

## US 41-WIS 441 OPERATIONAL NEEDS STUDY

US 41 (North of Breezewood Lane to Orange Lane) *and*  
WIS 441 (East of US 10 to North System Interchange)

### SUGGESTED SHORT TERM IMPROVEMENTS

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## INTRODUCTION

This report provides short term alternatives for each interchange along US 41 and WIS 441 from the Breezewood interchange, Neenah, Winnebago County to the recently completed Brown County six-lane capacity expansion, which begins near Orange Lane, De Pere, Brown County. See Figure 1 on page 2 for the location map.

The short term alternatives can be analyzed to determine whether or not they fit/correct problems at the individual interchanges when operations or safety warrant.

The intended audience and readers of this report are in-house WisDOT NE Region folks in upper management, the programming unit, scoping team, traffic unit and project development unit.

The suggested short term alternatives are taken from phase 1 of the Operational Needs Assessment/US 41 (CTH JJ/WIS 114 to CTH S) and WIS 441 Final Report, November 2011. See the Final Report for further in-depth details for short, intermediate and long term alternatives.

This report is organized with a summary table of short term alternatives (Table 1 on page 3) followed by short term improvement figures per interchange.

Figure 1: US 41 and WIS 441 Study Area Map

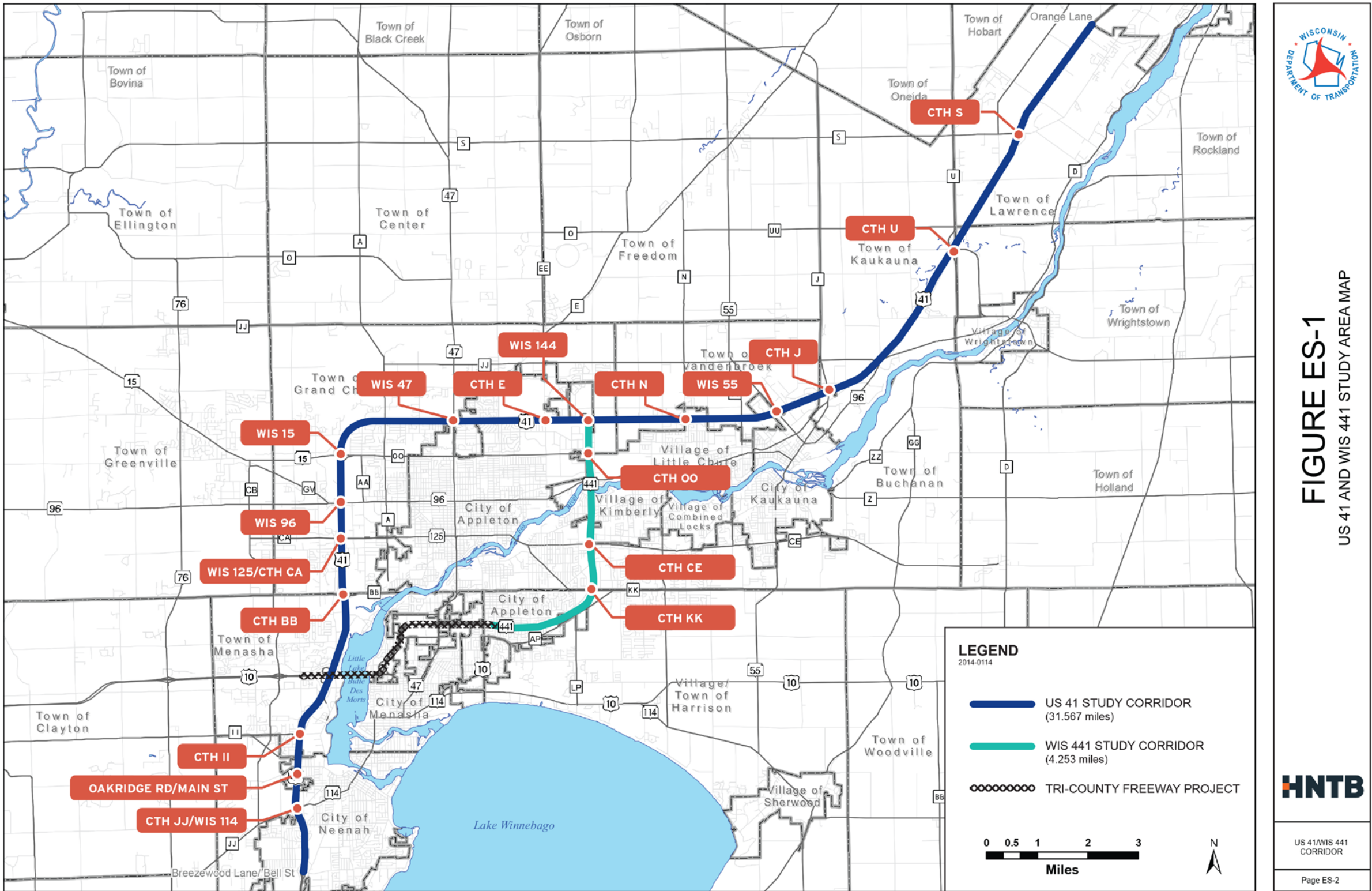


Table 1: Summary of Short Term Improvements

INTERCHANGES LOCATIONS	PROPOSED IMPROVEMENT	SUGGESTED IMPLEMENTATION YEAR	US 41 & WIS 441 SHORT-TERM COST*
WIS 114/County JJ (Winneconne Ave) Interchange	Short-term improvement (Alternative 1): Merge and diverge ramp improvements	2015-2017	\$580,000
Oakridge Rd/Main St Interchange	Short-term improvement (Alternative 1): Partial implementation of ramp terminal intersection improvements from Alternative 5	2015-2017	\$157,000
County II (Winchester Rd) Interchange	No short-term improvement identified.		
County BB (West Prospect Ave) Interchange	Short-term improvement (Alternative 1): Extended on-ramp acceleration lanes	2015-2017	\$260,000
WIS 125 (West College Ave) Interchange	No short-term improvement identified.		
WIS 96 (West Wisconsin Ave) Interchange	No short-term improvement identified.		
