Exit 79 – I-29 and 12th Street Interchange Modification Justification Study

Introduction

The interchange at the intersection of I-29 and 12th Street (Exit 79) in Sioux Falls is one of the first interchanges constructed in South Dakota. Figure 1 shows the location of the 12th Street – I-29 Interchange. Geometric deficiencies and the capacity analysis of this interchange indicate that it will be necessary to provide a new interchange. Due to the heavy turning movements and the limited right of way available, particularly on the west side of the interchange, a single point urban interchange is recommended. Figure 2 shows the existing configuration for Exit 79.

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.**

   There are a number of existing geometric deficiencies identified at this interchange. The clear zone provided on Ramps B and D is less than 30 feet. The grade provided on Ramp C is 6%, which exceeds the design criteria of 5%. A 2-foot wide curbed shoulder is provided on Ramp C as well, which is less than the 4-foot criteria. The 18-foot driving lane width on all the ramps, which is less than the recommended 19-foot wide lanes, should be corrected with the new interchange concept. The on-ramp taper rates for Ramps A and C are 21:1 and 28:1, which are well below the design criteria of 50:1. Access is provided along 12th Street only 150 feet west of the west ramp intersection.

   The capacity analysis performed for the existing diamond interchange indicates that the southbound off-ramp intersection is currently operating at Level of Service (LOS) C, and the northbound off-ramp intersection at LOS E. Figure 3 shows the capacity analysis with the existing configuration of exit 70. Figure 4 shows the existing level of service analysis at Exit 82, the Maple St. / Russell St. and I-29 Interchange.

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.**

   Existing characteristics and development in the vicinity of the interchange limited the new interchange design. Due to the limited right of way available and the amount of development adjacent to the interchange, it was determined that a single point interchange would have the least impact on adjacent development and still provide adequate capacity to accommodate the heavy turning movements.

