SECTION 7
STRATEGY PACKAGES AND NEPA

7.01 INTRODUCTION

The Beltline PEL Study Goal and Objectives address many different transportation modes. The Beltline PEL Study considered different improvements at specific locations on, near, or across the Beltline that, when combined, would address the Study Goal and Objectives. These improvements are multimodal in nature and are referred to as Components. It is impossible for a single infrastructure Component to satisfy all Beltline PEL Study Objectives; they must be assembled into Strategy Packages that are multifaceted in both the type of Components and the Objectives they satisfy. The Beltline PEL Study team assembled various Components into Strategy Packages creating a long-term vision for improvements on and near the Beltline corridor. The Component priorities reviewed in Section 6 were used to create four Strategy Packages. The Components were generally prioritized based on screening them against the Beltline PEL Study Objectives, feedback provided by stakeholders and the public, estimated impacts, and analysis of the potential benefits to accessibility that they would provide.

The Strategy Packages propose combinations of Components that result in different levels of improvement ranging from a Strategy Package that keeps the Beltline as it is today with only essential improvements and maintenance to a Strategy Package that does more to improve motor vehicle operations on the Beltline while offering a higher level of mobility and accessibility to all modes of travel.

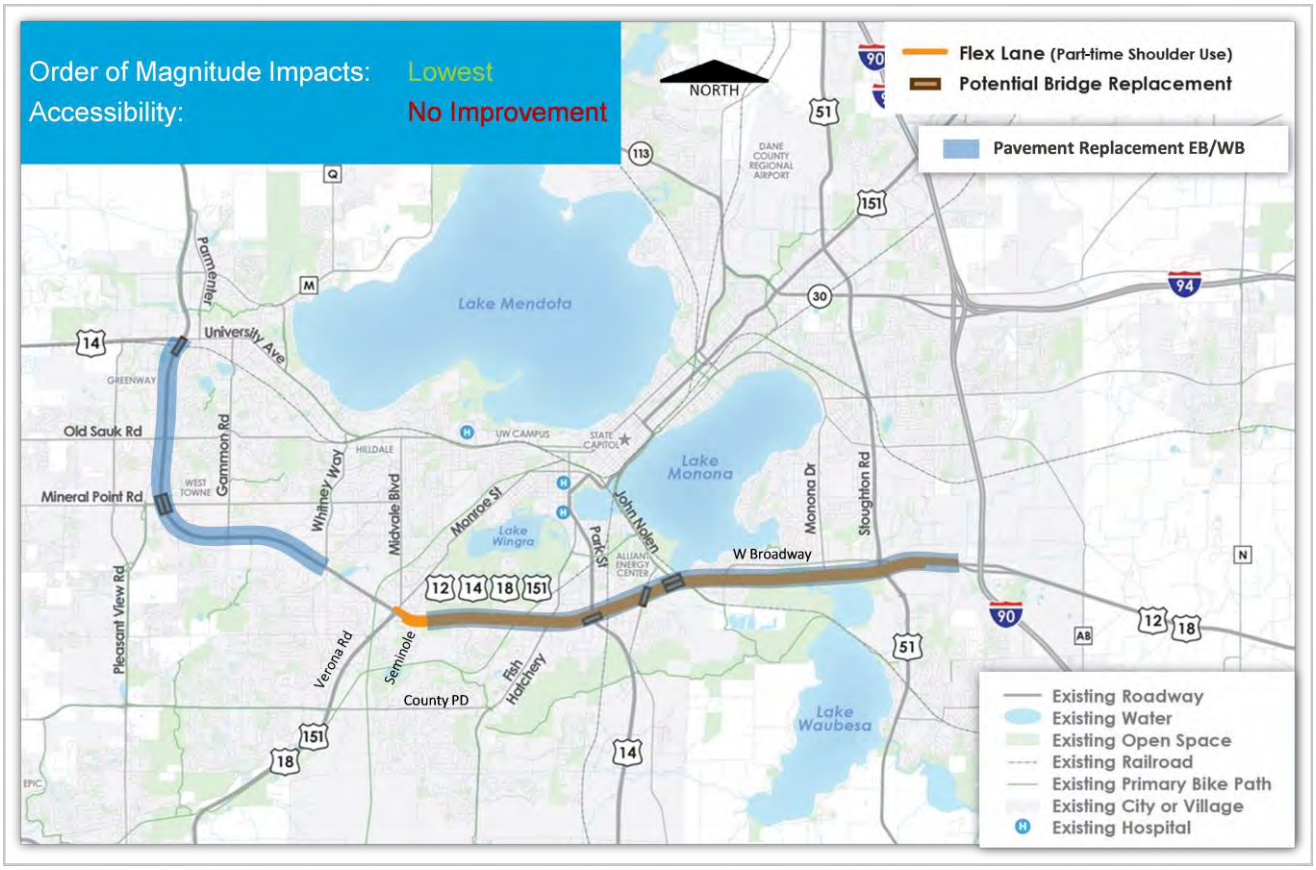
The section of the Beltline east of I-39/90 was not included in development of the Strategy Packages. Several corridor needs for this section were addressed as part of the US 12/18 and County AB interchange project completed in 2023 and a US 12 freeway conversion study identified spot improvements that could be made farther east if the need arises.

The following paragraphs describe the four Strategy Packages considered in the Beltline PEL Study including the Components that make up each Strategy Package and the anticipated LOS in design year 2050.

7.02 STRATEGY PACKAGES

A. Strategy Package 1–Preserve and Maintain

This Strategy Package would address existing and future transportation infrastructure needs and keep the Beltline as it is today. Figure 7.02-1 shows Strategy Package 1 (SP 1).



Map Source: Dane County GIS

Figure 7.02-1 SP1 Components

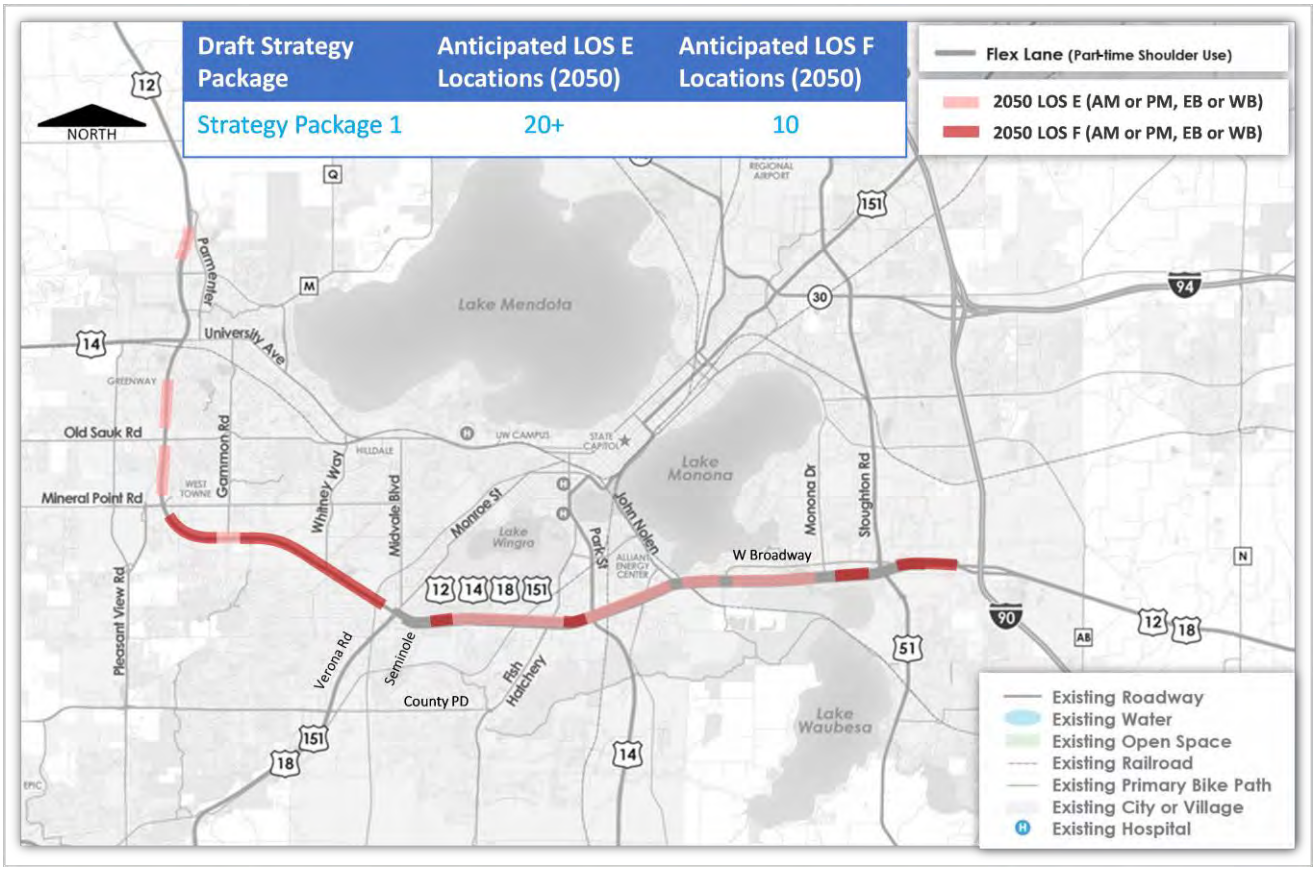
With SP 1, the Beltline would remain the same as it is today with the Beltline Flex Lane maintained between US 18/151 (Verona Road) and just west of I-39/90. Even SP1 has its own associated costs and necessary maintenance to keep the Beltline running through design year 2050. SP 1 would include pavement replacement on the Beltline from approximately University Avenue to Whitney Way and from just east of Seminole Highway to just west of I-39/90 to address pavement deficiencies. These sections are highlighted by a thick blue line in Figure 7.02-1. The mainline pavement between University Avenue and Whitney Way has the greatest pavement needs with a majority of the original pavement built in the 1960s. As part of SP 1, essential bridge replacements would also take place. Bridge replacements are anticipated to be needed by design year 2050 at:

- Westbound Terrace Avenue overpass just south of US 14/University Avenue in the city of Middleton (B-13-0014)
- Eastbound and westbound Beltline structures over Mineral Point Road (B-13-0221, B-13-0222)
- Eastbound Beltline structure over US 14 (Park Street) (B-13-0016)
- Rimrock Road structure over the Beltline (B-13-0310)
- Eastbound and westbound Beltline structures over John Nolen Drive (B-13-0195, B-13-0037)

In comparison to the other Strategy Packages considered in the Beltline PEL Study, it is anticipated that SP 1 would have the lowest amount of impact to the human and natural environment with the lowest financial cost. It is anticipated that with no improvements made other than necessary maintenance and pavement and structure replacements, there would be no improvement to accessibility along or near the Beltline.

LOS for motor vehicles is a measure of mobility. For a freeway facility like the Beltline, LOS is based on the density of vehicles measured in passenger cars per mile per lane. The LOS scale is from LOS A (low density, free-flow conditions with the ability to travel unimpeded) to LOS F (the volume of vehicles exceeds the capacity of the freeway resulting in congestion and slow or stopped traffic). For the Beltline LOS D is the desirable threshold.

The map in Figure 7.02-2 shows locations on the Beltline that are anticipated to operate at LOS E (light red) or LOS F (dark red) in 2050 if no improvements were made to the travel lanes or weaving locations along the Beltline. It is anticipated that the Beltline mainline would have at least 20 locations that operate at LOS E and ten locations that operate at LOS F in design year 2050 in one or more of the AM peak eastbound or westbound and PM peak eastbound or westbound. See Appendix F for detailed information regarding these locations.



Map Source: Dane County GIS

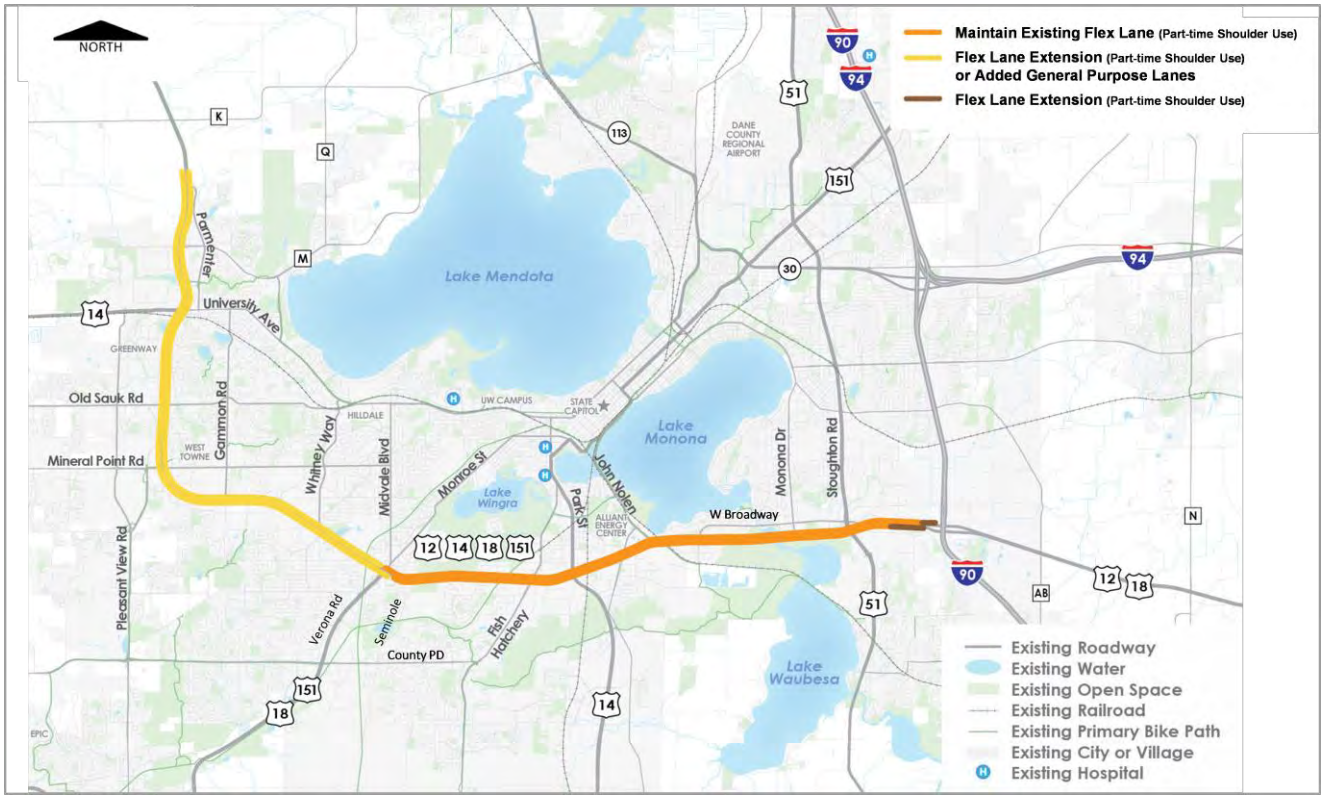
Figure 7.02-2 SP1 Anticipated 2050 LOS E and F Locations

B. Strategy Package 2 (SP 2)–Higher-Priority Components

SP 2 includes all of the pavement and bridge replacement elements included in SP 1 and adds higher-priority improvement Components. See Section 6–Components for additional detail on how the higher-priority Components were defined. The following paragraphs describe the Components included in SP 2 and the anticipated SP 2 operations and impacts.

1. Mainline Components

The Mainline Components for SP 2 are shown in Figure 7.02-3. SP 2 would include either an extension of the Beltline Flex Lane or the addition of one GP lane in each direction on the west end of the Beltline from about Parmenter Street to the Verona Road interchange (yellow line in Figure 7.02-3). The existing Beltline Flex Lane would also be extended to the I-39/90 interchange on the east end (brown line). The existing Beltline Flex Lane would remain between Verona Road and just west of I-39/90 (orange line). Figure 7.02-3 shows the Mainline Components included in SP 2.



Map Source: Dane County GIS

Figure 7.02-3 SP 2 Mainline Components

2. Weave Components

As part of improving Beltline mainline operations, Weave Components are included at specific locations. Weaving sections of a freeway occur when entering traffic mixes with traffic planning to exit at the next downstream off-ramp. These areas are often where freeway operations break down and safety issues occur. The Weave Components include the addition of a CD road which is parallel to, but physically separated from, the mainline freeway lanes, or basketweaves which carry one stream of traffic over the other using a bridge, thus eliminating the weaving movements.

The weaves considered most critical are projected to operate at LOS F for at least 2 hours of the day or have a v/c ratio greater than 1.05[1] in 2050. The Weave Components included in SP 2 are shown by a yellow symbol in Figure 7.02-4.

Map Source: Dane County GIS

Figure 7.02-4 SP 2 Weave Components

[1]The v/c ratio measures the amount of traffic using the Beltline versus the volume the Beltline was designed to carry. A roadway is likely congested and has a v/c ratio approaching or exceeding one indicating the volume using the road approaches or exceeds the capacity. While it varies depending on the specific location, the Beltline capacity is approximately 2,000 to, 2,100 vph per lane.

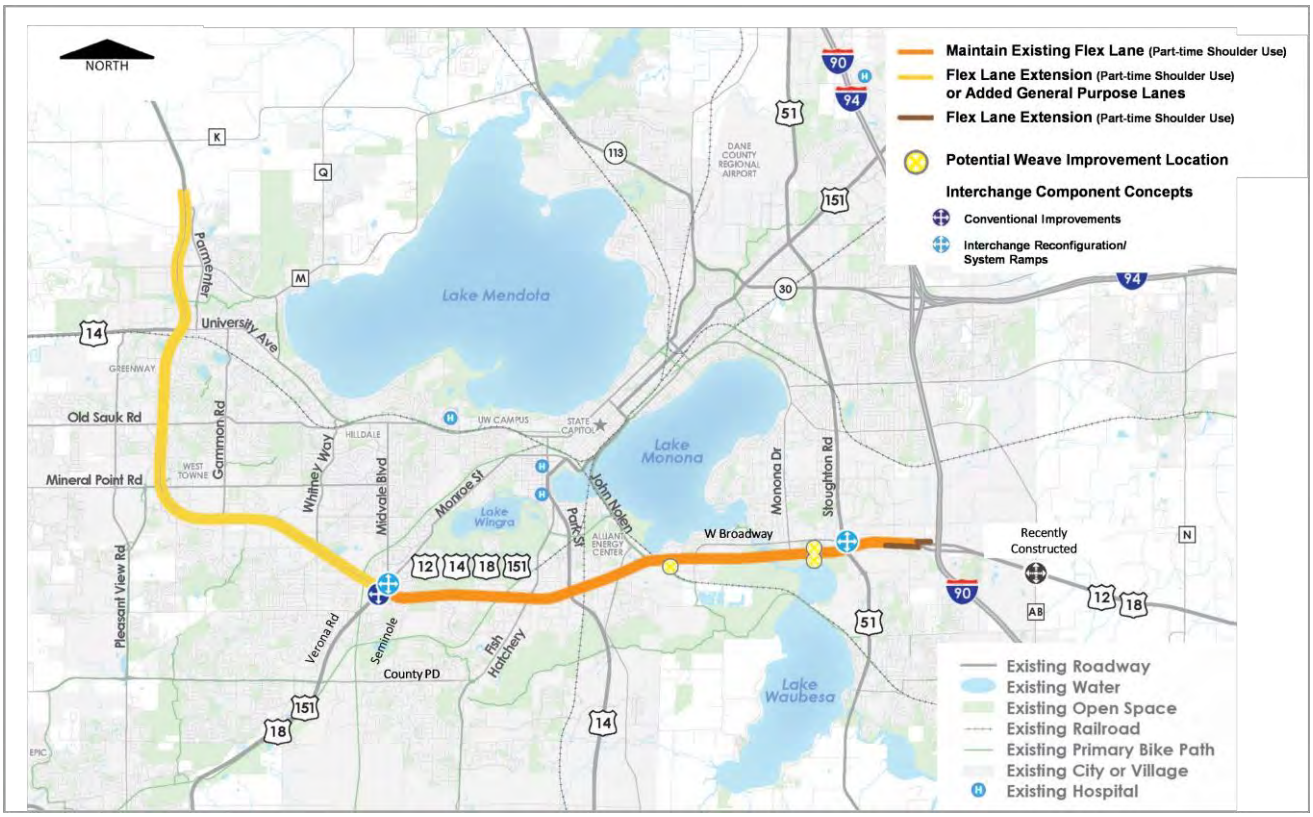
The most critical areas where Weave Components are included in SP 2 are:

- The eastbound Beltline between John Nolen Drive and West Broadway.
- The eastbound Beltline between Monona Drive and Stoughton Road.
- The westbound Beltline between Stoughton Road and Monona Drive.

Based on preliminary analysis, a basketweave is the likely option for these weave locations.

3. Interchange Components

Interchange Components would be included at the highest-priority interchanges, Verona Road and Stoughton Road. Highest-priority interchanges were determined by reviewing interchange capacity based on LOS, if queuing, or traffic backups, reach the Beltline mainline, and if queues along an arterial block ramp terminals or adjacent intersections. Existing and design year 2050 conditions were evaluated. These two interchanges operated at LOS F in the existing condition and design year 2050. Queuing to the Beltline mainline was observed in the existing condition and in traffic modeling for the design year for both interchanges (the westbound off-ramp at Verona Road and the eastbound off-ramp at Stoughton Road). In 2023, traffic growth at the Verona Road interchange had outpaced previous forecasts, and the westbound left-turn, eastbound left-turn, eastbound right-turn, northbound left-turn, and northbound right-turn movements had reached or exceeded the 2030 horizon year capacity of the improvements that were completed in 2016. Figure 7.02-5 shows the Interchange Components included in SP 2. Conventional interchange improvements are shown by a dark blue crossing symbol while interchange reconfiguration or system ramps are shown by a light blue crossing symbol. Both symbols are shown at the Verona Road interchange, because at this time, either conventional improvements or interchange reconfiguration or system ramps remain under consideration. Interchange reconfiguration or system ramps are being considered because conventional improvements may not be sufficient to address the operational uses at Verona Road. The Stoughton Road interchange is being evaluated under a separate ongoing NEPA study at the time of this report.



Map Source: Dane County GIS

Figure 7.02-5 SP 2 Interchange Components

4. Local Road System Crossings and Connections Components

SP 2 includes the higher-priority, new Local Road System Crossings and Connections Components. These were determined based on how well they met the Beltline PEL Study Objectives, feedback received, estimated impacts, and anticipated improvements to accessibility. The Local Road Crossings and Connections Components would include accommodations for pedestrians and bicyclists. Those that are included in SP 2 were:

- Crossing west of Whitney Way
- Crossing west of Park Street

Figure 7.02-6 shows the Local Road System Crossing and Connections Components included in SP 2 by a tan arrow.

Map Source: Dane County GIS

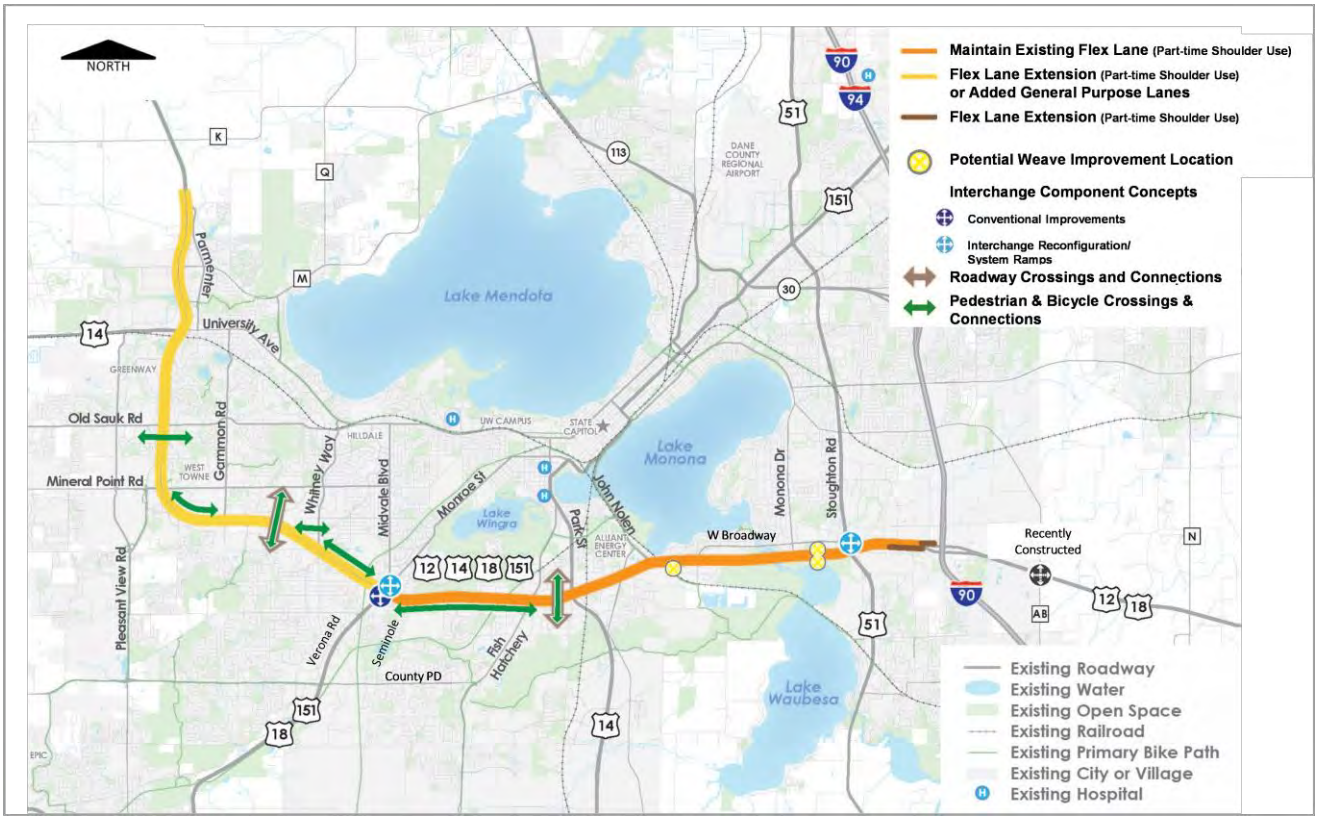
Figure 7.02-6 SP 2 Local Road System Crossings and Connections Components

5. Pedestrian and Bicycle Components

SP 2 would include the following higher-priority Pedestrian and Bicycle Components. These were determined based on how well they met the Beltline PEL Study Objectives, feedback received, estimated impacts, and anticipated improvements to accessibility. The Pedestrian and Bicycle Components included in SP 2 are:

- Crossing south of Old Sauk Road
- West Towne Path between High Point Road and Gammon Road
- Roadway crossing west of Whitney Way that would include pedestrian and bicycle accommodations
- Crossing of Whitney Way north of the Beltline
- Connection between the Beltline Path and Southwest Commuter Path on the north side of the Beltline
- Connection between Seminole Highway, the Cannonball Path, and Fish Hatchery Road on the south side of the Beltline, and
- Roadway crossing west of Park Street that would include pedestrian and bicycle accommodations

Figure 7.02-7 shows the Pedestrian and Bicycle Components included in SP 2 by a green arrow. Green arrows with a tan outline indicate a roadway crossing that would include pedestrian and bicycle accommodation.



