	1,887.3	90.6	7,074.2	6,983.6	191.9	15,099.8	14,907.9
1999	17.5	1,963.9	1,946.4	90.6	7,288.8	7,198.2	191.9	15,538.9	15,347.0
2000	17.5	2,023.0	2,005.5	90.6	7,503.5	7,412.9	191.9	15,978.0	15,786.1
2001	17.5	2,082.1	2,064.6	90.6	7,718.1	7,627.5	191.9	16,417.1	16,225.2
2002	17.5	2,141.2	2,123.7	90.6	7,932.8	7,842.2	191.9	16,856.2	16,664.3
2003	17.5	2,200.3	2,182.8	90.6	8,147.4	8,056.8	191.9	17,295.3	17,103.4
2004	17.5	2,259.4	2,241.9	90.6	8,362.1	8,271.5	191.9	17,734.4	17,542.5
2005	17.5	2,318.5	2,301.0	90.6	8,576.7	8,486.1	191.9	18,173.5	17,981.6
2006	17.5	2,377.6	2,360.1	90.6	8,791.4	8,700.8	191.9	18,612.6	18,420.7
2007	682.5	2,436.7	1,754.2	2,987.6	9,006.0	6,018.4	10,779.7	19,051.7	8,272.0
2008	17.5	2,495.8	2,478.3	90.6	9,220.7	9,130.1	191.9	19,490.8	19,298.9
2009	17.5	2,554.9	2,537.4	90.6	9,435.3	9,344.7	191.9	19,929.9	19,738.0
2010	17.5	2,614.0	2,596.5	90.6	9,650.0	9,559.4	191.9	20,369.0	20,177.1
2011	17.5	2,673.1	2,655.6	90.6	9,864.7	9,774.1	191.9	20,808.1	20,616.2
2012	17.5	2,732.2	2,714.7	90.6	10,079.3	9,988.7	191.9	21,247.2	21,055.3
2013	17.5	2,791.3	2,773.8	90.6	10,294.0	10,203.4	191.9	21,686.3	21,494.4
2014	17.5	2,850.4	2,832.9	90.6	10,508.6	10,418.0	191.9	22,125.4	21,933.5
2015	17.5	2,909.5	2,892.0	90.6	10,723.3	10,632.7	191.9	22,564.5	22,372.6
2016	17.5	2,968.6	2,951.1	90.6	10,937.9	10,847.3	191.9	23,003.6	22,811.7
2017	17.5	3,027.7	3,010.2	90.6	11,152.6	11,062.0	191.9	23,442.7	23,250.8
2018	17.5	3,086.8	3,069.3	90.6	11,367.2	11,276.6	191.9	23,881.8	23,689.9
2019	17.5	3,145.9	3,128.4	90.6	11,581.8	11,491.3	191.9	24,320.9	24,129.0
2020	17.5	3,205.0	3,187.5	90.6	11,796.5	11,705.9	191.9	24,760.0	24,568.1

Disc. Rate 6%	Alternative 1	Alternative 2	Alternative 3
a) Total Net Benefits	29,183.3	108,113.5	229,703.7
b) Total Net Costs	28,877.0	55,245.4	135,685.4
c) B/Cost Ratio	1.01	1.96	1.69
d) Net Present Value	306.3	52,868.1	94,018.3
	306.3	52,868.1	94,018.3
Internal Rate of Return	6.1%	13.1%	11.4%

Disc. Rate 10%	Alternative 1	Alternative 2	Alternative 3
a) Total Net Benefits	18,981.8	70,403.1	149,908.6
b) Total Net Costs	28,686.1	54,353.1	133,011.7
c) B/Cost Ratio	0.66	1.30	1.13
d) Net Present Value	(9,704.3)	16,050.0	16,896.8
	(9,704.3)	16,050.0	16,896.8
Internal Rate of Return	6.1%	13.1%	11.4%

Exhibit C.11

U.S. 63 ECONOMIC DEVELOPMENT BENEFIT/COST ANALYSIS CORRIDOR REGION
Alternative 1: Improved Two-lane
($000)

