# Exit 73 – I-29 Interchange Modification Justification Study

## Introduction

Figure 1 shows the location of Exit 73. This interchange is proposed to be the connecting point of the East and West Corridors to I-29. The proposed interchange modification will change the existing interchange from a conventional diamond configuration to a single point interchange with the cross road under I-29. The modification of this intersection will improve the operation of the interchange and I-29. The cross road will be widened to improve sight distance and improve the traffic flow on the cross road.

To preserve the future operation of the mainline through lanes for I-29, the project will include constructing the grade to accommodate a future northbound auxiliary lane between the I-229/I-29 and the Exit 73 interchanges. The shoulder for the auxiliary lane will not be paved on this project, therefore, the 12' wide outside lane will act as a shoulder in the interim until I-29 to the north of this project is repaved. At that time, the shoulder for the auxiliary lane will be surfaced.

Southbound I-29 will remain two lanes from I-229 to Exit 73. When traffic volumes warrant a third southbound lane, the additional lane will be constructed toward the median.

This study addresses the policy requirements for new or revised access points to the existing Interstate system published in the Federal Register Volume 63 Number 28 February 11, 1998.

### 1. The existing interchanges and/or local roads and streets in the corridor can neither provide the necessary access nor be improved to satisfactorily accommodate the design year traffic demands while at the same time providing the access intended by the proposal.

Figure 2 shows the existing configuration of Exit 73. Phase I of the 2001 Interstate Corridor Study reviewed the existing interchange characteristics. Existing geometric features were reviewed using the as-built plans for this interchange. The modification of this interchange will improve geometric deficiencies. Some of the improvements include:

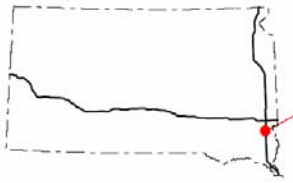
- Widen the driving lanes on the ramps from 18 feet to 19 feet.
- Widen the right shoulder on the ramps from 3 feet to 4 feet.
- Flatten the inslopes from 4:1 to 6:1.
- Lengthen the taper rates for Ramps A and C from 29:1 to 50:1
- Improve sight distance by removing the vertical curve on the cross road (cross road will now go under I-29).
- Widen the cross road from the current two lane design to four lanes with accommodations for dual left turns from the cross road to the ramps.

These deficiencies are relative to current design standards and practices.

