APPENDIX C

INTERCHANGE OPTIONS

INTERCHANGE ALTERNATIVE EVALUATION

This appendix addresses interchange alternative solutions at the intersection at 57th Street. Specifically, this appendix presents the process used to identify alternatives, describes the preliminary alternatives identified, explains the process for determining which alternatives to carry forward for detailed study, and presents the rationale for selecting the preferred alternative. This appendix also presents the interchange design criteria, identifies the interchange cost, considers environmental issues, and funding sources.

IDENTIFICATION OF INTERCHANGE LOCATIONS AND ALTERNATIVES

The 2003 EA identified four locations considered for grade separated interchanges in order to accommodate either future traffic volumes or geometrics.

- The first identified location is at the intersection of SD100 and South Dakota Highway 115 (SD115) or Minnesota Avenue. The interchange at SD115 was identified as needed due to the geometrics proposed in the 2003 EA Preferred Alternative. However, due to a refinement of the alignment for the Revised Build Alternative (Chapter 2 provides a detailed discussion of the alternatives evaluated for SD100); the interchange is no longer needed.
- The second identified location is in the area where South Dakota Highway 11 (SD11), 69th Street, 57th Street, and SD100 intersect. A traffic study completed by HDR in 2006 (updated in 2011) evaluated traffic volumes and flow without an interchange and confirmed the need for an interchange in this area; two interchange alternatives were analyzed at this location (HDR, 2006a).
- The third identified location in the 2003 EA is at the intersection of Rice Street and SD100. The traffic study completed in 2006 (updated in 2011) confirmed the need for a grade separated interchange in this area. A subsequent feasibility study completed by the City of Sioux Falls identified a future extension of Benson Road replacing Rice Street as the primary commuting route in northeast Sioux Falls. The interchange options will be discussed as part of the Northern Segment Supplemental EA.
- The fourth location identified in the 2003 EA was at I-90; the interchange options will be considered as part of the Northern Segment Supplemental EA.

Criteria used to evaluate interchange alternatives included construction and ROW costs, the ability to meet design criteria, constructability, adequately accommodate future traffic volumes, property impacts, and other environmental issues.

Build Alternative Options

Throughout South Dakota, two types of interchanges predominate: a diamond interchange and a single point interchange (SPI). The diamond interchange is prevalent along the interstate system in rural areas and the SPI is becoming the norm in urban areas where right-of-way (ROW) is expensive. Variations of the diamond interchange were evaluated for particular areas of this Project.

At the intersection of 57th Street and SD100, which is in the vicinity of the current 57th Street/SD11 intersection, the interchange options developed for comparison include a folded diamond interchange and a SPI. Figure C-1 shows the folded diamond option and Figure C-2 shows the single point option.

Comparisons of the impacts of each interchange type at 57th Street are discussed below. A more detailed description of potentially affected resources as well as potential impacts from traffic and maintenance of the improved transportation system can be found in Chapter 3, Affected Environment and Environmental

Impacts for the preferred interchange option at 57th Street. A brief summary of each interchange type along with an overview of advantages and disadvantages of each interchange type is summarized below.

57th Street Interchange

Folded Diamond Interchange – This type of interchange consists of all ramps located on only one side of the intersecting street. In the case of the folded diamond interchange located at 57th Street, the ramps are located to the north of 57th Street. The loops would accommodate northbound off and southbound movements. The primary reason for developing this option was to create maximum separation between the 69th Street and the ramp gores. Traffic would be controlled by two separate signals located at the northbound and southbound ramp junctions.

