

## SEGMENT 4 - US 41: SOUTH OF WIS 15 STRUCTURES TO WEST OF COUNTY E (4.980 MILES)

### 4.1 Existing Conditions

#### Traffic and Operations Summary

Mainline traffic forecasts were developed for each section of segment 4 through consultation with WisDOT Traffic Forecasting section. The K30 hourly volume projections developed using the Northeast Region travel demand model for year 2038 indicate three lanes each direction, with residual hourly capacities of over 150 vehicles per hour for all sections. Traffic Analysis Forecasting Information System (TAFIS) generated K30 projections indicate a need for three lanes, with residual capacity of over 500 vehicles per hour. Auxiliary lanes and a collector-distributor system tying to segment 5 will help address traffic operational issues in this segment. Additional detail concerning the traffic forecasts is available in the Traffic Forecasting Methodology memo in Appendix 1.

#### Safety Summary

The US 41 Interstate Conversion project has assessed crash data for a three year period along this segment of US 41. Table 4-1 below identifies the segments that exceed statewide averages for the same three year period.

**Table 4-1: Segment 4 – US 41 Crash Data**

| SECTION                                                         | CRITERIA                               | 3-YEAR AVERAGE RATE* | SEGMENT RATE* |
|-----------------------------------------------------------------|----------------------------------------|----------------------|---------------|
| North of Capital Dr to Soo Line Railroad (MM 140.0 to MM 141.0) | Total fatal and incapacitating crashes | 1.7 (Urban)          | 3.6           |
| Soo Line Railroad to WIS 47 (MM 141.0 to MM 142.0)              | Total fatal and incapacitating crashes | 1.7 (Urban)          | 3.7           |
| WIS 47 to Meade St (MM 142.0 to MM 143.0)                       | Total fatal crashes                    | 0.2 (Urban)          | 1.9           |
| Meade St to County E (MM 143.0 to MM 144.0)                     | Total fatal and incapacitating crashes | 1.7 (Urban)          | 4.0           |

\* 3-Year Average Rate (2005-2007) represents the Wisconsin statewide average number of crashes per 100 million vehicle miles traveled for urban and rural facilities. The Segment Rate represents the actual number of crashes per 100 million vehicle miles traveled for the mainline section listed.

#### Roadway Summary

The US 41 Interstate Conversion project has quantified existing geometric deficiencies that require action. Table 4-2 below identifies the deficiencies.

**Table 4-2: Segment 4 – Roadway Geometric Deficiencies**

| SECTION                                      | MILE MARKER    | CRITERIA                                          | ACTUAL VALUE                               |
|----------------------------------------------|----------------|---------------------------------------------------|--------------------------------------------|
| WIS 15 to WIS 47<br>(MM 139.0 to MM 142.0)   | 139.2 to 139.4 | Min. Vertical Grade = 0.5%<br>Desired = 0.3% min. | 0.20%                                      |
|                                              | 129.9 to 130.0 | Superelevation R = 3820'<br>Desired SE = 4.5%     | SE = 4.2%<br>Appropriate speed<br>= 65 mph |
|                                              | 140.5 to 140.6 | Min. Vertical Grade = 0.5%<br>Desired = 0.3% min. | 0.28%                                      |
| WIS 47 to County E<br>(MM 142.0 to MM 144.0) | 143.6 to 143.7 | Min. Vertical Grade = 0.5%<br>Desired = 0.3% min. | 0.10%                                      |

## Structures Summary

### *Bridges*

Summary of existing bridge conditions from Highway Structure Information are shown in Table 4-3 (page 4-3) and include bridge number, mile marker, bridge name, girder type, year built, year widened or raised, overlay or new deck year, current deck state, national bridge index values for deck, superstructure and substructure, sufficiency rating and inventory ratings as of October 31, 2012.

Summary of existing bridge geometry is shown in Table 4-4 (page 4-4) and includes bridge number, mile marker, bridge name, girder type, girder depth in inches, vertical clearance, superelevation and direction of super, clear bridge width, bridge length, number of spans, span configuration, bridge skew and cross road typical section.



Table 4-3: Segment 4 – Summary of Existing Bridge Conditions

| BRIDGE NUMBER | MILE MARKER (MM) | BRIDGE NAME                         | GIRDER TYPE                      | YEAR BUILT | YEAR WIDENED OR RAISED | YEAR OVERLAY OR NEW DECK | CURRENT DECK STATE            | NBI <sup>1</sup> DECK | NBI <sup>1</sup> SUPER | NBI <sup>1</sup> SUB | SUFFICIENCY RATING <sup>2</sup> | INVENTORY RATING <sup>3</sup> |
|---------------|------------------|-------------------------------------|----------------------------------|------------|------------------------|--------------------------|-------------------------------|-----------------------|------------------------|----------------------|---------------------------------|-------------------------------|
| B-44-0177     | 139.0            | WIS 15 EB Bridge Over US 41         | Prestressed Concrete Deck Girder | 1997       | N/A                    | N/A                      | Original                      | 7                     | 8                      | 8                    | 97                              | 22                            |
| B-44-0178     | 139.0            | WIS 15 WB Bridge Over US 41         | Prestressed Concrete Deck Girder | 1997       | N/A                    | N/A                      | Original                      | 7                     | 8                      | 8                    | 98                              | 22                            |
| B-44-0024     | 139.55           | Capital Drive Bridge Over US 41     | Continuous Steel Deck Girder     | 1960       | 2009                   | N/A                      | Original and Raised           | 8                     | 6                      | 7                    | 82.4                            | 18                            |
| B-44-0140     | 140.5            | County A Bridge Over US 41          | Prestressed Concrete Deck Girder | 2005       | N/A                    | N/A                      | Original                      | 8                     | 8                      | 8                    | 91.9                            | 21                            |
| B-44-0020     | 141.0            | US 41 SB Bridge Over Soo Line       | Prestressed Concrete Deck Girder | 1960       | N/A                    | 2006                     | Original and Concrete Overlay | 7                     | 7                      | 6                    | 81                              | 30                            |
| B-44-0021     | 141.0            | US 41 NB Bridge Over Soo Line       | Prestressed Concrete Deck Girder | 1960       | N/A                    | 2006                     | Original and Concrete Overlay | 8                     | 7                      | 6                    | 81                              | 30                            |
| B-44-0028     | 141.25           | US 41 SB Bridge Over Gillett Street | Continuous Concrete Haunch Slab  | 1961       | N/A                    | 2006                     | Original and Concrete Overlay | 7                     | 7                      | 6                    | 80                              | 21                            |
| B-44-0029     | 141.25           | US 41 NB Bridge Over Gillett Street | Continuous Concrete Haunch Slab  | 1961       | N/A                    | 2006                     | Original and Concrete Overlay | 7                     | 7                      | 6                    | 80                              | 21                            |
| B-44-0035     | 142.0            | WIS 47 SB Bridge Over US 41         | Prestressed Concrete Deck Girder | 1961       | N/A                    | 1982                     | Original and Concrete Overlay | 5                     | 5                      | 5                    | 67.4                            | 20                            |
| B-44-0036     | 142.0            | WIS 47 NB Bridge Over US 41         | Prestressed Concrete Deck Girder | 1961       | N/A                    | 1983                     | Original and Concrete Overlay | 5                     | 5                      | 5                    | 67.3                            | 21                            |
| B-44-0171     | 143.0            | Meade Street Bridge Over US 41      | Concrete Deck Girder             | 1996       | N/A                    | N/A                      | Original                      | 8                     | 8                      | 8                    | 95.4                            | 22                            |

1 The Federal Highway Administration (FHWA) Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges (Coding Guide) is the basis for the National Bridge Inventory (NBI) Inspection. Each bridge component, i.e. deck, superstructure, or substructure, is assigned a numeric rating code ranging from 9 to 0, with 9 being "excellent condition" and 0 being "failed condition". A bridge becomes structurally deficient when the condition of the deck, superstructure, or substructure condition is 4 or less.

2 Following a thorough review of the deck, superstructure and substructure, bridges are assigned a "sufficiency rating" number between one and 100. The rating takes into account some 75 factors reviewed during a bridge inspection and also considers a bridge's age, length and width, and the average amount of traffic the bridge handles. WisDOT uses the sufficiency ratings to help prioritize bridge improvements. A bridge with a sufficiency rating of 80 or less is eligible for bridge rehabilitation funding. A bridge with a sufficiency rating of 50 or less is eligible for replacement funding. Each year, all states including Wisconsin are required to submit a report to the FHWA that reviews the condition of its bridges.

3 The FHWA currently requires that two capacity ratings, referred to as the Inventory Rating and Operating Rating be submitted with the NBI file. The Inventory Rating is the load level that a structure can safely sustain for an indefinite period. The Operating Rating is the absolute maximum permissible load level to which a structure may be subjected. The FHWA requires that the standard AASHTO HS truck or lane loading be used as the vehicle when load rating with the Load Factor Rating method (LFR) and that the AASHTO HL-93 loading be utilized as the vehicle when load rating with the Load and Resistance Factor method (LRFR). The above table is shown in LFR using the AASHTO HS truck standard. Bridges are not eligible for replacement unless the Inventory Rating is HS10 or less.

