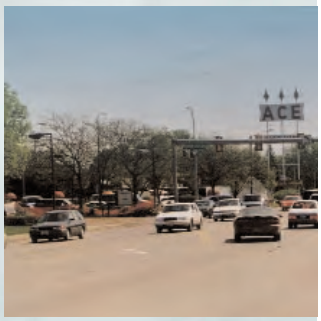




Phase 2 Report

# 41st Street Corridor Analysis City of Sioux Falls, SD

June 30, 2000

BANNER

SEH

SHORT ELLIOTT HENDRICKSON INC

Multidisciplined.
Single Source.

# 41st Street Corridor Study
# Phase 2 Report
# Sioux Falls, South Dakota

SEH No. A-SIOUX9902.00

June 30, 2000

I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of South Dakota.

_____

Glen Van Wormer, P.E.

Date: _____ Reg. No.: 3968

Reviewed by: _____

Date

Short Elliott Hendrickson Inc.
200 SEH Center
3535 Vadnais Center Drive
St. Paul, MN 55110-5108
(651) 490-2000

June 30, 2000

RE: 41st Street Corridor Study
Phase 2 Report
Sioux Falls, South Dakota
SEH No. A-SIOUX9902.00

Mr. Jeffrey Schmitt
Assistant Planner
City of Sioux Falls
224 West 9th Street
Sioux Falls, SD 57104–6407

Dear Jeff:

Attached is the final report for Phase 2 of the 41st Street Corridor Study. The report provides additional information and analysis of several concepts developed in Phase 1. It also gets more detailed and specific in recommendations for implementation. The report incorporates comments received throughout the process from the general public, the City, and reviewing agencies.

The process used in developing the report should help with implementation. Throughout the process, we received many positive comments about both the concepts and the process, and especially about the need to resolve the many problems existing on 41st Street. As expected, as the concepts became more detailed and specific, a few more concerns about a specific project arose. However, great momentum has been developed and the process, if continued, should resolve any issues and allow implementation.

There is no great single solution or major project that will address all the concerns, solve all the problems, and provide the safety and efficiency that is desired. Instead, there is a series of recommendations for implementation that range from major changes to interstate interchanges to adjustment of driveways. There are educational maps and roadway extensions recommended. Each of these elements is very important, and all need to be carried forward. A major decision still must be made between the split diamond interchange at 41st Street and I-29 and a half diamond interchange at 49th Street and I-29. An alignment for the 49th Street extension to the east must be selected. Equally important is getting a driveway improvement program started.

We have gathered a significant amount of data and comments to backup the report. We believe that we have also set up a process that should result in positive public reaction to many of the concepts to be implemented. We hope that we will have the opportunity to use this information, the knowledge of the corridor that we have gained, and the familiarity with the process that we have set up to assist the City and the other agencies in implementing this program. We greatly enjoyed our work to date with the City and other agencies, and look forward to continuing to work with the City of Sioux Falls.

Respectfully submitted,
Short Elliott Hendrickson Inc.

Glen Van Wormer, P.E.
Project Manager

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## List of Figures

# Table of Contents (Continued)

# Phase 2 Report

## 41st Street Corridor Study

Prepared for Sioux Falls, South Dakota

## 1.0 Executive Summary

The City of Sioux Falls, the South Dakota Department of Transportation (SDDOT), and the South Eastern Council of Governments have retained the services of Short Elliott Hendrickson Inc. (SEH) and Banner Associates to study the 41st Street Corridor from Cliff Avenue to Sertoma Avenue. The primary goals of the study are to identify and evaluate ways to improve the flow of traffic along the 41st Street corridor, and increase the capacity; all while allowing proper access to the businesses along the corridor.

Phase 1 of the study identified numerous concepts that met the goals of the project. Twenty–two concepts from Phase 1 were forwarded to Phase 2. Figure 1 shows the concept project locations. The purpose of Phase 2 is to evaluate each of the concepts in more detail, identify the impacts, both positive and negative, and develop a preliminary project cost estimate. The preliminary cost estimates do not include right-of-way, building acquisition costs, or major utility relocation. The information developed in Phase 2 will be used to determine if/when certain concepts should be implemented and to prioritize the projects.

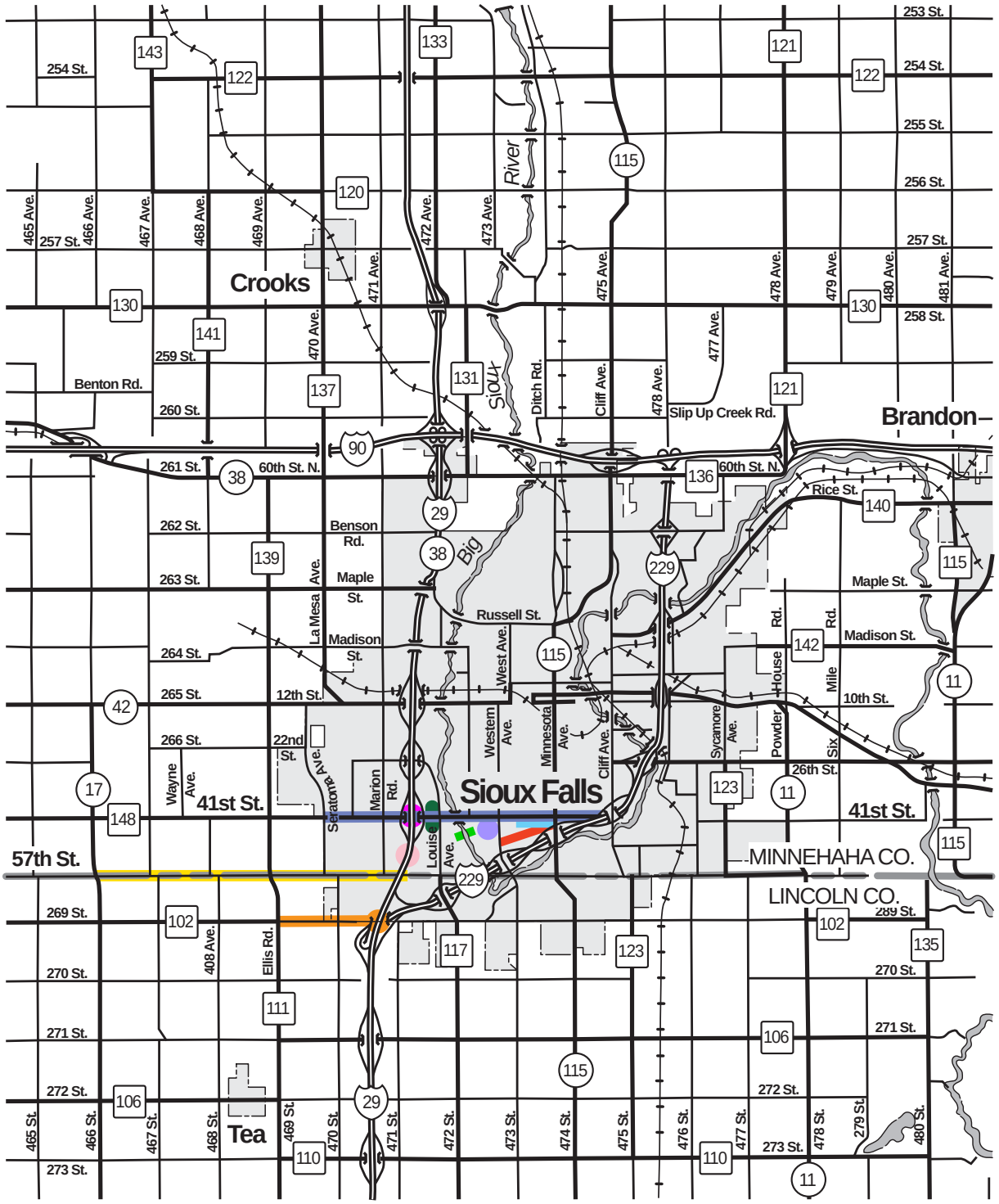
## 2.0 Background

Phase 1 of the 41st Street Corridor Study was completed in December 1999. The purpose of Phase 1 was to formulate concepts that met the primary goals of reducing accidents, increasing capacity, and improving overall flow in the corridor. A large amount of data was collected including traffic volumes, accident information, land use, and traffic signal timing. Sioux Falls 2015: A Growth Management Plan, adopted in October 1996, was used to review the commercial land uses and future growth areas. Public input, which is a very integral part of the process, was also collected. Everyone with property

along the corridor was given an opportunity to express any traffic concerns they had about 41st Street. The general public was also invited to state their concerns and/or comments about the corridor at two public open houses during Phase 1.

Using all the data that was collected, an assortment of concepts were developed which could satisfy some or all of the project goals. It was determined that there is no cure–all solution, rather there are a number of options that could work together to accomplish the goals of the project. It was also determined that providing alternate routes for existing and future traffic provided the best opportunities for improving the 41st Street corridor. The concepts were divided into four main categories. The first category is Alternate Routes for New Traffic and I 29 Alternates, or the "large scale projects". The second category is Alternate Routes for Local Traffic. The third category includes access management options and localized capacity improvements. The fourth category addresses the miscellaneous options, such as traffic signals, capacity improvements, Intelligent Transportation Systems (ITS), transit, and education.

Two more public open houses were held during Phase 2 to focus on the concepts that were forwarded from Phase 1. The first of these open houses highlighted the "large scale projects", including alternate routes for new traffic and some alternate routes for local traffic. The second open house focused on the smaller scale projects, such as local connectors, capacity improvements and access management. Information on every concept discussed in this report was available for public viewing at the final open house. The data gathered at all of the open houses was essential in developing and refining the concepts.




- 57th Street Extention
- I-29/I-229 Interchange
- 49th Street Extention
- 49th Street Half Diamond Interchange
- 41st Street Split Diamond Interchange
- 43rd Street River Crossing
- Empire Mall Area
- Western Mall Area
- Grange to Norton Connection
- Access Management and Spot Capacity Improvements

Figure 1

Project Locations

*41st Street Corridor Analysis - Phase 2*

*City of Sioux Falls, South Dakota*

## 3.0 Alternate Routes for New Traffic/I 29 Alternates

The comprehensive plan for the City of Sioux Falls shows residential growth to the west, south, and east. The plan also shows industrial and commercial growth areas, primarily to the north and northeast. All of these growth areas will have an impact on 41st Street traffic.

Residential growth will result in various trips to employment centers and commercial areas. The growth in the southwest quadrant of the City will result in more traffic on 26th Street, 41st Street, and 49th Street, as well as increasing traffic on the north-south corridors crossing 41st Street. The residential growth on the east side will also result in increased traffic to and from the retail areas along 41st Street.

The retail and office growth plan for the area along 57th Street, east of I-29, will result in additional trips to and from this area. The trips will originate in other portions of Sioux Falls or the surrounding region. This will add significant additional traffic to the interchanges at I-29/41st Street and at I-229/Louise Avenue.

Since 41st Street is one of only a few east-west roadways that cross the entire City, any new development in the City will result in increased traffic along 41st Street. Therefore, roadways that absorb the new traffic or divert existing traffic are an important part of the transportation system.

It is also necessary to evaluate growth of traffic from all areas and its impact on the road system. As an example, commercial, industrial, and residential growth south of 41st Street and east of I-29 will generate significant traffic using the I-229/Louise Avenue interchange. Diverting traffic from 41st Street to this interchange would be in conflict with the area traffic growth.

Listed below are six of the "large scale project" concepts, which were forwarded from Phase 1. The large-scale projects consist of new alternate routes for existing and future traffic or modifications to the interchanges on I-29. The locations of all the concepts are shown in Figure 1. Aerial photography supplied by the City was used to sketch some of the concepts. Each concept was drawn with enough detail in order to identify the major impacts, both positive and negative, and to prepare a preliminary project cost estimate. Since the layouts are in the preliminary stage, it may be difficult to estimate the exact right–of–way and the amount of earthwork required. The preliminary cost estimates do not include right-of-way or building acquisition costs.

## 3.1 Concept 1–D Create Full Interchange at I–29/I–229

This concept would develop a full interchange at I-229 and I-29 with an extension of 69th Street to the west. The existing I-29/I-229 interchange does not provide access to the west, which is where new residential development is taking place. This concept would provide access from the southwest region of Sioux Falls and the surrounding rural areas in Lincoln, Minnehaha, and Turner Counties to I-229 and I-29, and thus, other parts of the City. It would also allow traffic now using 41st Street as a through route to the east side of Sioux Falls to instead follow the 69th Street extension and I-229. It would not only reduce future potential traffic volumes on 41st Street, but also portions of 57th Street, 49th Street and many north-south streets in the area and within other interchanges to I-29 and I-229.

All of the planned development for 2015 west of I-29 is north of 69th Street. Some of the areas within platting jurisdiction of the City are shown as wetlands, which will somewhat limit potential development. Thus, the extension of 69th Street will serve a significantly smaller growth area than the 57th Street extension (Section 3.4). The extension of 69th Street to the west, in conjunction with the extension of 57th Street to the west, would provide two alternate routes through the growing development area.

A conceptual layout had previously been developed by Transystems for SDDOT; therefore, a new sketch was not prepared at this time. Figure 2 shows the interchange concept that was previously developed. It is not known how much of the existing roadway or structures can be integrated into the new design. At this time, full reconstruction of the interchange is assumed for cost estimating purposes.

Since 69th Street will make up the west leg of the interchange, this extension is included in Concept 1–D. A cost estimate to pave 69th Street from the new interchange to Ellis Road, assuming a three–lane rural section, is also included.

<u>Impacts</u>

1. A full interchange would provide direct access from the area west of I–29 and south of 41st Street to I–229. This would reduce the number of vehicles accessing I–229 at both Louise Avenue and Western Avenue. It would also reduce the volumes accessing I–29 at 41st Street or diverting 2 miles south to Highway 106.

2. The extension of 69th Street would reduce volumes on 41st Street by providing an alternate route for commuters in the southwest portion of the City currently using 41st Street to travel downtown or to the north side. 69th Street would provide direct access to I-29 and I-229.

