

## **I. Phase II Summary**

### **A. Introduction**

According to the Federal Highway Administration:

“Access Management is the process that provides access to land development while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity, and speed. It attempts to balance the need to provide good mobility for through traffic with the requirements for reasonable access to adjacent land uses.”

One of the most difficult problems in roadway administration and design today is balancing the dual function that many roads have: serving through traffic and providing access to property. Providing inappropriate or excessive access to property on arterial roadways can lead to increases in accidents, delays, and congestion. Access management involves carefully planning direct access from property to roadways. By doing this, potential conflict points are reduced. Conflict points lead to the opportunity for accidents to occur.

#### **1. Background and Summary**

Because of rising levels of congestion and rising costs for new road construction, transportation officials at the state and local levels are increasingly interested in access management techniques and projects. The extensive literature on access management indicates that access management projects often have significant benefits in terms of both traffic safety and operations. The literature also indicates, although less conclusively, that carefully designed access management projects do not usually negatively impact local businesses. However, many of the studies cited in the literature are usually from states that are considerably more urbanized than Iowa, such as Florida, Colorado, and New York.

The case studies from Iowa presented in this report confirm and expand upon the findings communicated in the extensive North American access management literature. Recent access management projects in the state of Iowa have had significant, positive impacts in terms of traffic safety and improved functioning of roadways. Although some individual businesses do report sales losses and/or customer complaints once projects have been completed, **access management projects in Iowa have not had an adverse impact on the great majority of businesses located along them. In fact, some of the projects seem to have contributed to an improved business environment along the corridors that have been improved.**

The case study corridors in Iowa have outperformed their communities in terms of retail sales and in terms of survival of businesses. Motorists who use the roadways overwhelmingly support the access management projects. The majority of local business owners and managers whose businesses are located along them also support them. Finally, public officials are also highly supportive of the access management projects completed in their communities.

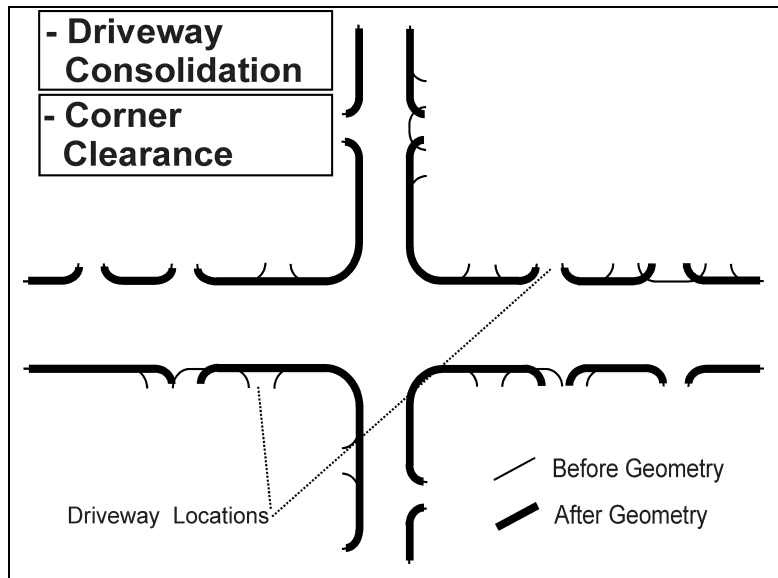
#### **2. Common Types of Access Management Projects**

Access management projects are all designed to do one thing: reduce conflict points associated with traffic turning into or leaving land developments. Six types of treatments or projects are the most commonly used in the state of Iowa (see Figures 1-5).

These six treatments are:

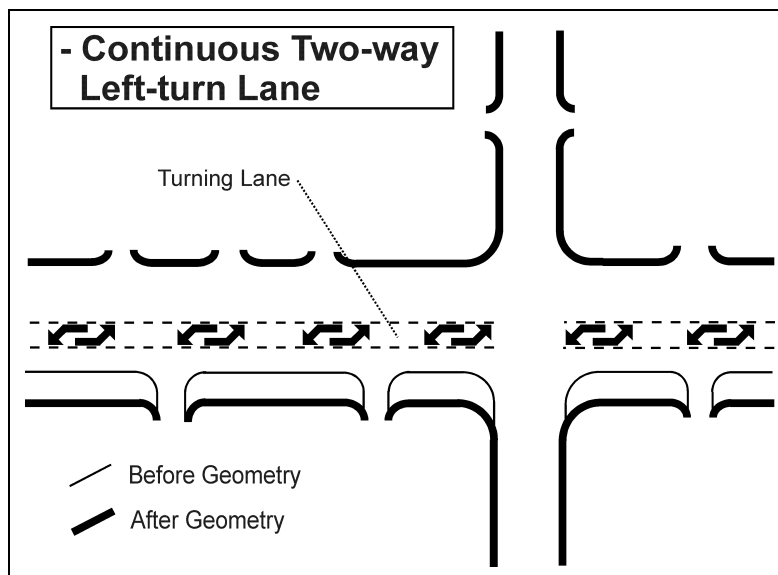
- Driveway consolidation. These are the simplest access management projects. They are designed to limit the number of driveways per mile along a road and provide adequate spacing between driveways. This reduces conflicts associated with both left and right turns.
- Corner clearance. Corner clearance involves keeping or moving driveway entrances away from intersections. Sometimes driveways are moved from main streets to side streets to clear corners. Corner clearance eliminates conflict points that can cause rear-end collisions.

**Figure 1: Driveway Treatments**



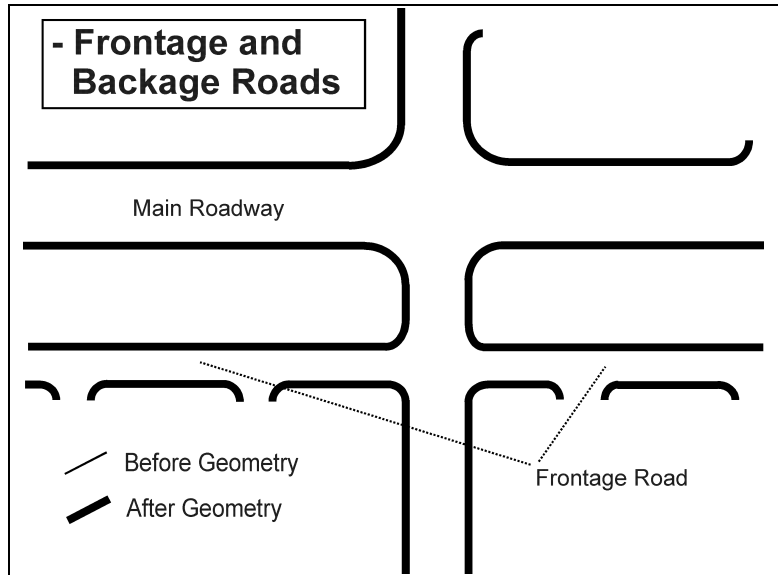
- Continuous two-way left-turn lane. These projects provide an additional dedicated turning lane in the center of a three or five lane street to separate left-turning traffic from through traffic. These turn lanes can be used in situations where moderate levels of traffic exist.

**Figure 2: Continuous Two-way Left-turn Lanes**



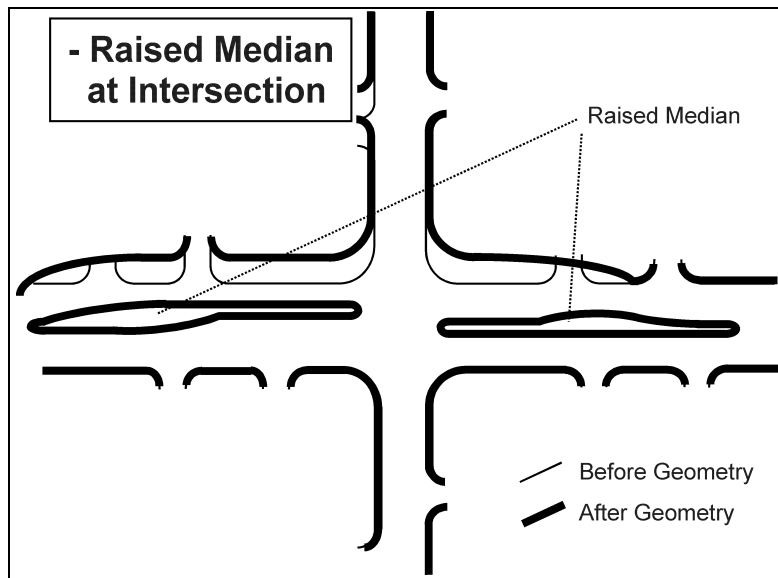
- Frontage and backage roads (alternative access ways). Frontage and backage roads provide alternative roadways off the main traveled roadway so as to separate turning and through traffic completely.