Map Source: Dane County GIS

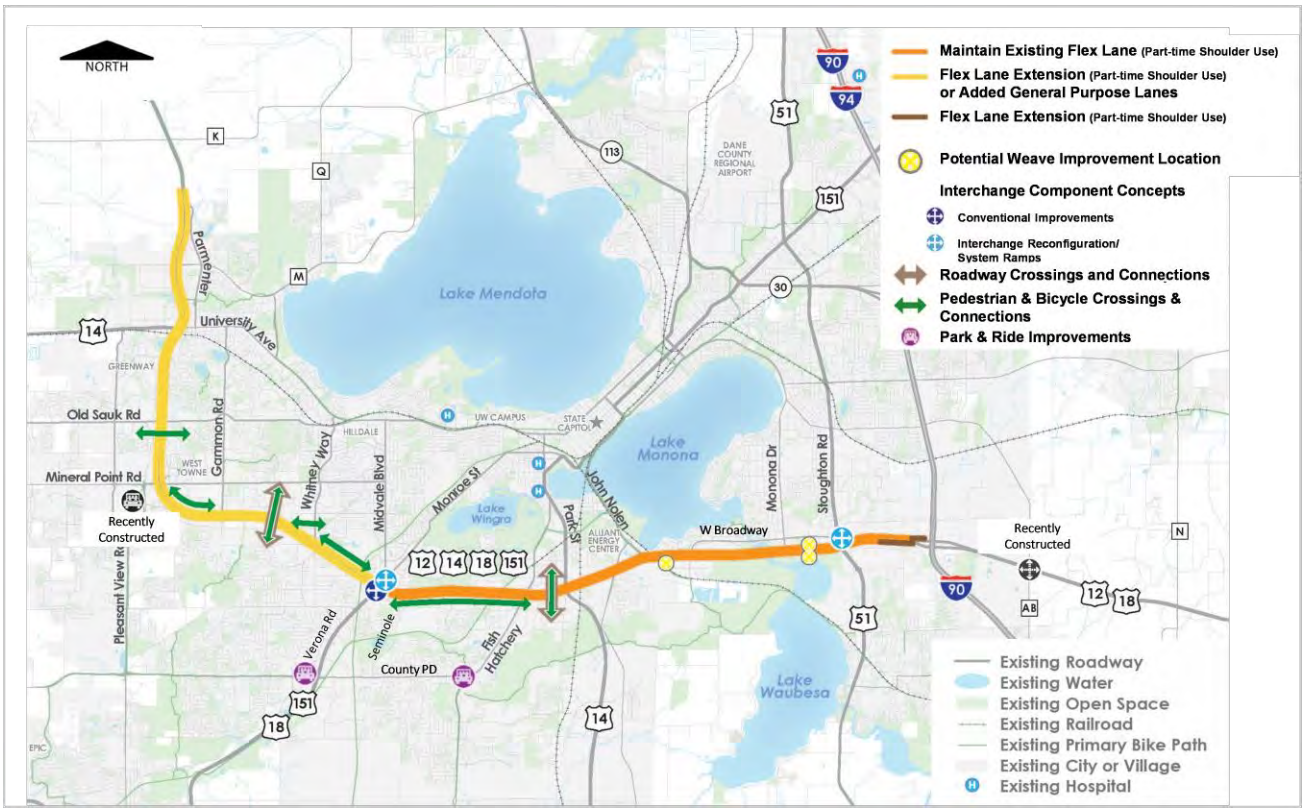
Figure 7.02-7 SP 2 Pedestrian and Bicycle Components

6. Park and Ride Components

SP 2 includes the following higher-priority Park and Ride Components. These were determined based on how well they met the Beltline PEL Study Objectives, feedback received, estimated impacts, and anticipated improvements to accessibility. The Park and Ride Components included in SP 2 are:

- County M and Mineral Point Road (completed as part of Madison BRT improvements in September 2024).
- Verona Road and County PD.
- Fish Hatchery Road and County PD.

Figure 7.02-8 shows the Park and Ride Components included in SP 2 by a purple symbol.



Map Source: Dane County GIS

Figure 7.02-8 SP 2 Park and Ride Components

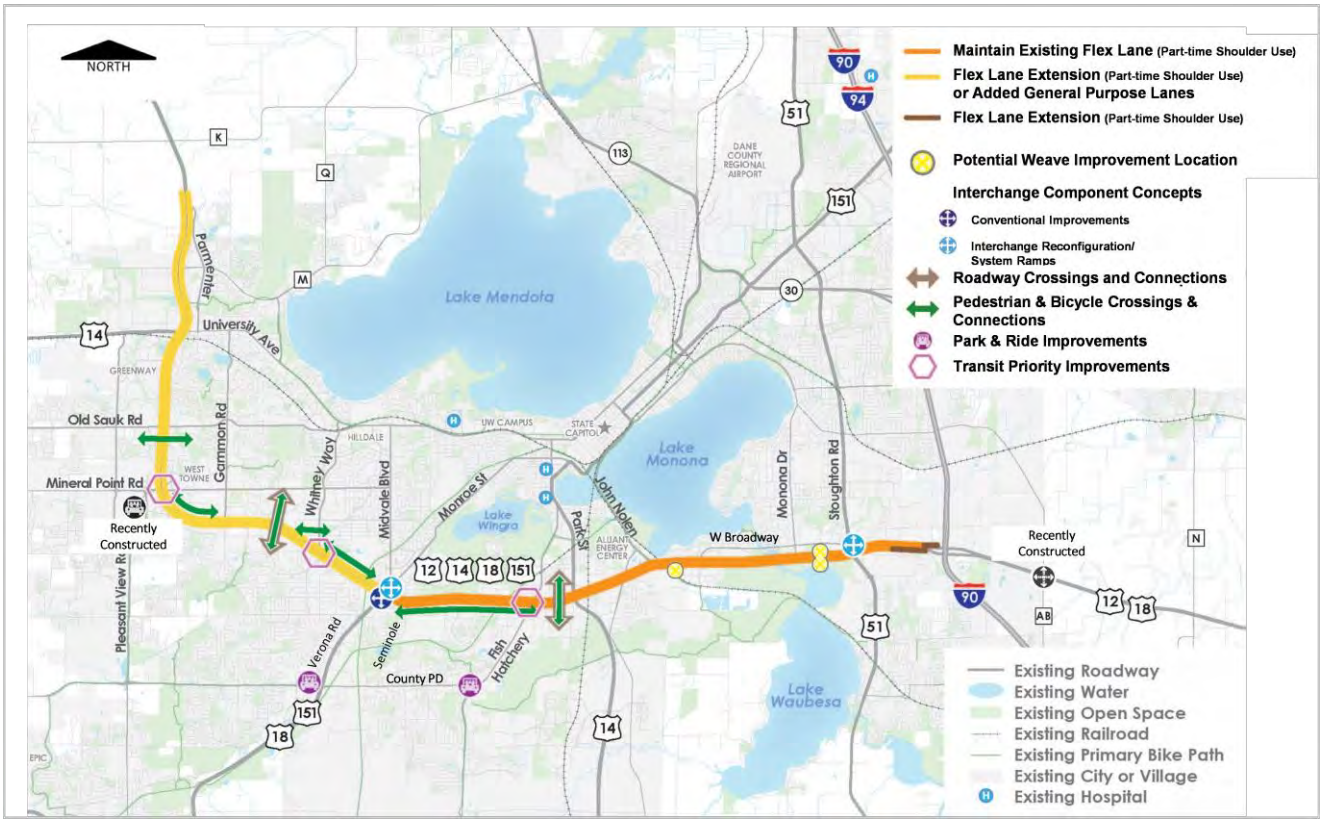
7. Transit Priority Components

SP 2 would include higher-priority Transit Priority Components. These were determined by the amount of transit service using each interchange. The Transit Priority Components included in SP 2 are located at:

- Mineral Point Road
- Whitney Way
- Fish Hatchery Road

At the time of this report, Mineral Point Road is an existing BRT crossing and Fish Hatchery Road is an anticipated BRT crossing and, therefore, highest priority. Each also has existing local service routes that travel through the interchange. The Whitney Way interchange also had highest priority based on the two standard routes that travel through the interchange. Standard routes have bus service every 30 minutes on weekdays, which is the second most frequent route type.

Figure 7.02-9 shows the locations of the Transit Priority Components included in SP 2 by a purple hexagon.

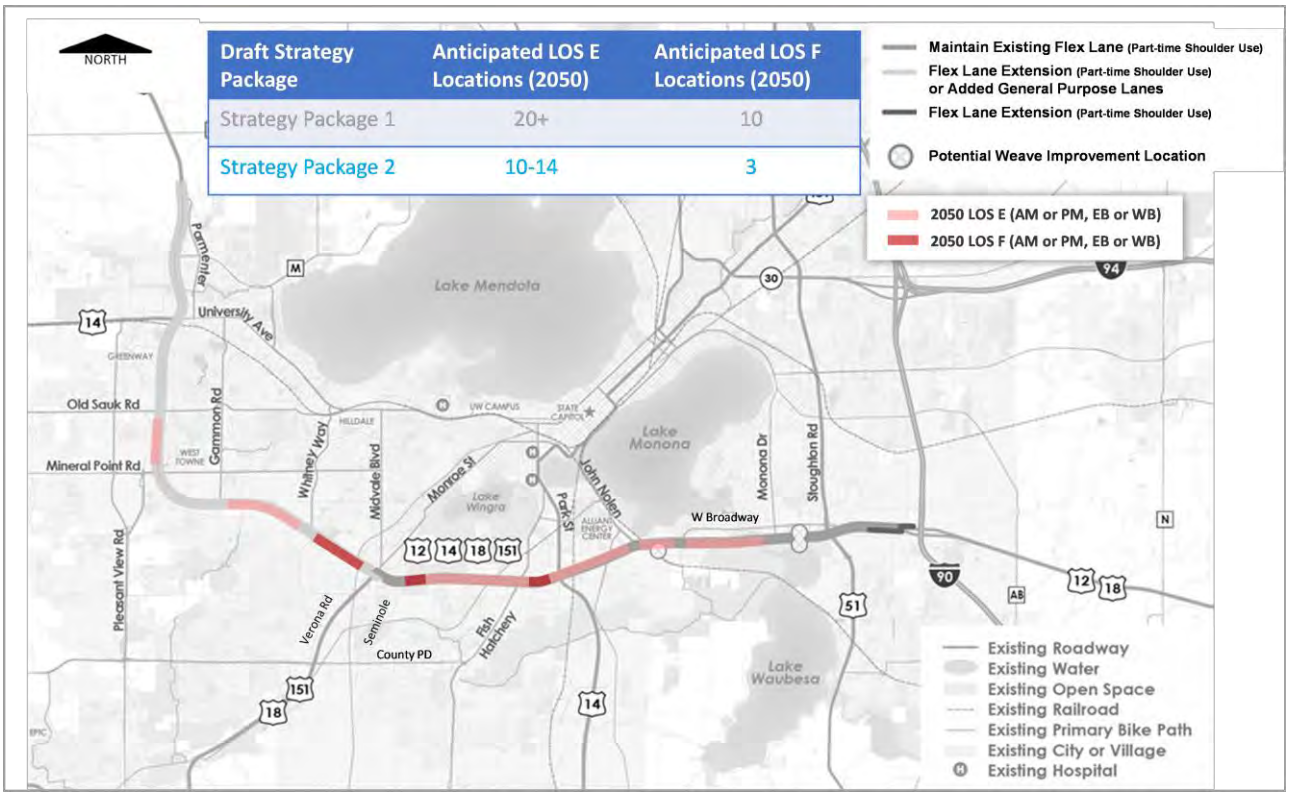


Map Source: Dane County GIS

Figure 7.02-9 SP 2 Transit Priority Components

8. Anticipated SP 2 2050 Operations

The map in Figure 7.02-10 shows locations on the Beltline that are anticipated to operate at LOS E (light red) or LOS F (dark red) with SP 2 in 2050. It is anticipated that the Beltline mainline would have 10 to 14 locations that operate at LOS E and three locations that operate at LOS F in design year 2050.

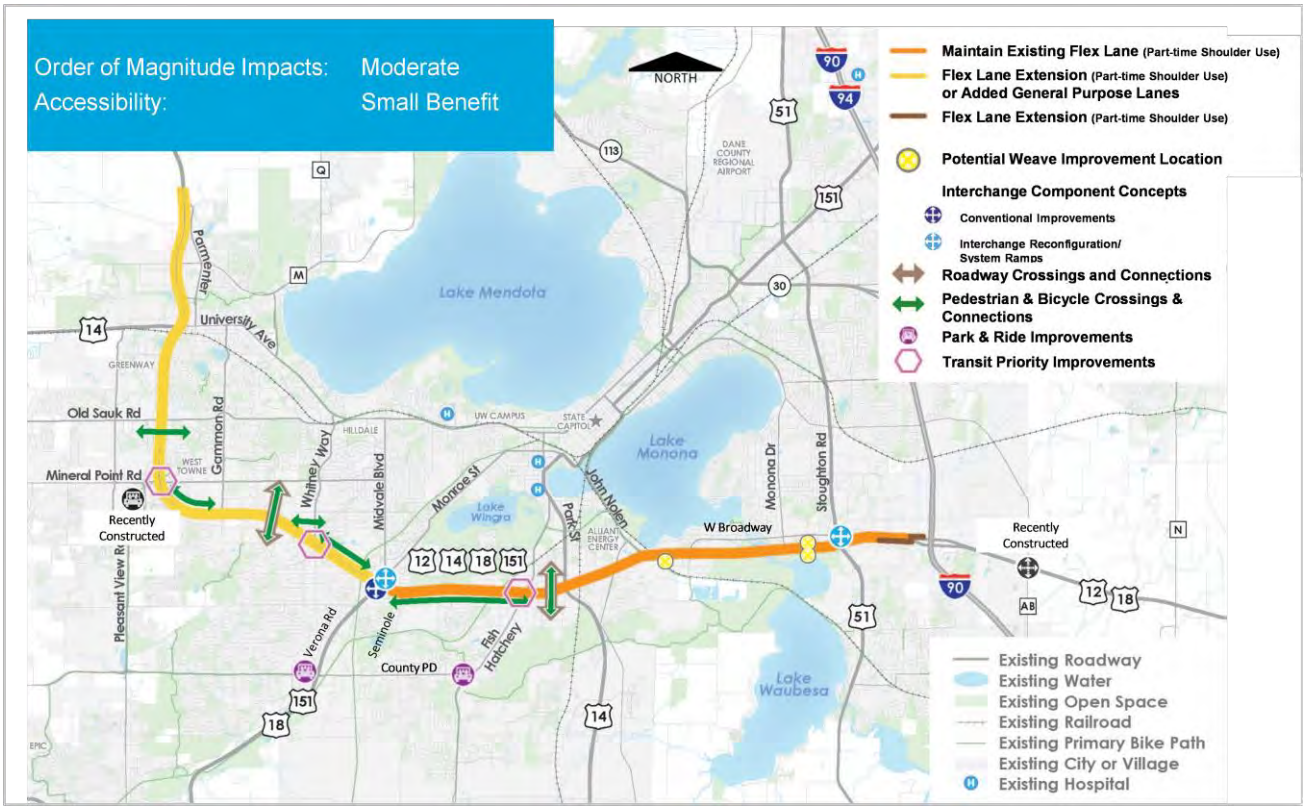


Map Source: Dane County GIS

Figure 7.02-10 SP 2 Anticipated 2050 LOS E and F Locations

9. Anticipated SP 2 Impacts

By order of magnitude, it is anticipated that SP 2 would have a moderate amount of impact to the human and natural environment and a higher cost than SP 1. It is anticipated that with two new roadway crossings, and the bicycle and pedestrian crossings and connections added, users would see a small increase in accessibility along or near the Beltline. Figure 7.02-11 shows all Components included in SP 2.



Map Source: Dane County GIS

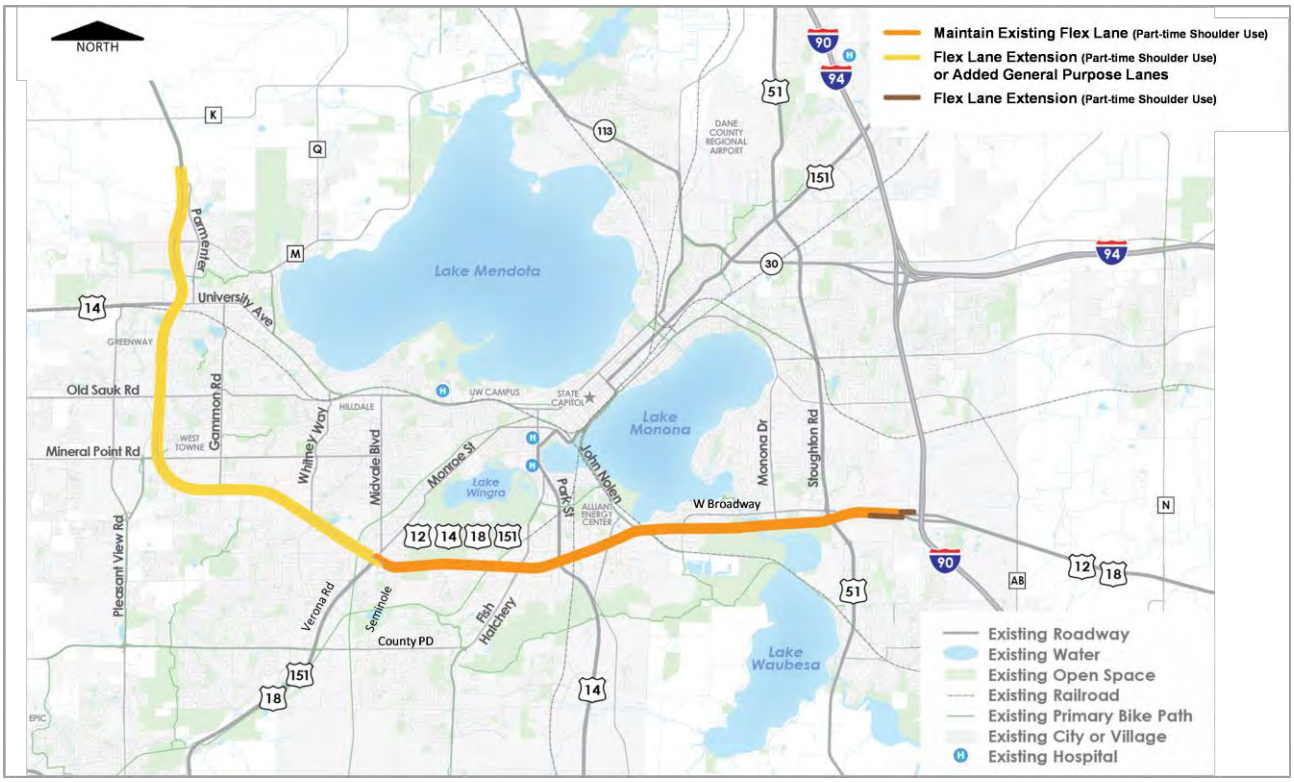
Figure 7.02-11 SP 2 Components

C. Strategy Package 3 (SP 3): Mid- to High-Priority Components

SP 3 builds upon SP 2 by including the higher-priority Components while also adding the mid-priority Components. See Section 6–Components for additional detail on how the mid- and high-priority Components were defined. The following paragraphs progressively disclose Components included in SP 3 and the anticipated SP 3 operations and impacts.

1. Mainline Components

Exactly the same as SP 2, SP 3 Mainline Components would include either the Beltline Flex Lane extension or the add one GP lane Mainline Components on the west end of the Beltline from about Parmenter Street to the Verona Road interchange (yellow line). The existing Beltline Flex Lane would be extended to the I-39/90 interchange on the east end (brown line). The existing Beltline Flex Lane would remain between Verona Road and just west of I-39/90 (orange line). Figure 7.02-12 shows the Mainline Components included in SP 3.

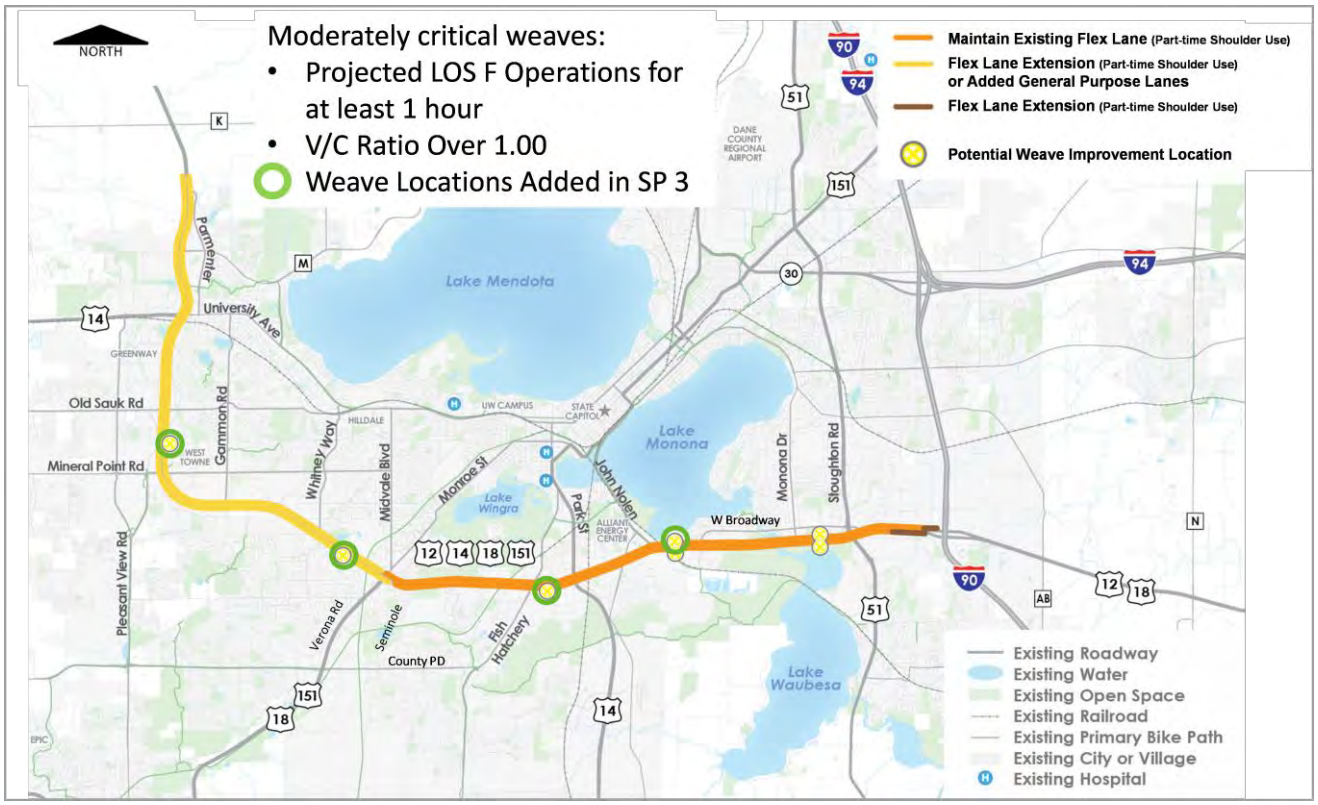


Map Source: Dane County GIS

Figure 7.02-12 SP 3 Mainline Components

2. Weave Components

In addition to the highest-priority Weave Components included as part of SP 2, moderately critical Weave Components were also included as part of SP 3. Moderately critical weave locations are projected to operate at LOS F for at least 1 hour per day or have a v/c ratio greater than 1.0 in design year 2050. The Weave Components that would be included in SP 3 are shown by a yellow symbol in Figure 7.02-13 with the moderately critical Weave Components added to those from SP 2 circled in green.



Map Source: Dane County GIS

Figure 7.02-13 SP 3 Weave Components

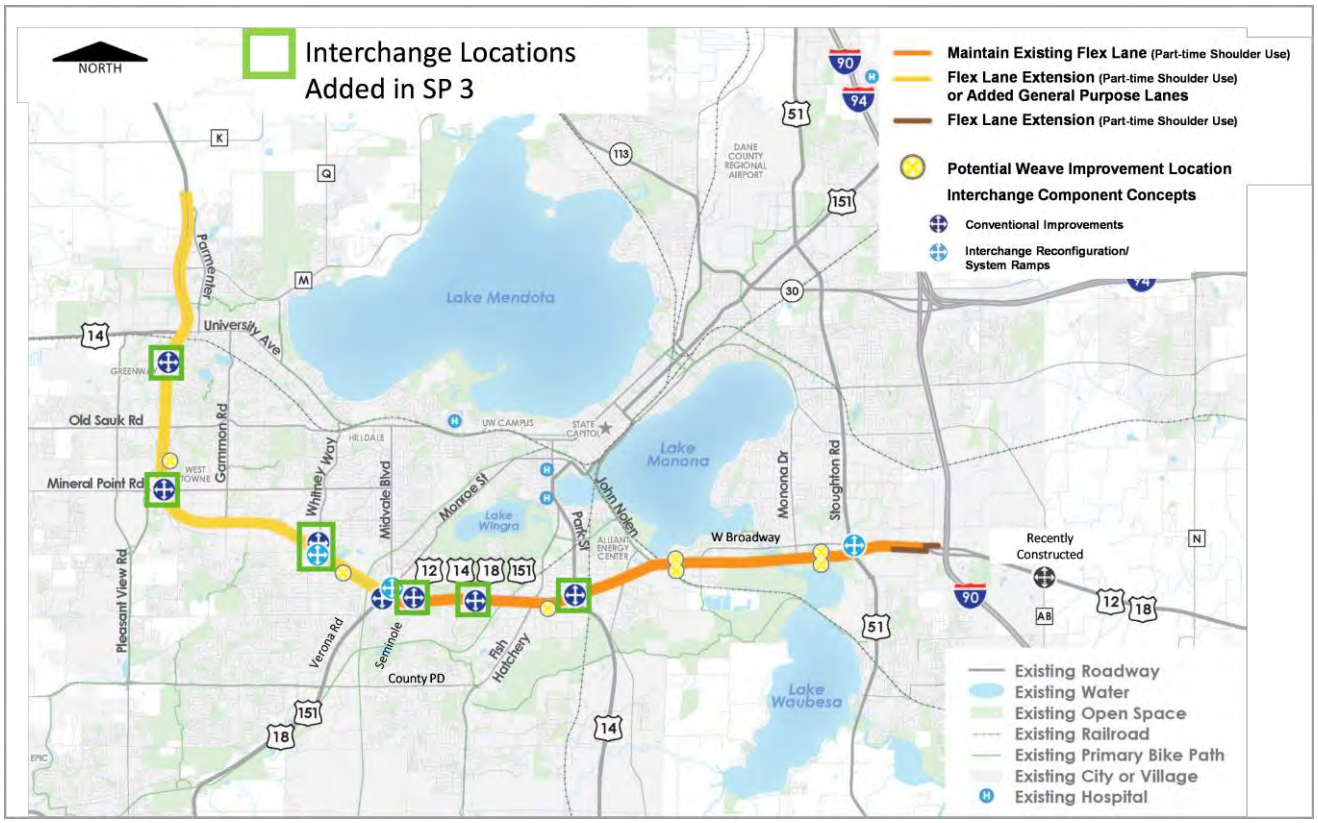
In addition to the highest-priority Weave Components in SP 2, moderately critical Weave Components that would be included in SP 3 are:

- The eastbound Beltline between Whitney Way and Verona Road and Fish Hatchery Road and Park Street.
- The westbound Beltline between West Broadway and John Nolen Drive, and Mineral Point Road and Old Sauk Road.