	Net Costs			Net Benefits				
Year	Capital	Maint	Total	Travel Efficiency	Comp. Position	Roadside Expend.	Add'l. Agr.	Total
1990								
1991	28,377.4	0.0	28,377.4					
1992	0.0	17.5	17.5	1,078.2	94.9	356.6	20.5	1,550.2
1993	0.0	17.5	17.5	1,111.3	107.4	369.9	20.8	1,609.3
1994	0.0	17.5	17.5	1,144.4	119.8	383.2	21.0	1,668.4
1995	0.0	17.5	17.5	1,177.5	132.3	396.5	21.3	1,727.5
1996	0.0	17.5	17.5	1,210.6	144.7	409.8	21.5	1,786.6
1997	0.0	17.5	17.5	1,243.7	157.1	423.1	21.8	1,845.7
1998	0.0	17.5	17.5	1,276.8	169.6	436.4	22.0	1,904.8
1999	0.0	17.5	17.5	1,309.9	182.0	449.7	22.3	1,963.9
2000	0.0	17.5	17.5	1,343.0	194.5	463.0	22.5	2,023.0
2001	0.0	17.5	17.5	1,376.1	207.0	476.3	22.8	2,082.1
2002	0.0	17.5	17.5	1,409.2	219.4	489.6	23.0	2,141.2
2003	0.0	17.5	17.5	1,442.3	231.8	502.9	23.3	2,200.3
2004	0.0	17.5	17.5	1,475.4	244.3	516.2	23.5	2,259.4
2005	0.0	17.5	17.5	1,508.5	256.8	529.5	23.8	2,318.5
2006	0.0	17.5	17.5	1,541.6	269.2	542.8	24.0	2,377.6
2007	665.0	17.5	682.5	1,574.7	281.7	556.1	24.3	2,436.7
2008	0.0	17.5	17.5	1,607.8	294.1	569.4	24.5	2,495.8
2009	0.0	17.5	17.5	1,640.9	306.6	582.7	24.8	2,554.9
2010	0.0	17.5	17.5	1,674.0	319.0	596.0	25.0	2,614.0
2011	0.0	17.5	17.5	1,707.1	331.5	609.3	25.3	2,673.1
2012	0.0	17.5	17.5	1,740.2	343.9	622.6	25.5	2,732.2
2013	0.0	17.5	17.5	1,773.3	356.4	635.9	25.8	2,791.3
2014	0.0	17.5	17.5	1,806.4	368.8	649.2	26.0	2,850.4
2015	0.0	17.5	17.5	1,839.5	381.3	662.5	26.3	2,909.5
2016	0.0	17.5	17.5	1,872.6	393.7	675.8	26.5	2,968.6
2017	0.0	17.5	17.5	1,905.7	406.2	689.1	26.8	3,027.7
2018	0.0	17.5	17.5	1,938.8	418.6	702.4	27.0	3,086.8
2019	0.0	17.5	17.5	1,971.9	431.1	715.7	27.3	3,145.9
2020	0.0	17.5	17.5	2,005.0	443.5	729.0	27.5	3,205.0

Exhibit C.12

U.S. 63 ECONOMIC DEVELOPMENT BENEFIT/COST ANALYSIS CORRIDOR REGION
Alternative 2: Improved Two-lane with Bypasses
($000)

	Net Costs			Net Benefits				
Year	Capital	Maint	Total	Travel Efficiency	Comp. Position	Roadside Expend.	Add'l. Agr.	Total
1990								
1991	52,873.7	0.0	52,873.7					
1992	0.0	90.6	90.6	4,321.6	528.6	885.6	50.5	5,786.3
1993	0.0	90.6	90.6	4,428.4	597.9	918.9	55.8	6,000.9
1994	0.0	90.6	90.6	4,535.2	667.2	952.2	61.0	6,215.6
1995	0.0	90.6	90.6	4,642.0	736.5	985.5	66.3	6,430.2
1996	0.0	90.6	90.6	4,748.8	805.8	1,018.8	71.5	6,644.9
1997	0.0	90.6	90.6	4,855.6	875.1	1,052.1	76.8	6,859.5
1998	0.0	90.6	90.6	4,962.4	944.4	1,085.4	82.0	7,074.2
1999	0.0	90.6	90.6	5,069.2	1,013.7	1,118.7	87.3	7,288.8
2000	0.0	90.6	90.6	5,176.0	1,083.0	1,152.0	92.5	7,503.5
2001	0.0	90.6	90.6	5,282.8	1,152.3	1,185.3	97.8	7,718.1
2002	0.0	90.6	90.6	5,389.6	1,221.6	1,218.6	103.0	7,932.8
2003	0.0	90.6	90.6	5,496.4	1,290.9	1,251.9	108.3	8,147.4
2004	0.0	90.6	90.6	5,603.2	1,360.2	1,285.2	113.5	8,362.1
2005	0.0	90.6	90.6	5,710.0	1,429.5	1,318.5	118.8	8,576.7
2006	0.0	90.6	90.6	5,816.8	1,498.8	1,351.8	124.0	8,791.4
2007	2,897.0	90.6	2,987.6	5,923.6	1,568.1	1,385.1	129.3	9,006.0
2008	0.0	90.6	90.6	6,030.4	1,637.4	1,418.4	134.5	9,220.7
2009	0.0	90.6	90.6	6,137.2	1,706.7	1,451.7	139.8	9,435.3
2010	0.0	90.6	90.6	6,244.0	1,776.0	1,485.0	145.0	9,650.0
2011	0.0	90.6	90.6	6,350.8	1,845.3	1,518.3	150.3	9,864.7
2012	0.0	90.6	90.6	6,457.6	1,914.6	1,551.6	155.5	10,079.3
2013	0.0	90.6	90.6	6,564.4	1,983.9	1,584.9	160.8	10,294.0
2014	0.0	90.6	90.6	6,671.2	2,053.2	1,618.2	166.0	10,508.6
2015	0.0	90.6	90.6	6,778.0	2,122.5	1,651.5	171.3	10,723.3
2016	0.0	90.6	90.6	6,884.8	2,191.8	1,684.8	176.5	10,937.9
2017	0.0	90.6	90.6	6,991.6	2,261.1	1,718.1	181.8	11,152.6
2018	0.0	90.6	90.6	7,098.4	2,330.4	1,751.4	187.0	11,367.2
2019	0.0	90.6	90.6	7,205.2	2,399.7	1,784.7	192.3	11,581.8
2020	0.0	90.6	90.6	7,312.0	2,469.0	1,818.0	197.5	11,796.5

