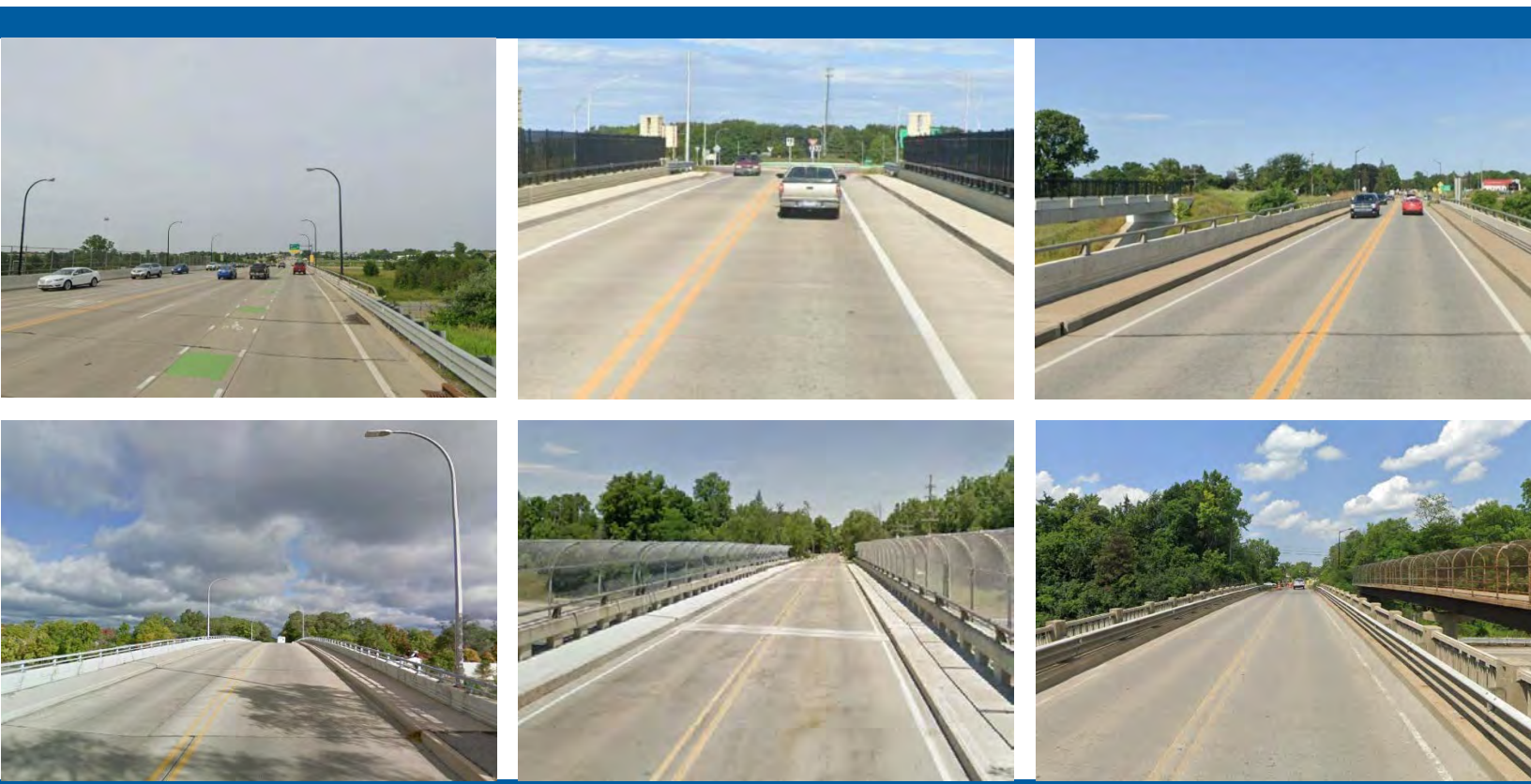


# FREEWAY CROSSING NON-MOTORIZED RETROFIT



FOR WASHTENAW AREA TRANSPORTATION STUDY

Final Report: June 30, 2020  
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- Appendix A – Existing Characteristics Log
- Appendix B – Conceptual Plans for Treatments
- Appendix C – Non-Motorized Facilities Recommendations Log
- Appendix D – Conceptual Plans for Recommendations

## SECTION 1.0 — EXECUTIVE SUMMARY

### 1.1 INTRODUCTION

Many of the freeway crossings have either substandard or do not have any non-motorized accommodations and have decades of service life remaining. To address these needs, the Washtenaw Area Transportation Study (WATS) selected Hubbell, Roth & Clark, Inc. (HRC) to identify various treatments to improve non-motorized travel and safety at each crossing. An inventory, outlining existing characteristics, and a basic cost estimate for possible treatments, was developed. The study includes 53 different federal-aid road freeway crossings over US-23, I-94, and M-14.

The focus of this study was to develop short-term and intermediate treatment on crossings, such as pavement markings, signage, and separation barriers, that will provide safer access for non-motorized travelers. The clear roadway width at each crossing was reviewed to determine the feasibility of each treatment. Long-term treatments that involve reconstructing or widening the bridge, such as adding a shared path with a separation barrier, were identified for when a bridge approaches the end of its service life. The highest priority was given to finding non-motorized improvements at crossings with adjacent pedestrian facilities and having four lanes or greater.

### 1.2 BEST PRACTICES AND STANDARDS

Guidance on non-motorized facilities was reviewed from the Federal Highway Administration (FHWA), American Association of State Highway and Transportation Officials (AASHTO), and the National Association of City Transportation Officials (NACTO). State-of-the-art design practices for pedestrian and bicycle facilities, such as bike lanes, shared lanes, bicycle signage, and shared paths were taken into account from various manuals and guides from the FHWA, AASHTO, and NACTO. Other design standards from the Michigan Department of Transportation (MDOT) related to bridges, curved fencing, overhead lighting, separation barriers, and pavement markings were also reviewed. This document has considered all the best design practices and standards when developing the non-motorized improvements at each crossing. This document focuses on non-motorized improvements feasible to a crossing and may not necessarily exhaust every variation of a bike lane or shared path.

### 1.3 EXISTING CHARACTERISTICS

Existing characteristics were obtained for each crossing from site visits and using the MDOT Bridge Conditions site and Google Earth. These characteristics include adjacent on and off-ramps, adjacent free-flow lanes, clear roadway width (restrictive distance between curbs or barriers on the roadway), length, average daily traffic (ADT), number of lanes, speed limit, and bridge condition. A complete inventory log, including other characteristics, such as road classification, X-Y coordinates, structure number, area, year built, structure type, and operational status, is provided in **Appendix A**.

## 1.4 IMPLEMENTATION PLAN

The main objective of this project was to develop non-motorized improvements to be applied to various types of freeway crossings. The following tasks were created and used to develop an implementation plan to identify non-motorized improvements and their feasibility for each crossing:

1. Develop Short-Term Treatments
2. Develop Intermediate Treatments
3. Develop Long-Term Treatments
4. Determine Interchange Treatments
5. Estimate Improvement Costs
6. Recommend Treatments

The Implementation Plan provides a method on how to meet the project's objective. Conceptual plans showing the improvements for each short-term, intermediate, and long-term treatment, along with the interchange treatments, are provided in **Appendix B**.

### Develop Short Term Treatments

Short-term treatments are low-level cost improvements to add or improve non-motorized facilities by installing signage or pavement markings only. Bridge conditions with a rating between 5 to 7 are typical candidates for preventative maintenance. The following short-term treatments could be coordinated during that time:

- **Bike Lane:** Designates a portion of the roadway for preferential use by bicyclists with a BIKE LANE sign (R3-17) and a bicycle lane symbol marking with an arrow. Best practices indicate it is desirable to have bike lane widths of five or six feet. The bike lanes recommended in this study are 6 feet wide on each side unless otherwise noted, so at least 12 feet must be available to add bike lanes to a crossing. If the bike lanes are adjacent to a guardrail or other physical barrier, an additional width of four feet is required to account for the two-foot shy on both sides. A buffered bike lane could also be considered if space is available. **Figure ES-1** shows a plan view of an existing crossing with a bike lane on each side.
- **Shared Lane:** Provides a travel way that is open to bicyclists and motorists with a shared lane marking (sharrow). The crossing does not have adequate width available to add bike lanes after subtracting the travel way from the clear roadway width and has a speed limit of 35 miles per hour or less. **Figure ES-2** shows a plan view of an existing crossing with a shared lane on each side.
- **Bicycle Warning:** Warns motorists to watch for bicyclists traveling along the roadway with a Bicycle Warning sign (W11-1) and SHARE THE ROAD plaque (W16-1P). The crossing does not have adequate width available to add bike lanes after subtracting the travel way from the clear roadway width and has a speed limit of 40 miles per hour or more. **Figure ES-3** shows a plan view of an existing crossing with a bicycle warning on each side.



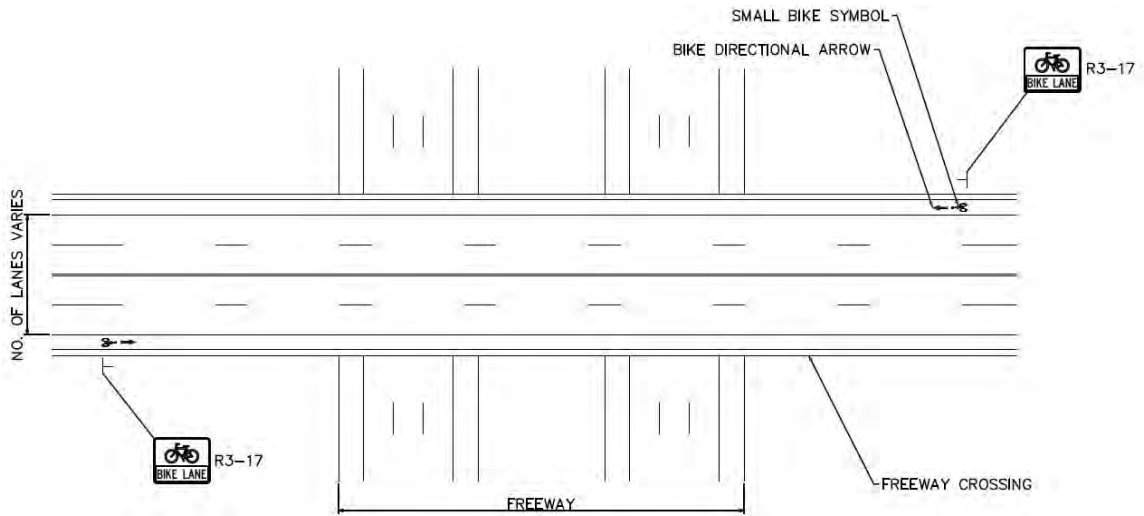


Figure ES-1: Plan View of Bike Lane Added to Existing Crossing

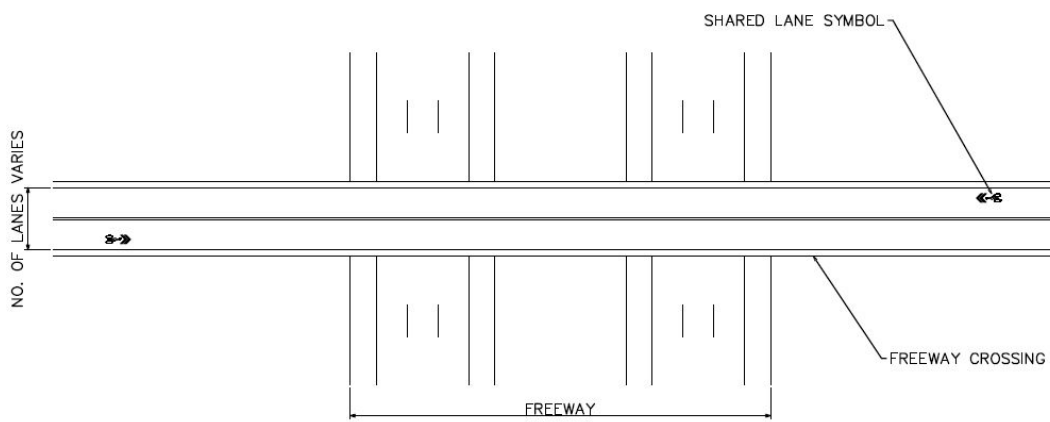


Figure ES-2: Plan View of Shared Lane Added to Existing Crossing

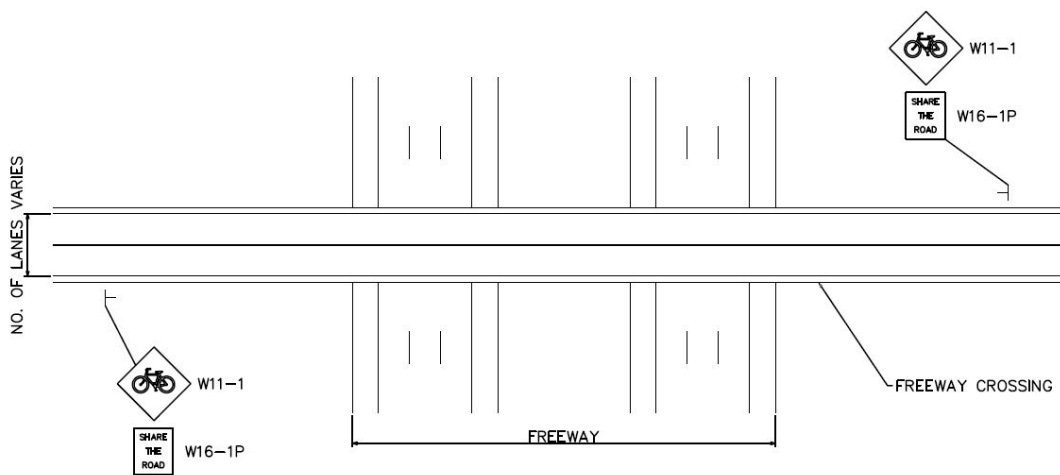


Figure ES-3: Plan View of Bicycle Warning Added to Existing Crossing

## Develop Intermediate Treatments

Intermediate treatments are mid-level cost improvements to add or improve non-motorized facilities that require some rehabilitation or minor construction. Bridge conditions with a rating of 4 or less are typical candidates for rehabilitation or reconstruction. The following intermediate treatments could be coordinated during that time and, in most cases, combined with each other or added with the short-term treatments:

- **Walkway Lighting:** Increases visibility of non-motorized users at nighttime. **Figure ES-4** shows a typical section of an existing crossing with surface mounted walkway lighting on each side.
- **Curved Fencing:** Limits the exposure of non-motorized traffic to the freeway. **Figure ES-5** shows a typical section of an existing crossing with curved fencing on each side.
- **Separation Barrier:** Protects non-motorized users from motorists. **Figure ES-6** shows a typical section of an existing crossing with a two-foot wide separation barrier on each side.

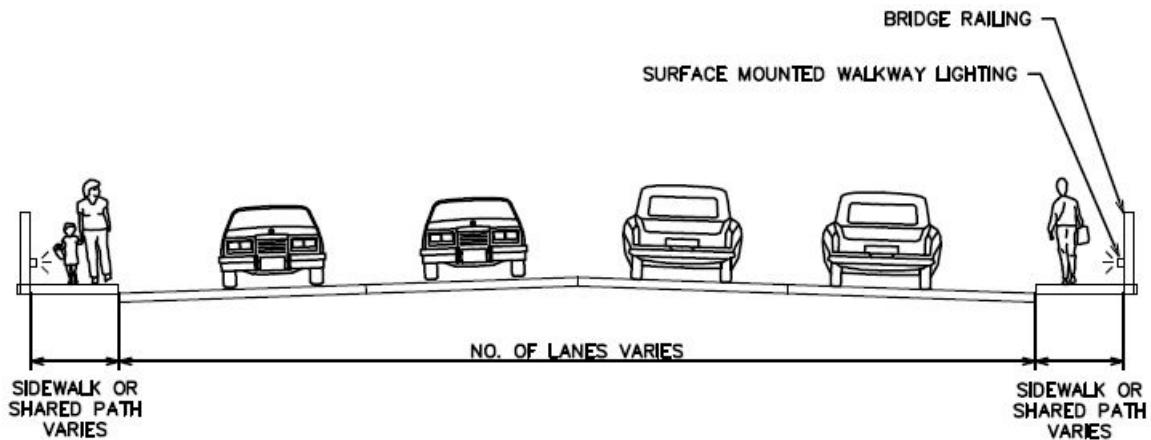


Figure ES-4: Typical Section of Walkway Lighting Added to Existing Crossing

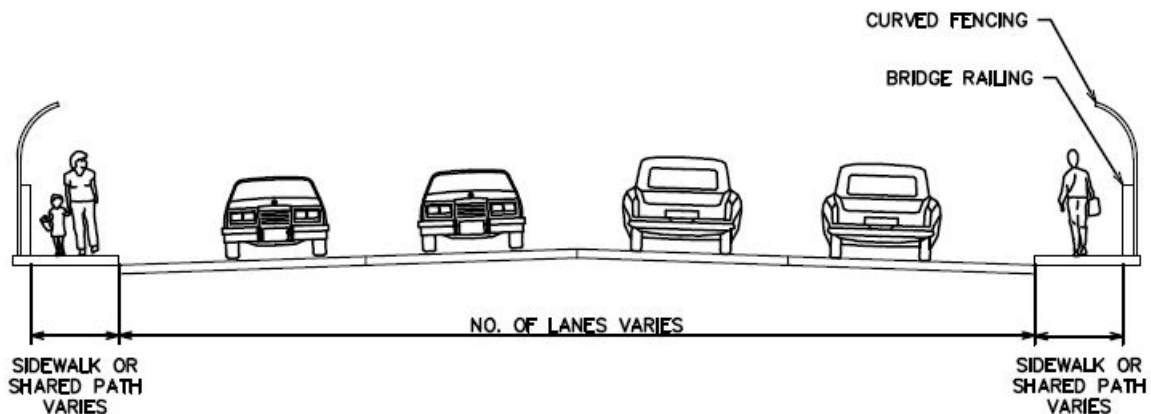


Figure ES-5: Typical Section of Curved Fencing Added to Existing Crossing

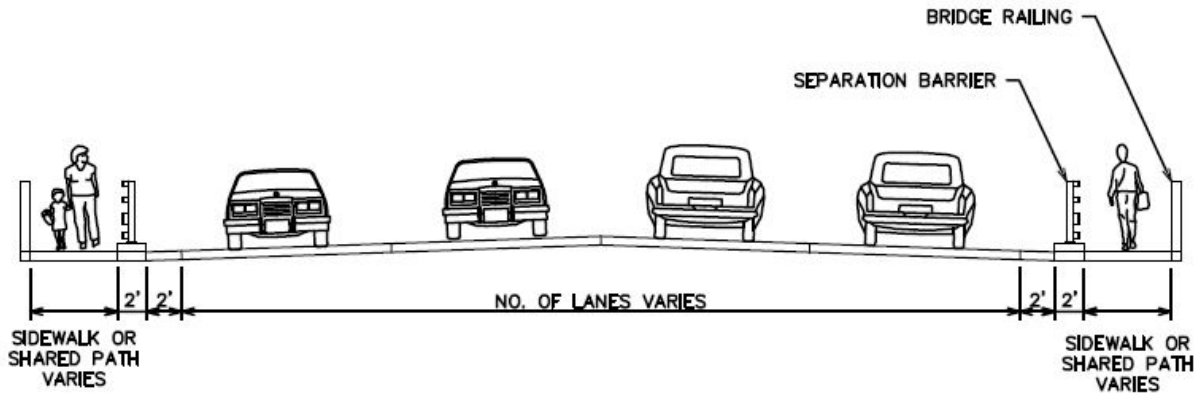
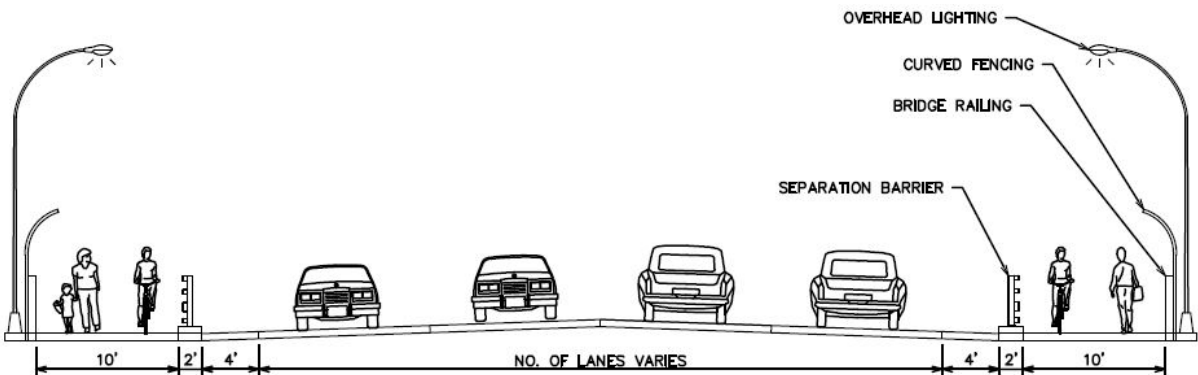


Figure ES-6: Typical Section of Separation Barrier Added to Existing Crossing

### Develop Long-Term Treatments

Long-term treatments are high-level cost improvements to add or improve non-motorized facilities that involve a total reconstruction of the entire crossing. Bridge conditions with a rating of 4 or less are typical candidates for rehabilitation or reconstruction. The following long-term treatment could be coordinated during that time:

- Shared Path with Separation Barrier, Curved Fencing, and Lighting:** Provides access and separation, limits freeway exposure, and increases nighttime visibility for non-motorized users. Figure ES-7 shows a typical section of a crossing with a 10-foot wide shared path, 2-foot wide separation barrier, curved fencing, and overhead lighting.