Based on preliminary analysis, basketweaves are the likely option for the moderately critical Weave Component locations with the exception of the westbound Beltline West Broadway to John Nolen Drive weave. A CD road is proposed for this Weave Component to minimize impacts on the north side of the Beltline.

3. Interchange Components

The high- and mid-priority Interchange Components would be included in SP 3 as shown in Figure 7.02-14 with the mid-priority interchange locations highlighted by a green square.



Map Source: Dane County GIS

Figure 7.02-14 SP 3 Interchange Components

In addition to the high-priority Verona Road and Stoughton Road interchanges included in SP 2, SP 3 would include Interchange Components at:

- Greenway Boulevard
- Mineral Point Road
- Whitney Way
- Seminole Highway
- Todd Drive
- Park Street

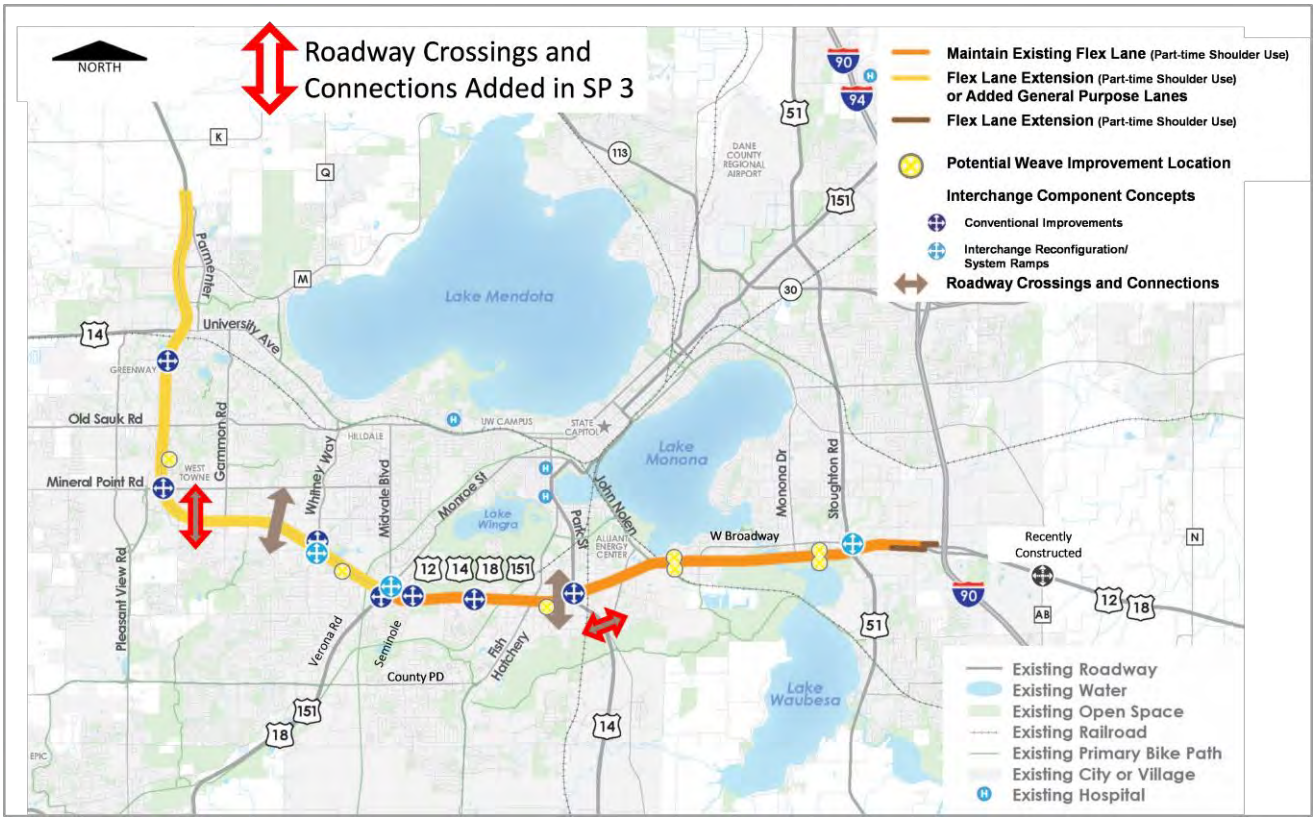
A majority of the Interchange Components added in SP 3 would be potential conventional improvements with the exception being the Whitney Way interchange where both conventional improvements and interchange ramp reconfiguration/system ramps would be considered. This is due to the fact that it may be difficult to meet operational goals through conventional interchange improvements.

4. Local Road System Crossings and Connections Components

In addition to the highest-priority Local Road System Crossings and Connections Components included in SP 2, SP 3 would also include the following mid-priority Local Road System Crossings and Connections Components:

- Crossing west of Gammon Road
- Crossing of US 14 from Stewart Street to Novation Parkway south of the Beltline

The SP 3 mid- and high-priority Local Road System Crossings and Connections Components are shown in Figure 7.02-15 by the tan arrows with the mid-priority Components highlighted with by a red outline.



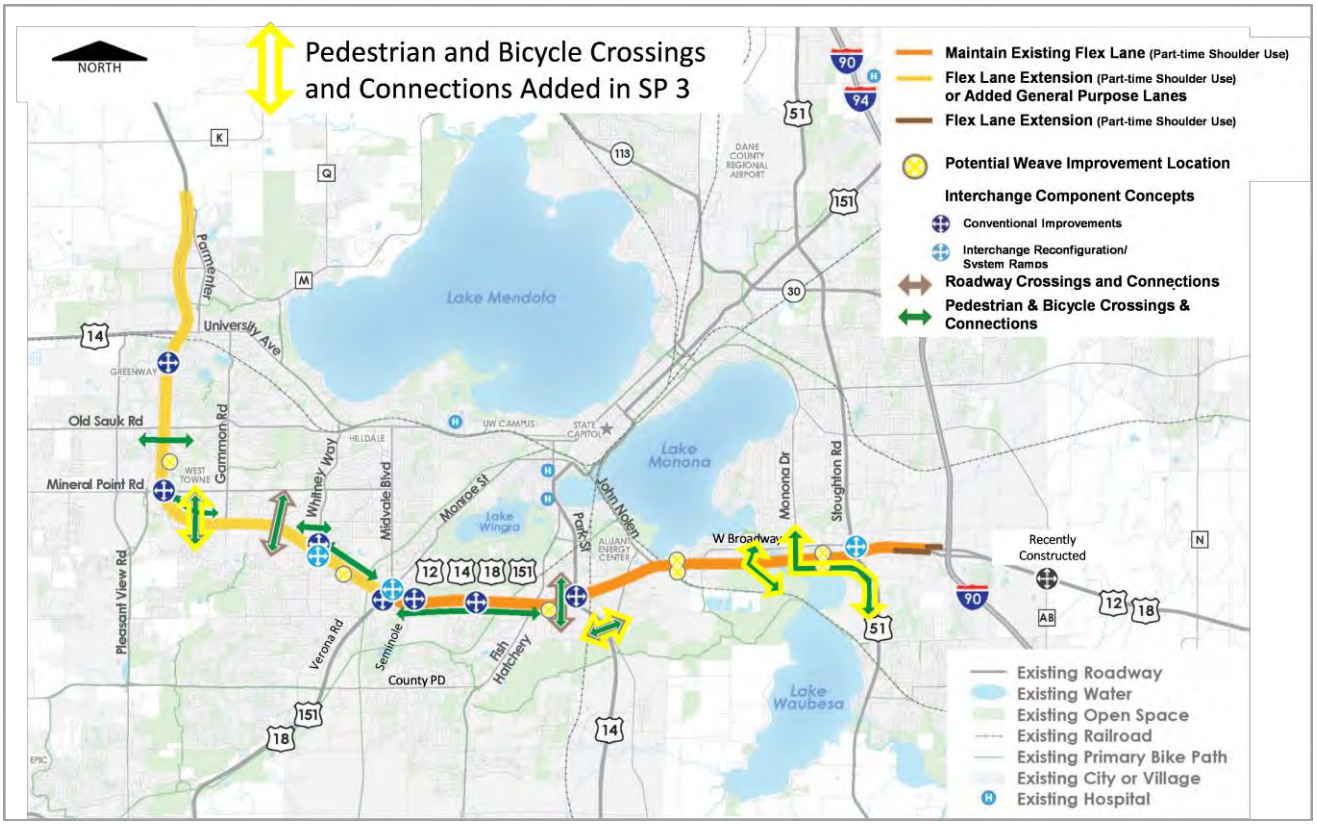
Map Source: Dane County GIS

Figure 7.02-15 SP 3 Local Road System Crossings and Connections Components

5. Pedestrian and Bicycle Components

In addition to the highest-priority Pedestrian and Bicycle Components included in SP 2, SP 3 also includes mid-priority Pedestrian and Bicycle Components. Locations added are shown in Figure 7.02-16 highlighted with a yellow outline and include:

- The roadway crossing west of Gammon Road that includes pedestrian and bicycle accommodations
- The roadway crossing of US 14 south of the Beltline that includes pedestrian and bicycle accommodations
- Connection through the CSSRA
- Connection from Monona Drive to Stoughton Road

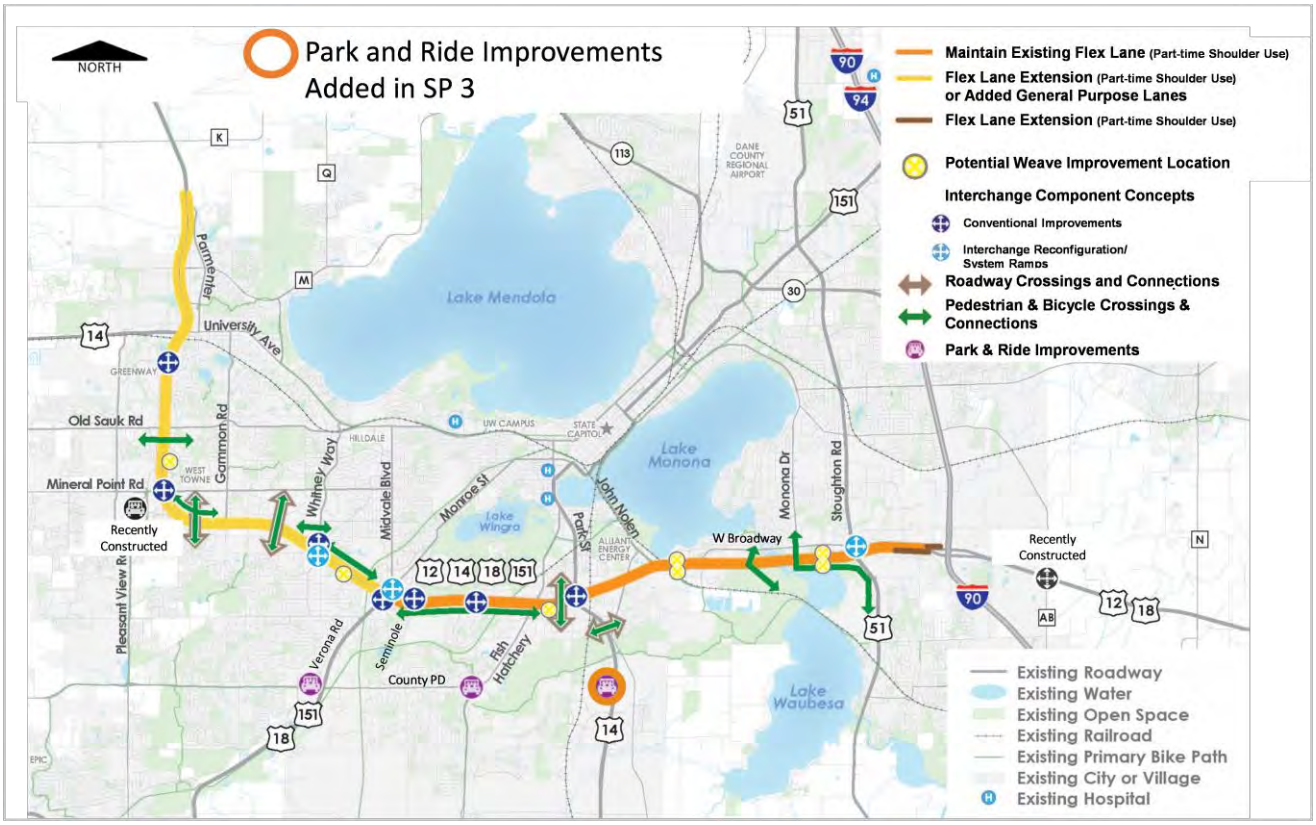


Map Source: Dane County GIS

Figure 7.02-16 SP 3 Pedestrian and Bicycle Components

6. Park and Ride Components

One mid-priority park and ride location would also be included in SP 3 in addition to those in SP 2. The location added is shown in Figure 7.02-17 at US 14/McCoy Road/Lacy Road, highlighted by an orange circle.



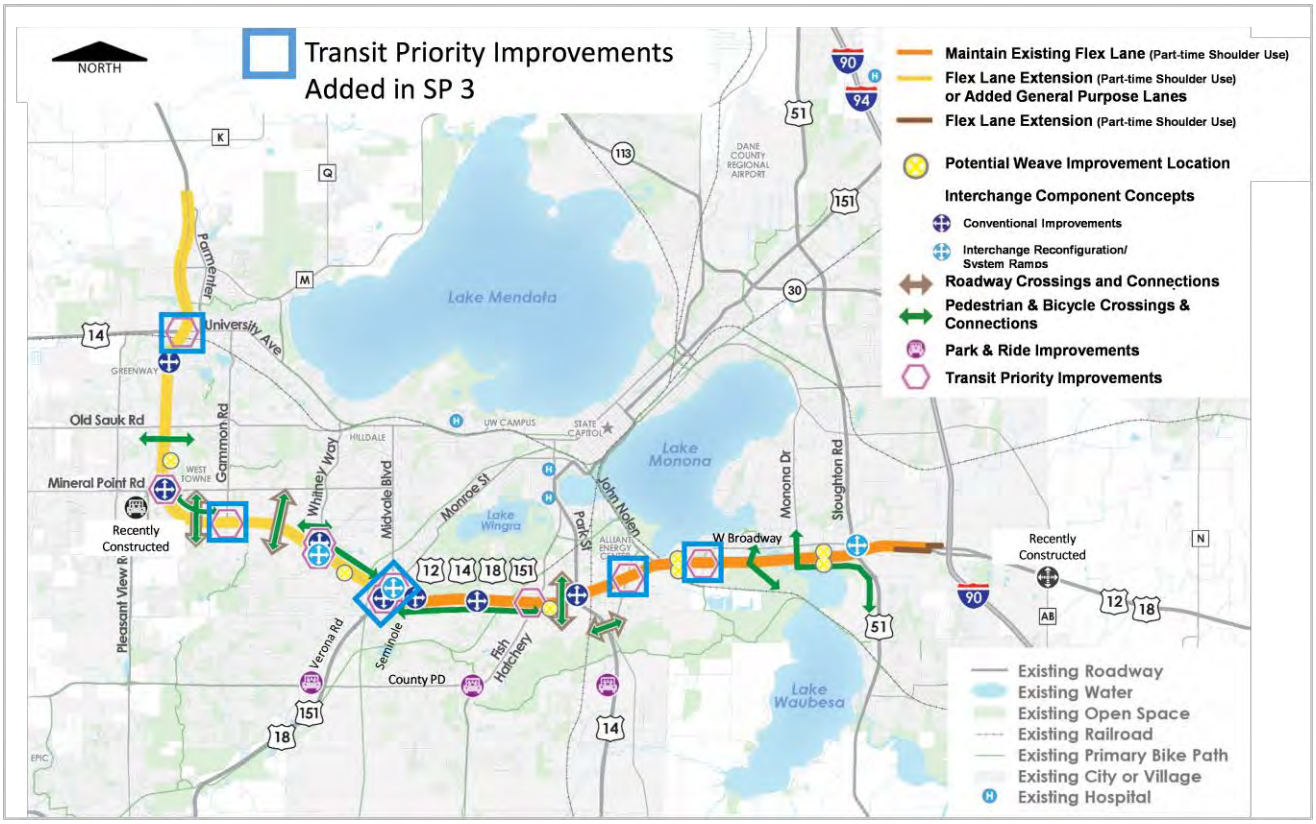
Map Source: Dane County GIS

Figure 7.02-17 SP 3 Park and Ride Components

7. Transit Priority Components

Mid-priority Transit Priority Components meet fewer of the Beltline PEL Study Objectives than the high-priority Components and were in the middle of the range of Components based on feedback the Beltline PEL Study team received. Mid-priority Components are included in SP 3 in addition to those included in SP 2. Purple hexagons have been added to the map in Figure 7.02-18 and highlighted with a blue square at the following interchanges:

- University Avenue
- Gammon Road
- Verona Road
- Rimrock Road
- West Broadway

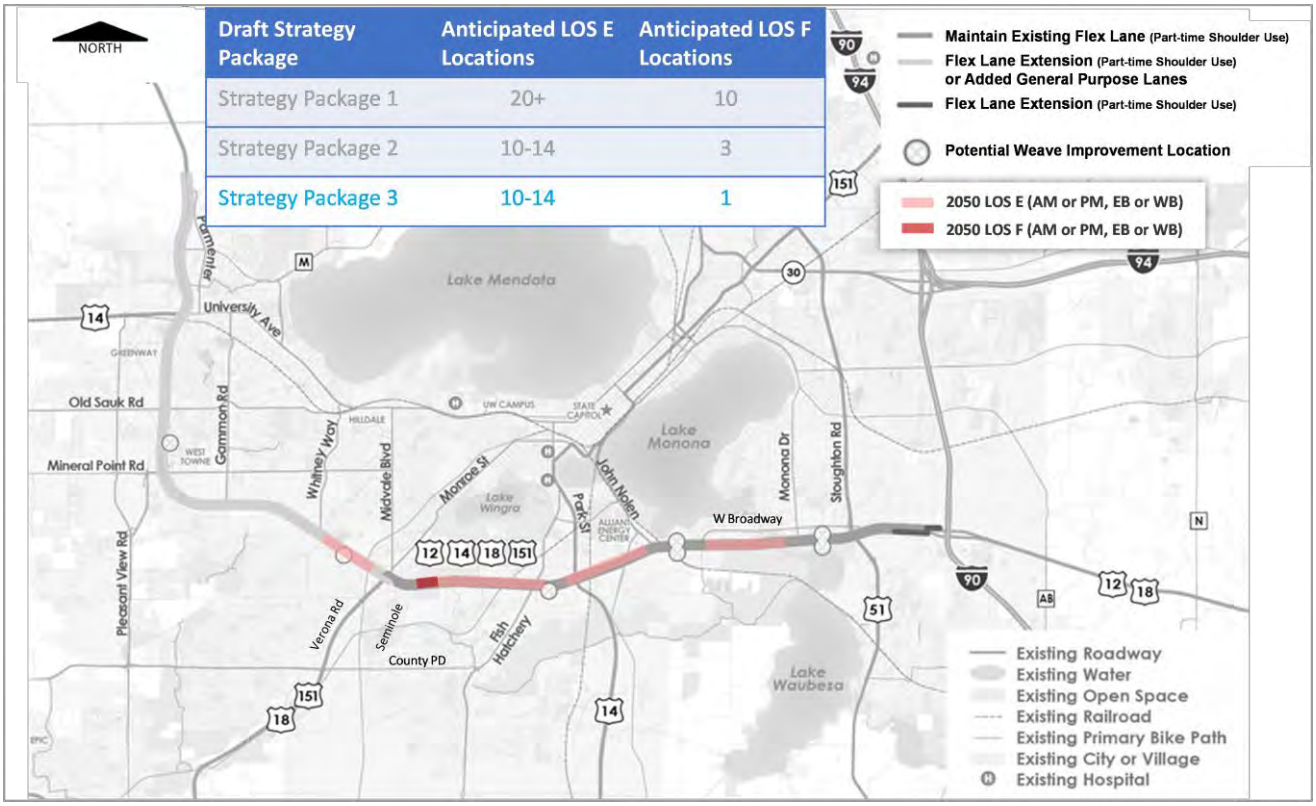


Map Source: Dane County GIS

Figure 7.02-18 SP 3 Transit Priority Components

8. Anticipated SP 3 2050 Operations

The map in Figure 7.02-19 shows locations on the Beltline that are anticipated to operate at LOS E (light red) or LOS F (dark red) in 2050 with SP 3. It is anticipated that the Beltline mainline would have ten to 14 locations that operate at LOS E and one location that operates at LOS F in design year 2050, which is two less LOS F locations as compared SP 2.

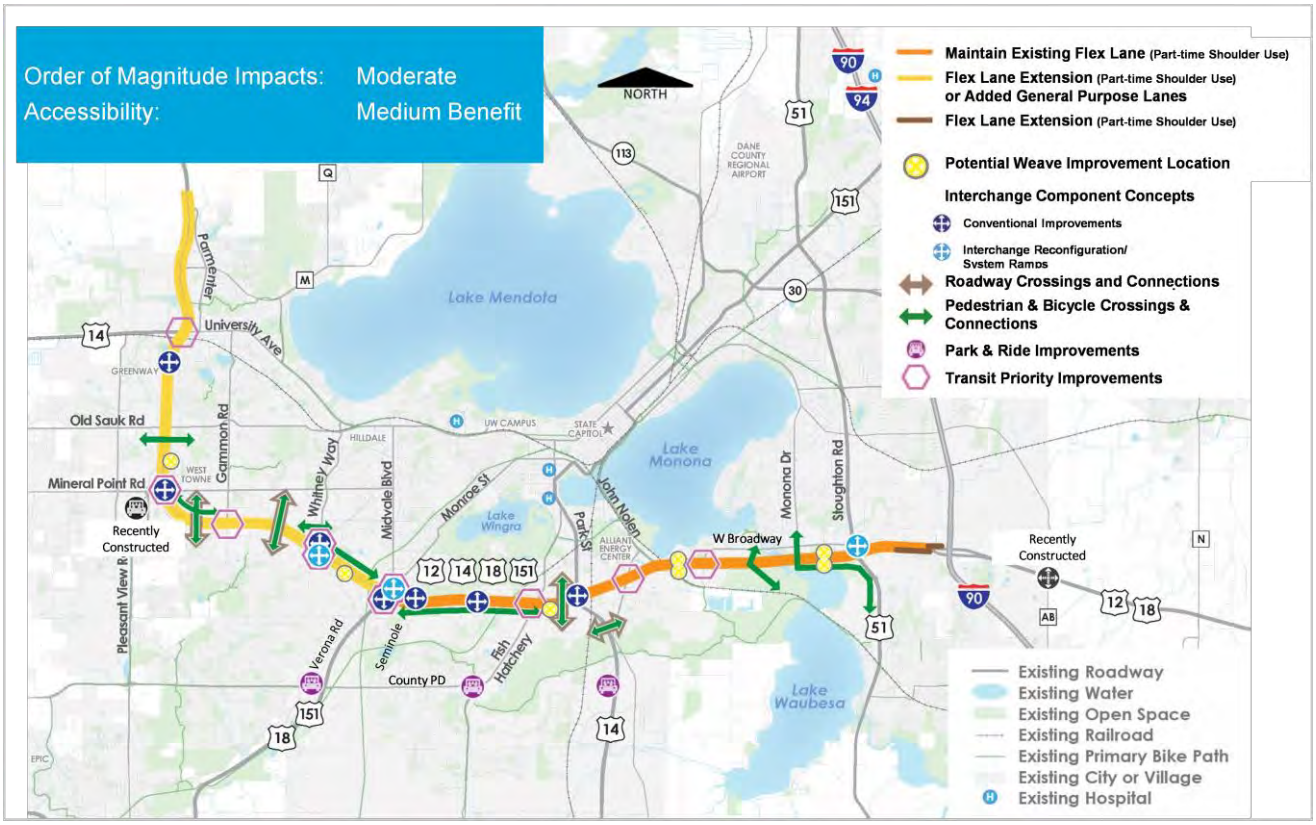


Map Source: Dane County GIS

Figure 7.02-19 SP 3 Anticipated 2050 LOS E and F Locations

9. Anticipated SP 3 Impacts

By order of magnitude, it is anticipated that SP 3 would have a moderate amount of impact to the human and natural environment and cost more than SP 2. SP 3 would include more Local Road System Crossings and Connections Components, and Pedestrian and Bicycle Crossings and Connections Components. For this reason, it is anticipated that users would see a moderate increase in accessibility along or near the Beltline. Figure 7.02-20 shows all Components included in SP 3.



Map Source: Dane County GIS

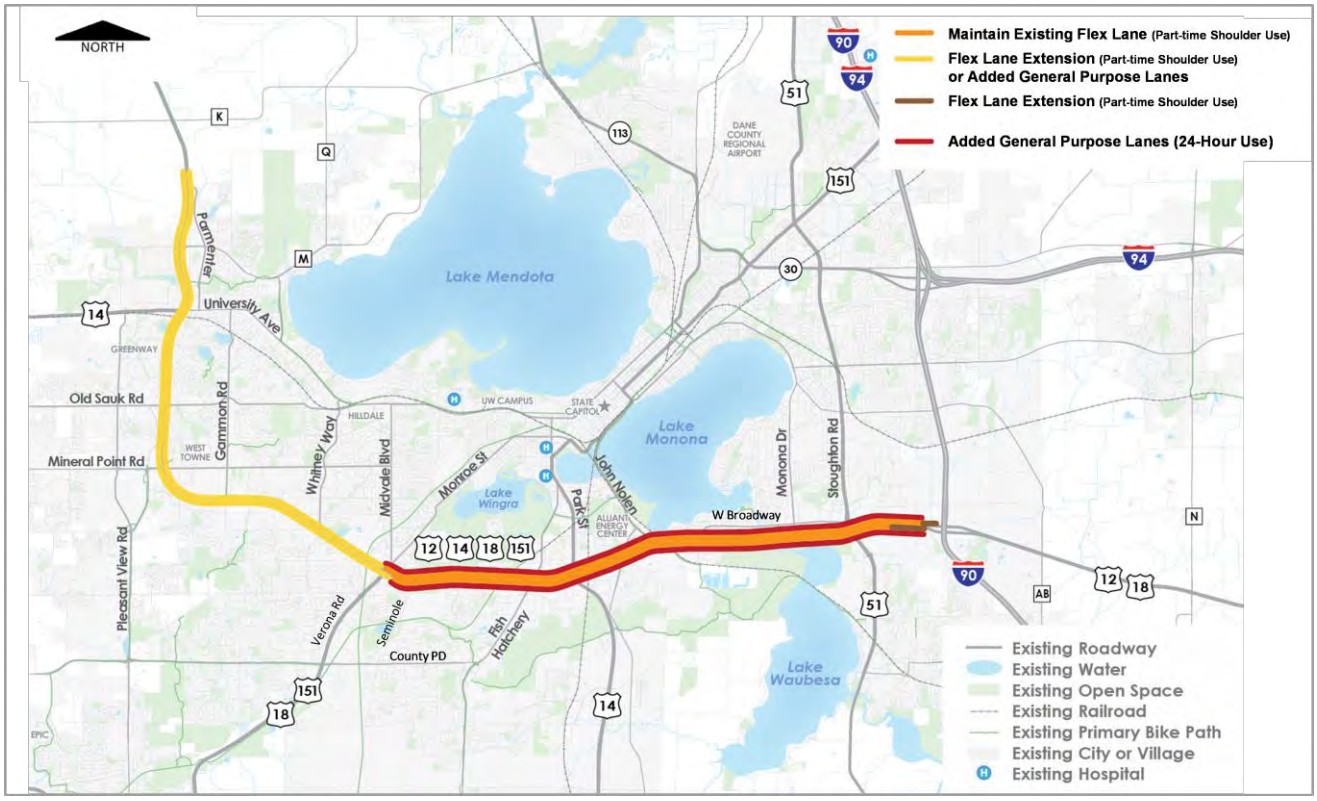
Figure 7.02-20 SP 3 Components

D. Strategy Package 4 (SP 4): All Retained Components

This Strategy Package builds upon SP 3 by including all Components from SP 2 and 3 as well as the lower-priority Components that still showed promise but were not included in previous Strategy Packages. See Section 6–Components for additional detail on how the low-, mid-, and high-priority Components were defined. The following paragraphs progressively disclose each of the Components included in SP 4 and the anticipated SP 4 operations and impacts.