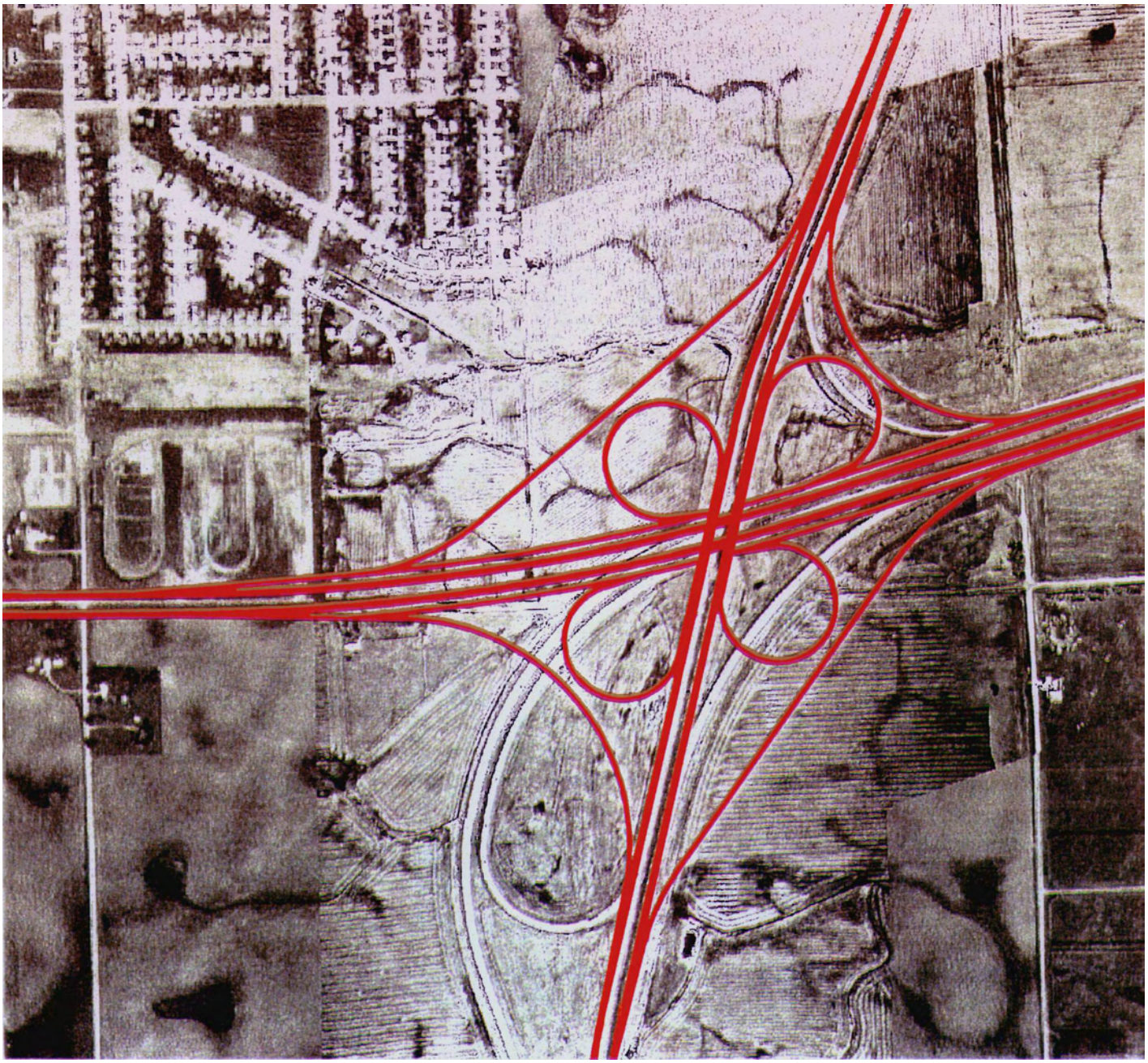
3. The new interchange would also reduce future volumes on 49th Street and 57th Street, and on north/south local and collector streets south of 41st Street. The volumes "removed" would be thru traffic destined for another interchange. "Thru" traffic typically drives more aggressively, and conflicts with locally generated traffic would be reduced.

4. The new interchange may require complete reconstruction of the existing structure. Right–of–way will be needed to accommodate the interchange. The amount of right–of–way and/or buildings needed is dependent on the final layout and the extent of development that has occurred in the northwest quadrant.

5. The interchange may affect an electrical substation and transmission line, depending on the final layout. The substation needs to be expanded in the near future, which may occur before the interchange would be constructed. East River Electric Power Coop and Southeastern Electric Coop must be coordinated with during preliminary and final design.

6. The extension of 69th Street west of the interchange to Ellis Road may require some right–of–way.

7. Preliminary cost estimate: $30 million.



## Concept 1D

### Create Full Interchange at I-29/I-229

- Provides improved access to the southwest region of Sioux Falls.
- Reduces traffic volumes at Louise Avenue and Western Avenue interchanges.
- Provides alternate route for commuters.
- May require complete reconstruction of interchange.
- Electrical substation and transmission lines may need to be relocated.
- Preliminary Cost Estimate: $30 Million

Figure 2

I-29/I-229 Interchange

## 3.2 Concept 4–A Split Diamond Interchange at I–29/41st Street

Concept 4–A is a modified interchange at 41st Street, which is actually split between 41st Street and Empire Place. Under this concept, southbound traffic on I–29 would continue to use the 41st Street exit. Once at the end of the ramp, traffic could turn left onto 41st Street or continue straight across the intersection on a new roadway. The new roadway would lead to an intersection with Empire Place on the west side of I–29. Traffic could then turn left onto Empire Place to access the Empire Mall or continue south on the entrance ramp of I–29. Northbound traffic would have a similar option when exiting. Traffic could either turn right at Empire Place to access the mall or continue straight through the intersection to get to 41st Street. Traffic coming from the north or south on I–29 would not have to use 41st Street to access the Empire Mall.

This concept will require a new bridge and new or modified roadways near the mall. This type of interchange is not a common design, but it is used effectively in certain circumstances. This concept will require further detailed study, as many of the impacts are difficult to determine at a conceptual level. A preliminary layout of this concept has been developed, but is not included in this report. Figure 3 shows a conceptual drawing of this interchange.

If the split diamond interchange is built in conjunction with the 43rd Street bridge (Concept 2-A) and modified access to the Western Mall (Concept 2-C), a continuous east-west connection between I-29 and the Western Mall would be created. This east-west connection would run parallel to 41st Street, and will remove many of the short trips from 41st Street, which will improve the flow of traffic.

<u>Impacts</u>

1. It is estimated that there will be an 8% to 10% reduction in traffic volumes on 41st Street between the I 29 ramps. It is estimated that there will be a 15% reduction in traffic volumes between the I 29 east ramp and the mall entrance.

2. As important as traffic reduction is (8 to 15%), the number of turns on and off of 41st Street is reduced even more. As an example, traffic leaving the Empire Mall to travel south on I-29 must turn left onto 41st Street and then turn left onto the on ramp. Both turns impact thru traffic.

3. This concept would reduce turns, conflicts, weaves, and traffic volumes on 41st Street, mostly between I–29 and the mall entrance. This would not only improve the operation of individual intersections, but it would also improve the flow of traffic along 41st Street.

4. Right–of–way will be needed for the extension of the ramps and the bridge across I–29.

5. A traffic signal will be needed at the intersection of the northbound exit ramp and Empire Place.

6. The intersection of the exit ramp and Empire Place is very close to the new intersection on the mall ring road. The spacing is not ideal, but can work if designed properly.

7. Because of the grades in the area, retaining walls and other structures will be needed.

8. It will be necessary to have Empire Drive become a public street.

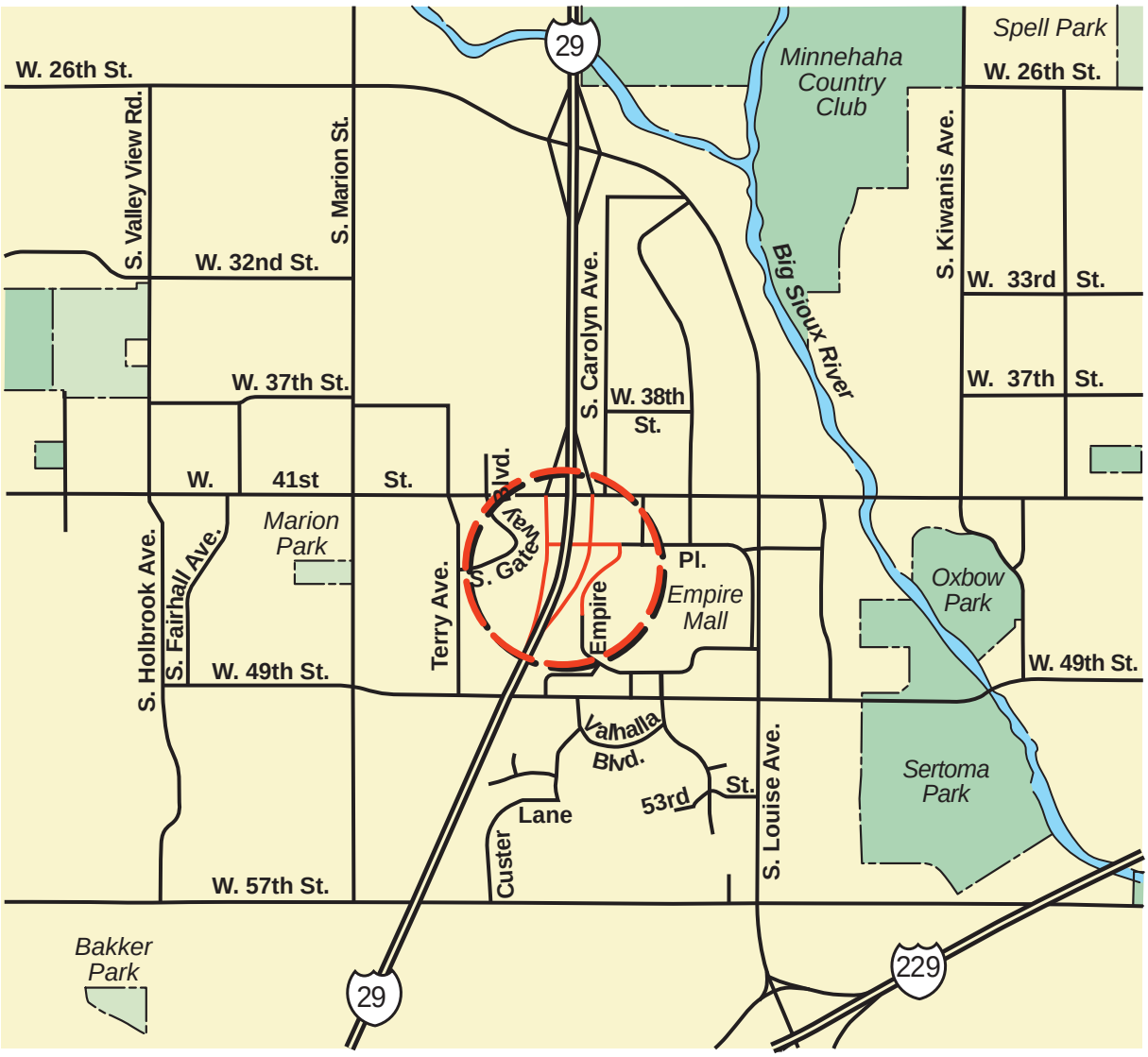
9. The parking lot just east of the existing exit ramp would need to be removed (about 100 spaces) along with approximately 75 parking spaces in the northwest corner of the mall parking lot. With the use of retaining walls, the impact to the parking lot can be minimized. There may be an opportunity to create new parking west and south of the mall ring road.

10. The hotel structure should not be impacted and access will be maintained, although parking will be impacted. If access to the hotel is changed, parking can be retained.

11. The buildings on the west side of I–29 should not be impacted. With the use of retaining walls, the impact on the parking lots will be minimal.

12. This concept could introduce additional traffic using the interchange to double back through the Empire Mall area in order to access the development along 49$^{th}$ Street. This would need to be addressed in the final design of the intersections and roadways.

13. Preliminary cost estimate: $7.7 million.




## Concept 4A - Revise Interchange at 41st Street

### Split Interchange at 41st Street - Add Empire Place

- Reduces traffic on 41st Street between I-29 and the Empire Mall by approximately 10-15%.
- Reduces turns, conflicts, and weaves on 41st Street between I-29 and the Empire Mall.
- Requires substantial changes in West Empire Mall area, including circulation, parking and structures.
- Parking in the northwest corner of the mall property would be removed. It may be possible to relocate parking elsewhere near mall.
- The bridge across I-29 south of 41st Street will create elevation differences requiring retaining walls and/or other structures.
- Requires changes to driveways along Empire Place.
- Requires right-of-way west of I-29, but buildings should not be impacted.
- This concept would be one part of an alternate route system which includes concepts 2A, 2C and 2D.
- Preliminary Cost Estimate : $7.7 Million

Figure 3

*41st Street Corridor Analysis - Phase 2*

Concept 4A

*City of Sioux Falls, South Dakota*

SEH

## 3.3 Concept 3–D Half Diamond Interchange to South at I–29/49th Street

Concept 3–D is to construct a half diamond interchange on I–29 at 49th Street. This interchange would provide access to and from the south only. A preliminary layout of this concept has been developed, which is not included in this report. Figure 4 shows a conceptual drawing of this interchange.

A combination of a half diamond interchange and a realigned mall ring road would provide convenient access to and from the mall and south I-29.

Impacts

1. The half diamond interchange would eliminate some traffic on 41st Street. The main reduction in traffic would be the westbound to southbound left turn at the west I–29 ramp intersection, which would improve the capacity of the intersection. This concept would not reduce the heavy volumes on the southbound I–29 off–ramp to 41st Street.

2. The traffic along 49th Street may increase, especially if the 49th Street extension is constructed. This would provide good east-west alternate access between I-29 and Minnesota Avenue for people coming from the south.