Figure 1

Map of Sioux Falls, South Dakota showing Project Location

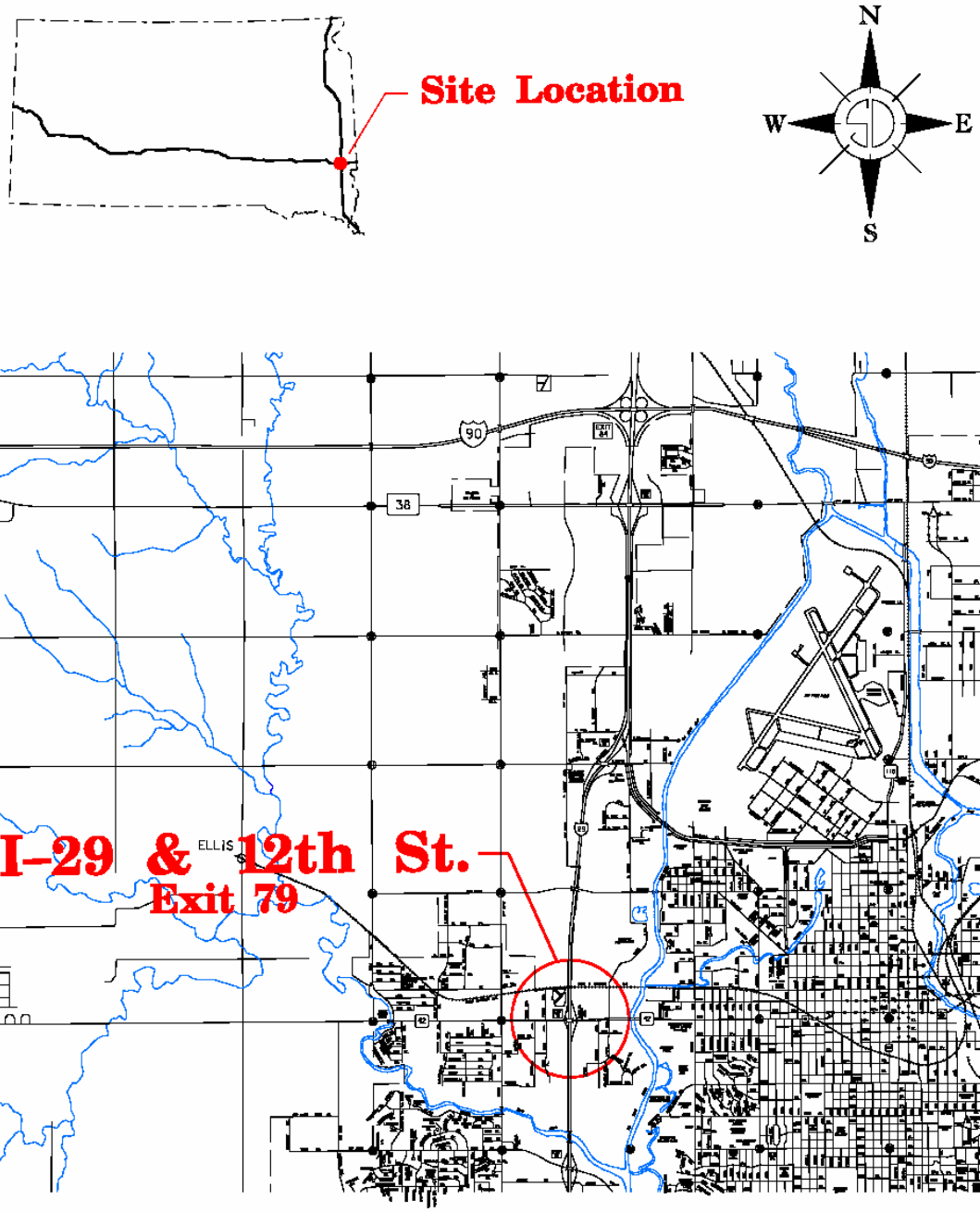


Figure 2

Existing Configuration at I–29 and 12th Street in Sioux Falls, S. D.