Exhibit C.13

U.S. 63 ECONOMIC DEVELOPMENT BENEFIT/COST ANALYSIS CORRIDOR REGION
Alternative 3: Four-lane with Bypasses
($000)

	Net Costs			Net Benefits				
Year	Capital	Maint	Total	Travel Efficiency	Comp. Position	Roadside Expend.	Add'l. Agr.	Total
1990								
1991	128,909.5	0.0	128,909.5					
1992	0.0	191.9	191.9	9,517.7	853.0	2,021.2	73.3	12,465.2
1993	0.0	191.9	191.9	9,763.0	964.5	2,096.8	80.0	12,904.3
1994	0.0	191.9	191.9	10,008.4	1,076.0	2,172.4	86.6	13,343.4
1995	0.0	191.9	191.9	10,253.7	1,187.5	2,248.0	93.3	13,782.5
1996	0.0	191.9	191.9	10,499.1	1,299.0	2,323.6	99.9	14,221.6
1997	0.0	191.9	191.9	10,744.4	1,410.5	2,399.2	106.6	14,660.7
1998	0.0	191.9	191.9	10,989.8	1,522.0	2,474.8	113.2	15,099.8
1999	0.0	191.9	191.9	11,235.1	1,633.5	2,550.4	119.9	15,538.9
2000	0.0	191.9	191.9	11,480.5	1,745.0	2,626.0	126.5	15,978.0
2001	0.0	191.9	191.9	11,725.8	1,856.5	2,701.6	133.2	16,417.1
2002	0.0	191.9	191.9	11,971.2	1,968.0	2,777.2	139.8	16,856.2
2003	0.0	191.9	191.9	12,216.5	2,079.5	2,852.8	146.5	17,295.3
2004	0.0	191.9	191.9	12,461.9	2,191.0	2,928.4	153.1	17,734.4
2005	0.0	191.9	191.9	12,707.2	2,302.5	3,004.0	159.8	18,173.5
2006	0.0	191.9	191.9	12,952.6	2,414.0	3,079.6	166.4	18,612.6
2007	10,587.8	191.9	10,779.7	13,197.9	2,525.5	3,155.2	173.0	19,051.7
2008	0.0	191.9	191.9	13,443.3	2,637.0	3,230.8	179.7	19,490.8
2009	0.0	191.9	191.9	13,688.6	2,748.5	3,306.4	186.3	19,929.9
2010	0.0	191.9	191.9	13,934.0	2,860.0	3,382.0	193.0	20,369.0
2011	0.0	191.9	191.9	14,179.4	2,971.5	3,457.6	199.7	20,808.1
2012	0.0	191.9	191.9	14,424.7	3,083.0	3,533.2	206.3	21,247.2
2013	0.0	191.9	191.9	14,670.1	3,194.5	3,608.8	213.0	21,686.3
2014	0.0	191.9	191.9	14,915.4	3,306.0	3,684.4	219.6	22,125.4
2015	0.0	191.9	191.9	15,160.8	3,417.5	3,760.0	226.3	22,564.5
2016	0.0	191.9	191.9	15,406.1	3,529.0	3,835.6	232.9	23,003.6
2017	0.0	191.9	191.9	15,651.4	3,640.5	3,911.2	239.5	23,442.7
2018	0.0	191.9	191.9	15,896.8	3,752.0	3,986.8	246.2	23,881.8
2019	0.0	191.9	191.9	16,142.1	3,863.5	4,062.4	252.8	24,320.9
2020	0.0	191.9	191.9	16,387.5	3,975.0	4,138.0	259.5	24,760.0

Exhibit C.14

U.S. 63 ECONOMIC DEVELOPMENT BENEFIT/COST ANALYSIS
TWO STATES SUMMARY TABLE
($000)