WIS 15/County OO (West Northland Avenue) Interchange	Short-term improvement (Alternative 1): On and off-ramp improvements	2012-2014	\$302,000
WIS 47 (Richmond Street) Interchange	No short-term improvement identified.		
County E (Ballard Road) Interchange	Short-term improvement (Alternative 2): Off-ramp improvements with deceleration lanes. Look-ahead left-turn lanes along County E NB and SB.	2012-2014	\$661,000
County N (North Freedom Road) Interchange	Short-term improvement (Alternative 1): Improve on-ramp acceleration length	2012-2014	\$658,000
WIS 55 (Delanglade Street) Interchange	No short-term improvement identified.		
County J (Hyland Avenue) Interchange	No short-term improvement identified.		
County U (South County Line Road) Interchange	No short-term improvement identified.		
County S (Freedom Road) Interchange	Short-term improvement (Alternative 2): Improve off-ramps along with County S turn lane improvements	2025	\$665,000
WIS 441/County KK (Calumet Street) Interchange	No short-term improvement identified.		
WIS 441/County CE (College Avenue) Interchange	No short-term improvement identified.		
WIS 441/County OO (East Northland Avenue) Interchange	Short-term improvement (Alternative 1): Improve off-ramps	2012-2014	\$568,000

\* Costs shown taken from Phase 1 of the Operational Needs Assessment for US 41 and WIS 441 Final Report, November 2011.

## **US 41 AND WIS 114/COUNTY JJ (WINNECONNE AVENUE) INTERCHANGE**

The primary need at the WIS 114 interchange is to improve the safety and operations at the ramp terminal intersections.

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- Improve merge taper horizontal and vertical geometrics for southbound US 41 on ramp
- Improve diverge taper horizontal and vertical geometrics for northbound US 41 off ramp
- Add an auxiliary right turn lane from southbound US 41 to southbound US 41 diverge
- Add receiving lane from eastbound Winneconne Ave. right turn to southbound US 41 on ramp
- Extend right and left turn lanes from 330' to 600' at southbound US 41 off ramp to Winneconne Avenue

The improvements in Alternative 1 will assist with crash severity problems at the southbound US 41 merge and diverge and the northbound US 41 diverge and will improve traffic flow between eastbound Winneconne Ave. free-flow right turn and westbound Winneconne Ave. signalized left turn to southbound US 41 on ramp. See Figure 2 on page 5.