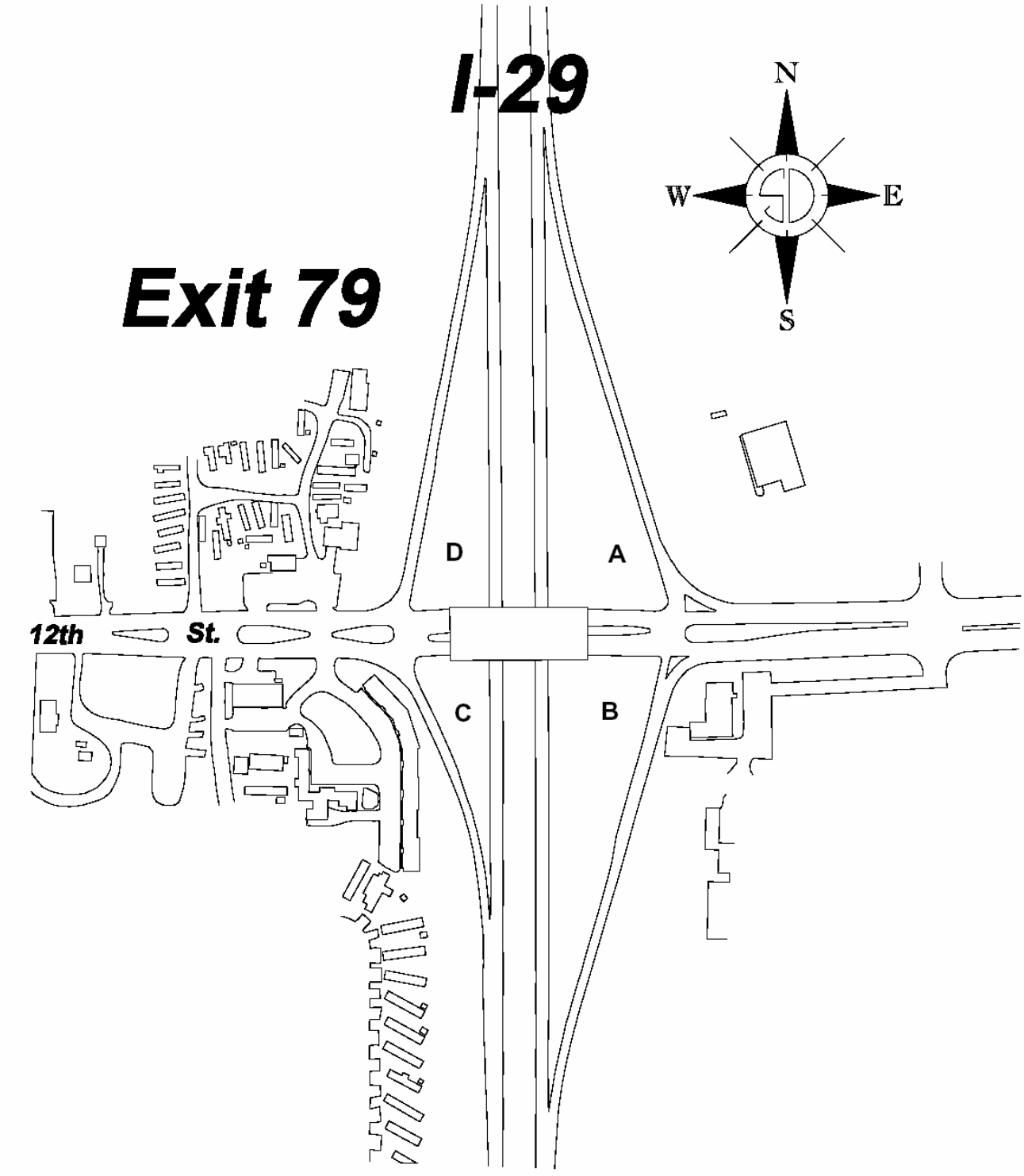


Figure 3

Existing Level of Service at I–29 and 12th Street in Sioux Falls, S. D.