Source: Adapted from MDOT Bridge Design Guides Section 6.05.02

Figure ES-7: Typical Section of Shared Path with Separation Barrier, Curved Fencing, and Lighting

### Determine Interchange Treatments

When adding non-motorized improvements to a crossing, consideration must be given to any impacts in advance of the structure, including freeway ramps and interchanges. Freeway ramps cause problems for bike lanes, sidewalks, and shared paths because they create conflict points for all road users. Freeway ramps with a free-flow merging or diverging lane (slip lane) are specifically challenging because they prioritize vehicle speed and do not require the vehicle to stop. Freeway ramps also typically contain heavy vehicle traffic that makes it difficult for non-motorized users to navigate. Section 5.4 provides detail on how to address some of these common issues.

## Estimate Improvement Costs

Available funding is a primary factor when selecting whether a short-term, intermediate, or long-term treatment should be applied to a crossing. To assist programming future projects, a conceptual cost estimate was developed for each non-motorized improvement. Weighted cost averages from 2020 were used to develop the conceptual cost estimates and a proper inflation rate may need to be applied to adjust for projects further out. The project cost could also vary based on the complexity of the bridge geometry and freeway crossing, the variability of the construction market, and other factors not included in the scope of this report. Section 5.5 provides detail on either a total cost or unit cost per linear foot of bridge for each improvement.

## 1.5 RECOMMENDED TREATMENTS

Specific non-motorized improvements from short-term, intermediate, and long-term treatments were recommended for each crossing. These improvements were developed based on existing characteristics. The available roadway width was the primary characteristic used to determine the feasibility of each improvement. Other characteristics, such as traffic volume, speed limit, and bridge condition were also considered. Special consideration was also given to non-motorized facilities in advance of each crossing to allow for a future tie-in.

Existing non-motorized facilities at each crossing were examined as well. Since not all improvements are applicable to each crossing, the following six categories, based on the number of lanes and width, were created to help determine the non-motorized needs for each crossing:

- Four Lanes or More with Width Available
- Four Lanes with Width Constrained
- Three Lanes with Width Available
- Three Lanes with Width Constrained
- Two Lanes with Width Available
- Two Lanes with Width Constrained

“Width Available” means there is enough lateral space to add a pedestrian or bicycle facility without reconstructing the bridge, while “Width Constrained” means there is not any width available. Section 6.0 provides recommended treatments, conceptual cost estimates, and other considerations specific to each crossing. A complete log listing the category, non-motorized facilities, and recommendations for each crossing is provided in **Appendix C** and a complete set of conceptual drawings is provided in **Appendix D**.

## 1.6 CONCLUSION

The findings from this study indicate 22 out of 53 crossings have a sidewalk and/or bike lane or shared path, while 31 crossings do not have any non-motorized crossing treatment. Nearly all the freeway crossings evaluated have recommendations for short-term or intermediate treatment to help improve non-motorized access. These improvements included adding a bike or shared lane, walkway lighting, curved fencing, and/or a separation barrier separating non-motorized users from motorists. These improvements are particularly applicable for crossings having a good to fair bridge condition rating and will not be reconstructed in the near future.

If a crossing is at the end of its service life and reconstruction is required, long-term treatment should be considered. Long-term treatment would be a shared path with a separation barrier, curved fencing, and overhead lighting. This improvement requires a large available roadway width, but it is assumed the entire bridge will be reconstructed or widened, and no limitations on clear roadway width would be in place. This improvement is considered one of the best non-motorized facilities and accommodates all road users.

Proper planning of a crossing should be inclusive of all road users and have a Complete Streets mentality. All modes of transportation, including walking and biking, should be integrated into the planning, design, construction, maintenance, and operation of each crossing. The main objective of this project was achieved by providing non-motorized improvements that can be applied to various types of crossings. Not only do these improvements increase safety, but they should encourage more non-motorized users to use the roadway and increase pedestrian and bike travel. When preventative maintenance, rehabilitation, or reconstruction is scheduled for a crossing, it is recommended to review the non-motorized needs of the community and implement a desirable treatment to improve non-motorized travel and safety.

## SECTION 2.0 — INTRODUCTION

Non-motorized transportation is increasing with the number of people walking and biking in Washtenaw County. Residents and visitors continue to seek safe non-motorized travel options for both work and recreational activities. One of the main barriers to connectivity throughout the county has been the lack of non-motorized facilities over freeway crossings. Many of the freeway crossings have either substandard or do not have any non-motorized accommodations and have decades of service life remaining. These crossings are prime candidates to receive short-term or intermediate retrofitting treatment to help improve non-motorized access.

To address these needs, the Washtenaw Area Transportation Study (WATS) selected Hubbell, Roth & Clark, Inc. (HRC) to identify various treatments to improve non-motorized travel and safety at each crossing. An inventory, outlining existing characteristics, and a basic cost estimate for possible treatments, was developed. The study includes 53 different federal-aid road freeway crossings along US-23, I-94, and M-14. The number of lanes crossing each freeway range from two lanes up to six lanes. **Figure 1** shows the freeway crossings included in the study area.

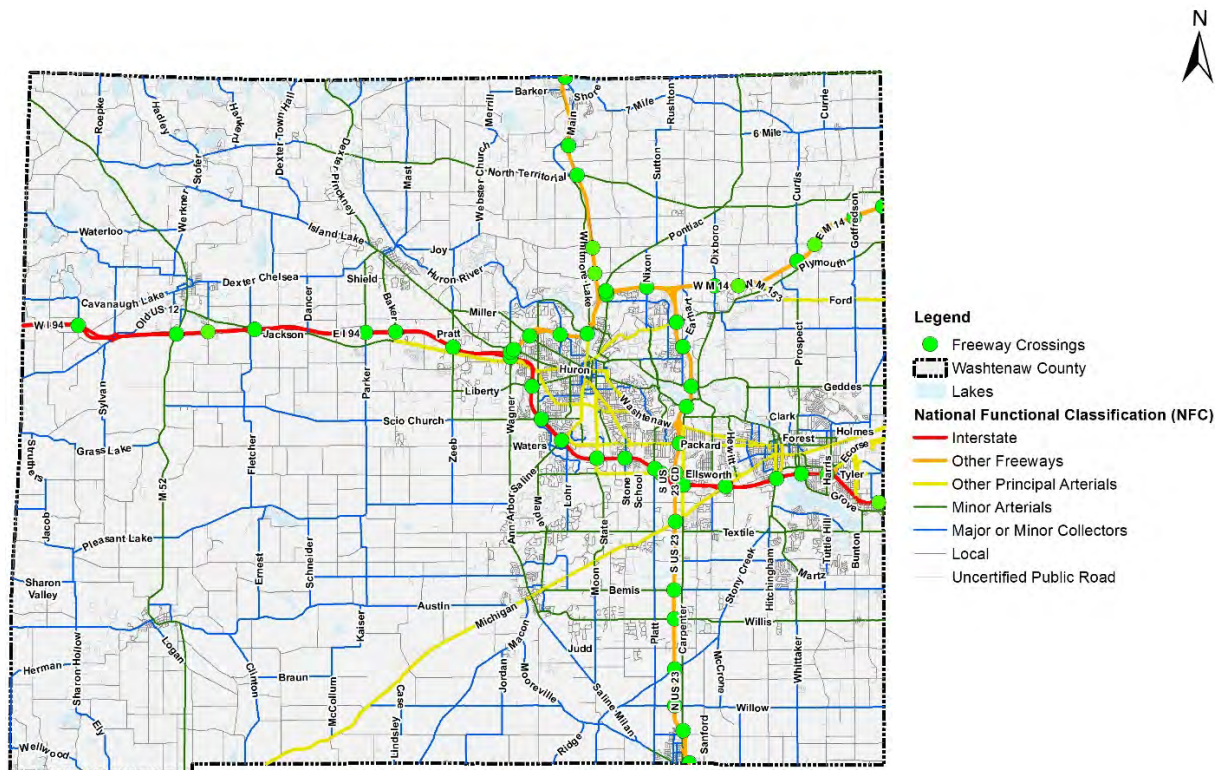


Figure 1: Freeway Crossings Included in Study Area

The focus of this study was to develop short-term and intermediate treatment on crossings, such as pavement markings, signage, and separation barriers, that will provide safer access for non-motorized travelers. The clear roadway width at each crossing was reviewed to determine the feasibility of each treatment. Long-term treatments that involve reconstructing or widening the bridge, such as adding a shared path with a separation barrier, were identified for when a bridge approaches the end of its service life. The highest priority was given to finding non-motorized improvements at crossings with adjacent pedestrian facilities and having four lanes or greater.

## SECTION 3.0 — BEST PRACTICES AND STANDARDS

Guidance on non-motorized facilities was reviewed from the Federal Highway Administration (FHWA), American Association of State Highway and Transportation Officials (AASHTO), and the National Association of City Transportation Officials (NACTO). State-of-the-art design practices for pedestrian and bicycle facilities, such as bike lanes, shared lanes, bicycle signage, and shared paths were taken from the following manuals and guides:

- 2011 Michigan Manual on Uniform Traffic Control Devices (MMUTCD)
- AASHTO 2012 Fourth Edition Guide for the Development of Bicycle Facilities
- NACTO Second Edition Urban Bikeway Design Guide
- Michigan Department of Transportation (MDOT) Best Design Practices for Walking and Bicycling

Design practices indicated in the MMUTCD were given the highest priority since it is a state document and adopts federal practices from the MUTCD. It is also pursuant to the provisions contained in Section 257.608 of the Michigan Vehicle Code. Guidance from AASHTO and NACTO were used in conjunction with the MMUTCD.

Section 5.2.1 of AASHTO's Guide to Bicycle Facilities indicates the typical width of a shared path ranges from 10 to 14 feet. For a shared path to be added on both sides of a crossing, there needs to be at least 28 feet of width available outside of the travel way to account for the path and shy widths. If pedestrian and bicycle traffic is low, such as in a rural area, a reduced shared path width of eight feet may be used.

When considering bike lanes, Section 4.6.4 of AASHTO's Guide to Bicycle Facilities indicates the recommended width for bike lanes is five feet, whereas NACTO's Urban Bikeway Design Guide indicates six feet is desirable. Bike lanes should be clearly marked with a BIKE LANE (R3-17) sign and bicycle lane markings as indicated in Sections 9B.04 and 9C.04 of the MMUTCD. If there is not enough available width to add a bike lane, Section 9C.07 of the MMUTCD indicates a shared lane marking may be used for roadways with a speed limit of 35 miles per hour or less. For roadways with speed limits above 35 miles per hour, Section 9B.19 of the MMUTCD indicates a Bicycle Warning (W11-1) sign and SHARE THE ROAD (W16-1P) plaque may be used.

Other design standards from MDOT related to bridges, curved fencing, overhead lighting, separation barriers, and pavement markings were also reviewed using the following references:

- MDOT Bridge Design Guides
- MDOT Bridge Standard Plans
- MDOT Bridge Design Manual dated 12/16/19
- MDOT Pavement Marking Standards

Section 6.05.02 (12/16/19) of the MDOT Bridge Design Guides shows bridge cross-sections with pedestrian facilities. The MDOT Bridge Standard Plans shows details for bridge railing and fencing. Section 7.02.31 of the MDOT Bridge Design Manual indicates clear roadway widths for deck replacements. PAVE-961-B (1/14/14) and PAVE-962-A (1/22/17) of the MDOT Pavement Marking Standards show details for shared lane markings and bike lane markings, respectively.

This document has considered all the best design practices and standards when developing the non-motorized improvements at each crossing. This document focuses on non-motorized improvements feasible to a crossing and may not necessarily exhaust every variation of a bike lane or shared path.

## SECTION 4.0 — EXISTING CHARACTERISTICS

Existing characteristics were obtained for each crossing from site visits and using the MDOT Bridge Conditions site (<http://featuredmaps-mdot.opendata.arcgis.com/app/michigan-bridge-conditions>) and Google Earth. **Table 1** shows the characteristics that were collected to develop a feasible treatment. These characteristics include adjacent on and off-ramps, adjacent free-flow lanes, clear roadway width (restrictive distance between curbs or barriers on the roadway), length, average daily traffic (ADT), number of lanes, speed limit, and bridge condition rating (10-point scale with 10 indicating excellent condition and 1 indicating poor). A complete log, including other characteristics, such as road classification, X-Y coordinates, structure number, area, year built, structure type, and operational status, is provided in **Appendix A**.

Table 1: Existing Characteristics

Name	Adjacent Ramps	Adjacent Free-Flow Lane	Clear Road Width (Feet)	Length (Feet)	ADT	Lanes	Speed Limit (MPH)	Rating
Ann Arbor-Saline Rd & I-94	Yes	Yes	79.3	247.9	23,043	6	45	6
Baker Rd & I-94	Yes	No	80	297.0	12,582	5	40	6
Bemis Rd & US-23	No	-	28	230.2	150	2	55	5
Carpenter Rd & I-94	No	-	64	289.5	14,290	5	45	6
Carpenter Rd & US-23	Yes	Yes	41	373.3	8,291	3	30	5
Curtis Rd & M-14	No	-	42	343.9	2,328	2	45	6
Dexter Rd/Dexter-Ann Arbor Rd & M-14	No	-	29.9	362.0	5,700	2	35	5
Dixboro Rd & M-14	No	-	28	304.4	5,047	2	45	6
Earhart Rd & US-23	No	-	26.8	365.4	2,226	2	35	5
Eight Mile Rd & US-23	Yes	Roundabout	34	244.2	7,650	2	25	6
Ellsworth Rd & I-94	No	-	64	599.3	14,670	4	45	6
Ellsworth Rd & US-23	No	-	61	304.6	11,652	4	45	6
Freer Rd & I-94	No	-	28.5	240.5	150	2	55	6
Geddes Rd & US-23	Yes	Roundabout	28	319.4	14,424	2	40	5
Gotfredson Rd & M-14	Yes	No	41.7	307.6	5,244	2	55	6
Grove St & I-94	No	-	52	453.3	6,486	3	25	5
Harris Rd & I-94	No	-	33.8	534.8	5,500	2	35	6
Huron River Dr & M-14 (Underpass)	-	-	-	-	1,241	2	35	-
Huron River Dr & US-23 (Underpass)	-	-	-	-	6,215	2	35	-
Huron St/Hamilton St & I-94	Yes	Yes	71.5	294.7	31,936	5	45	5
Joy Rd & M-14	No	-	36.5	358.6	220	2	55	6



Table 1: Existing Characteristics (cont.)

Name	Adjacent Ramps	Adjacent Free-Flow Lane	Clear Road Width (Feet)	Length (Feet)	ADT	Lanes	Speed Limit (MPH)	Rating
Joy Rd & US-23	No	-	27.1	209.7	5,682	2	55	5
Kalmbach Rd & I-94	Yes	No	28.5	272.6	1,349	2	55	4
Liberty Rd & I-94	No	-	27.9	226.0	10,376	2	35	5
Main St/Chelsea Manchester Rd & I-94	Yes	No	56.8	250.0	6,756	3	45	5
Milan Oakville Rd/County St & US-23	No	-	27.9	174.8	881	2	40	6
Miller Rd & M-14	Yes	No	28.5	325.1	8,611	2	50	4
Napier Rd & M-14	No	-	44.3	329.6	1,645	2	55	6
Newport Rd & M-14	No	-	26	314.6	1,624	2	25	6
Nixon Rd & US-23	No	-	29.5	233.5	775	2	30	6
North Territorial Rd & US-23	Yes	Roundabout	44	189.9	9,666	2	50	7
Old US-12/Jackson Rd & I-94	Yes	No	29.2	267.4	9,461	2	45	5
Packard St & US-23 (Underpass)	-	-	-	-	21,007	4	40	-
Parker Rd & I-94	No	-	29.2	283.4	2,534	2	55	5
Platt Rd & I-94	No	-	64	315.6	14,700	5	35	6
Plymouth Rd & US-23	Yes	No	52.3	348.5	10,000	4	45	6
Pontiac Tr & EB US-23/M-14	No	-	31.8	195.8	2,300	2	45	4
Pontiac Tr & WB US-23/M-14	No	-	31.8	149.6	2,300	2	45	5
Rawsonville Rd & I-94	Yes	No	69.9	312.8	23,491	4	40	5
Scio Church Rd & I-94	No	-	28.2	293.0	11,472	2	35	5
Six Mile Rd & US-23	Yes	No	34	275.0	5,625	2	35	7
State St & I-94	Yes	Yes	117.8	232.0	30,883	6	35	6
Stone School Rd & I-94	No	-	25.9	208.3	350	2	35	5
Stony Creek Rd & US-23	No	-	30.5	263.6	3,115	2	55	4
US-12 & I-94	Yes	Yes	91.9	434.7	20,815	6	45	5
US-12 & US-23	Yes	No	34.5	288.0	26,231	2	45	6
Vorhies Rd & M-14	No	-	25.9	316.9	250	2	45	5
Wagner Rd & I-94	No	-	29.2	196.3	12,183	2	45	6
Wagner Rd & M-14	No	-	25.9	375.8	12,183	2	45	5
Warren Rd & US-23	No	-	27.1	210.6	100	2	55	5
Willis Rd & US-23	Yes	Yes	33.1	265.0	5,627	2	45	4
Willow Rd & US-23	No	-	28	232.4	2,220	2	55	6
Zeeb Rd & I-94	Yes	No	76.4	346.9	18,625	5	45	5

## SECTION 5.0 — IMPLEMENTATION PLAN

The main objective of this project was to develop non-motorized improvements to be applied to various types of freeway crossings. The following tasks were created and used to develop an implementation plan to identify non-motorized improvements and their feasibility for each crossing:

1. Develop Short-Term Treatments
2. Develop Intermediate Treatments
3. Develop Long-Term Treatments
4. Determine Interchange Treatments
5. Estimate Costs
6. Recommend Treatments

The Implementation Plan provides a method on how to meet the project's objective. The following subsections detail each task. Conceptual plans showing the improvements for each short-term, intermediate, and long-term treatment, along with the interchange treatments, are provided in **Appendix B**.

### 5.1 DEVELOP SHORT-TERM TREATMENTS

Short-term treatments are low-level cost improvements to add or improve non-motorized facilities by installing signage or pavement markings only. These are generally easy to implement from a design standpoint and do not involve any rehabilitation or reconstruction of the bridge or curbs. Bridge conditions with a rating between 5 to 7 are typical candidates for preventative maintenance. The following short-term treatments could be coordinated during that time:

- **Bike Lane:** Designates a portion of the roadway for preferential use by bicyclists with a BIKE LANE sign (R3-17) and a bicycle lane symbol marking with an arrow. Best practices indicate it is desirable to have bike lane widths of five or six feet. The bike lanes recommended in this study are 6 feet wide on each side unless otherwise noted, so at least 12 feet must be available to add bike lanes to a crossing. If the bike lanes are adjacent to a guardrail or other physical barrier, an additional width of four feet is required to account for the two-foot shy on both sides. A buffered bike lane could also be considered if space is available. **Figure 2** shows a plan view of an existing crossing with a bike lane on each side.
- **Shared Lane:** Provides a travel way that is open to bicyclists and motorists with a shared lane marking (sharrow). The crossing does not have adequate width available to add bike lanes after subtracting the travel way from the clear roadway width and has a speed limit of 35 miles per hour or less. **Figure 3** shows a plan view of an existing crossing with a shared lane on each side.
- **Bicycle Warning:** Warns motorists to watch for bicyclists traveling along the roadway with a Bicycle Warning sign (W11-1) and SHARE THE ROAD plaque (W16-1P). The crossing does not have adequate width available to add bike lanes after subtracting the travel way from the clear roadway width and has a speed limit of 40 miles per hour or more. **Figure 4** shows a plan view of an existing crossing with a bicycle warning on each side.