1. Mainline Components

Similar to SP 2 and SP 3 Mainline Components, SP 4 would include either the Beltline Flex Lane extension or the add one GP lane Mainline Components on the west end of the Beltline from approximately Parmenter Street to the Verona Road interchange (yellow line). The existing Beltline Flex Lane would be extended to the I-39/90 interchange on the east end (brown line). For SP 4, in addition to the existing Beltline Flex Lane that would remain between Verona Road and just west of I-39/90 (orange line), a GP lane would be added to the Beltline in each direction within these same limits. Figure 7.02-21 shows the Mainline Components included in SP 4.



Map Source: Dane County GIS

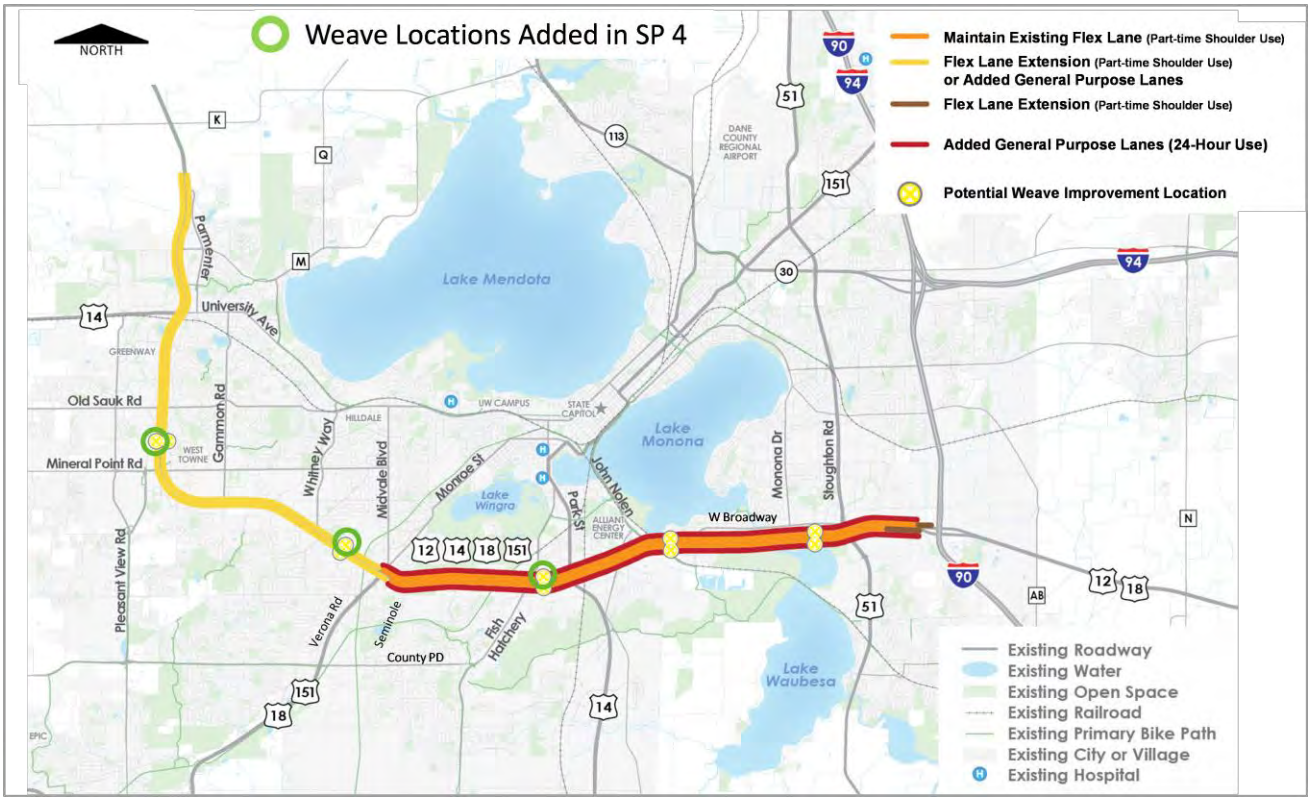
Figure 7.02-21 SP 4 Mainline Components

2. Weave Components

In addition to the mid- and high-priority Weave Components included as part of SP 2 and 3, the remaining weaves where operational concerns are anticipated by 2050 on the Beltline were included in SP 4. These areas remain at LOS E or LOS F even with the addition of mainline capacity by extending the Beltline Flex Lane and/or adding GP lanes in each direction. The Weave Components that would also be included in SP 4 are shown in Figure 7.02-22 and are as follows:

- On the eastbound Beltline between Old Sauk Road and Mineral Point Road.
- On the westbound Beltline between Park Street and Fish Hatchery Road, and Verona Road and Whitney Way.

Based on preliminary analysis, a basketweave would be the likely option for these weave locations.

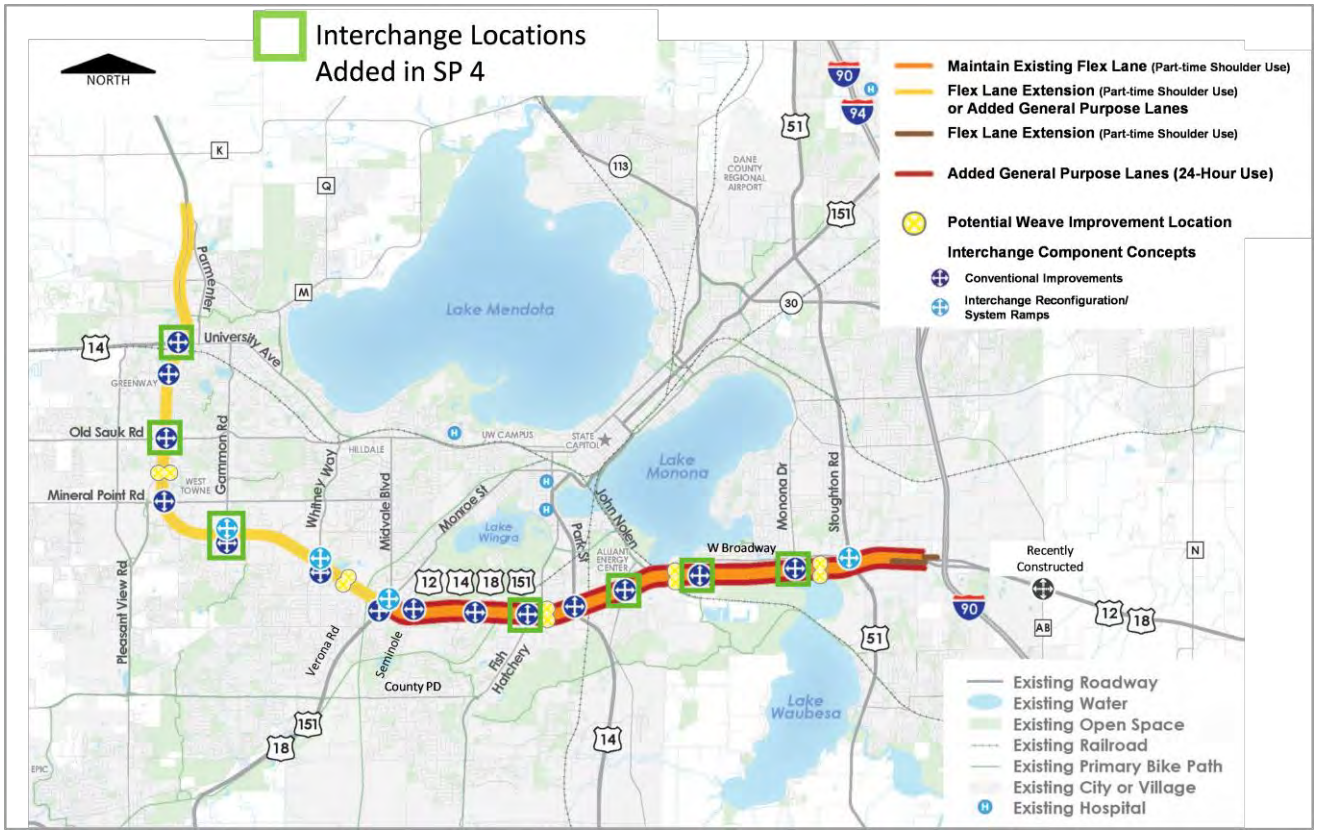


Map Source: Dane County GIS

Figure 7.02-22 SP 4 Weave Components

3. Interchange Components

The high- and mid-priority Interchange Components from SP 2 and SP 3 are included in SP 4 as well as the remaining Interchange Components on the Beltline PEL Study corridor as shown in Figure 7.02-23. The locations added to SP 4 are highlighted by a green square.



Map Source: Dane County GIS

Figure 7.02-23 SP 4 Interchange Components

In addition to Interchange Components included in SP 2 and 3, SP 4 would include Interchange Components at:

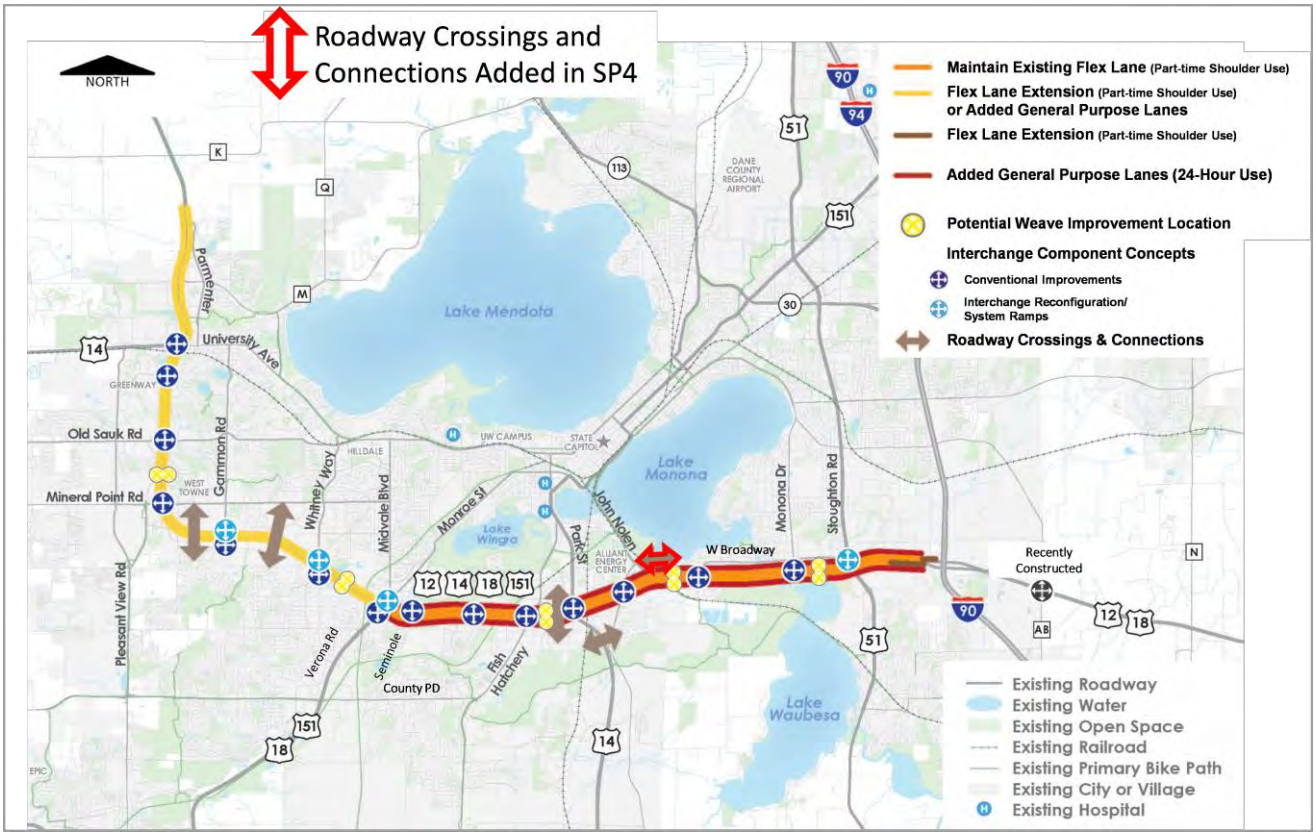
- University Avenue
- Old Sauk Road
- Gammon Road
- Fish Hatchery Road
- Rimrock Road
- West Broadway
- Monona Drive

A majority of the interchanges added in SP 4 are potential conventional improvements with the exception being the Gammon Road interchange where both conventional improvements and an interchange reconfiguration are being considered. This is due to the fact that it may be difficult to

meet operational goals through conventional interchange improvements. While the Gammon Road interchange ramp terminals themselves operate acceptably through the 2050 horizon year (as noted in Section 6), the closely spaced adjacent intersections do not. The northbound through at the eastbound ramp terminal backs through Seybold Road. Improvements in this area will need to carry through the interchange and Seybold Road, and potentially to Watts Road to the south and/or Odana Road to the north.

4. Local Road System Crossings and Connections Components

One remaining Local Road System Crossings and Connections Component is included in SP 4 in addition to those included in SP 2 and 3. This Local Road System Crossings and Connections Component would be located between John Nolen Drive and West Broadway. Local Road System Crossings and Connections Components included in SP 4 are shown in Figure 7.02-24 by the tan arrows with the added connection between John Nolen Drive and West Broadway highlighted by a red outline.



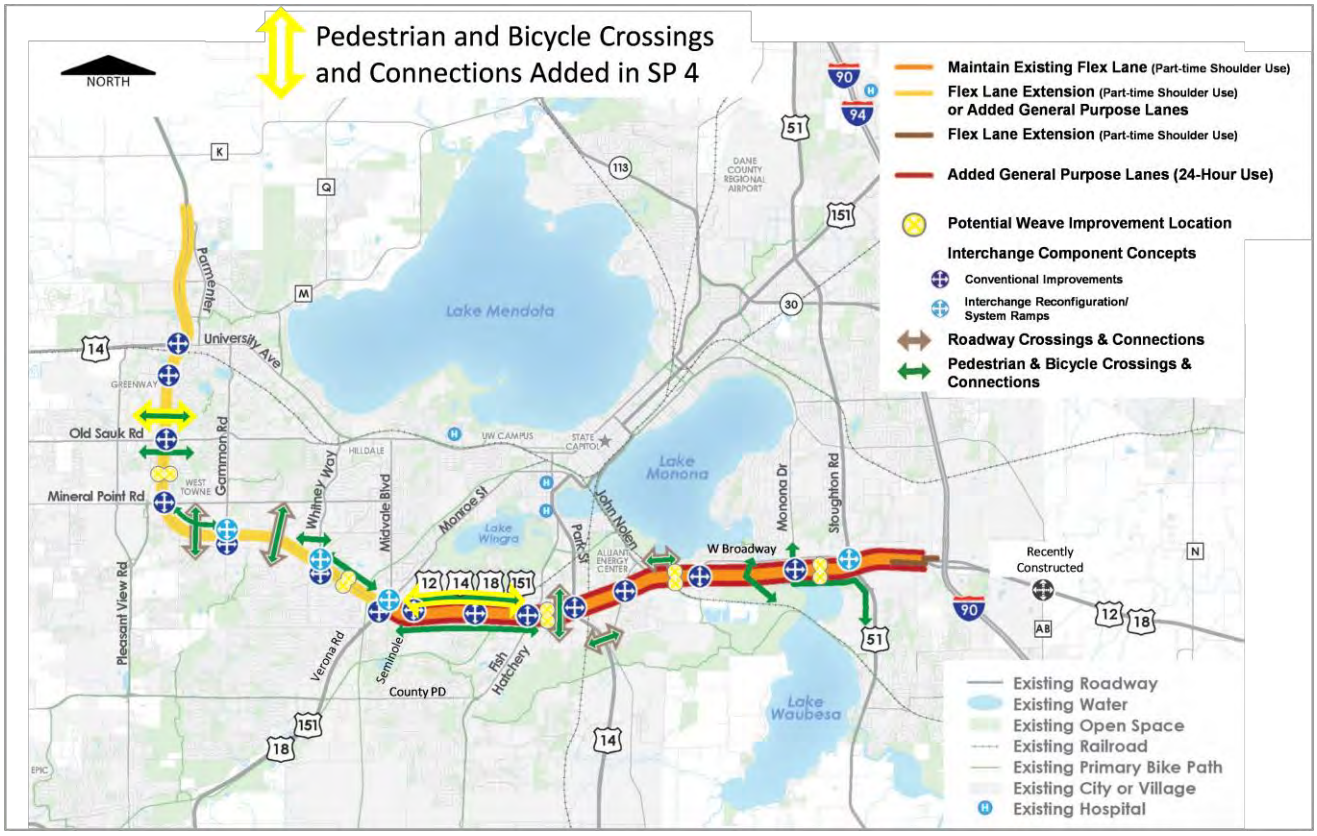
Map Source: Dane County GIS

Figure 7.02-24 SP 4 Local Road System Crossings and Connections Components

5. Pedestrian and Bicycle Components

All retained bicycle and pedestrian crossings and connections would be included in SP 4. The following locations are added to those from SP 3 and are noted by a yellow outline in Figure 7.02-25.

- Crossing North of Old Sauk Road
- Connection between Seminole Highway to the Cannonball Path north of the Beltline

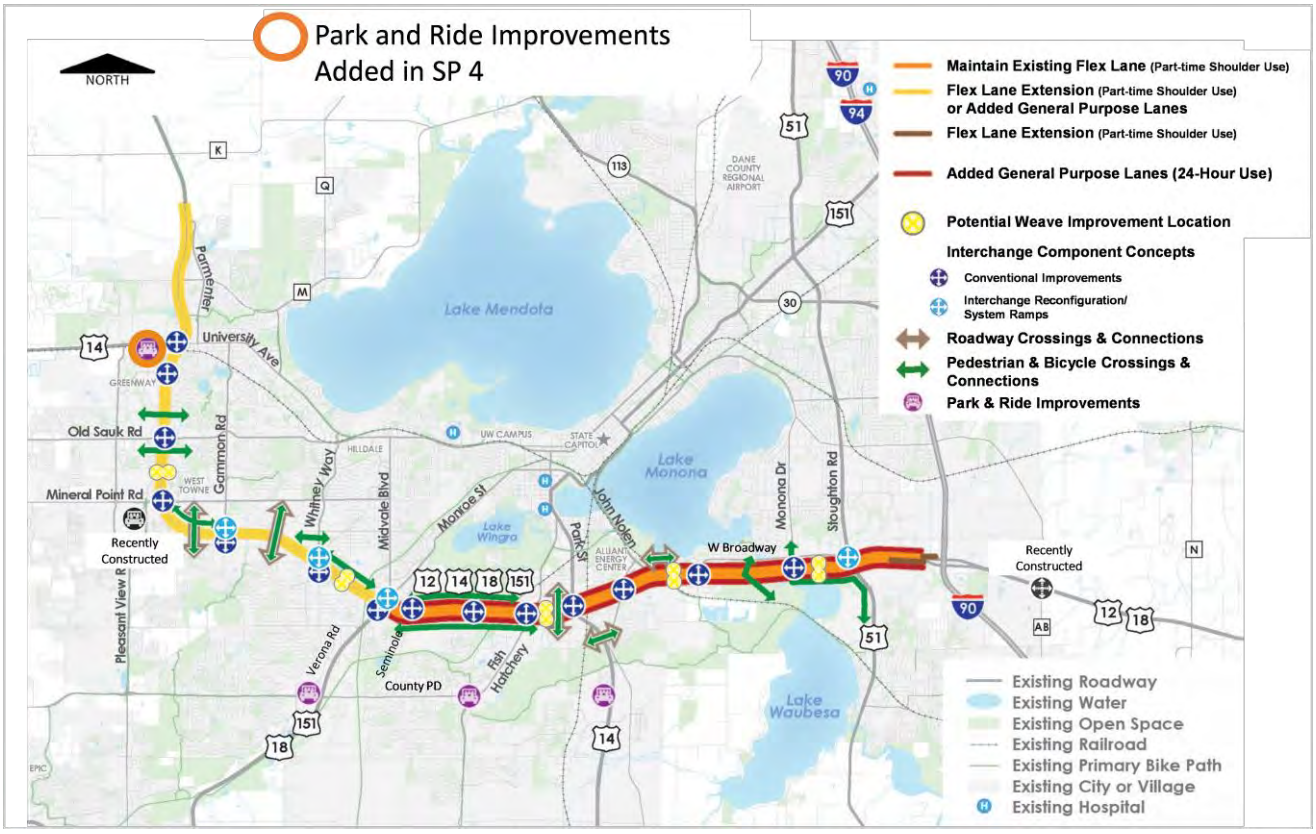


Map Source: Dane County GIS

Figure 7.02-25 SP 4 Pedestrian and Bicycle Components

6. Park and Ride Components

All retained Park and Ride Components would be included in SP 4. One location at US 14/University Avenue just west of the Beltline has been added to those from SP 3 and is highlighted by an orange circle in Figure 7.02-26.

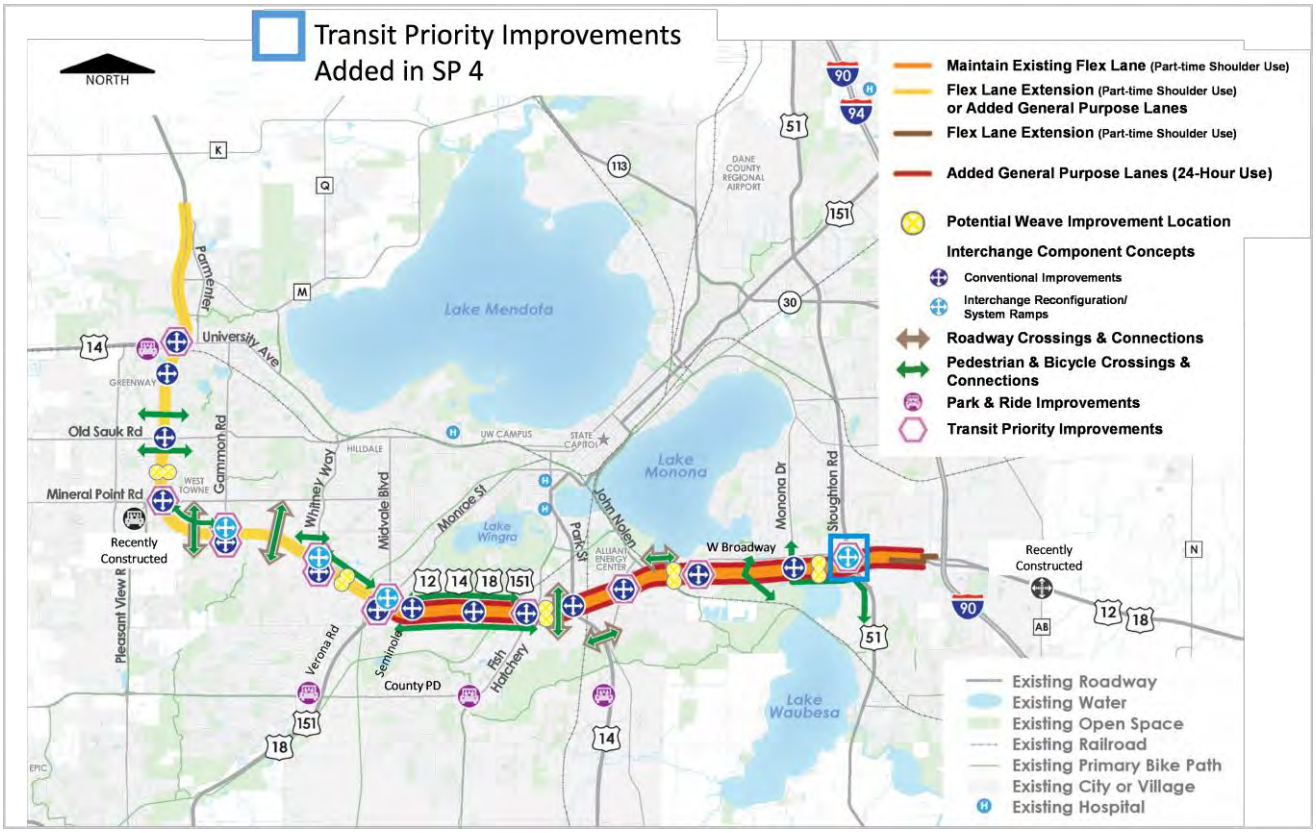


Map Source: Dane County GIS

Figure 7.02-26 SP 4 Park and Ride Components

7. Transit Priority Components

All interchange locations retained for transit priority as part of the Beltline PEL Study would be included in SP 4. The Stoughton Road interchange would be added to those from SP 3 and is highlighted with a blue square in Figure 7.02-27. It is anticipated that the ongoing separate NEPA study at the Stoughton Road interchange will further review the possibility of transit priority at this interchange.