## **US 41 AND OAKRIDGE ROAD/MAIN STREET INTERCHANGE**

The primary need at the Oakridge Road/Main Street interchange is to improve the safety and operations at the ramp terminal intersections.

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- Improve horizontal geometrics (first and second curve radii) for southbound US 41 off ramp
- Extend northbound off ramp RT turning bay storage length from 275' to 400'

The improvements in Alternative 1 will improve exiting movement from southbound US 41 auxiliary lane and contribute to efficient right and left turning movements from the northbound US 41 ramp terminal by reducing turning queue lengths anticipated for 2035 traffic volumes as shown in Figure 3 on page 6.

## **US 41 AND COUNTY II (WINCHESTER ROAD) INTERCHANGE**

No short term improvements were identified for the US 41 and County II interchange based upon the current potential for roundabouts as identified in the Phase II report.



Figure 2: WIS 114 Interchange Alternative 1 (Short Term)

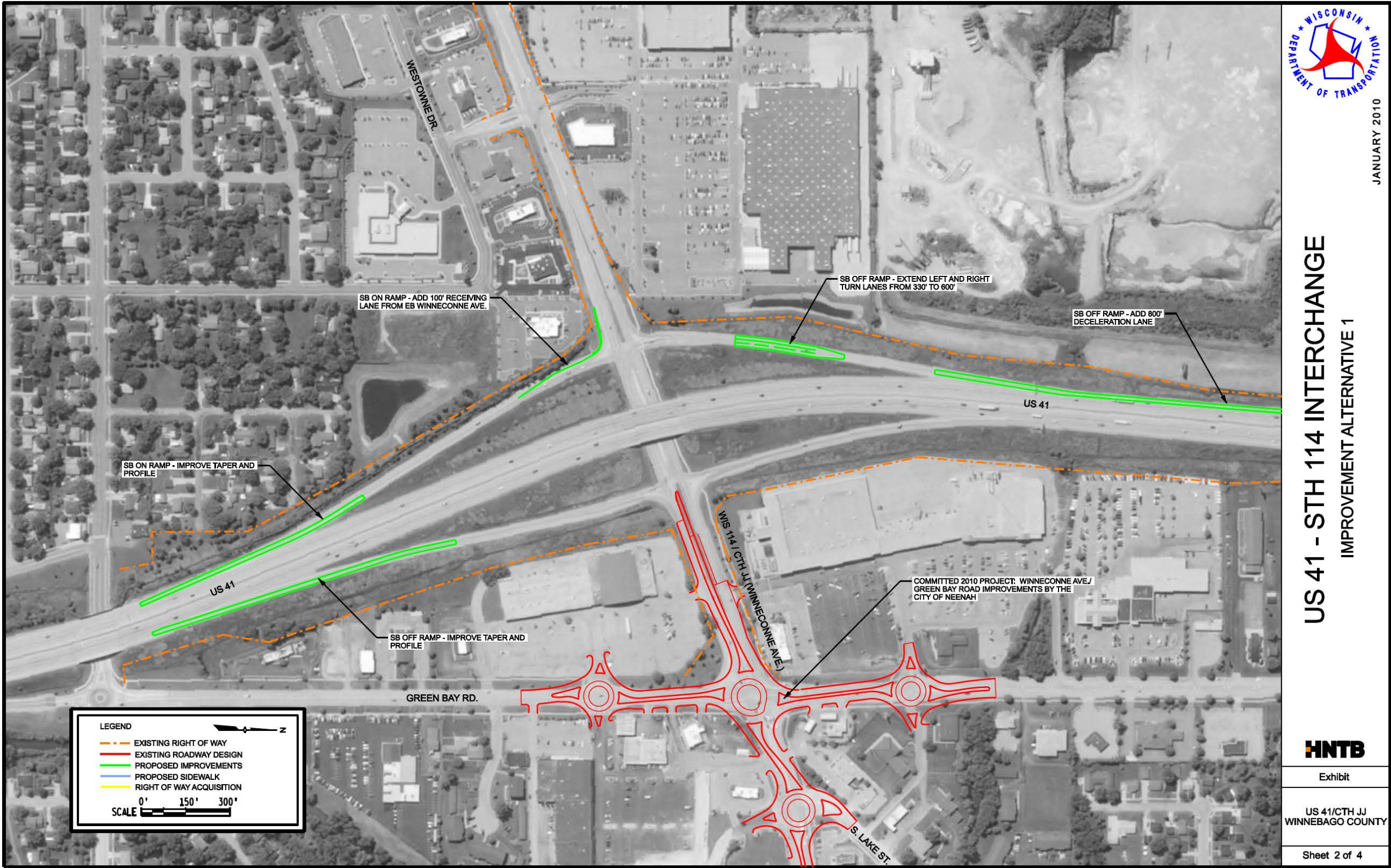




Figure 3: Oakridge Rd/Main St Interchange Alternative 1 (Short Term)



## **US 41 AND COUNTY BB (WEST PROSPECT AVENUE) INTERCHANGE**

The primary need at the CTH BB (Prospect Ave) interchange is to improve the safety and operations at the ramp terminal intersections.

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- Extend the northbound US 41 on ramp acceleration lane from 360 feet to 1200 feet.
- Extend the southbound US 41 on ramp acceleration lane from 360 feet to 1200 feet.

The improvements in Alternative 1 will improve safety and crash severity problems at the southbound and northbound US 41 merge locations.