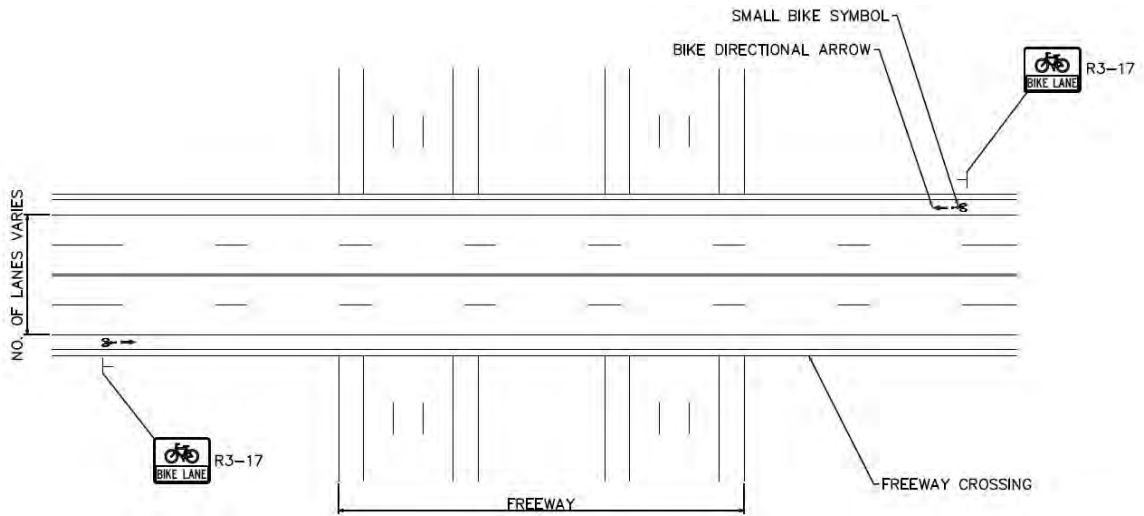


Figure 2: Plan View of Bike Lane Added to Existing Crossing

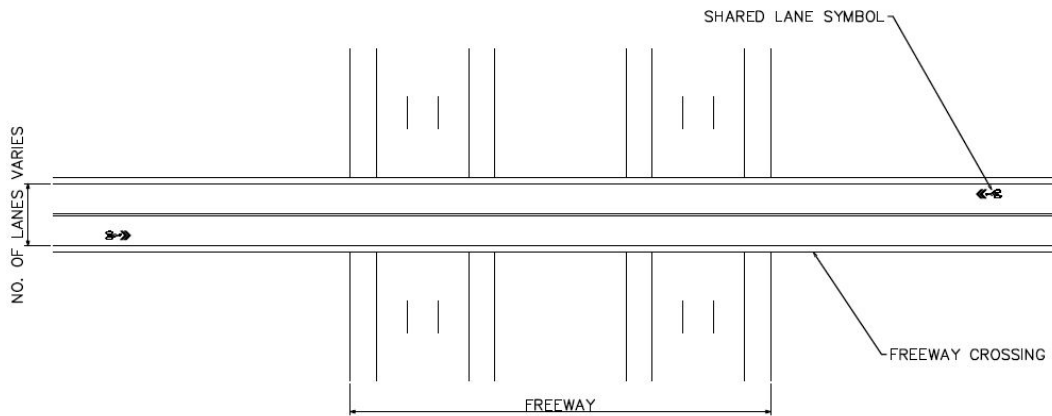


Figure 3: Plan View of Shared Lane Added to Existing Crossing

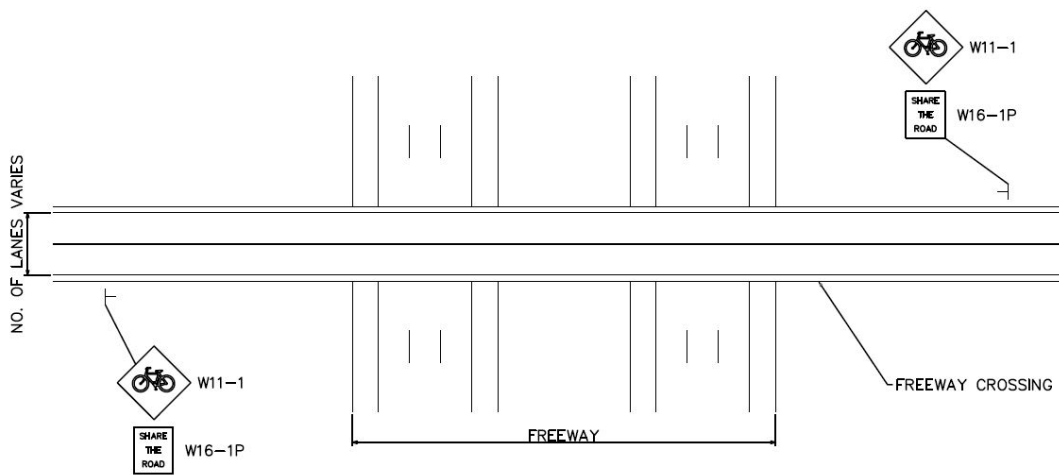


Figure 4: Plan View of Bicycle Warning Added to Existing Crossing

## 5.2 DEVELOP INTERMEDIATE TREATMENTS

Intermediate treatments are mid-level cost improvements to add or improve non-motorized facilities that require some rehabilitation or minor construction. These are generally a little more complex from a design standpoint and could include modification to the bridge railing, but they do not involve any widening of the bridge. A structural analysis would be required for any modifications to the deck or structure. Bridge conditions with a rating of 4 or less are typical candidates for rehabilitation or reconstruction. The following intermediate treatments could be coordinated during that time and, in most cases, combined with each other or added with the short-term treatments:

- **Walkway Lighting:** Increases visibility of non-motorized users at nighttime. **Figure 5** shows a typical section of an existing crossing with surface mounted walkway lighting on each side.
- **Curved Fencing:** Limits the exposure of non-motorized traffic to the freeway. **Figure 6** shows a typical section of an existing crossing with curved fencing on each side.
- **Separation Barrier:** Protects non-motorized users from motorists. **Figure 7** shows a typical section of an existing crossing with a two-foot wide separation barrier on each side.

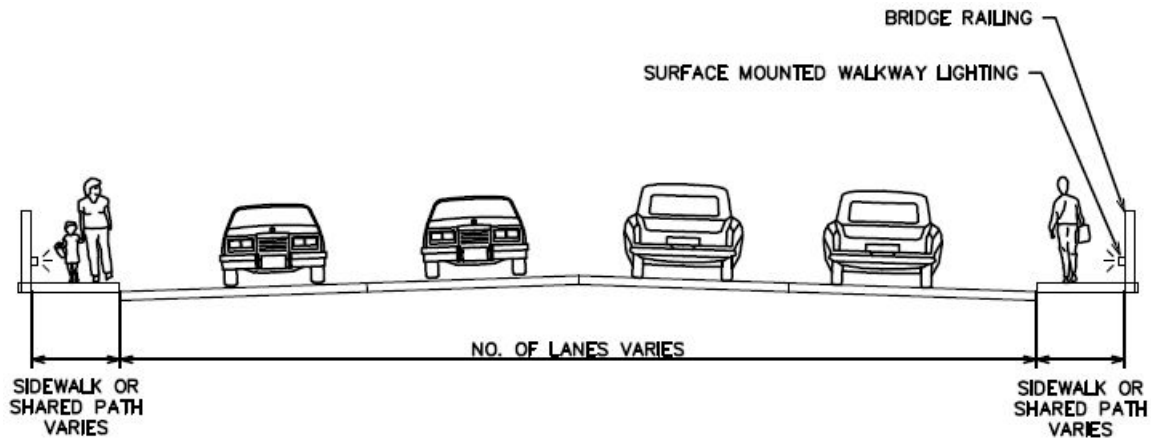


Figure 5: Typical Section of Walkway Lighting Added to Existing Crossing

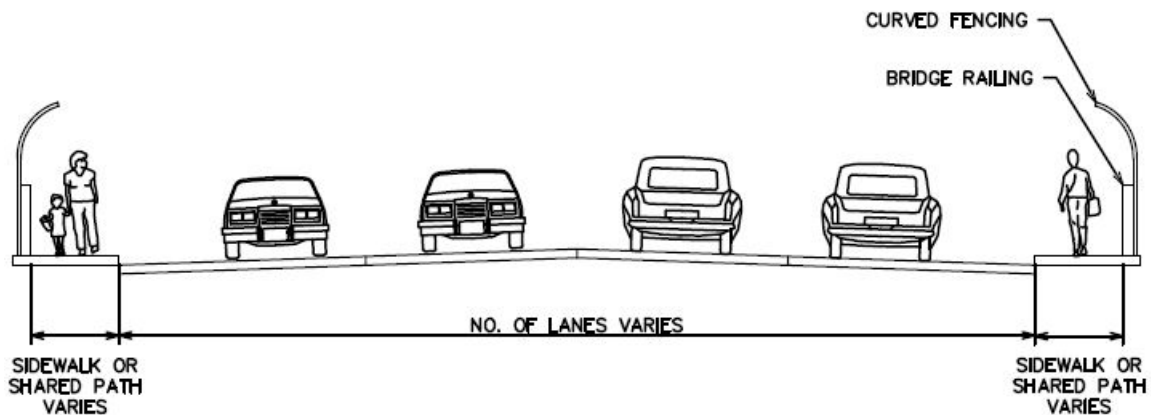


Figure 6: Typical Section of Curved Fencing Added to Existing Crossing

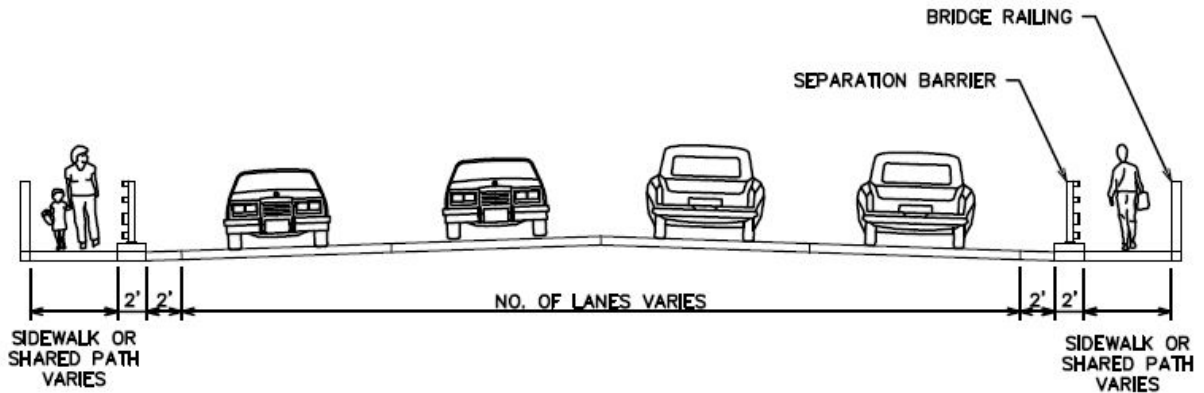
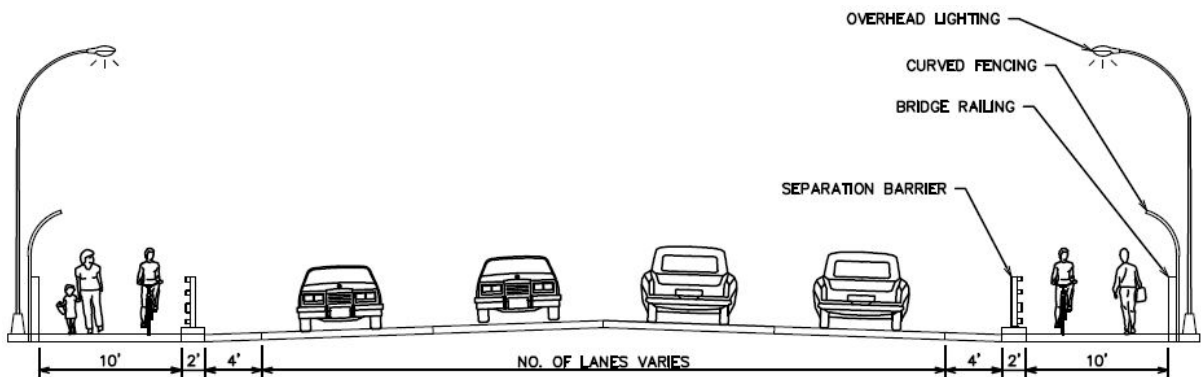


Figure 7: Typical Section of Separation Barrier Added to Existing Crossing

### 5.3 DEVELOP LONG-TERM TREATMENTS

Long-term treatments are high-level cost improvements to add or improve non-motorized facilities that involve a total reconstruction of the entire crossing. These are generally very complex from a design standpoint and it is assumed the bridge will be reconstructed or widened. It is also assumed there are no limitations on clear roadway width in place. Bridge conditions with a rating of 4 or less are typical candidates for rehabilitation or reconstruction. The following long-term treatment could be coordinated during that time:

- Shared Path with Separation Barrier, Curved Fencing, and Lighting:** Provides access and separation, limits freeway exposure, and increases nighttime visibility for non-motorized users. **Figure 8** shows a typical section of a crossing with a 10-foot wide shared path, 2-foot wide separation barrier, curved fencing, and overhead lighting.



Source: Adapted from MDOT Bridge Design Guides Section 6.05.02

Figure 8: Typical Section of Shared Path with Separation Barrier, Curved Fencing, and Lighting

## 5.4 DETERMINE INTERCHANGE TREATMENTS

When adding non-motorized improvements to a crossing, consideration must be given to any impacts in advance of the structure, including freeway ramps and interchanges. Freeway ramps cause problems for bike lanes, sidewalks, and shared paths because they create conflict points for all road users. Freeway ramps with a free-flow merging or diverging lane (slip lane) are specifically challenging because they prioritize vehicle speed and do not require the vehicle to stop. Freeway ramps also typically contain heavy vehicle traffic that makes it difficult for non-motorized users to navigate. The following subsections provide detail on how to address some of these common issues.

### 5.4.1 Bike Lanes at Freeway Ramps

Adding a bike lane at a freeway ramp creates crossing path conflicts between bicyclists and motorists, especially when there is a dedicated right-turn lane onto the ramp. To help mitigate crossing path conflicts, bike lanes should be placed to the left of a dedicated right-turn lane in advance of the on-ramp. This placement allows for motorists to weave across bicycle traffic away from the intersection to avoid a turning conflict. Motorists are required to yield to bicyclists before entering the dedicated right-turn lane.

The crossing path conflict area between bicyclists and motorists is indicated by a dotted white line, but additional measures can be taken to give road users more warning. A BEGIN RIGHT TURN LANE YIELD TO BIKES (R4-4) sign may be placed at the beginning of the conflict area to inform both motorists and bicyclists of the weaving maneuver. Green Methyl Methacrylate (MMA) pavement markings can also be used to help identify the conflict area. **Figure 9** shows a typical example of how to address an added bike lane at a crossing with a freeway ramp.

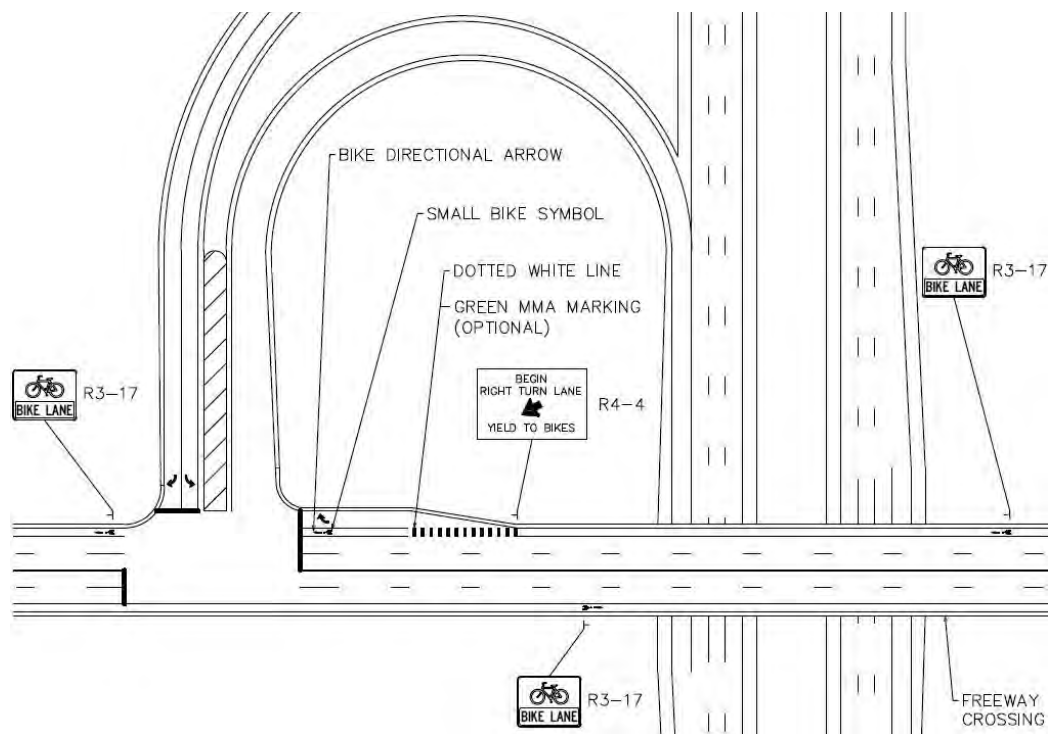


Figure 9: Added Bike Lane at Crossing with Freeway Ramp

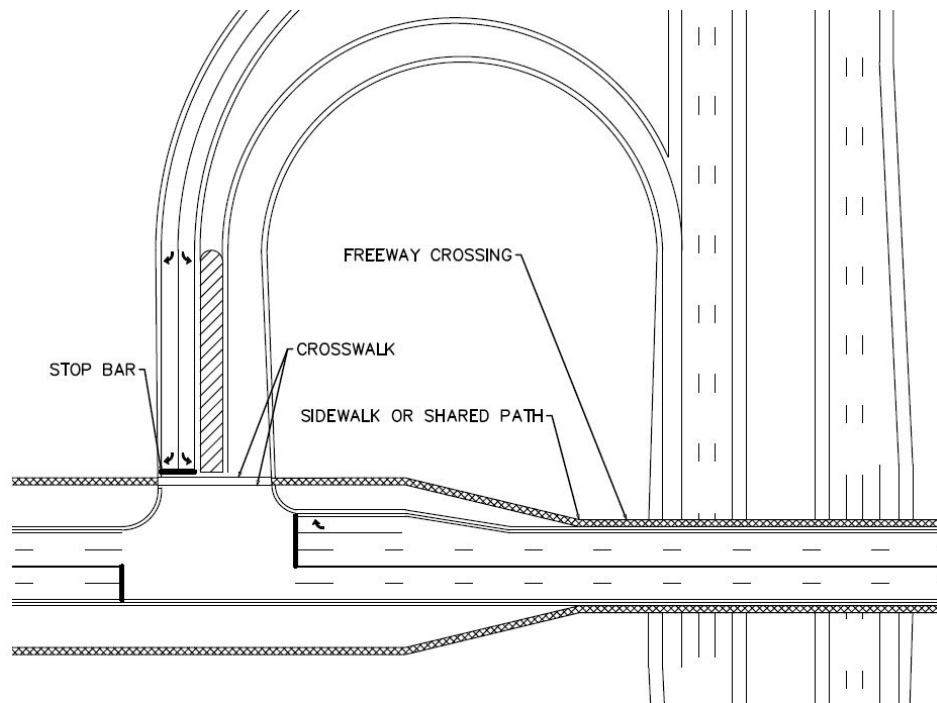
## 5.4.2 Sidewalks or Shared Paths at Freeway Ramps

Adding a sidewalk or shared path on a crossing may extend across a freeway ramp. If the freeway ramp was not designed for pedestrians, it may be challenging for pedestrians to cross. **Table 2** shows some common challenges that may occur when a sidewalk or shared path crosses a freeway ramp and possible solutions to consider.

**Table 2: Sidewalk or Shared Path Challenges and Solutions at Freeway Ramps**

Common Challenges	Possible Solutions
On-ramps have a high number of right-turning vehicles that make it difficult for pedestrians to cross	Perform an engineering study to determine if a traffic signal with a pedestrian countdown is warranted to create gaps for pedestrians to cross
Crossing distance across ramps is longer for pedestrians to accommodate larger turning radii from trucks	Move stop bar and crosswalk upstream from radius to reduce crossing distance
Ramp geometry is skewed and encourages higher vehicle speeds and/or sight distance issues among road users	Realign ramps to intersect roadway at right angles
Ramps lack pedestrian crossings	Add a crosswalk and ramps that are compliant with the Americans with Disabilities Act (ADA)

If any of these challenges are met when designing a sidewalk or shared path across a freeway ramp, it is important to consider possible solutions and apply the basic principles of pedestrian safety. **Figure 10** shows a typical example of how to address an added sidewalk or shared path at a crossing with a freeway ramp.



**Figure 10: Added Sidewalk or Shared Path at Crossing with Freeway Ramp**

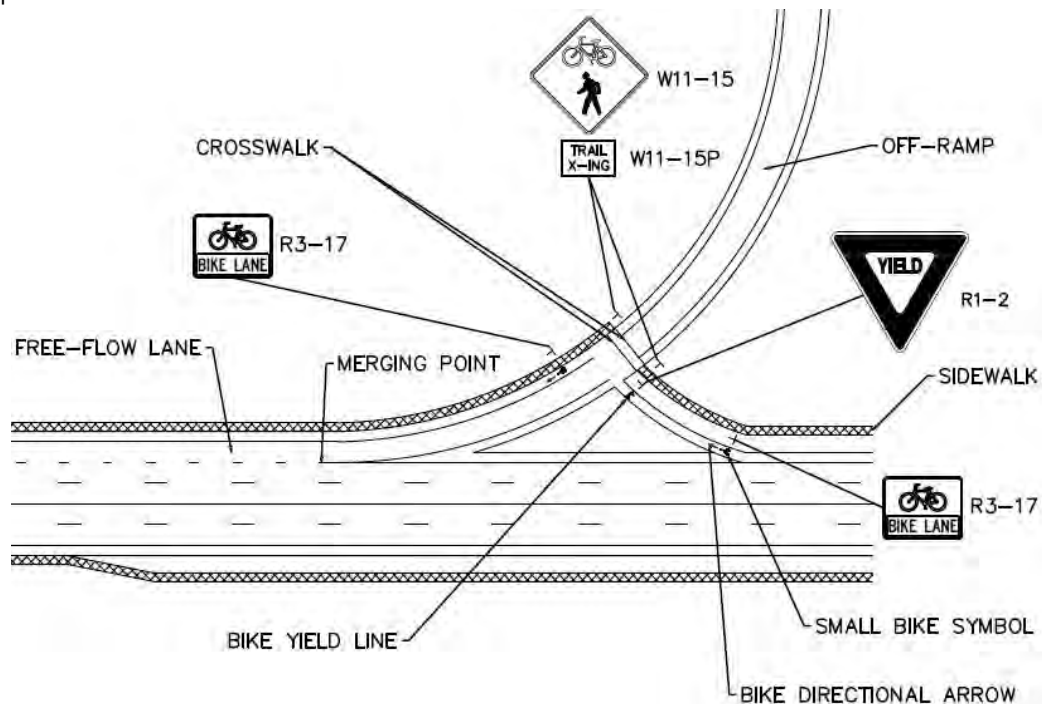
### 5.4.3 Bike Lanes and Sidewalks at Free-Flow Lanes (Slip Lanes)

Adding a sidewalk or bike lane on a crossing with a diverging or merging free-flow lane (slip lane) creates an issue for non-motorized users since vehicular traffic does not stop. Slip lanes encourage higher vehicular speeds for motorists to accelerate on and off the freeway ramp to help merge with traffic. Slip lanes can also create visibility issues for all road users with their acute intersecting angles to the main road. These characteristics compromise the safety of non-motorized users and make it difficult to cross.

To provide a safer environment for non-motorized users, the best solution is to eliminate the slip lane and redesign the ramp to intersect the roadway at a more traditional right angle. This realignment removes the free-flow movement that makes slip lanes dangerous for non-motorized users and forces a vehicle to slow down to make a turn. Realigning the ramps at larger angles also improves the visibility for all road users. If the ramp, however, cannot be realigned and the slip lane must remain in place, the following subsections provide treatments to help address some of the safety concerns caused by slip lanes.