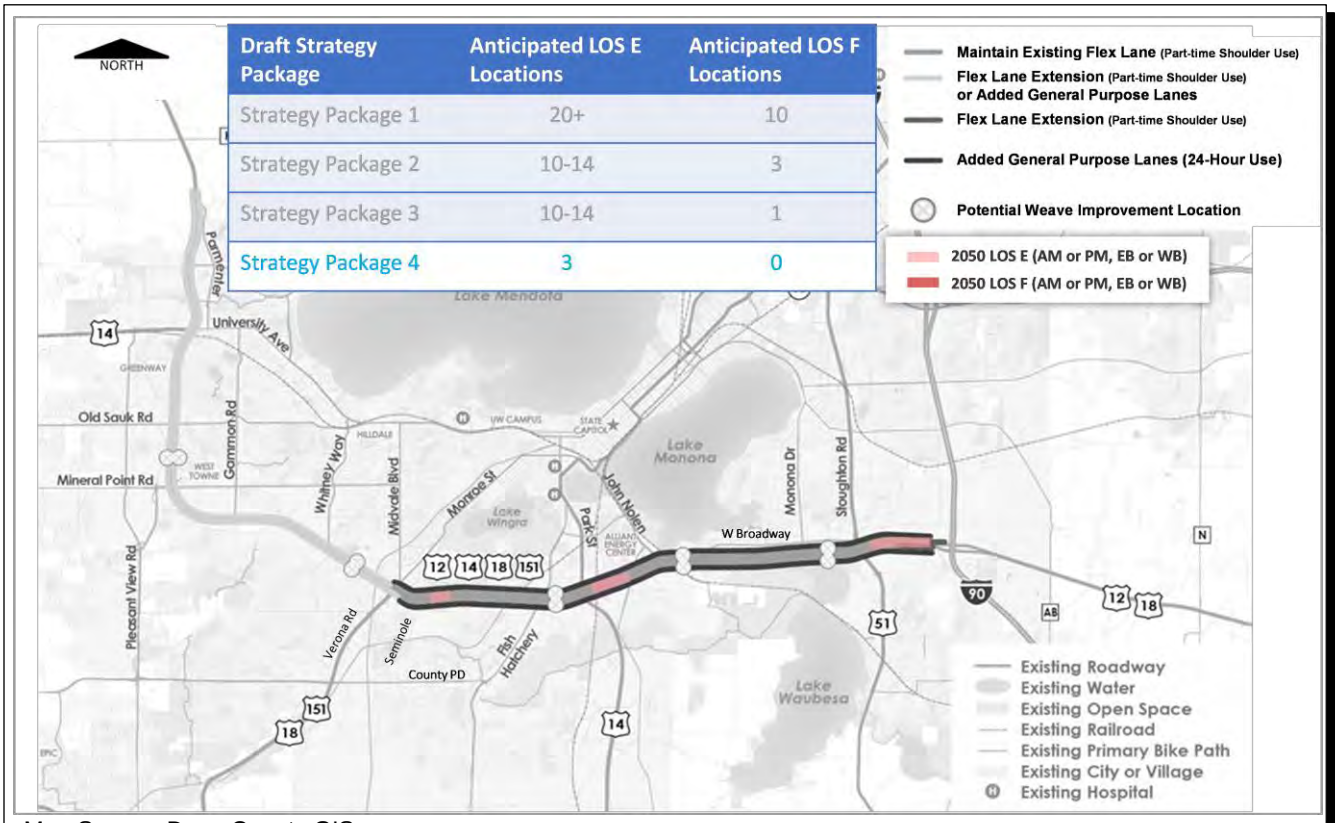


Map Source: Dane County GIS

Figure 7.02-27 SP 4 Transit Priority Components

8. Anticipated SP 4 2050 Operations

The map in Figure 7.02-28 shows locations on the Beltline that are anticipated to operate at LOS E (light red) or LOS F (dark red) with SP 4. With this Strategy Package, the Beltline mainline is anticipated to have three locations with LOS E operations and no LOS F operations in design year 2050.

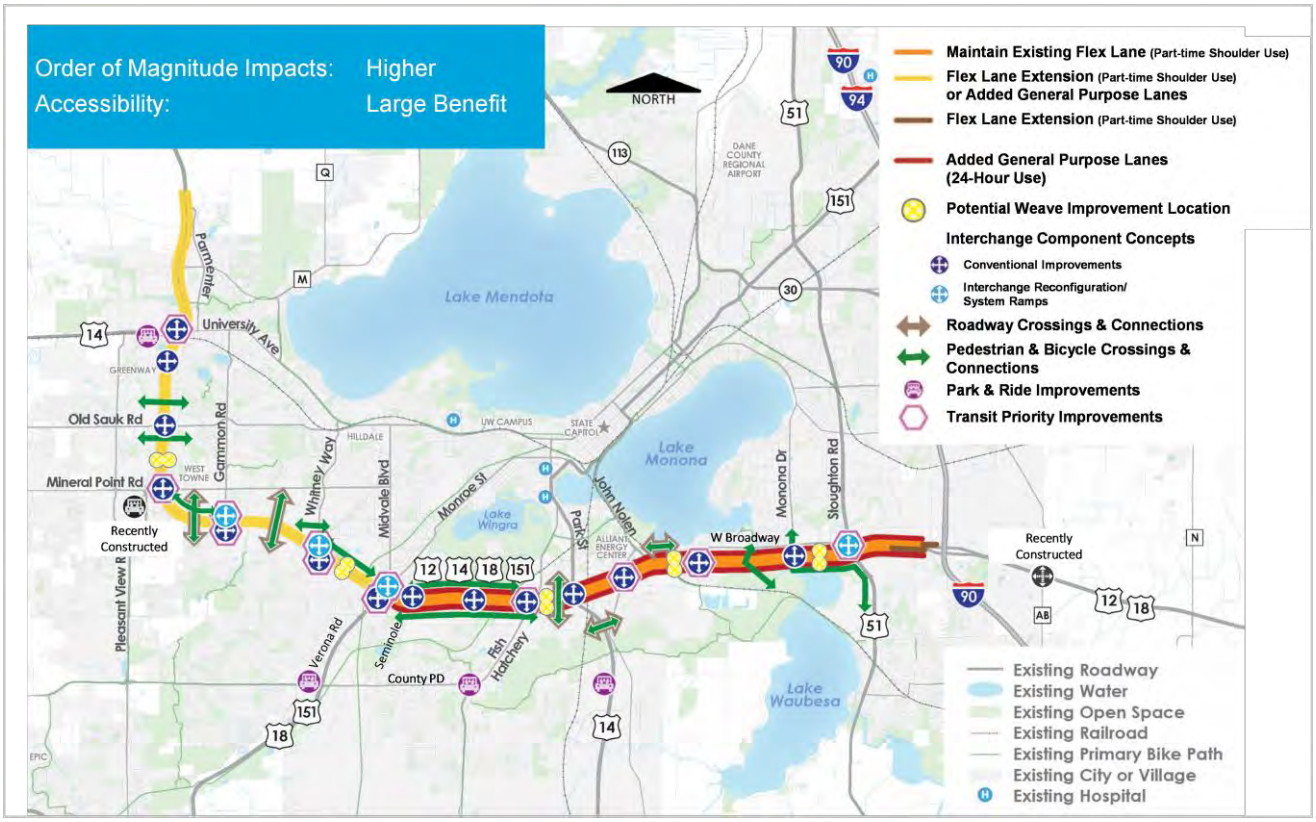


Map Source: Dane County GIS

Figure 7.02-28 SP 4 Anticipated 2050 LOS E and F Locations

9. Anticipated SP 4 Impacts

By order of magnitude, it is anticipated that SP 4 would have the most impact on the human and natural environment and highest financial cost of the Strategy Packages considered in the Beltline PEL Study. Although SP 4 is anticipated to have the most impact and cost, it is anticipated to add the most mobility and accessibility in the added crossings and connections for all users, would offer the most transit priority and park and ride locations, and does the most to improve mainline and interchange operations of all the Strategy Packages considered. Figure 7.02-29 shows all Components included in SP 4.



Map Source: Dane County GIS

Figure 7.02-29 SP 4 Components

7.03 STRATEGY PACKAGE SCREENING

Figure 7.03-1 provides a summary of the Components included in each Strategy Package. Note that as the Strategy Package number gets higher, the number of Components included gets higher.

	Strategy Package 1: Preserve/ Maintain	Strategy Package 2: High Priority	Strategy Package 3: Mid and High Priority	Strategy Package 4: All Retained Components
Common Elements				
Pavement Replacement	Yes	Yes	Yes	Yes
Bridge Replacements	Yes	Yes	Yes	Yes
Improvement Components				
Mainline West: Extend Flex Lane <or> +1 GP Lane (from about Whitney Way to Parmenter Street)	No	Yes	Yes	Yes
Mainline East: Extend Flex Lane to I-39/90 (from existing east limits to the I-39/90/Beltline Interchange)	No	Yes	Yes	Yes
Mainline East: +1 GP Lane (from about Verona Road to the I-39/90/Beltline Interchange)	No	No	No	Yes
Mainline Weaving	0	3	7	10
Interchanges	0	2	8	15
New Road Crossings and Connections	0	2	4	5
Bike/Ped Connections	0	7	11	14
Park and Ride Lots	0	2	3	4
Interchange Transit Priority	0	3	8	9

Figure 7.03-1 Summary of Strategy Package Components

The Beltline PEL Study Goal and Objectives address all transportation modes. Therefore, the Strategy Packages include various types of improvement Components to satisfy the Objectives. Similar to evaluating the Components, the Beltline PEL Study evaluated each Strategy Package based on multiple criteria including:

1. Beltline PEL Study Goal and Objectives: As with the Components, matrices with the screening criteria questions were used to screen and evaluate the Strategy Packages.

2. Feedback: Stakeholders and the public provided feedback on the Strategy Packages in person at meetings, via email and the website, and through online surveys created by the Beltline PEL Study team.

3. Impacts and Costs: The Beltline PEL Study team developed order-of-magnitude costs for the Strategy Packages.

4. Accessibility: The Beltline PEL Study team analyzed the degree to which the Strategy Packages would improve accessibility for all modes of travel.

A. Objectives Screening

Table 7.03-1 shows the Strategy Packages Screening Summary. Each column lists one of the Strategy Packages. Each row lists one of the screening questions. Answers to the questions include Yes (Y) if the Component satisfied or mostly satisfied the question, No (N) if it did not or mostly did not satisfy the question, and Somewhat (SW) if the Component partially satisfied the question or if the team suspects it would but the degree to which it would is unknown because of the relatively lower level of detail used in the Beltline PEL Study. The full screening matrix, including additional detail for each question, is included in Appendix G.

Table 7.03-1 Mainline Components Screening Summary

Strategy Packages Screening (Screening terminology: No, Somewhat, Yes)		SP 1 Preserve and Maintain	SP 2 Higher Priority Components	SP 3 Mid and High Priority Components	SP 4 All Retained Components
COMPONENT SCREENING SUMMARY					
1. Improve Safety for all Modes					
A	Decrease bicycle-motor vehicle crashes?	**N**	**SW**	**Y**	**Y**
B	Decrease pedestrian-motor vehicle crashes?	**N**	**SW**	**Y**	**Y**
C	Decrease motor vehicle crashes on the Beltline?	**N**	**SW**	**Y**	**Y**
2. Address Beltline Infrastructure Condition and Deficiencies					
D	Address Beltline pavements and bridges?	**Y**	**Y**	**Y**	**Y**
3. Improve System Mobility (Congestion) for All Modes.					
E	Provide pedestrian facilities?	**N**	**SW**	**Y**	**Y**
F	Complete pedestrian network near/across the Beltline?				
G	Provide bicycle facilities?				
H	Address bicycle network gaps?				
I	Provide convenient bicycle mode transfers?	**N**	**Y**	**Y**	**Y**
J	Improve routes for transit?	**N**	**SW**	**Y**	**Y**
K	Provide transit an advantage or priority?	**N**	**SW**	**Y**	**Y**
L	Provide convenient mode transfers?	**N**	**Y**	**Y**	**Y**
M	Address unstable traffic flow on the Beltline?	**N**	**SW**	**SW**	**Y**
N	Improve traffic operations?				
O	Provide alternate routes for local trips?	**N**	**SW**	**Y**	**Y**
P	Reduce motor vehicle trips?	**N**	**SW**	**Y**	**Y**
4. Limit Impacts to a Responsible Level of Social, Cultural, and Environmental Effects. See detailed screening sheets in Appendix G.					
5. Enhance Efficient Multimodal Access to Economic Centers.					
R	Acknowledge local road capacity?	**N**	**SW**	**Y**	**Y**
S	Connect economic centers for all modes?	**N**	**SW**	**Y**	**Y**
T	Improve operations at Beltline interchanges?	**N**	**SW**	**Y**	**Y**
6. Decrease Beltline Diversion Impacts to Neighborhood Streets					
U	Volumes compatible with local streets/land uses?	**N**	**SW**	**SW**	**Y**
7. Complement Other Major Transportation Initiatives and Studies In the Madison Area					
V	Consistent with other initiatives/plans?	**N**	**SW**	**SW**	**SW**

As shown in Table 7.03-1, because SP 1 makes no changes to the Beltline PEL Study corridor other than necessary maintenance, it does not satisfy the Beltline PEL Study Goals which are focused on improving conditions to all modes of travel. Each successive Strategy Package adds Components, and therefore does a better job of satisfying the Beltline PEL Study Objectives.

B. Strategy Packages Feedback

The Beltline PEL Study team presented the Draft Strategy Packages to the Beltline PEL Study TAC, PAC, agencies, and the public in spring and summer 2023. The team also requested feedback from organizations and groups representing EJ populations (low-income populations and minority populations).

1. TAC and PAC Feedback

The Beltline PEL Study team asked for feedback following the TAC and PAC joint meeting in May 2023. There were ten responses to the online survey. When asked “How likely are you to support each of the Draft Strategy Packages as the Preferred Strategy Package?” SP 3 ranked highest. SP 3 includes mid- to high-priority Components and includes mainline capacity expansion on the Beltline west of Verona Road with either an extension of the Beltline Flex Lane or addition of a GP lane to the west.

SP 1 that preserves and maintains the existing Beltline ranked last. In general, responses pointed out that the preserve and maintain Strategy Package was not acceptable in design year 2050 based on poor operations and no Components included for bicycles, pedestrians, and transit. Responses generally agreed with prioritization of the Components within the Strategy Packages but consistently wanted more emphasis placed on Components for bicycles, pedestrians, and transit.

Feedback was also received from a city of Monona representative on the potential Local Road System Crossings and Connections Component between John Nolen Drive and West Broadway (Component F) north of the Beltline noting concerns about negative impacts to homeowners on Waunona Way as well as the high number of pedestrians and bicyclists that use local streets in the area. Based on this feedback the Beltline PEL Study team eliminated it from further consideration in the Beltline PEL Study.

Feedback did not support adding lanes to the Beltline, especially east of Verona Road, but some indicated they could accept extending the Beltline Flex Lane west.

Specific feedback from TAC and PAC members also pointed out that the EJ outreach conducted for the Beltline PEL Study did not directly ask for opinions on how the Beltline might impact residents’ quality of life. In response, the Beltline PEL Study team developed an online survey to follow up and expand on feedback received from past EJ outreach. The follow-up EJ survey specifically asked for opinions on how the Beltline impacts quality of life. It is discussed in the next section.

Full results of the TAC/PAC May 2023 online survey are provided in Appendix C.

2. EJ Feedback

In response to the May 2023 TAC and PAC comments regarding quality of life impacts, additional EJ outreach was completed with an online survey in December 2023. The goal of the survey was to reach minority populations and low-income populations near the Beltline to expand on the EJ feedback already received by asking for their thoughts on how they potentially use or do not use the Beltline and how the possible long-term Beltline improvements may or may not impact their quality of life. Information and online survey links in English, Spanish and Hmong languages were sent to the same EJ community leaders and business owners near the Beltline that were contacted for the initial EJ interviews in spring and summer 2022. The EJ community leaders and business owners were asked to circulate the information and links to their communities and patrons. A total of 127 responses were received.

Of the 127 respondents, 75 (59 percent) were willing to give their demographic information:

- 45 percent were over the age of 65
- 92 percent were white
- 81 percent had an income greater than $75,000.[2]

Despite good faith efforts to achieve a higher share of low-income and minority respondents, the majority were white with an income greater than $75,000.

A majority of the survey participants:

- Live within one to eight blocks of the Beltline
- Believe the existing Beltline is congested
- Believe the existing Beltline congestion negatively affects them; however,
- They also believe the Beltline provides adequate access to goods and services

When asked how the existing Beltline affects their quality of life, the results were mixed as shown by the pie chart in Figure 7.03-2.

[2]The Dane County median household income was $84,300 (2022 dollars) for a period between 2018 and 2022 according to the US Census Bureau QuickFacts for Dane County, Wisconsin, https://www.census.gov/quickfacts/fact/table/danecountywisconsin/PST045223, accessed on July 17, 2024.

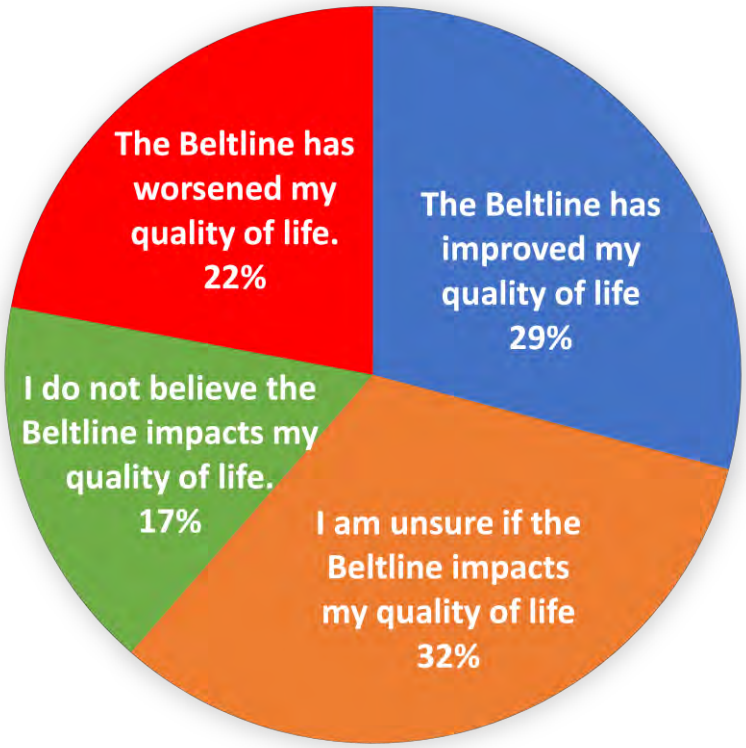


Figure 7.03-2 EJ Survey Quality of Life Question Results

Participants were able to expand on their response. They most often noted noise, speeding, and an impression of lack of law enforcement on the Beltline, and few opportunities to cross the Beltline without navigating a congested interchange as elements of the existing Beltline that negatively affect their quality of life. However, several responses also noted that overall the existing Beltline gives them convenient and easy access with a quick way to get to their destinations.

Participants were asked to indicate what type of Component they believe would have the most positive impact on their quality of life if constructed on, over, under, or near the Beltline. Pictures of each type of Component with a brief description were shown on the survey to help participants. As shown in Figure 7.03-3, the top categories included:

- Beltline travel lane improvements such as extending the Beltline Flex Lane to the west of its existing limits or adding a lane to the Beltline.
- New roadway crossings or connections under, over, or along the Beltline such as a new roadway over the Beltline or new roadway connecting existing streets parallel to the Beltline. This new crossing or connection would accommodate biking and walking.
- New bicycle and pedestrian crossings or connections under, over, or along the Beltline such as a new path via a bridge over the Beltline or new path parallel to the Beltline that connects local streets and paths.

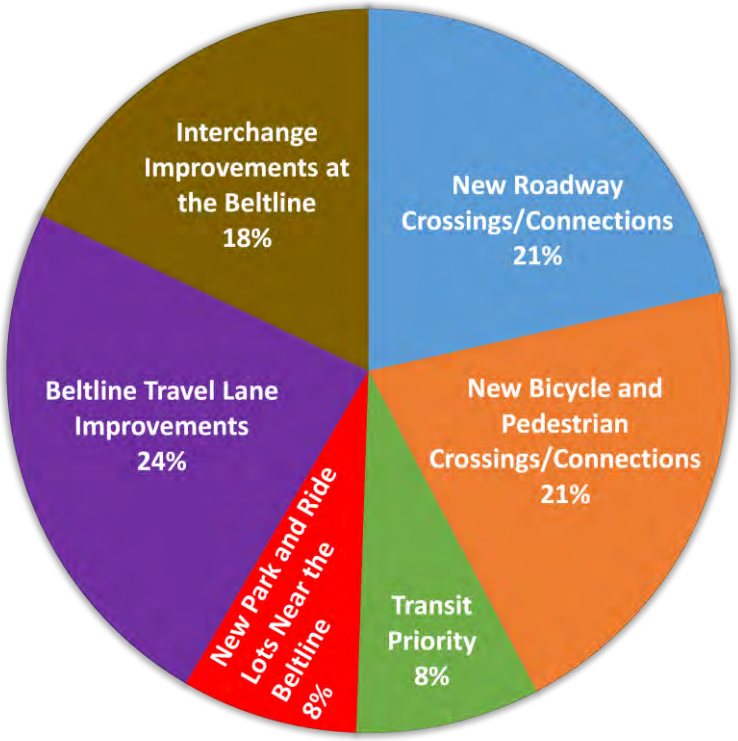


Figure 7.03-3 EJ Survey Results of Preferred Types of Components Question

Participants had the ability to explain the reason for their choice, and several noted the benefits of crossings of the Beltline such as the existing roadway crossing at High Point Road that could accommodate motor vehicles, transit, bicycles and pedestrians, or a bicycle/pedestrian overpass or underpass.

Full results of the December 2023 online EJ survey are provided in Appendix C.

3. Public Feedback

Feedback was also received via an online survey available to be completed at the PIM in June 2023 and available on the project website. This survey had 52 responses. Similar to the TAC/PAC survey results, when asked “How likely are you to support each of the Draft Strategy Packages as the Preferred Strategy Package?” respondents ranked SP 3 highest. SP 1 that preserved and maintained the existing Beltline ranked last again.

In general, responses again pointed out that SP 1–Preserve and Maintain was not acceptable in design year 2050 based on poor operations and no Components for bicycles, pedestrians and transit. Similar to the TAC/PAC survey, responses generally agreed with prioritization of the Components within the Strategy Packages but consistently asked for more focus on Components for bicycles, pedestrians, and transit. Several responses did not support adding lanes to the

Beltline, especially east of Verona Road but some said they could accept extending the Beltline Flex Lane west.

Specific feedback received also requested the Beltline PEL Study team to either eliminate a specific Component from further consideration or bring the Component forward. The crossing east of Gammon Road (Local Road System Crossings and Connections Component B) was proposed for elimination after initial prioritization of the Components (see Section 6) and presented at the PIM meetings as being eliminated; however, it is being brought forward for further analysis in NEPA after feedback received from a nearby neighborhood. The Beltline PEL Study team updated SP 2, 3, and 4 to include either a new roadway crossing east of Gammon Road (Component B) or west of Whitney Way (Component C).

Full results of the June 2023 PIM 2 online survey are provided in Appendix C.

C. Impacts and Costs

1. Direct Impacts

Direct impacts refer to the physical space needed for future improvements, resulting in the need to purchase land for ROW and the need to purchase residential, commercial, business, or other property and provide relocation services for the existing owners or mitigation for impacts to other environmental resources. The direct impacts of the Strategy Packages are anticipated to increase as more Components are added. This means that SP 1–Preserve and Maintain would have the fewest direct impacts, while SP 4–All Retained Components would have the most direct impacts.

The Beltline PEL Study completed only a planning-level assessment of direct impacts. For example, potential wetland impact locations due to Components associated with a Strategy Package have been identified but not how many acres could potentially be impacted or how those impacts compare to other Components. As another example, a general location for a new roadway crossing of the Beltline has been identified in the Beltline PEL Study, but a preferred location has not been identified where this crossing has the least amount of social, cultural, and environment effects. Note that none of the Draft Strategy Packages represent precisely what WisDOT may propose for future construction, and some Components may change or could be dropped during future NEPA analysis.

a. Mainline

The Mainline Components consist of Beltline mainline capacity (number of travel lanes) and Weave Components.

- SP 1 does not add any capacity or Weave Components and therefore is anticipated to have the lowest direct impacts.
- SP 2, 3, and 4 each include either extending the Beltline Flex Lane or adding one GP lane in each direction on the Beltline to the west of Verona Road. Either of these options is expected to have modest direct impacts because nearly all of the widening required is anticipated to occur to the inside within the area of the existing Beltline median.
- East of Verona Road, SP 2 and 3 do not add mainline capacity, instead relying on the Beltline Flex Lane to accommodate future traffic demand. SP 4 would add one GP lane in each direction on the Beltline east of Verona Road to I-39/90, and the widening is anticipated to occur to the outside. This would likely result in higher impacts associated with SP 4 east of Verona Road.

The amount of direct impacts for Weave Components is anticipated to increase as the number of weave areas included increases with each of these Strategy Packages.

- SP 1 does not include any Weave Components, which would result in the lowest impacts for weave areas.
- SP 2 includes three Weave Component locations
- SP 3 includes seven weave locations
- SP 4 includes ten weave locations.

b. Interchanges

- SP 1 does not include any Interchange Components along the Beltline, and therefore is anticipated to have the lowest impacts.
- SP 2 includes improvement Components at two existing interchanges, including interchange reconfiguration or system ramps at Verona Road which would have more substantial direct impacts.
- SP 3 includes eight Interchange Components including interchange reconfiguration or system ramps at Verona Road and Gammon Road which would have more substantial direct impacts.
- SP 4 includes 15 Interchange Components including interchange reconfiguration or system ramps at Verona Road, Whitney Way, and Gammon Road which would have more substantial direct impacts.

c. Local Road System Crossings and Connections

Direct impacts are expected to increase with the increase in number of Local Road System Crossings and Connections Components included a Strategy Package.

- SP 1 does not include any new Local Road System Crossings and Connections Components, and therefore is anticipated to have the lowest impacts.
- SP 2 includes two new Local Road System Crossings and Connections Components.
- SP 3 includes four new Local Road System Crossings and Connections Components.
- SP 4 includes five new Local Road System Crossings and Connections Components.

d. Pedestrian and Bicycle Components

The order of magnitude of impacts from these Components is somewhat less than those from mainline capacity expansion, Weave Components, Interchange Components, and new Local Roadway Crossings and Connections Components.

- SP 1 does not include any Pedestrian and Bicycle Components, and therefore is anticipated to have the lowest impacts.
- SP 2 includes seven Pedestrian and Bicycle Components.
- SP 3 includes 11 Pedestrian and Bicycle Components.
- SP 4 includes 14 Pedestrian and Bicycle Components.

e. Park and Ride Components

The order of magnitude of impacts from these Components is somewhat less than those from mainline capacity expansion, Weave Components, Interchange Components, and new Local Roadway Crossings and Connections Components.

- SP 1 does not include any Park and Ride Components, and therefore is anticipated to have the lowest impacts.
- SP 2 includes two Park and Ride Components.
- SP 3 includes three Park and Ride Components.
- SP 4 includes four Park and Ride Components.

f. Transit Priority Components

The order of magnitude of impacts from these Components is somewhat less than those from mainline capacity expansion, Weave Components, Interchange Components, and new Local Roadway Crossings and Connections Components.

- SP 1 does not include any Transit Priority Components, and therefore is anticipated to have the lowest impacts.
- SP 2 includes transit priority at three interchanges.
- SP 3 includes transit priority at eight interchanges.
- SP 4 includes transit priority at nine interchanges.

g. Relative Order of Magnitude of Direct Impacts

- SP 1 has the lowest amount of direct impacts because it does not expand the footprint of the Beltline or any of the interchanges and it does not include any of the other multi-modal Components.
- SP 2 would have approximately four times the direct impacts of SP 1
- SP 3 would have approximately five times the direct impacts of SP 1, and 1.25 times the impacts of SP 2
- SP 4 would have approximately eight times the direct impacts of SP 1, twice the direct impacts of SP 2, and 1.6 times the direct impacts of SP 3

2. Indirect and Cumulative Impacts (ICI)

a. ICI Background

The Beltline PEL Study ICI Analysis was conducted in summer 2023 and developed consistent with law, regulation, policy, and agency guidance applicable at the time of the analysis. Should any of the planning information in the Beltline PEL Study be used for future environmental review and permitting processes, environmental documentation will be prepared consistent with 42 USC 4321 et seq, 23 USC 139, 23 CFR 771, other applicable laws and regulations, executive orders, agency policy and guidance.

The Council on Environmental Quality (CEQ) defines Indirect Impacts as impacts “caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable,” such as a change in the rate of an area’s population growth or decline.

These can include two general types of impacts:

- Induced-Growth Impacts (IGI)–IGIs are changes in the location, magnitude, or pace of future development that result from changes in accessibility caused by the project. An example of an IGI is commercial development occurring around a new interchange and the environmental impacts associated with this development.