**Figure 3: Alternate Access Treatments**



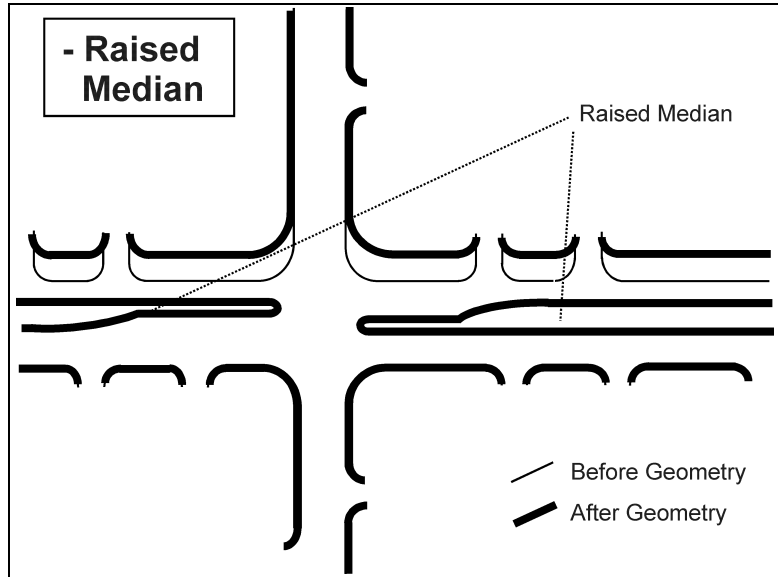
- Raised medians at intersections. These projects provide for limited installation of barriers near intersections in the center of multilane roadways. These prevent some turning movements near intersections. Such projects are very common in Iowa.

**Figure 4: Raised Median at Intersection**



- Full raised medians. Medians are barriers in the center of a major street that prevent both left turns and cross traffic. These projects eliminate a considerable number of conflict points and are most often used in situations where traffic volumes are high. They are usually the most controversial kind of access management project.

**Figure 5: Full Raised Median Treatment**

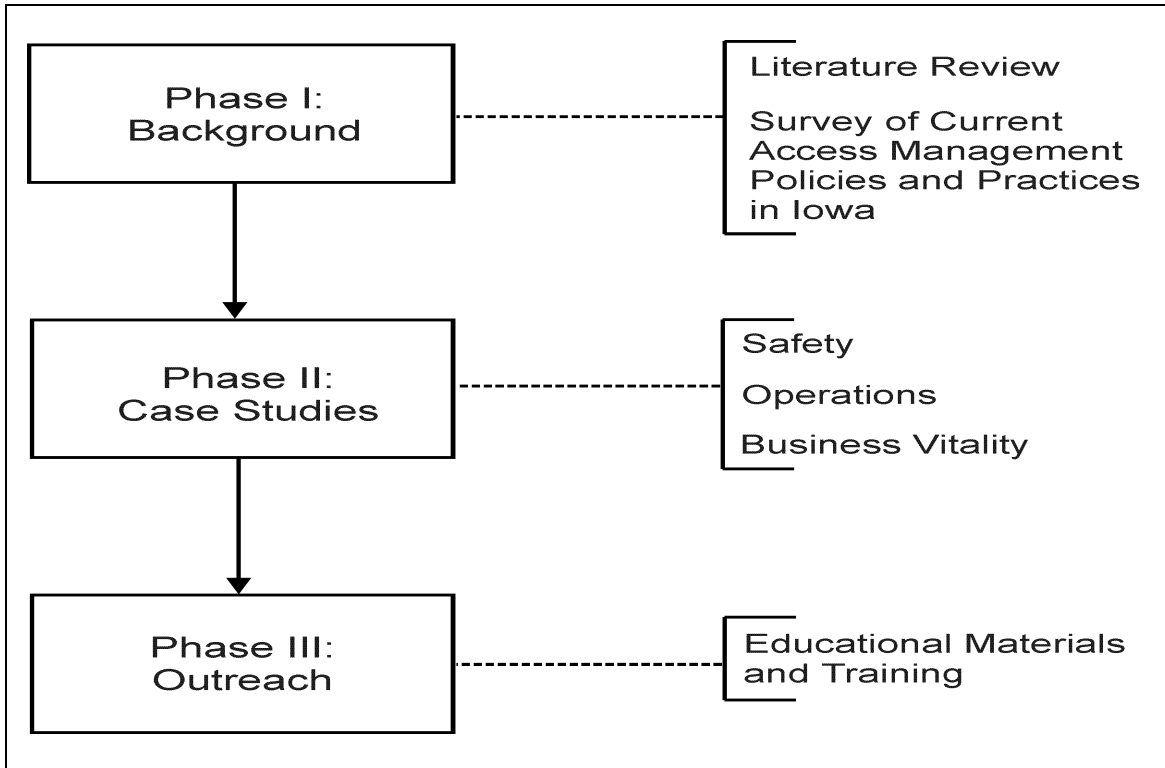


Access management treatments are often used in combination with each other and along with other roadway improvements such as improved signalization or installation of turning lanes or bays.

### ***B. Iowa Access Management Research and Awareness Project***

The Access Management Task Force worked cooperatively with the Safety Management System, the Iowa DOT, and the Center for Transportation Research and Education to develop a work plan that would both research and provide education and outreach activities on access management. The result was a three-phase effort spanning a total of 18 months (see Figure 6).

**Figure 6: Project Overview**



The three phases include the following:

- Phase I of the effort, completed in fall 1996, involved preliminary research on access management, including a review of existing literature and a survey of current access management practices in Iowa.
- Phase II of the effort, presented in this report, involved detailed research into the safety and traffic flow impacts of specific access management case studies in Iowa. The effect of controlling access on local businesses was also evaluated for selected case studies. This business vitality study is one the first of its kind ever conducted in the United States and Canada.
- Phase III, to be initiated in late 1997, will involve the development and distribution of access management educational materials based on the research results from Phases I and II. The key audiences for these materials will include local government officials, businesspersons, chambers of commerce, land use planners, real estate developers, and transportation professionals. Media to be used for education and training materials include print, multimedia, video, the Internet, and a statewide conference on access management.

## **1. Iowa Access Management Task Force**

In 1996, the Iowa Department of Transportation (Iowa DOT) established an Access Management Task Force as part of its Safety Management System (SMS) development process. The Task Force has representation from the Iowa DOT, the Federal Highway Administration, local government, and the private sector.

The Safety Management System encompasses many activities, including accident location data improvement, work zone safety, sign vandalism prevention, speed limit change analysis, safety training and education, railroad grade crossing safety, and animal-related accident prevention. One of the highest priority projects initiated by the SMS involves research and outreach on access management.

## **2. Research Team**

The team for the project represented a close collaboration by researchers from three universities in Iowa. The project was managed by the Center for Transportation Research and Education (CTRE) at Iowa State University. The Department of Marketing in the School of Business at the University of Northern Iowa undertook a major survey research effort during Phase II. The University of Iowa's Public Policy Institute provided support during Phase I in terms of studying current access management practices in Iowa. The Department of Economics at Iowa State University provided assistance in measuring impacts on local businesses.

## **3. Case Study Selection Process**

The Iowa Access Management Research and Awareness Project has relied heavily on a case study approach for research data. Nominations for Iowa access management case studies were sought through direct mailings to local and state transportation officials throughout Iowa. In addition, a nomination form was made available on the Center for Transportation Research and Education's World Wide Web site and through its technology transfer newsletter. Over 50 locations in Iowa were nominated as potential case studies via direct submissions or the web page (<http://www.ctre.iastate.edu/access>).