#### Free-Flow Off-Ramp Treatment

If a bike lane or sidewalk is being added where vehicles are exiting off the ramp in a free-flow movement and the slip lane cannot be eliminated, the trail crossing can be positioned upstream of the merging point. This position allows for non-motorized users to cross at close to a right angle. This trail adjustment increases the visibility for all road users and allows non-motorized users to cross away from where vehicles are trying to merge with traffic. This trail adjustment also provides orderly movement and guidance between road users where bicyclists and pedestrians are to yield to vehicles. **Figure 11** shows a typical treatment of a bike lane and sidewalk crossing a free-flow off-ramp.



Source: Adapted from AASHTO 2012 Guide for the Development of Bicycle Facilities Figure 4-42

Figure 11: Bike Lane and Sidewalk Crossing a Free-Flow Off-Ramp



## Free-Flow On-Ramp Treatment

If a bike lane is being added where vehicles are entering onto the ramp in a free-flow movement and the slip lane cannot be eliminated, the bike lane can be shifted to the left of the slip lane in advance of the ramp. This bike lane shift allows for motorists to weave across bicycle traffic away from where vehicles are turning onto the ramp like the bike lane treatment indicated in Section 5.4.1. If a sidewalk is being added, it can be positioned downstream of the diverging point to increase the visibility between motorists and pedestrians. **Figure 12** shows a typical treatment of a bike lane and sidewalk crossing a free-flow on-ramp.

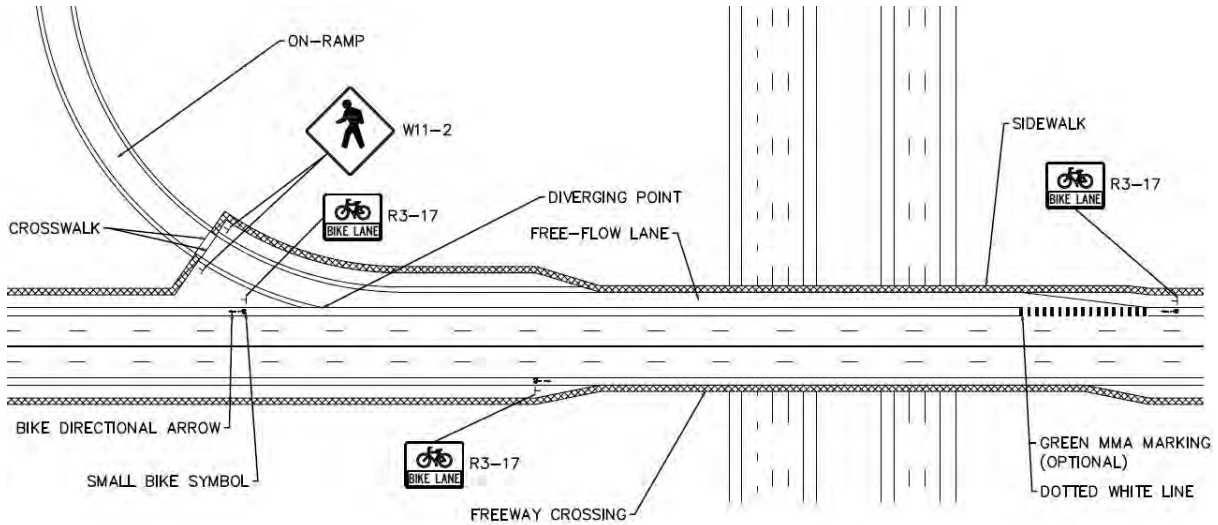


Figure 12: Bike Lane and Sidewalk Crossing Free-Flow On-Ramp

## 5.5 ESTIMATE IMPROVEMENT COSTS

Available funding is a primary factor when selecting whether a short-term, intermediate, or long-term treatment should be applied to a crossing. To assist programming future projects, a conceptual cost estimate was developed for each non-motorized improvement. Weighted cost averages from 2020 were used to develop the conceptual cost estimates and a proper inflation rate may need to be applied to adjust for projects further out. The project cost could also vary based on the complexity of the bridge geometry and freeway crossing, the variability of the construction market, and other factors not included in the scope of this report. The following subsections provide detail on either a total cost or unit cost per linear foot of bridge for each improvement.

### 5.5.1 Short-Term Treatment – Bike Lane

Adding a bike lane to both sides of a crossing costs approximately between \$2,000 – \$4,000, depending on the length of the crossing. This improvement includes a solid white bike lane line and new pavement marking lines (broken white and double solid yellow lines) on the crossing, and a BIKE LANE sign (R3-17) and a bicycle lane symbol marking with an arrow in advance of the crossing.

### **5.5.2 Short-Term Treatment – Shared Lane**

Adding a shared lane to both sides of a crossing costs approximately between \$1,500 – \$3,500, depending on the length of the crossing. This improvement includes new pavement marking lines (broken white and double solid yellow lines) on the crossing and a sharrow in advance of the crossing.

### **5.5.3 Short-Term Treatment – Bicycle Warning**

Adding a bicycle warning to both sides of a crossing costs approximately \$500. This improvement includes a Bicycle Warning sign (W11-1) and SHARE THE ROAD plaque (W16-1P) in advance of the crossing.

### **5.5.4 Intermediate Treatment – Walkway Lighting**

Adding walkway lighting to both sides on the bridge railing of a crossing costs approximately \$200 per linear foot of the bridge. This improvement includes modifications to the railing to install the lights, conduit, and electrical cable, but does not include any electrical service to get power to the crossing.

### **5.5.5 Intermediate Treatment – Curved Fencing**

Adding curved fencing to both sides of a crossing costs approximately \$100 per linear foot of the bridge. This improvement includes any connections required to attach the fencing to the crossing.

### **5.5.6 Intermediate Treatment – Separation Barrier**

Adding a separation barrier to both sides of a crossing costs approximately \$1,100 per linear foot of the bridge. This improvement includes a pedestrian railing attached to the barrier and any connections required to attach the barrier to the crossing.

### **5.5.7 Long-Term Treatment Costs**

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing costs approximately \$15,000 per linear foot of bridge for two lanes and \$20,400 per linear foot of bridge for four lanes or more. This improvement includes replacing and widening the entire bridge (deck, substructure, superstructure) to include a shared path. If the bridge is in good condition, a shared path may be added by widening the existing crossing without having to reconstruct the entire bridge. If only widening is performed leaving most of the existing bridge in place, the approximate cost is \$4,800 per linear foot of the bridge.

## **5.6 RECOMMEND TREATMENTS**

Each crossing was individually reviewed to determine which non-motorized improvements within the short-term, intermediate, and long-term treatments could be applied. Crossings with similar characteristics were grouped together to help with the selection process. Several factors were considered to determine which improvements were specific to each crossing. Section 6.0 provides further detail on specific recommended treatments, conceptual cost estimates, and other considerations for each crossing.

## SECTION 6.0 — RECOMMENDED TREATMENTS

Specific non-motorized improvements from short-term, intermediate, and long-term treatments were recommended for each crossing. These improvements were developed based on existing characteristics. The available roadway width was calculated by subtracting the travel way (assumed 12-foot wide travel lanes unless otherwise noted) from the clear roadway width. If the travel way was adjacent to a guardrail or other physical barrier, an additional width of four feet was deducted to account for a two-foot shy on both sides. The available roadway width was the primary characteristic used to determine the feasibility of each improvement. Other characteristics, such as traffic volume, speed limit, and bridge condition were also considered. Special consideration was also given to non-motorized facilities in advance of each crossing to allow for a future tie-in.

Existing non-motorized facilities at each crossing were examined as well. Twenty-two (22) out of 53 crossings have a sidewalk, bike lane, or shared path, while 31 crossings do not have any non-motorized facilities. Since not all improvements are applicable to each crossing, the following six categories, based on the number of lanes and width, were created to help determine the non-motorized needs for each crossing:

- Four Lanes or More with Width Available
- Four Lanes with Width Constrained
- Three Lanes with Width Available
- Three Lanes with Width Constrained
- Two Lanes with Width Available
- Two Lanes with Width Constrained

“Width Available” means there is enough lateral space available to add a pedestrian or bicycle facility without widening the bridge, while “Width Constrained” means there is not enough width available to add non-motorized facilities without widening the bridge. The following subsections have grouped each crossing under one of these categories. Each crossing then lists specific improvements applicable to short-term, intermediate, and long-term treatments that can be chosen based on available funding, rehabilitation/reconstruction schedule, and non-motorized needs of the community. Intermediate treatments are meant to be added with short-term treatments unless otherwise noted. The costs provided are approximations only and any assumptions are listed in Section 5.5. A complete log listing the category, non-motorized facilities, and recommendations for each crossing is provided in **Appendix C** and a complete set of conceptual drawings is provided in **Appendix D**.

### 6.1 FOUR LANES OR MORE WITH WIDTH AVAILABLE

Crossings in this category have four lanes or more and have enough available roadway width to add a sidewalk or bike lane without having to reconstruct or widen the bridge. This category includes 12 out of the 53 crossings, including one (1) underpass. **Table 3** provides a summary of these crossings.

Table 3: Crossings of Four Lanes or More with Width Available

Section	Crossing	Available Roadway Width (Feet)	Non-Motorized Facilities on Crossing	Adjacent Non-Motorized Facilities to Crossing
6.1.1	Ann Arbor-Saline Road Crossing I-94	9.3	Sidewalk; Bike Lanes	Sidewalk; Bike Lanes
6.1.2	Baker Road Crossing I-94	16	None	None
6.1.3	Carpenter Road Crossing I-94	12	Sidewalk	Sidewalk; Bike Lanes
6.1.4	Ellsworth Road Crossing I-94	12	Bike Lanes	Bike Lanes
6.1.4	Ellsworth Road Crossing US-23	9	Bike Lanes	Bike Lanes
6.1.5	Huron/Hamilton Street Crossing I-94	7.5	None	Sidewalk
6.1.6	Packard Street Crossing US-23 (Underpass)	-	Sidewalk	Sidewalk
6.1.7	Platt Road Crossing I-94	11	Sidewalk; Bike Lanes	Sidewalk; Bike Lanes
6.1.8	Rawsonville Road Crossing I-94	17.9	None	None
6.1.9	State Street Crossing I-94	41.8	None	Sidewalk
6.1.10	US-12 Crossing I-94	15.9	None	None
6.1.11	Zeeb Road Crossing I-94	14.4	Sidewalk	Sidewalk

### 6.1.1 Ann Arbor-Saline Road Crossing I-94

#### Background

Ann Arbor-Saline Road crossing I-94 has an available roadway width of 9.3 feet, assuming 11-foot lanes and a length of 247.9 feet. Non-motorized facilities on this crossing include a northeast-bound sidewalk with a separation barrier and fencing and a bike lane (deduct from available width) and lighting on both sides. Adjacent non-motorized facilities include a northeast-bound sidewalk and a bike lane on both sides that tie into the crossing. **Figure 13** shows a street view of this crossing.



Source: Google Earth

Figure 13: Ann Arbor-Saline Road Crossing I-94 Facing Southwest

## Other Considerations

- No treatments are being proposed since the crossing already contains pedestrian and bicycle facilities.
- There is no southwest-bound sidewalk due to the free-flow eastbound on-ramp. Pedestrians will need to cross at Waters/Lohr Road or Eisenhower Parkway to use the northeast-bound sidewalk.

### 6.1.2 Baker Road Crossing I-94

#### Background

Baker Road crossing I-94 has an available roadway width of 16 feet and a length of 297 feet. There are not any non-motorized facilities on or adjacent to this crossing. **Figure 14** shows a street view of this crossing.



Source: Google Earth

Figure 14: Baker Road Crossing I-94 Facing South

#### Short-Term Treatment

A six-foot bike lane could be added on both sides of the crossing, which would cost approximately \$3,000. **Figure 15** shows a concept of the proposed bike lanes at this crossing.



Figure 15: Proposed Bike Lanes at Baker Road Crossing I-94

## Intermediate Treatment

If the center left-turn lane were removed, a shared path with a separation barrier, curved fencing, and lighting could be added on both sides of the crossing, which would cost approximately \$390,000. **Figure 16** shows a concept of the proposed lane geometry without the center left-turn lane and refer to **Figure 8** for a typical section of a crossing with a shared path.



**Figure 16: Proposed Lane Geometry at Baker Road Crossing I-94**

## Other Considerations

- With a bridge condition rating of six, preventative maintenance is expected to be performed. The bike lanes could be coordinated during this time.
- No long-term treatment involving the reconstruction of the bridge is being proposed since the crossing has enough available width to add a shared path if the center lane were to be removed.
- If a bike lane is added, the bridge railing height needs to be verified. Best practices indicate the minimum height of a bridge railing adjacent to a bike lane is 42 inches.
- On-ramps and off-ramps exist in advance of the crossing. Refer to Section 5.4.1 for guidance on bike lanes at freeway ramps and Section 5.4.2 for guidance on shared paths at freeway ramps.

### 6.1.3 Carpenter Road Crossing I-94

#### Background

Carpenter Road crossing I-94 has an available roadway width of 12 feet, if the center lane were to be removed, and a length of 289.5 feet. Non-motorized facilities on this crossing include a sidewalk with a separation barrier and fencing on both sides. Adjacent non-motorized facilities include a southbound sidewalk that ties into the crossing and a bike lane on both sides south of the crossing. **Figure 17** shows a street view of this crossing.



Source: Google Earth

**Figure 17: Carpenter Road Crossing I-94 Facing South**

#### Short-Term Treatment

If the center left-turn lane were removed, a six-foot bike lane would be available on both sides of the crossing, which would cost approximately \$3,000. **Figure 18** shows a concept of the proposed bike lanes and new lane geometry without the center lane at this crossing.



**Figure 18: Proposed Bike Lanes and New Lane Geometry at Carpenter Road Crossing I-94**

## Intermediate Treatment

Walkway lighting could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$61,000 (short-term treatment cost included). Refer to **Figure 5** for a typical section of a crossing with walkway lighting.

## Other Considerations

- With a bridge condition rating of six, preventative maintenance is expected to be performed. The bike lanes could be coordinated during this time.
- No long-term treatment involving the reconstruction of the bridge is being proposed since the crossing already contains a sidewalk with a separation barrier and enough available width to add bike lanes.

### 6.1.4 Ellsworth Road Crossing I-94 and US-23

#### Background

Ellsworth Road crossing I-94 and US-23 has available roadway widths of 12 and 9 feet, respectively, and lengths of 599.3 and 304.6 feet, respectively. Non-motorized facilities on these crossings include bike lanes (deduct from available width) on both sides. Adjacent non-motorized facilities include bike lanes on both sides that tie into the crossings. **Figures 19** and **20** show a street view of these crossings, respectively.



Source: Google Earth

Figure 19: Street View of Ellsworth Road Crossing I-94 Facing West



Source: Google Earth

Figure 20: Street View of Ellsworth Road Crossing US-23 Facing West



## Short-Term Treatment

A BIKE LANE sign and bicycle lane symbol marking with an arrow could be added in advance of each crossing on both sides, which would cost approximately \$500. **Figure 21** shows a concept of the proposed bicycle signs and pavement markings at Ellsworth Road crossing US-23. Ellsworth Road crossing I-94 would be similar.



Figure 21: Proposed Bicycle Signs and Pavement Markings at Ellsworth Road Crossing I-94

## Intermediate Treatment

Walkway lighting could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$62,000 (short-term treatment cost included) crossing US-23 and \$121,000 (short-term treatment cost included) crossing I-94. Refer to **Figure 5** for a typical section of a crossing with walkway lighting.

## Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing would cost approximately \$6,215,000 crossing US-23 and \$12,226,000 crossing I-94. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$1,463,000 crossing US-23 and \$2,877,000 crossing I-94. Refer to **Figure 8** for a typical section of a crossing with a shared path.

## Other Considerations

- With a bridge condition rating of a six, preventative maintenance is expected to be performed. The bicycle pavement markings and signs could be coordinated during this time.

## 6.1.5 Huron/Hamilton Street Crossing I-94

### Background

Huron/Hamilton Street crossing I-94 has an available roadway width of 7.5 feet and a length of 294.7 feet. There are not any non-motorized facilities on this crossing. Adjacent non-motorized facilities include a southbound sidewalk that ends in advance of the crossing. **Figure 22** shows a street view of this crossing.



Source: Google Earth

**Figure 22: Huron/Hamilton Street Crossing I-94 Facing South**

### Other Considerations

- No treatments are being proposed since a two-way shared path is scheduled to be added to the crossing in 2022.

## 6.1.6 Packard Street Crossing US-23 (Underpass)

### Background

Packard Street crossing US-23 is an underpass. Non-motorized facilities at this crossing include a sidewalk with a separation barrier and fencing on both sides. Adjacent non-motorized facilities include a sidewalk on both sides underneath the crossing. **Figure 23** shows a street view of this crossing.



Source: Google Earth

**Figure 23: Packard Street Crossing US-23 Facing East**

## Other Considerations

- No treatments are being proposed since this crossing is an underpass.

### 6.1.7 Platt Road Crossing I-94

#### Background

Platt Road crossing I-94 has an available roadway width of 11 feet, assuming 11-foot lanes and a 9-foot center lane, and a length of 315.6 feet. Non-motorized facilities on this crossing include a sidewalk and bike lane (deduct from available width) on both sides. Adjacent non-motorized facilities include a sidewalk and bike lane on both sides that tie into the crossing. **Figure 24** shows a street view of this crossing.



Source: Google Earth

**Figure 24: Platt Road Crossing I-94 Facing South**

#### Intermediate Treatment

Walkway lighting and curved fencing could be added on both sides of the crossing, which would cost approximately \$95,000. Refer to **Figures 5** and **6** for typical sections of a crossing with walkway lighting and curved fencing, respectively.

#### Other Considerations

- No short-term treatment involving bicycle signs or pavement markings are being proposed since a BIKE LANE sign and bicycle lane symbol marking with an arrow already exists in advance of the crossing.
- The posted speed limit is 35 miles per hour. Separation barriers are not required for speeds of 40 miles per hour or less, but they should still be considered on a case-by-case basis to provide added protection between non-motorized users and motorists.
- No long-term treatment involving the reconstruction of the bridge is being proposed since the crossing already contains a sidewalk and bike lanes.

## 6.1.8 Rawsonville Road Crossing I-94

### Background

Rawsonville Road crossing I-94 has an available roadway width of 17.9 feet and a length of 312.8 feet. There are not any non-motorized facilities on or adjacent to this crossing. **Figure 25** shows a street view of this crossing.



Source: Google Earth

Figure 25: Rawsonville Road Crossing I-94 Facing South

### Short-Term Treatment

A six-foot bicycle lane could be added on both sides of the crossing, which would cost approximately \$3,000. **Figure 26** shows a concept of the proposed bike lanes at this crossing.



Figure 26: Proposed Bike Lanes at Rawsonville Road Crossing I-94

## Intermediate Treatment

Walkway lighting could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$66,000 (short-term treatment cost included). Refer to **Figure 5** for a typical section of a crossing with walkway lighting. If bike lanes are not implemented, a sidewalk with a separation barrier, curved fencing, and walkway lighting could be added on both sides of the crossing instead, which would cost approximately \$407,000. Refer to **Figures 5 – 7** for typical sections of a crossing with walkway lighting, curved fencing, and a sidewalk with a separation barrier, respectively.

## Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing would cost approximately \$6,381,000. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$1,502,000. Refer to **Figure 8** for a typical section of a crossing with a shared path.

## Other Considerations

- With a bridge condition rating of five, preventative maintenance is expected to be performed. The bike lanes could be coordinated during this time.
- If a bike lane or sidewalk is added, the bridge railing height needs to be verified. Best practices indicate the minimum height of a bridge railing adjacent to a bike lane or sidewalk is 42 inches.
- On-ramps and off-ramps exist in advance of the crossing. Refer to Section 5.4.1 for guidance on bike lanes at freeway ramps and Section 5.4.2 for guidance on sidewalks and shared paths at freeway ramps.

### 6.1.9 State Street Crossing I-94

#### Background

State Street crossing I-94 has an available roadway width of 41.8 feet and a length of 232 feet. Non-motorized facilities on this crossing include overhead lighting on both sides. Adjacent non-motorized facilities include sidewalks on both sides that end in advance of the crossing. **Figure 27** shows a street view of this crossing.



Source: Google Earth

**Figure 27: State Street Crossing I-94 Facing North**

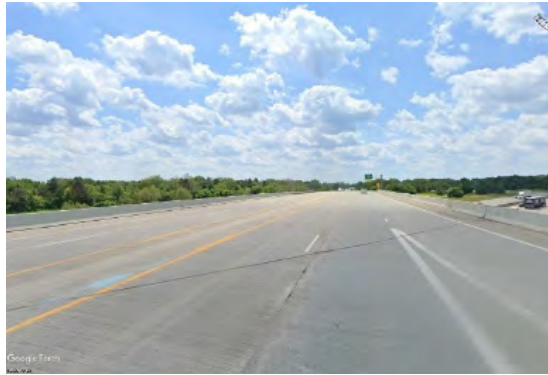
#### Other Considerations

- No treatments are being proposed since interchange options in State Street Corridor Study are ongoing.

## 6.1.10 US-12 Crossing I-94

### Background

US-12 crossing I-94 has an available roadway width of 15.9 feet and a length of 434.7 feet. There are not any non-motorized facilities on or adjacent to this crossing. **Figure 28** shows a street view of this crossing.



Source: Google Earth

**Figure 28: US-12 Crossing I-94 Facing Southwest**

### Short-Term Treatment

A six-foot northeast-bound bike lane could be added, which would cost approximately \$3,000. **Figure 29** shows a concept of the proposed northeast-bound bike lane at this crossing.