Table 4-4: Segment 4 – Summary of Existing Bridge Geometry

| BRIDGE NO. | MILE MARKER (MM) | BRIDGE NAME                                                   | GIRDER TYPE                      | GIRDER DEPTH (INCHES) | VERTICAL CLEARANCE (FEET) | SUPER-ELEVATION % | BRIDGE CLEAR WIDTH (FEET) | BRIDGE LENGTH (FEET) | NUMBER OF SPANS | SPAN CONFIGURATION (FEET) | BRIDGE SKEW    | LOCAL ROAD TYPICAL SECTION                                                                                                       |
|------------|------------------|---------------------------------------------------------------|----------------------------------|-----------------------|---------------------------|-------------------|---------------------------|----------------------|-----------------|---------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------|
| B-70-0049  | 130.7            | US 41 SB Bridge Over Cecil Street                             | Prestressed Concrete Deck Girder | 45                    | 14.95                     | 4.1 LT            | 68.25                     | 137.05               | 3               | 27.48/74.44/31.47         | 16° 51' LF     | End Span: 2:1 Slope paving; Main Span: 1-12' lane and 1-10' shoulder with c&g each direction, 10' terrace                        |
| B-70-0050  | 130.7            | US 41 NB Bridge Over Cecil Street                             | Prestressed Concrete Deck Girder | 45                    | 15.45                     | 4.1 LT            | 68.25                     | 135.88               | 3               | 28.04/74.11/30.05         | 16° 51' LF     | End Span: 2:1 Slope paving; Main Span: 1-12' lane and 1-10' shoulder with c&g each direction, 10' terrace                        |
| B-70-0123  | 131.0            | US 41 SB Bridge Over WIS 114                                  | Prestressed Concrete Deck Girder | 54                    | 17.13                     | 5.0 RT            | 56.25                     | 199.52               | 2               | 98.0/98.0                 | 5° 16' 10" RF  | End Spans: 11' median; 3-12' lanes with c&g each direction, 19' terrace, 2:1 slope paving                                        |
| B-70-0124  | 131.0            | US 41 NB Bridge Over WIS 114                                  | Prestressed Concrete Deck Girder | 54                    | 17.09                     | 5.0 RT            | 56.25                     | 199.52               | 2               | 98.0/98.0                 | 5° 16' 10" RF  | End Spans: 11' median; 3-12' lanes with c&g each direction, 19' terrace, 2:1 slope paving                                        |
| B-70-0125  | 132.0            | US 41 SB Bridge Over Main Street                              | Prestressed Concrete Deck Girder | 45                    | 15.62                     | NC; Ramp 6.0      | Varies 68.48 to 81.55     | 149.5                | 3               | 32.0/82.0/32.0            | 2° 29' 32" RF  | End Spans: 2:1 slope paving; Middle Span: 4' median, 2-12' lanes with c&g in each direction, 10' terrace                         |
| B-70-0126  | 132.0            | US 41 NB Bridge Over Main Street                              | Prestressed Concrete Deck Girder | 45                    | 17.89                     | NC                | 56.25                     | 149.5                | 3               | 32.0/82.0/32.0            | 2° 29' 32" RF  | End Spans: 2:1 slope paving; Middle Span: 4' median, 2-12' lanes with c&g in each direction, 10' terrace                         |
| B-70-0127  | 132.2            | US 41 SB Bridge Over North Street                             | Prestressed Concrete Deck Girder | 36                    | 15.15                     | NC                | 68.25                     | 136.77               | 3               | 32.0/69.25/32.0           | 4° 27' 02" RF  | End Spans: 2:1 slope paving; Middle Span: 4' median, 2-12' lanes with c&g in each direction, 10' terrace                         |
| B-70-0128  | 132.2            | US 41 NB Bridge Over North Street                             | Prestressed Concrete Deck Girder | 36                    | 17.25                     | NC                | 56.25                     | 136.77               | 3               | 32.0/69.25/32.0           | 4° 27' 02" RF  | End Spans: 2:1 slopes; Middle Span: 2-12' lanes with c&g in each direction, 6' terrace                                           |
| B-70-0129  | 132.7            | US 41 SB Bridge Over County II                                | Prestressed Concrete Deck Girder | 54                    | 17.25                     | NC                | 56                        | 208.6                | 2               | 105.0/100.0               | 14° 22' RF     | End Spans: 14' median; 3-12' lanes with c&g each direction, 18' terrace, 2:1 slope paving                                        |
| B-70-0130  | 132.7            | US 41 NB Bridge Over County II                                | Prestressed Concrete Deck Girder | 54                    | 18.28                     | NC                | 56                        | 208.58               | 2               | 105.0/100.0               | 11° 00' RF     | End Spans: 14' median; 3-12' lanes with c&g each direction, 18' terrace, 2:1 slope paving                                        |
| B-70-0131  | 133.0            | US 41 SB Bridge Over American Drive/North Green Bay Road/CNRR | Continuous Steel Deck Girder     | 54                    | 24.42*                    | 5.9 RT            | 68                        | 281.5                | 2               | 135.5/140.0               | 41° 25' 28" LF | Span 1: 2:1 slope paving, 2-12' lanes with c&g in each direction, 4' terrace; Span 2: ditches with Railroad and 2:1 slope paving |
| B-70-0132  | 133.0            | US 41 NB Bridge Over American Drive/North Green Bay Road/CNRR | Continuous Steel Deck Girder     | 54                    | 23.18*                    | 5.9 RT            | 68                        | 281.5                | 2               | 135.5/140.0               | 41° 25' 28" LF | Span 1: 2:1 slope paving, 2-12' lanes with c&g in each direction, 4' terrace; Span 2: ditches with Railroad and 2:1 slope paving |
| B-70-0210  | 133.7            | North Lake Street/Jacobsen Road Bridge Over US 41             | Steel Deck Girder                | 54                    | 16.24                     | NC                | 34                        | 391.92               | 3               | 145.0/95.0/145.0          | 41° 30' LF     | 2-12' lanes with 4' or 6' shoulders and 10' sidewalk along north side of bridge                                                  |
| B-70-0133  | 134.8            | US 41 SB Bridge Over Menasha Creek                            | Prestressed Concrete Deck Girder | 36                    | N/A                       | Super Transition  | 69                        | 41.69                | 1               | 38.0                      | 18° 00' LF     | N/A                                                                                                                              |
| B-70-0134  | 134.8            | US 41 SB Bridge Over Menasha Creek                            | Prestressed Concrete Deck Girder | 36                    | N/A                       | Super Transition  | 69                        | 41.69                | 1               | 38.0                      | 18° 00' LF     | N/A                                                                                                                              |

**Legend:**  
RT = Superelevation Right  
NC = Normal Crown  
LT = Superelevation Left  
LF = Left Forward  
RF = Right Forward  
N/A = Not Applicable  
c&g = Curb and Gutter

### Pre-NEPA Environmental Screening Summary

Impacts within Segment 4 mainly consist of “medium” and some “low” impact items. Low impact items generally include potential impacts on agriculture and aesthetics, as this segment uniquely intertwines commercial, residential, and natural land uses creating potential impacts on many different types of resources in the area.

Medium impact items generally include potential impacts on economic resources, community and residential resources, streams and floodplains, environmental justice, air quality, noise, and the ever present potential for erosion, storm water, historic, and archaeological impacts. Even though the perceived risk of impact is considered medium, further consideration will be needed to gain a better understanding of any imminent impacts, their severity, and mitigation or avoidance measures.

High impact items include impacts on Section 4(f) resources. General discussion about these impacts can be seen below. Further information on environmental impacts can be seen in the Pre-NEPA Environmental Screening located in Appendix 4.

#### *WIS 15 to WIS 47*

No environmental factors are rated as “high” impact.

#### *WIS 47 to County E*

##### Section 4(f)

Apple Creek Trail, a multi-use path, is located just north of US 41 between N. Meade Street and County E. Expansion of US 41 would impact the horizontal alignment of the trail and require the realignment of the trail.

A historic Native American archaeological site exists on the west side of the County E interchange and spans across US 41. Eligibility for the National Register of Historic Places (NRHP) needs to be confirmed.

Section 4(f) may apply to this segment if right-of-way is acquired from the Apple Creek Trail as indicated in conceptual design plans. Section 4(f) may also apply if work is done outside existing right-of-way and within the archaeological site’s established limits and is found eligible for the NRHP.

## 4.2 Expansion Design Concept

### Mainline Segment 4

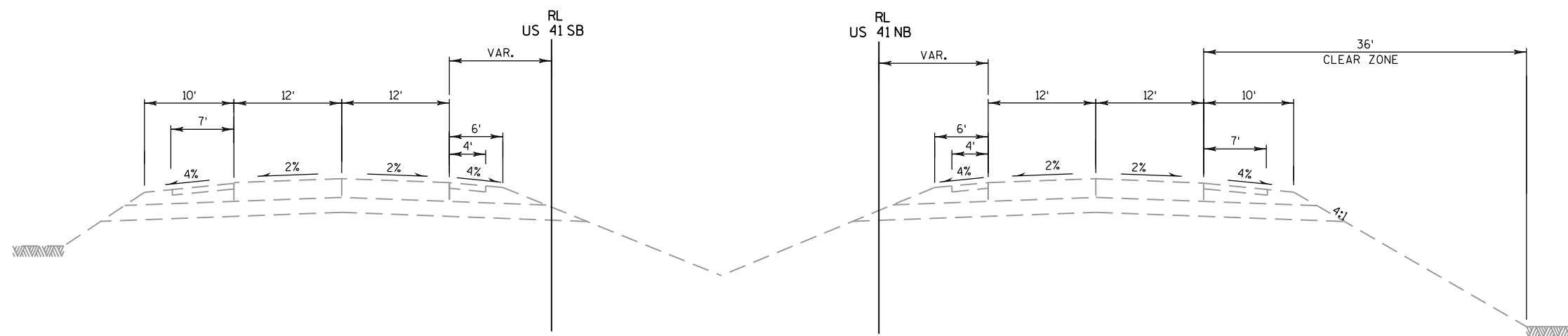
For ease in discussion, Segment 4 – US 41: South of WIS 15 Structures to West of County E was broken into mainline sections with limits at interchange cross roads.

***Section 1: South of WIS 15 Structures to WIS 47 (Richmond Street)*****US 41 Alignment**

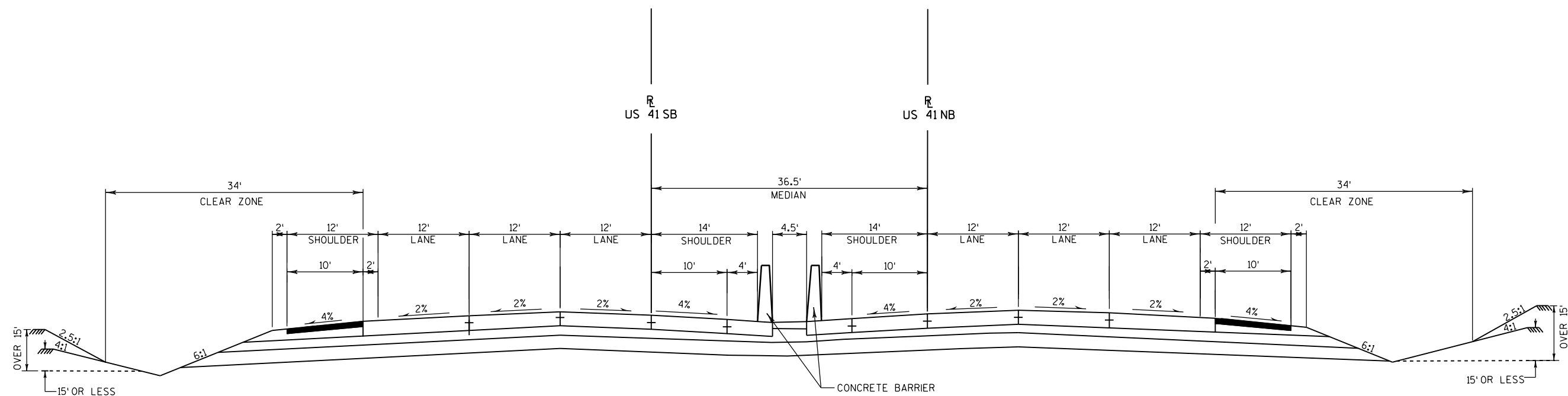
This segment of US 41 is on existing alignment with the additional expansion lanes placed within the median.