Alternative 1 does not propose any ramp terminal improvements as shown in Figure 4 on page 8.

## **US 41 AND WIS 125 (WEST COLLEGE AVENUE) INTERCHANGE**

No short term improvements were identified at this location as recent construction activities implemented previously identified short term recommendations.

## **US 41 AND WIS 96 (WEST WISCONSIN AVENUE) INTERCHANGE**

No short term improvements were identified at this location as recent construction activities implemented previously identified short term recommendations.



Figure 4: County BB Interchange Alternative 1 (Short Term)



## **US 41 AND WIS 15/COUNTY OO (WEST NORTHLAND AVENUE) INTERCHANGE**

The primary need at the WIS 15 (Northland Ave) interchange is to improve the safety and operations at the ramp terminal intersections.

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- Add an additional left turn lane on the northbound off ramp.
- Add an additional right turn lane and extend right turn lane from 250 feet to 375 feet to the southbound off ramp.
- Extend the on ramp acceleration lane for northbound ramp from 750 feet to 1000 feet.

The improvements in Alternative 1 will reduce queue lengths on the off ramps and assist with crash severity problems at the northbound US 41 merge location. It is recommended that a traffic signal be installed at the southbound ramp terminal intersection for the right turn movement, southbound to westbound, and remove the existing yield sign. The signal would be coordinated with the existing traffic signals at the southbound ramp terminal intersection. See Figure 5 on page 10.

Further investigation is needed for potential removal of trees in the clear-zone with the recommendation made to the left turn at the US 41 northbound off ramp.