**Figure 29: Proposed Northeast-Bound Bike Lane at US-12 Crossing I-94**

## Intermediate Treatment

A northeast-bound shared path with a separation barrier, curved fencing, and walkway lighting could be added on one side of the crossing, which would cost approximately \$286,000. Refer to **Figure 8** for a typical section of a crossing with a shared path (one side only).

## Other Considerations

- With a bridge condition rating of five, preventative maintenance is expected to be performed. The bike lane could be coordinated during this time.
- No southwest-bound treatments are being proposed due to the free-flow westbound off-ramp and eastbound on-ramp. If adjacent non-motorized facilities encourage for a treatment to be added, refer to Section 5.4.3 for guidance on bike lanes and sidewalks at free-flow lanes.
- If a bike lane is added, the bridge railing height needs to be verified. Best practices indicate the minimum height of a bridge railing adjacent to a bike lane is 42 inches.
- No long-term treatment involving the reconstruction of the bridge is being proposed since the crossing contains enough available width to add a shared path.

### 6.1.11 Zeeb Road Crossing I-94

#### Background

Zeeb Road crossing I-94 has an available roadway width of 14.4 feet and a length of 346.9 feet. Non-motorized facilities on this crossing include a southbound sidewalk. Adjacent non-motorized facilities include a southbound sidewalk that ties into the crossing and a northbound sidewalk (north of crossing) that ends in advance of the crossing. **Figure 30** shows a street view of this crossing.



Source: Google Earth

**Figure 30: Zeeb Road Crossing I-94 Facing South**

### Short-Term Treatment

A six-foot bike lane could be added on both sides of the crossing, which would cost approximately \$3,000. **Figure 31** shows a concept of the proposed bike lanes at this crossing.



**Figure 31: Proposed Bike Lanes at Zeeb Road Crossing I-94**

### Intermediate Treatment

Walkway lighting could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$73,000 (short-term treatment cost included). Refer to **Figure 5** for a typical section of a crossing with walkway lighting. If bike lanes are not implemented, one of the following improvements could be added instead:

- A southbound separation barrier, northbound sidewalk with a separation barrier and walkway lighting and curved fencing on both sides of the crossing could be added, which would cost approximately \$451,000. Refer to **Figures 5 – 7** for typical sections of a crossing with walkway lighting, curved fencing, and a sidewalk with a separation barrier, respectively.
- If the lane widths were reduced to 11 feet, a southbound shared path with a separation barrier, curved fencing, and walkway lighting could be added on one side of the crossing, which would cost approximately \$264,000. Refer to **Figure 5** for a typical section of a crossing with walkway lighting and **Figure 8** for a typical section of a crossing with a shared path (one side only without overhead lighting).

### Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing would cost approximately \$7,078,000. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$1,666,000. Refer to **Figure 8** for a typical section of a crossing with a shared path.



## Other Considerations

- With a bridge condition rating of five, preventative maintenance is expected to be performed. The bike lanes could be coordinated during this time.
- If a bike lane or northbound sidewalk is added, the bridge railing height needs to be verified. Best practices indicate the minimum height of a bridge railing adjacent to a bike lane or sidewalk is 42 inches.
- On-ramps and off-ramps exist in advance of the crossing. Refer to Section 5.4.1 for guidance on bike lanes at freeway ramps and Section 5.4.2 for guidance on sidewalks and shared paths at freeway ramps.

## 6.2 FOUR LANES WITH WIDTH CONSTRAINED

Crossings in this category have four lanes and not enough available roadway width to add a sidewalk or bike lane without having to reconstruct or widen the bridge. This category includes 1 out of the 53 crossings. **Table 4** provides a summary of this crossing.

**Table 4: Crossings of Four Lanes or More with Width Constrained**

Section	Crossing	Available Roadway Width (Feet)	Non-Motorized Facilities on Crossing	Adjacent Non-Motorized Facilities to Crossing
6.2.1	Plymouth Road Crossing US-23	4.3	Sidewalk	Sidewalk

### 6.2.1 Plymouth Road Crossing US-23

#### Background

Plymouth Road crossing US-23 has an available roadway width of only 4.3 feet and a length of 348.5 feet. Non-motorized facilities on this crossing include sidewalk on both sides. Adjacent non-motorized facilities include an eastbound sidewalk that ends in advance of the crossing. **Figure 32** shows a street view of this crossing.



Source: Google Earth

**Figure 32: Plymouth Road Crossing US-23 Facing Northeast**

### Short-Term Treatment

A Bicycle Warning sign and SHARE THE ROAD plaque could be added in advance of each crossing on both sides, which would cost approximately \$500. **Figure 33** shows a concept of the proposed bicycle warning signs and plaques at this crossing.



**Figure 33: Proposed Bicycle Warning Signs and Plaques at Plymouth Road Crossing US-23**

### Intermediate Treatment

Walkway lighting and curved fencing could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$106,000 (short-term treatment cost included). Refer to **Figures 5** and **6** for typical sections of a crossing with walkway lighting and curved fencing, respectively.

### Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing would cost approximately \$7,110,000. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$1,673,000. Refer to **Figure 8** for a typical section of a crossing with a shared path.

## Other Considerations

- If the lane widths were to be reduced, a larger shoulder could be added on both sides of the crossing for bicyclists to unofficially use as a bike lane. The decision on the bicycle warning signs and plaques versus the larger shoulders should be coordinated with the City of Ann Arbor and the Washtenaw County Road Commission to be consistent with the Plymouth Road Project.
- With a bridge condition rating of six, preventative maintenance is expected to be performed. The bicycle warning signs and plaques or four-foot shoulder could be coordinated during this time.
- On-ramps and off-ramps exist in advance of the crossing. Refer to Section 5.4.2 for guidance on shared paths at freeway ramps.

### 6.3 THREE LANES WITH WIDTH AVAILABLE

Crossings in this category have three lanes and enough available roadway width to add a sidewalk or bike lane without having to reconstruct or widen the bridge. This category contains 2 out of the 53 crossings. **Table 5** provides a summary of these crossings.

**Table 5: Crossings of Three Lanes with Width Available**

Section	Crossing	Available Roadway Width (Feet)	Non-Motorized Facilities on Crossing	Adjacent Non-Motorized Facilities to Crossing
6.3.1	Grove Street Crossing I-94	16	Sidewalk; Bike Lanes	Sidewalk; Bike Lanes
6.3.2	Main Street/Chelsea Manchester Road Crossing I-94	16.8	None	None

#### 6.3.1 Grove Street Crossing I-94

##### Background

Grove Street crossing I-94 has an available roadway width of 16 feet and a length of 453.3 feet. Non-motorized facilities on this crossing include a sidewalk, bike lanes (deduct from available width), and lighting on both sides. Adjacent non-motorized facilities include a sidewalk and bike lane on both sides that tie into the crossing. **Figure 34** shows a street view of this crossing.



Source: Google Earth

**Figure 34: Grove Street Crossing I-94 Facing Southeast**

## Short-Term Treatment

A BIKE LANE sign could be added at the existing bicycle pavement markings in advance of each crossing on both sides, which would cost approximately \$500. **Figure 35** shows a concept of the proposed bicycle signs at this crossing.



Figure 35: Proposed Bicycle Signs at Grove Street Crossing I-94

## Intermediate Treatment

Curved fencing could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$46,000 (short-term treatment cost included). Refer to **Figure 6** for a typical section of a crossing with curved fencing.

## Other Considerations

- With a bridge condition rating of five, preventative maintenance is expected to be performed. The bicycle signs could be coordinated during this time.
- The posted speed limit is 25 miles per hour. Separation barriers are not required for speeds of 40 miles per hour or less, but they should still be considered on a case-by-case basis to provide added protection between non-motorized users and motorists.
- No long-term treatment involving the reconstruction of the bridge is being proposed since the crossing already contains a sidewalk and bike lanes.

### 6.3.2 Main Street/Chelsea Manchester Road Crossing I-94

#### Background

Main Street/Chelsea Manchester Road crossing I-94 has an available roadway width of 16.8 feet and a length of 250 feet. There are not any non-motorized facilities on or adjacent to this crossing. **Figure 36** shows a street view of this crossing.



Source: Google Earth

Figure 36: Main Street/Chelsea Manchester Road Crossing I-94 Facing North

#### Short-Term Treatment

A six-foot bike lane could be added on both sides of the crossing, which would cost approximately \$3,000. **Figure 37** shows a concept of the proposed bike lanes at this crossing.



Figure 37: Proposed Bike Lanes at Main Street/Chelsea Manchester Road Crossing I-94

### Intermediate Treatment

Walkway lighting could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$53,000 (short-term treatment cost included). Refer to **Figure 5** for a typical section of a crossing with walkway lighting. If bike lanes are not implemented, a sidewalk with a separation barrier, curved fencing, and walkway lighting could be added on both sides of the crossing instead, which would cost approximately \$325,000. Refer to **Figures 5 – 7** for typical sections of a crossing with walkway lighting, curved fencing, and a sidewalk with a separation barrier, respectively.

### Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing would cost approximately \$4,425,000. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$1,200,000. Refer to **Figure 8** for a typical section of a crossing with a shared path.

### Other Considerations

- With a bridge condition rating of five, preventative maintenance is expected to be performed. The bike lanes could be coordinated during this time.
- If a bike lane or sidewalk is added, the bridge railing height needs to be verified. Best practices indicate the minimum height of a bridge railing adjacent to a bike lane or sidewalk is 42 inches.
- On-ramps and off-ramps exist in advance of the crossing. Refer to Section 5.4.1 for guidance on bike lanes at freeway ramps and Section 5.4.2 for guidance on sidewalks and shared paths at freeway ramps.

## 6.4 THREE LANES WITH WIDTH CONSTRAINED

Crossings in this category have three lanes and no available roadway width to add a sidewalk or bike lane without having to reconstruct or widen the bridge. This category includes 1 out of the 53 crossings. **Table 6** provides a summary of this crossing.

**Table 6: Crossings of Three Lanes with Width Constrained**

Section	Crossing	Available Roadway Width (Feet)	Non-Motorized Facilities on Crossing	Adjacent Non-Motorized Facilities to Crossing
6.4.1	Carpenter Road Crossing US-23	4	None	None

## 6.4.1 Carpenter Road Crossing US-23

### Background

Carpenter Road crossing US-23 has an available roadway width of only 4 feet and a length of 373.3 feet. There are not any non-motorized facilities on or adjacent to this crossing. **Figure 38** shows a street view of this crossing.



Source: Google Earth

**Figure 38: Carpenter Road Crossing US-23 Facing South**

### Short-Term Treatment

A southbound shared lane could be added, which would cost approximately \$2,500. **Figure 39** shows a concept of the proposed shared lane on the crossing.



**Figure 39: Proposed Shared Lane at Carpenter Road Crossing US-23**

### Intermediate Treatment

Southbound walkway lighting could be added on one side of the crossing with the short-term treatment, which would cost approximately \$40,000 (short-term treatment cost included). Refer to **Figure 5** for a typical section of a crossing with walkway lighting (one side only).

## Long-Term Treatment

Reconstructing the bridge to include a southbound shared path with a separation barrier, curved fencing, and overhead lighting on one side of the crossing would cost approximately \$3,304,000. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$896,000. Refer to **Figure 8** for a typical section of a crossing with a shared path (one side only).

## Other Considerations

- With a bridge condition rating of five, preventative maintenance is expected to be performed. The southbound shared lane could be coordinate during that time.
- No northbound treatments are being proposed due to the free-flow northbound on-ramp.

## 6.5 TWO LANES WITH WIDTH AVAILABLE

Crossings in this category have two lanes and enough available roadway width to add a sidewalk or bike lane without having to reconstruct the bridge. This category includes 10 out of the 53 crossings, including two underpasses. **Table 7** provides a summary of these crossings.

**Table 7: Crossings of Two Lanes with Width Available**

Section	Crossing	Available Roadway Width (Feet)	Non-Motorized Facilities on Crossing	Adjacent Non-Motorized Facilities to Crossing
6.5.1	Curtis Road Crossing M-14	14	None	None
6.5.1	Golfredson Road Crossing M-14	13.7	None	None
6.5.1	Napier Road Crossing M-14	16.3	None	None
6.5.1	North Territorial Road Crossing US-23	16	None	None
6.5.2	Eight Mile Road Crossing US-23	10	Sidewalk	None
6.5.3	Harris Road Crossing I-94	11.8	Sidewalk	Sidewalk
6.5.4	Huron River Drive Crossing M-14 (Underpass)	-	None	None
6.5.4	Huron River Drive Crossing US-23 (Underpass)	-	None	None
6.5.5	Joy Road Crossing M-14	10.5	None	None
6.5.6	Six Mile Road Crossing US-23	10	Sidewalk; Bike Lanes	Bike Lane



## 6.5.1 Curtis Road Crossing M-14, Gotfredson Road Crossing M-14, Napier Road Crossing M-14, and North Territorial Road Crossing US-23

### Background

Curtis, Gotfredson, and Napier Roads crossing M-14 and North Territorial Road crossing US-23 have available roadway widths ranging from 13.7 to 16.3 feet and lengths ranging from 189.9 to 343.9 feet. There are not any non-motorized facilities on or adjacent to these crossings. **Figures 40 – 43** show a street view of these crossings.



Source: Google Earth

**Figure 40: Curtis Road Crossing M-14 Facing South**



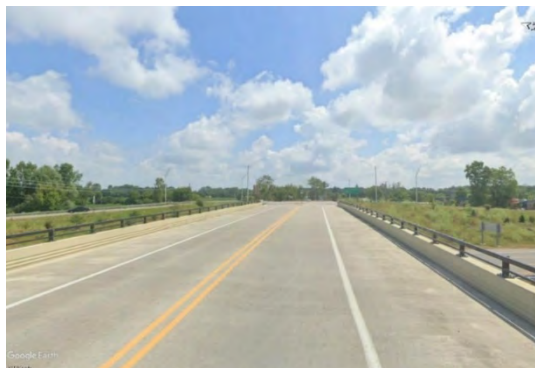
Source: Google Earth

**Figure 41: Gotfredson Road Crossing M-14 Facing North**



Source: Google Earth

Figure 42: Napier Road Crossing M-14 Facing South



Source: Google Earth

Figure 43: North Territorial Road Crossing US-23 Facing East

### Short-Term Treatment

A six-foot bike lane could be added on both sides of the crossing, which would cost approximately \$3,000. **Figure 44** shows a concept of the proposed bike lanes at Napier Road crossing M-14. The concepts for the other crossings would be similar.

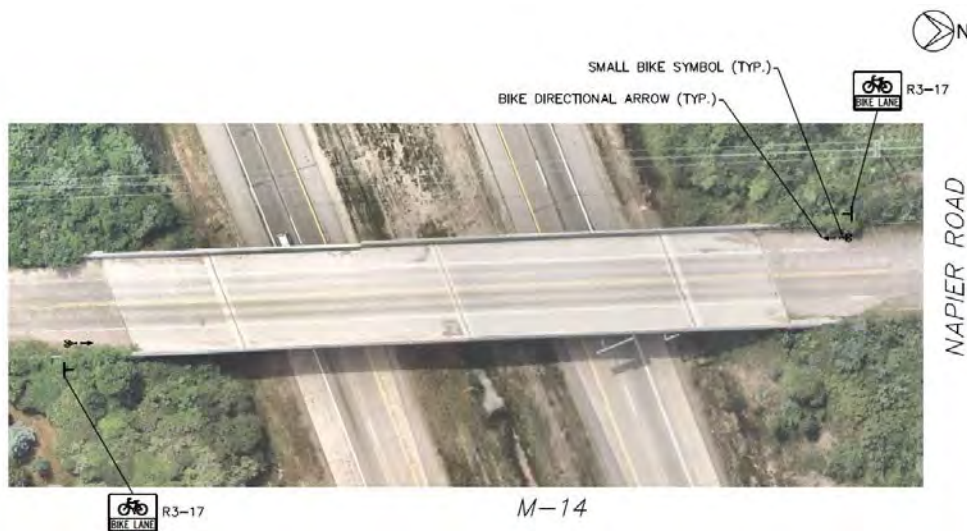


Figure 44: Proposed Bike Lanes at Napier Crossing M-14

## Intermediate Treatment

Walkway lighting could be added on both sides of the crossing with the short-term treatment, which would cost approximately between \$41,000 – \$72,000 (short-term treatment cost included), depending on the length of the crossing. Refer to **Figure 5** for a typical section of a crossing with walkway lighting. If bike lanes are not implemented, a sidewalk with a separation barrier, curved fencing, and walkway lighting could be added on both sides of the crossing instead, which would cost approximately between \$247,000 – \$447,000, depending on the length of the crossing. Refer to **Figures 5 – 7** for typical sections of a crossing with walkway lighting, curved fencing, and a sidewalk with a separation barrier, respectively.

## Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing would cost approximately between \$2,849,000 – \$5,158,000, depending on the length of the crossing. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately between \$912,000 – \$1,651,000. Refer to **Figure 8** for a typical section of a crossing with a shared path.

## Other Considerations

- With bridge condition ratings of six and seven, preventative maintenance is expected to be performed. The bike lanes could be coordinated during this time.
- There are two roundabouts adjacent to North Territorial Road crossing US-23.
- If a bike lane or sidewalk is added, the bridge railing height needs to be verified. Best practices indicate the minimum height of a bridge railing adjacent to a bike lane or sidewalk is 42 inches.
- A reduced shared path width of eight feet may be suitable for Curtis, Gotfredson, and Napier Roads since the areas are more rural.
- On-ramps and off-ramps exist in advance of the crossing. Refer to Section 5.4.1 for guidance on bike lanes at freeway ramps and Section 5.4.2 for guidance on sidewalks and shared paths at freeway ramps.

## 6.5.2 Eight Mile Road Crossing US-23

### Background

Eight Mile Road crossing US-23 has an available roadway width of 10 feet and a length of 244.2 feet. Non-motorized facilities on this crossing include a sidewalk and fencing on both sides. There are not any non-motorized facilities adjacent to this crossing. **Figure 45** shows a street view of this crossing.



Source: Google Earth

Figure 45: Eight Mile Road Crossing US-23 Facing West

### Short-Term Treatment

A five-foot bike lane could be added on both sides of the crossing, which would cost approximately \$3,000. **Figure 46** shows a concept of the proposed bike lanes at this crossing.



Figure 46: Proposed Bike Lanes at Eight Mile Road Crossing US-23

## Intermediate Treatment

Walkway lighting could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$52,000 (short-term treatment cost included). Refer to **Figure 5** for a typical section of a crossing with walkway lighting.

## Other Considerations

- With a bridge condition rating of six, preventative maintenance is expected to be performed. The bike lanes could be coordinated during this time.
- The posted speed limit is 25 miles per hour. Separation barriers are not required for speeds of 40 miles per hour or less, but they should still be considered on a case-by-case basis to provide added protection between non-motorized users and motorists.
- If a bike lane is added, the bridge railing height needs to be verified. Best practices indicate the minimum height of a bridge railing adjacent to a bike lane is 42 inches.
- There are two roundabouts adjacent to this crossing.
- No long-term treatment involving the reconstruction of the bridge is proposed since the crossing already contains a sidewalk and enough available width to add a bike lane.

### 6.5.3 Harris Road Crossing I-94

#### Background

Harris Road crossing I-94 has an available roadway width of 11.8 feet, if the lane widths are reduced to 11 feet, and a length of 534.8 feet. Non-motorized facilities on this crossing include a sidewalk and lighting on both sides. Adjacent non-motorized facilities include a sidewalk on both sides that tie into the crossing. **Figure 47** shows a street view of this crossing.



Source: Google Earth

**Figure 47: Harris Road Crossing I-94 Facing North**

## Short-Term Treatment

If the lane widths were reduced to 11 feet, a 5.9-foot bike lane could be added on both sides of the crossing, which would cost approximately \$3,000. **Figure 48** shows a concept of the proposed bike lanes at this crossing.



**Figure 48: Proposed Bike Lanes at Harris Road Crossing I-94**

## Intermediate Treatment

Curved fencing could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$57,000 (short-term treatment cost included). Refer to **Figure 6** for a typical section of a crossing with curved fencing.

## Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing would cost approximately \$8,022,000. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$2,567,000. Refer to **Figure 8** for a typical section of a crossing with a shared path.

## Other Considerations

- With a bridge condition rating of six, preventative maintenance is expected to be performed. The bike lanes could be coordinated during this time.
- If a bike lane is added, the bridge railing height needs to be verified. Best practices indicate the minimum height of a bridge railing adjacent to a bike lane is 42 inches.

## 6.5.4 Huron River Drive Crossing M-14 and US-23 (Underpasses)

### Background

Huron River Drive crossing M-14 and US-23 are underpasses. There are not any non-motorized facilities on or adjacent to these crossings. **Figures 49** and **50** show a street view of these crossings, respectively.



Source: Google Earth

Figure 49: Huron River Drive Crossing M-14 Facing North



Source: Google Earth

Figure 50: Huron River Drive Crossing US-23 Facing Southeast

### Other Considerations

- No treatments are being proposed since these crossings are underpasses.

## 6.5.5 Joy Road Crossing M-14

### Background

Joy Road crossing M-14 has an available roadway width of 10.5 feet, if the lane widths are reduced to 11 feet, and a length of 358.6 feet. There are not any non-motorized facilities on or adjacent to this crossing. **Figure 51** shows a street view of this crossing.



Source: Google Earth

Figure 51: Street View of Joy Road Crossing M-14 Facing East

### Short-Term Treatment

If the lane widths were reduced to 11 feet, a five-foot bike lane could be added on both sides of the crossing, which would cost approximately \$3,000. **Figure 52** shows a concept of the proposed bike lanes at this crossing.