3. The existing bridge has sufficient width to accommodate a left turn lane and should not have to be reconstructed in order to construct the half diamond.

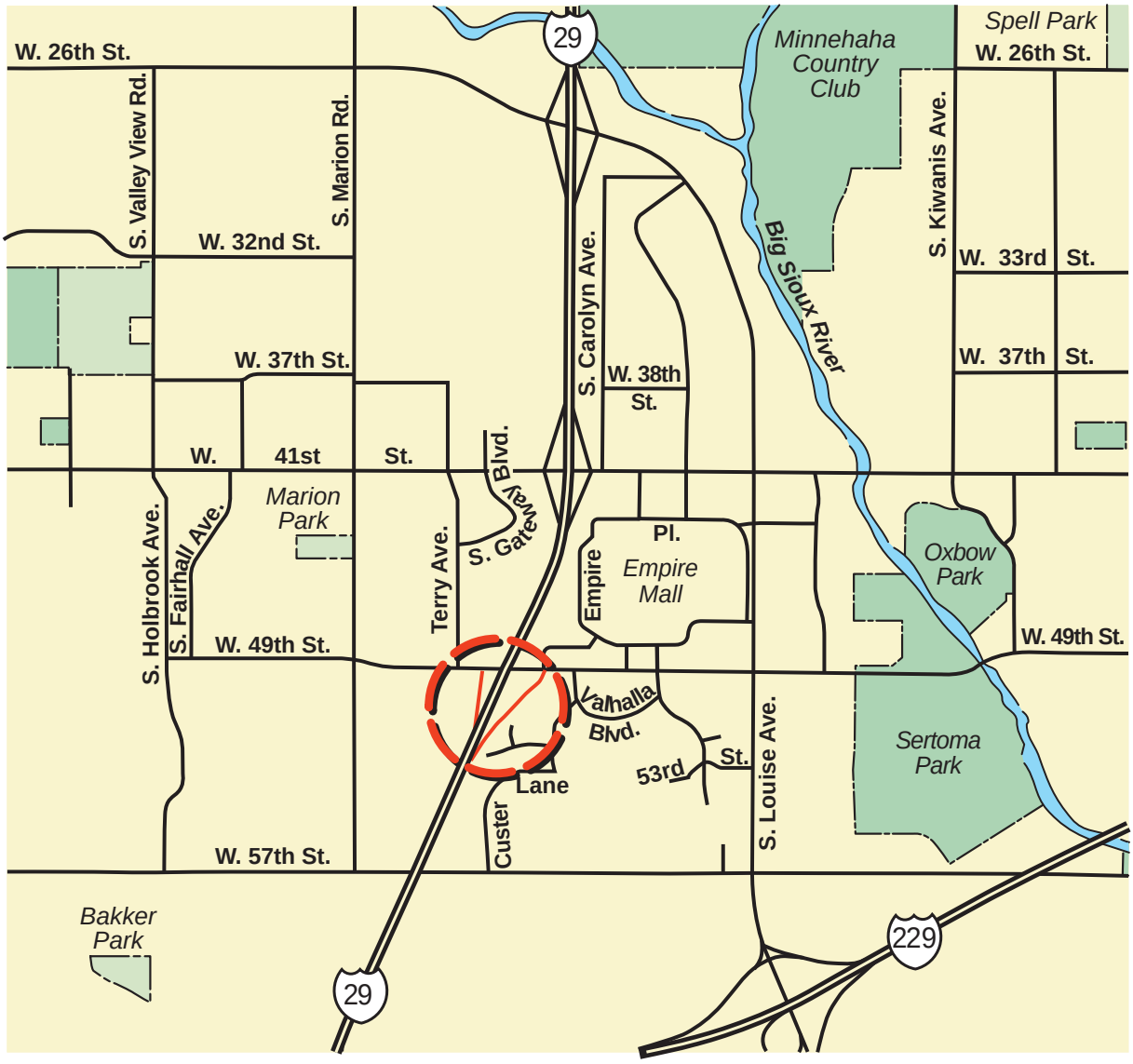
4. The half diamond interchange would require additional right–of–way. In order to construct the entrance ramp, several homes would need to be removed. The exit ramp would require the reconstruction of the retention pond located in the southeast corner of the interchange.

5. There would be two merges onto southbound I–29 within a short distance, which may create some weaving concerns. Northbound traffic would face two exits, which may cause a slight reduction in the right lane speed, but should not create a significant problem. Further analysis would be needed to evaluate the operation of the ramps and the mainline freeway.

6. The spacing of the intersections along 49th Street does not seem to pose any operational problems.

7. Half diamond interchanges can create re-entry problems for motorists continuing in the same direction. This has led to policies against building half diamond interchanges. Trail blazer signing can offset the concern at this location.

8. Preliminary cost estimate: $4.2 million.




## Concept 3D - Interchange at 49th Street

### Half Diamond Interchange to South at 49th Street

- Would provide alternate access to the Empire Mall and businesses along 49th Street for motorists from the south.
- Reduces some traffic on 41st Street, but has no affect on southbound heavy left turn volume at the I-29 west ramp.
- Eliminates some turning conflicts and may improve the operation of certain intersections.
- The existing 49th Street bridge would not need to be reconstructed.
- Minimizes right-of-way needs, although several homes would need to be aquired.
- Minimizes "on freeway" concerns, compared to other concepts which were developed.
- Would provide access to/from the south only.
- Preliminary Cost Estimate : $4.2 Million

Figure 4

*41st Street Corridor Analysis - Phase 2*

Concept 3D

*City of Sioux Falls, South Dakota*

SEH

## 3.4 Concept 1–A Extend 57th Street

This concept includes extending 57th Street to County Road 17. Figure 5 shows the drawing of this concept. An overpass at I-29 for 57th Street is currently in the 2001 Interstate 3R Program of the SDDOT. Construction of a three-lane urban section between Marion Road and Sertoma Avenue is currently in the year 2000 City program. Extending the roadway out to County Road 17 will provide for additional access for the development west of Sioux Falls.

The extension of 57th Street, from Louise Avenue west over I-29 and potentially west to County Road 17, would provide an additional major east-west route. More importantly, it would provide an east-west route crossing I-29 and serve the growing southwest corner of Sioux Falls and other motorists in Lincoln, Minnehaha, and Turner Counties. It would relieve traffic on both 41st Street and 49th Street by providing an alternate route across the south Sioux Falls area, and more importantly, alternate access to the I-229 interchanges at both Louise Avenue and Western Avenue. The cost estimate includes creating a three-lane urban section from Tea/Ellis Road to County Road 17 (approximately 3 miles).

As 57th Street is extended and as development continues to take place along it, it is necessary to manage the access so that it does not develop the same problems that 41st Street has related to numerous access points. A separate access management plan for 57th Street should be developed.

<u>Impacts</u>

1. The anticipated 57th Street overpass and extension past Sertoma Avenue (possibly to Tea/Ellis Road) would provide an additional major east–west route to serve the growing southwest corner of Sioux Falls and the rural areas of Lincoln, Minnehaha, and Turner Counties.

2. The overpass and extension will provide alternative access to I-229 via the Louise Avenue or Western Avenue interchanges.

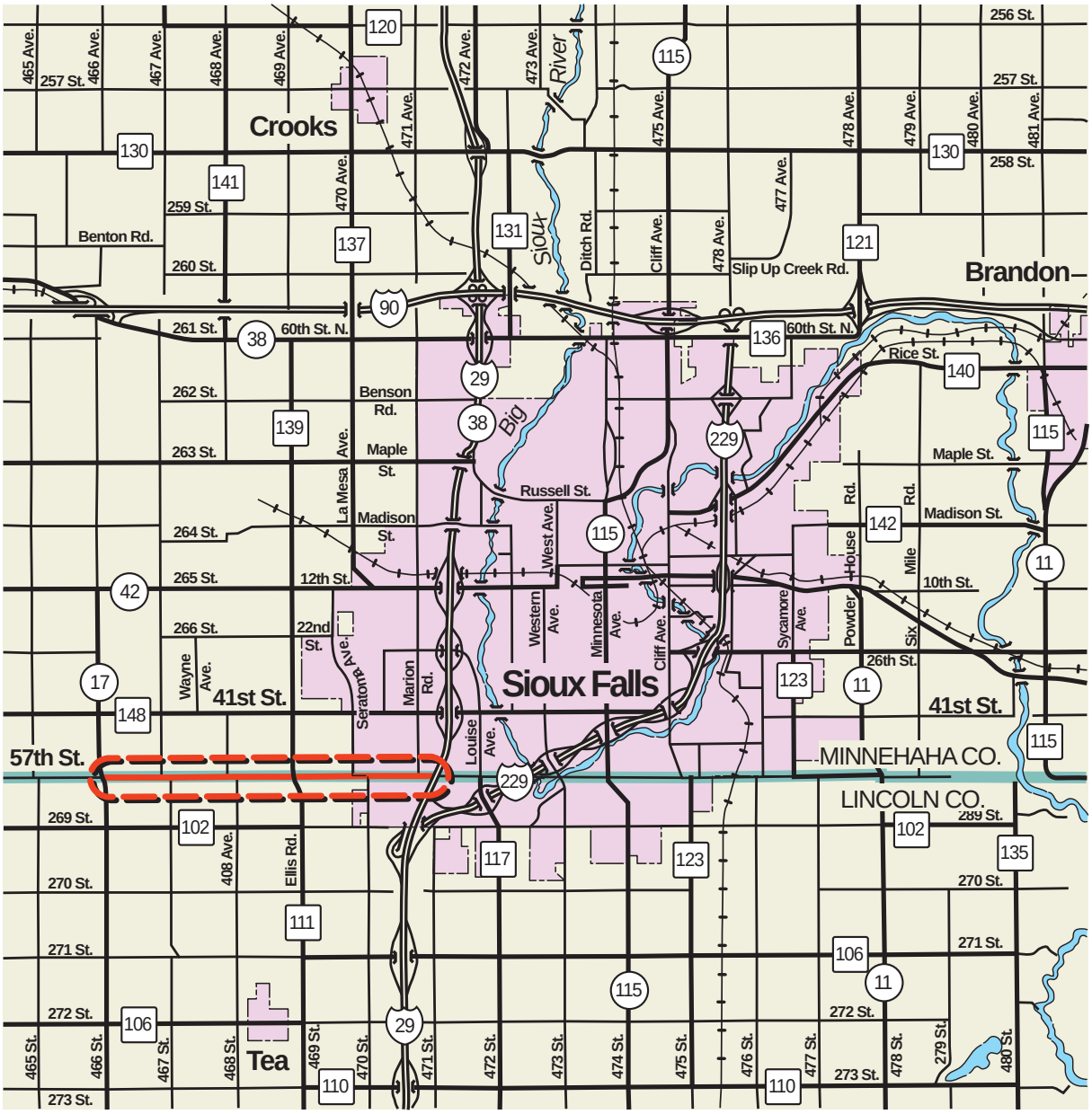
3. It would allow commuters residing in the southwest corner to reach the employment concentrated in the northeast corner of Sioux Falls or downtown area without using 41st Street

4. The overpass and extension will relieve traffic on both 41st Street and 49th Street by providing an alternate route across the south Sioux Falls area.

5. This concept will require very little right–of–way to complete.

6. This concept may add additional traffic to Minnesota Avenue and Cliff Avenue south of 41st Street, which may create possible capacity problems.

7. Preliminary cost estimate: $7.6 million.




## Concept 1A

### Extend 57th Street West to Highway 17

- Serves growing southwest corner of Sioux Falls and rural Lincoln and Minehaha counties.
- Provides alternate route across the city from Highway 17 to Sycamore Avenue.
- Provides alternate access to I-229 via Louise Avenue or Western Avenue interchanges.
- Potential to extend further west.
- Locally generated traffic from area west of Louise Avenue could also use this street.
- Part of current transportation plan.
- Will be best route for development southwest of 57th/Louise Avenue (59th and Louise poor spot for an intersection).
- Might put more traffic on Minnesota Avenue and Cliff Avenue south of 41st Street creating possible capacity problems.
- Will reduce traffic volumes on 49th Street and 41st Street.
- Very little right-of-way required.
- Preliminary Cost Estimate : $7.6 Million

Figure 5

*41st Street Corridor Analysis - Phase 2*

Concept 1A

*City of Sioux Falls, South Dakota*

SEH

## 3.5 Concept 1–E/1–F Extend 49th Street from Western Avenue to Minnesota Avenue

Concept 1–E is the extension of 49th Street from Western Avenue to Grange Avenue and Concept 1–F is the extension of 49th Street from Grange Avenue to Minnesota Avenue. These two segments have been combined into one concept (Concept 1–E/F) for simplicity.

The extension of 49th Street between Western Avenue and Minnesota Avenue would provide an alternate route for traffic now using 41st Street or 51st Street/Grange Drive. It would provide alternate access between Minnesota Avenue and shopping areas to the west. It would provide an alternate route for commuters. It would also provide alternate access to additional commercial and industrial properties south of 41st Street and the developing areas along the abandoned Burlington Northern Railroad tracks. This would reduce future traffic volume growth on 41st Street. With connections to other streets, such as Duluth Avenue or Norton Avenue, it could spread north south traffic to other streets in the commercial and industrial areas.

Three alignment options for Concept 1–E/F have been developed. They can be seen in Figure 6. A four–lane urban section, with sidewalks and/or a bike path, has been assumed. Listed below are the detailed descriptions of each of the options. Further study is needed to determine the optimum alignment. The final alignment may be one of the three described here or a combination of them. The final alignment should also reflect on existing and potential platting of properties. An access management plan should be developed, especially to control access near intersections and curves.

### 3.5.1 Option 1

Under Option 1, 49th Street extends straight east of Western and West Avenues to the railroad right–of–way. It then follows the old railroad alignment east to Minnesota Avenue. The section of Grange Drive between Duluth Avenue and Minnesota Avenue would be rerouted to intersect with 49th Street at Duluth Avenue.