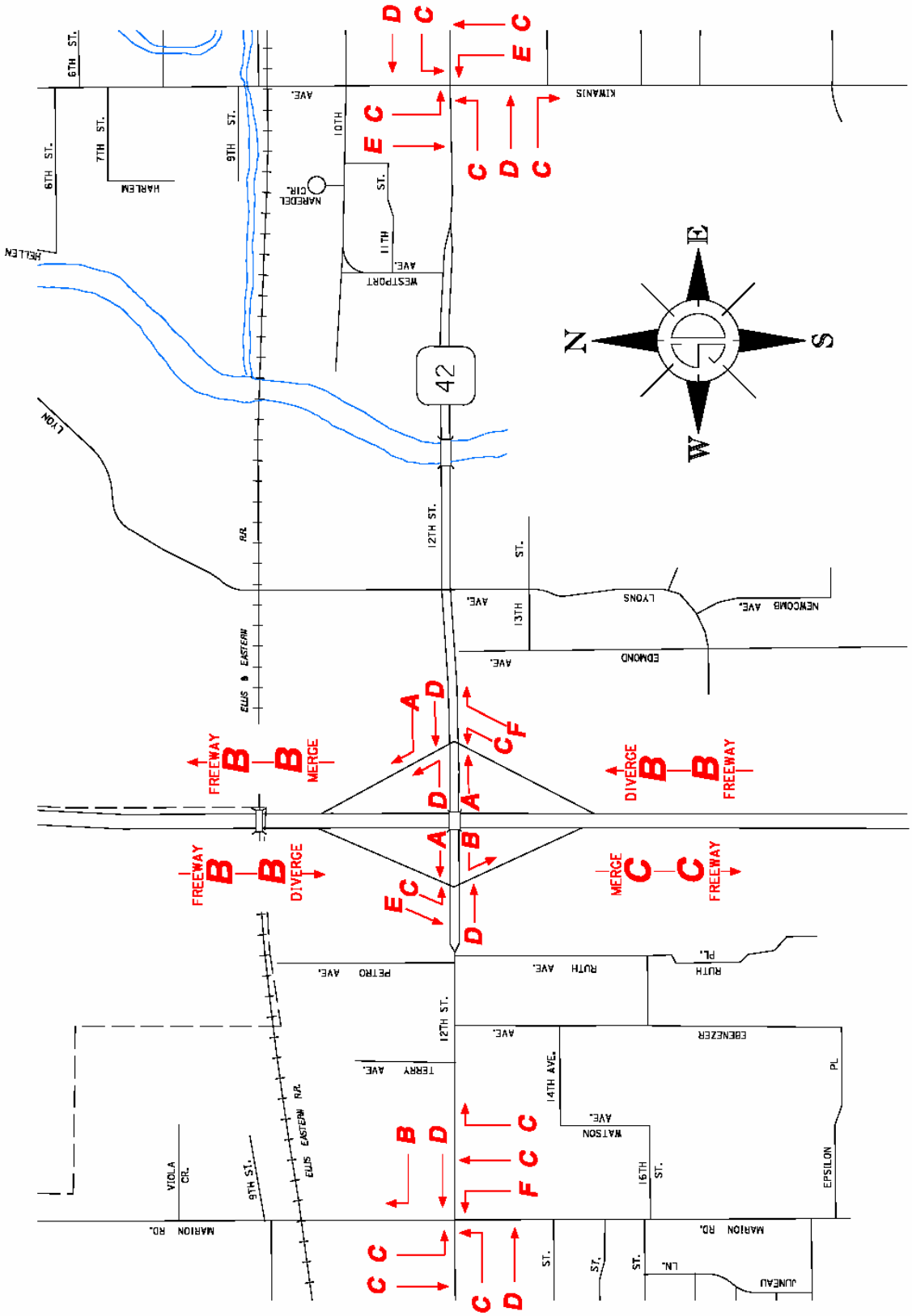
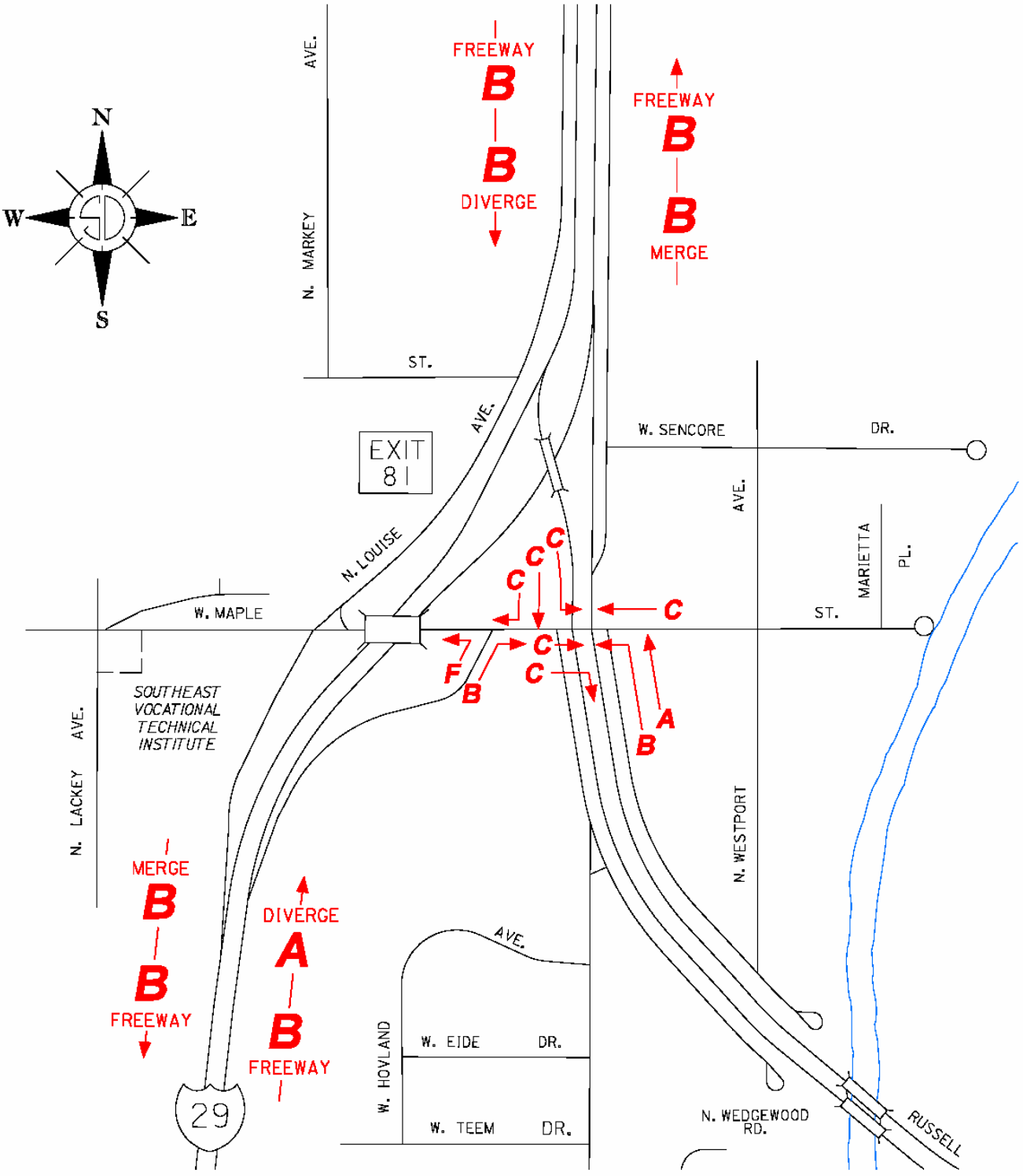