The Access Management Task Force based on its selection of case studies on two main criteria: (1) types of access management issues and solutions illustrated and (2) geographic diversity. The task force wished to study a variety of issues and solutions as well as a variety of locations and city sizes around Iowa.

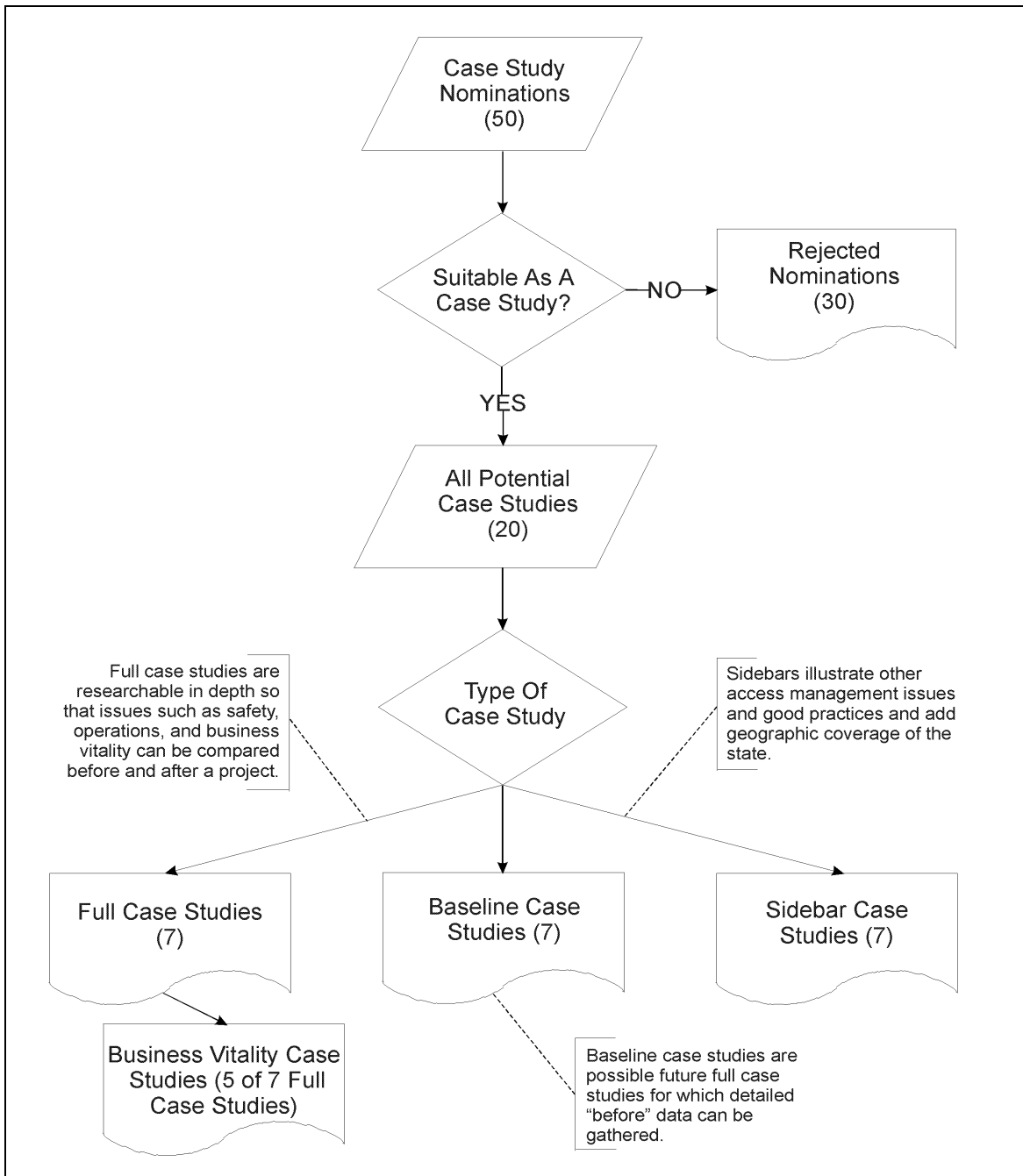
## **4. Case Study Types**

The Access Management Task Force identified four types of cases to be studied in Iowa (see Figure 7). These types of case studies include:

- **Full Case Studies.** Seven case studies were selected by the Task Force to receive intensive study in terms of safety and traffic operations. For the most part, these cases involved improvements made during the mid-1990s. Improvement types varied from driveway consolidation to full installation of medians.
- **Business Vitality Case Studies.** Five of the seven full case study locations were selected to receive intensive study in terms of the impacts of access management projects. These were all projects completed in the past decade so that business owners and motorists would be able to make detailed before and after comparisons.

- Sidebar Case Studies. Eleven additional case studies were selected to be studied in less detail. These eleven locations illustrate either good access management practices or current access management issues. The purpose of the sidebar cases was to provide additional coverage in terms of both issues analyzed and geography.
- Baseline Case Studies. Two other locations, in Coralville and Council Bluffs, were selected for data gathering so that future “before and after” comparisons could be easily made. These are case studies for which improvements are either pending or in progress.

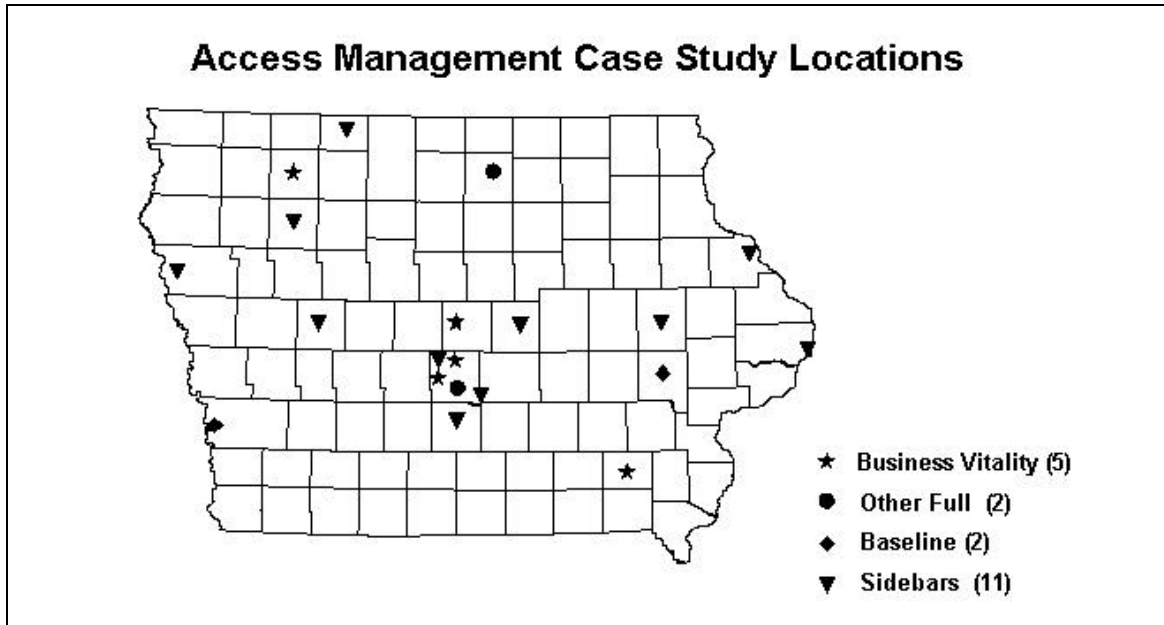
**Figure 7: Case Study Selection Process**



## 5. Case Study Map and Listings

The following map illustrates the geographic distribution of various case study types throughout Iowa (see Figure 8). Since the majority of access management problems are found in urban, suburban, and urban/rural fringe areas, this is reflected in the mapped distribution. However, communities studied range from under 10,000 to nearly 200,000 in population. Access management problems can be found in even small urban places.

**Figure 8: Case Study Locations**



Most of the access management case studies fell along federal or state numbered routes (see Table 1), indicating that access management problems arise when the dual roadway functions of serving property access and serving through traffic come into conflict.