<u>Impacts</u>

1. The 49th Street extension would provide an alternate route for traffic now using 41st Street, which would result in a reduction in volumes on 41st Street between Western Avenue and Minnesota Avenue. It would provide alternate access between Minnesota Avenue and the shopping areas to the west, as well as provide an alternate route for commuters.

2. Soo Sports would need to be acquired, along with the buildings just west of West Avenue. The roadway should be able to be constructed without taking any additional buildings.

3. The intersection of 49th Street and Grange Avenue is not in an ideal location relative to the curve and intersection just south of it. This intersection and the surrounding roads may be reconfigured to improve the geometrics.

4. The intersection of 49th Street and Minnesota Avenue is also not in an ideal location relative to the I–229 ramps. The new intersection should be located north of where the intersection of Grange Drive and Minnesota Avenue is currently located. It may also be desirable to move the I–229 ramp further south.

5. This alignment provides improved access to the land between 41st Street and I–229, especially the land along the railroad right-of-way.

6. The land between Grange Avenue and Minnesota Avenue would have to be obtained from the railroad.

7. Preliminary cost estimate: $4.5 million.

### 3.5.2 Option 2

Option 2 follows a similar alignment as Option 1 between Western Avenue and Grange Avenue. East of Grange Avenue, the roadway would curve north and east to line up with 43rd Street at Norton Avenue. The section of Grange Drive, between Duluth Avenue and Minnesota Avenue, could either remain as it is or be rerouted to line up with Duluth Avenue. A new connection between Duluth Avenue and Minnesota Avenue following the railroad tracks would be constructed, in conjunction with the reroute. It would be preferable to make the intersection of Grange Drive and Minnesota Avenue a right turn only access.

Some of the Option 2 impacts are the same as those of Option 1.

<u>Impacts</u>

1. The 49th Street extension would provide an alternate route for traffic now using 41st Street, which would result in a reduction in volumes on 41st Street between Western Avenue and Minnesota Avenue. It would provide alternate access between Minnesota Avenue and the shopping areas to the west, as well as provide an alternate route for commuters.

2. Soo Sports would need to be acquired, along with the buildings just west of West Avenue.

3. There is also a building just west of Norton Avenue, which would need to be acquired.

4. The curved road between Grange Avenue and Norton Avenue will require right–of–way outside of the railroad right–of–way.

5. The roadway alignment between Grange Avenue and Norton Avenue would go through a proposed development, whose plat has been approved by the City.

6. This alignment does not provide convenient access to the undeveloped land along the railroad right- of-way.

7. The intersection of 49th Street and Grange Avenue is not in an ideal location relative to the curve and intersection just south of it. This intersection and the surrounding roads should be reconfigured to improve the geometrics.

8. The intersection of 49th Street/43rd Street and Minnesota Avenue is located approximately midway between the I–229 ramps and 41st Street, which is preferable from an operations and safety point of view.

9. If Grange Drive is rerouted to line up with Duluth Avenue, the drivers on Grange Drive have more options on how to access Minnesota Avenue or 41st Street.

10. Preliminary cost estimate: $4.5 million.

### 3.5.3 Option 3

Option 3 follows the same alignment as Options 1 and 2 between Western and West Avenues. East of West Avenue, 49th Street would curve to and line up with the existing Grange Drive. Between Grange Avenue and Minnesota Avenue, 49th Street would follow the alignment of Grange Drive.

<u>Impacts</u>

1. The 49th Street extension would provide an alternate route for traffic now using 41st Street, which would result in a reduction in volumes on 41st Street between Western Avenue and Minnesota Avenue. It would provide alternate access between Minnesota Avenue and shopping areas to the west, as well as provide an alternate route for commuters.

2. Soo Sports would need to be acquired, along with the buildings just west of West Avenue.

3. The intersection of 49th Street/Grange Avenue/Grange Drive could be reconfigured to a four–legged intersection to improve the geometrics.

4. A connection between Grange Drive and Duluth Avenue would provide alternate access to Minnesota Avenue or 41st Street.

5. The north–south links are limited between 41st Street and 49th Street.

6. This alignment does not provide convenient access to the undeveloped land along the railroad right- of-way. The road does not directly serve the redeveloped area north of the railroad tracks between Grange Avenue and Norton Avenue.

7. Since this alignment follows the existing South Grange Drive alignment, the roadway between Grange Avenue and Minnesota Avenue may not need to be reconstructed.

8. Preliminary cost estimate: $3.3 million.


## Concept 1E/1F

### 49th Street Extension - Western Avenue to Minesota Avenue

- Option 1 follows the abandoned railroad between West Avenue and Minnesota Avenue.
- Option 2 follows the abandoned railroad between West Avenue and Grange Avenue then curves up to meet 43rd Street.
- Option 3 follows the existing Grange Drive alignment.
- Each option provides an alternate route for traffic on 41st Street, both shopping and commuter.
- Each option provides improved access to the land between 41st Street and I-29, of varing degree.
- New intersection at Minnesota Avenue would be very close to the I-229 ramp intersection.
- Right-of-way from several parties (depending on the final alignment) would be needed.
- Preliminary Cost Estimate:

  Option 1: $4.5 Million
  Option 2: $4.5 Million
  Option 3: $3.3 Million

Figure 6

Concept 1E/1F

## 3.6 Miscellaneous

### 3.6.1 Mall Ring Road

An additional concept is to reroute the mall ring road in the southwest corner of the mall property. It can be rerouted such that it lines up across from Solberg Avenue.

A combination of a half diamond interchange at 49th Street and a realigned mall ring road would provide convenient access to and from the mall and south I-29. A combination of a split diamond interchange at 41st Street and a realigned mall ring road would provide more convenient access between I-29 and 49th Street than currently exists.

Impacts

1. This would provide more direct access from the west side of the mall to the City street system.
2. This would provide good north  south access.
3. It may also be an opportunity to evaluate the mall parking needs and possibly add a section of parking in this location.
4. This concept will require right-of-way on the Empire Mall for a city street. Access and setbacks need to be considered.
5. Preliminary cost estimate:  $720,000.

## 4.0 Alternate Routes for Local Traffic

Local connections are defined as optional routes to 41st Street for travelers who are using 41st Street for short trips. Short trips between businesses along the corridor typically create the "friction" that is felt by motorists, caused by vehicles pulling into traffic, weaving, and then slowing to turn. Removing some of the short trips from 41st Street will help to smooth the flow of traffic along the corridor and decrease the potential for accidents. Listed below are seven of the local traffic concepts, which were forwarded from Phase 1. The locations of the concepts are shown in Figure 1.

Each concept has been drawn with enough detail to identify the major impacts, both positive and negative, and develop a preliminary cost estimate. Since the layouts are in the preliminary stage, it may be difficult to estimate the exact right of way and the amount of cut and fill needed. The preliminary cost estimates do not include right-of-way or building acquisition costs.

### 4.1 Concept 2–A Connect 43rd Street (South Golden Creek Parkway) with Park Place Circle

This concept includes constructing a bridge across the Big Sioux River to connect 43rd Street west of the river with Park Place Circle east of the river. Figure 7 shows this concept.

Two alignment options have been developed for this river crossing. The first option crosses the river at roughly a 90 degree angle. It would require the removal of the Park Place Plaza building on the east side of the river. This alignment would have minimal impact on the park land south of Park Place Circle. The second alignment option crosses the river at a slight skewed angle, which protects the Park Place Plaza building, but would remove parking. Option 2 may impact more of the park land south of Park Place Circle.

<u>Impacts</u>

1. This connection would provide an additional river crossing between Kiwanis Avenue and Louise Avenue, which would create an alternate route to the Empire Mall and Empire East from east of the river. This alternative, along with other improvements near the Western Mall, would create a connection between the Empire Mall and Western Mall without using 41st Street. This could also be an extension of the split diamond 41st Street/Empire Drive concept.

2. It would remove some of the short trips from 41st Street and reduce the conflicts on 41st Street at several driveways. It could reduce left turns at both the 41st Street/Louise Avenue and 41st Street/Kiwanis Avenue intersections.

3. This connection would give back access to several businesses, which now only have access onto 41st Street, where making a left turn is now difficult.

4. The concept will impact some buildings and/or parking lots, depending on the alignment option. Option 1 would require the removal of the Park Place Plaza building, but it will have minimal impacts on the parking lot and the park land. Option 2 will not require the removal of the Park Place Plaza building, but it will remove parking and will impact the park land.

5. There will be an increase in the turning movement volumes at 43rd Street and Louise Avenue, which may warrant a traffic signal. The location of this intersection is not ideal for a signal because of the close spacing to the intersection of 41st Street and Louise Avenue.

6. There will be an increase in the volumes at the intersection of Kiwanis Avenue and 43rd Street, which may warrant a change in traffic control or geometric modifications. The 43rd Street and Kiwanis Avenue intersection is located on a curve and could experience some confusion for northbound left turns.

7. Preliminary cost estimate: Option 1 $3.9 million.
   Option 2 $4.2 million.


## Concept 2A

### Connect South Golden Creek Parkway (43rd Street) with Park Circle

- Would provide additional connection between Kiwanis Avenue and Louise Avenue.
- Would provide additional route to Empire Mall from east of the Big Sioux River.
- Could divert traffic from 41st Street.
- Would remove short trips from 41st Street.
- Would reduce conflicts at several driveways on 41st Street.
- Would provide back access to several businesses.
- Location of intersection of 43rd Street and Louise Avenue is not ideal.
- There may be an increase in turning movement volumes at 43rd Street and Louise Avenue, which may warrent a traffic signal.
- Reverse curve needed east of river.
- May need to purchase building and/or parking lot, depending on final alignment.
- Preliminary Cost Estimate : $3.9-4.2 Million (depending on alignment).

Figure 7

*41st Street Corridor Analysis - Phase 2*

Concept 2A

*City of Sioux Falls, South Dakota*

SEH

## 4.2 Concept 2–D Develop Empire Place/43rd Street/Louise Avenue as a Major Intersection

This concept includes reconstructing the west leg of the intersection at Louise Avenue and 43rd Street. The west leg currently curves to connect Louise Avenue with the mall ring road. This leg could be reconstructed as a straight east/west road, which would also require reconfiguration of the mall ring road. This concept could work by itself or in conjunction with the extension of 43rd Street across the river (Concept 2 rd
Street would provide good alternate east-west access between the Empire Mall and locations east of the river. Figure 8 shows several concepts near the Empire Mall

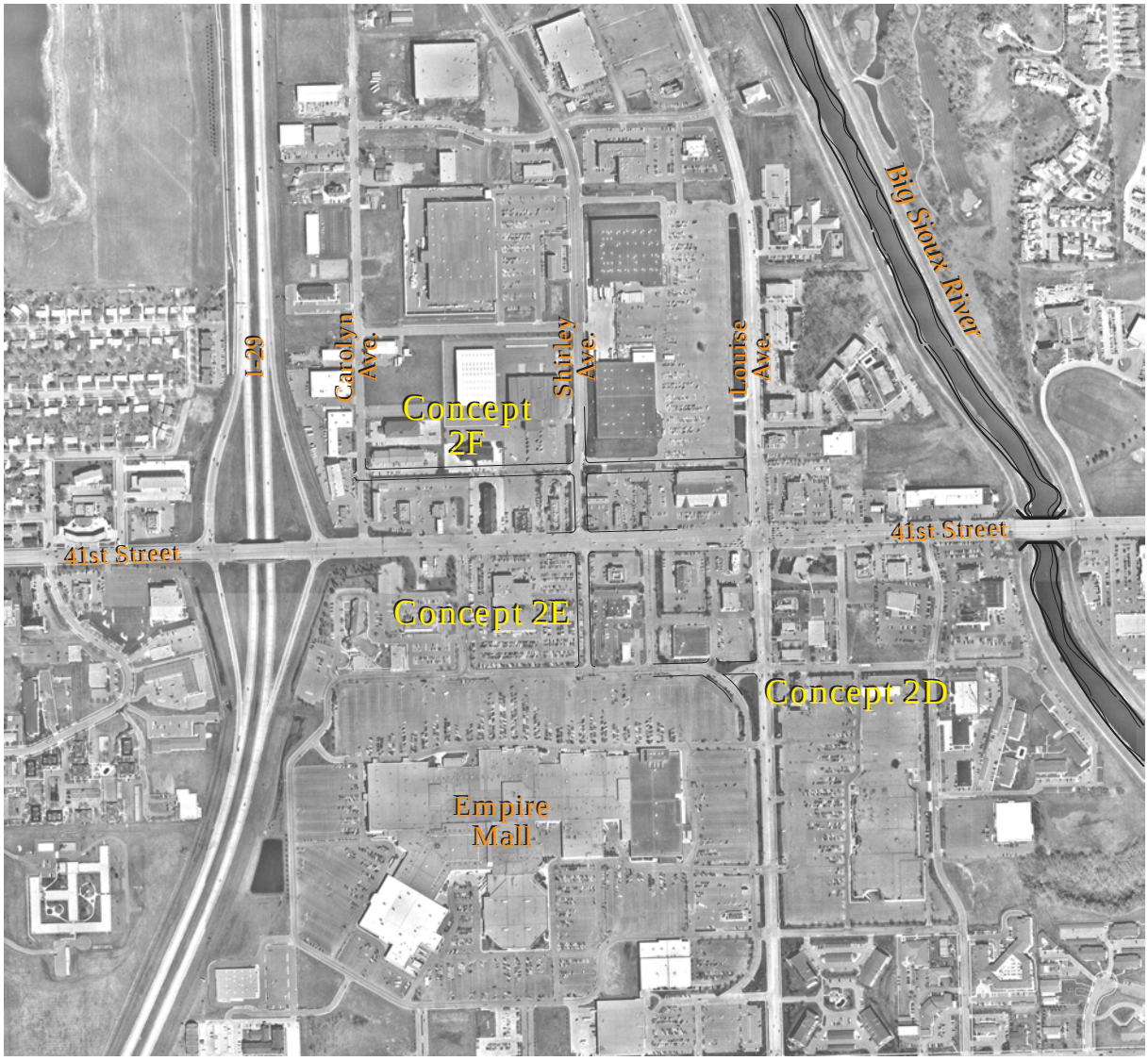
Impacts

1. This concept may improve the operation of the intersection by allowing more eastbound "stacking" space and better sight distance.