Figure 4

Existing Level of Service at Maple St., Russell St. and I–29 in Sioux Falls, S. D.



The need to provide dual left turn lanes on 12th Street will require that 12th Street be widened to six lanes through the interchange area. The proximity of the active railroad located north of 12th Street requires the existing bridges to be widened to provide acceptable ramp taper lengths. Figure 5 shows the preferred design for Exit 79.

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 single point interchange will improve the safety and operation of I-29 in the future. In 2025 the new interchange will be operating at a LOS C. Both the northbound and southbound merge and diverge movements will be operating a LOS C. Figure 6 shows the 2025 Level of Service projected for the 12th Street – I-29 interchange and the closest crossover road intersections. The proposed interchange modification will not have a negative impact on the interstate system. In 2025, the Madison Street interchange located north of the 12th Street interchange will operate at a LOS C. The northbound diverge and freeway movements will both operate at a LOS B. The southbound merge and freeway movements will operate at LOS C. Figure 7 depicts the 2025 LOS analysis for the Madison Street Interchange with the proposed modification to the 12th Street Interchange. The proposed interchange will not affect the operation of the 26th Street interchange located over a mile south of the 12th Street interchange. It is the intent of the Department to reduce access points near this interchange, which will improve traffic flow on 12th Street.

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 access improvement connects to a public road only and will continue to provide for all traffic movements. The improvement will 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 local land use plans, the STIP and local transportation planning and MPO and State Long Range Plans.

Figure 5

Proposed Configuration at I–29 and 12th Street in Sioux Falls, S. D.