## **US 41 AND WIS 47 (RICHMOND STREET) INTERCHANGE**

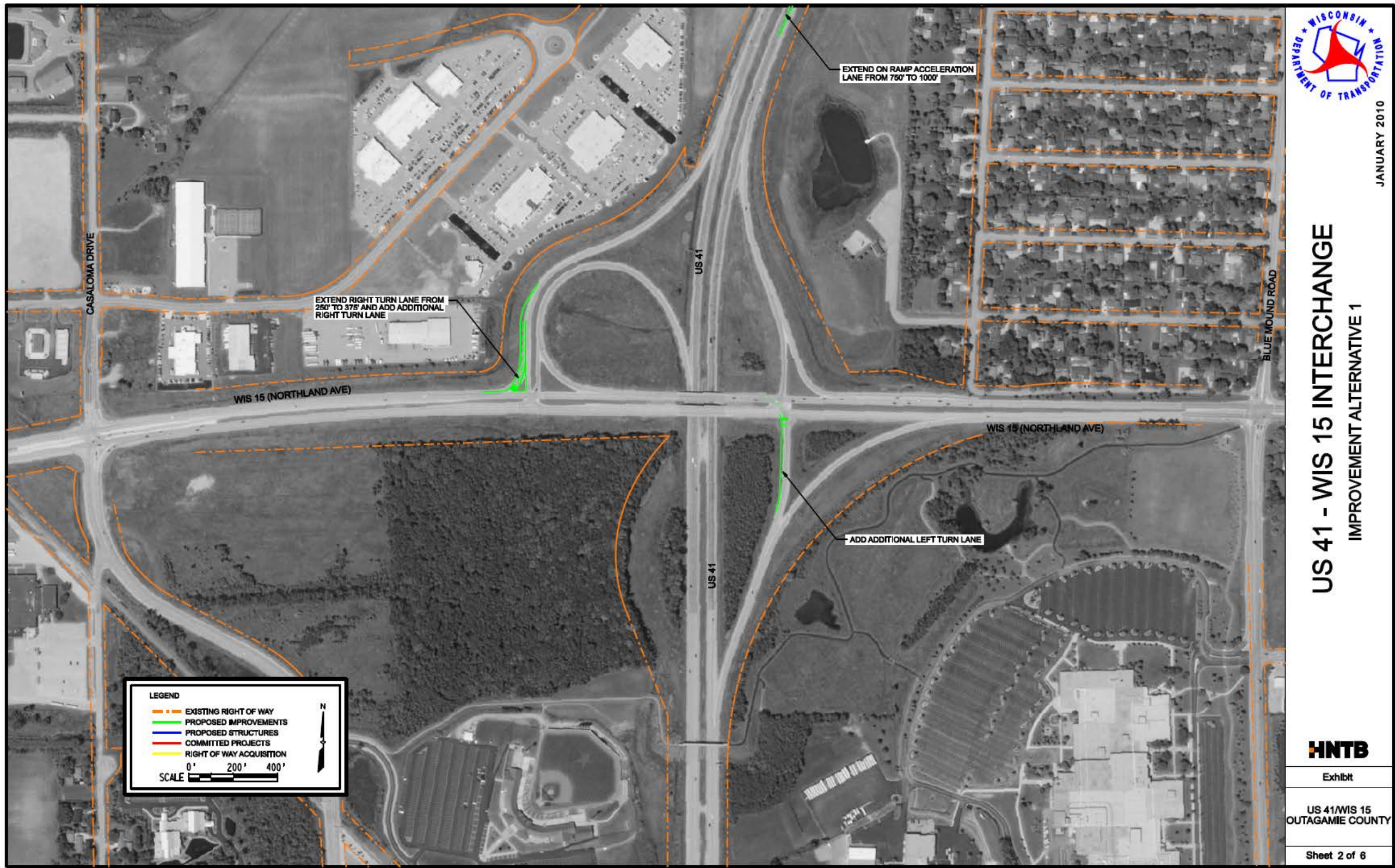
No short term improvements were identified at this location as upcoming construction activities as scheduled for this location (1130-33-00).

## **US 41 AND WIS 441 NORTH SYSTEM INTERCHANGE**

No short term improvements were identified at this location beyond previously committed projects as geometric deficiencies were very minor in nature and did not warrant the capital cost to address.



Figure 5: WIS 15 Interchange Alternative 1 (Short Term)



Suggested Short Term Alternatives

## US 41 AND COUNTY E (BALLARD ROAD) INTERCHANGE

The primary need at the CTH E (Ballard Rd) and US 41 interchange is to improve the safety at the ramp terminal intersections by improving traffic flow and level of service (LOS). LOS is expected to reach a grade of “F” at the ramp terminal intersections by 2020.

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- US 41 northbound off ramp: add an additional right turn lane and extend the existing right turn bay to a length of 300 feet
- US 41 southbound off ramp: add an additional right turn lane and extend the existing right turn bay to a length of 300 feet
- US 41 northbound off ramp: add an additional left turn lane and extend the existing left turn bay to a length of 500 feet
- Extend the northbound diverge deceleration distance from 300 feet to 1,400 feet
- Extend the southbound merge acceleration distance from 400 feet to 2,000 feet
- Add a look-ahead left turn lane for southbound traffic at the southbound ramp terminal intersection
- Add a look-ahead left turn lane for northbound traffic at the northbound ramp terminal intersection

Alternative 2 will provide more vehicle storage space which will help to ensure left turning vehicle queues will not disrupt thru traffic traveling north and south on CTH E (Ballard Rd). The look-ahead lanes will also help to reduce congestion, as shown in Figure 6 on page 12.