- Encroachment-Alteration Impacts (EAI)–EAIs are physical, chemical, or biological changes in the environment that occur as a result of the project but are removed in time or distance from the direct impacts. An example of an EAI is a long-term decline in the viability of a population of a particular species as a result of habitat fragmentation caused by the project.

CEQ defines Cumulative Impacts as impacts "on the environment which results from the incremental impact of the action when added to other… actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

For example, the air quality of an area today is a measurable condition, relative to the National Ambient Air Quality Standards. In the past, the quality of the air may have been worse, the same, or better than it is today depending on a number of factors such as automobile use, industry, residential development (fireplaces), and climatic conditions. The condition of the air today is the result of these factors, which constitute the past effects of the Cumulative Impact question. Add the impacts of the proposed project, other occurring activities, and the positive and negative reasonably foreseeable impacts from any source, and the result equates to the air quality Cumulative Impact.

b. ICI Expert Panel

For the Beltline PEL Study ICI analysis, the Beltline PEL Study team assembled an expert panel. The prospective panelists included representatives from every community in the draft Beltline PEL Study areas, as well as representatives of the Dane County Planning Department, the Greater Madison MPO, CARPC, 1000 Friends of Wisconsin, the University of Wisconsin, Downtown Madison, Inc., WDNR, and the DATCP. Representatives from other nonmunicipal organizations were invited due to their expertise in fields pertaining to the ICI analysis process such as environmental, land use, and economic issues.

After creating draft maps of the ICI analysis Beltline PEL Study boundary areas, the expert panelists were asked to review the maps. The proposed boundaries were the same for both the ICI Study Areas. The panelists were provided with the draft maps of the ICI study areas, and the rationale for how the maps were delineated, and were asked to comment on the appropriateness of the Beltline PEL Study areas.

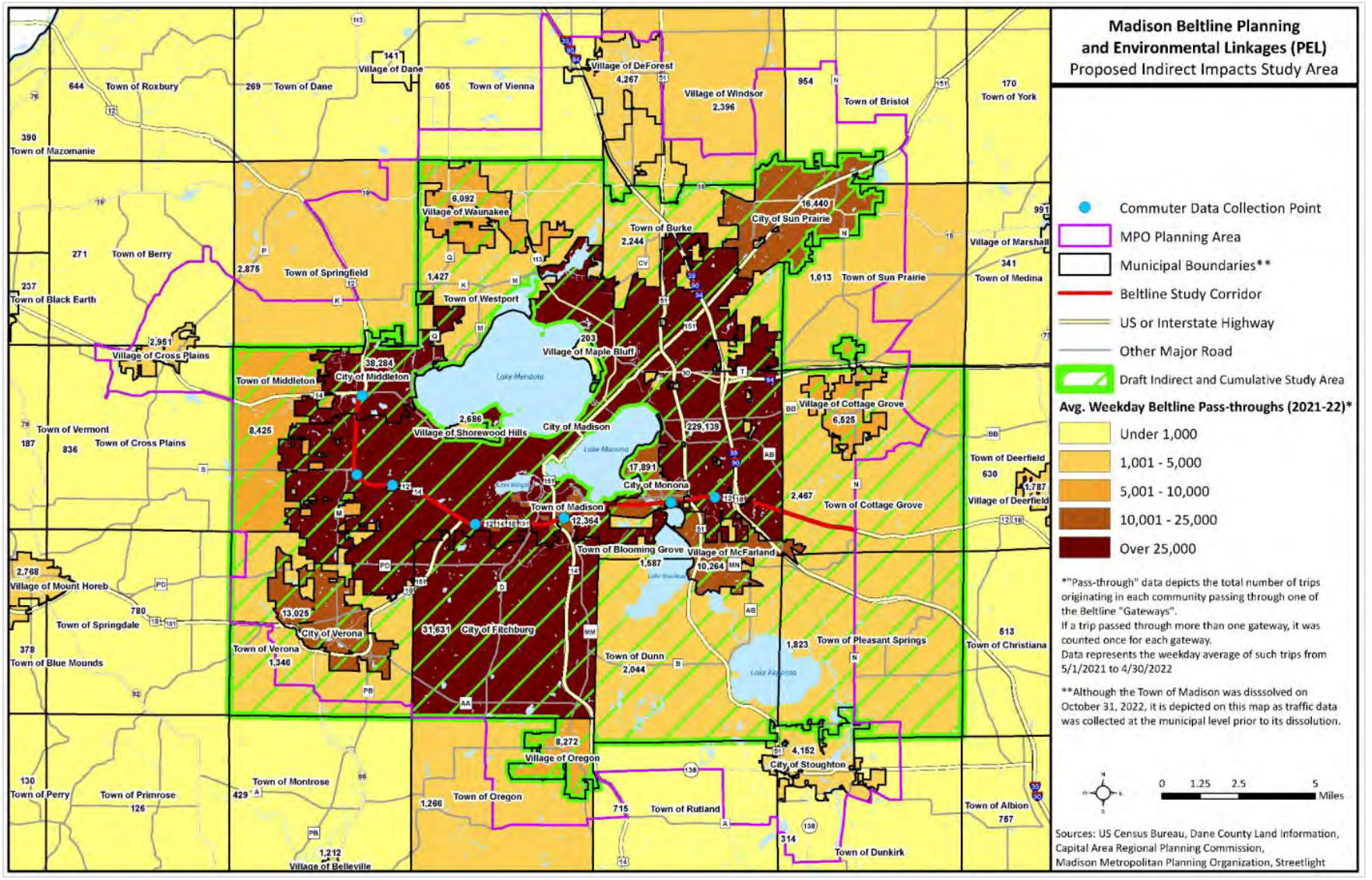
The specific questions asked by WisDOT of the panelists were as follows:

(1) Do you believe the draft Indirect Impacts Study Area boundary is appropriate for the Beltline PEL Study ICI Analysis? Yes or No. If no, please explain why or what you believe should change.

(2) Do you believe the draft Cumulative Impacts Study Area boundary is appropriate for the Beltline PEL Study ICI Analysis? Yes or No. If no, please explain why or what you believe should change.

The Beltline PEL Study team did not receive any feedback requesting that the boundaries be modified. Figure 7.03-4 shows the final ICI Study Area used in the analysis for the Beltline PEL Study.

Figure 7.03-4 ICI Study Area



Map Source: Technical Memorandum dated March 29, 2024: *Indirect Impacts and Cumulative Impacts Report 2023-24*, available upon request from the WisDOT Southwest Region Office

c. ICI Interactive Mapping Exercise

With the Study Area boundaries finalized, two web-based mapping exercises were developed and shared with expert panelists (one for Indirect Impacts and one for Cumulative Impacts). The maps included layers that could be toggled on or off, to show all of the various Components under each of the four Strategy Packages. They also included a number of additional layers depicting relevant background information to help inform panelists' insights on where potential impacts may occur.

These background layers were the result of extensive data collection by the Beltline PEL Study team and included information grouped into three broad categories:

- The Land Use and Transportation category included existing land use, planned development and adopted land use plans, and planned transportation projects.
- The EJ category included areas of persistent poverty, historically disadvantaged communities, and areas with a higher percentage of residents with lower incomes.
- The Natural Resources category included natural resources or development constraints, agricultural enterprise areas, USDA watersheds, CARPC environmental corridors, WDNR wetlands, and Federal Emergency Management Association (FEMA) 100-year rainfall event and 500-year rainfall event floodplains.

Once created, links to the interactive web maps were sent to the expert panelists 2 weeks before convening the expert panel meeting. Panelists were also notified they would have 2 weeks following the expert panel event to map additional potential impacts.

It was requested that panelists provide comments on the location and type of impact within the Study Areas and identify the Strategy Package the impacts may occur under. A PDF document with detailed instructions on how to use the interactive maps was provided, as well as a video demonstrating how to add comments to the maps. Panelists were also able to provide input on hard copies.

Types of impacts panelists could map using the indirect and cumulative maps included:

- Residential
- Commercial
- Industrial
- Infrastructure
- Natural Resource
- Special Population (i.e., EJ population)
- Altered Development Pace (indicating the same type of land use as is depicted in adopted plans is likely to occur but may occur more or less quickly than originally anticipated due to implementation of one or more Strategy Packages).
- Other
- Missing Element (for panelists to identify background information or elements not included in the maps)

The maps also enabled panelists to include detailed descriptions of their mapped impacts via a text field.

d. Expert Panel Meeting

The expert panel was convened on August 28, 2023. Panelists were given the option of attending in-person or remotely via virtual log-in. Eight expert panelists attended the meeting, representing seven different communities or organizations (city of Fitchburg, city of Sun Prairie, town of Middleton, village of McFarland, 1000 Friends of Wisconsin, DATCP, and the Greater Madison MPO), as well as representatives from WisDOT, FHWA, and the Beltline PEL Study team.

The Study Team reviewed the comments received to date on the web maps and provided another demonstration of how to use the maps and add comments or potential impacts. The meeting was then opened up for a group discussion about potential ICIs. The Study Team added comments suggested by panelists in real time to the maps during the meeting.

Comments received at the meeting generally included:

- The city of Fitchburg representative offered general support for Local Road System Crossings and Connections Components D (west of Park Street) and E (across US 14 south of the Beltline) as well as the Transit Priority Component at Fish Hatchery Road where it would benefit affordable housing along the corridor.
- The Greater Madison MPO representative noted the need for new road improvements serving the Epic Systems campus in the city of Verona.
- The town of Middleton representative inquired about the source of planned land uses on the ICI maps (later confirmed to be the most recent plans), and offered support for the Park and Ride Component B that was being constructed at the time as part of the Metro East-West BRT project.
- The 1,000 Friends of Wisconsin representative asked about the impact of the Flex Lane on daily Beltline traffic, and also supported the multi-modal Components included in SP 2 and 3 but not the additional GP lane in SP 4.

The technical memorandum dated March 29, 2024, *Indirect Impacts and Cumulative Impacts Report 2023-24,* and all comments received are included in Appendix H.

3. Costs

The Beltline PEL Study team developed planning-level order-of-magnitude costs based on estimated major construction quantities for each Strategy Package. As one might expect, the costs for SP 1 are anticipated to be lowest followed by increasing costs as more improvement Components are added to SP 2, 3, and 4. Costs did not factor in the development of the Draft Preferred Strategy Package. Components that address the Beltline PEL Study Goal and Objectives the best are anticipated to be analyzed further in future NEPA studies and costs are anticipated to be considered at that time.

D. Accessibility

Accessibility is the ease with which one can travel to their desired destinations. The Beltline PEL Study Objectives included improving accessibility as well as traditional mobility (measured using LOS). Considering this, the Beltline PEL Study team conducted an accessibility analysis for each of the Components (see Section 6 of this report) as well as the combined Components that make up the Strategy Packages. The report summarizing the accessibility analysis is included in Appendix I.

Four types of activities were considered: access to jobs, services, retail, and schools. The nature of the various Components impacts the types of accessibility improvements they would provide. For example, a Pedestrian and Bicycle Component would improve access for pedestrians and bicyclists, but not for transit riders or passenger motor vehicles. A new Local Road System Crossings and Connections Component would have the potential to improve accessibility for all travelers.

SP 1 does not improve accessibility. As one might expect, accessibility benefits are anticipated to increase as each of the other three Strategy Packages adds more Components. SP 4 is anticipated to provide the most improvement in accessibility for all modes to each of the four types of activities considered while SP 2 provides the least.

The results are presented in two formats. First, the total number of person-hours saved during the weekday AM peak hour as estimated by the Greater Madison MPO's TDM is summarized for each of the three build Strategy Packages. Total time savings associated with a Strategy Package is defined as the network-wide estimated amount of reduction in travel time by mode and by destination type. Second, the benefits for each build Strategy Package are shown as a percentage of the highest benefit achieved. This demonstrates the relative increase in accessibility benefits achieved by the increase in the number of Components included in successive Packages from SP 2 (the fewest, but highest-priority Components) to SP 4 (all viable Components retained for analysis).

1. Walking Trips

The relative differences between the Strategy Packages varied depending on the mode and activity considered. Accessibility for walking trips is influenced by Components including new Local Road System Crossings and Connections Components (because sidewalk and pedestrian facilities would be included), Pedestrian and Bicycle Components, and to a lesser degree Park and Ride Components. See Section 6 for additional information on the effectiveness of Components related to improving accessibility.

Figures 7.03-5 and 7.03-6 show the accessibility analysis results for the Strategy Packages for trips made by walking. Figure 7.03-5 shows the total hours of time saved during a typical weekday AM peak period, as predicted by the Greater Madison MPO's TDM. SP 2 results are shown in blue, SP 3 in orange, and SP 4 in gray. The graph shows that for walking, the Packages are anticipated to improve accessibility to each of the activity types. The largest benefits are anticipated to be to schools for SP 3 and SP 4.

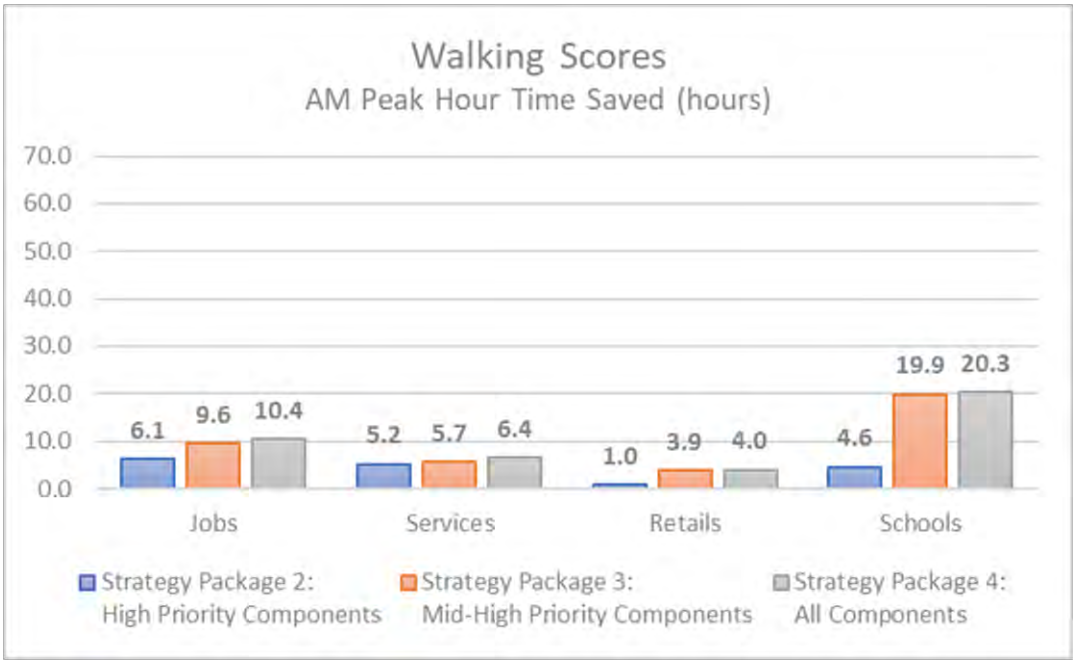


Figure 7.03-5 Total Accessibility Benefits for Trips Made by Walking

Figure 7.03-6 shows the benefits for trips made by walking as a percentage of the highest benefit achieved. It demonstrates that the increase in benefits to accessibility is generally anticipated to be greater when moving from SP 2 to 3, than from SP 3 to 4. Across all of the activity types combined, SP 3 would more than double the walking benefits of SP 2. SP 4 would improve them by only about an additional 5 percent compared to SP 3.

Figure 7.03-6 Relative Accessibility Benefits for Trips Made by Walking

2. Biking Trips

Accessibility for biking trips is influenced by Components including new Local Road System Crossings and Connections Components (because bicycle facilities would be included), Pedestrian and Bicycle Components, and to a lesser degree Park and Ride Components. See Section 6 for additional information on the effectiveness of Components related to improving accessibility.

For bicycling, each of the four activity types are anticipated to see a benefit with the Strategy Packages. Figure 7.03-7 shows that the benefits would be much larger for trips to jobs and services compared to retail and schools.

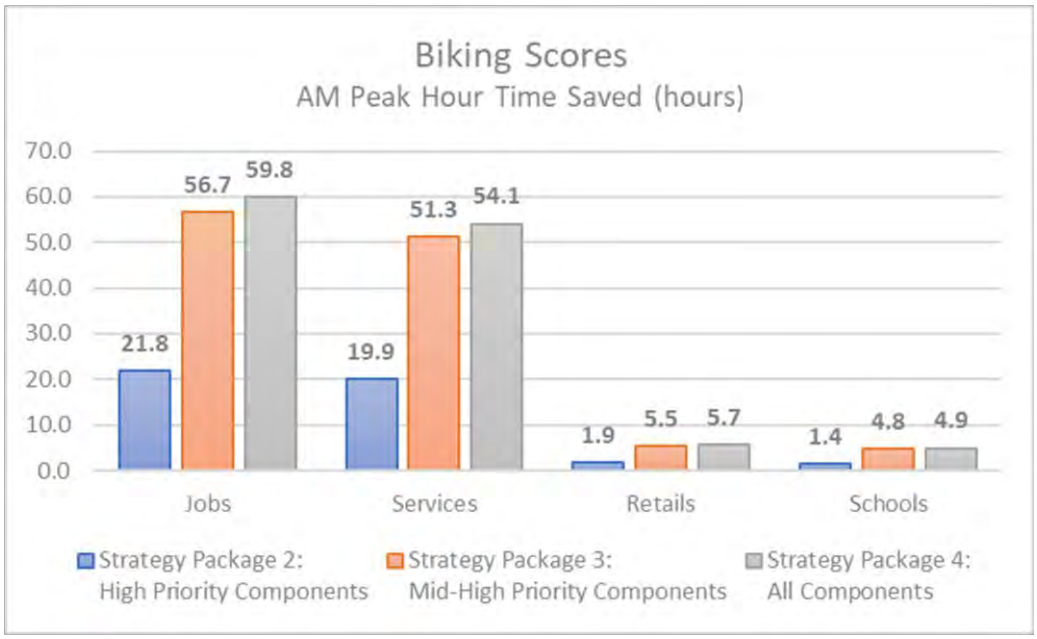


Figure 7.03-7 Total Accessibility Benefits for Trips Made by Bicycling

Figure 7.03-8 shows that SP 3 again is anticipated to more than double the total bicycling benefits gained by SP 2. The additional Components in SP 4 would provide only approximately 5 percent more total benefit than SP 3. It is important to note that the results represent commuting trips and do not reflect the added benefits to recreational bicycling that the Components also provide.

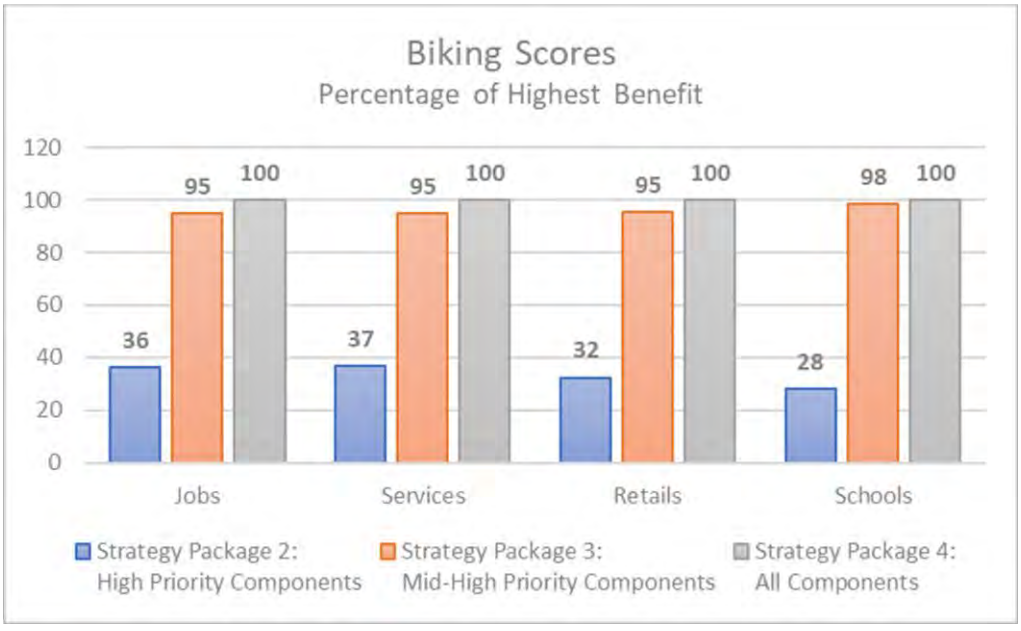


Figure 7.03-8 Relative Accessibility Benefits for Trips Made by Bicycling

3. Bus Trips

Accessibility for bus trips is influenced by Components including Interchanges, Transit Priority, Park and Rides, and to a lesser degree, Mainline Components (because Metro bus routes only use the Beltline to a limited degree). New Local Road System Crossings and Connections Components were not considered in the accessibility analysis for bus trips because it is unknown which Metro routes might use the new connections and crossings. See Section 6 for additional information on the effectiveness of Components related to improving accessibility.

For bus riders, there is anticipated to be little difference in the accessibility benefits provided by the three build Strategy Packages (SP 2, 3, and 4). Figure 7.03-9 shows that access to jobs is anticipated to see the largest benefit, followed by services. There would be little benefit for retail or school accessibility by transit for any of the Packages.

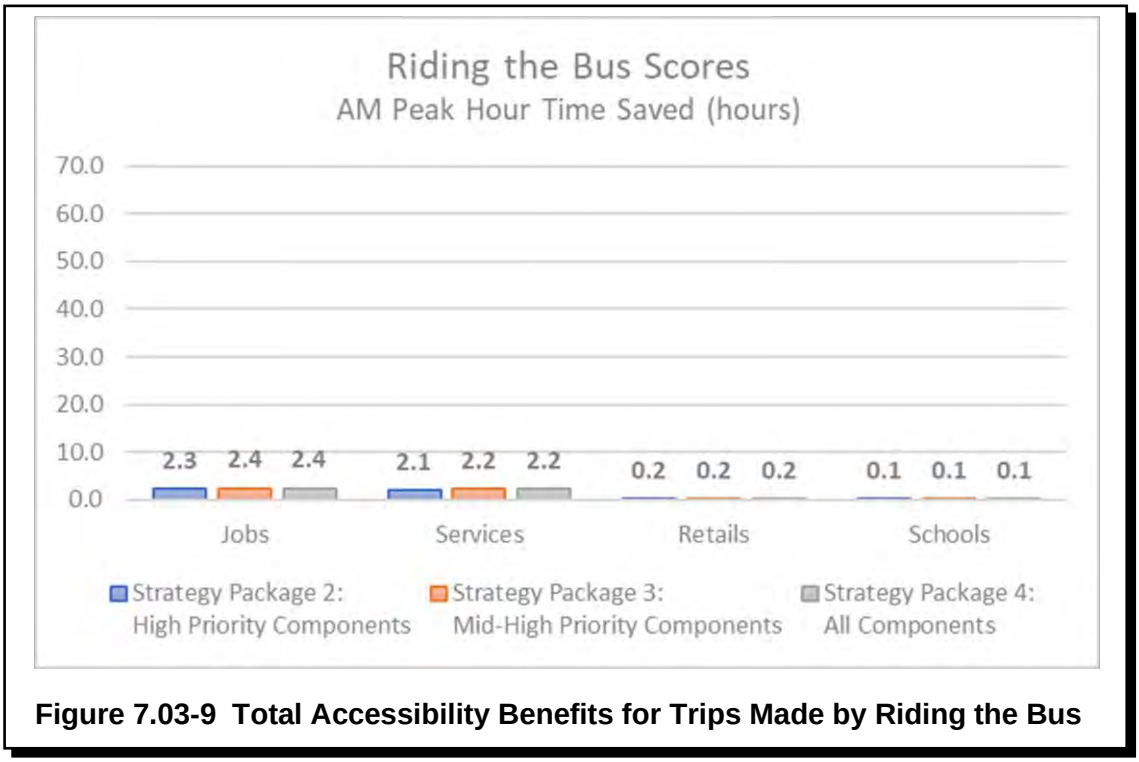


Figure 7.03-9 Total Accessibility Benefits for Trips Made by Riding the Bus

Figure 7.03-10 shows that most of the accessibility benefits to transit are achieved by SP 2, with little added benefit from SP 3 or 4.

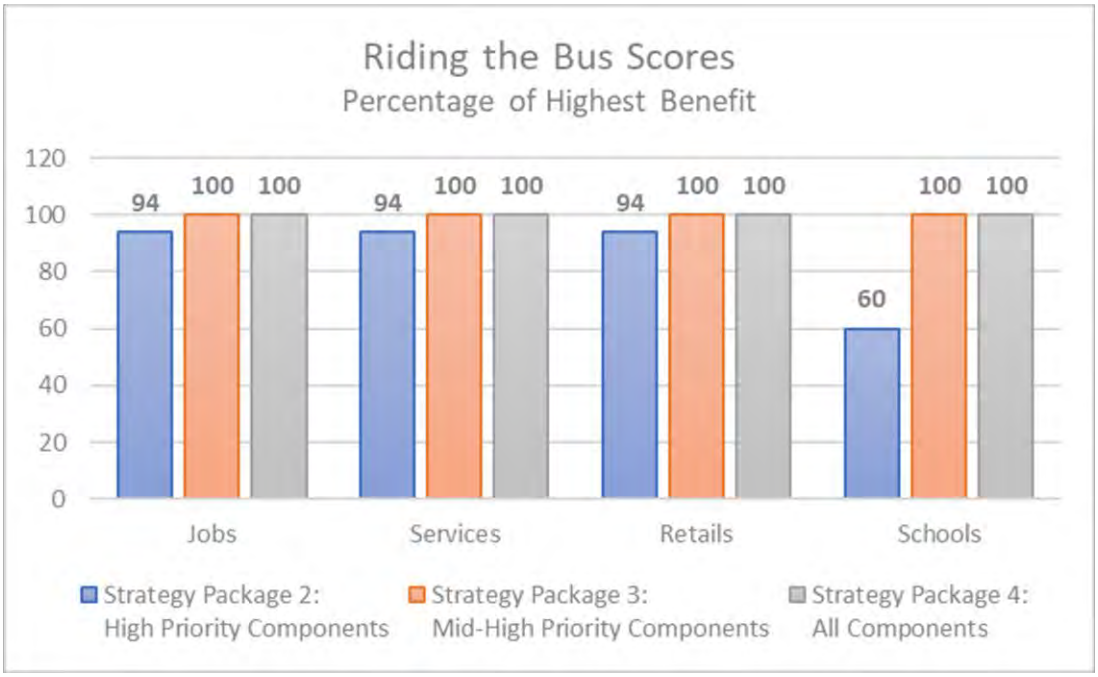


Figure 7.03-10 Relative Accessibility Benefits for Trips Made by Riding the Bus

4. Driving Trips

Accessibility for driving trips is influenced by Components including Mainline, Interchanges, new Local Road System Crossings and Connections, Park and Rides, and Transit Priority Components. See Section 6 for additional information on the effectiveness of Components related to improving accessibility.

For driving, Figure 7.03-11 shows that SP 2 would provide some improvement in accessibility to jobs and services, but somewhat less than SP 3 or 4. There are lesser benefits for retail and school trips.