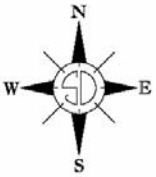
FIGURE 1

# Project Location

## I-29- Exit 73 - Tea Interchange



**Site Location**



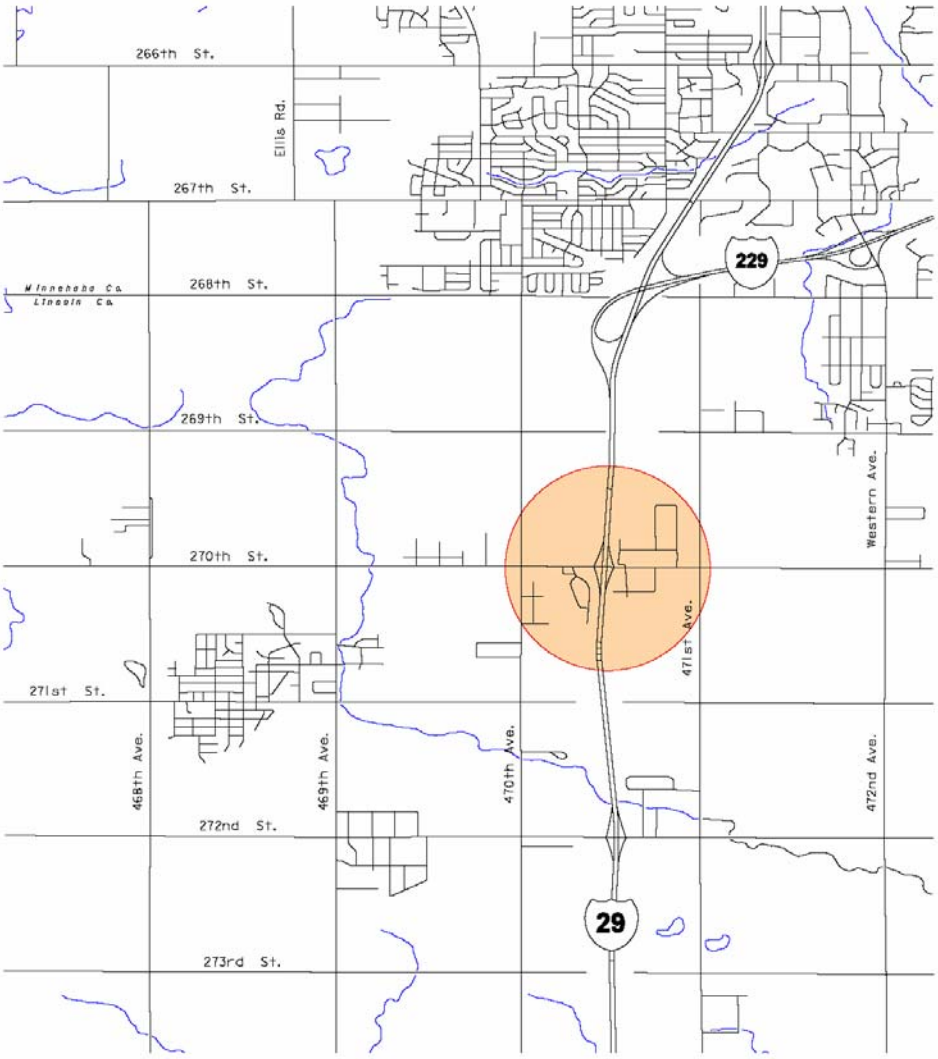
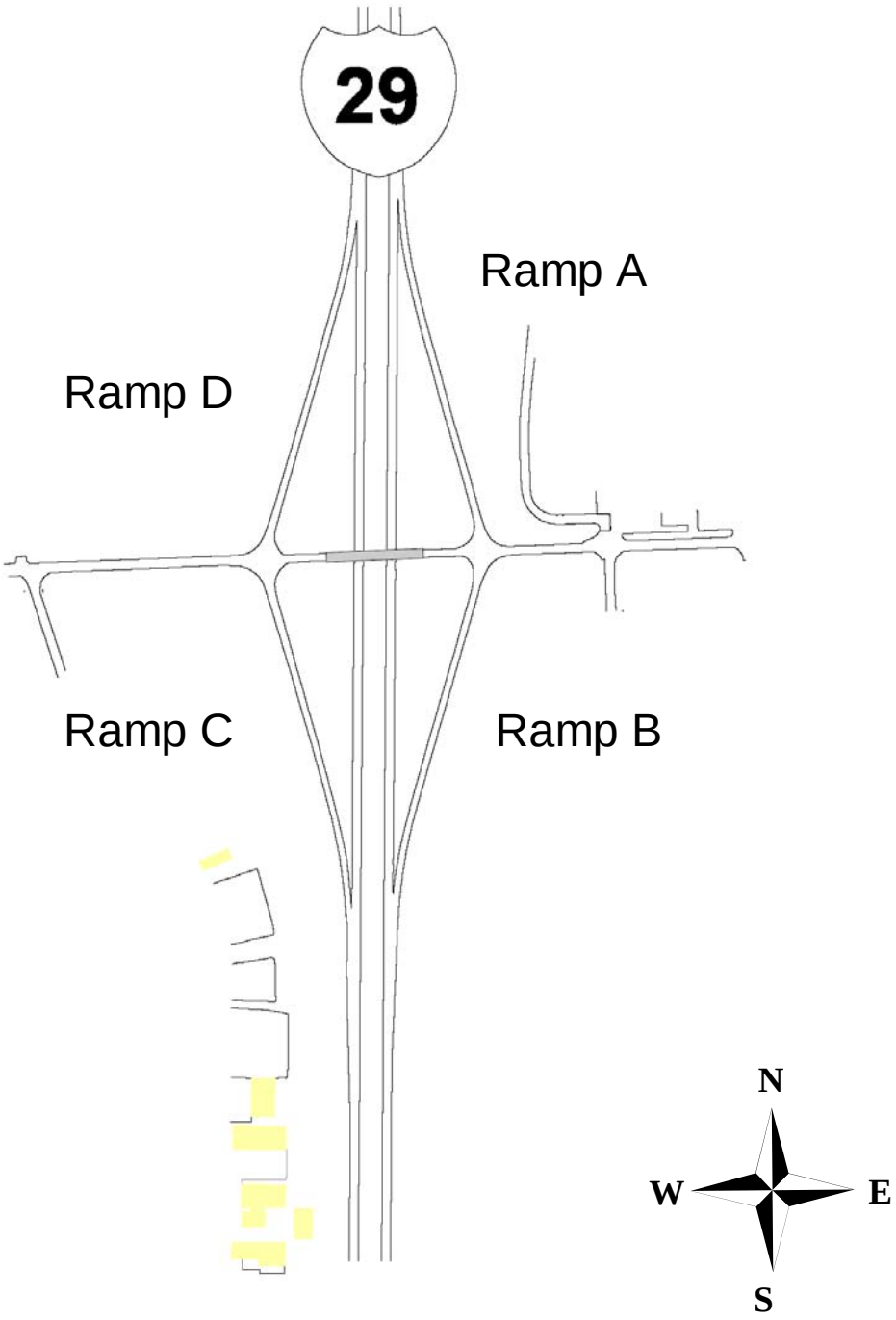