**Table 1: Full Case Study Information**

Community	Federal or State Route	Street Name	Population (1990 or Latest)	Project Type And Length (In Miles)	Project Completion Year
Ames	US 69	S. Duff Ave.	47,198	Continuous two-way left-turn lane; 0.5 miles	1994
Ankeny	US 69	N. Ankeny Blvd.	21,485*	Median with turning lanes; 1.0 miles	1993
Clive	N/A	NW 86 <sup>th</sup> St.	9,073	Median with turning lanes; 0.6 miles	1991
Des Moines	US 65/69	SE 14 <sup>th</sup> St.	193,189	Median with turning lanes; 1.5 miles	1985
Fairfield	US 34	W. Burlington Ave.	9,768	Driveway consolidation; 0.6 miles	1992
Mason City	US 18	4 <sup>th</sup> St. SW	29,040	Median at intersection; 0.2 miles	1991
Spencer	US 71	S. Grand Ave.	11,066	Continuous two-way left-turn lane; 0.6 miles	1992

\*Based on a 1994 Special Census of Ankeny.

The eleven sidebar case studies were selected to illustrate a variety of access management issues found in urban and rural settings in Iowa (see Table 2).

**Table 2: Sidebar Case Study Information**

<b>City or County</b>	<b>US or State Route</b>	<b>Issues Illustrated / Lessons Learned</b>
Carroll	US 30	Shows a growing <b>commercial/industrial area</b> where access could have been managed more effectively; the roadway will need to be bypassed in the future.
Clinton	US 67	Illustrates a <b>mixed land use area</b> where access has not been managed effectively; a retrofit project is planned which will use a variety of techniques (medians, driveway consolidation, and frontage road improvement) to address safety and operational problems.
Dubuque	IA 32 (Northwest Arterial)	Highlights a newly constructed arterial that effectively integrates <b>land use planning</b> , land use regulations, and strong access management standards.
Estherville	IA 9	Shows the effective use of a <b>frontage road</b> system in a small city.
Marion	Business US 151	Highlights the integrated use of a variety of access management techniques, including medians, turning lanes, and the redesign of entrances.
Marshalltown	Old US 30	Shows the case of a <b>bypass</b> built several decades ago and where access was not managed effectively. A second bypass was eventually required, illustrating the high cost of not managing access.
Sioux City	IA 12 (Gordon Drive)	Illustrates the impacts of a lack of effective access management along a <b>commercial strip area</b> . This case is typical of access management problems in many cities in Iowa.
Storm Lake	Old US 71 and IA 7	Shows the effective use of a <b>three lane design</b> with a continuous center turning lane.
Urbandale	IA 28 (Merle Hay Road)	Illustrates the effective <b>retrofit of a major intersection</b> including turning lanes, medians at the intersection, and frontage road modifications.
Polk County	IA 163	Illustrates various <b>rural access management issues</b> : a single large traffic generator; restricted sight distance along a major arterial; and frontage road design issues. (A project is planned to address these problems).
Warren County	US 65/69	Illustrates various <b>rural access management issues</b> : access along a major arterial in an urban fringe area with high future growth potential; and restricted sight distance.

The full case studies provided valuable information on the impacts of access management projects because it was possible to study them on a before and after basis. Two additional corridors, in Coralville and Council Bluffs, were selected for development of detailed “before” information. These corridors are currently being modified to incorporate improved access management. They are both high volume arterials located in suburban areas.

## **6. Research Methods Used**

During Phase II of the Iowa research, four primary methods of investigation were used to examine the selected case studies. Each case study was examined in the field and as much historic information as possible was gathered. For many of the projects, extensive Iowa DOT project files were available.

Detailed before and after accident studies were conducted for many of the case studies by employing the Iowa Department of Transportation's Personal Computer Accident Location Analysis System (PC-ALAS).

Business trends for corridors were primarily analyzed using retail sales tax data made available by the Iowa Department of Revenue and Finance. Other data sources, principally R.L. Polk City Directories, were used to augment the sales tax data.

Finally, opinion surveys of business owners and managers and motorists/customers were conducted using personal interviews. The School of Business of the University of Northern Iowa conducted these interviews on site. It should be noted that more emphasis was placed on obtaining a large sample proportion of business owners/managers than of motorists/customers. In some communities, the sample size for the motorist/customer survey is small. Results should be viewed with some caution, although because of their strongly positive nature it is doubtful that a larger sample size would have led to much of a difference.

### ***C. Summary of Key Research Results***

The key impacts of access management have been divided into three categories in the literature: traffic safety, traffic flow/operations, and business vitality. These categories were also used in Iowa's study, with great emphasis being placed on safety and business vitality. Since traffic congestion is not a serious problem in most places in Iowa, traffic operations and flow analysis was given much less emphasis in the study design than safety and business vitality. Clearly, the results indicate that access management projects have a positive impact when all factors, including safety, traffic operations, and business vitality, are factored in.

Results from the full case studies and business vitality case studies indicate that:

- A typical access management project in Iowa may be expected to lead to a reduction in annual accidents of between 10 and 65 percent and a similar range of reduction in the accident rate per million vehicle miles of travel. The average reduction in accidents and accident rates for all projects is around 40 percent. Both personal injury accidents and property damage only accidents are reduced significantly, but property damage accidents by a greater percentage.
- Access management projects studied in Iowa raised the level of traffic service to motorists at peak hour along a corridor by one level, providing significant benefits in terms of increased operating speed and reduced traffic congestion and delay.
- Corridors where access management projects have been completed actually perform better in terms of retail sales than their surrounding communities. In addition, business failure rates along access management corridors are at or below the statewide average for Iowa. This indicates that access management projects generally do not have an adverse effect on the majority of businesses. Some individual businesses may be affected.
- The vast majority of businesses (80 percent) along access management corridors reported sales at least as high after the project was in place. Relatively few businesses reported declines associated with the project, although these business owners clearly felt they were hurt by the project. Negatively-impacted firms were a mixture of business types. Similarly, about 80 percent of businesses reported no customer complaints regarding access to their businesses after project completion. Those businesses that tended to most often report complaints were highly oriented toward automobile traffic (e.g. restaurants and auto sales and service businesses).
- Motorist opinions about the access management projects studied were highly positive. In all cases 90 to 100 percent of motorists surveyed had a favorable opinion of improvements made to roadways that involve access management. The vast majority of motorists agreed that the improved roadways are safer, operate better, and are easier to drive on.

**D. Safety Benefits**

The single most significant benefits associated with the projects studied have to do with traffic safety (see Tables 3 and 4). These benefits are often highly significant and include:

- A decline in the overall number of traffic accidents. All but one (Spencer) of the full case study projects experienced a reduction in annual accidents. The number of accidents declined in a range from 30 to 70 percent with this one exception. Spencer experienced a small increase in accidents. However, this was partly explained by a large (nearly 20 percent) increase in traffic along the project after it was completed. A typical reduction in accidents was 39 percent, a figure consistent with previous experience in other studies.
- A decrease in the rate of accidents per vehicle mile of travel (VMT) (see Figure 9). The accident rate makes an adjustment for decreases or increases in the amount of travel on a roadway. Accident rates decreased for all the case studies; the average reduction in accident rates was over 40 percent. Rate reductions varied from under 10 percent (Spencer) to over 65 percent (Ames).