**US 41 Typical Section**

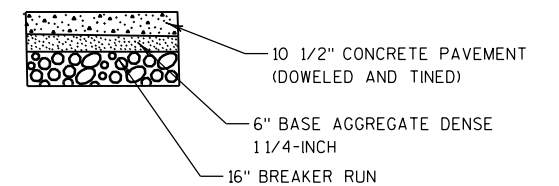
Between WIS 15 and WIS 47 Interchanges, the mainline typical section consists of a 36.5' median (14' inside shoulders with 56-inch single face barriers). US 41 has 3 – 12' lanes and 12' northbound and southbound outside shoulders with 42-inch single face barrier for portions of the section with tight right-of-way, frontage road, or noise structure constraints. Refer to Figure 4-1 (page 4-7) for US 41 Roadway Typical Section.



**TYPICAL EXISTING SECTION**  
US 41 (SOUTH OF WIS 15 TO WIS 47 INTERCHANGE)



**DESIRABLE PROPOSED SECTION**  
US 41 (SOUTH OF WIS 15 TO WIS 47 INTERCHANGE)



NOTE: THE ASSUMED SECTION USED FOR COST ESTIMATE PURPOSES.

### US 41 Ramps and Auxiliary Lanes

Review all exit ramp configurations for single or dual lane needs.

Refer to Exhibit 4-1 (page 4-10) for further discussion on the WIS 15 southbound on-ramp configuration (4-1-A).

Refer to Exhibit 4-2 (page 4-11) for further discussion on the WIS 15 southbound off-ramp configuration and parallel deceleration lane (4-1-B).

Refer to Exhibit 4-2 (page 4-11) for further discussion on the WIS 15 northbound on-ramp configuration and parallel acceleration lane (4-1-C).

Refer to Exhibit 4-6 (page 4-15) for further discussion on the WIS 47 southbound on-ramp configuration and coordination with Project ID 1130-33-00 (4-1-D).

Refer to Exhibit 4-6 (page 4-15) for further discussion on the WIS 47 northbound off-ramp configuration and coordination with Project ID 1130-33-00 (4-1-E).

### Frontage Roads

Refer to Exhibit 4-2 and Exhibit 4-3 (page 4-11 and page 4-12 respectively) for discussion on North Rifle Range Road/West Grand Chute Boulevard frontage road and concrete barrier requirements (4-1-F).

### Addressing Geometric Deficiencies

All geometric deficiencies are anticipated to be corrected during the long-term improvement expansion project (4-1-G). Refer to Exhibit 4-2 (page 4-11) for discussion on the deficient vertical grade (MM 139.2 to MM 139.4). Refer to Exhibit 4-2 and Exhibit 4-3 (page 4-11 and page 4-12 respectively) for deficient horizontal curve superelevation at MM 140.1. Refer to Exhibit 4-3 (page 4-12) for discussion on the deficient vertical grade (MM 140.5 to MM 140.6).

### Right-of-Way Impacts

Conceptual plans do not show any right of way impacts, however a detailed design that incorporates vertical design and slope intercepts may identify additional locations for concrete barrier or beam guard used with steeper slopes to minimize right of way impacts. Based upon future cost analysis, it may be economical to purchase additional strip acquisitions.

### Utilities

The following utilities are shown on Exhibit 4-2 (page 4-11):

- Refer to Exhibit 4-2 (page 4-11) for Time Warner overhead electric crossing at approximately just north of Capitol Drive (4-1-H).
- Refer to Exhibit 4-2 (page 4-11) for WE Energies overhead electric facility at approximately just north of Capitol Drive (4-1-I).

The following utilities are shown on Exhibit 4-3 (page 4-12):

- Refer to Exhibit 4-3 (page 4-12) for WE Energies overhead electric facility at approximately North Bluemound Drive (4-1-J).

The following utilities are shown on Exhibit 4-4 (page 4-13):

- Refer to Exhibit 4-4 (page 4-13) for Time Warner overhead electric crossing at approximately 150 feet west of County A (4-1-K).
- Refer to Exhibit 4-4 (page 4-13) for WE Energies overhead electric facility at approximately 120 feet west of County A (4-1-L).

The following utilities are shown on Exhibit 4-5 (page 4-14):

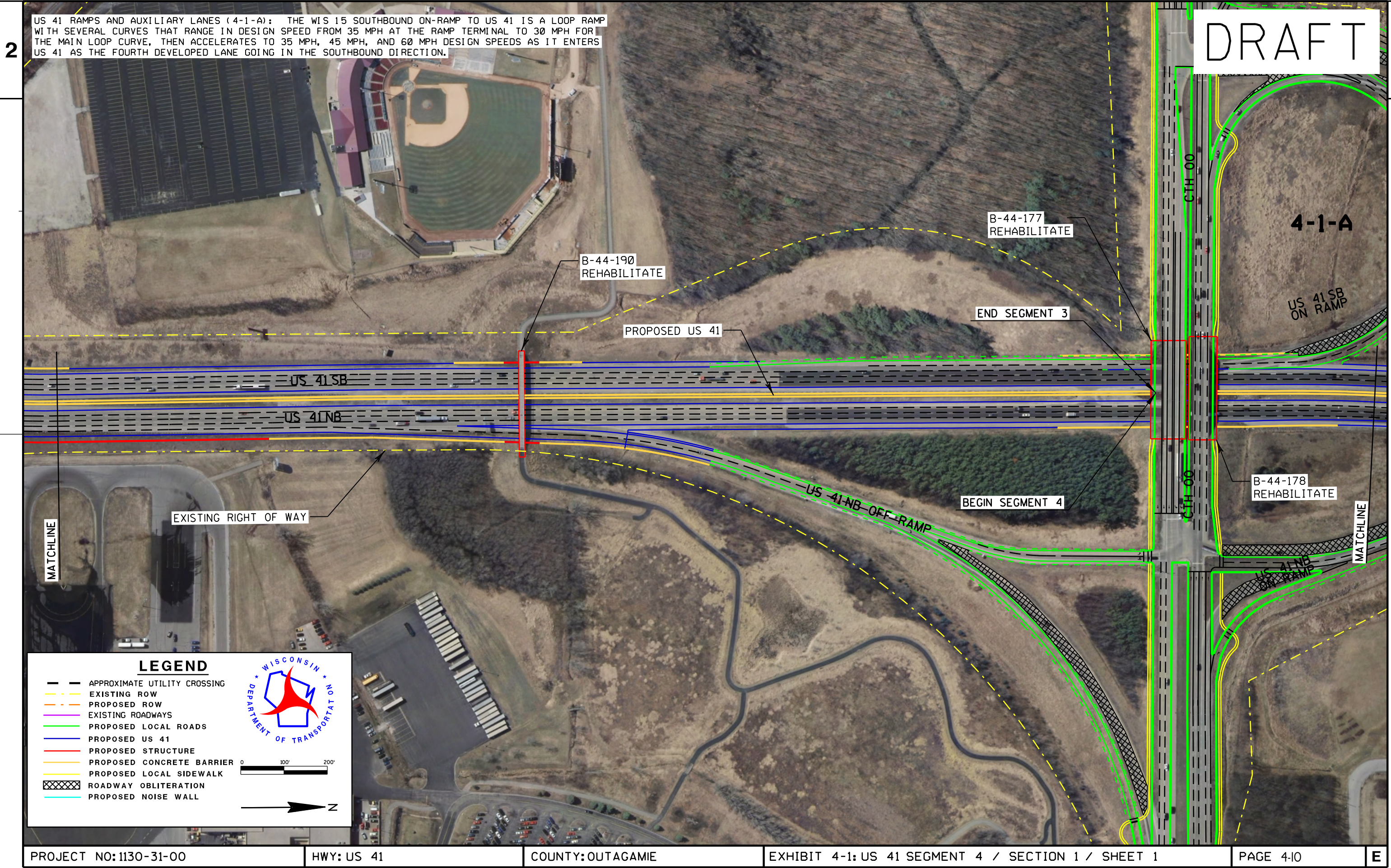
- Refer to Exhibit 4-5 (page 4-14) for Time Warner buried cable crossing US 41 at approximately Gillette Street (4-1-M).
- Refer to Exhibit 4-5 (page 4-14) for WE Energies overhead electric facility at approximately Gillette Street (4-1-N).
- Refer to Exhibit 4-5 (page 4-14) for WE Energies buried gas crossing US 41 at approximately Gillette Street (4-1-O).
- Refer to Exhibit 4-5 (page 4-14) for the ANR Pipeline buried gas crossing under US 41 located approximately 630 feet east of North Gillette Street (4-1-P).

#### Further Analysis Recommendations

Refer to Exhibit 4-2 (page 4-11) for discussion on WIS 15 ramp recommendations (4-1-Q).

Further review of the roadway section in the noise wall locations is needed to make sure that the noise walls are located far enough outward to allow room for drainage ditches while avoiding right-of-way impacts.







US 41 RAMPS AND AUXILIARY LANES (4-1-B): THE WIS 15 SOUTHBOUND OFF-RAMP FROM US 41 IS A TAPERED OFF-RAMP CONFIGURATION THAT RUNS PARALLEL WITH A PORTION OF THE WIS 15 SOUTHBOUND LOOP ON-RAMP. THE RAMP DESIGN SPEED AT THE TAPER EXIT IS 60 MPH, THEN STAGGER STEPS DOWN TO 50 MPH AND 45 MPH AS IT APPROACHES THE WIS 15 RAMP TERMINAL INTERSECTION. SINCE THE OFF-RAMP IS LOCATED WITHIN THE US 41 MAINLINE CURVE, A LONG PARALLEL DECELERATION LANE WAS ADDED.