FIGURE 2

# Existing Configuration

## I-29- Exit 73 - Tea Interchange



The traffic analysis of the existing interchange indicates that the left turn movement on the northbound off ramp intersection is currently operating at a Level of Service (LOS) D. The left turn movement on the southbound off ramp intersection is operating at a LOS C. All the other traffic movements are currently operating at a LOS A or B. Figure 3 shows the existing traffic capacity analysis.

Figure 3

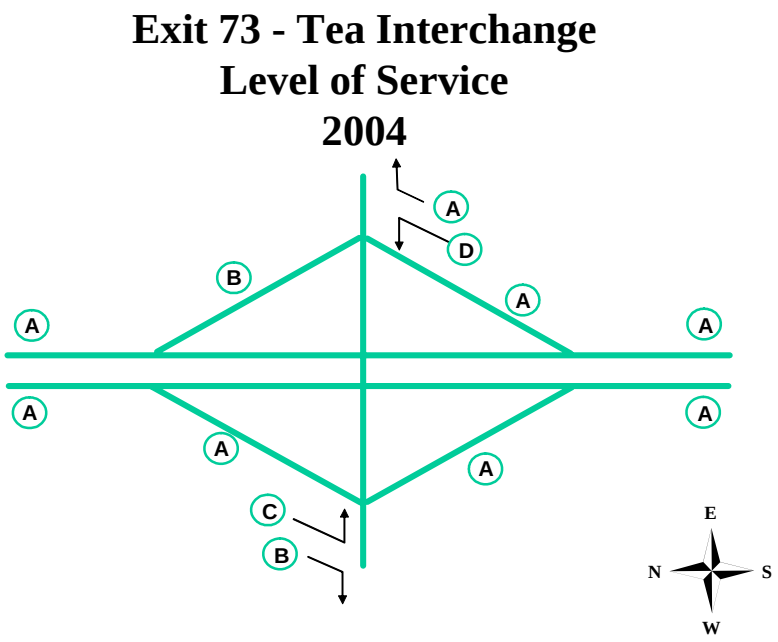
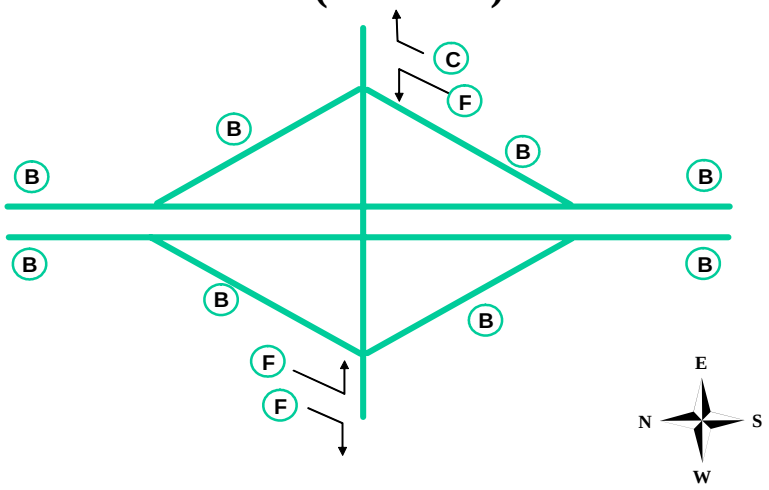



Figure 4 shows the capacity analysis for the projected 2024 traffic volumes if no changes are made to the interchange. This analysis includes the increased traffic resulting from the completion of the East and West Corridors. The left turn movement on the northbound off ramp declines to LOS F. Both the left and right turn movements on the southbound off ramp intersection would also operate at an unacceptable LOS F.