	Alternative 1 Improved Two-lane			Alternative 2 Improved with Bypasses			Alternative 3 Four-Lane with Bypasses		
Year	Net Costs	Net Benefits	Net Flow	Net Costs	Net Benefits	Net Flow	Net Costs	Net Benefits	Net Flow
1991	28,377.4	0.0	(28,377.4)	52,873.7	0.0	(52,873.7)	128,909.5	0.0	(128,909.5)
1992	17.5	1,251.0	1,233.5	90.6	4,942.2	4,851.6	191.9	10,597.7	10,405.8
1993	17.5	1,294.0	1,276.5	90.6	5,110.8	5,020.2	191.9	10,941.6	10,749.7
1994	17.5	1,337.0	1,319.5	90.6	5,279.4	5,188.8	191.9	11,285.4	11,093.5
1995	17.5	1,380.0	1,362.5	90.6	5,448.0	5,357.4	191.9	11,629.2	11,437.3
1996	17.5	1,423.0	1,405.5	90.6	5,616.6	5,526.0	191.9	11,973.1	11,781.2
1997	17.5	1,466.0	1,448.5	90.6	5,785.2	5,694.6	191.9	12,316.9	12,125.0
1998	17.5	1,509.0	1,491.5	90.6	5,953.8	5,863.2	191.9	12,660.8	12,468.9
1999	17.5	1,552.0	1,534.5	90.6	6,122.4	6,031.8	191.9	13,004.6	12,812.7
2000	17.5	1,595.0	1,577.5	90.6	6,291.0	6,200.4	191.9	13,348.5	13,156.6
2001	17.5	1,638.0	1,620.5	90.6	6,459.6	6,369.0	191.9	13,692.3	13,500.4
2002	17.5	1,681.0	1,663.5	90.6	6,628.2	6,537.6	191.9	14,036.2	13,844.3
2003	17.5	1,724.0	1,706.5	90.6	6,796.8	6,706.2	191.9	14,380.0	14,188.1
2004	17.5	1,767.0	1,749.5	90.6	6,965.4	6,874.8	191.9	14,723.9	14,532.0
2005	17.5	1,810.0	1,792.5	90.6	7,134.0	7,043.4	191.9	15,067.7	14,875.8
2006	17.5	1,853.0	1,835.5	90.6	7,302.6	7,212.0	191.9	15,411.6	15,219.7
2007	682.5	1,896.0	1,213.5	2,987.6	7,471.2	4,483.6	10,779.7	15,755.4	4,975.7
2008	17.5	1,939.0	1,921.5	90.6	7,639.8	7,549.2	191.9	16,099.3	15,907.4
2009	17.5	1,982.0	1,964.5	90.6	7,808.4	7,717.8	191.9	16,443.1	16,251.2
2010	17.5	2,025.0	2,007.5	90.6	7,977.0	7,886.4	191.9	16,787.0	16,595.1
2011	17.5	2,068.0	2,050.5	90.6	8,145.6	8,055.0	191.9	17,130.9	16,939.0
2012	17.5	2,111.0	2,093.5	90.6	8,314.2	8,223.6	191.9	17,474.7	17,282.8
2013	17.5	2,154.0	2,136.5	90.6	8,482.8	8,392.2	191.9	17,818.6	17,626.7
2014	17.5	2,197.0	2,179.5	90.6	8,651.4	8,560.8	191.9	18,162.4	17,970.5
2015	17.5	2,240.0	2,222.5	90.6	8,820.0	8,729.4	191.9	18,506.3	18,314.3
2016	17.5	2,283.0	2,265.5	90.6	8,988.6	8,898.0	191.9	18,850.1	18,658.2
2017	17.5	2,326.0	2,308.5	90.6	9,157.2	9,066.6	191.9	19,193.9	19,002.0
2018	17.5	2,369.0	2,351.5	90.6	9,325.8	9,235.2	191.9	19,537.8	19,345.9
2019	17.5	2,412.0	2,394.5	90.6	9,494.4	9,403.8	191.9	19,881.6	19,689.7
2020	17.5	2,455.0	2,437.5	90.6	9,663.0	9,572.4	191.9	20,225.5	20,033.6

Disc. Rate 6%			
a) Total Net Benefits	22,906.3	90,318.5	191,244.3
b) Total Net Costs	28,877.0	55,245.4	135,685.4
c) B/Cost Ratio	0.79	1.63	1.41
d) Net Present Value	(5,970.7)	35,073.0	55,558.9
	(5,970.7)	35,073.0	55,558.9
Internal Rate of Return	4.1%	10.9%	9.3%

Disc. Rate 10%			
a) Total Net Benefits	14,964.2	59,021.4	125,227.6
b) Total Net Costs	28,686.1	54,353.1	133,011.7
c) B/Cost Ratio	0.52	1.09	0.94
d) Net Present Value	(13,721.9)	4,668.3	(7,784.1)
	(13,721.9)	4,668.3	(7,784.1)
Internal Rate of Return	4.1%	10.9%	9.3%

Exhibit C.15

U.S. 63 ECONOMIC DEVELOPMENT BENEFIT/COST ANALYSIS TWO STATES
Alternative 1: Improved Two-lane
($000)