US 41 RAMPS AND AUXILIARY LANES (4-1-C): THE WIS 15 NORTHBOUND ON-RAMP TO US 41 IS A PARALLEL TYPE CONFIGURATION. THE RAMP ENTRY LIES WITHIN A MAINLINE HORIZONTAL CURVE. A LONGER PARALLEL RAMP WAS ADDED THROUGH THE MAINLINE CURVE AND MERGES IN NEAR THE END OF THE MAINLINE CURVE TANGENT POINT.

FRONTAGE ROADS (4-1-F): NORTH RIFLE RANGE ROAD/ WEST GRAND CHUTE BOULEVARD IS A FRONTAGE ROAD ALONG THE NORTHWEST SIDE OF US 41 MAINLINE JUST NORTH OF CAPITOL DRIVE. THE FRONTAGE ROAD IS SHOWN COMBINED WITH THE US 41 RIGHT-OF-WAY. THE WIDER US 41 MAINLINE CROSS SECTION WITH TRAVERSABLE EMBANKMENT SIDE SLOPES MAY IMPACT THE FRONTAGE ROADS. THEREFORE, CONCRETE BARRIER WITH STEEPER SIDE SLOPES FOR DRAINAGE MAY BE NEEDED ALONG THE OUTSIDE SHOULDER OF US 41 MAINLINE TO MINIMIZE IMPACTS TO THE FRONTAGE ROAD AND PROVIDE ROOM FOR DRAINAGE DITCHES.

UTILITIES (4-1-H): TIME WARNER HAS AN OVERHEAD ELECTRIC CROSSING AT APPROXIMATELY JUST NORTH OF CAPITOL DRIVE.

UTILITIES (4-1-I): WE ENERGIES HAS AN OVERHEAD ELECTRIC FACILITY AT APPROXIMATELY JUST NORTH OF CAPITOL DRIVE.

GEOMETRIC DEFICIENCY (4-1-G):  
APPROXIMATE END OF  
DEFICIENT SUPERELEVATION  
ACTUAL 4.2%  
DESIRED 4.5%

UTILITIES (4-1-H):

B-44-24  
RECONSTRUCT

PROPOSED US 41

US 41 SB

US 41 NB

N. RIFLE RANGE RD

4-1-C

GEOMETRIC DEFICIENCY (4-1-G):  
APPROXIMATE END OF  
DEFICIENT VERTICAL GRADE  
ACTUAL 0.20%  
DESIRED 0.50%  
MINIMUM 0.30%

EXISTING RIGHT OF WAY

UTILITIES (4-1-I):

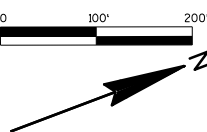
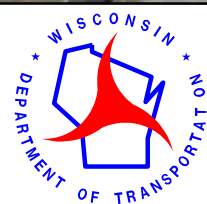
4-1-O

4-1-F

GEOMETRIC DEFICIENCY (4-1-G):  
APPROXIMATE START OF  
DEFICIENT VERTICAL GRADE  
ACTUAL 0.20%  
DESIRED 0.50%  
MINIMUM 0.30%

### LEGEND

- APPROXIMATE UTILITY CROSSING
- EXISTING ROW
- PROPOSED ROW
- EXISTING ROADWAYS
- PROPOSED LOCAL ROADS
- PROPOSED US 41
- PROPOSED STRUCTURE
- PROPOSED CONCRETE BARRIER
- PROPOSED LOCAL SIDEWALK
- ROADWAY OBLITERATION
- PROPOSED NOISE WALL



FURTHER ANALYSIS RECOMMENDATIONS (4-1-O): THE WIS 15 SOUTHBOUND OFF-RAMP AND WIS 15 NORTHBOUND ON-RAMP ARE RECOMMENDED FOR FURTHER EVALUATION OF RAMP (AUXILIARY LANE) NEEDED AROUND US 41 MAINLINE HORIZONTAL CURVE.



GEOMETRIC DEFICIENCY (4-1-G):  
DEFICIENT SUPERELEVATION  
ACTUAL 4.2%  
DESIRED 4.5%

4-1-F

PROPOSED US 41

UTILITIES (4-1-J):

### LEGEND

|                                                                                     |                              |
|-------------------------------------------------------------------------------------|------------------------------|
|  | APPROXIMATE UTILITY CROSSING |
|  | EXISTING ROW                 |
|  | PROPOSED ROW                 |
|  | EXISTING ROADWAYS            |
|  | PROPOSED LOCAL ROADS         |
|  | PROPOSED US 41               |
|  | PROPOSED STRUCTURE           |
|  | PROPOSED CONCRETE BARRIER    |
|  | PROPOSED LOCAL SIDEWALK      |
|  | ROADWAY OBLITERATION         |
|  | PROPOSED NOISE WALL          |




UTILITIES (4-1-K): TIME WARNER HAS AN OVERHEAD ELECTRIC CROSSING AT APPROXIMATELY 150 FEET WEST OF COUNTY A.  
UTILITIES (4-1-L): WE ENERGIES HAS AN OVERHEAD ELECTRIC FACILITY AT APPROXIMATELY 120 FEET WEST OF COUNTY A.





UTILITIES (4-1-M): TIME WARNER HAS A BURIED CABLE CROSSING US 41 AT APPROXIMATELY GILLETTE STREET.

UTILITIES (4-1-N): WE ENERGIES HAS OVERHEAD ELECTRIC FACILITY AT APPROXIMATELY GILLETTE STREET.

UTILITIES (4-1-O): WE ENERGIES HAS A BURIED GAS CROSSING US 41 AT APPROXIMATELY GILLETTE STREET.

UTILITIES (4-1-P): ANR PIPELINE HAS A BURIED GAS CROSSING UNDER US 41 LOCATED APPROXIMATELY 630 FEET EAST OF N. GILLETTE STREET.

DRAFT





US 41 RAMPS AND AUXILIARY LANES (4-1-D): THE WIS 47 SOUTHBOUND ON-RAMP TO US 41 IS A PARALLEL TYPE CONFIGURATION. PORTIONS OF THE WIS 47 SOUTHBOUND ON-RAMP FROM CURVE PT TO RAMP TERMINAL WILL BE CONSTRUCTED WITH PROJECT ID 1130-33-00 IN 2014. THE PARALLEL RAMP AND CURVE PORTIONS OF THE ON-RAMP ARE TO BE CONSTRUCTED WITH THE FUTURE EXPANSION PROJECT.

US 41 RAMPS AND AUXILIARY LANES (4-1-E): THE WIS 47 NORTHBOUND OFF-RAMP FROM US 41 IS A PARALLEL TYPE CONFIGURATION. PORTIONS OF THE US 41 NORTHBOUND OFF-RAMP FROM CURVE PT TO RAMP TERMINAL INCLUDING THE CRASH INVESTIGATION SITE PAVEMENT WIDENING WILL BE CONSTRUCTED WITH PROJECT ID 1130-33-00 IN 2014. THE PARALLEL RAMP AND CURVE PORTIONS OF THE OFF-RAMP ARE TO BE CONSTRUCTED WITH THE FUTURE EXPANSION PROJECT.





## ***Section 2: WIS 47 (Richmond Street) to West of County E***

### **US 41 Alignment**

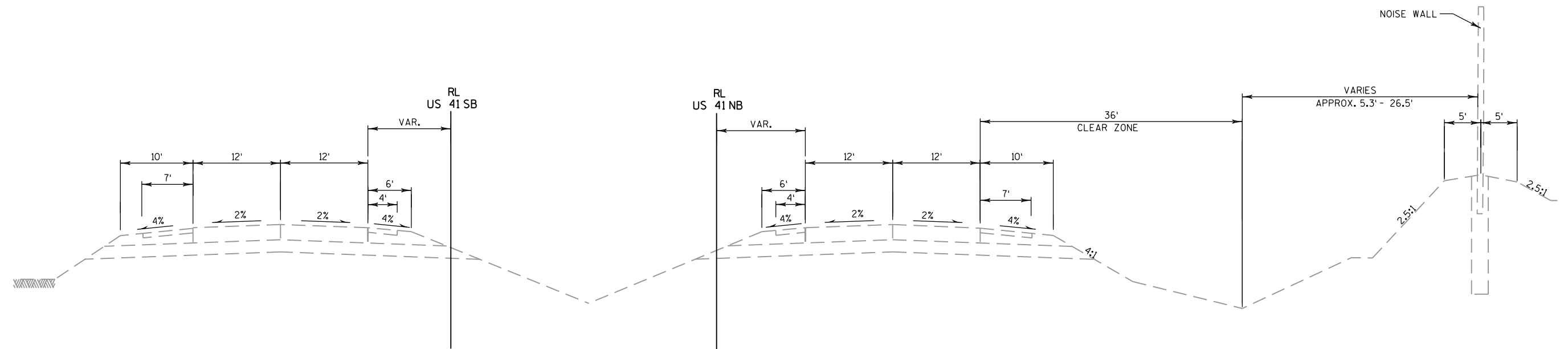
This segment of US 41 is on existing alignment with the additional expansion lanes placed within the median. The C-D Road System is along the US 41 Southbound lanes and expands along the north side of the right-of-way.

### **US 41 Typical Section**

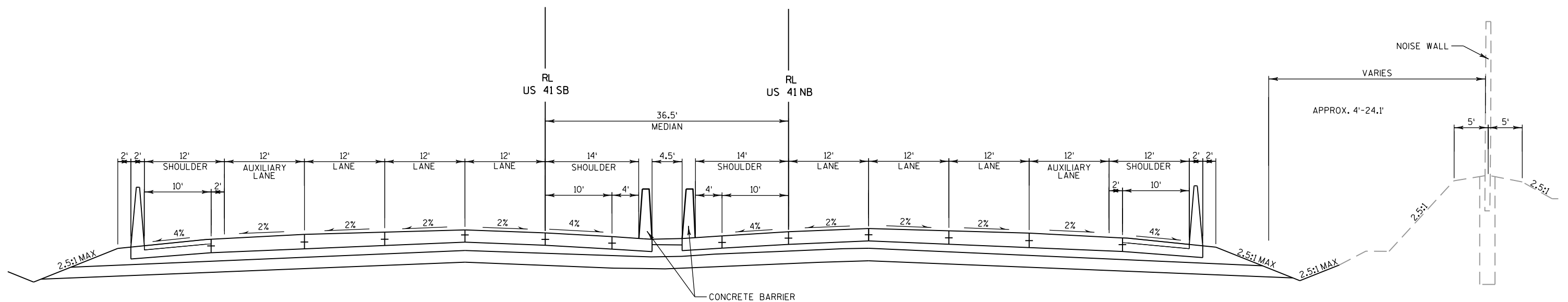
Between WIS 47 and Meade Street Overpass, the mainline typical section consists of a 36.5' median (14' inside shoulders with 56-inch single face barriers). Both Northbound and Southbound US 41 have four 12' lanes including one 12' auxiliary lane and have 12' outside shoulders with 42-inch single face barrier for portions of the section with tight right-of-way constraints or adjacent to noise wall structures. Refer to Figure 4-2 (page 4-17) for Typical Section.