2. It would establish better east–west access. It would be one part of the system to provide alternate access between I-29 and the Western Mall area.

3. The location of a traffic signal at this intersection on Louise Avenue is not ideal because of the close spacing between it and the intersection of 41st Street and Louise Avenue.

4. Preliminary cost estimate: $550,000.




## Concept 2D

### Develop Empire Place/43rd Street as Major Street

- Would provide good alternate east/west access.
- Would allow more stacking and better sight distances.
- Location of intersection with Louise Avenue is not ideal - may require signalization in future.
- Would become part of the system to provide alternate access between the Empire and Western Malls.
- Preliminary Cost Estimate : $550,000

## Concept 2E

### Make Shirley Avenue the Main Entrance to Empire Mall

- Main entrance would be across from a city street.
- Would provide good alternate north/south access.
- Combining turning movements at one intersection would be more efficient and less confusing.
- May remove some turning traffic from 41st Street and Louise Avenue.
- May need to obtain right-of-way on north or south side of 41st Street.
- Preliminary Cost Estimate : $1.1 Million

## Concept 2F

### Provide Back Access North of 41st Street

- Would provide back access to businesses between I-29 and Louise Avenue.
- Would remove short trips from 41st Street.
- Would provide access to Shirley Avenue, making left turn onto 41st Street less difficult.
- Location of intersection with Louise Avenue is not ideal.
- May remove some parking and require r.o.w.
- Preliminary Cost Estimate : $1.5 Million

Figure 8

Empire Mall Area

## 4.3 Concept 2 E Locate Main Entrance to Empire Mall Across from Shirley Avenue

Concepts 2 E and 2 F relate to access to the businesses north and south of 41st Street between I 29 and Louise Avenue. Along this section of 41st Street, there are five signalized intersections within 3,000 feet and numerous access drives to individual businesses.

The signalized intersections at West Empire Place (west) and West Empire Place (east)/Shirley Avenue are 600 feet apart. The signal at West Empire Place (west) mainly provides access to the south, while the signal at West Empire Place (east) mainly provides access to the north. One of these signals could be removed and the turning movements combined at one signal. Since an intersection at Shirley Avenue would allow for access both north and south of 41st Street, this would be the most advantageous location, although it would be less than 1,000 feet from the signal at Louise Avenue. The traffic signal system between I-29 and Louise Avenue should be studied further to determine the optimum solution. Concept 2-E works best if done in conjunction with the split diamond interchange (Concept 4-A). Figure 8 shows several concepts near the Empire Mall

Impacts

1. Combining the turning movements at one signal will be more efficient, there would be fewer stops, and the flow of traffic would improve through this section of 41st Street.

2. Removing a signal may also reduce the probability of rear end accidents, thus increasing safety.

3. The access to most businesses would not be significantly impacted, since the turning movements would be moved and not removed.

4. A signal at Shirley Avenue would locate the Empire Mall main access across from a City street and would provide for good alternate north south access to Louise Avenue.

5. North south access at Shirley Avenue would remove some turning movement volumes from the intersection of 41st Street and Louise Avenue, since drivers would be able to travel between the Empire Mall and the retail area north of 41st Street without having to drive on 41st Street.

6. Since the intersections of Shirley Avenue and Louise Avenue are less than 1,000 feet apart, there may be a problem with stacking vehicles in the left turn lanes. This problem can be minimized by modifying the signal timing and/or coordination.

7. If this is done in conjunction with the split diamond interchange at 41st Street (Concept 4 A), the flow of traffic between I 29 and Louise Avenue improves even more.

8. Shirley Avenue north of 41st Street may need to be widened and/or realigned across from West Empire Place (east).

9. West Empire Place (east), south of 41st Street, may need to be widened and/or realigned in order to accommodate the redistributed volumes.

10. Right of way may need to be obtained north and/or south of 41st Street.

11. Traffic from businesses west of West Empire Place (west) would need to use the east/west section of Empire Place to reach the West Empire Place (east) signal.

12. Traffic on the north side of 41st Street that currently uses the west Empire Place (west) signal would not have easy access to the Shirley Avenue signal.

13. Preliminary cost estimate: $1.1 million.

## 4.4 Concept 2 F Provide Back Access Between Carolyn Avenue and Louise Avenue and Cul-de-sac Carolyn Avenue

This concept includes creating back access to the businesses north of 41st Street between Carolyn Avenue and Louise Avenue. Currently, there is back access to some of the businesses, but there is not a continuous road between Shirley Avenue and Louise Avenue. Some businesses are only accessible from 41st Street and left turns in or out from 41st Street can be very difficult during peak periods.

Another part of this concept would be to cul-de-sac Carolyn Avenue. The current intersection of Carolyn Avenue and 41st Street is located only 200 feet from the I 29 entrance ramp intersection. It is nearly impossible to turn left onto 41st Street during peak periods, and there are weaving problems when turning right onto 41st Street. The major goals of the project are to reduce accidents, improve the flow, and increase the capacity, all while allowing proper access to the businesses.

The number of accidents at this location have actually decreased since the I-29/26th Street interchange was constructed. If Carolyn Avenue were cut off from 41st Street, the numerous businesses along Carolyn Avenue would lose direct access. Indirect access would still be available, but it would be very inconvenient. Since many of these businesses depend on convenient access, the loss of access at Carolyn Avenue could be detrimental.

Existing signing directs motorists to the traffic signal at Shirley Avenue, although the signs should be larger. If the intersection at 41st Street and Shirley Avenue were reconstructed to provide better north-south access, more people may be inclined to use it rather than the individual driveways or Carolyn Avenue. Businesses could provide maps or instructions to customers on how to reach Shirley Avenue and 41st Street. It is recommended to not cul-de-sac Carolyn Avenue. This recommendation is based on the existing land uses along Carolyn Avenue. If the land uses are changed or a major redevelopment takes place, this closure could be reconsidered.

Figure 8 shows several concepts near the Empire Mall.

<u>Impacts</u>

1. This back access connection would remove some of the short trips from 41st Street and reduce the conflicts at several driveways on 41st Street.

2. The connection may remove some turning movement volumes from the intersection of 41st Street and Louise Avenue.

3. Right
   order to construct the road.

4. This new back access road would create a new intersection on Louise Avenue, which is only 400 feet north of the intersection of 41st Street and Louise Avenue. This is not a good location for an intersection, but may be possible as a right turn only access.

5. Removing access by creating a cul-de-sac on Carolyn Avenue would improve safety, but it would be detrimental to businesses along Carolyn Avenue.

6. An east west roadway could be provided further to the north, which may not require as much right of way, but it would not provide back access to the businesses that front 41st Street.

7. The existing 39th Street between Carolyn Avenue and Shirley Avenue can be used for reoriented Carolyn Avenue businesses. An extension from Shirley Avenue to Louise Avenue is physically possible.

8. Preliminary cost estimate: $1.5 million.

As an alternative to a cul-de-sac of Carolyn Avenue or continuing the existing situation, a concept of reorienting the I-29 ramps and Carolyn Avenue was suggested. The geometrics would be similar to those at I-229 and Cliff Avenue.

Impacts

1. Carolyn Avenue traffic would benefit from access to/from 41st Street with a traffic signal.

2. Right-of-way would be required. Since the northbound I-29 on ramp could only be moved slightly west, the northbound I-29 off ramp would be moved east to align with Carolyn Avenue resulting in removal of the hotel.

3. The eastbound to northbound left turn at the I-29 on ramp would not be controlled by a traffic signal. There would be conflicts with westbound thru, westbound right turn, and southbound right turn vehicles.

4. The left turn lane to Carolyn Avenue would be very short.

5. The concept is in conflict with Concept 4-A, the split diamond interchange.

Based on the impacts, especially the conflict with Concept 4-A, the concept was not carried forward.

Another suggested alternate to the cul-de-sac of Carolyn Avenue was to expand the I-29 east ramp intersection signal to include Carolyn Avenue. This concept would stop westbound traffic at Carolyn Avenue and eastbound traffic at the ramp. The idea was to provide traffic signal access for Carolyn Avenue.

Drawbacks are primarily in the traffic signal phasing and driver understanding. Dual clearance timing would be required for westbound and eastbound movements at their common green cycle termination, and for both southbound and northbound phases. Eastbound left turns to Carolyn Avenue would either be excluded from a separate phase or require additional clearance. The phases for I-29 and Carolyn Avenue would be separate.

The total amount of time for the extra phases and dual clearances would significantly reduce the efficiency of the intersection.

## 4.5 Concept 2 C Roadways Near Western Mall

Concept 2 C relates to the roadways near the Western Mall. Several options have been developed that could improve existing access or provide new access to the Western Mall area. The new and/or improved access would give drivers an alternate to 41st Street.

The specific concepts are described below, along with the respective impacts. Most of the individual concepts would work well by themselves, but there would have be added benefit if more than one concept were implemented. Figure 9 shows the roadways relating to Concept 2-C.

### 4.5.1 Realign Kiwanis Avenue South of 41st Street

This concept includes realigning Kiwanis Avenue south of 41st Street to intersect with Sheldon Avenue at 90 degrees at approximately 43rd Street. This realignment could be in conjunction with creating a main access point to the Western Mall off of Sheldon Avenue. It could also be done in combination with the 43rd Street Bridge concept over the river.

Impacts

1. This connection, in addition to the 43rd Street bridge, would allow for access between Empire Mall and the Western Mall without using 41st Street.
2. It may reassign some of the turning movements at the intersection of Kiwanis Avenue and 41st Street, and remove some weaving on 41st Street. Specifically, drivers on southbound Kiwanis Avenue that are destined to the Western Mall could go straight through the intersection instead of turning left onto 41st Street and then right into the mall.
3. This connection would remove some of the medium length trips from 41st Street and reduce the conflicts at several driveways on 41st Street.
4. The east-west flow would be improved, but the north-south flow along Kiwanis Avenue /Sheldon Lane would be hindered.
5. Kiwanis Avenue has continuity from 49th Street to North of 12th Street. This concept eliminates the continuity and could reorient some traffic to Western Avenue.
6. The east/west roadway would be terminated at the Western Mall and would not allow continuity south of 41st Street.
7. Right of way would be needed in order to construct this.
8. It may be difficult to develop the geometrics for this intersection.

9. Because of impacts to Kiwanis Avenue and the potential of Concept 4.5.2, this concept is no longer recommended.

### 4.5.2 Develop Back Access to Western Mall

This concept would create a road south of the Western Mall, but north of 46th Street, which would connect Western Avenue to Kiwanis Avenue. Creating back access to the Western Mall in conjunction to constructing a 43rd Street river crossing would provide a continuous route from the area west of the river to the Western Mall.

Impacts

1. This back access connection would remove some of the short to medium length trips from 41st Street and reduce the conflicts at several driveways on 41st Street.
2. This road would provide for continuous back access to the Western Mall and may promote travel on 49th Street or 43rd Street instead of 41st Street.
3. Some parking may be removed in order to construct the road.
4. Preliminary cost estimate: $800,000.

### 4.5.3 Develop Access from Western Mall to 46th Street

In conjunction with the back access road discussed above, an additional connection could be made from it to 46th Street in the location of Elmwood Avenue.

Impacts

1. This connection could help to reduce pressures for access from the Western Mall to 41st Street, Western Avenue, and/or Kiwanis Avenue.
2. It could also provide additional connections for local traffic from the south.
3. It may increase cut through traffic in the Western Mall parking lot.
4. Preliminary cost estimate: $270,000.

### 4.5.4 Move Traffic Signal from Elmwood Avenue to Holly Avenue

This concept includes relocating the existing traffic signal at 41st Street and Elmwood Avenue to Holly Avenue. The parking lot of the Western Mall is better configured to accommodate a signal located at Holly Avenue, although minor changes must be made to the access from the north/south entry road to the parking lots.

Impacts

1. The parking lot road must be modified to eliminate an immediate onsite intersection. Some loss of parking will result.

2. The number of vehicles using the proposed signal versus the existing signal to exit the parking lot may increase slightly. This intersection would be more attractive due to better geometrics and the ability to stack vehicles.

3. The flow of entering and exiting traffic will be improved because of the geometrics.

4. Since the volumes will increase, but the flow will improve, the operation of the intersection should not change significantly.

5. There is not a significant difference in the operation of the coordinated signal system whether the signal is located at Elmwood Avenue or Holly Avenue.

6. Preliminary cost estimate: $150,000.


## Concept 2C

### Access to Western Mall Area

- Develop road south of Western Mall to connect Western Avenue to Kiwanis Avenue - provides back access to Western Mall.
- Would become part of the system to provide alternate access between the Empire and Western Malls.
- Would remove some short to medium length trips from 41st Street.
- Would reduce the conflicts at several driveways.
- Some parking may be removed.
- Providing back access at Elmwood Avenue would connect 49th Street to the Western Mall.
- Relocating the traffic signal from Elmwood to Holly Avenue is more in accordance with parking lot layout and would be more efficient.
- Preliminary Cost Estimate : $1.1 Million

Figure 9

Western Mall Area

## 4.6 Concept 2 I Connect Grange Avenue and Norton Avenue (between 42nd Street and 43rd Street)

This concept would create a connection between Grange Avenue and Norton Avenue, south of 41st Street. Some businesses are only accessible from 41st Street, and left turns in or out can be very difficult during peak periods. This could be constructed in conjunction with the redevelopment of the land south of 41st Street and east of Grange Avenue. It would also be beneficial to create cross-access between the businesses south of 41st Street between Grange Avenue and Norton Avenue. Figure 10 shows this concept.

Impacts

1. This would create an alternate route between the Shopko retail area and Minnesota Avenue (and possibly I 229).
2. This connection would provide back access for the businesses that front 41st Street between Grange Avenue and Norton Avenue.
3. It could also provide access to future redeveloped land to the south.
4. This connection would remove some of the short trips from 41st Street, reduce the conflicts on 41st Street at several driveways and may remove some turning movements from the intersection of 41st Street and Minnesota Avenue.
5. Since the land south of 41st Street/42nd Street is proposed to be redeveloped, this may be a convenient time to construct this roadway. This roadway could serve the business south of 41st Street in addition to the redeveloped land to the south.
6. Right of way would be needed to create this link.