	Net Costs			Net Benefits				
Year	Capital	Maint	Total	Travel Efficiency	Comp. Position	Roadside Expend.	Add'l. Agr.	Total
1990								
1991	28,377.4	0.0	28,377.4					
1992	0.0	17.5	17.5	1,078.2	65.0	57.2	50.6	1,251.0
1993	0.0	17.5	17.5	1,111.3	72.5	59.3	50.9	1,294.0
1994	0.0	17.5	17.5	1,144.4	80.0	61.4	51.2	1,337.0
1995	0.0	17.5	17.5	1,177.5	87.5	63.5	51.5	1,380.0
1996	0.0	17.5	17.5	1,210.6	95.0	65.6	51.8	1,423.0
1997	0.0	17.5	17.5	1,243.7	102.5	67.7	52.1	1,466.0
1998	0.0	17.5	17.5	1,276.8	110.0	69.8	52.4	1,509.0
1999	0.0	17.5	17.5	1,309.9	117.5	71.9	52.7	1,552.0
2000	0.0	17.5	17.5	1,343.0	125.0	74.0	53.0	1,595.0
2001	0.0	17.5	17.5	1,376.1	132.5	76.1	53.3	1,638.0
2002	0.0	17.5	17.5	1,409.2	140.0	78.2	53.6	1,681.0
2003	0.0	17.5	17.5	1,442.3	147.5	80.3	53.9	1,724.0
2004	0.0	17.5	17.5	1,475.4	155.0	82.4	54.2	1,767.0
2005	0.0	17.5	17.5	1,508.5	162.5	84.5	54.5	1,810.0
2006	0.0	17.5	17.5	1,541.6	170.0	86.6	54.8	1,853.0
2007	665.0	17.5	682.5	1,574.7	177.5	88.7	55.1	1,896.0
2008	0.0	17.5	17.5	1,607.8	185.0	90.8	55.4	1,939.0
2009	0.0	17.5	17.5	1,640.9	192.5	92.9	55.7	1,982.0
2010	0.0	17.5	17.5	1,674.0	200.0	95.0	56.0	2,025.0
2011	0.0	17.5	17.5	1,707.1	207.5	97.1	56.3	2,068.0
2012	0.0	17.5	17.5	1,740.2	215.0	99.2	56.6	2,111.0
2013	0.0	17.5	17.5	1,773.3	222.5	101.3	56.9	2,154.0
2014	0.0	17.5	17.5	1,806.4	230.0	103.4	57.2	2,197.0
2015	0.0	17.5	17.5	1,839.5	237.5	105.5	57.5	2,240.0
2016	0.0	17.5	17.5	1,872.6	245.0	107.6	57.8	2,283.0
2017	0.0	17.5	17.5	1,905.7	252.5	109.7	58.1	2,326.0
2018	0.0	17.5	17.5	1,938.8	260.0	111.8	58.4	2,369.0
2019	0.0	17.5	17.5	1,971.9	267.5	113.9	58.7	2,412.0
2020	0.0	17.5	17.5	2,005.0	275.0	116.0	59.0	2,455.0

Exhibit C.16

U.S. 63 ECONOMIC DEVELOPMENT BENEFIT/COST ANALYSIS TWO STATES
Alternative 2: Improved Two-lane with Bypasses
($000)

Year	Net Costs: Capital	Maint	Total	Net Benefits: Travel Efficiency	Comp. Position	Roadside Expend.	Add'l. Agr.	Total
1990								
1991	52,873.7	0.0	52,873.7					
1992	0.0	90.6	90.6	4,321.6	360.6	135.0	125.0	4,942.2
1993	0.0	90.6	90.6	4,428.4	404.4	140.5	137.5	5,110.8
1994	0.0	90.6	90.6	4,535.2	448.2	146.0	150.0	5,279.4
1995	0.0	90.6	90.6	4,642.0	492.0	151.5	162.5	5,448.0
1996	0.0	90.6	90.6	4,748.8	535.8	157.0	175.0	5,616.6
1997	0.0	90.6	90.6	4,855.6	579.6	162.5	187.5	5,785.2
1998	0.0	90.6	90.6	4,962.4	623.4	168.0	200.0	5,953.8
1999	0.0	90.6	90.6	5,069.2	667.2	173.5	212.5	6,122.4
2000	0.0	90.6	90.6	5,176.0	711.0	179.0	225.0	6,291.0
2001	0.0	90.6	90.6	5,282.8	754.8	184.5	237.5	6,459.6
2002	0.0	90.6	90.6	5,389.6	798.6	190.0	250.0	6,628.2
2003	0.0	90.6	90.6	5,496.4	842.4	195.5	262.5	6,796.8
2004	0.0	90.6	90.6	5,603.2	886.2	201.0	275.0	6,965.4
2005	0.0	90.6	90.6	5,710.0	930.0	206.5	287.5	7,134.0
2006	0.0	90.6	90.6	5,816.8	973.8	212.0	300.0	7,302.6
2007	2,897.0	90.6	2,987.6	5,923.6	1,017.6	217.5	312.5	7,471.2
2008	0.0	90.6	90.6	6,030.4	1,061.4	223.0	325.0	7,639.8
2009	0.0	90.6	90.6	6,137.2	1,105.2	228.5	337.5	7,808.4
2010	0.0	90.6	90.6	6,244.0	1,149.0	234.0	350.0	7,977.0
2011	0.0	90.6	90.6	6,350.8	1,192.8	239.5	362.5	8,145.6
2012	0.0	90.6	90.6	6,457.6	1,236.6	245.0	375.0	8,314.2
2013	0.0	90.6	90.6	6,564.4	1,280.4	250.5	387.5	8,482.8
2014	0.0	90.6	90.6	6,671.2	1,324.2	256.0	400.0	8,651.4
2015	0.0	90.6	90.6	6,778.0	1,368.0	261.5	412.5	8,820.0
2016	0.0	90.6	90.6	6,884.8	1,411.8	267.0	425.0	8,988.6
2017	0.0	90.6	90.6	6,991.6	1,455.6	272.5	437.5	9,157.2
2018	0.0	90.6	90.6	7,098.4	1,499.4	278.0	450.0	9,325.8
2019	0.0	90.6	90.6	7,205.2	1,543.2	283.5	462.5	9,494.4
2020	0.0	90.6	90.6	7,312.0	1,587.0	289.0	475.0	9,663.0