Between Meade Street Overpass and County E, the mainline typical section has the same median and northbound lane configuration. East of the Meade Street overpass, the C-D Road System merges in with the southbound lanes. The southbound lanes consist of three 12' lanes and have an 28.5' outside median with the C-D System. It consists of a 14' outside shoulder for the southbound US 41 lanes and a 6' inside shoulder for the C-D System. The C-D System consists of a 15' lane and 12' outside shoulder with 42-inch single face barrier for large portions of the C-D Road System due to minimizing right-of-way impacts.

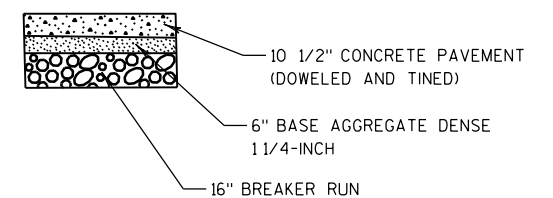




**TYPICAL EXISTING SECTION**  
US 41 (WIS 47 INTERCHANGE TO MEADE ST)



**DESIRABLE PROPOSED SECTION**  
US 41 (WIS 47 INTERCHANGE TO MEADE ST)



NOTE: THE ASSUMED SECTION USED FOR COST ESTIMATE PURPOSES.



### US 41 Ramps and Auxiliary Lanes

Review all exit ramp configurations for single or dual lane needs.

Refer to Exhibit 4-7 (page 4-20) for further discussion on the WIS 47 northbound on-ramp configuration (4-2-A).

Refer to Exhibit 4-7 (page 4-20) for further discussion on the WIS 47 southbound off-ramp configuration (4-2-B).

Refer to Exhibit 4-10 (page 4-23) for further discussion on the County E southbound on-ramp and C-D Road configuration (4-2-C).

Refer to Exhibit 4-10 (page 4-23) for further discussion on the County E northbound off-ramp and auxiliary lane configuration (4-2-D).

### Multi-Use Paths

Refer to Exhibit 4-9 (page 4-22) for further discussion on the Fox Cities Area Trail and Apple Creek Trail multi-use path impacts (4-2-E).

### Addressing Geometric Deficiencies

All geometric deficiencies are anticipated to be corrected during the long-term improvement expansion project (4-2-F). Refer to Exhibit 4-9 (page 4-22) for discussion on the deficient vertical curve from MM 143.6 to MM 143.7.

### Right-of-Way Impacts

Refer to Exhibit 4-9 (page 4-22) for discussion on right-of-way acquisition along the C-D Road System (4-2-G). See 4-2-E (page 4-22) reference for further discussion.

Refer to Exhibit 4-10 (page 4-23) for discussion on right-of-way acquisition required for ramp realignments (4-2-H).

### Utilities

The following utilities are shown on Exhibit 4-7 (page 4-20):

- Refer to Exhibit 4-7 (page 4-20) for the WE Energies overhead electric facility (3 lines) located at approximately 200 feet east of WIS 47 (4-2-I).
- Refer to Exhibit 4-7 (page 4-20) for Time Warner overhead electric crossing at approximately 135 feet east of WIS 47 (4-2-J).

The following utilities are shown on Exhibit 4-8 (page 4-21):

- Refer to Exhibit 4-8 (page 4-21) for the WE Energies buried gas facility located approximately 100 feet east of Meade Street. (4-2-K).

The following utilities are shown on Exhibit 4-10 (page 4-23):

- Refer to Exhibit 4-10 (page 4-23) for the WE Energies has an overhead electric facility (2 lines) located at approximately 100 feet east of Meade Street (4-2-L).



*Further Analysis Recommendations*

Refer to Exhibit 4-9 (page 4-22) for discussion on C-D Road System and Apple Creek Trail refinements (4-1-M).

Refer to Segment 5, Section 1, Item G (5-1-G) for further discussion on how the C-D System could be affected by incorporating incident management design adjustments for the C-D Roadway System. These adjustments could adversely affect right-of-way impacts.



US 41 RAMP AND AUXILIARY LANES (4-2-A): THE WIS 47 NORTHBOUND ON-RAMP TO US 41 IS A PARALLEL TYPE RAMP THAT DEVELOPS INTO THE 12' AUXILIARY LANE.

US 41 RAMP AND AUXILIARY LANES (4-2-B): THE WIS 47 SOUTHBOUND OFF-RAMP FROM US 41 IS A TAPERED TYPE RAMP THAT EXITS FROM THE US 41 SOUTHBOUND AUXILIARY LANE. THE AUXILIARY LANE CONTINUES SOUTHWARD AND MERGES INTO THE OUTSIDE LANE PAST THE WIS 47 OVERPASS STRUCTURE AND PRIOR TO THE US 41 SOUTHBOUND ON-RAMP FROM WIS 47.

UTILITIES (4-2-I): WE ENERGIES HAS AN OVERHEAD ELECTRIC FACILITY (3 LINES) LOCATED AT APPROXIMATELY 200 FEET EAST OF WIS 47.

UTILITIES (4-2-J): TIME WARNER HAS AN OVERHEAD ELECTRIC CROSSING AT APPROXIMATELY 135 FEET EAST OF WIS 47.

UTILITIES (4-2-J):

UTILITIES (4-2-I):

N. ALVIN ST

EXISTING RIGHT OF WAY

US 41 SB OFF RAMP

4-2-B

US 41 SB

US 41 NB

US 41 NB ON RAMP

4-2-A

PROPOSED US 41

CARIBOU CT

W. SIOUX DR

SIOUX CT

APACHE CT

W. SHOSHONE DR

N. DIVISION ST

W. SIOUX DR

ONEIDA CT

N. WELLINGTON DR

HILLSBOROUGH DR

ONEIDA CT

### LEGEND

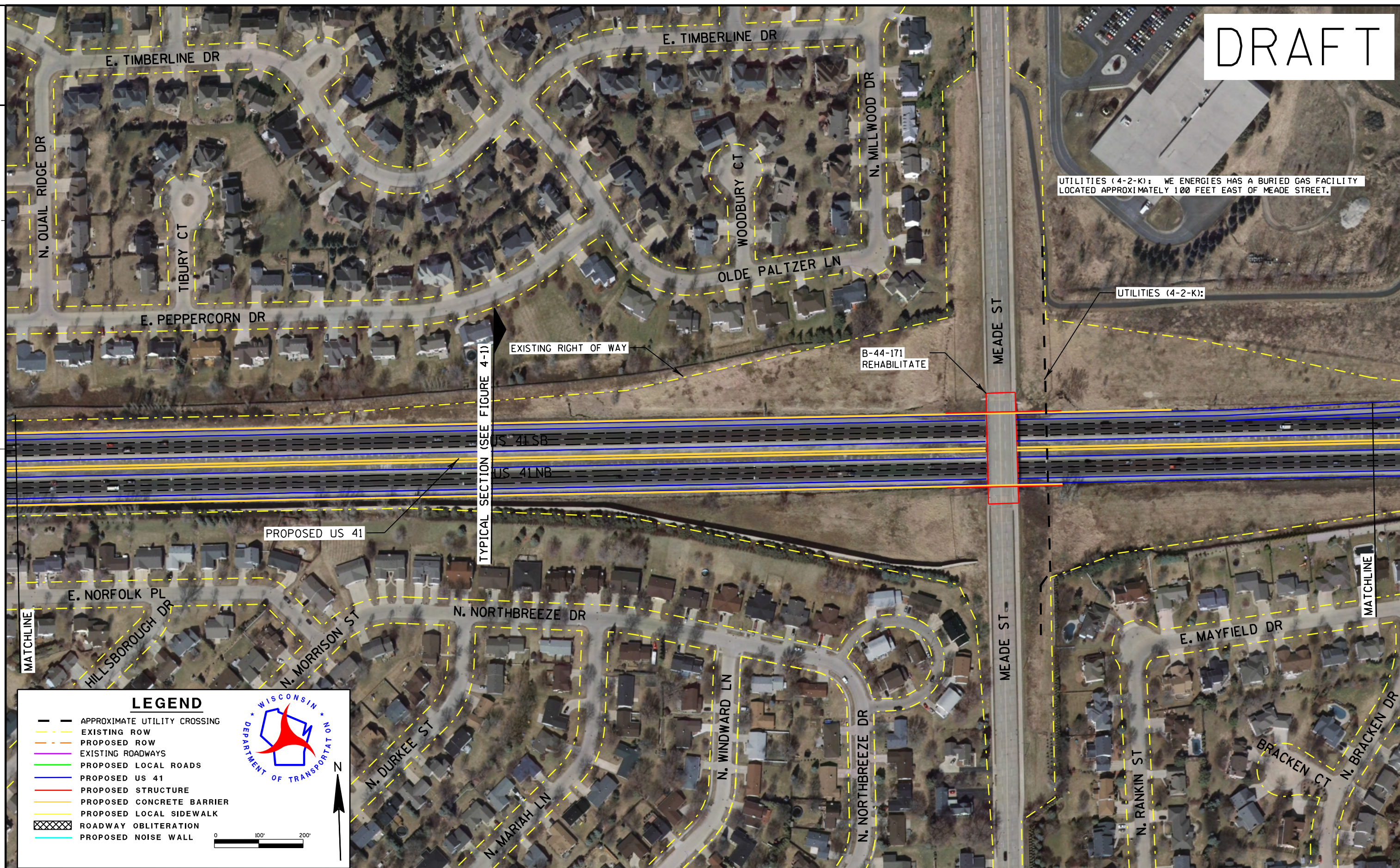
- APPROXIMATE UTILITY CROSSING
- - - EXISTING ROW
- - - PROPOSED ROW
- - - EXISTING ROADWAYS
- - - PROPOSED LOCAL ROADS
- - - PROPOSED US 41
- - - PROPOSED STRUCTURE
- - - PROPOSED CONCRETE BARRIER
- - - PROPOSED LOCAL SIDEWALK
- XXXX ROADWAY OBLITERATION
- - - PROPOSED NOISE WALL



0 100' 200'









**MULTI-USE PATHS (4-2-E):** A FOX CITIES AREA TRAIL, THE APPLE CREEK TRAIL, IS A MULTI-USE PATH THAT RUNS FROM MEADE STREET TO COUNTY JJ NEAR HOLLAND ROAD. THE PATH RUNS NEAR THE RIGHT-OF-WAY ALONG THE NORTH SIDE OF US 41. DUE TO THE C-D ROAD SYSTEM, IT IS ANTICIPATED THAT THE RIGHT-OF-WAY STRIP ACQUISITION IS NEEDED ALONG THE NORTH SIDE. APPROXIMATELY 50-FEET TO 100-FEET OF THE MULTI-USE PATH IS ANTICIPATED TO BE IMPACTED AND IS SHOWN AS BEING RECONSTRUCTED AS A WORST CASE PROJECT FOOTPRINT SCENARIO.