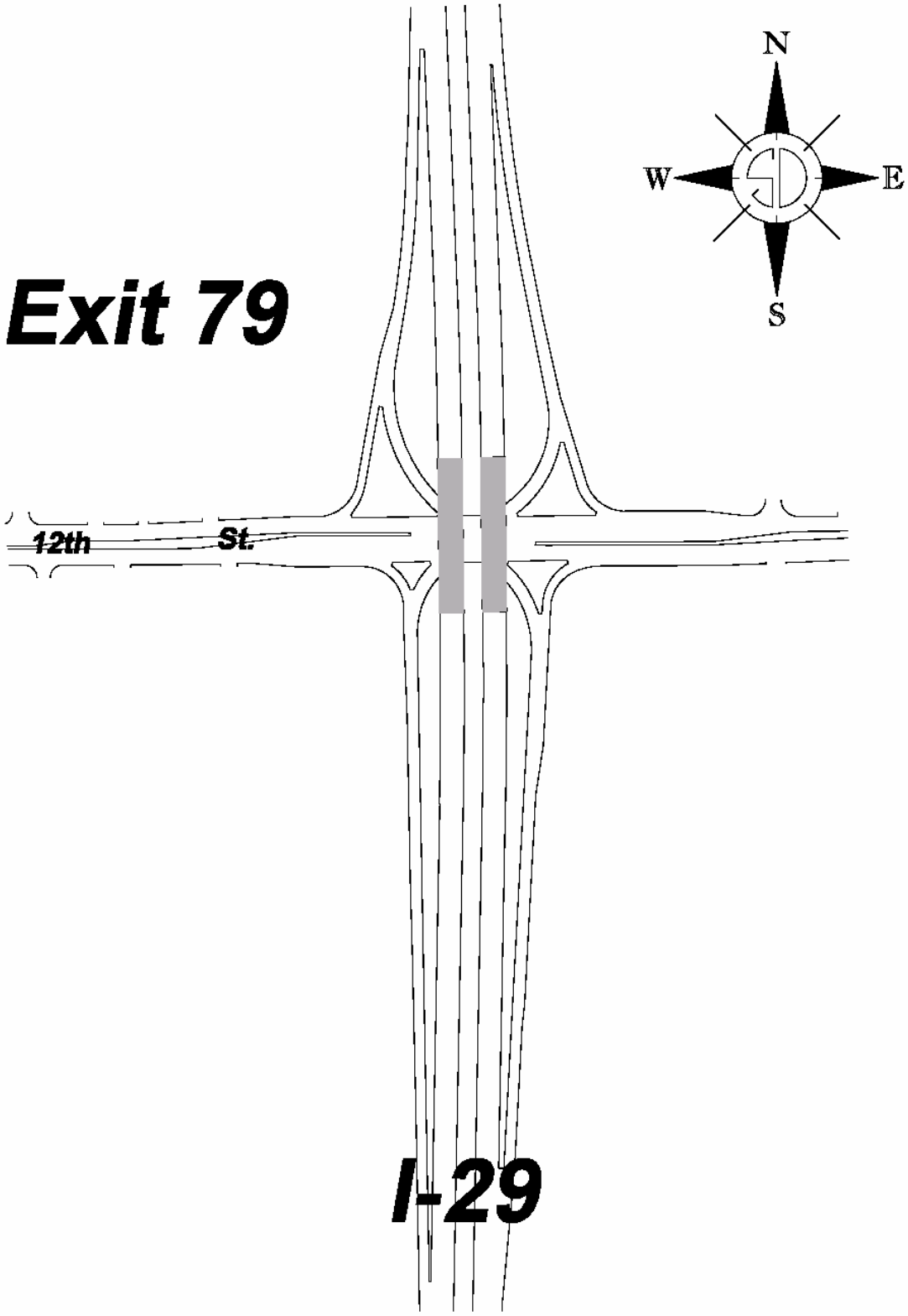


Figure 6

Proposed Level of Service at I–29 and 12th Street in Sioux Falls, S. D. (PM Peak Hour – 2025)