Exhibit C.17

U.S. 63 ECONOMIC DEVELOPMENT BENEFIT/COST ANALYSIS TWO STATES
Alternative 3: Four-lane with Bypasses
($000)

Year	Net Costs Capital	Maint	Total	Net Benefits Travel Efficiency	Comp. Position	Roadside Expend.	Add'l. Agr.	Total
1990								
1991	128,909.5	0.0	128,909.5					
1992	0.0	191.9	191.9	9,517.7	589.3	319.6	171.1	10,597.7
1993	0.0	191.9	191.9	9,763.0	660.5	331.4	186.7	10,941.6
1994	0.0	191.9	191.9	10,008.4	731.6	343.2	202.2	11,285.4
1995	0.0	191.9	191.9	10,253.7	802.8	355.0	217.8	11,629.2
1996	0.0	191.9	191.9	10,499.1	873.9	366.8	233.3	11,973.1
1997	0.0	191.9	191.9	10,744.4	945.1	378.6	248.9	12,316.9
1998	0.0	191.9	191.9	10,989.8	1,016.2	390.4	264.4	12,660.8
1999	0.0	191.9	191.9	11,235.1	1,087.4	402.2	280.0	13,004.6
2000	0.0	191.9	191.9	11,480.5	1,158.5	414.0	295.5	13,348.5
2001	0.0	191.9	191.9	11,725.8	1,229.7	425.8	311.1	13,692.3
2002	0.0	191.9	191.9	11,971.2	1,300.8	437.6	326.6	14,036.2
2003	0.0	191.9	191.9	12,216.5	1,372.0	449.4	342.1	14,380.0
2004	0.0	191.9	191.9	12,461.9	1,443.1	461.2	357.7	14,723.9
2005	0.0	191.9	191.9	12,707.2	1,514.3	473.0	373.2	15,067.7
2006	0.0	191.9	191.9	12,952.6	1,585.4	484.8	388.8	15,411.6
2007	10,587.8	191.9	10,779.7	13,197.9	1,656.6	496.6	404.3	15,755.4
2008	0.0	191.9	191.9	13,443.3	1,727.7	508.4	419.9	16,099.3
2009	0.0	191.9	191.9	13,688.6	1,798.9	520.2	435.4	16,443.1
2010	0.0	191.9	191.9	13,934.0	1,870.0	532.0	451.0	16,787.0
2011	0.0	191.9	191.9	14,179.4	1,941.2	543.8	466.6	17,130.9
2012	0.0	191.9	191.9	14,424.7	2,012.3	555.6	482.1	17,474.7
2013	0.0	191.9	191.9	14,670.1	2,083.5	567.4	497.7	17,818.6
2014	0.0	191.9	191.9	14,915.4	2,154.6	579.2	513.2	18,162.4
2015	0.0	191.9	191.9	15,160.8	2,225.8	591.0	528.8	18,506.3
2016	0.0	191.9	191.9	15,406.1	2,296.9	602.8	544.3	18,850.1
2017	0.0	191.9	191.9	15,651.4	2,368.0	614.6	559.8	19,193.9
2018	0.0	191.9	191.9	15,896.8	2,439.2	626.4	575.4	19,537.8
2019	0.0	191.9	191.9	16,142.1	2,510.3	638.2	590.9	19,881.6
2020	0.0	191.9	191.9	16,387.5	2,581.5	650.0	606.5	20,225.5