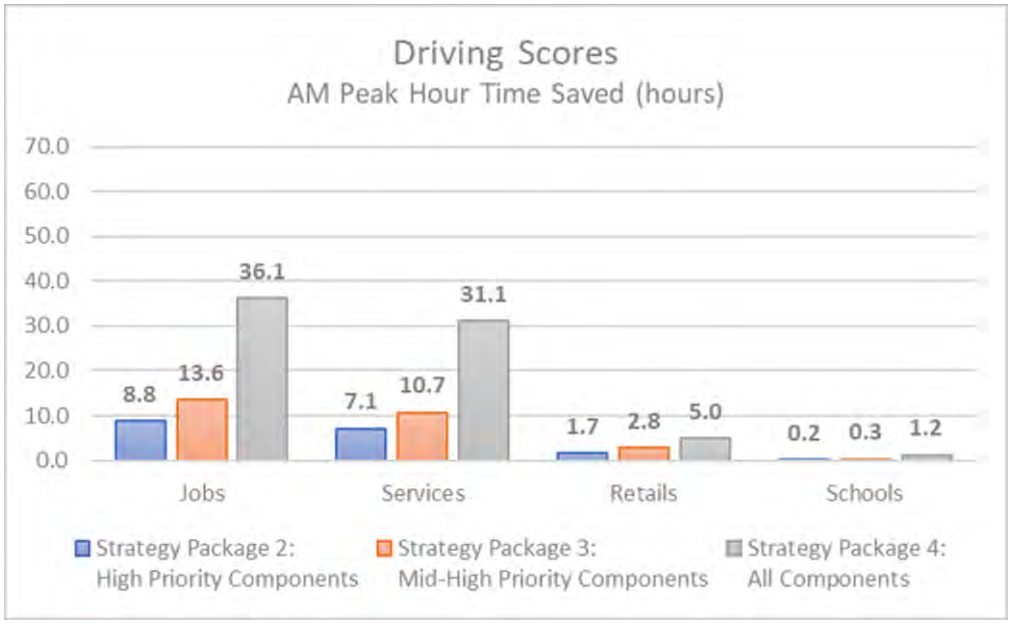


Figure 7.03-11 Total Accessibility Benefits for Trips Made by Driving

Figure 7.03-12 shows that SP 3 would provide approximately 54 percent more benefit compared to SP 2. SP 4 would increase the benefits by more than 1.5 times the benefits of SP 3.

Figure 7.03-12 Relative Accessibility Benefits for Trips Made by Driving

In summary, all three of the build Strategy Packages are anticipated to improve accessibility. While SP 4 would provide the largest increase, there is a noticeable step up from SP 2 to 3 for walking and biking and less so from SP 3 to 4. For driving, the additional lane in each direction on the east end of the Beltline results in a larger jump in accessibility improvements between SP 3 and 4 compared to the other travel modes.

7.04 DRAFT PREFERRED STRATEGY PACKAGE

After presenting and getting feedback on the Strategy Packages from the PAC, TAC, public, and agencies and completing additional accessibility analysis on the Draft Strategy Packages, the Beltline PEL Study team developed a Draft Preferred Strategy Package. The Draft Preferred Strategy Package includes Components that the team recommends be carried forward and evaluated further in NEPA. It does not represent what WisDOT proposes for future construction. NEPA analysis will consider a No Build/Preserve and Maintain alternative as well as one or more build alternatives, and some Components of the Draft Preferred Strategy Package may change or be dropped during the NEPA analysis.

A. Basis for Developing the Draft Preferred Strategy Package

Two main factors guided the identification of the Draft Preferred Strategy Package. First was the stakeholder feedback the team received on the Strategy Packages during TAC and PAC meetings, agency meetings, PIMs, and follow-up surveys. The main themes of the input provided were:

- Focus on multimodal Components
- Generally not in favor of an added GP lane throughout the corridor, particularly in the area east of Verona Road where the Flex Lane is.
- Extending the Flex Lane west of Verona Road was acceptable
- In general, people agreed with how the Components were prioritized and placed within the Strategy Packages.

The second factor was how well the Strategy Packages addressed the Beltline PEL Study Goals and Objectives. As an example, adding a GP lane in each direction was not something the majority of people supported. However, the addition of a GP lane is anticipated to better address the Beltline PEL Study operational Goals. At this point in the process, the team did not want to dismiss adding a GP lane from further evaluation in NEPA because not enough detailed analysis of the potential impacts versus potential benefits of this added lane has been completed in this Beltline PEL Study.

Finally, as part of determining the Draft Preferred Strategy Package, the Strategy Package accessibility analysis results were also taken into consideration. This analysis demonstrated, as expected, that accessibility improvements increase as the number of Components included in a Strategy Package increases. It is also worth noting that the Greater Madison MPO TDM has limitations in measuring accessibility. For example, benefits to recreational pedestrian and bicycle trips are not accounted for by the TDM.

The Beltline PEL Study team used SP 4 as a basis for the Draft Preferred Strategy Package because it includes all the viable Components, but made modifications based on the factors listed previously.

B. Summary of Components included in the Draft Preferred Strategy Package

1. Mainline Travel Lanes

For the Beltline mainline west of Verona Road, the Draft Preferred Strategy Package includes a Beltline Flex Lane extension or adding one GP lane in each direction, shown by the yellow line in Figure 7.04-1. It includes extending the existing Beltline Flex Lane east to the Beltline interchange with I-39/90, shown by the brown line, and either a Maintain Flex Lane (no-build) option or Maintain Flex Lane and Add One GP Lane in each direction, shown by the dashed red line. While feedback was received in favor of and not in favor of additional GP lanes on the Beltline, the Beltline PEL Study team kept the option of adding one GP lane in each direction in the Draft Preferred Strategy Package because traffic modeling suggests the additional GP lanes do the most to improve operations and move the corridor towards typical operational goals. The next study phases (NEPA) will allow WisDOT to fully evaluate the tradeoffs between operations and safety versus impacts and costs associated with adding GP lanes.

Map Source: Dane County GIS

Figure 7.04-1 Draft Preferred Strategy Package Mainline Components

Corridor needs for the section between the Beltline interchange with I-39/90 and County N interchange were addressed as part of the US 12/18 and County AB interchange project and a US 12 freeway conversion study that identified some spot improvements that could be made farther east if the need arose in the future.

2. Weave Areas

The Draft Preferred Strategy Package includes Weave Components in each location where simply adding a mainline lane of capacity is not expected to be sufficient to eliminate poor operations in 2050. This includes both mainline directions between:

- Old Sauk Road and Mineral Point Road
- Whitney Way and US 151/Verona Road
- Fish Hatchery Road and US 14/Park Street
- John Nolen Drive and West Broadway
- Monona Drive and US 51/Stoughton Road

Figure 7.04-2 shows the Weave Components.

Map Source: Dane County GIS

Figure 7.04-2 Draft Preferred Strategy Package Weave Components

3. Interchanges

The Draft Preferred Strategy Package assumes improvement Components at each interchange. Most locations are anticipated to be conventional expansion such as adding turn lanes or through lanes on the crossing streets at the ramp terminals. These are shown in darker blue on the map in Figure 7.04-3. Locations where more substantial changes are being considered are shown in light blue. These locations include:

- Gammon Road
- Whitney Way
- Verona Road
- Stoughton Road (which was being evaluated as part of a separate majors study at the time of this report)

Map Source: Dane County GIS

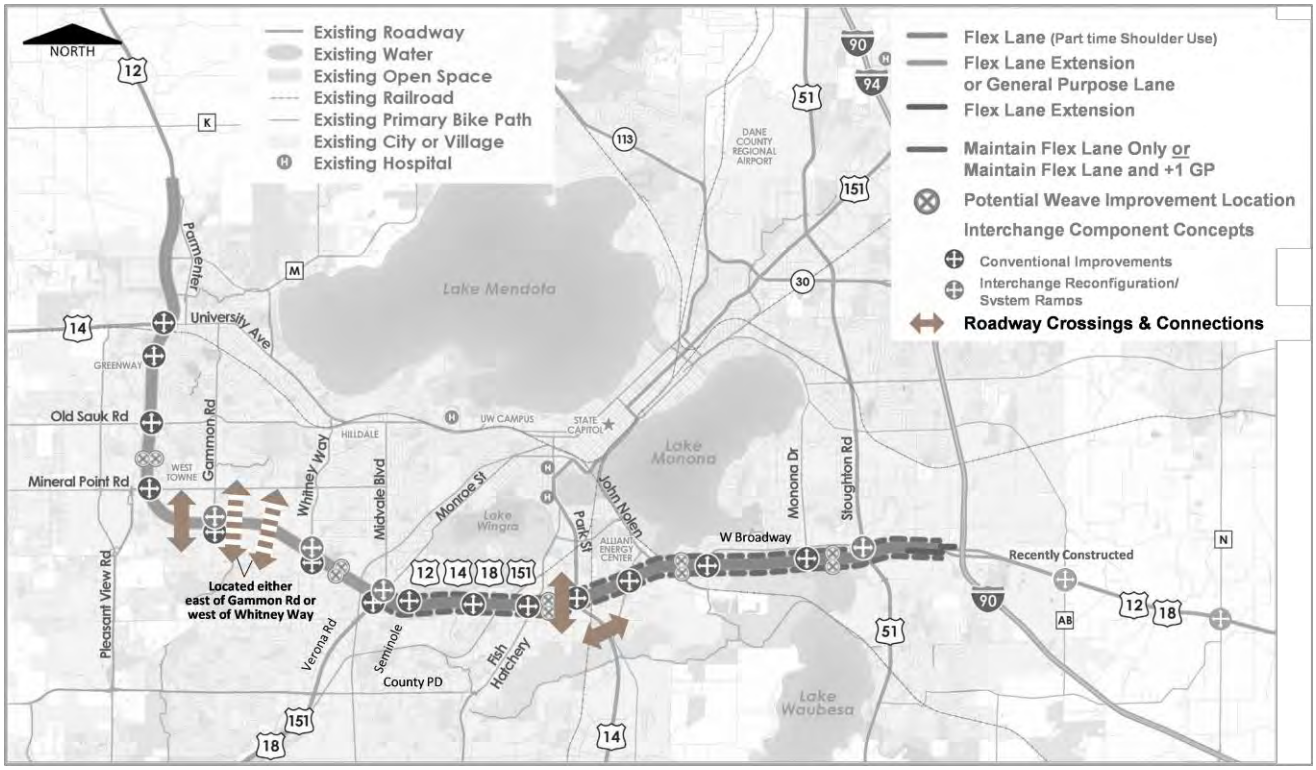
Figure 7.04-3 Draft Preferred Strategy Package Interchange Components

4. Local Road System Crossings and Connections Components

The Draft Preferred Strategy Package includes Local Road System Crossings and Connections Components. Potential new Local Road System Crossings and Connections accommodating motor vehicles, pedestrians and bicycles include:

- West of Gammon Road
- East of Gammon Road or West of Whitney Way
- West of Park Street
- Crossing of US 14 south of the Beltline

These Components are shown by the brown arrows in Figure 7.04-4 except for the Components west of Gammon Road and west of Whitney Way that are shown by a dashed brown line where the two will be evaluated and compared further in NEPA to determine the best location for this crossing. The city of Madison received a grant in spring 2024 to study and design the Beltline PEL Study West of Park Street Component.



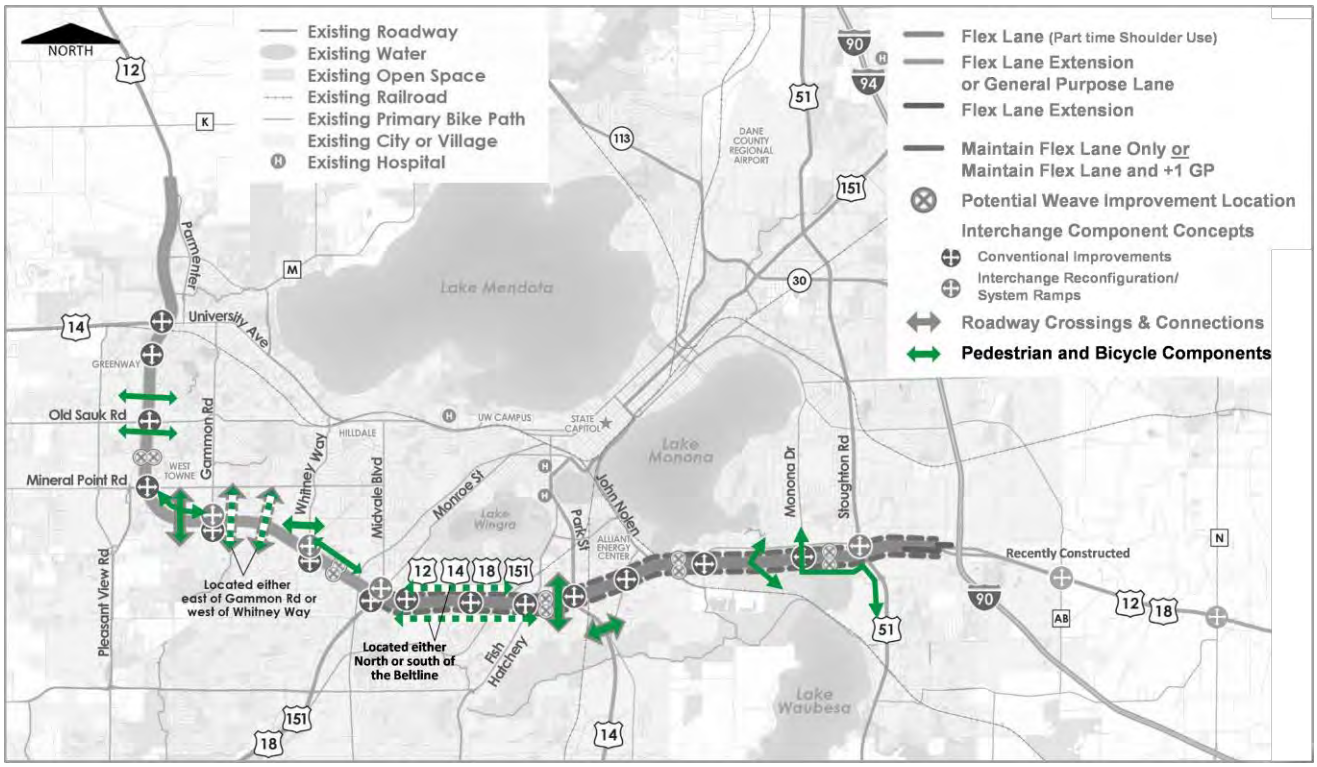
Map Source: Dane County GIS

Figure 7.04-4 Draft Preferred Strategy Package Local Road System Crossings and Connections Components

5. Pedestrian and Bicycle Components

The Draft Preferred Strategy Package includes the following locations that are shown by green arrows in Figure 7.04-5:

- North of Old Sauk Road
- South of Old Sauk Road
- Extension of the West Towne path from Mineral Point Road to Gammon Road[3]
- Crossing of Whitney Way north of the Beltline
- Connection from Whitney Way to the Southwest Commuter Path
- Connection from Seminole Highway to the Cannonball Path and Fish Hatchery Road North or South of the Beltline[4]
- Connection from West Broadway to the Upper Yahara River Trail through the CSSRA
- Connection from Monona Drive to Stoughton Road and south to the village of McFarland



Map Source: Dane County GIS

Figure 7.04-5 Draft Preferred Strategy Package Pedestrian and Bicycle Components

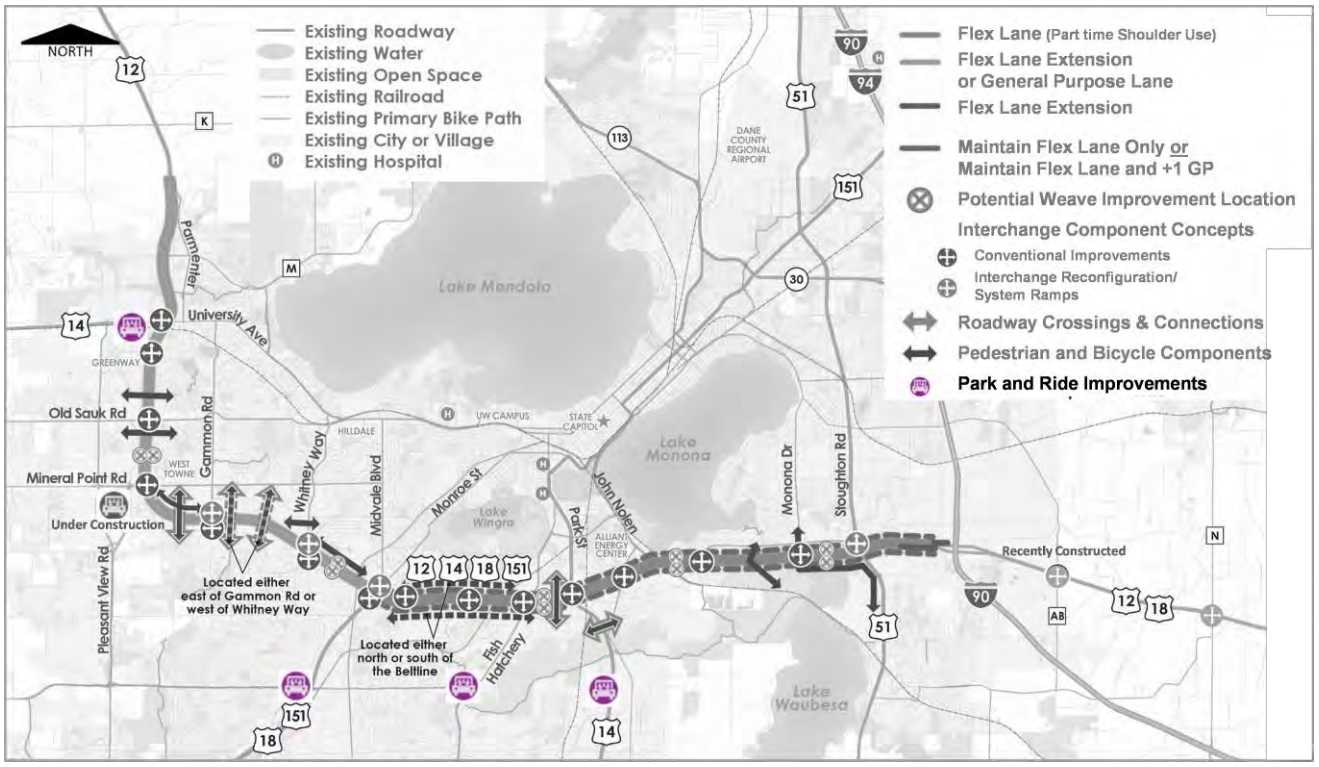
[3]Madison plans to construct the first portion of this path from Highpoint Road to Zor Shrine Place in 2025.
[4]The Pedestrian and Bicycle Components between Seminole Highway and the Cannonball Path may impact the UW-Arboretum property, a National Historic Landmark. They are shown as an "or" option to allow flexibility in future NEPA evaluation.

6. Park and Ride Components

The Park and Ride Components included in the Draft Preferred Strategy Package are shown in Figure 7.04-6. They include:

- US 14/University Avenue at the Beltline
- US 151/Verona Road at County PD
- Fish Hatchery Road at County PD
- US 14 at McCoy Road

A park and ride near Mineral Point Road and Junction Road was constructed in 2024 as part of the city of Madison East-West BRT project.



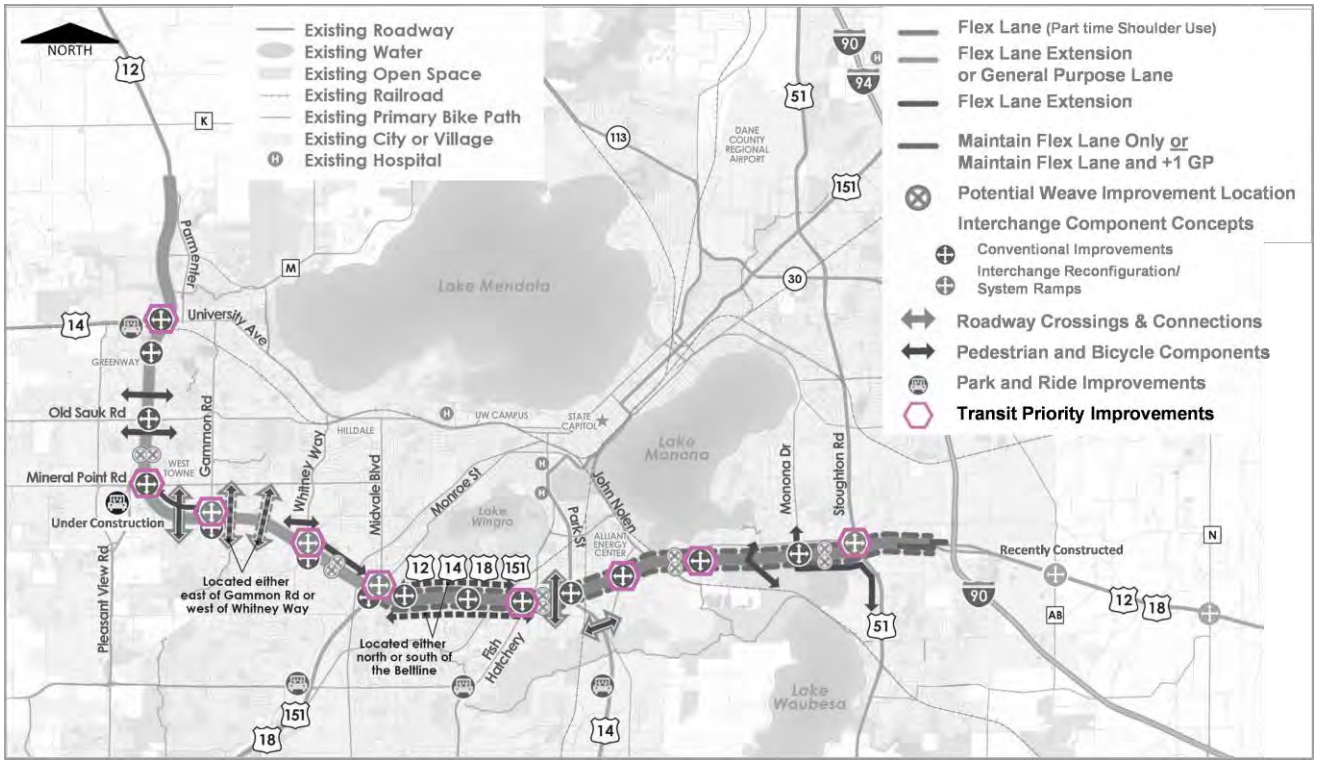
Map Source: Dane County GIS

Figure 7.04-6 Draft Preferred Strategy Package Park and Ride Components

7. Transit Priority Components

A detailed discussion of Transit Priority Components is provided in Section 6.02 F. The locations of the Transit Priority Components included in the Draft Preferred Strategy Package are shown in Figure 7.04-7. They include:

- US 14/University Avenue at the Beltline
- Mineral Point Road (BRT crossing)
- Gammon Road
- Whitney Way
- Midvale Boulevard/US 151/Verona Road
- Fish Hatchery Road (BRT crossing)
- Rimrock Road
- West Broadway
- Stoughton Road



Map Source: Dane County GIS

Figure 7.04-7 Draft Preferred Strategy Package Transit Priority Components

8. Overall Draft Preferred Strategy Package

The Draft Preferred Strategy Package is not a preferred construction alternative. It consists of many Components that the Beltline PEL Study team believes have the most potential for addressing the Beltline PEL Study Goal and Objectives and warrant more detailed evaluation during future NEPA studies. The Components included in the Preferred Strategy Package will be used to develop the range of alternatives in future NEPA documents. Figure 7.04-8 shows all the Components included in the Draft Preferred Strategy Package.

Map Source: Dane County GIS

Figure 7.04-8 All Components Included in the Draft Preferred Strategy Package

C. Feedback on the Draft Preferred Strategy Package

1. TAC and PAC Feedback

A combined TAC and PAC meeting was held on April 30, 2024. The Beltline PEL Study team presented the Draft Preferred Strategy Package and requested feedback. The group also participated in live polling of the Components. Attendees were asked to rank the degree to which they agreed with the Components included in the Draft Preferred Strategy Package from 1 (do not agree) to 5 (fully agree). Between 16 and 18 attendees participated in the live polling (67 to 75 percent) depending on the question. The live-polling results were:

- Mainline Components: Range: 3 to 5 Average: 4.0
- Weaving Components: Range: 2 to 5 Average: 4.0

- Interchanges Components: Range: 2 to 5 Average: 3.8
- Roadway Crossings and Connection Components: Range: 3 to 5 Average: 4.6
- Pedestrian and Bicycle Components: Range: 4 to 5 Average: 4.6
- Park and Ride Components: Range: 2 to 5 Average: 3.5
- Transit Priority Components: Range: 3 to 5 Average: 4.4
- Overall Draft Preferred Strategy Package: Range: 3 to 5 Average: 4.0

Only one TAC or PAC member filled out an online survey that was offered. They rated the Components included in the Draft Preferred Strategy Package as 5 out of 5 and provided positive comments about the process and outcome.

See Appendix C for the full results from the TAC and PAC meeting, live polling, and online survey.

In summer 2024, the city of Fitchburg Common Council passed resolution R-133-24 that states the Council “opposes the widening of the Beltline and calls for the Wisconsin Department of Transportation to remove the proposed capacity expansion from the Beltline PEL Study and instead prioritize transit, biking, walking, and local road improvements”.

2. Public Feedback

The Beltline PEL Study team held a virtual PIM on May 28, 2024, and an in-person PIM at the Boys & Girls Club of Dane County on May 29, 2024. There were 47 attendees total between the two meetings. In-person questions were asked about the Beltline Flex Lane and speed enforcement, concerns regarding added capacity and its impact on climate change, vehicle-miles traveled, and greenhouse gases were voiced, and clarifying questions were asked regarding the differences between SP 4 and the Draft Preferred Strategy Package, among others.

Using the online comment form and online survey combined, 26 total responses were received. The online comment form provided an opportunity for respondents to offer general comments on the Beltline PEL Study. The online survey asked participants to rate the degree to which they agreed with the various Components included in the Draft Preferred Strategy Package. In general, feedback regarding potentially adding capacity to the Beltline mainline was mixed with some opposed and others in favor. Of those that stated a clear opinion, 19 were opposed to additional capacity on the Beltline while seven were in favor. Many noted their approval of the multimodal aspects of the Draft Preferred Strategy Package.

The degree to which respondents agreed with the various Components included in the Draft Preferred Strategy Package from 1 (do not agree) to 5 (fully agree) were:

- Mainline Components: Average: 2.9
- Weave Components: Average: 3.6
- Interchanges Components: Average: 3.4
- Roadway Crossings and Connections Components: Average: 3.8
- Pedestrian and Bicycle Components: Average: 4.5
- Park and Ride Components: Average: 3.8
- Transit Priority Components: Average: 4.1
- Overall Draft Preferred Strategy Package: Average: 3.6

See Appendix C for the full summary of the public comments and questions received.

3. Agencies Feedback

An agencies meeting was held on June 17, 2024, to request feedback on the Draft Preferred Strategy Package to the agencies.