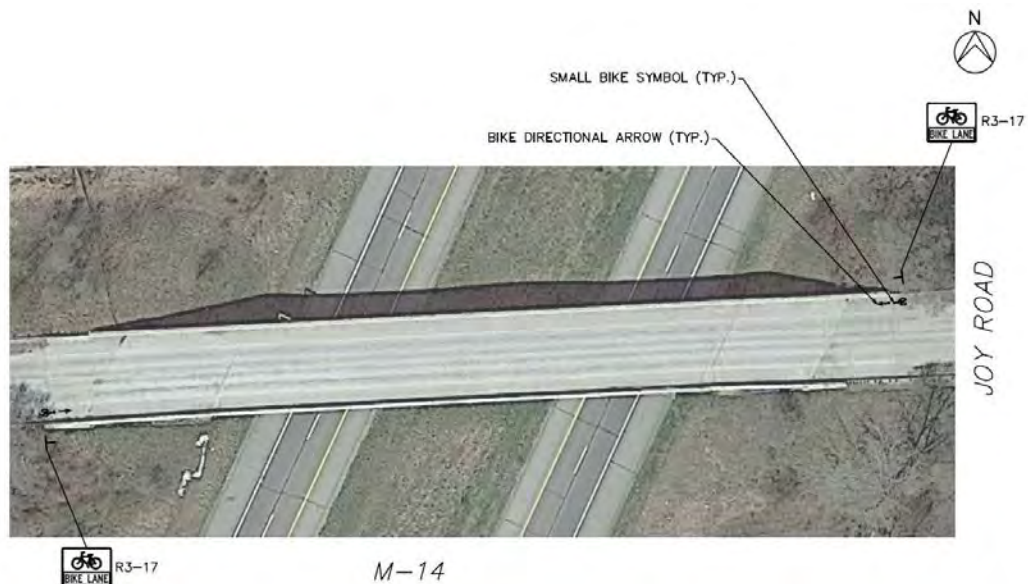


Figure 52: Proposed Bike Lanes at Joy Road Crossing M-14



### Intermediate Treatment

Walkway lighting could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$75,000 (short-term treatment cost included). Refer to **Figure 5** for a typical section of a crossing with walkway lighting.

### Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing would cost approximately \$5,380,000. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$1,722,000. Refer to **Figure 8** for a typical section of a crossing with a shared path.

### Other Considerations

- With a bridge condition rating of six, preventative maintenance is expected to be performed. The bike lanes could be coordinated during this time.
- If a bike lane is added, the bridge railing height needs to be verified. Best practices indicate the minimum height of a bridge railing adjacent to a bike lane is 42 inches.
- A reduced shared path width of eight feet may be suitable since the area is more rural.

## 6.5.6 Six Mile Road Crossing US-23

### Background

Six Mile Road crossing US-23 has an available roadway width of 10 feet and a length of 275 feet. Non-motorized facilities on this crossing include a sidewalk, fencing, and a bike lane (deduct from available width) on both sides. Adjacent non-motorized facilities include a northwest-bound bike lane that ties into the crossing and a paved area on both sides that tie into the southeast end of the crossing. **Figure 53** shows a street view of this crossing.



Source: Google Earth

**Figure 53: Six Mile Road Crossing US-23 Facing Southeast**

## Short-Term Treatment

A BIKE LANE sign and bicycle lane symbol marking with an arrow could be added in advance of the crossing on both sides, which would cost approximately \$3,000. **Figure 54** shows a concept of the proposed bicycle signs and pavement markings this crossing.



Figure 54: Proposed Bicycle Signs and Pavement Markings at Six Mile Road Crossing US-23

## Intermediate Treatment

Walkway lighting could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$58,000 (short-term treatment cost included). Refer to **Figure 5** for a typical section of a crossing with walkway lighting.

## Other Considerations

- With a bridge rating of seven, preventative maintenance is expected to be performed. The bicycle pavement markings and signs could be coordinated during this time.
- The posted speed limit is 35 miles per hour. Separation barriers are not required for speeds of 40 miles per hour or less, but they should still be considered on a case-by-case basis to provide added protection between non-motorized users and motorists.
- No long-term treatment involving the reconstruction of the bridge is being proposed since the crossing already contains a sidewalk and a bike lane.

## 6.6 TWO LANES WITH WIDTH CONSTRAINED

Crossings in this category have two lanes and not enough available roadway width to add a sidewalk or bike lane without having to reconstruct or widen the bridge. This category includes 27 out of the 53 crossings. **Table 8** provides a summary of these crossings.

**Table 8: Crossings of Two Lanes with Width Constrained**

Section	Crossing	Available Roadway Width (Feet)	Non-Motorized Facilities on Crossing	Adjacent Non-Motorized Facilities to Crossing
6.6.1	Bemis Road Crossing US-23	0	None	None
6.6.1	Dixboro Road Crossing M-14	4	None	None
6.6.1	Freer Road Crossing I-94	0.5	None	None
6.6.1	Joy Road Crossing US-23	0	None	None
6.6.1	Kalmbach Road Crossing I-94	0.5	None	None
6.6.1	Old US-12/Jackson Road Crossing I-94	1.2	None	None
6.6.1	Parker Road Crossing I-94	1.2	None	None
6.6.1	Stony Creek Road Crossing US-23	2.5	None	None
6.6.1	US-12 Crossing US-23	6.5	None	None
6.6.1	Wagner Road Crossing I-94	1.2	None	None
6.6.1	Warren Road Crossing US-23	0	None	None
6.6.1	Willow Road Crossing US-23	0	None	None
6.6.2	Dexter Road/Dexter Ann Arbor Road Crossing M-14	5.9	Sidewalk	Sidewalk
6.6.3	Earhart Road Crossing US-23	0	None	None
6.6.3	Nixon Road Crossing US-23	1.5	None	None
6.6.4	Geddes Road Crossing US-23	4	Sidewalk; Shared Path Bridge	Shared Path
6.6.5	Liberty Road Crossing I-94	0	Sidewalk	Sidewalk; Bike Lanes
6.6.6	Milan-Oakville Road/County Street Crossing US-23	3.9	Sidewalk	Sidewalk
6.6.7	Miller Road Crossing M-14	4.5	Sidewalk	Sidewalk
6.6.8	Newport Road Crossing M-14	2	Sidewalk; Bicycle Warnings	Sidewalk; Shared Lane; Bike Lane
6.6.9	Pontiac Trail Crossing Eastbound US-23/M-14	3.8	None	Bike Lanes
6.6.9	Pontiac Trail Crossing Westbound US-23/M-14	3.8	None	None
6.6.10	Scio Church Road Crossing I-94	0	Sidewalk	Sidewalk
6.6.11	Stone School Road Crossing I-94	0	Shared Path Bridge	Shared Path
6.6.12	Vorhies Road Crossing M-14	1.9	Sidewalk	None
6.6.12	Wagner Road Crossing M-14	1.9	Sidewalk	None
6.6.13	Willis Road Crossing US-23	5.1	None	None

6.6.1 Bemis Road Crossing US-23, Dixboro Road Crossing M-14, Freer Road Crossing I-94, Joy Road Crossing US-23, Kalmbach Road Crossing I-94, Old US-12/Jackson Road Crossing I-94, Parker Road Crossing I-94, Stony Creek Road Crossing US-23, US-12 Crossing US-23, Wagner Road Crossing I-94, Warren Road Crossing US-23, and Willow Road Crossing US-23

Background

Bemis Road crossing US-23, Dixboro Road crossing M-14, Freer Road Crossing I-94, Joy Road Crossing US-23, Kalmbach Road crossing I-94, Old US-12/Jackson Road crossing I-94, Parker Road crossing I-94, Stony Creek Road crossing US-23, US-12 crossing US-23, Wagner Road crossing I-94, Warren Road Crossing US-23, and Willow Road crossing US-23 have available roadway widths of 6.5 feet or less and lengths ranging from 196.3 to 304.4 feet. There are not any non-motorized facilities on or adjacent to these crossings. Figures 55 – 66 show a street view of these crossings.



Source: Google Earth

Figure 55: Bemis Road Crossing US-23 Facing East



Source: Google Earth

Figure 56: Dixboro Road Crossing M-14 Facing South



Source: Google Earth

Figure 57: Freer Road Crossing I-94 Facing South



Source: Google Earth

Figure 58: Joy Road Crossing US-23 Facing East



Source: Bing Maps

Figure 59: Kalmbach Road Crossing I-94 Facing South



Source: Google Earth

Figure 60: Old US-12/Jackson Road Crossing I-94 Facing Northwest



Source: Google Earth

Figure 61: Parker Road Crossing I-94 Facing South



Source: Google Earth

Figure 62: Stony Creek Road Crossing US-23 Facing Northeast



Source: Google Earth

Figure 63: US-12 Crossing US-23 Facing Southwest



Source: Google Earth

Figure 64: Wagner Road Crossing I-94 Facing South



Source: Google Earth

Figure 65: Warren Road Crossing US-23



Source: Google Earth

Figure 66: Willow Road Crossing US-23 Facing West

### Short-Term Treatment

A Bicycle Warning sign and a SHARE THE ROAD plaque could be added in advance of each crossing on both sides, which would cost approximately \$500. **Figure 67** shows a concept of the proposed bicycle warning signs and plaques at Bemis Road crossing US-23. The concepts for the other crossings would be similar.

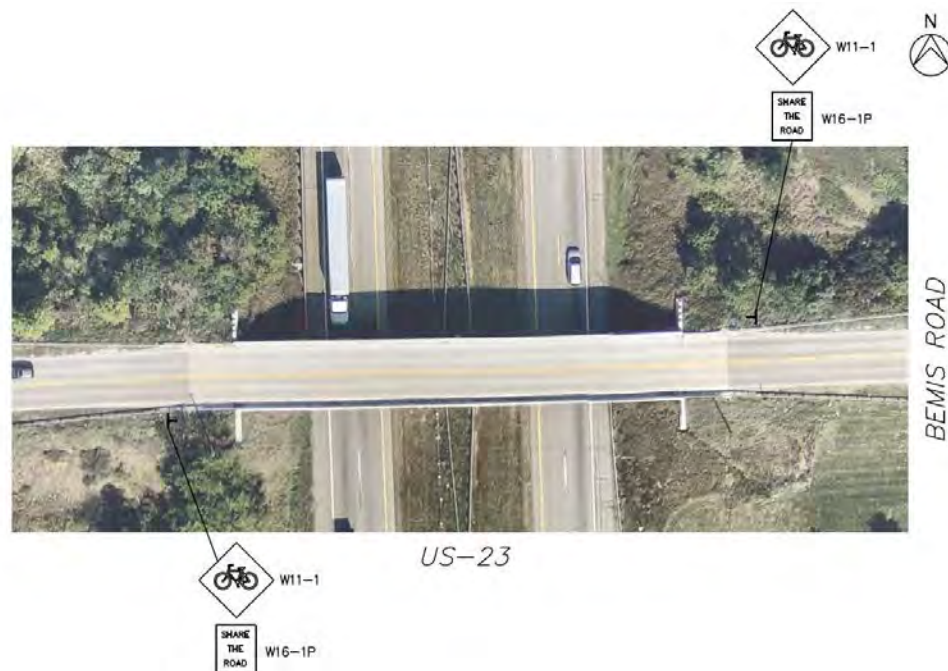


Figure 67: Proposed Bicycle Warning Signs and Plaques at Bemis Road Crossing US-23

### Intermediate Treatment

Walkway lighting could be added on both sides of the crossing with the short-term treatment, which would cost approximately between \$40,000 – \$62,000 (short-term treatment cost included), depending on the length of the crossing. Refer to **Figure 5** for a typical section of a crossing with walkway lighting.



## Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting could be added on both sides of the crossing, which would cost approximately between \$2,945,000 – \$4,566,000, depending on the length of the crossing. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately between \$943,000 – \$1,461,000, depending on the length of the crossing. Refer to **Figure 8** for a typical section of a crossing with a shared path.

## Other Considerations

- With a bridge condition rating ranging from five to six at Bemis Road crossing US-23, Dixboro Road crossing M-14, Freer Road crossing I-94, Joy Road crossing US-23, Old US-12/Jackson Road crossing I-94, Parker Road crossing I-94, US-12 crossing US-12, Wagner Road crossing I-94, Warren Road crossing US-23, and Willow Road crossing US-23, preventative maintenance is expected to be performed. The bicycle warning signs and plaques could be coordinated during this time.
- With a bridge condition rating of four at Kalmbach Road crossing I-94 and Stony Creek Road crossing US-23, rehabilitation is expected to be performed. The bicycle warning signs, plaques, and walkway lighting could be coordinated during this time.
- The posted speed limit is above 35 miles per hour at these crossings. Shared lanes are not recommended for roadways having a speed limit above 35 miles per hour.
- A reduced shared path width of eight feet may be suitable for Dixboro, Freer, Joy, Kalmbach, Old US-12/Jackson, Parker, Stony Creek, Warren, and Willow Roads, since the areas are more rural.
- On-ramps and off-ramps exist in advance of Kalmbach Road crossing I-94, Old US-12/Jackson Road crossing I-94, and US-12 crossing US-23. Refer to Section 5.4.2 for guidance on shared paths at freeway ramps.

## 6.6.2 Dexter Road/Dexter Ann Arbor Road Crossing M-14

### Background

Dexter Road/Dexter Ann Arbor Road crossing M-14 has an available roadway width of only 5.9 feet and a length of 362 feet. Non-motorized facilities on this crossing include a sidewalk on both sides. Adjacent non-motorized facilities include an eastbound sidewalk that ties into the east end of the crossing. **Figure 68** shows a street view of the crossing.



Source: Google Earth

Figure 68: Dexter/Dexter Ann Arbor Road Crossing M-14 Facing Northwest

### Short-Term Treatment

Shared lanes could be added on both sides of the crossing, which would cost approximately \$2,500. **Figure 69** shows a concept of the proposed shared lanes at this crossing.



Figure 69: Proposed Shared Lanes at Dexter/Dexter Ann Arbor Road Crossing M-14

### Intermediate Treatment

Walkway lighting and curved fencing could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$112,000 (short-term treatment cost included). Refer to **Figures 5 and 6** for typical sections of a crossing with walkway lighting and curved fencing, respectively.

### Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing would cost approximately \$5,431,000. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$1,738,000. Refer to **Figure 8** for a typical section of a crossing with a shared path.

### Other Considerations

- With a bridge condition rating of five, preventative maintenance is expected to be performed. The shared lanes could be coordinated during this time.

## 6.6.3 Earhart and Nixon Road Crossing US-23

### Background

Earhart and Nixon Road crossing US-23 have available roadway widths of 1.5 feet or less and lengths of 365.4 and 233.5 feet, respectively. There are not any non-motorized facilities on or adjacent to these crossings. **Figures 70 and 71** show a street view of these crossings, respectively.



Source: Google Earth

**Figure 70: Earhart Road Crossing US-23 Facing South**



Source: Google Earth

Figure 71: Nixon Road Crossing US-23 Facing South

### Short-Term Treatment

Shared lanes could be added on both sides of the crossing, which would cost approximately \$2,500. **Figure 72** shows a concept of the proposed shared lanes at Nixon Road Crossing US-23. The concept for Earhart Road crossing US-23 would be similar.



Figure 72: Proposed Shared Lanes at Nixon Road Crossing US-23

### Intermediate Treatment

Walkway lighting could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$76,000 (short-term treatment cost included) at Earhart Road crossing US-23 and \$50,000 (short-term treatment cost included) at Nixon Road crossing US-23. Refer to **Figure 5** for a typical section of a crossing with walkway lighting.

### Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing would cost approximately \$5,481,000 at Earhart Road crossing US-23 and \$3,503,000 at Nixon Road crossing US-23. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$1,754,000 at Earhart Road crossing US-23 and \$1,121,000 at Nixon Road crossing US-23. Refer to **Figure 8** for a typical section of a crossing with a shared path.

## Other Considerations

- With bridge condition ratings of five and six, preventative maintenance is expected to be performed. The shared lanes could be coordinated during this time.
- A reduced shared path width of eight feet may be suitable for Nixon Road since the area is more rural.

### 6.6.4 Geddes Road Crossing US-23

#### Background

Geddes Road crossing US-23 has an available roadway width of only 4 feet and a length of 319.4 feet. Non-motorized facilities near this crossing include an eastbound shared path bridge with fencing. Adjacent non-motorized facilities include an eastbound shared path that ties into the crossing. **Figure 73** shows a street view at this crossing.



Source: Google Earth

Figure 73: Geddes Road Crossing US-23 Facing West

#### Intermediate Treatment

Walkway lighting could be added on both sides of the shared path bridge, which would cost approximately \$64,000.

#### Other Considerations

- No long-term treatment involving the reconstruction of the bridge is being proposed since the crossing already contains a shared path bridge with fencing.
- There are two roundabouts adjacent to the crossing.
- The eastbound shared path bridge was constructed in 2008. It was determined a shared path bridge was cheaper than reconstructing the bridge.
- There is no westbound shared path bridge. Pedestrians will need to cross at Dixboro Road or Earhart Road to use the eastbound shared path bridge.

## 6.6.5 Liberty Road Crossing I-94

### Background

Liberty Road crossing I-94 does not have any available roadway width and has a length of 226 feet. Non-motorized facilities on this crossing include an eastbound sidewalk with a separation barrier and fencing. Adjacent non-motorized facilities include an eastbound sidewalk that ties into the crossing, a westbound sidewalk that ends in advance of the crossing, and a bike lane on both sides that end in advance of the crosswalk. **Figure 74** shows a street view of this crossing.



Source: Google Earth

Figure 74: Liberty Road Crossing I-94 Facing West

### Short-Term Treatment

Shared lanes could be added on both sides of the crossing, which would cost approximately \$2,500. **Figure 75** shows a concept of the proposed shared lanes on the crossing.



Figure 75: Proposed Shared Lanes at Liberty Road Crossing I-94

### Intermediate Treatment

Walkway lighting could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$48,000 (short-term treatment cost included). Refer to **Figure 5** for a typical section of a crossing with walkway lighting.

### Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing would cost approximately \$3,391,000. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$1,085,000. Refer to **Figure 8** for a typical section of a crossing with a shared path.

### Other Considerations

- With a bridge condition rating of five, preventative maintenance is expected to be performed. The shared lanes could be coordinated during this time.
- Portions of the eastbound sidewalk with separation barrier and fencing may be salvageable if converted into a shared path.

## 6.6.6 Milan-Oakville Road/County Street Crossing US-23

### Background

Milan-Oakville Road/County Street crossing US-23 has an available roadway width of only 3.9 feet and a length of 174.8 feet. Non-motorized facilities on this crossing include a westbound sidewalk. Adjacent non-motorized facilities include a westbound sidewalk that ties into the crossing. **Figure 76** shows a street view of this crossing.

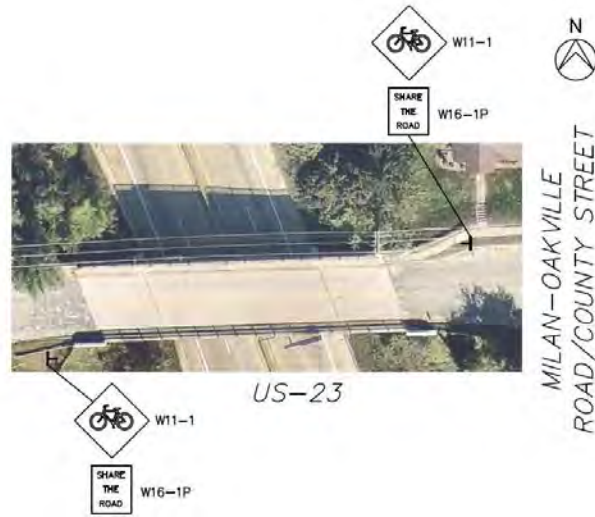


Source: Google Earth

**Figure 76: Milan-Oakville Road/County Street Crossing US-23 Facing West**

### Short-Term Treatment

A Bicycle Warning sign and a SHARE THE ROAD plaque could be added in advance of the crossing on both sides, which would cost approximately \$500. **Figure 77** shows a concept of the proposed bicycle warning signs and plaques at this crossing.



**Figure 77: Proposed Bicycle Warning Signs and Plaques at Milan-Oakville Road/County Street Crossing US-23**

### Intermediate Treatment

Westbound curved fencing and walkway lighting could be added on one side of the crossing with the short-term treatment, which would cost approximately \$27,000 (short-term treatment cost included). Refer to **Figures 5** and **6** for typical sections of a crossing with walkway lighting and curved fencing (one side only), respectively.

### Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing would cost approximately \$2,622,000. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$839,000. Refer to **Figure 8** for a typical section of a crossing with a shared path.

### Other Considerations

- With a bridge condition rating of six, preventative maintenance is expected to be performed. The bicycle warning signs and plaques could be coordinated during this time.
- The posted speed limit is 40 miles per hour at this crossing. Shared lanes are not recommended for roadways having a speed limit above 35 miles per hour.



## 6.6.7 Miller Road Crossing M-14

### Background

Miller Road crossing M-14 has an available roadway width of only 4.5 feet and a length of 325.1 feet. Non-motorized facilities on this crossing include a sidewalk on both sides. Adjacent non-motorized facilities include a southeast-bound sidewalk that ends in advance of the northwest end of the crossing. **Figure 78** shows a street view of this crossing.



Source: Google Earth

Figure 78: Miller Road Crossing M-14 Facing Southeast

### Short-Term Treatment

A Bicycle Warning sign with a SHARE THE ROAD plaque could be added in advance of the crossing on both sides, which would cost approximately \$500. **Figure 79** shows a concept of the proposed bicycle warning signs and plaques at this crossing.



Figure 79: Proposed Bicycle Warning Signs and Plaques at Miller Road Crossing M-14

## Intermediate Treatment

Walkway lighting and curved fencing could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$98,000 (short-term treatment cost included). Refer to **Figures 5 and 6** for typical sections of a crossing with walkway lighting and curved fencing, respectively.

## Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing would cost approximately \$4,876,000. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$1,561,000. Refer to **Figure 8** for a typical section of a crossing with a shared path.

## Other Considerations

- With a bridge condition rating of four, rehabilitation is expected to be performed. The bicycle warning signs, plaques, curved fencing, and walkway lighting could be coordinated during this time.
- The posted speed limit is 50 miles per hour. Shared lanes are not recommended for roadways having a speed limit above 35 miles per hour.
- On-ramps and off-ramps exist in advance of the crossing. Refer to Section 5.4.2 for guidance on shared paths at freeway ramps.