Exhibit C.18

ALTERNATIVES BENEFIT/COST COMPARED WITH ALTERNATIVE #3 INCREMENTAL BENEFIT/COST

	Alternative 1 Improved Two-lane			**Alternative 2 Improved with Bypasses**			**Alternative 3 Four-Lane with Bypasses**			**Incremental B/C Analysis Alt #3 less Alt #2**		
Year	Net Costs	Net Benefits	Net Flow	Net Costs	Net Benefits	Net Flow	Net Costs	Net Benefits	Net Flow	Net Costs	Net Benefits	Net Flow
1991	28,377.4	0.0	(28,377.4)	52,873.7	0.0	(52,873.7)	128,909.5	0.0	(128,909.5)	76,035.8	0.0	(76,035.8)
1992	17.5	1,078.9	1,061.4	90.6	4,321.7	4,231.1	191.9	9,518.1	9,326.2	101.3	5,196.4	5,095.1
1993	17.5	1,112.0	1,094.5	90.6	4,428.5	4,337.9	191.9	9,763.4	9,571.5	101.3	5,334.9	5,233.6
1994	17.5	1,145.0	1,127.5	90.6	4,535.4	4,444.8	191.9	10,008.8	9,816.9	101.3	5,473.4	5,372.1
1995	17.5	1,178.1	1,160.6	90.6	4,642.2	4,551.6	191.9	10,254.1	10,062.2	101.3	5,612.0	5,510.7
1996	17.5	1,211.2	1,193.7	90.6	4,749.0	4,658.4	191.9	10,499.5	10,307.6	101.3	5,750.5	5,649.2
1997	17.5	1,244.3	1,226.8	90.6	4,855.8	4,765.2	191.9	10,744.8	10,552.9	101.3	5,889.0	5,787.7
1998	17.5	1,277.4	1,259.9	90.6	4,962.6	4,872.0	191.9	10,990.2	10,798.3	101.3	6,027.5	5,926.2
1999	17.5	1,310.5	1,293.0	90.6	5,069.4	4,978.8	191.9	11,235.5	11,043.6	101.3	6,166.1	6,064.8
2000	17.5	1,343.6	1,326.1	90.6	5,176.3	5,085.7	191.9	11,480.9	11,289.0	101.3	6,304.6	6,203.3
2001	17.5	1,376.6	1,359.1	90.6	5,283.1	5,192.5	191.9	11,726.2	11,534.3	101.3	6,443.1	6,341.8
2002	17.5	1,409.7	1,392.2	90.6	5,389.9	5,299.3	191.9	11,971.5	11,779.6	101.3	6,581.7	6,480.4
2003	17.5	1,442.8	1,425.3	90.6	5,496.7	5,406.1	191.9	12,216.9	12,025.0	101.3	6,720.2	6,618.9
2004	17.5	1,475.9	1,458.4	90.6	5,603.5	5,512.9	191.9	12,462.2	12,270.3	101.3	6,858.7	6,757.4
2005	17.5	1,509.0	1,491.5	90.6	5,710.3	5,619.7	191.9	12,707.6	12,515.7	101.3	6,997.3	6,896.0
2006	17.5	1,542.1	1,524.6	90.6	5,817.1	5,726.5	191.9	12,952.9	12,761.0	101.3	7,135.8	7,034.5
2007	682.5	1,575.1	892.6	2,987.6	5,924.0	2,936.4	10,779.7	13,198.3	2,418.6	7,792.1	7,274.3	(517.8)
2008	17.5	1,608.2	1,590.7	90.6	6,030.8	5,940.2	191.9	13,443.6	13,251.7	101.3	7,412.8	7,311.5
2009	17.5	1,641.3	1,623.8	90.6	6,137.6	6,047.0	191.9	13,689.0	13,497.1	101.3	7,551.4	7,450.1
2010	17.5	1,674.4	1,656.9	90.6	6,244.4	6,153.8	191.9	13,934.3	13,742.4	101.3	7,689.9	7,588.6
2011	17.5	1,707.5	1,690.0	90.6	6,351.2	6,260.6	191.9	14,179.6	13,987.7	101.3	7,828.4	7,727.1
2012	17.5	1,740.6	1,723.1	90.6	6,458.0	6,367.4	191.9	14,425.0	14,233.1	101.3	7,967.0	7,865.7
2013	17.5	1,773.7	1,756.2	90.6	6,564.8	6,474.2	191.9	14,670.3	14,478.4	101.3	8,105.5	8,004.2
2014	17.5	1,806.7	1,789.2	90.6	6,671.7	6,581.1	191.9	14,915.7	14,723.8	101.3	8,244.0	8,142.7
2015	17.5	1,839.8	1,822.3	90.6	6,778.5	6,687.9	191.9	15,161.0	14,969.1	101.3	8,382.6	8,281.3
2016	17.5	1,872.9	1,855.4	90.6	6,885.3	6,794.7	191.9	15,406.4	15,214.5	101.3	8,521.1	8,419.8
2017	17.5	1,906.0	1,888.5	90.6	6,992.1	6,901.5	191.9	15,651.7	15,459.8	101.3	8,659.6	8,558.3
2018	17.5	1,939.1	1,921.6	90.6	7,098.9	7,008.3	191.9	15,897.1	15,705.2	101.3	8,798.1	8,696.8
2019	17.5	1,972.2	1,954.7	90.6	7,205.7	7,115.1	191.9	16,142.4	15,950.5	101.3	8,936.7	8,835.4
2020	17.5	5,858.8	5,841.3	90.6	23,539.7	23,449.1	191.9	66,409.9	66,218.0	101.3	42,870.2	42,768.9