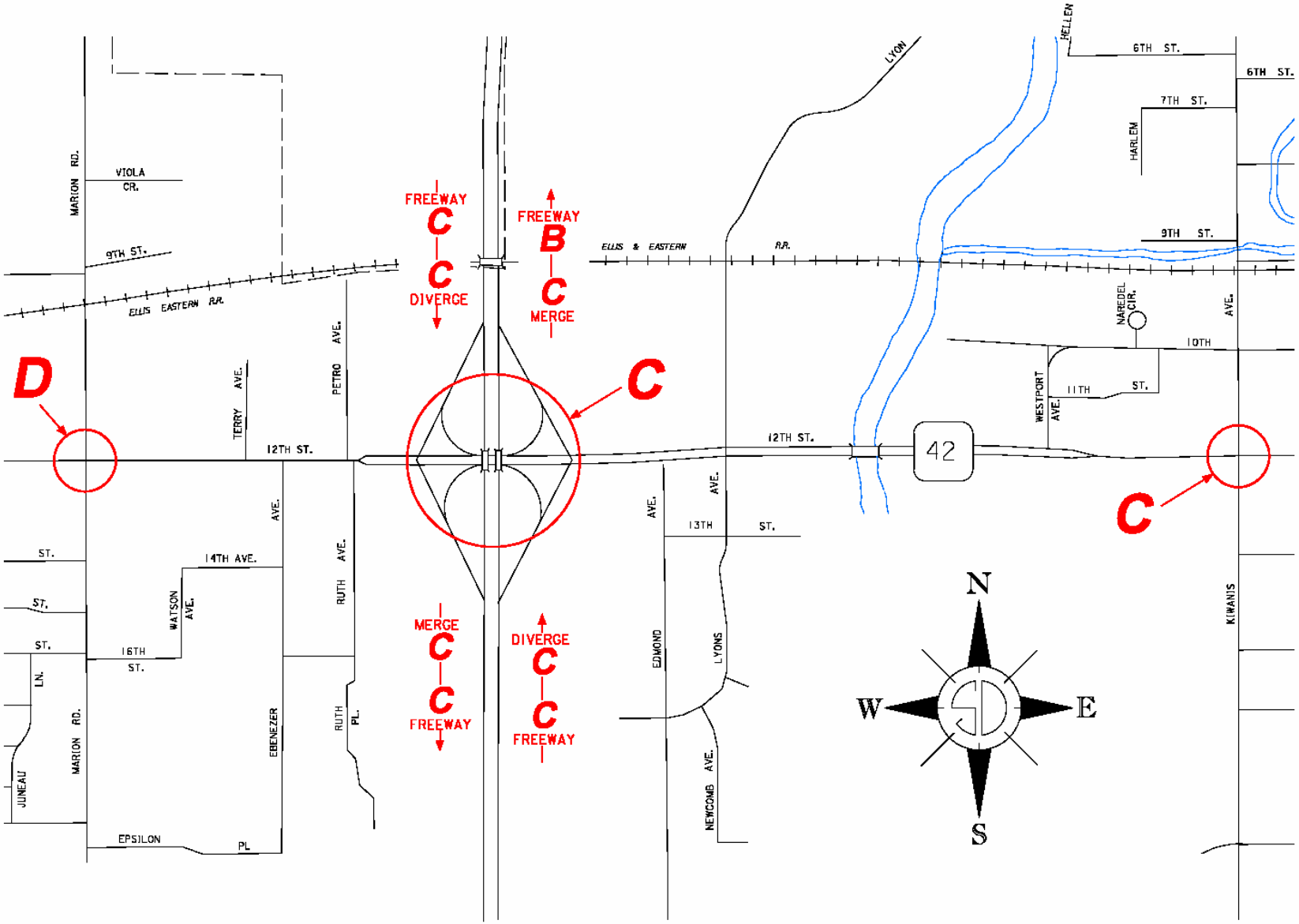
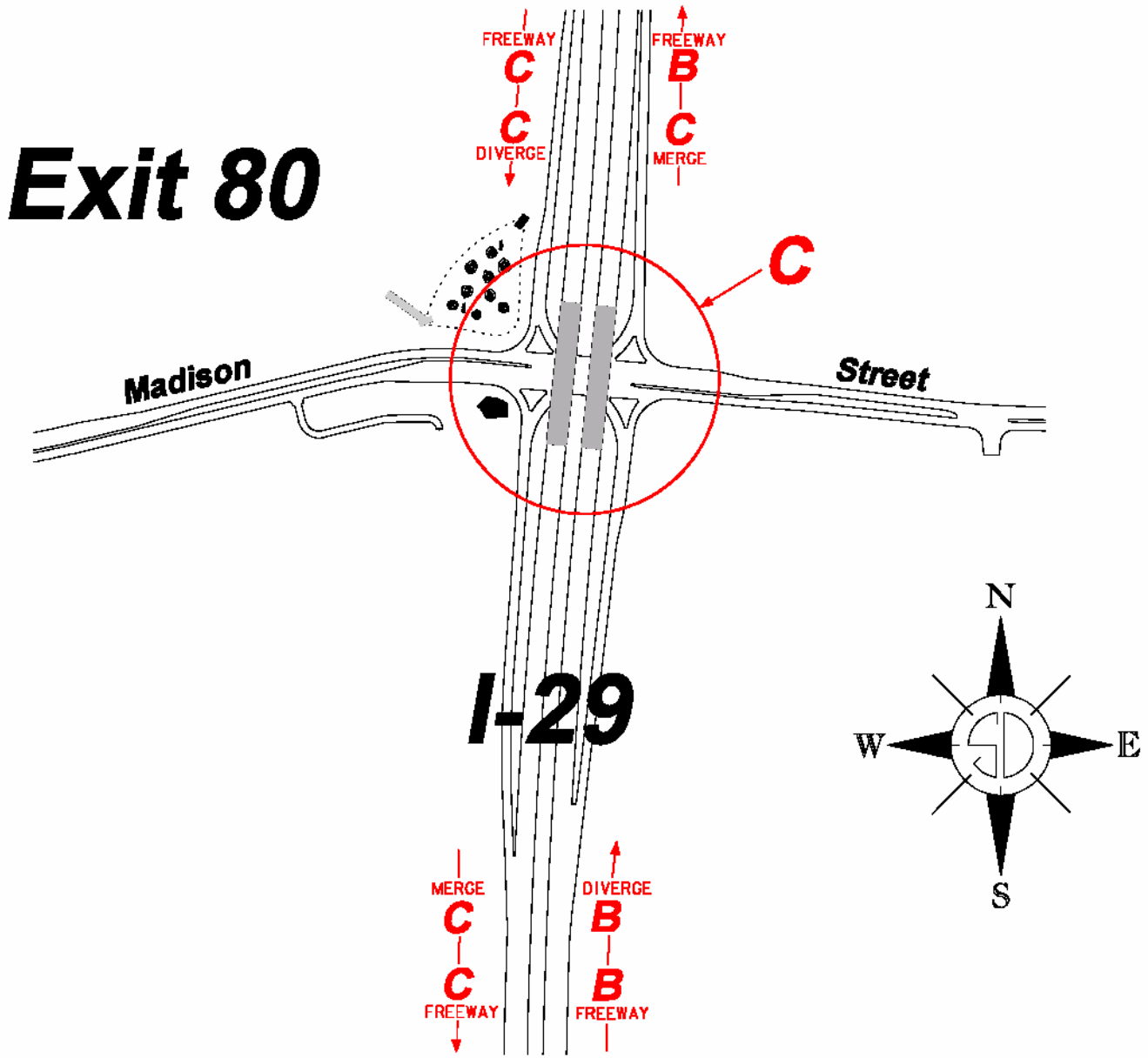


Figure 7

Proposed Level of Service at I–29 and Madison Street in Sioux Falls, S. D.



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.**

   The Department is constructing new interchanges at Exit 82 (Benson Road) and Exit 80 (Madison Street). The South Dakota Interstate Corridor Study completed in February 2001 indicated that when the new interchanges are completed there is no potential for future interchange additions along this segment of Interstate I-29 from 26th Street to I-90.

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.**

   This request for revised access is not the result of new development but corrects problems with the existing interchange configuration. It is the result of the natural growth of the City of Sioux Falls. The transportation system improvements are coordinated with and consistent with this natural growth.

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 status of the environmental processing is a separate part of this request for the revised access.