## 6.6.8 Newport Road Crossing M-14

### Background

Newport Road crossing M-14 has an available roadway width of only 2 feet and a length of 314.6 feet. Non-motorized facilities on this crossing include a sidewalk and fencing on both sides and a northbound Bicycle Warning sign with a SHARE THE ROAD plaque. Adjacent non-motorized facilities include a southbound sidewalk that ties into the crossing, a southbound shared lane south of the crossing, and a northbound bike lane that ends in advance of the crossing. **Figure 80** shows a street view of the crossing.



Source: Google Earth

**Figure 80: Newport Road Crossing M-14 Facing North**

### Short-Term Treatment

A shared lane could be added on both sides of the crossing, which would cost approximately \$2,500. **Figure 81** shows a concept of the proposed shared lanes on this crossing.



**Figure 81: Proposed Shared Lanes at Newport Road Crossing M-14**

### Intermediate Treatment

Walkway lighting could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$66,000 (short-term treatment cost included). Refer to **Figure 5** for a typical section of a crossing with walkway lighting.

### Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing would cost approximately \$4,719,000. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$1,510,000. Refer to **Figure 8** for a typical section of a crossing with a shared path.

### Other Considerations

- With a bridge condition rating of six, preventative maintenance is expected to be performed. The shared lanes could be coordinated during this time.
- The northbound Bicycle Warning sign and SHARE THE ROAD plaque should be removed if shared lanes are added.

## 6.6.9 Pontiac Trail Crossing Eastbound and Westbound US-23/M-14

### Background

Pontiac Trail crossing eastbound and westbound US-23/M-14 has an available roadway width of 3.8 feet and lengths of 195.8 and 149.6 feet, respectively. There are not any non-motorized facilities on these crossings. Adjacent non-motorized facilities include bike lanes on both sides that end in advance of Pontiac Trail crossing eastbound US-23/M-14. **Figures 82** and **83** show a street view of these crossings, respectively.



Source: Google Earth

Figure 82: Pontiac Trail Crossing Westbound US-23/M-14 Facing South



Source: Google Earth

Figure 83: Pontiac Trail Crossing Eastbound US-23/M-14 Facing South

## Short-Term Treatment

A Bicycle Warning Sign and a SHARE THE ROAD plaque could be added in advance of each crossing on both sides, which would cost approximately \$500. **Figure 84** shows a concept of the proposed bicycle warning signs and plaques at Pontiac Trail crossing westbound US-23/M-14. The concept for Pontiac Trail crossing eastbound US-23/M14 would be similar.



**Figure 84: Proposed Bicycle Warning Signs and Plaques at Pontiac Trail Crossing Westbound US-23/M-14**

## Intermediate Treatment

Walkway lighting could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$31,000 (short-term treatment cost included) crossing westbound US-23/M-14 and \$40,000 (short-term treatment cost included) crossing eastbound US-23/M14. Refer to **Figure 5** for a typical section of a crossing with walkway lighting.

## Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing would cost approximately \$2,245,000 crossing westbound US-23/M-14 and \$2,937,000 crossing eastbound US-23/M-14. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$719,000 crossing westbound US-23/M-14 and \$940,000 crossing eastbound US-23/M-14. Refer to **Figure 8** for a typical section of a crossing with a shared path.

## Other Considerations

- With bridge condition ratings of four and five, rehabilitation and preventative maintenance is expected to be performed. The bicycle warning signs and plaques could be coordinated during this time.
- Treatments should be applied to Pontiac Trail between the crossings to make segment consistent.
- A reduced shared path width of eight feet may be suitable since the area is more rural.

## 6.6.10 Scio Church Road Crossing I-94

### Background

Scio Church Road crossing I-94 does not have any available roadway width and has a length of 293 feet. Non-motorized facilities on this crossing include an eastbound sidewalk with a separation barrier and fencing. Adjacent non-motorized facilities include an eastbound sidewalk that ties into the crossing and a westbound sidewalk that ends in advance of the crossing. **Figure 85** shows a street view of this crossing.

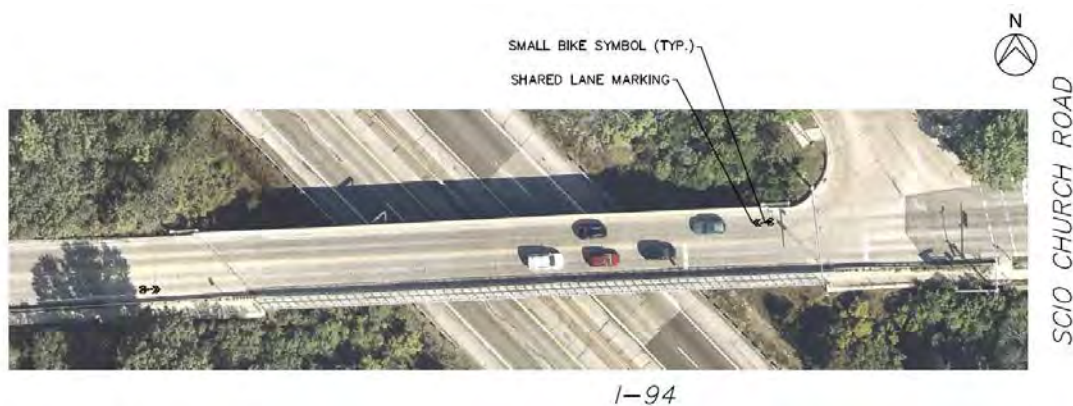


Source: Google Earth

**Figure 85: Scio Church Road Crossing I-94 Facing East**

### Short-Term Treatment

Shared lanes could be added on both sides of the crossing, which would cost approximately \$2,500. **Figure 86** shows a concept of the proposed shared lanes on the crossing.



**Figure 86: Proposed Shared Lanes at Scio Church Road Crossing I-94**

### Intermediate Treatment

Walkway lighting could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$62,000 (short-term treatment cost included). Refer to **Figure 5** for a typical section of a crossing with walkway lighting.

### Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing would cost approximately \$4,395,000. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$1,407,000. Refer to **Figure 8** for a typical section of a crossing with a shared path.

### Other Considerations

- With a bridge condition rating of five, preventative maintenance is expected to be performed. The shared lanes could be coordinated during this time.
- There is a traffic signal adjacent to the east end of the crossing.
- There is no westbound sidewalk. Pedestrians will need to cross at Maple Road to use the eastbound sidewalk.

## 6.6.11 Stone School Road Crossing I-94

### Background

Stone School Road crossing I-94 does not have any available roadway width and has a length of 208.3 feet. Non-motorized facilities on this crossing include a northbound shared path bridge with fencing. Adjacent non-motorized facilities include a northbound shared path that ties into the crossing. **Figure 87** shows a street view of this crossing.



Source: Google Earth

**Figure 87: Stone School Road Crossing I-94 Facing North**

## Intermediate Treatment

Walkway lighting could be added on both sides of the shared path bridge, which would cost approximately \$42,000.

## Other Considerations

- No long-term treatment involving the reconstruction of the bridge is being proposed since the crossing already contains a shared path bridge with fencing.
- There is no southbound shared path bridge. Pedestrians will need to cross at Valencia Circle or Birch Hollow Drive to use the northbound shared path bridge.

### 6.6.12 Vorhies and Wagner Road Crossing M-14

#### Background

Vorhies and Wagner Road crossing M-14 have available roadway widths of 1.9 feet and lengths of 316.9 and 375.8 feet, respectively. Non-motorized facilities on these crossings include a sidewalk on both sides. There are not any non-motorized facilities adjacent to these crossings. **Figures 88 and 89** show a street view of these crossings, respectively.



Source: Google Earth

**Figure 88: Vorhies Road Crossing M-14 Facing North**



Source: Google Earth

**Figure 89: Wagner Road Crossing M-14 Facing North**



### Short-Term Treatment

A Bicycle Warning sign and a SHARE THE ROAD plaque could be added in advance of the crossing on both sides, which would cost approximately \$500. **Figure 90** shows a concept of the proposed bicycle warning signs with plaques at Wagner Road crossing M-14. Vorhies Road crossing M-14 would be similar.



**Figure 90: Proposed Bicycle Warning Signs and Plaques at Wagner Road Crossing M-14**

### Intermediate Treatment

Walkway lighting and curved fencing could be added on both sides of the crossing with the short-term treatment, which would cost approximately \$96,000 (short-term treatment cost included) for Vorhies Road crossing M-14 and \$114,000 (short-term treatment cost included) for Wagner Road crossing M-14. Refer to **Figures 5 and 6** for typical sections of a crossing with walkway lighting and curved fencing, respectively.

### Long-Term Treatment

Reconstructing the bridge to include a shared path with a separation barrier, curved fencing, and overhead lighting on both sides of the crossing would cost approximately \$4,755,000 at Vorhies Road crossing M-14 and \$5,638,000 at Wagner Road crossing M-14. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$1,522,000 at Vorhies Road crossing M-14 and \$1,804,000 at Wagner Road crossing M-14. Refer to **Figure 8** for a typical section of a crossing with a shared path.

### Other Considerations

- With a bridge condition rating of five, preventative maintenance is expected to be performed. The bicycle warning signs with plaques could be coordinated during this time.
- A reduced shared path width of eight feet may be suitable for Vorhies Road since the area is more rural.

### 6.6.13 Willis Road Crossing US-23

#### Background

Willis Road crossing US-23 has an available roadway width of 5.1 feet and a length of 265 feet. Non-motorized facilities on this crossing include fencing. There are not any non-motorized facilities adjacent to this crossing. **Figure 91** shows a street view of this crossing.



Source: Google Earth

**Figure 91: Street View of Willis Road Crossing US-23 Facing East**

#### Short-Term Treatment

A westbound Bicycle Warning sign and a SHARE THE ROAD plaque could be added in advance of the crossing, which would cost approximately \$250. **Figure 92** shows a concept of the proposed bicycle warning signs and plaques at this crossing.



**Figure 92: Proposed Bicycle Warning Signs and Plaques at Willis Road Crossing US-23**

### Intermediate Treatment

Westbound walkway lighting could be added on one side of the crossing with the short-term treatment, which would cost approximately \$27,000 (short-term treatment cost included). Refer to **Figure 5** for a typical section of a crossing with walkway lighting (one side only).

### Long-Term Treatment

Reconstructing the bridge to include a westbound shared path with a separation barrier, curved fencing, and overhead lighting on one side of the crossing would cost approximately \$1,988,000. Adding these items by only widening the existing crossing without having to reconstruct the entire bridge would cost approximately \$636,000. Refer to **Figure 8** for a typical section of a crossing with a shared path (one side only).

### Other Considerations

- With a bridge condition rating of four, rehabilitation is expected to be performed. The bicycle warning sign and plaque and walkway lighting could be coordinated during this time.
- No eastbound treatments are being proposed due to the free-flow northbound on-ramp.
- A reduced shared path width of eight feet may be suitable since the area is more rural.

## SECTION 7.0 — CONCLUSION

Short-term, intermediate, and long-term treatments were developed to improve non-motorized travel and safety at 53 different freeway crossings. These crossings are located throughout Washtenaw County over US-23, I-94, and M-14. These improvements will increase the mobility and safety for residents and visitors seeking non-motorized travel options for work and recreational activities. These improvements will also help standardize outdated pedestrian and bicycle facilities at crossings where non-motorized facilities adjacent to the crossing exist.

To help develop and determine the feasibility of non-motorized improvements specific to each crossing, existing characteristics were collected, best practices and standards were reviewed, and the following tasks were created to develop an implementation plan

- Developed Short-Term Treatments
- Developed Intermediate Treatments
- Developed Long-Term Treatments
- Determined Interchange Treatments
- Estimated Improvement Costs
- Recommended Treatments

The findings from this study indicate 22 out of 53 crossings have a sidewalk and/or bike lane or shared path, while 31 crossings do not have any non-motorized crossing treatment. Nearly all the freeway crossings evaluated have recommendations for short-term or intermediate treatment to help improve non-motorized access. These improvements included adding a bike or shared lane, walkway lighting, curved fencing, and/or a separation barrier separating non-motorized users from motorists. These improvements are particularly applicable for crossings having a good to fair bridge rating and will not be reconstructed in the near future.

If a crossing is at the end of its service life and reconstruction is required, long-term treatment should be considered. Long-term treatment would be a shared path with a separation barrier, curved fencing, and overhead lighting. This improvement requires a large available roadway width, but it is assumed the entire bridge will be reconstructed or widened, and no limitations on clear roadway width would be in place. This improvement is considered one of the best non-motorized facilities and accommodates all road users.

Proper planning of a crossing should be inclusive of all road users and have a Complete Streets mentality. All modes of transportation, including walking and biking, should be integrated into the planning, design, construction, maintenance, and operation of each crossing. The main objective of this project was achieved by providing non-motorized improvements that can be applied to various types of crossings. Not only do these improvements increase safety, but they should encourage more non-motorized users to use the roadway and increase pedestrian and bike travel. When preventative maintenance, rehabilitation, or reconstruction is scheduled for a crossing, it is recommended to review the non-motorized needs of the community and implement a desirable treatment to improve non-motorized travel and safety.

*Appendix A — Existing Characteristics Log*

Existing Characteristics Log

Name	Roads NFC	Class.	Area Type	X Coord	Y Coord	Structure No.	Adjacent Ramps	Adjacent Free-Flow Lane	Clear Road	Area	Length	ADT	Lanes	Speed Limit	Year Built	Year Reconstructed	Structure Type	Operation	Deck Condition	Superstructure Condition	Substructure Condition	Lowest Rating
Ann Arbor-Saline Rd & I-94	City-Trunkline	Arterial	Urban	-83.763317	42.2456	10834	Yes	Yes	79.3	19662	247.9	23,043	6	45	1974	-	Steel	Open	6	6	7	6
Baker Rd & I-94	County-Trunkline	Arterial	Urban	-83.878047	42.298361	10945	Yes	No	80	23760	297.0	12,582	5	40	2006	-	Concrete	Open	7	7	6	6
Bemis Rd & US-23	County-Trunkline	Arterial	Urban	-83.68459	42.171545	10895	No	-	28	6446	230.2	150	2	55	1962	-	Concrete	Open	6	5	7	5
Carpenter Rd & I-94	County-Trunkline	Arterial	Urban	-83.679925	42.224628	10840	No	-	64	18525	289.5	14,290	5	45	1975	-	Steel	Open	6	7	6	6
Carpenter Rd & US-23	County-Trunkline	Arterial	Urban	-83.676631	42.10059	10891	Yes	Yes	41	15304	373.3	8,291	3	30	1962	1998	Steel	Open	6	5	6	5
Curtis Rd & M-14	County-Trunkline	Collector	Rural	-83.605909	42.338835	10922	No	-	42	14442	343.9	2,328	2	45	1975	2006	Steel	Open	6	7	6	6
Dexter Rd/Dexter-Ann Arbor Rd & M-14	County-Trunkline	Arterial	Urban	-83.797378	42.290874	10953	No	-	29.9	10825	362.0	5,700	2	35	1966	2000	Steel	Open	5	5	6	5
Dixboro Rd & M-14	County-Trunkline	Collector	Rural	-83.661638	42.325452	10915	No	-	28	8522	304.4	5,047	2	45	1964	-	Concrete	Open	6	6	6	6
Earhart Rd & US-23	County-Trunkline	Collector	Urban	-83.682589	42.294281	10872	No	-	26.8	9792	365.4	2,226	2	35	1962	-	Steel	Open	7	5	6	5
Eight Mile Rd & US-23	County-Trunkline	Collector	Urban	-83.766804	42.428995	10885	Yes	Roundabout	34	8302	244.2	7,650	2	25	2017	-	Concrete	Open	7	9	6	6
Ellsworth Rd & I-94	County-Trunkline	Arterial	Urban	-83.695417	42.230264	10842	No	-	64	38354	599.3	14,670	4	45	1995	-	Steel	Open	7	6	7	6
Ellsworth Rd & US-23	County-Trunkline	Arterial	Urban	-83.685172	42.230619	10874	No	-	61	18583	304.6	11,652	4	45	1962	-	Concrete	Open	6	6	6	6
Freer Rd & I-94	County-Trunkline	Local	Rural	-84.005504	42.295866	10940	No	-	28.5	6855	240.5	150	2	55	1960	-	Concrete	Open	6	6	6	6
Geddes Rd & US-23	County-Trunkline	Arterial	Urban	-83.676105	42.274434	10871	Yes	Roundabout	28	8943	319.4	14,424	2	40	1961	-	Steel	Open	6	5	6	5
Golfredson Rd & M-14	County-Trunkline	Arterial	Rural	-83.567714	42.361598	10924	Yes	No	41.7	12825	307.6	5,244	2	55	1975	2006	Steel	Open	7	7	6	6
Grove St & I-94	City-Trunkline	Arterial	Urban	-83.599974	42.231455	10848	No	-	52	23572	453.3	6,486	3	25	1972	-	Steel	Open	6	6	5	5
Harris Rd & I-94	County-Trunkline	Arterial	Urban	-83.582542	42.231323	10854	No	-	33.8	18075	534.8	5,500	2	35	1971	2005	Steel	Open	6	6	6	6
Huron River Dr & M-14 (Underpass)	City-Trunkline	Arterial	Urban	-83.747672	42.299927	10957	-	-	-	-	-	1,241	2	35	-	-	-	-	-	-	-	-
Huron River Dr & US-23 (Underpass)	County-Trunkline	Arterial	Urban	-83.67891	42.264175	10869/10870	-	-	-	-	-	6,215	2	35	-	-	-	-	-	-	-	-
Huron St/Hamilton St & I-94	Trunkline-Trunkline	Arterial	Urban	-83.616886	42.228925	10847	Yes	Yes	71.5	21074	294.7	31,936	5	45	1969	1998	Steel	Open	6	5	6	5
Joy Rd & M-14	County-Trunkline	Local	Rural	-83.593926	42.34807	10923	No	-	36.5	13090	358.6	220	2	55	1975	-	Steel	Open	6	7	7	6
Joy Rd & US-23	County-Trunkline	Local	Rural	-83.745547	42.343373	10880	No	-	27.1	5682	209.7	5,682	2	55	1962	-	Concrete	Posted	6	5	7	5
Kalmbach Rd & I-94	County-Trunkline	Collector	Rural	-84.093912	42.297411	10936	Yes	No	28.5	7770	272.6	1,349	2	55	1960	-	Steel	Open	4	6	6	4
Liberty Rd & I-94	City-Trunkline	Arterial	Urban	-83.784384	42.272559	10832	No	-	27.9	6306	226.0	10,376	2	35	1956	-	Concrete	Open	6	5	6	5
Main St/Chelsea Manchester Rd & I-94	Trunkline-Trunkline	Arterial	Urban	-84.026999	42.294571	10939	Yes	No	56.8	14198	250.0	6,756	3	45	1960	-	Steel	Open	5	5	6	5
Milan Oakville Rd/County St & US-23	City-Trunkline	Arterial	Urban	-83.671811	42.084318	7087	No	-	27.9	4876	174.8	881	2	40	1950	-	Steel	Open	6	6	6	6
Miller Rd & M-14	City-Trunkline	Arterial	Urban	-83.786897	42.298143	10954	Yes	No	28.5	9264	325.1	8,611	2	50	1966	-	Steel	Open	4	5	7	4
Napier Rd & M-14	County-Trunkline	Collector	Rural	-83.548449	42.367239	11355	No	-	44.3	14600	329.6	1,645	2	55	1975	-	Steel	Open	6	7	6	6
Newport Rd & M-14	City-Trunkline	Collector	Urban	-83.765926	42.298909	10955	No	-	26	8179	314.6	1,624	2	25	1966	-	Concrete	Open	6	6	6	6
Nixon Rd & US-23	County-Trunkline	Collector	Rural	-83.707931	42.324003	10911	No	-	29.5	6888	233.5	775	2	30	1962	1999	Concrete	Open	7	6	6	6
North Territorial Rd & US-23	County-Trunkline	Arterial	Urban	-83.757101	42.379604	10881	Yes	Roundabout	44	8357	189.9	9,666	2	50	2017	-	Concrete	Open	7	9	7	7
Old US-12/Jackson Rd & I-94	County-Trunkline	Arterial	Rural	-83.974048	42.29786	10941	Yes	No	29.2	7808	267.4	9,461	2	45	1960	-	Steel	Open	5	5	6	5
Packard St & US-23 (Underpass)	County-Trunkline	Arterial	Urban	-83.683386	42.245486	10865/10866	-	-	-	-	-	21,007	4	40	-	-	-	-	-	-	-	-
Parker Rd & I-94	County-Trunkline	Arterial	Rural	-83.898415	42.297765	10944	No	-	29.2	8275	283.4	2,534	2	55	1961	-	Concrete	Open	5	5	6	5
Platt Rd & I-94	City-Trunkline	Arterial	Urban	-83.699819	42.232491	10837	No	-	64	20200	315.6	14,700	5	35	1998	-	Steel	Open	7	7	6	6
Plymouth Rd & US-23	County-Trunkline	Arterial	Urban	-83.687028	42.306639	10873	Yes	No	52.3	18227	348.5	10,000	4	45	1962	-	Steel	Open	6	6	6	6
Pontiac Tr & EB US-23/M-14	County-Trunkline	Arterial	Rural	-83.735851	42.321584	10910	No	-	31.8	6226	195.8	2,300	2	45	1962	-	Concrete	Open	4	5	5	4
Pontiac Tr & WB US-23/M-14	County-Trunkline	Arterial	Rural	-83.735294	42.319834	10909	No	-	31.8	4758	149.6	2,300	2	45	1962	-	Concrete	Open	6	5	6	5
Rawsonville Rd & I-94	County-Trunkline	Arterial	Urban	-83.545862	42.218445	10823	Yes	No	69.9	21862	312.8	23,491	4	40	1973	-	Steel	Open	6	6	5	5
Scio Church Rd & I-94	County-Trunkline	Arterial	Urban	-83.777527	42.256253	10833	No	-	28.2	8262	293.0	11,472	2	35	1956	-	Concrete	Open	5	5	5	5
Six Mile Rd & US-23	County-Trunkline	Collector	Urban	-83.763576	42.394497	10882	Yes	No	34	9351	275.0	5,625	2	35	2017	-	Concrete	Open	7	9	7	7
State St & I-94	City-Trunkline	Arterial	Urban	-83.739133	42.237044	10835	Yes	Yes	117.8	27331	232.0	30,883	6	35	1972	-	Steel	Open	6	6	6	6
Stone School Rd & I-94	City-Trunkline	Collector	Urban	-83.720104	42.237355	10836	No	-	25.9	5394	208.3	350	2	35	1954	-	Concrete	Open	6	5	6	5
Stony Creek Rd & US-23	County-Trunkline	Collector	Rural	-83.683127	42.131551	10893	No	-	30.5	8039	263.6	3,115	2	55	1962	-	Steel	Open	4	6	6	4
US-12 & I-94	Trunkline-Trunkline	Arterial	Urban	-83.651181	42.224364	10841	Yes	Yes	91.9	39949	434.7	20,815	6	45	1975	-	Steel	Open	6	5	6	5
US-12 & US-23	Trunkline-Trunkline	Arterial	Urban	-83.684817	42.205967	10896	Yes	No	34.5	9936	288.0	26,231	2	45	1962	-	Steel	Open	6	6	7	6
Vorhies Rd & M-14	County-Trunkline	Local	Rural	-83.645471	42.325719	10916	No	-	25.9	8209	316.9	250	2	45	1964	-	Concrete	Open	6	5	7	5