Figure 4

**Exit 73 - Tea Interchange**
**Level of Service**
**2024 (No Build)**




2. **All reasonable alternatives for design options, location and transportation system management type improvements (such as ramp metering, mass transit, and HOV facilities) have been assessed and provided for if currently justified, or provisions are included for accommodating such facilities if a future need is identified.**

   All reasonable alternatives for design options were considered. Factors considered were the close proximity of the I-29/I-229 interchange and the consideration that the Tea interchange is proposed to be the connecting interchange for the East and West Corridors to I-29. A single point interchange was selected because little additional right of way would be required and the design gave the Department more flexibility in regards to possible future improvements to the I-29/I-229 interchange to the north. The capacity of the new interchange will accommodate future traffic generated by the East and West Corridors.

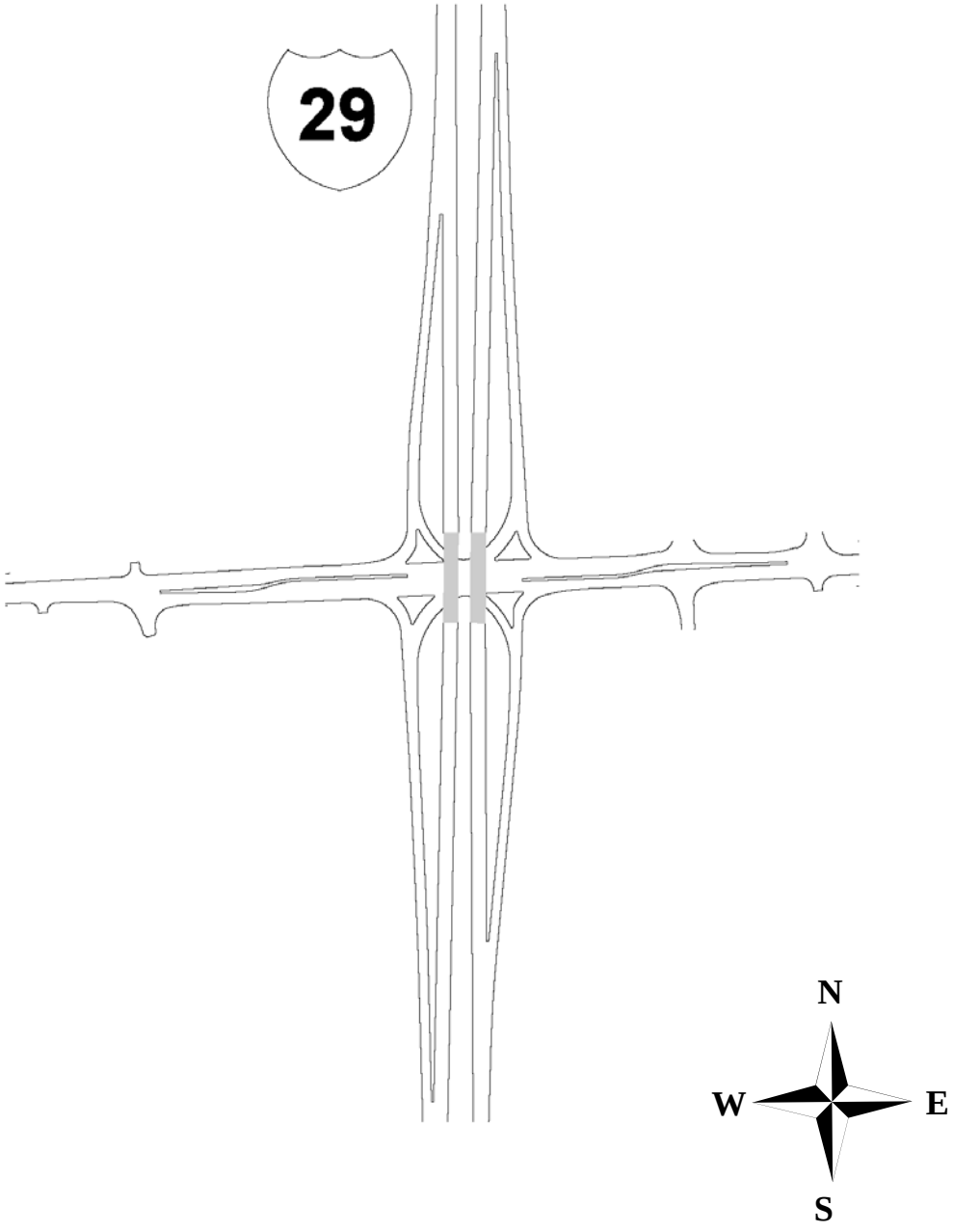
   The need for transportation system management type improvements were assessed and it was determined that the need will not exist for these types of improvements.