**Table 3: Average Annual Total Traffic Accidents (By Case Study)**

Case Study	Before Project	After Project	Change	Percent Change
Ames	53	17	-36	-67.9%
Ankeny	37	21	-16	-43.2%
Clive	69	43	-26	-37.7%
Fairfield	35	22	-13	-37.1%
Mason City	33	24	-9	-27.3%
Spencer	23	25	+2	Increased 8.7%
Total, All Cases	250	152	-98	-39.2%

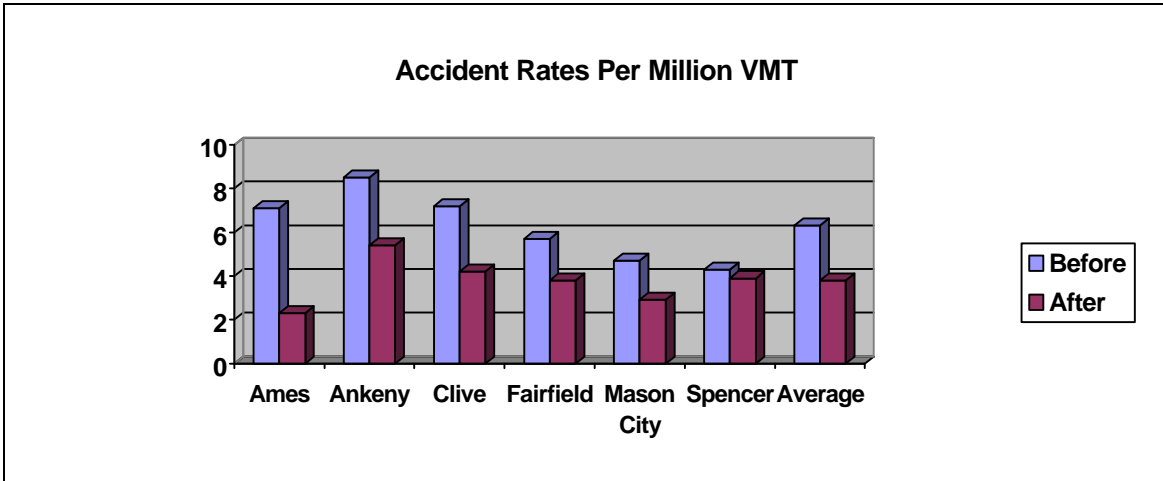
Note: The Des Moines case study is not included due to a lack of comparable “before” data.

**Table 4: Accident Rate Per Million Vehicle Miles Traveled (By Case Study)**

Case Study	Before Project	After Project	Percentage Change
Ames	7.1	2.1	-70.1%
Ankeny	8.5	5.4	-36.5%
Clive	7.2	4.2	-41.7%
Fairfield	5.7	3.8	-33.3%
Mason City	4.7	2.9	-38.3%
Spencer	4.3	3.9	-9.3%
Average, All Cases	6.3	3.8	-39.7%

Note: The Des Moines case study is not included due to a lack of comparable “before” data.

**Figure 9: Accident Rates Reduction**



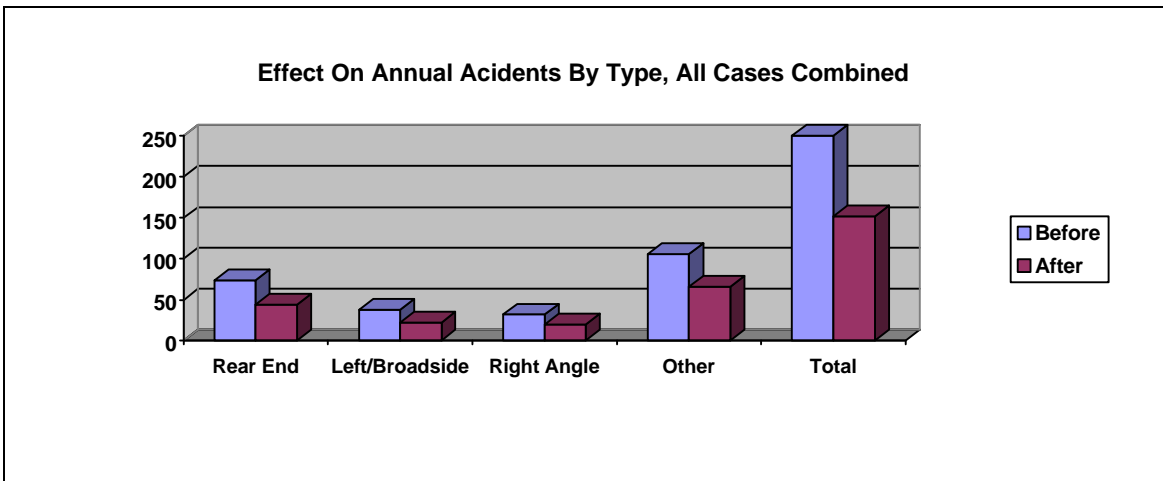
Although the access management projects studied were effective in decreasing many types of accidents (see Table 5 and Figure 10), there were above-average declines in two types of accidents generally associated with access problems: rear-end collisions and broadside/left turn accidents. These declined by over 40 percent combined for the six case studies for which before and after comparisons are possible.

**Table 5: Accidents Per Year By Type (All Before And After Case Studies Combined)**

Accident Type	Before Projects	After Projects	Percentage Change
Rear End	74 (29%)	44 (29%)	-40.5%
Broadside/Left Turn	38 (16%)	22 (16%)	-42.1%
Right Angle	32 (12%)	20 (13%)	-37.5%
All Other/Uncertain	106 (42%)	66 (43%)	-37.7%
Total, All Types	250 (100%)	152 (100%)	-39.2%

Note: The Des Moines case study is not included due to a lack of comparable “before” data.

**Figure 10: Reduction in Accident Types**



One full case study access management project (Des Moines) was of an age such that necessary comparative accident data from before the project in the early 1980s could not be gathered. However, some historic data and “after” data can be used to show how the SE 14<sup>th</sup> access management project affected traffic safety. Before the project in the period between 1975 and 1977, there were 323 accidents per year along SE 14<sup>th</sup> Street--almost one accident every day. The accident rate was calculated by the Iowa DOT to be over eight accidents per million vehicle miles during these three years. Accidents and the accident rate were growing. Once the raised median project was put in place, the accident rate fell to about 4.9 accidents per million vehicle miles for the years 1986 through 1988, a drop of 40 percent. This result is comparable with those for the other full case studies.

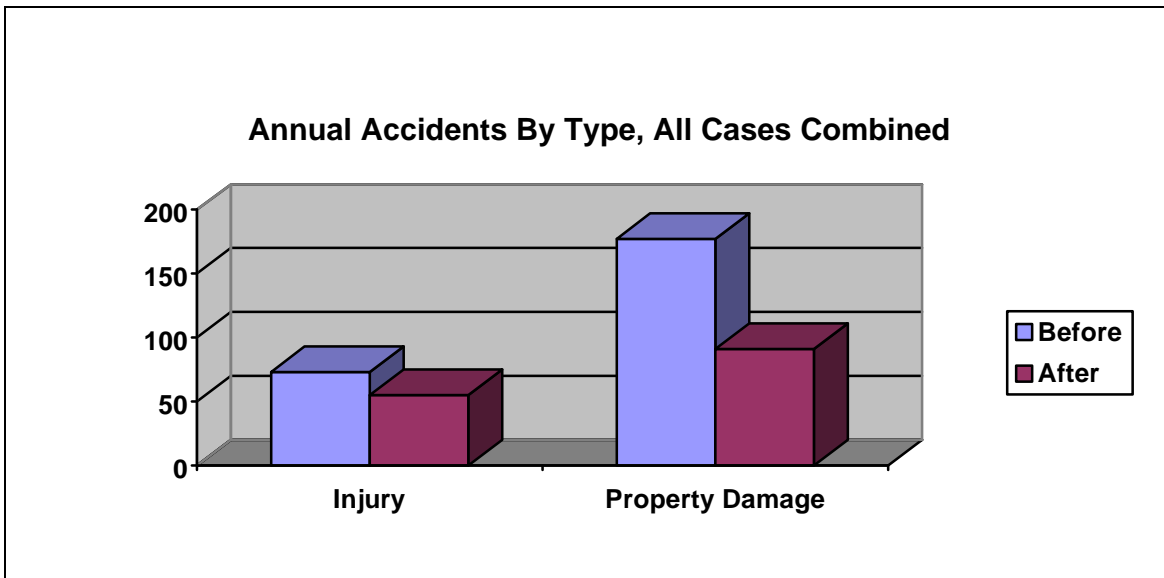
Both personal injury accidents and particularly property-damage-only accidents were significantly reduced after project completion. For the six case studies where complete before and after comparisons are possible, personal injury accidents dropped almost 25 percent and property damage only accidents were almost cut in half (see Table 6 and Figure 11).

**Table 6: Average Annual Accident Statistics (Six Full Case Studies Combined)**

Accident Type	Before Projects	After Projects	Absolute Change	Percent Change
Personal Injury Accidents	73	55	-18	-24.7%
Fatalities	0	0	0	No Change
Injuries	108	89	19	-17.6%
Property Damage Only Accidents	177	91	-86	-48.6%
Total Vehicles Involved, All Accidents	529	313	-216	-40.0%

Note: The Des Moines case study is not included due to a lack of comparable “before” data.