Disc. Rate 6%	Alternative 1	Alternative 2	Alternative 3	Incremental (Alt #3 less Alt #2)
a) Total Net Benefits	19,916.7	76,397.0	172,277.8	95,880.9
b) Total Net Costs	28,877.0	55,245.4	135,685.4	80,440.0
c) B/Cost Ratio	0.69	1.38	1.27	1.19
d) Net Present Value	(8,960.3)	21,151.6	36,592.4	15,440.9
	(8,960.3)	21,151.6	36,592.4	15,440.9
Internal Rate of Return	3.2%	9.0%	8.1%	7.5%

Disc. Rate 10%	Alternative 1	Alternative 2	Alternative 3	Incremental (Alt #3 less Alt #2)
a) Total Net Benefits	12,846.6	49,571.3	110,836.7	61,265.5
b) Total Net Costs	28,686.1	54,353.1	133,011.7	78,658.7
c) B/Cost Ratio	0.45	0.91	0.83	0.78
d) Net Present Value	(15,839.5)	(4,781.8)	(22,175.0)	(17,393.2)
	(15,839.5)	(4,781.8)	(22,175.0)	(17,393.2)
Internal Rate of Return	3.2%	9.0%	8.1%	7.5%

Exhibit C.19

U.S. 63 BENEFIT/COST ANALYSIS
Incremental Benefit/Cost: Alternative 3 Compared with Alternative 2

	Net Costs			Net Benefits				
Year	Capital	Maint	Total	Oper	Acc	Time	R. Value	Total
1990								
1991	76,035.8	0.0	76,035.8					
1992	0.0	101.3	101.3	194.0	3,627.9	1,374.4	0.0	5,196.4
1993	0.0	101.3	101.3	199.7	3,718.0	1,417.2	0.0	5,334.9
1994	0.0	101.3	101.3	205.4	3,808.1	1,460.0	0.0	5,473.4
1995	0.0	101.3	101.3	211.0	3,898.2	1,502.8	0.0	5,612.0
1996	0.0	101.3	101.3	216.7	3,988.2	1,545.5	0.0	5,750.5
1997	0.0	101.3	101.3	222.4	4,078.3	1,588.3	0.0	5,889.0
1998	0.0	101.3	101.3	228.0	4,168.4	1,631.1	0.0	6,027.5
1999	0.0	101.3	101.3	233.7	4,258.5	1,673.9	0.0	6,166.1
2000	0.0	101.3	101.3	239.3	4,348.6	1,716.6	0.0	6,304.6
2001	0.0	101.3	101.3	245.0	4,438.7	1,759.4	0.0	6,443.1
2002	0.0	101.3	101.3	250.7	4,528.8	1,802.2	0.0	6,581.7
2003	0.0	101.3	101.3	256.3	4,618.9	1,845.0	0.0	6,720.2
2004	0.0	101.3	101.3	262.0	4,709.0	1,887.7	0.0	6,858.7
2005	0.0	101.3	101.3	267.7	4,799.1	1,930.5	0.0	6,997.3
2006	0.0	101.3	101.3	273.3	4,889.1	1,973.3	0.0	7,135.8
2007	7,690.8	101.3	7,792.1	279.0	4,979.2	2,016.1	0.0	7,274.3
2008	0.0	101.3	101.3	284.7	5,069.3	2,058.8	0.0	7,412.8
2009	0.0	101.3	101.3	290.3	5,159.4	2,101.6	0.0	7,551.4
2010	0.0	101.3	101.3	296.0	5,249.5	2,144.4	0.0	7,689.9
2011	0.0	101.3	101.3	301.7	5,339.6	2,187.2	0.0	7,828.4
2012	0.0	101.3	101.3	307.3	5,429.7	2,229.9	0.0	7,967.0
2013	0.0	101.3	101.3	313.0	5,519.8	2,272.7	0.0	8,105.5
2014	0.0	101.3	101.3	318.7	5,609.9	2,315.5	0.0	8,244.0
2015	0.0	101.3	101.3	324.3	5,700.0	2,358.3	0.0	8,382.6
2016	0.0	101.3	101.3	330.0	5,790.0	2,401.0	0.0	8,521.1
2017	0.0	101.3	101.3	335.7	5,880.1	2,443.8	0.0	8,659.6
2018	0.0	101.3	101.3	341.3	5,970.2	2,486.6	0.0	8,798.1
2019	0.0	101.3	101.3	347.0	6,060.3	2,529.4	0.0	8,936.7
2020	0.0	101.3	101.3	352.6	6,150.4	2,572.1	33,795.0	42,870.2