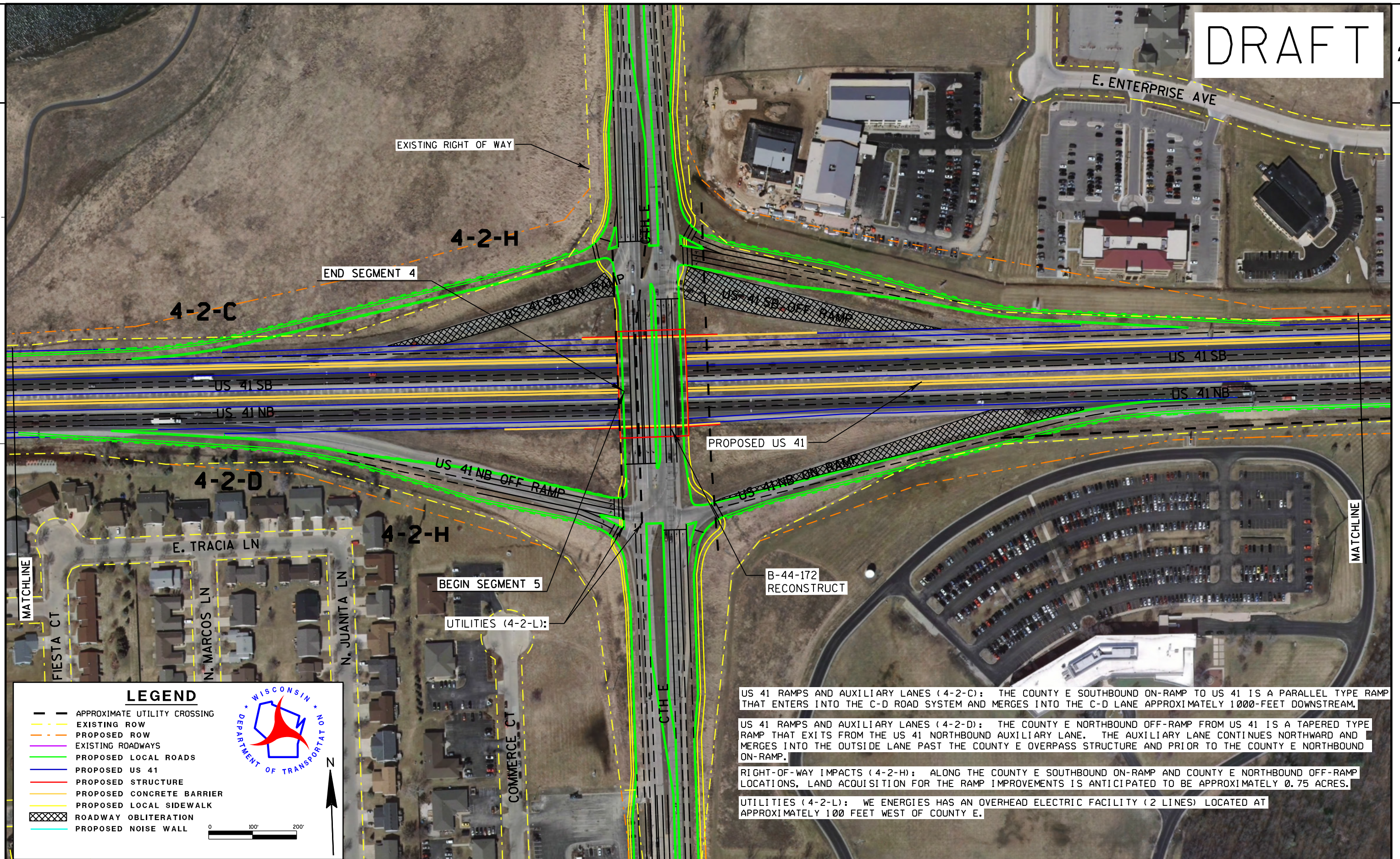
**RIGHT-OF-WAY IMPACTS (4-2-G):** RIGHT-OF-WAY STRIP ACQUISITIONS EQUALING APPROXIMATELY 1.0 ACRES ARE ANTICIPATED PARALLEL TO THE C-D ROAD SYSTEM. NO ACQUISITIONS ARE ANTICIPATED, ALTHOUGH THE APPLE CREEK TRAIL IS DIRECTLY ADJACENT TO THE US 41 SOUTHBOUND LANES AND MAY BE IMPACTED DUE TO ITS PROXIMITY. SEE MULTI-USE PATHS FOR FURTHER DISCUSSION.

**FURTHER ANALYSIS RECOMENDATIONS (4-2-M):** FURTHER REVIEW OF THE C-D ROAD SYSTEM WILL DETERMINE IF THE APPLE CREEK TRAIL WILL BE ACTUALLY IMPACTED OR COULD BE AVOIDED THROUGH FURTHER DESIGN REFINEMENTS.

DRAFT









## Structures

### *Bridges*

Summary of potential bridge geometry is shown in Table 4-5 (page 4-25) and include bridge number, mile marker, bridge name, existing bridge age in 2013, girder type, girder depth, desired vertical clearance, minimum vertical clearance, potential vertical clearance, superelevation and direction of curve, clear bridge width, bridge length, number of spans, span configuration, bridge skew, local road typical section, and design recommendations.

Additional noise walls are shown in Segment 4 Exhibits along Northbound US 41 from Capitol Drive to west of County A and from County A to WIS 47 with gaps at the Canadian National RR and North Gillett Street. Noise walls are shown along Southbound US 41 from west of County A to east of North Gillett Street. The future NEPA study will access future noise wall requirements.



Table 4-5: Segment 4 – Summary of Potential Bridge Geometry

| BRIDGE NO. | MILE MARKER (MM) | BRIDGE NAME                  | AGE IN 2013 | GIRDER TYPE                      | GIRDER DEPTH (INCH) | DESIRED VERT. CLEAR (FEET) | MIN. VERT. CLEAR (FEET) | VERT. CLEAR (FEET) | SUPER % & DIR. | BRIDGE CLEAR WIDTH (FEET) | BRIDGE LENGTH (FEET) | NO. OF SPANS | SPAN CONFIG. (FEET)    | BRIDGE SKEW  | LOCAL ROAD TYPICAL SECTION                                                                                                 | DESIGN RECOMMENDATIONS                                                                                                                                                                                         |
|------------|------------------|------------------------------|-------------|----------------------------------|---------------------|----------------------------|-------------------------|--------------------|----------------|---------------------------|----------------------|--------------|------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| B-44-0177  | 139.0            | WIS 15 EB Over US 41         | 21          | Prestressed Concrete Deck Girder | 54                  | 16.75                      | 16.75                   | 16.42              | NC             | 82                        | 252.0                | 2            | 128.0/124.0            | No Skew      | 2 – 12' Left turn lanes, 3 - 12' thru lanes, 4' bike path with curb and gutter, 2' barrier and 8' sidewalk                 | Assume reconstruction for conventional interchange layout. Bridges will be longer to provide a rural section with clear zone along US 41. Vertical clearances over 16'-9" are maintained.                      |
| B-44-0178  | 139.0            | WIS 15 WB Over US 41         | 21          | Prestressed Concrete Deck Girder | 54                  | 16.75                      | 16.75                   | 16.42              | NC             | 70                        | 252.0                | 2            | 128.0/124.0            | No Skew      | 8' sidewalk with 2' barrier, 1 – 12' right turn lane (to loop ramp) with curb and gutter, 4' bike lane, 3 - 12' thru lanes | Assume reconstruction for conventional interchange layout. Bridges will be longer to provide a rural section with clear zone along US 41. Vertical clearances over 16 9" are maintained.                       |
| B-44-0024  | 139.6            | Capital Drive Over US 41     | 58          | Continuous Steel Deck Girder     | 45                  | 16.75                      | 16.33                   | 16.75              | NC             | 36                        | 320.00               | 4            | 46.8/110.4/ 110.4/46.8 | 39° 17' LF   | 1-12' lane and 1 - 8' shoulder in each direction.                                                                          | Reconstruction since age of bridge will be over 50-years in 2018. 2-span would have 72W beams and would increase profile over 3-feet.                                                                          |
| B-44-0140  | 140.5            | County A Over US 41          | 13          | Prestressed Concrete Deck Girder | 54                  | 15.25                      | 16.00 or ES             | 17.25              | NC             | 91.45                     | 213.83               | 2            | 102.0/108.0            | No Skew      | 1 - 6' sidewalk west side, 2 - 12' lanes with c&g each direction, 18' median, 1 - 12' sidewalk east side                   | Assume rehabilitation since roadway section is adequate.                                                                                                                                                       |
| B-44-0020  | 141.0            | US 41 SB Over Soo Line       | 58          | Prestressed Concrete Deck Girder | 28                  | 23.30                      | 23.00                   | 23.30              | NC             | 62                        | 139.00               | 3            | 45.5/44.0/45.5         | No Skew      | End Spans: 2:1 Slope paving; Middle Span: railroad with ditches                                                            | Reconstruction since age of bridge will be over 50-years in 2018.                                                                                                                                              |
| B-44-0021  | 141.0            | US 41 NB Over Soo Line       | 58          | Prestressed Concrete Deck Girder | 28                  | 23.30                      | 23.00                   | 23.30              | NC             | 62                        | 139.00               | 3            | 45.5/44.0/45.5         | No Skew      | End Spans: 2:1 Slope paving; Middle Span: railroad with ditches                                                            | Reconstruction since age of bridge will be over 50-years in 2018.                                                                                                                                              |
| B-44-0028  | 141.3            | US 41 SB Over Gillett Street | 57          | Continuous Concrete Haunch Slab  | 36                  | 15.25                      | 14.75                   | 15.25              | NC             | 62                        | 142.00               | 3            | 35.0/68.0/35.0         | No Skew      | End Spans: 2:1 Slope paving; Middle Span: 1-12' lane and 4' bike lane with c&g each direction, 16' terrace                 | Reconstruction since age of bridge will be over 50-years in 2018.                                                                                                                                              |
| B-44-0029  | 141.3            | US 41 NB Over Gillett Street | 57          | Continuous Concrete Haunch Slab  | 36                  | 15.25                      | 14.75                   | 15.25              | NC             | 62                        | 142.00               | 3            | 35.0/68.0/35.0         | No Skew      | End Spans: 2:1 Slope paving; Middle Span: 1-12' lane and 4' bike lane with c&g each direction, 16' terrace                 | Reconstruction since age of bridge will be over 50-years in 2018.                                                                                                                                              |
| B-44-0035  | 142.0            | WIS 47 SB Over US 41         | 57          | Prestressed Concrete Deck Girder | 36                  | 16.75                      | 16.33                   | 16.75              | NC             | 37.45                     | 235.07               | 4            | 39.0/70.5/82.5/39.0    | 2° 43' 10"RF | 2 - 12' lanes with c&g both sides with varying terrace and 8' path                                                         | Assumes recent STH 47 project will reconstruct bridges in 2014 and only minor bridge rehabilitation may be necessary. A retaining wall will be required along the north abutment for auxiliary lane placement. |