   Figure 5 shows the preferred interchange configuration.

FIGURE 5

# Proposed Configuration

## I-29- Exit 73 - Tea Interchange



3. **The proposed access point does not have a significant adverse impact on the safety and operation of the Interstate facility based on an analysis of current and future traffic. The operational analysis for existing conditions shall, particularly in urbanized areas, include an analysis of sections of Interstate to and including at least the first adjacent existing or proposed interchange on either side. Crossroads and other roads and streets shall be included in the analysis to the extent necessary to assure their ability to collect and distribute traffic to and from the interchange with new or revised access points.**

   The proposed interchange modification will not have a significant impact on the safety and operations of I-29. Figure 6 shows that the LOS in 2010 for the interchange after the improvement has been made is better than the existing conditions, even with additional traffic. Figure 7 shows the LOS in 2024 which includes traffic to be generated by the East and West Corridors.

   To preserve the future operation of the mainline, the project will include constructing the grade to accommodate a third northbound auxiliary lane between the I-229/I-29 and the Exit 73 interchanges. The shoulder will not be paved on this project and the 12' wide outside lane will act as a shoulder in the interim until I-29 to the north of this project is repaved. At that time, the shoulder for the auxiliary lane will be surfaced.

   The southbound mainline of I-29 will remain two lanes from I-229 to Exit 73. When traffic volumes warrant a third lane, the additional lane will be constructed toward the median. There are provisions in the plans that the structures for I-29 over the interchange could be widened toward the median to accommodate possible three lanes in each direction in the future.

   The preferred design will have no impact on either the I-29/I-229 interchange located to the north or Exit 71 which is located 2 miles to the south. The Department of Transportation is conducting a system analysis including the I-29/I-229 interchange to insure that any future improvements to the I-29/I-229 interchange will not have a negative impact on Exit 73 or the operation of I-29 or I-229.

   The operation of the crossover road will improve when it is widened to two lanes each direction and accommodations for duel left turns from the cross road to the ramps are added. The LOS for the interchange will also improve with the separation of the left turns from the right turns for the off ramp to cross road movements. Both off ramps will be single lanes as they exit the interstate and will expand to left and right turn lanes at the cross road. The on-ramps will also be two lanes at the cross road and will taper to a single lane before they merge with the I-29. Access points on the cross road will be assessed during the development of the East and West Side Corridors to insure compatibility with the Exit 73 interchange.

   Consideration was also given to the pedestrians and bicyclers in the design of the interchange. East of the interchange a berm will be constructed behind the curb and gutter where sidewalks can be added when bicycle and pedestrian traffic develops. Under the interchange, curb ramps will be provided for pedestrian and bicycle traffic. The Department will work with local governments to address future bicycle and pedestrian needs.