**Figure 11: Annual Accidents**



### ***E. Operational Benefits***

Operational concerns such as traffic speed and congestion are generally not as important as safety concerns in the selection of candidates for access management projects in Iowa. This has to do with the traffic patterns and roadway level of service conditions that tend to prevail in most of the state, including in metropolitan areas. For the most part, roadways in the state are not congested with traffic, and facilities operate at or near the free flow speed even during peak hour. Average Annual Daily Traffic (AADT) is an indication of the amount of traffic a roadway carries on an average day during a year. The seven full case study location roadways mainly carried moderate levels of traffic (15,000 to 25,000 vehicles) both before and after they were improved (see Table 7).

**Table 7: Before And After Traffic Volumes (AADT At Full Case Study Locations)**

<b>Project Location</b>	<b>Traffic Before Project (AADT)</b>	<b>Traffic After Project (AADT)</b>	<b>Percentage Change In Traffic</b>	<b>Comments</b>
Ames (US69/S. Duff Ave.)	20,500	21,800	+6.3%	Some new land development occurred along the route after project completion
Ankeny (US 69/Ankeny Blvd.)	12,000	16,300	+35.8%	Significant new land development occurred along the route after project completion.
Clive (NW 86 <sup>th</sup> St.)	26,000	28,000	+7.7%	100 <sup>th</sup> Street opened parallel to 86 <sup>th</sup> Street, diverting some traffic.
Des Moines (US 65-69/SE 14 <sup>th</sup> St.)	25,900	27,800	+7.3%	A bypass is under construction for US 65 (to open in late 1997).
Fairfield (US 34/Burlington Ave.)	16,800	15,800	-6.0%	Other streets were paved during the project; a bypass is planned for US 34.
Mason City (US 18/4 <sup>th</sup> St.)	19,000	22,000	+15.8%	A bypass is under construction for US 18.
Spencer (US 71/Grand Ave.)	14,800	17,600	+18.9%	A bypass is planned for US 71.

Only the Ankeny roadway experienced a very large increase in traffic after it was improved. It was widened from a two-lane roadway to a four-lane facility with raised medians and left turn lanes. There was considerable new commercial business development along the route after the project was completed, which raised the traffic count. In Fairfield, traffic actually declined on the route following the access management improvements. This may be due in part to the paving of some nearby streets. Traffic on the Clive route was partially relieved by the opening of a new major arterial, 100<sup>th</sup> Street, about one mile to the west. As a result, traffic on 86<sup>th</sup> Street did not increase as much as might have been expected with the completion of the access management project.

Level of Service (LOS) provides an overall indication of the quality of service that a roadway provides to motorists in terms of speed, travel time, traffic interruptions, freedom to maneuver, driving comfort, convenience, and probability of accidents (see Table 8). Level of Service A is the highest quality of service possible and indicates that there is little restriction on speed or maneuverability caused by other vehicles. Traffic flows freely. Quality of service declines under levels of service B and C and operating speeds and ability to maneuver begin to decline. At Level of Service D, traffic flow begins to become unstable and speeds become highly variable. The probability of accidents also rises. Level of Service E indicates the capacity of the roadway has been reached; driving becomes difficult and accident potential is high. Level of Service F is the lowest possible quality of traffic service; traffic flow is forced and speeds can drop to zero for short periods as traffic jams develop.

**Table 8: Peak Hour Traffic Service Levels (Full Case Study Locations)**

<b>Project Location</b>	<b>Approximate Peak Hour Level of Traffic Service Before Project*</b>	<b>Approximate Peak Hour Level of Traffic Service After Project*</b>
Ames	C	B
Ankeny	C/D**	B
Clive	D	B/C**
Des Moines	D	B/C**
Fairfield	B	B
Mason City	B	B
Spencer	B	B

\* Based on estimated peak hour traffic volumes per lane and considering turning lanes and calculated based on the methodology for urban arterial streets contained in the Highway Capacity Manual.

\*\* Indicates that roadway is operating near the boundary between two levels; both levels are shown.

In the cases of the Ankeny, Clive, and Des Moines locations levels of traffic service, travel speed, and congestion were of concern before the access management projects were initiated. The Clive and Des Moines locations had previously been two of the most congested arterial streets in the state. In all three cases, the access management projects contributed to a marked improvement in traffic operations.

According to the Iowa DOT, Level of Service C is considered the desirable performance for urban roadways in Iowa. Level of Service D is the minimum acceptable standard. All of the case study location roadways now meet or exceed Level of Service C (see Table 9).

**Table 9: Travel Speeds And Level Of Service\***

<b>LOS</b>	<b>Approximate Travel Speed</b>	<b>Nature of Performance</b>
A	Greater than 30 mph	Unrestricted flow
B	Greater than 25 mph	Stable flow
C	Greater than 20 mph	Stable flow
D	Approximately 15 mph	Approaching unstable flow
E	Approximately 10 mph	Unstable flow; moderate congestion; road capacity reached
F	Less than 10 mph	Forced flow; extreme congestion

\*Based on an urban arterial with a posted speed limit of 35 miles per hour.

## ***F. Impacts on Business Vitality***

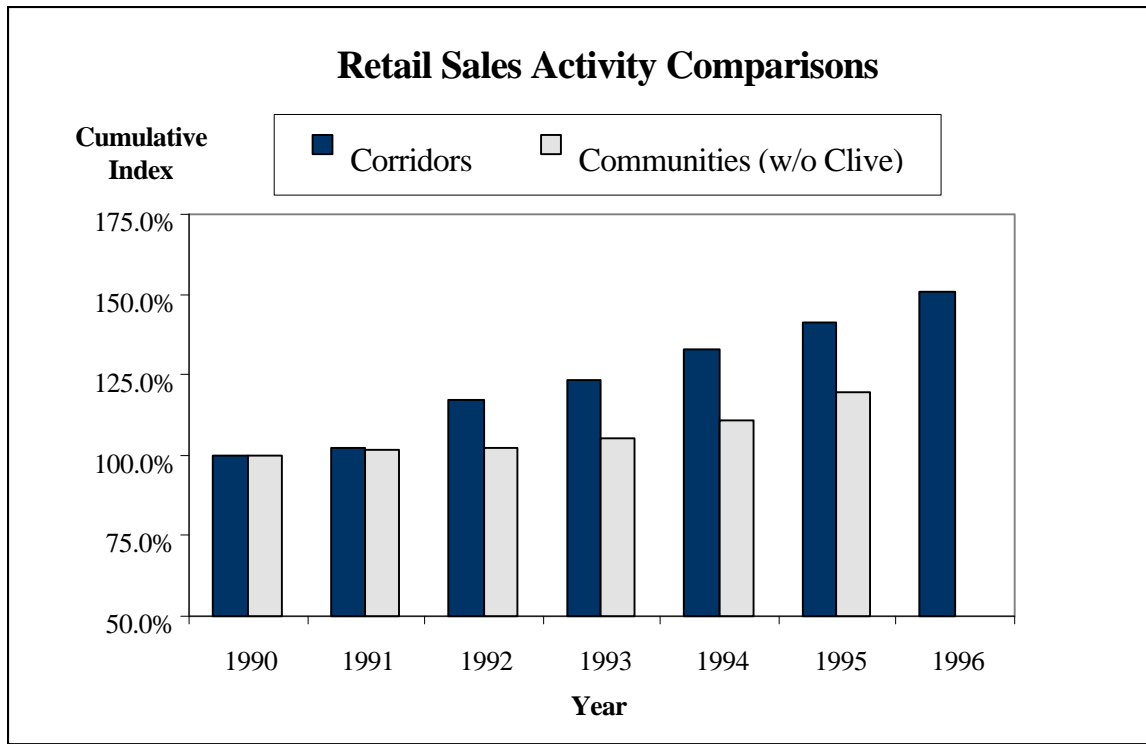
Business owners often express the concern that changes in access management will have temporary or permanent impacts on their sales. They are particularly concerned about access management projects, such as medians, that significantly reduce turning opportunities for motorists.