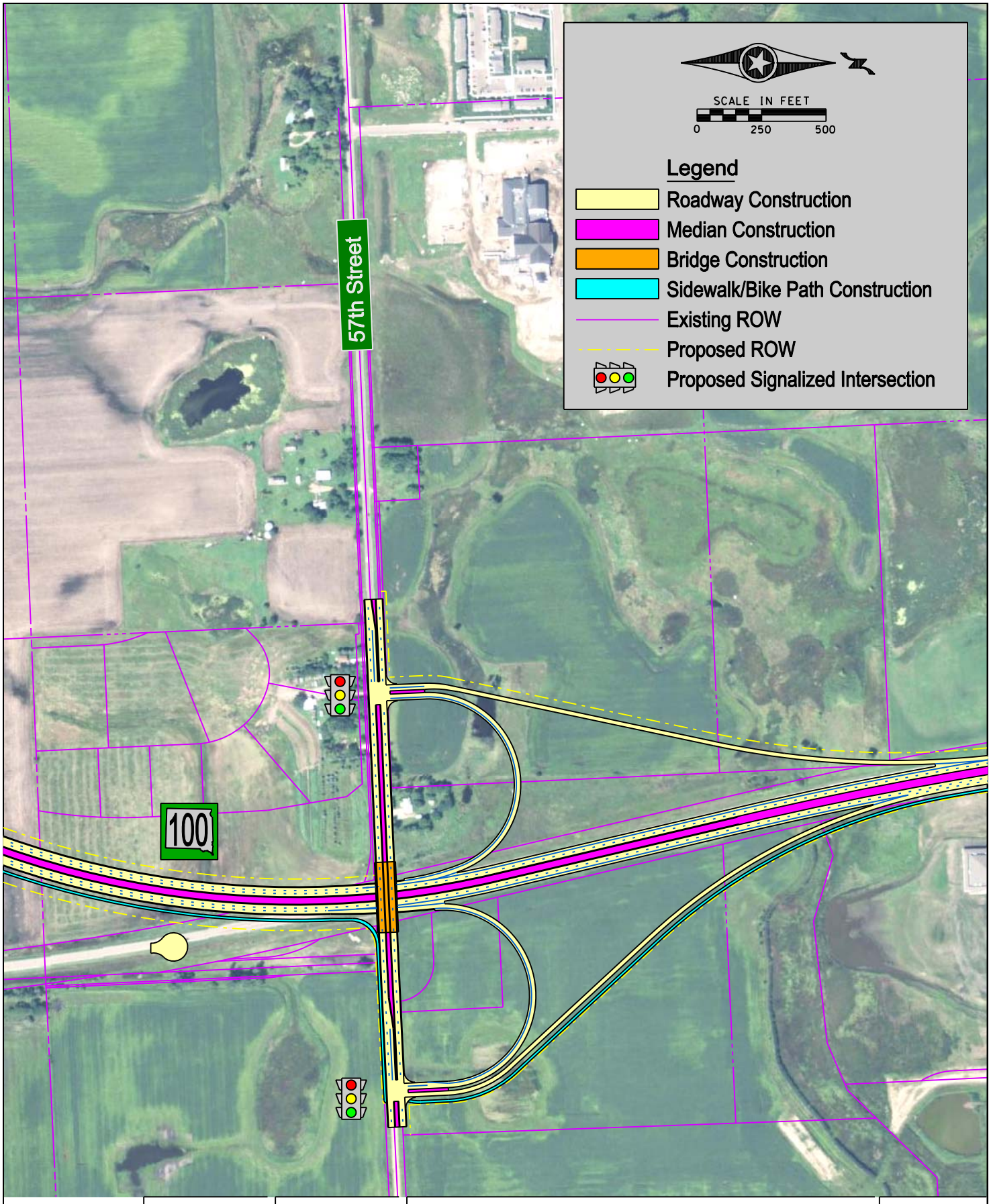
- **Advantages**
  - Typical interchange – familiarity
  - Lowest construction cost of options developed
- **Disadvantages**
  - Increased ROW needs
  - Increase of wetland impacts of approximately 3 acres more than the SPUI

Single Point Interchange – This type of interchange is best suited for urban areas where ROW acquisition is limited and expensive. The SPI essentially combines two separate diamond ramp intersections into one large intersection which accommodates all vehicular movements and is controlled by a single traffic signal. The other unique concept of the SPI is that opposing left turning movements are to the left of each other.