## Concept 2I

### Connection Between Grange Avenue and Norton Avenue (Between 42nd Street and 43rd Street)

- Provides alternate route between Shopko retail area and Minnesota Avenue (and I-229).
- Provides back access for businesses between Grange Avenue and Norton Avenue.
- Could provide access to future redeveloped land to south - should coordinate with developers.
- Removes short trips from 41st Street.
- Reduces the conflicts on 41st Street at several driveways.
- Right-of-way needed.

Figure 10

Concept 2I

## 4.7 Internal Circulation and Frontage along 41st Street

The flow of traffic along 41st Street is affected by the number of vehicles, the signal coordination, the number and location of access points, and the off street circulation in the parking lots that front 41st Street. Each business along the corridor should review how their parking lot functions in relation to access to/from 41st Street. In some cases, parking spaces may be moved to help circulation, or driveways may be relocated or combined in order to concentrate access. Numerous driveways are not wide enough to allow vehicles to enter and exit at the same time. If a driver cannot turn into a driveway until the other vehicle exits, backups occur on 41st Street, which affect the speed, flow, and safety.

Cross access between businesses which front 41st Street helps to keep short trips from entering and then exiting 41st Street. The cross-access between businesses works in conjunction with the driveways that provide access to 41st Street. If driveways are modified, the cross-access should be assessed. Cross access may also provide the driver a way to get to an intersection with a traffic signal, where it is generally easier and safer to turn left.

Listed below are several cross-access recommendations, which should be coordinated with the property owners in order to address all the concerns.

- Provide cross-access between the businesses on the north side of 41st Street between Carolyn Avenue and Shirley Avenue.
- Provide cross-access between the businesses on the north side of 41st Street between Louise Avenue and the Greenway Mall.
- Provide cross-access between the businesses on the south side of 41st Street between the river and Kiwanis Avenue.
- Provide cross-access between the businesses from the Dakota Plaza to Gary's Gun Shop.

# 5.0 Access Management

## 5.1 Driveways

41st Street is a principal arterial between Minnesota Avenue and Sertoma Avenue, and a collector to the east and west. From an ideal roadway classification standpoint, a principal arterial should have a minimum intersection spacing of ½ mile and direct land access should be limited to major generators only. Generally, as the number of access points along a roadway increase, the ability to move traffic efficiently decreases, and the potential for accidents increases. Since 41st Street is a commuter route and also provides access to many businesses, a balance must be achieved between moving traffic and providing access. Both are goals of the corridor study.

The driveways on 41st Street provide direct access to all the businesses that front 41st Street, but hinder the free flow of traffic along it. The accident analysis indicated that there are a high number of rear end accidents at mid block locations, which means the accidents are happening at the driveway locations. Numerous driveways are not wide enough to allow vehicles to enter and exit at the same time. If a driver cannot turn into a driveway until the other vehicle exits, backups occur on 41st Street, which affect the speed, flow, and safety. Additionally, speed differentials are created by vehicles pulling into traffic, changing lanes, and then slowing to turn. Studies have shown that as speed differentials increase, the probability of rear end accidents increase as well.

There are ways in which the driveways can be modified to improve the flow of traffic along 41st Street, while not significantly affecting the access to businesses. There are basically two examples of driveway modifications that should be made. The first is the offset driveway, which is illustrated in Figure 11. As can be seen in the figure, a conflict point occurs in the center left turn lane between the two driveways for vehicles turning left at the respective driveways. If the two driveways are aligned across from each other, the conflict point is removed, and the turns are concentrated at one point instead of two. The second example is too many and close spaced driveways, which can be seen in Figure 12. Short spacing between access drives compounds the driving task by requiring the driver to watch for entering and exiting traffic at several points, all while maintaining appropriate spacing between vehicles on 41st Street. It also creates conflict points between vehicles turning in opposite directions from neighboring driveways. By combining two or more access drives into one, the number of conflict points are removed and the turns are concentrated in one location. It also will improve the flow of traffic along 41st Street and may improve the on site circulation. It may also be beneficial to move driveways from 41st Street to a cross street and/or allow cross-access between businesses.

In the future, the City needs to carefully review plans for new development with regards to access, so that other arterial streets do not end up like 41st Street. The type of road should control how much direct access is granted. "City of Sioux Falls engineering design standards for public improvements" should be used as a reference when designing/reviewing driveway locations.

Impacts

1. By combining two or more access drives into one, the number of conflict points are reduced and the turns are concentrated in one location. The probability of accidents will decrease with fewer conflict points.
2. There will be less delay for vehicles waiting in the two-way left turn lane.
3. Reducing the number of access drives will improve the flow of traffic along 41st Street.
4. The onsite circulation may be improved by relocating driveways.
5. The relocated driveway may not be located directly in front of a business, but the business will still have convenient access.
6. Cross easements may be needed between neighboring businesses if two driveways are combined and shared.
7. Preliminary cost estimate: $1,000 to $5,000, depending on complexity.

Listed below are several suggested driveway or access modifications. Figures 13 through 15 show the driveway modifications graphically. These changes should be coordinated with the property owners in order to address all the concerns. The changes can be made over time in conjunction with other projects. These suggestions will not have an adverse affect on direct access to 41st Street.

- Combine the two Lewis Southwest driveways, which are east of Larch Avenue, and align across from the Clock Tower Square access drive. It would be best to either line up the Lewis driveway across from Larch Avenue (which would require relocation of the greenhouse) or to move the Clock Tower Square west driveway further east.
- Align the Carmike Cinema driveway across from Meadow Avenue. This would eliminate the offset intersection. The parking lot will have to be slightly reconfigured to accommodate the new entrance location. There is also a grade change between 41st Street and the parking lot that would have to be accommodated.

- Create additional access for Carlos O'Kelly's onto the side street to the west. This will allow easier and safer left turns into and out of the site. A median cut on the side street would be required.
- Align the Greenway Mall (west) access drive across from Westport Avenue. This would eliminate the offset intersection.
- Combine Dauby's and Home Federal access across from Randall's driveway.
- Combine Advanced Auto Parts with Burger King and align across from Lincoln Avenue. Cross-access would be required.
- Combine the two west driveways in front of Sioux Falls Music and align across from Gilrich Village.
- Align driveway between 41st Street Village and Dakota Plaza across from Walts Avenue.
- Combine Big O Tire and Gary's Gun Shop driveways and align across from Prairie Avenue. Cross-access should be provided between Dakota Plaza and Gary's Gun Shop.
- Move access for Coyote Canyon west to line up across from Harold's driveway.
- Combine Ace Hardware driveways to two or three.
- Move the Rent All driveway to line up with 5th Avenue.
- Combine three driveways just west of Cornerstone Church.

There are many other driveway modifications that could be made that would affect the direct access to businesses, but indirect access would still be maintained. Listed below are several suggested driveway modifications, which should be coordinated with the property owners in order to address all the concerns.

- Provide cross-access between Pizza Inn, Jiffy Lube, Tires Plus, and Greenway Mall.
- Remove west driveway for Randall's.
- Remove driveway on south side of 41st Street just west of Sheldon Lane. Relocate driveway onto Sheldon Lane. The new driveway must be designed to allow truck access.
- Remove 41st Street access to Crown Casino. Relocate access to Elmwood Avenue.
- Remove eastern access to Dunhill Plaza.

- Consolidate driveways to Schmitt Music.

### 5.1.1 Implementation

Implementation of a proactive access management program for existing driveways is difficult. At the public open houses and at a few meetings, most business owners were open to changes. However, few seemed inclined to follow up without technical assistance. The following concept program should be reviewed and details set to provide implementation on a proactive basis.

The City should review notes to determine areas/businesses with most interest. The Western Mall, Greenway Mall, and Ace Hardware may have initial interest. The City, using existing staff, could refine concept layouts using aerial photos, as-built plans, surveys, etc. These should be reviewed with affected businesses.

Assuming agreement on concepts, the City and property owners/businesses could proceed with design and construction. The City may wish to provide some funding percentage based on the improvement to 41st Street traffic flow and could vary from curb and gutter to all work within City right-of-way. Specific concerns, in addition to funding, include design of plans, approval process, contract administration (inspection) and liability for design/construction.

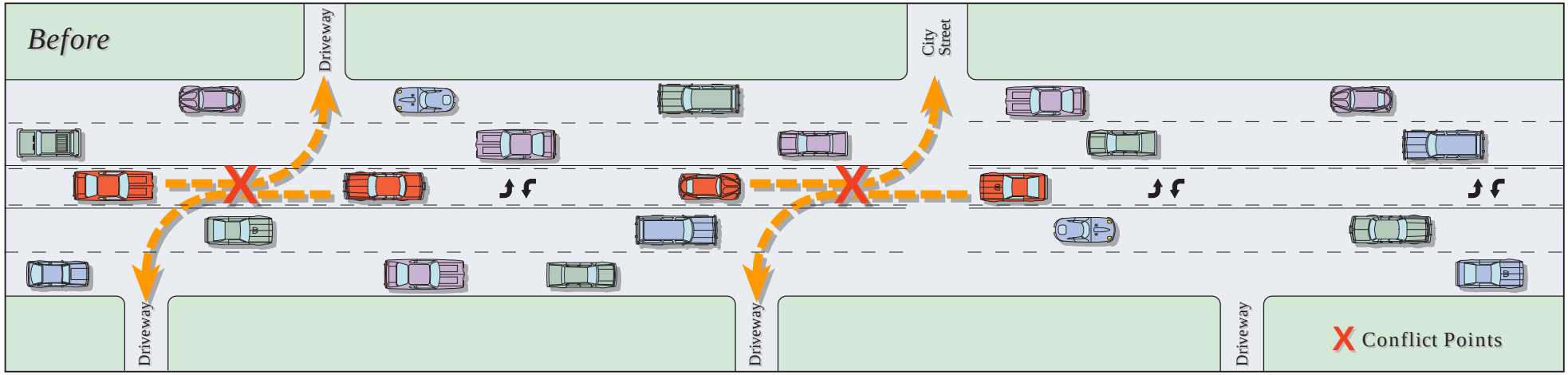
By working with interested businesses, agreements may be easier to achieve and precedents and interest may be set. Follow up with other businesses may be easier once the initial changes are made.

Ultimately, the City should review each block for access changes and improvements.

As an alternate, changes could be made only in conjunction with redevelopment or other owner initiated efforts. This would be slow and would not take advantage of current interest in improving 41st Street.

In the case where major redevelopment occurs and driveway locations can be moved or combined, a right turn lane should also be considered. See Section 7.2.3 for more information.

Realigning driveways reduces the potential for conflicts thus improving the safety and operation of the intersection.



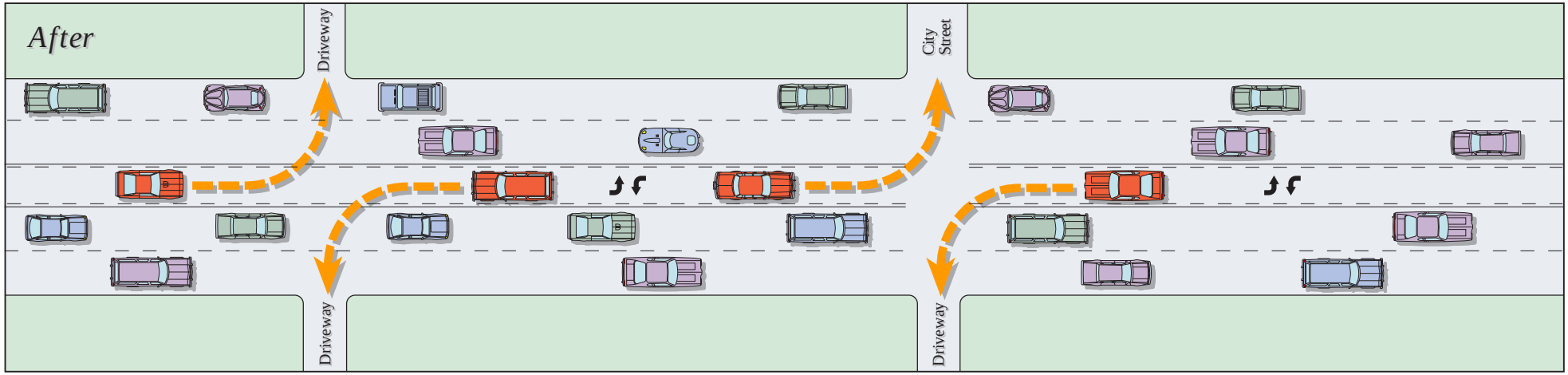



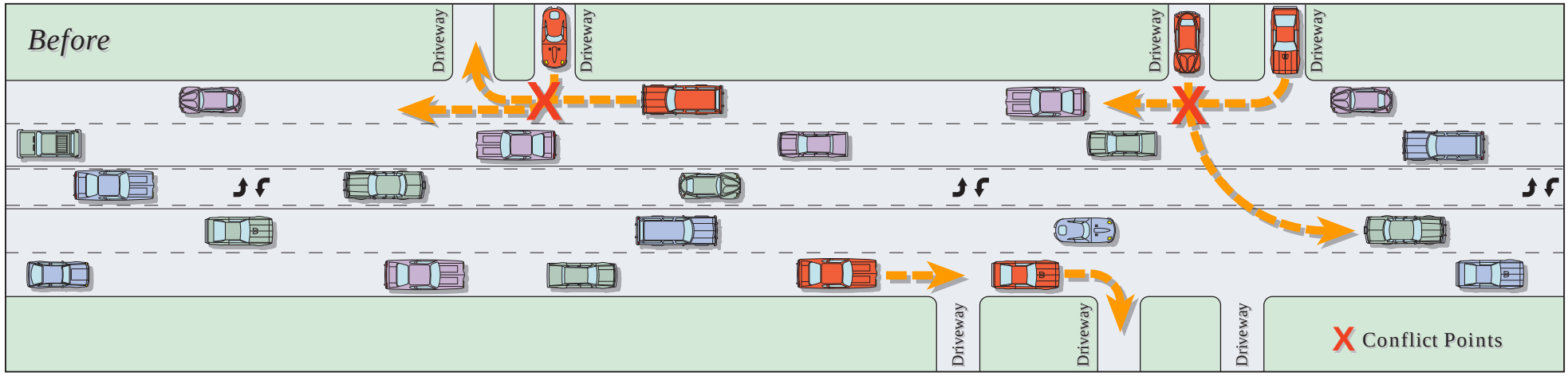

Figure 11

Driveway Modifications (Offset Driveways)

*41st Street Corridor Analysis - Phase 2*

*City of Sioux Falls, South Dakota*

Too many driveway choices may increase driver confusion as to where to turn. This affects safety and operation of corridor.