### **1. Economic Indicators**

Analysis conducted for each of the five business vitality case studies using statistics from the Iowa Department of Revenue and Finance and other published sources indicates negative impacts on business tend to be confined to a small number of individual businesses. In fact, the five business study corridors where access management changes occurred generally performed better in terms of sales activities than their surrounding communities once the project was in place. The results of this analysis indicate that:

- There were no particular business categories that consistently decreased in number of establishments for any of the five corridors studied. Traffic-dependent businesses such as convenience stores and fast food restaurants did not appear to be affected in a significantly different manner than were all businesses.
- The rates of business turnover in the study corridors ranged from about 2.6 percent to 10 percent per year, a range below or equal to the business turnover rate for Iowa as a whole, which is about 10 percent per year. Businesses located along the case study corridors turned over less than would normally be expected of retail businesses in Iowa. (Turnover in this case includes going out of business, moving out of the corridor, or changing the business's name.)
- With one exception, retail sales for businesses within the case study corridors significantly outpaced sales in their respective communities. The one exception was Clive, in which the community as a whole experienced phenomenal retail trade growth and draws customers from a large trade area. The corridor's growth was also exceptionally high after the project was completed, indicating that it did not harm business along the corridor in the aggregate.
- The following chart contrasts sales within the access management corridors with the sales in their respective communities (see Figure 12). Figures for Clive have been removed; that city's unusually dramatic retail sales performance would have made interpreting the results difficult. (Sales along the Clive corridor grew by 79 percent from 1990-1996, the second-highest growth rate of any corridor studied. Community-wide sales more than tripled, growing more than three times more than any other community examined).
- There do not appear to have even been any significant short term declines in retail activity associated with the access management projects. Corridor sales results outpaced community results throughout the period 1992 through 1995 and probably in 1996 as well.

Figure 12: Retail Sales



Note: 1996 community sales report numbers are not yet available from the Iowa Department of Revenue and Finance. The relative pattern of the bars is expected to continue in 1996.

## 2. Business Owner and Manager Opinions of Projects

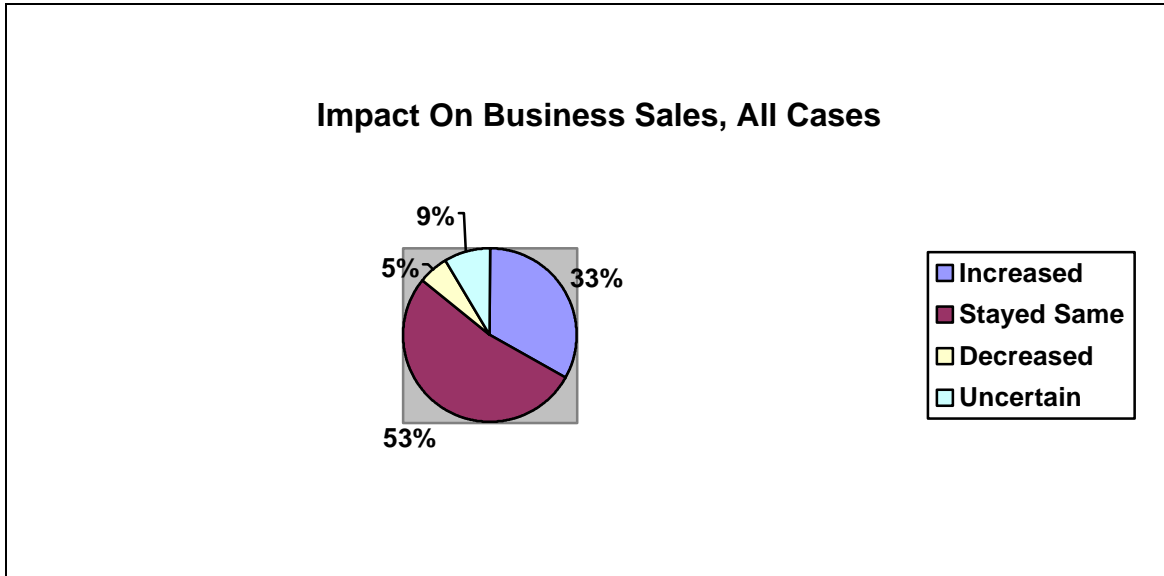
Access management projects, particularly those that involve a major reduction in direct access to property, are often controversial among business owners and managers. However, data collected for five case study corridors in Iowa strongly suggests that access management projects do not harm the great majority of businesses. This was confirmed by the results of a survey of business owners and managers conducted by the University of Northern Iowa.

**Well over 80 percent of all business owners surveyed along the five business vitality corridors indicated that their sales had increased, stayed the same, or that they were uncertain about the impact.** Interestingly, the business owners along raised median projects had both the highest percentage responses of both “increased” and “decreased” sales (see Table 10 and Figure 13).

Table 10: Reported Sales of Surveyed Businesses After Projects

Sales Impact	Ames	Ankeny	Clive	Fairfield	Spencer	Average, All Cases
Increased	18.2%	41.7%	40.0%	28.6%	36.4%	33.0%
Same	72.7%	25.0%	50.0%	71.4%	45.5%	52.9%
Decreased	0.0%	16.7%	10.0%	0.0%	0.0%	5.4%
Uncertain	9.1%	16.7%	0.0%	0.0%	18.2%	8.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Type of Project	Two-way left-turn lane	Raised median	Raised median	Driveway consolidation	Two-way left-turn lane	All

**Figure 13: Business Sales Impact**



A few businesses (three of 63 interviewed, or five percent) did report decreased sales activity after the access management projects were completed. These were of no particular business type and included a real estate office, a supermarket, and a tanning salon. All three of these businesses were located along raised median projects in Ankeny and Clive.

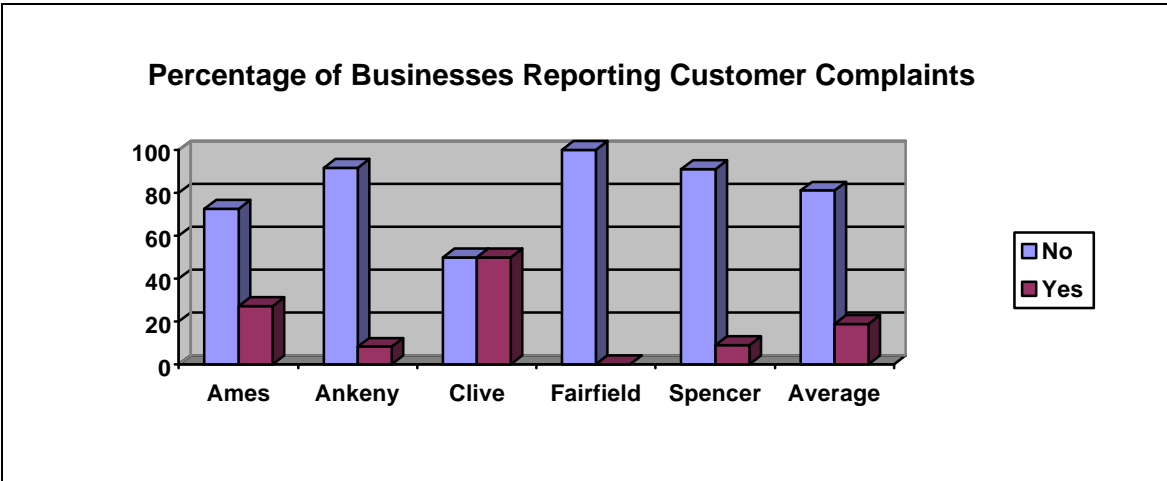
About 19 percent of businesses reported their customers complained or reported some difficulty in driving to their businesses after the completion of the access management project. The level of complaint varied significantly by case study, with the Ames and Clive projects being complained about most often. Over 80 percent of business owners reported no customer complaints about access to their businesses (see Table 11 and Figure 14).

**Table 11: Reported Customer Complaints About Access to Businesses**

<b>Do Your Customers Complain?</b>	<b>Ames</b>	<b>Ankeny</b>	<b>Clive</b>	<b>Fairfield</b>	<b>Spencer</b>	<b>Average</b>
No	72.7%	91.7%	50.0%	100.0%	91.0%	81.1%
Yes	27.3%	8.3%	50.0%	0.0%	9.0%	18.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Type of Project	Two-way left turn lane	Raised median	Raised median	Driveway consolidation	Two-way left turn lane	All

The businesses that received complaints were concentrated in two communities—Ames and Clive (one two way left turn lane and one median project). Complaints were also concentrated by business type. Restaurants and automotive sales and service businesses were the business types most often reporting complaints. These are types of businesses that are especially sensitive to the ability of motorists to access them.