**Legend:**

ES = Exception to Standard

RT = Superelevation Right

NC = Normal Crown

LT = Superelevation Left

LF = Left Forward

RF = Right Forward

N/A = Not Applicable

c&g = Curb and Gutter



| BRIDGE NO. | MILE MARKER (MM) | BRIDGE NAME             | AGE IN 2013 | GIRDER TYPE                      | GIRDER DEPTH (INCH) | DESIRED VERT. CLEAR (FEET) | MIN. VERT. CLEAR (FEET) | VERT. CLEAR (FEET) | SUPER % & DIR. | BRIDGE CLEAR WIDTH (FEET) | BRIDGE LENGTH (FEET) | NO. OF SPANS | SPAN CONFIG. (FEET) | BRIDGE SKEW   | LOCAL ROAD TYPICAL SECTION                                                                                 | DESIGN RECOMMENDATIONS                                                                                                                                                                                         |
|------------|------------------|-------------------------|-------------|----------------------------------|---------------------|----------------------------|-------------------------|--------------------|----------------|---------------------------|----------------------|--------------|---------------------|---------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| B-44-0036  | 142.0            | WIS 47 NB Over US 41    | 57          | Prestressed Concrete Deck Girder | 36                  | 16.75                      | 16.33                   | 16.75              | NC             | 37.45                     | 235.07               | 4            | 39.0/70.5/82.5/39.0 | 2° 43' 10"RF  | 2 - 12' lanes with c&g both sides with varying terrace and 8' path                                         | Assumes recent STH 47 project will reconstruct bridges in 2014 and only minor bridge rehabilitation may be necessary. A retaining wall will be required along the north abutment for auxiliary lane placement. |
| B-44-0171  | 143.0            | Meade Street Over US 41 | 22          | Concrete Deck Girder             | 54                  | 16.75                      | 16.00 or ES             | 17.06              | NC             | 65.5                      | 211.83               | 2            | 102.0/106.0         | 0° 07' 16" RF | 1 - 5' sidewalk west side, 2 - 11' lanes with c&g on outside in each direction, 1 - 10' sidewalk east side | Rehabilitation for this bridge. The bridge does not need to be raised. Retaining walls will be required along the abutments for auxiliary lane placement.                                                      |

**Legend:**

ES = Exception to Standard

RT = Superelevation Right

NC = Normal Crown

LT = Superelevation Left

LF = Left Forward

RF = Right Forward

N/A = Not Applicable

c&g = Curb and Gutter



## Interchanges

### *WIS 15/County OO (West Northland Avenue) Interchange*

#### Interchange Alternatives Summary

The study developed five sets of short to intermediate-term alternatives for the WIS 15/County OO interchange (see Appendix 14). Alternative 1 addresses existing safety and operational issues of the US 41 mainline within the interchange area by improving the Northbound on-ramp acceleration lanes and off-ramp turn lane geometry. Alternative 2 reduces congestion on WIS 15/County OO by decreasing the possibility of turning queues affecting eastbound traffic. Alternative 3 improvements to the side road intersections will allow the intersections to operate more effectively and provide more queue space for Fox Cities Baseball Stadium event traffic. Alternatives 4 and 5 developed roundabout options for the WIS 15/County OO intersections at the ramp terminals and side roads Casaloma Drive and Blue Mound Drive. Alternative 6 is a conventional intersection alternative evaluated for 2038 traffic volumes. Refer to Figure 4-3 (page 4-30) for Interchange layout. Refer to Appendix 15 for operational analysis.

Alternative 1 reduces the operational and safety problems at the interchange by:

- Extending the northbound on-ramp acceleration lane from 750 feet to 1000-feet and widening the existing acceleration lane as needed to improve the crash severity problems at the US 41 merge location.
- Signalizing the southbound right-turn movement by adding an additional right-turn lane and extending the right-turn lane from 250 feet to 375 feet to the southbound off-ramp.
- Adding an additional left-turn lane on the northbound off-ramp including potential tree removal within the clear zone.

Alternative 2, in addition to Alternative 1, adds an additional left-turn lane for eastbound WIS 15 to northbound on-ramp movement and reconstructs the northbound on-ramp with corrected horizontal alignment and improved signage.

Alternative 3, in addition to Alternatives 1 and 2, improves the side road intersections for more efficient operations by adding additional left-turn lanes and lengthening turn lane bays on the westbound, eastbound and northbound approaches. Right-turn bays were improved on the eastbound and southbound intersection approaches. Additional thru capacity was added on the northbound approach and additional left turn receiving lane for westbound to northbound traffic on the north intersection leg.

Alternative 4 is a roundabout alternative that evaluates the side road and ramp terminal intersections using 2020 traffic volumes. WIS 15/County OO requires two or three lanes in each direction between roundabouts. All four of the roundabouts are multi-lane roundabouts with free flow right-turn movements for several approaches.

Alternative 5 is a roundabout alternative that evaluates the side road and ramp terminal intersections using 2035 traffic volumes. WIS 15/County OO requires three lanes in each direction between roundabouts and 4 lanes westbound between Casaloma Drive and the



southbound off-ramp. Alternative 5 was reevaluated for 2038 traffic volumes and found that the roundabouts did not operate effectively and were not considered further.

Alternative 6 is a full interchange reconstruction alternative evaluated using 2038 traffic volumes for the side roads and ramp terminal intersections. Refer to Figure 4-3 (page 4-30) for Interchange Layout. Refer to Appendix 15 for operational analysis. An additional lane in both the WIS 15/County OO eastbound and westbound directions are required creating a six-lane arterial from Casaloma Drive thru Blue Mound Drive. Additional intersection improvements include:

The County OO and Blue Mound Drive intersection improvements include:

- The westbound right-turn lane was increased from 150' to 200' long.
- The westbound single 600' left-turn lane was modified to a dual 400' left-turn lane.
- The southbound left-turn lane was extended from 75' to 150' long.
- The southbound combined thru and right-turn lane was separated into a dedicated thru lane and dedicated right-turn lane with a 150' length.
- An additional 300' eastbound right-turn lane was added to the existing continuous right-turn lane.
- The existing eastbound 100' left-turn lane was extended to 300' long and an additional 300' long left-turn lane was added making a dual left-turn lane.
- The northbound combined thru and left-turn lane was modified to a dedicated thru lane and dedicated 325' long left-turn lane. An additional 325' long left-turn lane was added creating a dual left-turn lane.
- The northbound right-turn lane was decreased from 750' long to 200'.

The WIS 15 and US 41 Northbound on- and off-ramp terminal intersection improvements include:

- An additional 750' long westbound look-ahead right-turn lane was added.
- The existing eastbound 775' left-turn lane was decreased by 200' to 650' long and an additional 650' long left-turn lane was added making a dual left-turn lane.
- The northbound combined thru and left-turn lane remains and an additional 250' left-turn lane was added.
- The existing free-flow right-turn lane was extended by 200'.

The WIS 15 and US 41 Southbound on- and off-ramp terminal intersection improvements include:

- The westbound free-flow right-turn to the US 41 Southbound on-ramp was made continuous between the ramp terminals.
- The southbound off-ramp right-turn lane was modified from a single 200' long right-turn lane to a dual 500' long right-turn lane.



- The southbound off-ramp left-turn lane was modified from a single left turn lane to a dual 250' long left-turn lane.
- The existing single eastbound 250' left-turn lane was extended to 325' long and an additional 325' long left-turn lane was added making a dual left-turn lane.

The WIS 15 and Casaloma Drive intersection improvements include:

- The westbound right-turn lane was increased by 200' to 400' long from 200' long.
- The westbound single 1550' left-turn lane was modified to a triple 500' left-turn lane with the addition of two additional left-turn lanes.
- The southbound single left-turn lane was decreased by 75' to 200' from the existing 275' length and made a triple left with the addition of two 200' long left-turn lanes.
- The southbound combined thru and right-turn lane was separated into a dedicated thru lane and dedicated right-turn lane with a 200' length.
- The eastbound 300' long single left-turn lane was modified to a triple left-turn with the addition of two 350' long left-turn lanes.
- The northbound 100' long existing left-turn lane was extended 100' to 200' long, which will require review of access to the parcel in the SW quadrant of the intersection.
- The northbound single right-turn lane was modified to a dual 275' long right-turn lane.
- An additional northbound thru lane was added.