Combining driveways reduces the number of conflict points and concentrates turns in one location.

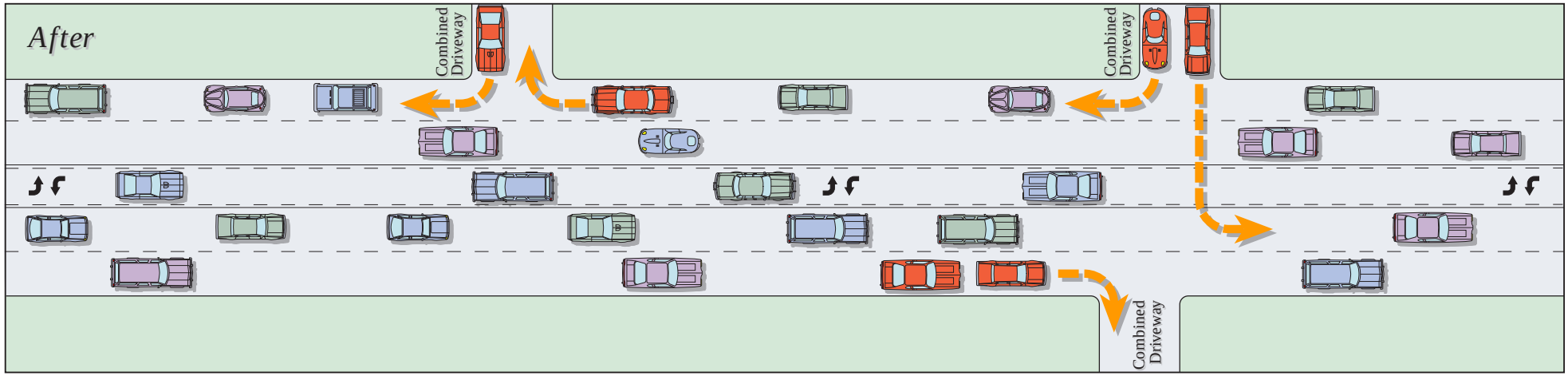



Figure 12

Driveway Modifications (Too Many Driveways)

*41st Street Corridor Analysis - Phase 2*

*City of Sioux Falls, South Dakota*

SEH

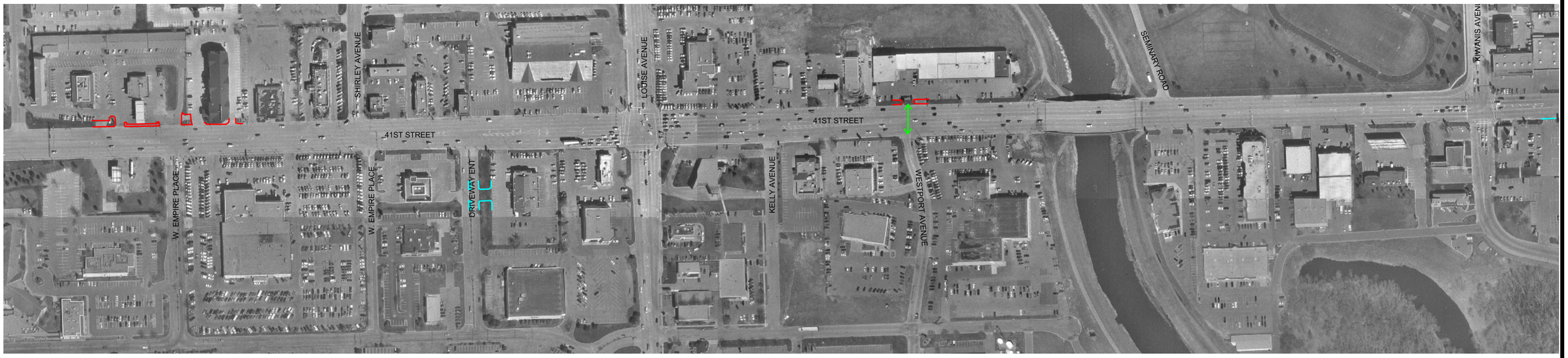
# Suggested Driveway Modifications



1st Priority
2nd Priority
Signals

Figure 13
41st Street Corridor Analysis
City of Sioux Falls, SD

# Suggested Driveway Modifications

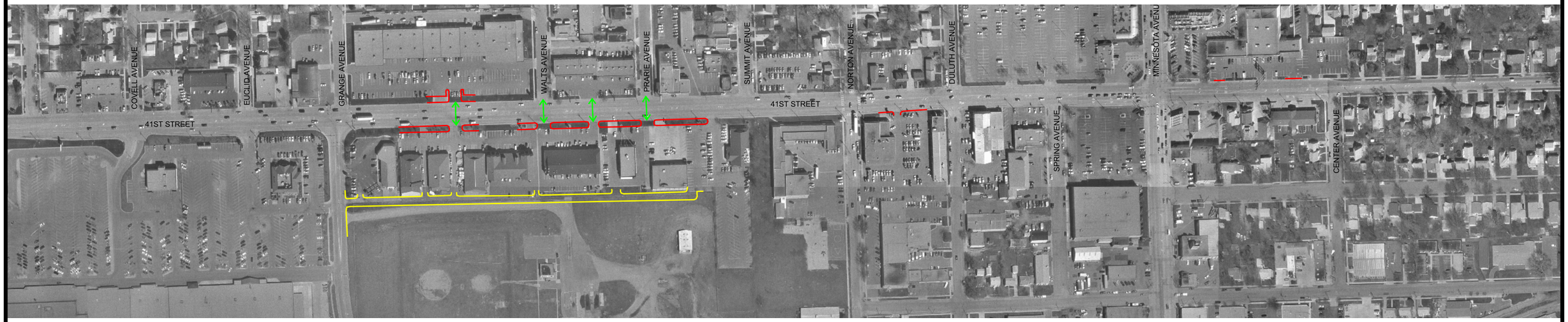




1st Priority
2nd Priority
Signals

Figure 14
41st Street Corridor Analysis
City of Sioux Falls, SD

# Suggested Driveway Modifications





1st Priority
2nd Priority
Signals

Figure 15
41st Street Corridor Analysis
City of Sioux Falls, SD

## 5.2 Medians

A raised median is another form of access control. It acts as a physical barrier in the middle of the road and allows access only at major intersections or traffic generators. The median eliminates many vehicle conflicts by redirecting left turns to specific locations. It can reduce accidents and increase traffic capacity. However, a median restricts access and therefore, needs careful evaluation of benefits and problems.

Considerations

- A raised median may decrease accidents by limiting the places where people can make left turns on to or off of 41st Street.
- A raised median can improve the flow of traffic by removing the mid block left turns.
- A raised median consolidates the left turning vehicles at the major intersections, where median openings are located and drivers expect them. But this not only increases the number of left turns, but the number of U turns at these locations, which in turn affects the level of service (LOS) at the intersection.
- A raised median would eliminate the head-on conflicts associated with the two-way left turn lane.
- A raised median forces mid-block driveways to right-in/right-out movements and increases potential for neighborhood street cut-through traffic (three right turns in place of one left turn).
- A raised median can convert a left turn to a right turn, weave, and "U" turn.
- Businesses may be adversely impacted by a raised median, since it may be more difficult for customers to access them. Conversely, since the flow of traffic in front of the businesses will improve, it will be easier to get in and out of driveways (right turn only).
- Right of way would be required to install a median. A 4-foot or 6-foot wide median in the center of the road would require moving the existing lanes outward or to one side in order to construct it.

The primary goals of the study are to reduce accidents, improve traffic flow, and increase capacity, while allowing proper access to businesses. A median may help to decrease accidents and traffic flow, but the capacity would not be affected since capacity is restricted by intersections. The access to businesses along 41st Street would be significantly modified. Medians were opposed by many at the open houses.

There are certain places along 41st Street where a raised median may fit and other places where it may be difficult to install. An alternate to an actual raised median is to visualize a "ghost median street and access system to compliment 41st Street that would provide alternate access as if an actual raised median were installed. Figure 16 shows how a raised median would look for one section of 41st Street. Due to the impacts of a center median, it is recommended that alternate access be provided in place of constructing a median.

This recommendation is based on existing land uses. If the land uses change or a major redevelopment takes place, this should be reconsidered.

Preliminary cost estimate: $10,000 to $15,000 per 100 linear feet.


Figure 16

Raised Median Concept

*41st Street Corridor Analysis - Phase 2*

*City of Sioux Falls, South Dakota*

## 6.0 Traffic Signals and Coordination

Traffic signal coordination is a tool to manage the existing traffic, but it will not remove traffic from 41st Street. As traffic increases due to residential and commercial growth in the area, the traffic signal coordination will need to be monitored and possibly modified.

If some or all of the previously mentioned concepts (from Sections 3.0 and 4.0) are implemented, some of the traffic will be diverted to other routes and the flow of traffic along 41st Street will improve. As future development occurs, the traffic along 41st Street will increase, but since there would be alternate routes for new traffic, the future operation of 41st Street should not decrease significantly from present day.

If none of the concepts are implemented, the volumes on 41st Street will increase and create operational problems. As the volumes increase, the strain on the signal system to manage the traffic increases. Therefore, the operation of the signal system is dependent on if/when certain concepts are implemented.

The traffic signals along the 4 mile corridor are currently part of a closed loop coordinated signal system. All of the traffic signals along 41st Street, except Cliff Avenue and Phillips Avenue, are part of one system, meaning that they all run on the same cycle length. A quick analysis was performed to determine if the operation of the corridor could be improved by making modifications to the signal timing.

Listed below are a few ideas that the City can study further to determine the potential benefits. Each of these options would be very easy and inexpensive to implement.

- Split the 4 mile corridor into two or more sections. The analysis indicated that two systems, with the dividing point at the river, would be beneficial.
- Evaluate the signals along 41st Street and Louise Avenue near the Empire Mall to determine if it would be beneficial to coordinate them as a system.
- Evaluate the possibility of letting the signals at Sertoma Avenue and Valley View Road run “free”. This means that the signals would not be part of a coordinated system, but would run on their own optimal cycle length. The intersections could run “free” all the time, or just during lower traffic periods.
- Relocate the signal at Elmwood Avenue to Holly Avenue. The parking lot of the Western Mall is better configured to have a signal located at Holly Avenue, although minor changes must be

made. The analysis indicated that moving this signal 300 feet to the east does not affect the operation of the system.

- Evaluate geometric changes at individual intersections in order to improve capacity. These options are listed in the next section.

- Evaluate the phasing at each intersection. Some intersections have protected left turn phasing, some have protected/permissive phasing, and others have permissive phasing. Protected left turn phasing means that left turning vehicles may turn only if there is a green arrow. Protected/permissive left turn phasing provides a green arrow for left turning traffic and also allows left turns when the thru traffic has the green ball. Permissive left turn phasing means that left turning vehicles must yield to oncoming traffic. Each of these phasing scenarios are appropriate in different scenarios.

- Evaluate if any of the side streets should be changed to split phase operation, meaning that opposing approaches move independently from each other.

# 7.0 Capacity Improvements

There are certain areas along the corridor where "bottlenecks" occur. A bottleneck occurs where the capacity of the roadway cannot handle the volumes. The most basic way to address a bottleneck problem is to add capacity, usually in the form of additional lanes.

Additional capacity will allow the road to carry more traffic, but it will not remove traffic from 41st Street. As traffic increases due to residential and commercial growth in the area, capacity improvements may be needed at various locations.

If some or all of the previously mentioned concepts (from Sections 3.0 and 4.0) are implemented, some of the traffic will be diverted to other routes, leaving more capacity on 41st Street. As future development occurs, the traffic along 41st Street will increase, but since there would be alternate routes for new traffic, the existing capacity should be able to handle the future volumes.

If none of the concepts are implemented, the volumes on 41st Street will increase and create operational problems. As the volumes increase, the capacity of the roadway and the intersections will not be sufficient to handle the traffic. Therefore, implementing the previously mentioned concepts is important in order to maintain the current level of operation without adding a significant amount of capacity.

Preliminary cost estimate: $10,000 to $15,000 per turn lane (depending on length of turn lane and utility conflicts).

Listed below are a few options to gain capacity at certain locations along 41st Street.

## 7.1 Additional Through Lanes

### 7.1.1 41st Street and Kiwanis Avenue

Install a third westbound through lane at Kiwanis Avenue. An additional westbound lane can be constructed between Kiwanis Avenue and Garfield Avenue. The further east the lane is constructed, the more benefit, but there will also be more impacts.

<u>Impacts</u>

1. It is estimated that the westbound queue at the intersection will be reduced by approximately 50%. This will benefit the operation of the intersection, as well as improve access to businesses east of Kiwanis Avenue.

2. The operation of the intersection will improve from LOS D to C.

3. Some parking may be lost for the businesses located in the northeast corner of 41st Street and Kiwanis. Access to these businesses would also be modified.

4. It will be necessary to modify the merge area west of Kiwanis Avenue to accommodate the southbound right turn and westbound through merge.

5. The operation of the southbound right turn may be slightly impacted, but it will continue to operate satisfactorily.

6. Right of way would be needed on the north side of 41st Street.

## 7.2 Additional Right Turn Lanes

### 7.2.1 41st Street and Western

Add right turn lanes to all the approaches at 41st Street and Western Avenue. Currently, all the approaches have shared through/right turn lanes.