## US 41 AND COUNTY N (FREEDOM ROAD) INTERCHANGE

The primary need at the CTH N (Freedom Rd.) interchange is to improve operations of the ramp terminal intersections.

This alternative addresses the operational and safety problems at the interchange by making the following changes:

- Extend acceleration lanes at northbound and southbound on ramp merge locations.

The improvements in Alternative 1 provide increased merging opportunities for the northbound and southbound on ramps as shown in

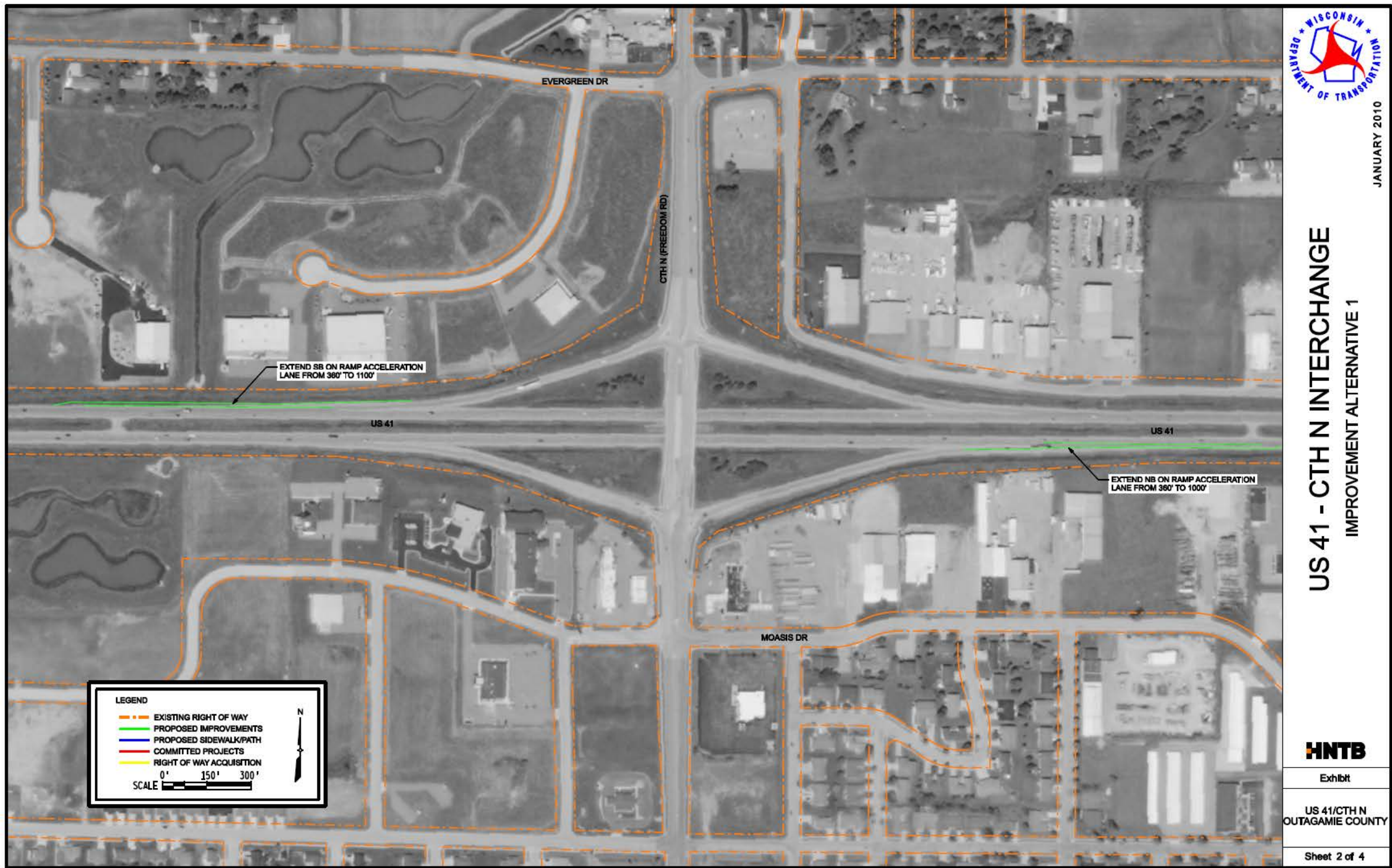


Figure 6: US 41/CTH E Interchange Alternative 2 (Short Term)