#### Alternative Represented in Expansion Design Concept

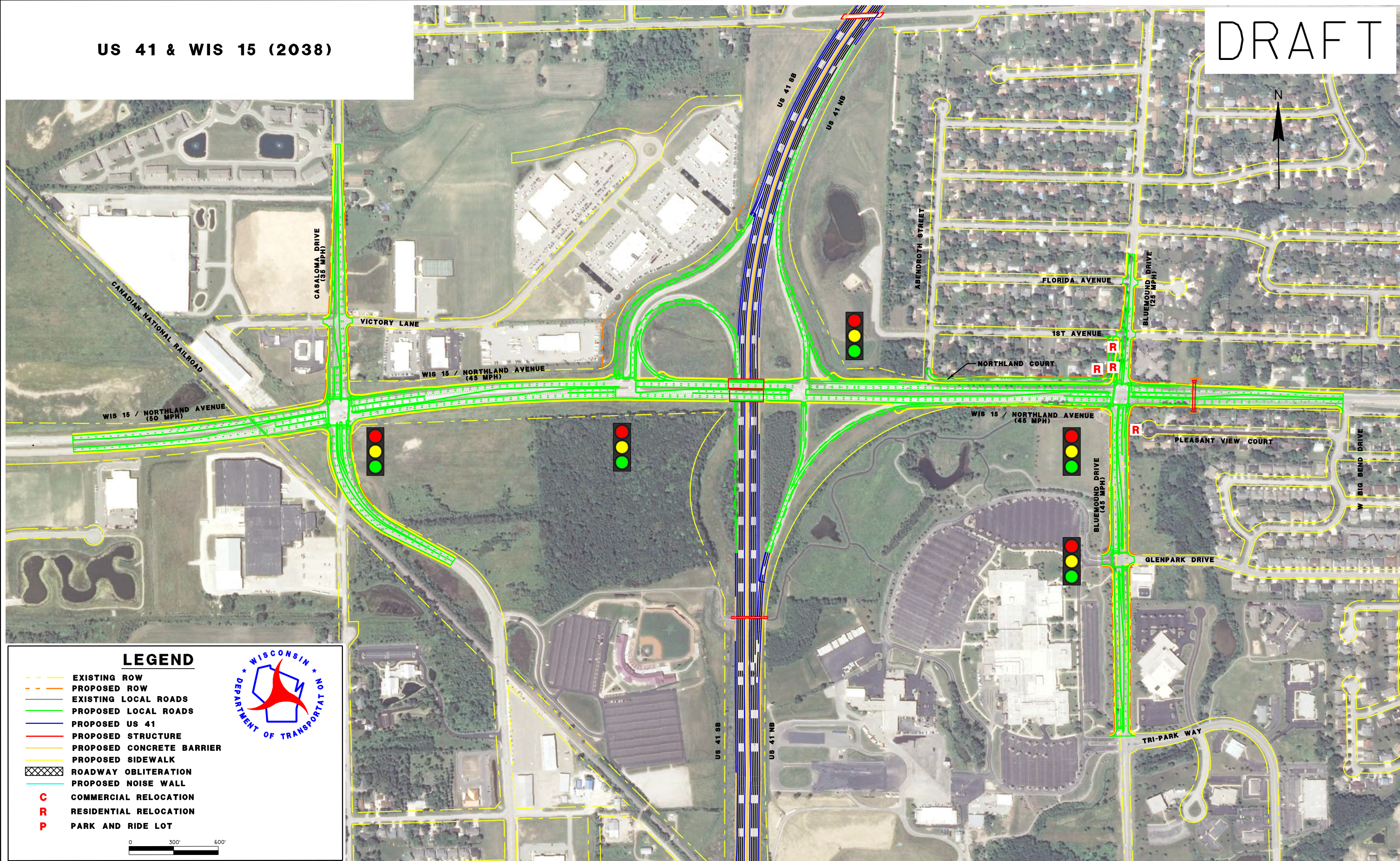
Alternative 6 works operationally and represents the reasonable upper limit alternative interchange cost although has significant real estate costs specifically at the side road intersections. The improvements to the Casaloma Drive intersection, in particular the westbound approach, will impact the at-grade Fox Valley Railroad crossing on WIS 15. Railroad coordination will be required for this intersection work. Alternative 6 is shown in the planning study exhibits but should be further evaluated within the future NEPA study for effectively minimizing impacts while meeting interchange safety and operational needs. Figure 4-4 (page 4-32) is a line diagram indicating Year 2038 traditional intersection improvements required.

The short-term improvement Alternative 1 is suggested for implementation in 2012 to 2014 prior to the long-term expansion project. Alternative 1 provides immediate safety and operational improvements while minimizing throw away costs to implement the long-term improvement Alternative 6.

#### Traffic Operations

Year 2038 traffic analysis was conducted at the WIS 15/County OO interchange intersections using the geometrics presented in Alternative 6. A summary of the Year 2038 intersection operating conditions is provided in Table 4-6 (page 4-31).







**Table 4-6: WIS 15/County OO Interchange Intersection Level of Service (LOS)**

| WIS 15/County OO Intersection | Intersection Type | Peak Hour LOS by Intersection |    |
|-------------------------------|-------------------|-------------------------------|----|
|                               |                   | AM                            | PM |
| Casaloma Drive                | Traffic Signal    | D                             | D  |
| US 41 Southbound Ramps        | Traffic Signal    | C                             | B  |
| US 41 Northbound Ramps        | Traffic Signal    | C                             | C  |
| County AA/Bluemound Drive     | Traffic Signal    | C                             | D  |

*Right-of-Way Impacts*

Strip right-of-way acquisition would be needed along WIS 15 east of US 41, along both sides of Blue Mound Drive and both sides of Casaloma Drive. Alternative 6 would potentially require four residential relocations at the WIS 15/Blue Mound Drive intersection.

In addition one garage would need to be razed and relocated on a parcel on the corner of Northland Court and Abendroth Street.

The pump island at the Moto Mart gas station in the southeast corner of the Blue Mound/Glenpark intersection would likely need to be removed and reconfigured since the existing canopy would overhang the potential sidewalk.

*Access*

Alternative 6 would require the reconfiguration of Northland Ct because of the extra width on County OO (Northland Avenue) and the existing short distance between the County OO/Blue Mound intersection and the Blue Mound/Northland Ct intersection. The roadway would be shifted north to provide clearance to the sidewalk along County OO. The curve at the west end of Northland Ct would be realigned to provide an adequate turning radius for a public roadway. The east end of Northland Ct would be realigned to intersect First Avenue just west of Blue Mound Drive.

One access point at the Moto Mart gas station at the Blue Mound/Glenpark intersection would be removed because of its proximity to the intersection.

Access to the Pacon Corp parcel in the southwest quadrant of WIS 15 and Casaloma Drive will need to be considered due to truck maneuvers in and out of the property.

*Complete Streets*

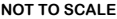
Alternative 6 includes sidewalks along both sides of WIS 15/County OO, Bluemound Drive, and Casaloma Drive to provide pedestrian accommodation. A 16' wide outside lane is identified on WIS 15/County OO, Bluemound Drive and Casaloma Drive to provide bicycle accommodation. .

*Further Analysis Recommendations*

The WIS 15 Interchange serves a large traffic shed due to its location in the northwest corner of the Appleton Freeway Loop. A comprehensive study of the area from WIS 15 to County A is recommended to determine future traffic circulation options.



**PREPARED 3-1-13**





### ***WIS 47 (Richmond Street) Interchange (Current PDS Project ID 1130-33-00)***

A previous WisDOT Backbone Needs and Improvement Study was prepared on April 2007 and included one short-term improvement and two long-term improvements using a 2035 design year. See Appendix 12 for the WisDOT Backbone Needs and Improvement Study for Alternatives 1 thru 3. Project ID 1130-33-00 is a WisDOT design project for the WIS 47 interchange roundabout alternative improvements to be constructed in year 2014. The improvements to be constructed have been included in the mainline Segment Exhibits. Therefore, no significant construction costs are included in the Cost Estimate for the WIS 47 Interchange. Only costs to connect the ramp to the new mainline cross section are included within the estimate. No crash investigation site construction costs are included since these are to be built with the currently scheduled 2014 WisDOT project.

## **4.3 Cost Summary**

Table 4-7 below summarizes the short-term and long-term alternative costs for Segment 4. Individual one page cost summaries using the US 41 Majors cost estimating worksheets are included for each US 41 mainline segment and Interchange. See Appendix 6 for a detailed breakdown of these cost estimating worksheets by segment or interchange.

**Table 4-7: Segment 4 – Cost Summary**

| <b>MAINLINE SEGMENT<br/>LIMITS/INTERCHANGE</b>        | <b>SHORT-TERM<br/>COSTS*</b> | <b>LONG-TERM<br/>COSTS*</b> | <b>TOTALS</b>        |
|-------------------------------------------------------|------------------------------|-----------------------------|----------------------|
| <b>South of WIS 15 Structures to West of County E</b> |                              |                             |                      |
| Major Roadway Items                                   |                              | \$31,195,000                |                      |
| Allowance Items                                       |                              | \$18,646,000                |                      |
| Structures                                            |                              | \$21,621,000                |                      |
| Special Construction Elements                         |                              | \$0                         |                      |
| Context Sensitive Solutions (CSS)                     |                              | \$3,573,000                 |                      |
| Scope Change Allowance Items                          |                              | \$18,008,000                |                      |
| Project Delivery Allowance Items                      |                              | \$32,285,000                |                      |
| External Costs and Risk Assessment                    |                              | \$8,254,000                 | \$133,582,000        |
| <b>WIS 15/County OO Interchange</b>                   |                              |                             |                      |
| Short-Term Alternative 1                              | \$321,000                    |                             | \$321,000            |
| Long-Term Alternative 6                               |                              |                             |                      |
| Major Roadway Items                                   |                              | \$11,503,000                |                      |
| Allowance Items                                       |                              | \$6,875,000                 |                      |
| Structures                                            |                              | \$4,635,000                 |                      |
| Special Construction Elements                         |                              | \$5,000,000                 |                      |
| Context Sensitive Solutions (CSS)                     |                              | \$1,401,000                 |                      |
| Scope Change Allowance Items                          |                              | \$7,059,000                 |                      |
| Project Delivery Allowance Items                      |                              | \$12,657,000                |                      |
| External Costs and Risk Assessment                    |                              | \$3,235,000                 | \$52,365,000         |
| <b>WIS 47 (Richmond Street) Interchange</b>           |                              |                             |                      |
| Pavement Replacement                                  |                              | \$10,000,000                | \$10,000,000         |
| <b>Segment 4 Total</b>                                | <b>\$321,000</b>             | <b>\$195,947,000</b>        | <b>\$196,268,000</b> |

\*Costs are shown in 2013 dollars with no future year construction or material cost increases from inflation included.