Impacts

1. The operation of the intersection will improve from LOS F to D.

2. The flow through the intersection will improve and the safety of the intersection will increase by removing the slower moving right turning traffic from the thru lane.

3. Right of way may be needed to construct the turn lanes.

### 7.2.2 41st Street and Holly Avenue

Install a right turn lane at the Western Mall main entrance opposite Holly Avenue.

Impacts

1. The operation of the intersection will improve, as will the flow of traffic on 41st Street, by removing the right turning traffic from the thru lane.

2. This could be done when the traffic signal is moved from Elmwood Avenue.

### 7.2.3 High Traffic Generators

Install right turn lanes on 41st Street at high traffic generators. An example of this can be seen on eastbound 41st Street at the Shopko access drive. If driveways along 41st Street are combined and/or realigned, it would be convenient to install a right turn lane at that time, if the right of way exists or can be made available.

Impacts

1. This will remove the slower moving right turning traffic from the thru lane flow, thus improving the flow of traffic.

2. Right of way may be needed to construct them.

## 7.3 Better Lane Alignments/Designations

### 7.3.1 Eastbound at Kiwanis Avenue

The eastbound approach at Kiwanis Avenue is confusing for many drivers. The left through lane on 41st Street becomes a left turn lane to accommodate the dual left turn lane. Therefore, vehicles in what was the left most through lane often get trapped in the rightmost left turn lane after the transition in lane designation.

The signs on the sign bridge are not standard lane use signs and should be replaced. Additional signing should also be installed at the intersection to warn people of the lane configuration. Pavement markings (i.e., turn arrows) can also advise drivers of the lane uses.

Impacts

1. Better signing and pavement markings will reduce the confusion, which will reduce the probability of accidents.

2. Better signing and pavement markings will also improve the flow of traffic, which will increase the capacity of the intersection.

### 7.3.2 Westbound at I 29

A lane drop occurs at the westbound approach to the intersection of 41st Street and the northbound ramp to I 29. The rightmost through lane becomes a right turn only lane. The highway signs often get overlooked because of all the entrances and commercial signs. A combination of signing, pavement marking, and driveway definition may reduce the concern.

Impacts

1. Better signing and pavement markings will reduce the confusion, which will reduce the probability of accidents.

## 7.4 41st Street and Kiwanis Avenue Eastbound Left Turn Lane

A concept introduced as a potential improvement for the 41st Street/ Kiwanis Avenue intersection was to create a “raised left turn flyover”. In this concept, the eastbound left turn, now made via a dual left turn phase of the traffic signal, would be made instead by a ramp/bridge combination. Left turning traffic would enter a ramp in the middle of 41st Street west of Louise Avenue, drive up to a bridge with a 90° turn, and ramp back down to Kiwanis Avenue. The idea is to eliminate the

direct conflict of eastbound left turn vehicles and westbound thru vehicles.

A major concern, in addition to cost, is the amount of ramp required on both Kiwanis Avenue and 41st Street. The ramp essentially becomes a median barrier. In addition, it is a sight distance restriction and would prevent left turns between the Big Sioux River and Kiwanis Avenue and between Kiwanis Avenue and 39th Street.

Other concerns are snow removal and/or storage, visual impact, sharp turn on bridge, pier protection/hazard, and sight distance.

# 8.0 Intelligent Transportation Systems (ITS) Concepts

Intelligent Transportation Systems (ITS) is an umbrella term that refers to an assortment of technologies that can help the City collect and process data, quickly respond, and implement remedies that apply to changing traffic conditions. The goal of ITS is to enhance mobility by reducing congestion and improving safety. Further analysis should be conducted to determine what would be the best system to develop.

Listed below are some ITS concepts and examples that could be implemented in the Sioux Falls area.

## 8.1 Congestion Monitors and Changeable Message Signs (CMS)

The basic concept behind this system is to collect traffic data and convert it to an easy to understand format for the public. The traffic data could be five minute volumes, average speeds, occupancy, etc. The data would be collected by using some sort of detection equipment. Several types of detection equipment are available, including in ground loop detectors, video detectors, or radar. Once the data is collected, real time traffic information can be displayed on CMS, which can help the motorists chose the best route.

<u>Impacts</u>

1. May remove some traffic from 41st Street, especially at critical times. Drivers would be advised to use a different route, depending on conditions.

2. Will aid in the clearing of accidents. The time it takes to clear an accident will decrease if drivers avoid the area until the incident is cleared.

3. The system must be monitored and maintained in order to assure proper operation.

4. The more complex the system is, the more dependable it is, but the more expensive it is.

Listed below are some examples of this application.

- Install detectors on 41st Street at Empire Place or on southbound I 29 at 41st Street. When this section of roadway is congested, advise southbound I 29 traffic to use the I 29/26th Street/Louise Avenue interchange.

- Install detectors on 41st Street at Empire Place or on northbound I 29 at 41st Street. When this section of roadway is congested, advise northbound I 29 traffic to use the I 229/Louise Avenue interchange.

- Install detectors at the intersection of 41st Street and Louise Avenue along with a CMS on Minnesota Avenue to indicate the LOS on 41st Street and Louise Avenue. By using this information, the motorists have an option to take an alternate route.

- Install detectors on 41st Street at Empire Place or on I 29, north and south of 41st Street. Install CMS on I 90, east of the City, to advise motorists of alternate routes to 41st Street.

## 8.2 Traveler Information System

The basic concept behind this system is also to collect traffic data and convert it to an easy to understand format for the public. It can be collected in a similar fashion as was described in the previous section. Weather data can also be collected to inform motorists of adverse weather that may affect their travel. Once the data is collected, the real time traffic information can be made available to the public in a variety of ways. A few examples of how the information can be displayed are listed below.

- The City's web site or other Internet locations.
- E mail notification.
- Kiosks at the malls or downtown locations.
- Highway Advisory Radio.
- Local media (TV, radio).

<u>Impacts</u>

1. May remove some traffic from 41st Street. Drivers would have knowledge of traffic conditions before they start their trip and can choose their route or time accordingly.

2. Transit data could be available at major stops, i.e. malls, downtown, etc.

3. The system must be monitored and maintained in order to assure proper operation.

4. The more complex the system is, the more dependable it is, but the more expensive it is.

## 8.3 Miscellaneous

There are numerous other types of ITS concepts that could be employed. A few of the major ones are listed below.

- Automatic Vehicle Locators (AVL) could be installed on the buses, which would give people information on the exact arrival time of the bus. Kiosks at the malls and downtown could provide information to the riders.

- Traffic signals could be upgraded to run totally traffic responsive. As traffic changes, the timing of the signals varies accordingly.
- The detectors at certain intersections can be replaced with video detection. These cameras can also be used for monitoring traffic along the corridor.

## 9.0 Miscellaneous

In addition to all the physical changes or ITS concepts discussed in the previous sections, a few other concept areas exist. They are:

- Transit
- Education
- Information

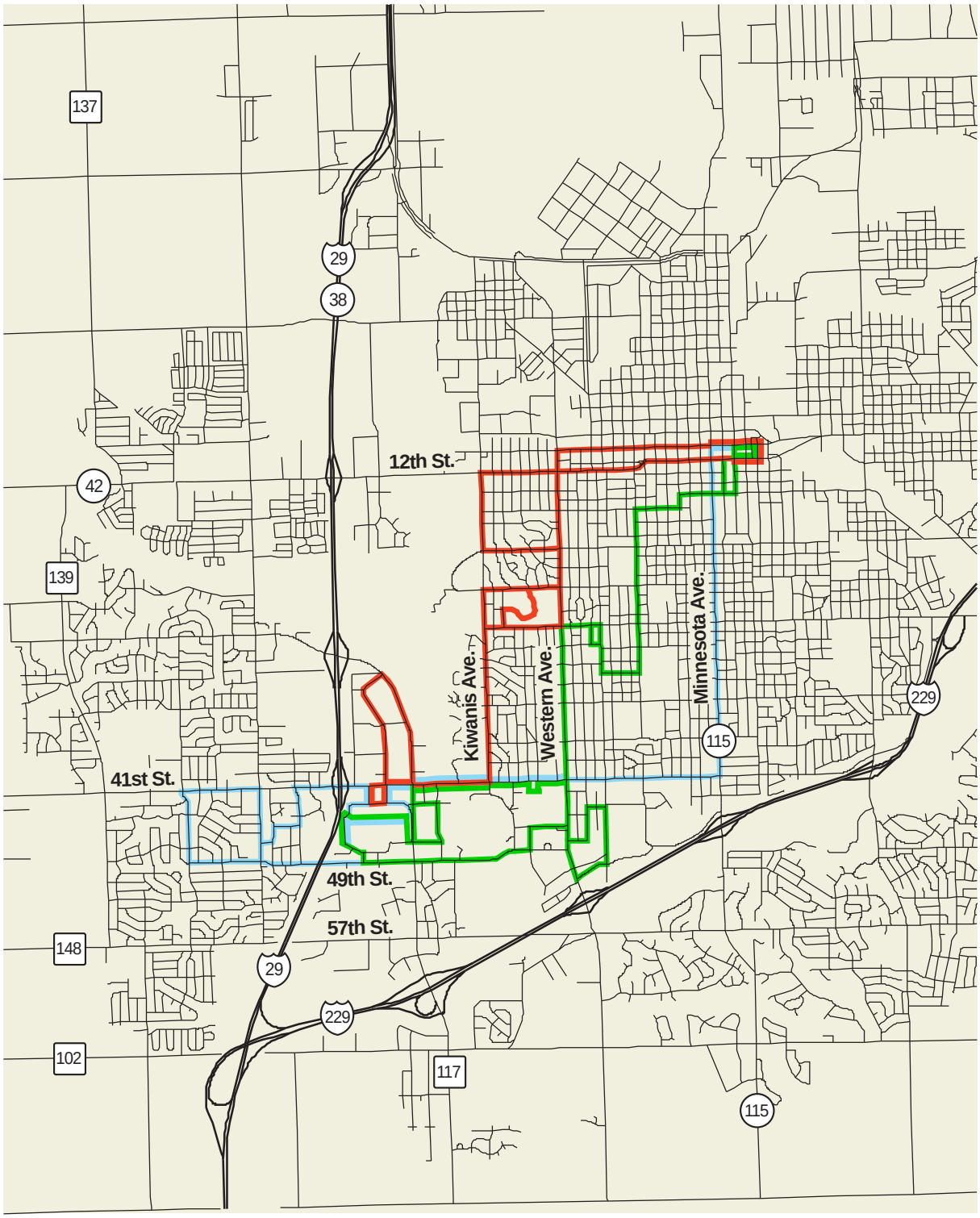
The concepts in this section are less defined and have less of a quantitative analysis, but are still important in developing an overall package of ideas to reach the basic goals of the study.

### 9.1 Transit

Sioux Falls Transit currently operates 10 standard bus fixed routes in the City of Sioux Falls and one express route which serves Southeast Technical Institute. There are five additional routes that mainly serve Southeast Technical Institute and the three public high schools. A circulator route, which operates during the holiday season, travels between the major retail centers along the corridor. Currently, three bus routes serve all or most portions of 41st Street. There are nine buses that travel along 41st Street during the p.m. peak hour, resulting in a total of 36 turns on to or off of 41st Street. Figure 17 shows the existing bus routes that use 41st Street during the peak hours.

The City will be studying the transit system in the near future to determine if new, modified, or expanded routes can achieve operational improvements. The existing or new routes will be able to take advantage of any new roadway connections constructed as a result of this study. If the bus is able to utilize some of the new, more direct connections, some routes may not have to depend on 41st Street and certain trips may be shortened.

Some of the new connections will result in more efficient service, which, along with marketing and advertising, may help to increase ridership. Transit should continue to be encouraged as an alternative for employee single vehicle trips. The more people that use transit, results in fewer automobiles using the same roadway.




Existing Bus Routes Serving the 41st Street Corridor

SIOUX FALLS TRANSIT

Route 1
Route 2
Route 3

Figure 17

*41st Street Corridor Analysis - Phase 2*

Sioux Falls Transit

*City of Sioux Falls, South Dakota*

SEH

## 9.2 Education and Information

Education is a powerful tool. While construction projects can take years to implement, education can work instantaneously. Education and information can alert motorists to alternate routes or ideas. If and/or when some of the local connections are made, an aerial photograph could be displayed in some of the businesses that are affected by it to educate customers of the additional alternate routes. Overall maps of 41st Street could be on permanent display in the Western Mall, Empire Mall, City Hall, and other areas. In anticipation of the holiday shopping season, alternate routes to the Empire Mall could be part of advertising brochures or public service announcements.

The City has an assortment of tools for providing information to the public. The videos made for the 41st Street Corridor Study were very effective in informing the public of the progress on the 41st Street Corridor Study. Showing the videos on Channel 61 also served as advertisement for upcoming meetings. The same format could be used to show alternative ideas, suggestions for rerouting, or provide general information regarding traffic operations.

The closed loop traffic signal system is capable of providing a significant amount of information, which could be converted to an easy to understand format for the public. This information could be made more regularly available to incorporate the public into an awareness of the problem, potential problems, alternatives, and status.

The City has an excellent GIS Department, which can provide a wide variety of mapping and information that may be of interest to motorists and help them to find a better route or schedule.

As the final concepts are prioritized and recommendations are being made, these numerous tools of the City should be utilized to continue the public involvement and have them as an active participant in a solution. It may be that recognizing the concern and problem will lead some of the individual motorists to make their own decision, which could, in its own way, help lessen the congestion and the concerns on 41st Street.

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## Education and Information

- Education is a powerful tool. If the public understands the concerns and problems, they can more effectively help to create the solutions.
- Using the media (both TV and newspapers) to reach the general public is very effective.
- The videos that were created as part of this project worked very well to educate the public on the project.
- The Open House process works well to get people involved.
- Once projects are implemented, aerial mapping can be used to show new or alternate routes.
- Newsletters or brochures can also be used to inform people of changing road conditions.

Figure 18