**Figure 14: Businesses with Customer Complaints**



**3. Temporary Sales Impacts on Businesses During Construction**

The Iowa study did not measure the temporary impacts of projects on businesses during construction. However, a 1996 study of twelve highway reconstruction projects in Indiana (Palmer, 1996) shows that the average loss of retail sales during a major construction project was 13 percent. Those businesses experiencing the biggest temporary losses were gas stations, grocery stores, consumer electronics stores, hardware stores, and automotive sales and service firms.

The Indiana study indicates that most businesses achieve a full recovery within two years, although 20 percent of businesses did experience a long-term negative impact on their sales. Mirroring the Iowa results, a majority of businesses actually reported they benefited from the project improvements. The majority also supported the projects as necessary. This was because traffic flowed better and access to their location was enhanced. Business types most likely to experience long-term negative effects were gas stations, car washes, and other automotive-related businesses. These findings appear to be along similar lines as those from Iowa.

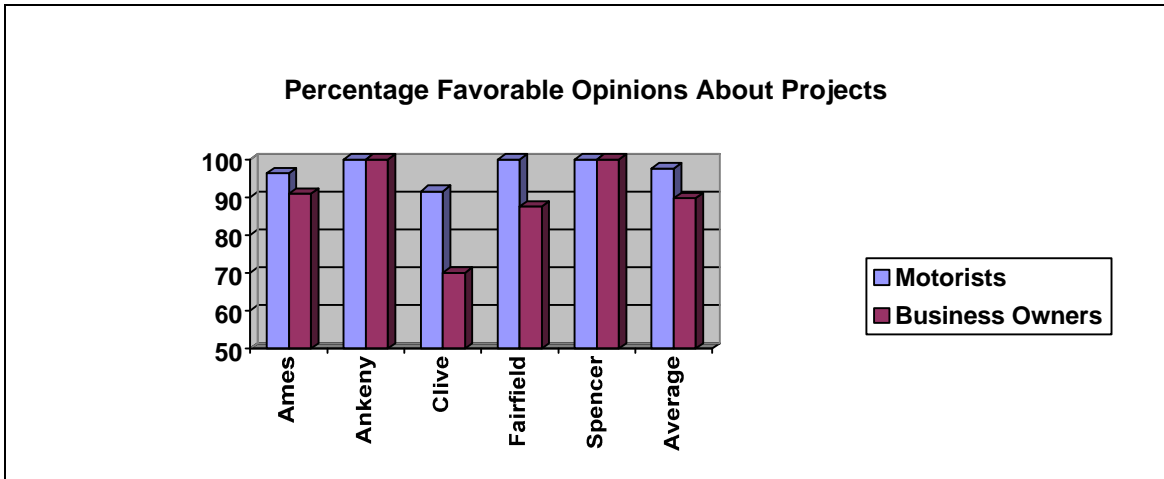
**G. Motorist and Customer Opinions of Projects**

For five of the case study projects, motorists were surveyed by the University of Northern Iowa to obtain their opinions about the projects. Nearly all motorists surveyed were aware that a roadway improvement had been made. (It must be noted here that for some communities, Ankeny, Clive, and Fairfield in particular, these results are based on a small sample of individuals). In all cases 90 to 100 percent of motorists surveyed had a favorable opinion of improvements made to roadways that involve access management. The vast majority of motorists agreed that improved roadways are safer, operate better, and are easier to drive on (see Table 12 and Figure 15).

**Table 12: Respondents Expressing A Favorable Opinion About Projects (By Case Study)**

Group Surveyed	Ames	Ankeny	Clive	Fairfield	Spencer	Average, All Cases
Motorists	96.3%	100.0%	91.6%	100.0%	100.0%	97.6%
Business Owners / Managers	90.9%	100.0%	70.0%	87.5%	100.0%	89.7%
Type of Project	Two-way left-turn lane	Raised median	Raised median	Driveway consolidation	Two-way left-turn lane	All

**Figure 15: Favorable Motorist and Business Owner Opinions**



Motorists always responded at least as favorably to projects as business owners and managers. In general, business owners are less enthusiastic about the projects than their customers. Further, rankings of support percentages are consistent across projects; the most controversial projects tend to be more controversial for both groups and the best-supported projects are well-supported by both groups. Those businesses indicating they were generally not supportive of the completed access management projects (6 out of 63 businesses surveyed, or 10 percent of the businesses responding) were located in three different communities and along three different types of projects. All six were different types of businesses.

## ***H. Public Official Opinions of Projects***

A cross-section of public officials in the five business vitality case study communities were interviewed to determine their opinion of the access management projects in their communities. Public officials interviewed included mayors, city council members, and school superintendents. (Several of the projects were located adjacent to or very near schools). Questions covered subjects including impact on business vitality, land use, traffic and pedestrian safety, and traffic operations. The results of these interviews were entirely positive. Most public officials interviewed also indicated that motorists had made positive comments to them about the projects.

## ***I. Negative Findings and Caveats***

Although the vast majority of findings in this study are positive there are some negative aspects or findings that should be cited to provide guidance for state and local transportation officials. For example, access management projects are very worthwhile from a safety and operational standpoint but can be difficult to implement because of the perceived impact on adjacent businesses. Some caveats from this research project are useful in providing a realistic and truthful marketing effort for access management improvements. These are:

- The safety analysis for the Iowa case studies indicates that access management projects are likely to be much more effective in reducing property damage accidents than in reducing accidents that are more serious and involve injuries. Still, the injury prevention potential of access management projects is significant.
- The operational impacts of access management projects can be lost to subsequent traffic increases. Traffic increases might be partly generated by the route becoming more attractive due to the project and partly generated by the area becoming a more attractive site for commercial development. Access management projects may delay but not prevent the need for long-term additions to capacity through such changes as bypasses for through traffic.
- A limited number of businesses should be expected to experience long-term sales declines when access management projects are implemented. The percentage might be estimated at up to 15 percent of the businesses in a project corridor, but this percentage may be lower than this or even zero depending on the project. More businesses may experience temporary sales declines, although most businesses will recover rather quickly.
- Some types of businesses will likely bear the brunt of customer complaints about difficulty of accessing their properties once projects are completed. These will tend to be businesses that depend heavily on highway access, such as fast food restaurants and automobile sales and service businesses.
- A minority of business owners and managers (up to 30 percent on some projects) will not be supportive of access management projects along their corridors even if the projects are clearly needed for traffic operations and safety reasons.
- Not all motorists will support access management projects, but the vast majority will. The percentage of non-support will probably be under 10 percent. Non-support will be higher for more complex projects (e.g. projects involving raised medians or continuous left turn lanes).

### ***J. Preview: Phase III of the Project***

Phase II of the Access Management Research and Awareness Project has demonstrated that access management is an effective tool for improving the safety and operations of Iowa's highway transportation system. It has also demonstrated that access management projects are generally not detrimental to local businesses.

The emphasis of Phase III of the project will be on translating the research results shown in this report into educational materials to help Iowa move forward on access management where appropriate. Some materials will be designed to raise awareness of access management and its benefits among stakeholder groups such as transportation professionals, local government decision-makers, businesspersons, urban planners, and land developers. Others will be designed to provide more in-depth education on access management concepts.

Phase III, to be completed by Summer 1998, will result in the production of a number of materials, including:

- A short videotape introduction to access management in Iowa.
- A number of printed brochures and manuals, some general and some technical in nature.
- Multimedia educational materials, including slide shows on access management benefits and concepts.
- A statewide conference on access management to be held in central Iowa in late spring 1998.
- An access management "tool kit" for local governments to help them get started in access management or continue an existing effort more effectively.
- An enhanced Iowa access management World Wide Web site providing most of the materials above in electronic form.

In addition, a full report on the Phase II research results will be published, including detailed documentation of all the case studies.

### ***K. References***

Palmer, James et. al. 1996. Effects of Road Reconstruction on Adjacent Economic Activity: A Retrospective Study. Transportation Research Center, Indiana University, Bloomington, Indiana.