Figure 7: County N Interchange Alternative 1 (Short Term)



Suggested Short Term Alternatives



## **US 41 AND WIS 55 (DELANGLADE STREET) INTERCHANGE**

No short term improvements were identified at this location as upcoming construction activities as scheduled for this location (4650-08-71).

## **US 41 AND COUNTY J (HYLAND AVENUE) INTERCHANGE**

No short-term improvements were identified at this location as the interchange has recently been reconstructed with roundabouts and no additional modifications are currently identified.

## **US 41 AND COUNTY U (SOUTH COUNTY LINE ROAD) INTERCHANGE**

No short-term improvements were identified at this location however upcoming construction activities at this location are planned in conjunction with Weigh in Motion (WIM).

## **US 41 AND COUNTY S (FREEDOM ROAD) INTERCHANGE**

The primary need at the CTH S (Freedom Road) interchange is to improve the safety and operations at the ramp terminal intersections.

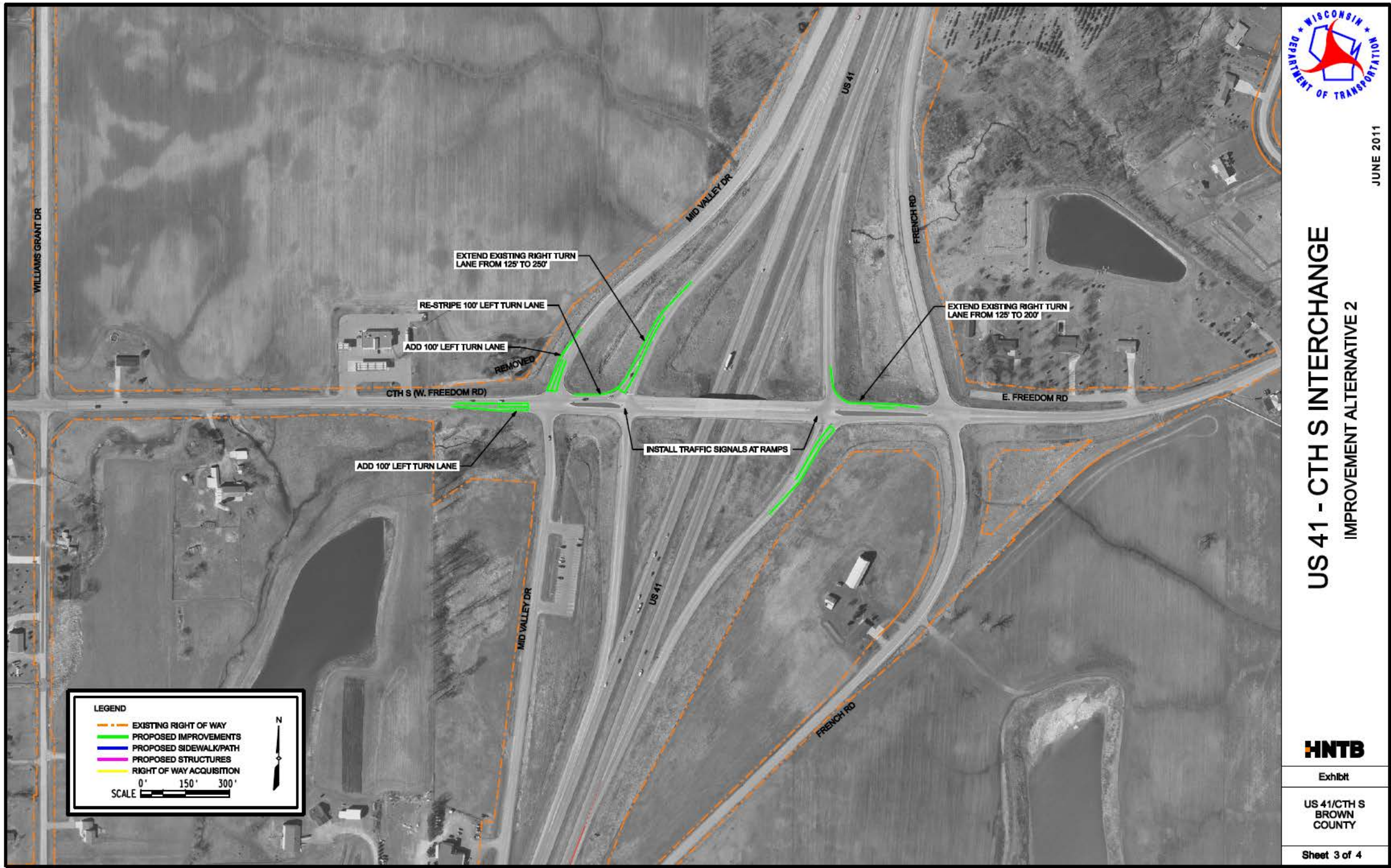
This alternative addresses the operational and safety problems at the interchange by making the following changes:

- Extend off ramp right turn storage by 75 feet (Southbound off ramp) and 150 feet (Northbound off ramp)
- Provide a continuous westbound right turn lane approaching Mid Valley Drive
- Signalize northbound and southbound ramp terminals
- Provide left turn storage at Mid Valley Drive on the eastbound, westbound and southbound approaches.

The signalization improvement in Alternative 2, as shown in Figure 8 on page 15, develops vehicle platoons and gaps in traffic. With these gaps, adjacent intersection cross streets (French and Mid Valley) have the opportunity to conduct turning movements. The HCM method (calculation) of determining levels of service (LOS) does not consider gaps that are created by signalization. Therefore, LOS F on the northbound approach of French Road is conservative and better operations are expected.

During 2035, ramp terminal traffic warrants the use of traffic signals. Under signal control, the ramp terminals during both peak hours are expected to operate at overall LOS B or better. All way stop control is proposed at French Road. All way stop provides north/south traffic with the opportunity to traverse the intersection. Eastbound traffic may have a tendency to queue to the northbound off ramp during the PM peak hour.

Figure 8: County S Interchange Alternative 2 (Short-Term)



Suggested Short Term Alternatives

## **WIS 441 AND COUNTY KK (CALUMET STREET) INTERCHANGE**

No short-term improvements were identified at this location as HSIP improvements are pending.

## **WIS 441 AND COUNTY CE (COLLEGE AVENUE) INTERCHANGE**

No short-term improvements were identified at this location; however construction is planned for the County CE and Eisenhower Road intersection to the east of WIS 441.

## **WIS 441 AND COUNTY OO (NORTHLAND AVENUE) INTERCHANGE**

The primary need at the CTH OO (Northland Ave.) interchange is to improve traffic safety at the southbound merge. The other issue that needs to be addressed is the traffic operations and safety at both of the ramp terminal intersections.

This alternative addresses the operational and safety problems at the interchange by making the following change:

- Auxiliary lanes for US 41 northbound and southbound between CTH OO (Northland Ave.) and the northern US 41 System Interchange (already constructed).
- Extend the acceleration lane on the southbound on ramp from 600 feet to 800 feet, end before bridge.
- Extend the right turn lane on the southbound off ramp from 120 feet to 350 feet.
- Extend the two left turn lanes on the northbound off ramp from 315 feet to 425 feet.
- Add an additional 400 foot right turn lane and extend existing right turn lane on the northbound off ramp from 160 feet to 400 feet.
- Add a sign bridge on the northbound off ramp for lane designation.

The improvements in Alternative 1, as shown in Figure 9 on page 17, will help solve the crash severity problem at the southbound US 41 merge location. It will also help with traffic operations at both of the ramp terminal intersection approaches. The potential for queuing vehicles backing up through the northbound ramp terminal intersection is also drastically reduced.

By 2020 auxiliary lanes will be constructed between CTH OO (Northland Ave.) and the North US 41 System Interchange. These auxiliary lanes will help to reduce the existing crash severity problem with the southbound off ramp and northbound on ramp.



Figure 9: WIS 441 and County OO Interchange Alternative 1 (Short Term)