Figure 6

# Exit 73 - Tea Interchange
# Level of Service
# 2010 (Single Point Interchange)

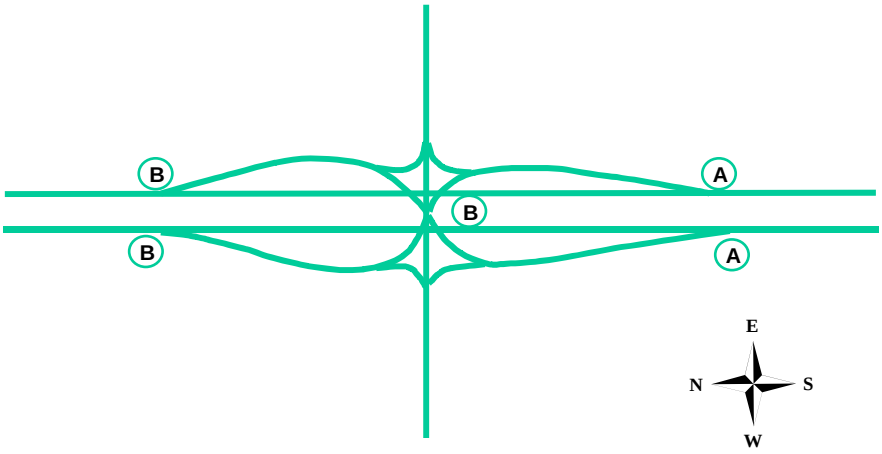
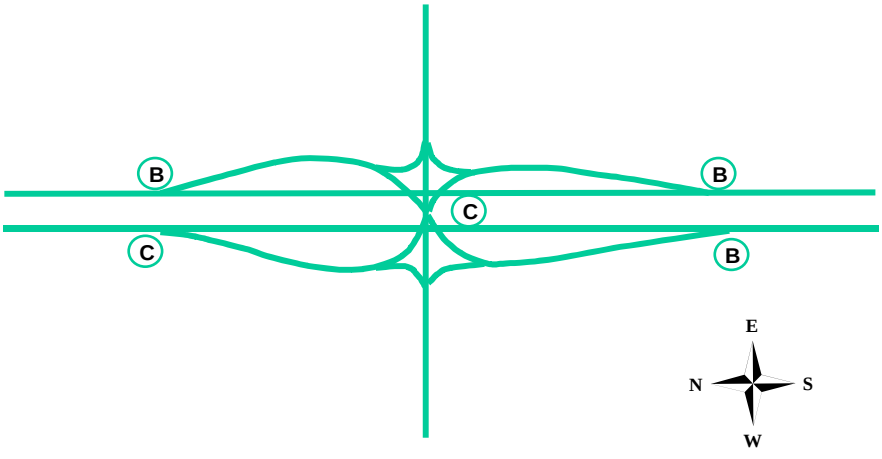



Figure 7

# Exit 73 - Tea Interchange
# Level of Service
# 2024 (Single Point Interchange)



4. **The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" for special purpose access for transit vehicles, or HOV's or into park and ride lots may be considered on a case by case basis. The proposed access will be designated to meet or exceed current standards for Federal-aid projects on the Interstate system.**

   The interchange connects to a public road which is proposed to be the future East and West Side Corridor for Sioux Falls and will provide for all traffic movements. The proposed modification will be designed to meet or exceed current standards for Federal-aid projects on the interstate system.

5. **The proposal considers and is consistent with local and regional land use and transportation plans. Prior to final approval, all requests for new or revised access must be consistent with the metropolitan and/or statewide transportation plan, as appropriate, the applicable provisions of 23 CFR part 450 and the transportation conformity requirements of 40 CFR parts 51 and 93.**

   The proposed interchange improvement is consistent with the STIP and local planning. The project is contained in both the MPO TIP and Statewide STIP.

6. **In areas where the potential exists for future multiple interchange additions, all requests for new or revised access are supported by a comprehensive Interstate network study with recommendations that address all proposed and desired access within the context of a long-term plan.**

   There are no plans for additional interchanges along this section of I-29. The Department is conducting a comprehensive system study to determine future needs.

7. **The request for a new or revised access generated by new or expanded development demonstrates appropriate coordination between the development and related or otherwise required transportation system improvements.**

   The interchange is being reconstructed to improve geometric design and the traffic operation of the interchange. However, the town of Tea has seen increased development in both residential and commercial areas. This interchange will also serve as the connector for the future East and West Side Corridors to I-29.

8. **The request for new or revised access contains information relative to the planning requirements and the status of the environmental processing of the proposal.**

   The proposed revised access is included in the STIP and the MPO TIP. The status of the environmental processing is a separate part of this request for the revised access.