Similar to the TAC and PAC meeting, the team asked agency representatives to participate in live polling during the meeting. Attendees were asked to rank the degree to which they agreed with the Components included in the Draft Preferred Strategy Package from 1 (do not agree) to 5 (fully agree). Depending on the question, between three and five of the seven agency representatives answered each question at the meeting. The live-polling results were:

- Mainline Components: Average: 4.2
- Weave Components: Average: 4.8
- Interchanges Components: Average: 4.3
- Roadway Crossings and Connections Components: Average: 4.0
- Pedestrian and Bicycle Components: Average: 4.3
- Park and Ride Components: Average: 4.5
- Transit Priority Components: Average: 4.3
- Overall Draft Preferred Strategy Package: Average: 4.0

Agencies were also asked to provide feedback via an online survey. One response was received. The WDNR gave the overall Draft Preferred Strategy Package a ranking of 4 out of 5 and commented “[The Draft Preferred Strategy Package] seems appropriate to improve safety and operations. Some current weave movements could be improved.”

See Appendix C for the full summary of agency comments and questions received.

D. Final Preferred Strategy Package

WisDOT acknowledges the city of Fitchburg Common Council Resolution R-133-24 passed on June 25, 2024, that “opposes the widening of the Beltline and calls for the Wisconsin Department of Transportation to remove the proposed capacity expansion from the Beltline PEL Study and instead prioritize transit, biking, walking, and local road improvements”. However, at this point in the process, the Beltline PEL Study team did not want to dismiss adding a GP lane from further evaluation in NEPA because it is anticipated to better address the Beltline PEL Study operational goals and not enough detailed analysis of the potential impacts versus potential benefits of this added lane has been completed in this Beltline PEL Study.

In summer 2024, the I-39/90 Madison to Wisconsin Dells NEPA Study completed traffic modeling using updated forecasts for the I-39/90 corridor including at the Beltline interchange with I-39/90. This analysis indicated that the Beltline eastbound to I-39/90 northbound and I-39/90 southbound to Beltline westbound system ramps would reach capacity sometime between 2030 and 2040. Accordingly, reconfiguration of these two system ramps at the Beltline interchange with I-39/90 has been added to the Preferred Strategy Package.

In fall 2024, the Beltline PEL Study team completed analysis of conventional improvements at the US 18/151/Verona Road interchange and found that they are not sufficient to provide acceptable operations in 2050. Therefore, this improvement Component was eliminated from the final Preferred Strategy Package leaving only interchange reconfiguration/system ramps.

Because the majority of the feedback generally supported the Components included in the Draft Preferred Strategy Package, with the exception of adding GP lanes as noted previously, the Beltline PEL Study team did not elect to make any other changes to the Draft Preferred Strategy Package. Figure 7.04-9 shows the Final Preferred Strategy Package.

Map Source: Dane County GIS

Figure 7.04-9 Final Preferred Strategy Package

7.05 NEPA SECTIONS AND TIMING

To identify proposed NEPA projects and the timing of future studies, the Beltline PEL Study team followed 23 CFR 771.111(f) by considering logical termini, independent utility, and when and where needs are expected to develop along the Beltline corridor.

A. Logical Termini and Future NEPA Study Sections

1. Logical Termini Definition and Considerations

FHWA regulations require that projects connect logical termini and be of sufficient length to address environmental matters on a broad scope. FHWA defines logical termini as:

(1) Rational end points for a transportation improvement
(2) Rational end points for a review of the environmental impacts.[5]

In the past, the most common termini have been points of major traffic generation, especially intersecting roadways; however, if the project improvement is not primarily related to congestion due to traffic generators, the choice of termini based on these generators may not be appropriate.

For the Beltline corridor, congestion due to traffic generators is one of the need factors, among others. Existing Beltline traffic volumes west of Verona Road are about 45,000 to 95,000 vpd, while east of Verona Road existing traffic volumes are about 120,000 to 145,000 vpd. This difference in traffic volumes suggests the US 18/151/Verona Road interchange area is a logical terminus for future NEPA studies.

When considering the Verona Road area for potential future improvements, geometric design standards suggest alternatives may need to extend west to at least the Whitney Way interchange and east to at least the Todd Drive area. The portion of the Beltline PEL Study corridor west of the larger Verona Road area represents another logical project area, and the portion of the Beltline PEL Study corridor east of the larger Verona Road area represents a third logical project area.

The recommended logical termini are listed below and shown in Figure 7.05-1. These will be reviewed and confirmed or altered prior to any future NEPA studies.

[5]https://www.environment.fhwa.dot.gov/legislation/nepa/guidance_project_termini.aspx accessed July 15, 2024

Map Source: Dane County GIS

Figure 7.05-1 Logical Termini for the Beltline Corridor

a. West of Verona Road Area (US 14/University Avenue to Whitney Way)

b. Verona Road Area (Whitney Way to Todd Drive)

c. East of Verona Road Area (Todd Drive to the I-39/90/94 Interchange)

B. Independent Utility

1. Independent Utility Definition

FHWA regulations require that studies have independent utility or independent significance, (i.e., be usable and be a reasonable expenditure even if no additional improvements in the area are made). They must also not restrict consideration of alternatives for other reasonably foreseeable transportation projects.[6]

[6]https://www.environment.fhwa.dot.gov/legislation/nepa/guidance_project_termini.aspx accessed July 15, 2024

2. Independent Utility of Proposed Future NEPA Corridors

a. West of Verona Road Area

Potential long-term improvements in this section of the Beltline corridor include extension of the Beltline Flex Lane or the addition of one GP lane in each direction, in addition to other multimodal Components noted previously. The potential mainline capacity expansion would result in the west end of the corridor generally matching the existing Beltline capacity to the east. The team does not believe a project in this area would drive the need for additional improvements, nor preclude potential future improvements. Therefore, this proposed future study corridor has independent utility.

b. Verona Road Area

Potential long-term improvements in this section of the Beltline corridor include modifications that would remove an existing bottleneck for the northbound US 151/Verona Road to eastbound Beltline and westbound Beltline to southbound US 151/Verona Road backbone movements, as well as additional multimodal Components. Potential long-term solutions proposed for further evaluation include:

- Verona Road Stage 3–A high-speed flyover ramp from northbound Verona Road to the eastbound Beltline and a high-speed free-flow fly under ramp from the westbound Beltline to southbound Verona Road.
- Reduced Verona Road Stage 3–Provides free-flow directional ramps for northbound Verona Road to the eastbound Beltline and the westbound Beltline to southbound Verona Road at a lower deign speed of 50 mph instead of the 60-mph ramps in Verona Road Stage 3. This would result in a lower cost, smaller footprint, and fewer potential relocations.
- Modified Existing Interchange with New Free-Flow Crossovers–Converts the existing single-point interchange to a partial or full DDI, and also includes a free-flow crossover south of the Madison Beltline that would allow westbound Beltline traffic heading southbound on Verona Road to bypass some of the traffic signals. Northbound Verona Road to eastbound Beltline traffic would continue to use an at-grade connection with additional capacity provided (rather than a flyover ramp as proposed in the other two solutions).

While the Beltline PEL Study team evaluated relative differences in benefits, impacts, and approximate costs of these three potential solutions, any promising long-term solutions in the Verona Road area will require a more detailed analysis in a future NEPA study.

The existing corridors downstream are anticipated to have adequate capacity to accommodate the removal of this bottleneck. The team does not anticipate it would drive the need for additional improvements, nor preclude potential future improvements. Therefore, this proposed future study corridor has independent utility.

c. East of Verona Road Area

Potential long-term improvements in this section of the Beltline corridor include eliminating weaving sections, extending the Beltline Flex Lane east to the Beltline interchange with I-39/90, and considering one additional GP lane in each direction, in addition to other multimodal Components. WisDOT is considering interim and/or spot improvements at each end of this corridor between the US 151/Verona Road interchange and the I-39/90 interchange. Interim improvements would help address larger needs until a NEPA study is completed but may not be compatible with planned long-term improvements. Spot improvements would address specific needs anticipated to arise before a proposed NEPA study with long-term compatibility considered.

Potential interim and spot improvements being considered at or near the US 151/Verona Road interchange and the I-39/90 interchange are discussed later in this section, including independent utility of the potential improvements. The future NEPA study in the area of east of Verona Road would take into account the status of these interim or spot improvements and investigate whether alternatives considered for the area east of Verona Road have value on their own, and do not drive the need for additional improvements or preclude future projects. Therefore, this proposed future study corridor is anticipated to have independent utility.

C. Timing of Needs and Future NEPA Studies

Safety is the primary goal of most transportation projects. From 2015 to 2019 the Beltline had total crash rates that were greater than statewide averages for similar facilities for approximately 40 percent of the freeway corridor between Parmenter Street and I-39/90. For the same stretch, approximately 35 percent of the freeway corridor had injury crash rates that were greater than statewide averages. Specifically, the following portions of the Beltline corridor had a crash history from 2015 through 2019 greater than statewide averages for similar corridors for total crashes and/or fatal and serious injury (KAB):

1. Eastbound Beltline

- US 14/University Avenue to Greenway Avenue: 1.74 times total crashes, 1.12 times KAB crashes.
- Gammon Road to Whitney Way: 1.73 times total crashes, 1.08 times KAB crashes.
- Whitney Way to Verona Road: 1.37 times KAB crashes.
- Seminole Highway to Todd Drive: 2.47 times total crashes, 2.10 times KAB crashes.
- Todd Drive to Fish Hatchery Road: 1.02 times total crashes, 1.11 times KAB crashes.
- Fish Hatchery Road to US 14/Park Street: 1.22 times KAB crashes.
- US 14/Park Street to Rimrock Road: 1.74 times total crashes, 1.46 times KAB crashes.
- Rimrock Road to John Nolen Drive: 1.94 times total crashes, 2.52 times KAB crashes.
- John Nolen Drive to West Broadway: 1.28 times total crashes, 1.42 times KAB crashes.
- US 51/Stoughton Road to I-39/90: 1.39 times total crashes, 1.53 times KAB crashes.

2. Westbound Beltline

- US 14/University Avenue to Greenway Avenue: 1.12 times KAB crashes.
- Seminole Highway to Todd Drive: 2.22 times total crashes, 2.66 times KAB crashes.
- Todd Drive to Fish Hatchery Road: 1.26 times total crashes, 1.11 times KAB crashes.
- Fish Hatchery Road to US 14/Park Street: 1.92 times total crashes, 1.49 times KAB crashes.
- US 14/Park Street to Rimrock Road: 1.59 times total crashes, 1.46 times KAB crashes.
- Rimrock Road to John Nolen Drive: 1.38 times total crashes, 1.68 times KAB crashes.
- John Nolen Drive to West Broadway: 1.04 times total crashes.
- West Broadway to Monona Drive: 1.17 times KAB crashes.
- Monona Drive to US 51/Stoughton Road: 1.37 times total crashes, 1.03 times KAB crashes.

The Beltline Flex Lane opened in July 2022 between Verona Road and I-39/90. Over the first year of operations there were 24 percent less total crashes and the number of fatal/injury crashes remained about the same compared to the 5-year average from 2015 to 2019. Crash rates decreased for the westbound direction of travel and increased for the eastbound direction of travel during the first year of operation. It is important to note that crash trends have historically varied year-to-year along the Beltline. To assess overall performance, WisDOT relies on multiple years of crash data before developing alternatives for safety improvements.

An updated crash analysis will be part of any future NEPA project along the Beltline corridor.

Additional needs considered include mainline LOS, interchange LOS, pavement condition, and bridge condition. Table 7.05-1 summarizes the needs along the Beltline PEL Study corridor. For mainline LOS, the approximate year that operations are expected to reach mid-LOS E is shown. For the interchanges, the approximate year at least one of the ramp terminal intersection's operations are expected to reach LOS E is shown. For the pavement and bridges, the estimated year of the end of life cycle is shown.

Table 7.05-1 Estimated Years of Need

Location	Estimated Year of Need			
	Mainline Mid-LOS E	Interchange LOS E	End of Pavement Life	End of Bridge Life
Parmenter Street		2025 to 2030		
• Mainline	2050+		2036	
Airport Road		2050+		
• Mainline	2050+		2036	
US 14/University Avenue		2050		
• Mainline	2050+		2036	2038 (Westbound Beltline over WSOR Railroad at Terrace Avenue)
Greenway Boulevard		2025 to 2030		
• Mainline	2045 to 2050		2036	
Old Sauk Road		2050+		
• Mainline	2045 to 2050		2040	
Mineral Point Road		2025 to 2030		2044 (Eastbound) and 2045 (Westbound Beltline over Mineral Point Road)
• Mainline	2030 to 2035		2045	
Gammon Road		2050+		
• Mainline	2025 to 2030		2027	
Whitney Way		2035 to 2040		
• Mainline	2040 to 2045		2047	
US 18/151/Verona Road		2025 to 2030		
• Mainline	2030 to 2035		2047	
Seminole Highway		2035 to 2040		
• Mainline	2025		2047	
Todd Drive		2035 to 2040		
• Mainline	2040 to 2050		2032	
Fish Hatchery Road		2050+		
• Mainline	2025 to 2040		2032	
US 14/Park Street		2035 to 2040		2049 (Eastbound) and 2050 (Westbound Beltline over US 14/Park Street)
• Mainline	2040 to 2050		2032	
Rimrock Road		2050+		
• Mainline	2040 to 2050		2032	
John Nolen Drive		NA		2045 (Eastbound and Westbound Beltline over John Nolen Drive)
• Mainline	2040 to 2050		2032	
West Broadway		2050+		
• Mainline	2040 to 2050		2032	
Monona Drive		2050+		
• Mainline	2025 to 2040		2032	
US 51/Stoughton Road		2025		
• Mainline	2025 to 2040		2032	

The Beltline PEL Study is a high-level analysis preceding future NEPA studies. The Preferred Strategy Package is not a preferred construction alternative. It consists of many Components that the Beltline PEL Study team believes have the most potential for addressing the Beltline PEL Study Goal and Objectives and warrant more detailed evaluation during future NEPA studies.

It is also a desired outcome of the Beltline PEL Study that there be an understanding of the limits or termini on the Beltline and timing of subsequent NEPA studies based on when needs are anticipated to arise in the future, meaning not all the Components are anticipated to be studied further at the same time or constructed at the same time. Factors that influence timing of the subsequent NEPA studies include:

- Safety (this would include needing to address high crash rates in specific areas of the corridor)
- Mainline and interchange traffic capacity (if a specific area of the corridor is not meeting minimum or desired operational levels or an interchange ramp is backing up onto the Beltline causing safety concerns or delays, this area might be prioritized earlier than other areas of the Beltline)
- Pavement and structures deficiencies (some parts of the underlying Beltline pavement and structures are older than other areas and replacement in these areas may need to be prioritized)

The Beltline PEL Study includes the following recommendations shown in Figure 7.05-2 for how the Beltline corridor will be potentially separated into multiple NEPA studies and the potential timing for each; however, the Beltline and its safety concerns and needs can change over time, so the timing of construction may be adjusted accordingly as the safety concerns and needs arise. WisDOT must also balance needs of the Beltline with the needs of other important corridors throughout the state. Additionally, potential interim and spot improvements are noted within the corresponding study limits that are either funded projects at the time of the Beltline PEL Study, or address needs that are anticipated to occur earlier than the proposed timing for the future NEPA studies. Potential interim improvements are not anticipated to fully satisfy long-term goals, but address short-term needs and may not be compatible with other Components recommended for further analysis in NEPA as part of the Beltline PEL Study. Alternatively, potential spot improvements would help satisfy long-term goals and are compatible with Components recommended for further analysis in NEPA as part of the Beltline PEL Study. These potential interim and spot improvements would be planned and designed to not preclude or induce future reasonably foreseeable projects.

Map Source: Dane County GIS

Figure 7.05-2 Proposed Future NEPA Sections and Timing

1. West of Verona Road Area

   a. Timing of Future NEPA Analysis

   There are a number of operations needs and a section of pavement anticipated to need improvements before 2030. Additional operations, pavement, and bridge needs are also anticipated between 2030 and 2040. Some of these extend north of the official Beltline PEL Study end point at US 14/University Avenue, as noted in the following.

   - The official Beltline PEL Study end point is the US 14/University Avenue interchange with needs at interchanges and on mainline east of US 14/University Avenue expected to develop by about 2030, if not earlier. However, North of Parmenter Street is a logical endpoint because conceptual layout of the Components that add mainline capacity indicates the Beltline Flex Lane or added GP lanes would need to begin/end north of Parmenter Street due to geometric design considerations. This is north of the official Beltline PEL Study end point at US 14/University Avenue.

   - The Whitney Way interchange is a logical endpoint because the interchange needs and mainline needs east of Whitney Way are expected to develop later (from about

2035 to 2040), while the needs west of Whitney Way are expected to develop by about 2030, if not earlier.

The Beltline PEL Study team recommends the West of Verona Road corridor from north of US 14/University Avenue to Whitney Way transition to a NEPA study in the mid- to late 2020s. In the Verona Road area, Verona Road Stages 1 and 2 were recently completed making improvements to the Verona Road interchange with the Beltline and US 151/Verona Road south of the Beltline. Within the Verona Road area and east of the Verona Road area, the Beltline Flex Lane was opened to traffic in July 2022 adding capacity during peak travel periods. The west portion of the Beltline is the only area that has not had recent significant improvements completed. Also, in general a larger share of the needs within the west portion of the Beltline are anticipated to occur before 2040.

b. Potential Interim Improvements West of Verona Road Area

(1) Pavement Replacement

WisDOT is beginning design for a pavement rehabilitation project from Terrace Avenue to Gammon Road. This routine maintenance project will not add capacity and will have minimal impacts. This improvement would address a known maintenance need as well as potential safety needs. Therefore, this improvement would have value on its own without the need for additional future improvements. It would also be planned and designed to not preclude or induce future reasonably foreseeable projects.

(2) Westbound (Northbound) Beltline Bridge over Wisconsin Southern Railroad (WSOR)

The westbound Beltline bridge over the WSOR railroad near Terrace Avenue will reach the end of its design life by 2038. WisDOT may elect to complete an interim bridge rehabilitation or replacement project to address this, depending on the ultimate timing of a larger future NEPA study of this portion of the Beltline. This improvement would address a known maintenance need as well as potential safety needs. Therefore, this improvement would have value on its own without the need for additional future improvements. It would also be planned and designed to not preclude or induce future reasonably foreseeable projects.

2. Verona Road Area

a. Timing of Future NEPA Analysis

This area has a number of operations needs anticipated to occur before 2030, as well as additional operations needs anticipated between 2030 and 2040. It is important to note that a staged alternative was recommended in the 2011 Verona Road FEIS/ROD. Stages 1 and 2 have already been constructed. The 2011 FEIS anticipated construction

of Stage 3 around 2030, but current traffic volumes for half of the movements at the interchange have already reached or exceeded those forecasted volumes.

- The Whitney Way interchange is a logical endpoint because the interchange needs and mainline needs east of Whitney Way are expected to develop between 2035 to 2040, while the needs west of Whitney Way are expected to develop before by 2030.
- The Todd Drive interchange area is a logical endpoint because the interchange and mainline needs east of Todd Drive are expected to develop between 2035 and 2040, or after, while the needs west of Todd Drive are expected to develop before 2030.

Using endpoints west and east of the Verona Road interchange is also logical because future growth in the Madison and the city of Verona areas to the southwest is anticipated to continue to drive operational needs on this portion of the Beltline to a larger degree than points farther west or east.

The Beltline PEL Study team recommends the Verona Road Area from Whitney Way to Todd Drive transition to a NEPA study in the mid- to late 2020s.

b. Potential Interim and Spot Improvements in the Verona Road Area

The following projects are identified as interim or spot improvements and are included as Components to be moved into a NEPA analysis in the Preferred Strategy Package. Based on traffic and crash data, they may need to be moved ahead of a NEPA study for this section of the corridor and analyzed as a complete project as defined by 23 CFR 771.111(f).

(1) Beltline Mainline Queue Warning System (QWS)

WisDOT may investigate a QWS on the westbound Beltline upstream of the westbound off-ramp to US 151/Verona Road southbound. Traffic growth has exceeded forecast volumes during peak periods for this movement and recurring congestion, slow moving traffic, and rolling queues that reach the Beltline occurs. A QWS may be a means to alert drivers to downstream congestion and slower moving traffic with the goal of reducing the risk of associated crashes. This improvement could help address a known congestion need, as well as potential safety needs. Therefore, this improvement would have value on its own without the need for additional future improvements; however, it is anticipated that this interim improvement would not fully address needs along the westbound Beltline. This interim improvement would be planned and designed to not preclude or induce future reasonably foreseeable projects.

(2) Verona Road Westbound Off-Ramp Queue Flush System

WisDOT may investigate a queue flush system for the westbound Beltline off-ramp to US 151/Verona Road. This system would add detection along the westbound

off-ramp that would be used to trigger a new signal timing plan at the interchange to clear out the westbound off-ramp queue. The eastbound off-ramp right turn would likely also need improvements as part of this interim improvement. These improvements could help address a known congestion need and potential safety needs and, therefore, have value on their own without the need for additional future improvements; however, it is anticipated that this interim improvement would not fully address needs at the Verona Road interchange. This interim improvement would be planned and designed to not preclude or induce future reasonably foreseeable projects.

(3) Beltline Eastbound On-Ramp Expansion at Verona Road

The eastbound on-ramp at the Verona Road interchange is anticipated to need two full lanes of capacity entering the eastbound Beltline by 2035. Backups are anticipated to extend into the Verona Road interchange if no improvements are made to the current merge area. WisDOT is considering a potential spot improvement for the eastbound direction of travel, which would allow for a two-lane merge. The spot improvement would convert the leftmost GP lane at Whitney Way to the Flex Lane. A lane shift would then occur near the Verona Road merge to allow for two lanes to enter the eastbound Beltline from Verona Road. With the conversion of the leftmost GP lane to the Flex Lane at Whitney Way, a third eastbound lane would still be provided for traffic when needed the most during weekday AM and PM peak periods. This improvement is similar to what was part of the original Flex Lane project. A majority of the median work and Intelligent Transportation Systems work needed for this concept was already constructed as part of the original Flex Lane project.

This improvement would address a known operations need as well as a potential safety need. Therefore, this improvement would have value on its own without the need for additional future improvements. It would also be planned and designed to not preclude or induce future reasonably foreseeable projects.

3. East of Verona Road Area

a. Timing of Future NEPA Analysis

The needs in this area are generally anticipated to develop after 2030, with many occurring after 2040. Some interim improvements may be needed in this area, discussed further in the next section.

- The Todd Drive interchange area is a logical endpoint because the interchange needs and mainline needs east of Todd Drive are expected to develop later from approximately 2035 to 2040, or after, while the needs west of Todd Drive are expected to develop by approximately 2025 to 2030.
- The I-39/90 interchange is a logical endpoint because traffic on the Beltline/US 12/18 drops from approximately 90,000 vpd west of the interchange to

about 18,000 east of the interchange. In addition, this section of US 12/18 has a completed freeway conversion plan. Several corridor needs for the section of the Beltline PEL Study corridor east of the I-39/90 interchange were recently addressed as part of a separate project that made improvements with access changes and constructed a new interchange at County AB. The remaining spot improvements identified in the US 12/18 freeway conversion plan should be considered when traffic or safety issues arise in the future.

The Beltline PEL Study team recommends the East of Verona Road corridor from Todd Drive to the I-39/90 interchange transition to a NEPA study in the 2030s. With the recent construction and positive results of the Beltline Flex Lane, corridor-wide, long-term improvements are not expected to be needed for several years. Initial crash analysis indicates the Beltline Flex Lane has generally improved safety compared to 2015 to 2019 conditions. A full assessment of the Beltline Flex Lane's safety performance will occur once 5 years of crash data is available. That said, the Beltline Flex Lane is expected to provide acceptable operations until approximately 2030 to 2035, so it is anticipated that NEPA could begin in that time frame.

b. Potential Interim and Spot Improvements East of Verona Road Area

The following projects are identified as interim or spot improvements and are included as Components to be moved into NEPA analysis in the Preferred Strategy Package. Based on traffic and crash data, they may need to be moved up ahead of a NEPA study for this section of the corridor and analyzed as a complete project as defined by 23 CFR 771.111(f).

(1) Beltline Mainline between Fish Hatchery Road and US 14/Park Street

The weaves between Fish Hatchery Road and US 14/Park Street are expected to reach mid-LOS E before 2030. WisDOT is considering potential spot weave improvements which could consist of basket-weaves or C-D roads. These improvements would address an anticipated operations and safety need and, therefore, have value on their own without the need for additional future improvements. They would also be planned and designed to not preclude or induce future reasonably foreseeable projects.

While the spot improvement considered in the westbound direction between Fish Hatchery Road and US 14/Park Street is not anticipated to contribute to the existing backups at the westbound Beltline exit ramp to Verona Road, the backups at this ramp are anticipated to limit the effectiveness of this potential Beltline spot improvement during weekday peak periods. Therefore, it may be preferred to implement the westbound spot improvement after the backups at the westbound Beltline exit ramp to Verona Road are alleviated.

(2) Beltline Mainline between US 51/Stoughton Road and Monona Drive

The eastbound and westbound weaves between US 51/Stoughton Road and Monona Drive are expected to reach mid-LOS E before 2030. WisDOT is considering a potential spot weave improvement for each direction of travel which could consist of a basket-weave. This improvement would address a known operations need as well as a potential safety need. Therefore, this improvement would have value on its own without the need for additional future improvements. It would also be planned and designed to not preclude or induce future reasonably foreseeable projects.

(3) Beltline Interchange with I-39/90

The eastbound to northbound and southbound to westbound system ramps at the Beltline interchange with I-39/90 are anticipated to reach mid-LOS E between 2030 and 2035. WisDOT may consider spot improvements to these two ramps. It is anticipated these improvements would consist of adding a third lane to the existing two-lane system ramps. These improvements would address an anticipated operations need and potential safety need and, therefore, they have value on their own without the need for additional future improvements. They would also be compatible with the *Interstate 39/90/94 Corridor, US 12/18 to US 12/WIS 16 (Madison to Wisconsin Dells) Final Environmental Impact Statement and Record of Decision and Final Section 4(f) Evaluation (2024)* in this area and, therefore, would not preclude or induce this reasonably foreseeable future project.

(4) Beltline Mainline between Stoughton Road and I-39/90

The eastbound Beltline Flex Lane ends downstream of the Stoughton Road eastbound on-ramp. This area sees recurring congestion due to the Beltline Flex Lane drop and multiple streams of weaving traffic. Over the first year of Flex Lane operations, crash rates have increased in this area of the corridor for the eastbound direction of travel. To assess overall performance, WisDOT relies on multiple years of crash data before developing alternatives for safety improvements; however, the preliminary results indicate a safety need in this area of the Beltline. WisDOT is considering an interim improvement project that would extend the eastbound Beltline Flex Lane to the Beltline interchange with I-39/90. This improvement would help address known operations needs as well as a potential safety need. Therefore, this improvement would have value on its own ahead of additional future improvements. It is considered an interim improvement because it would not be compatible with the Beltline interchange with I-39/90 system ramp spot improvements already described.

D. Summary of NEPA Sections and Timing

The Beltline PEL Study recommends the following sections and timing for future NEPA studies along the Beltline corridor.

1. West of Verona Road area from US 14/University Avenue to Whitney Way beginning in the mid to late 2020s–These limits would be revisited in a pre-NEPA phase and it is possible this section would be studied concurrently with the Verona Road area section. It is also anticipated that the west/north limits may extend to north of Parmenter Street based on the anticipated limits of the Mainline Components/range of alternatives.

2. Verona Road area from Whitney Way to Todd Drive beginning in the mid to late 2020s–These limits would be revisited in a pre-NEPA phase and it is possible this section would be studied concurrently with the West of Verona Road area section.

3. East of Verona Road area from Todd Drive to I-39/90 beginning in the 2030s.