- **Advantages**
  - Reduced ROW needs
  - Increased traffic capacity
  - Driver familiarity
  - Reduce wetland impacts by approximately 3 acres than the Folded Diamond Interchange
- **Disadvantages**
  - Higher construction costs

PREFERRED INTERCHANGE OPTIONS

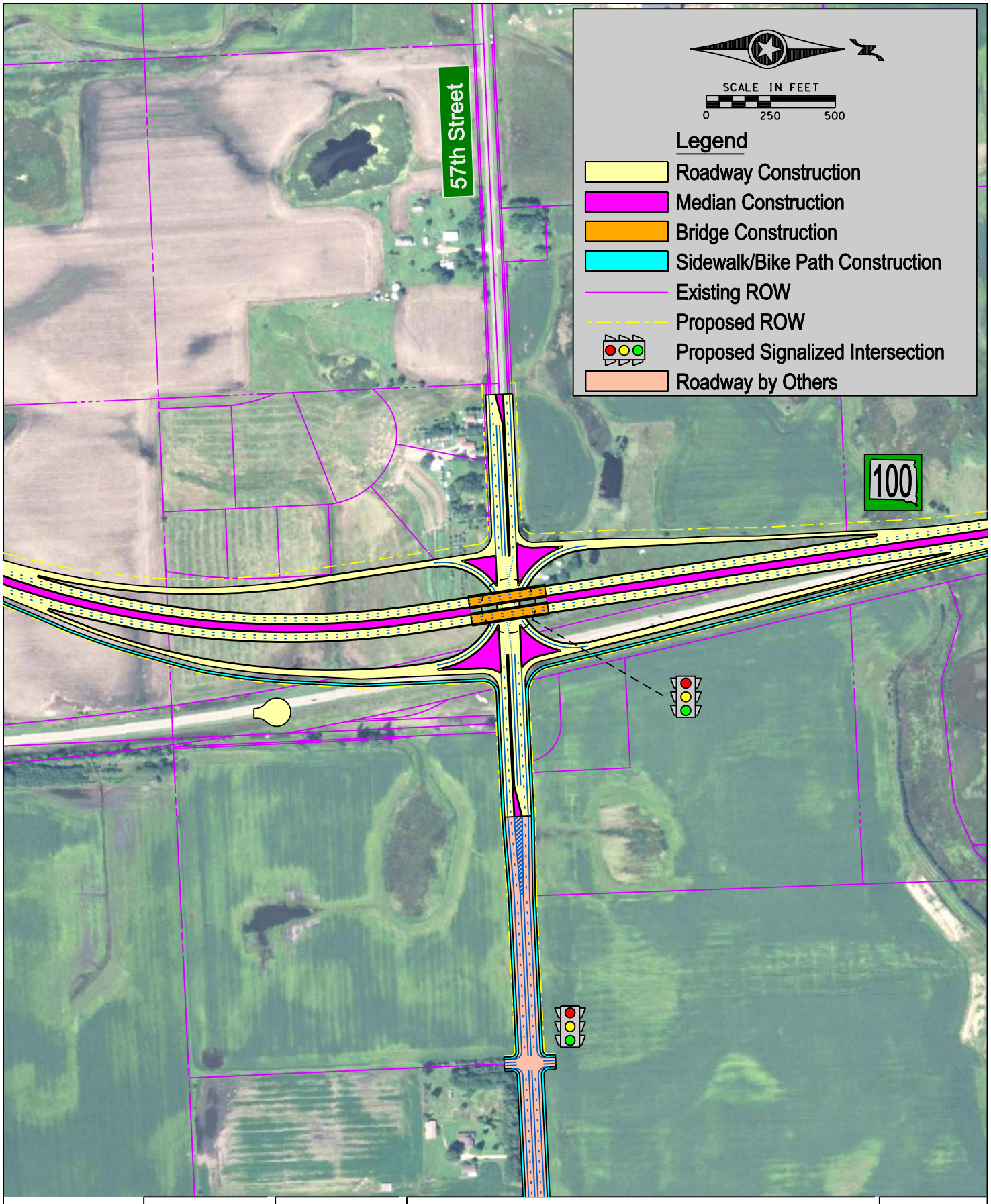
Based on an evaluation of advantages and disadvantages of the options identified for the 57th Street Interchange, the SPI has been identified as the preferred interchange for the Revised Build Alternative.



Folded Diamond at SD100 / 57th Street

Eastside Corridor (SD100) - I-29 to South of 26th Street

Figure C-1



Single Point at SD100 / 57th Street

Eastside Corridor (SD100) - I-29 to South of 26th Street

Figure C-2