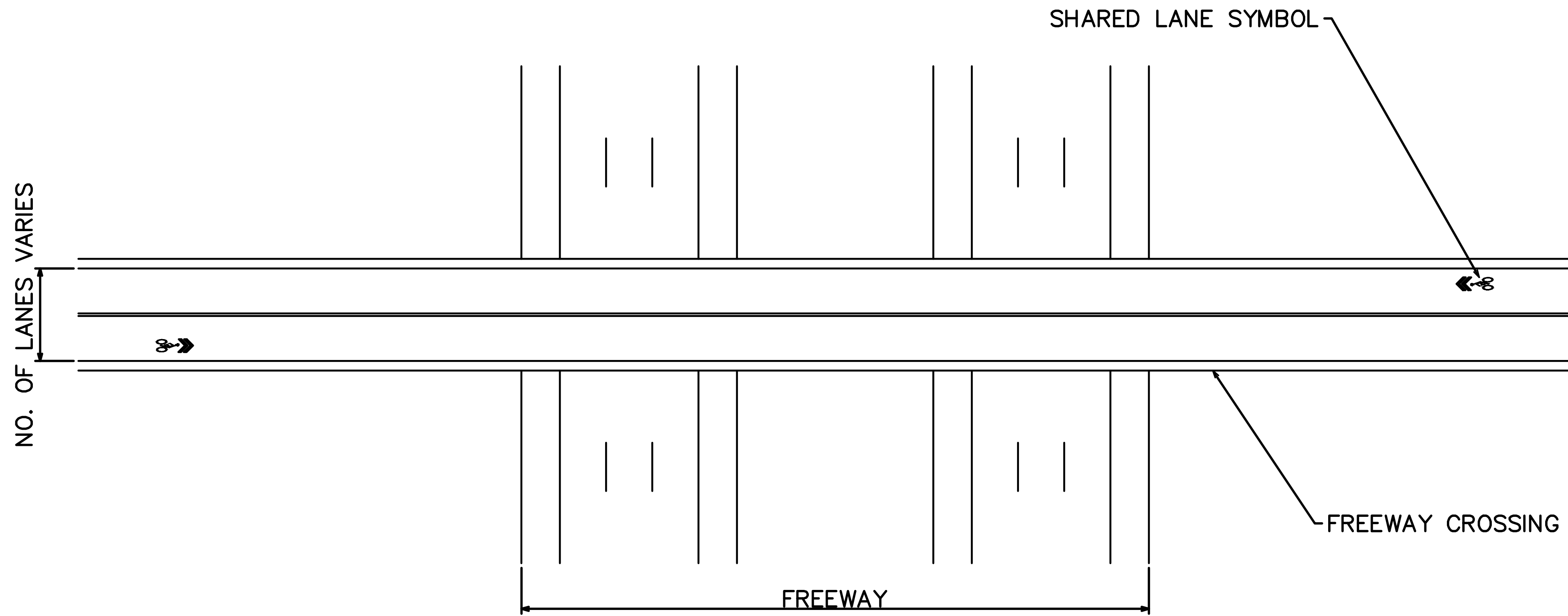
**Existing Characteristics Log**

Name	Roads NFC	Class.	Area Type	X Coord	Y Coord	Structure No.	Adjacent Ramps	Adjacent Free-Flow Lane	Clear Road	Area	Length	ADT	Lanes	Speed Limit	Year Built	Year Reconstructed	Structure Type	Operation	Deck Condition	Superstructure Condition	Substructure Condition	Lowest Rating
Wagner Rd & I-94	County-Trunkline	Arterial	Urban	-83.799501	42.287129	10948	No	-	29.2	5733	196.3	12,183	2	45	1960	-	Concrete	Open	6	6	6	6
Wagner Rd & M-14	County-Trunkline	Arterial	Urban	-83.79956	42.289658	10951	No	-	25.9	9734	375.8	12,183	2	45	1966	-	Steel	Open	5	6	6	5
Warren Rd & US-23	County-Trunkline	Local	Rural	-83.742988	42.330544	10879	No	-	27.1	5707	210.6	100	2	55	1962	-	Concrete	Open	5	5	7	5
Willis Rd & US-23	County-Trunkline	Arterial	Rural	-83.684019	42.156878	10894	Yes	Yes	33.1	8770	265.0	5,627	2	45	1962	-	Steel	Open	4	6	6	4
Willow Rd & US-23	County-Trunkline	Collector	Rural	-83.682445	42.113187	10892	No	-	28	6508	232.4	2,220	2	55	1962	-	Concrete	Open	6	7	7	6
Zeeb Rd & I-94	County-Trunkline	Arterial	Urban	-83.838697	42.291439	10946	Yes	No	76.4	26505	346.9	18,625	5	45	2002	-	Concrete	Open	5	7	7	5

*Appendix B — Conceptual Plans for Treatments*







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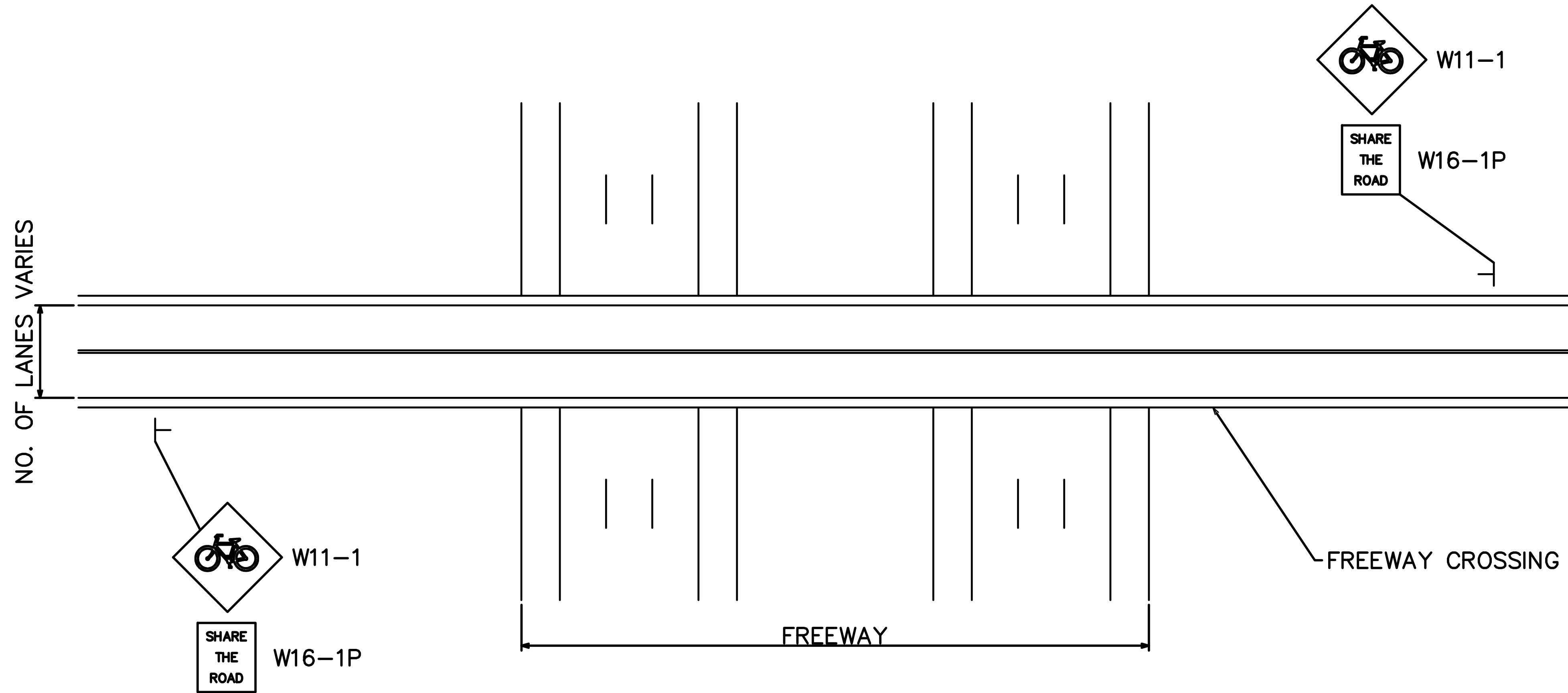


DATE	ADDITIONS AND/OR REVISIONS
DESIGNED	NBN
DRAWN	NBN
CHECKED	
APPROVED	

**WASHTENAW AREA TRANSPORTATION STUDY**  
**FREEWAY CROSSING**  
**NON-MOTORIZED**  
**RETROFIT**

SHARED LANES  
 ON  
 CROSSING

HRC JOB NO. 20191021	SCALE NTS
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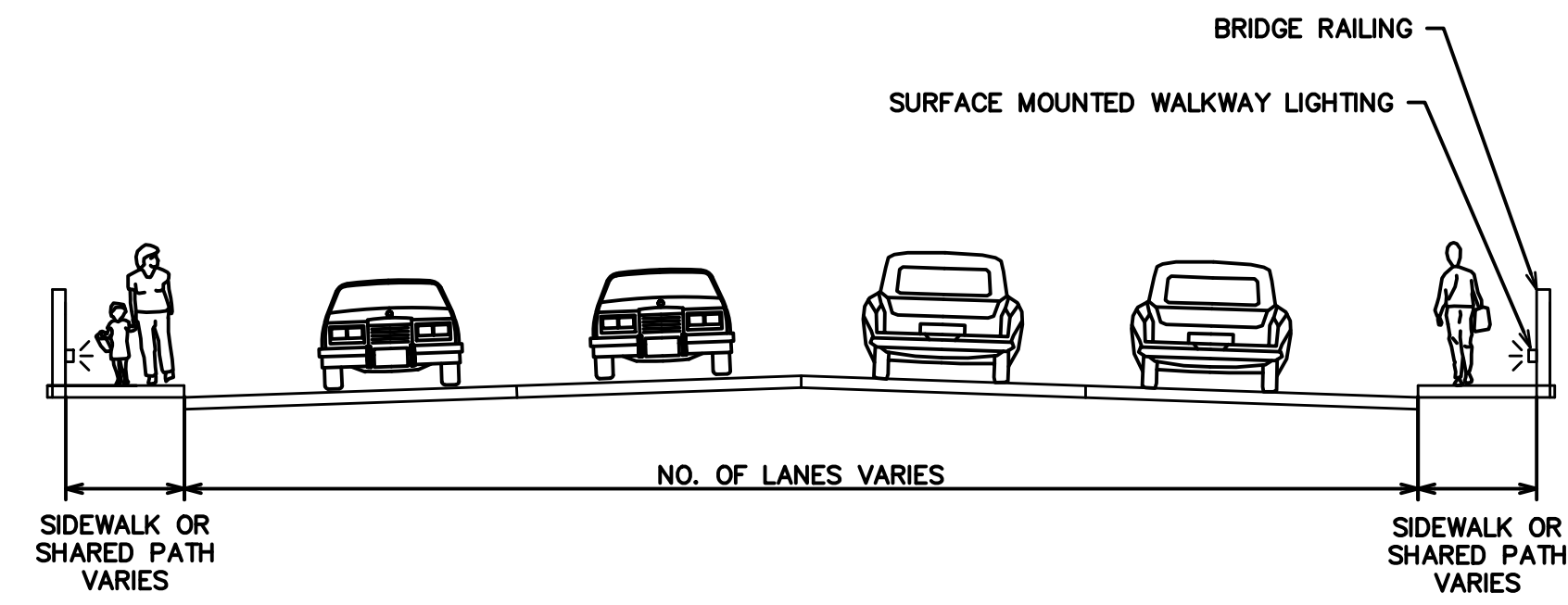


DATE	ADDITIONS AND/OR REVISIONS
DESIGNED	NBN
DRAWN	NBN
CHECKED	
APPROVED	

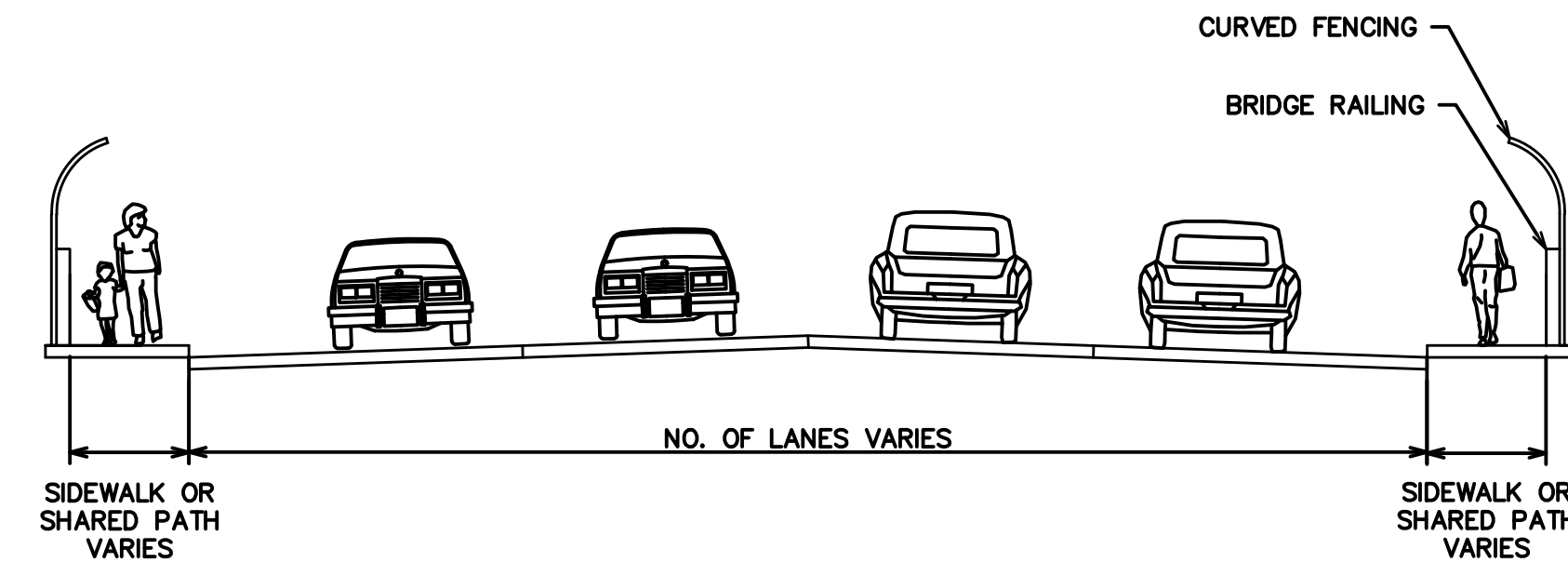
**WASHTENAW AREA TRANSPORTATION STUDY**  
**FREEWAY CROSSING**  
**NON-MOTORIZED**  
**RETROFIT**

BICYCLE WARNING  
 ON  
 CROSSING

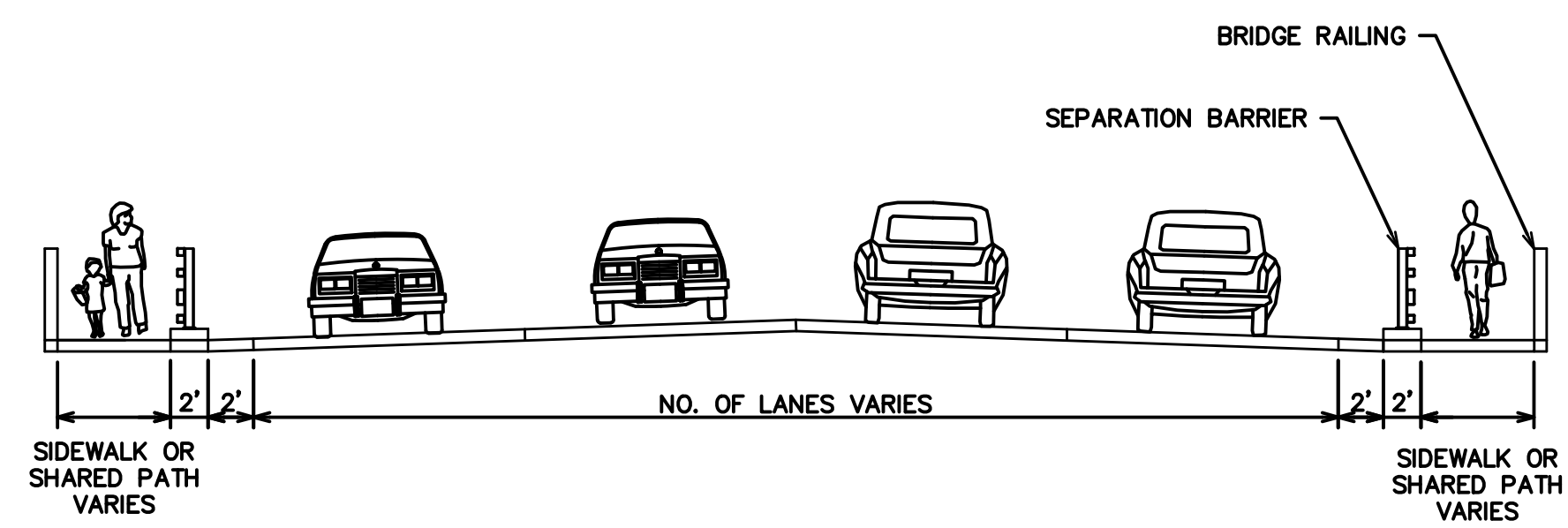
HRC JOB NO. 20191021	SCALE NTS
DATE June 2020	SHEET NO. 3



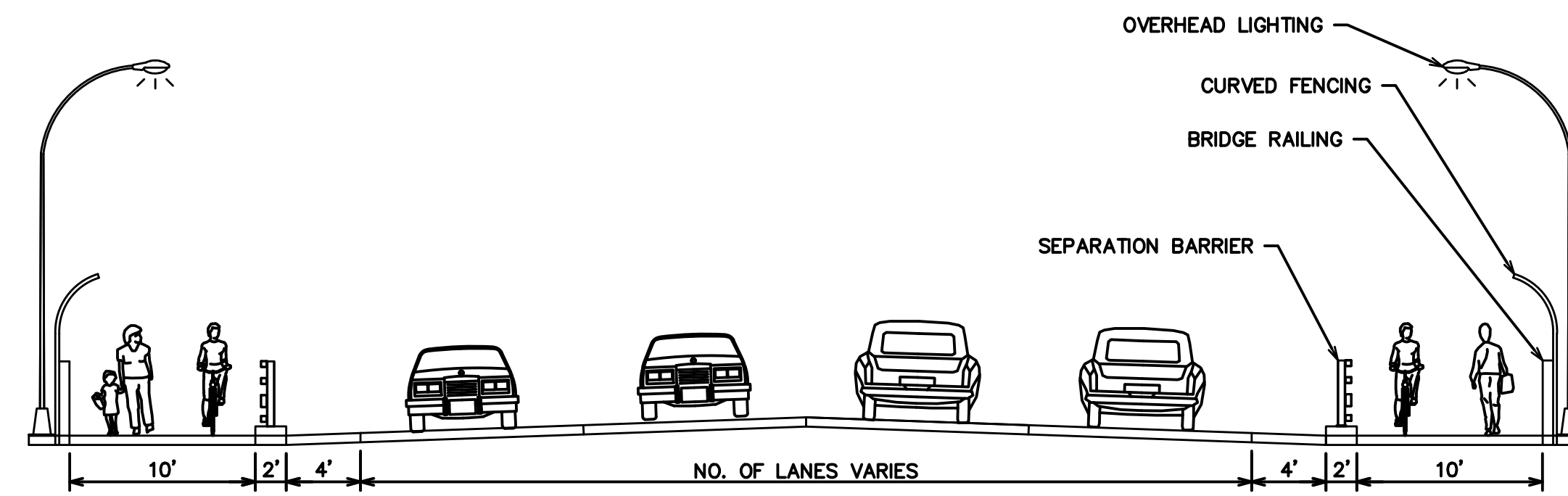
**TYPICAL SECTION – SURFACE MOUNTED WALKWAY LIGHTING**



**TYPICAL SECTION – CURVED FENCING**



**TYPICAL SECTION – SEPARATION BARRIER**



**TYPICAL SECTION – SHARED PATH WITH SEPARATION BARRIER, CURVED FENCING, LIGHTING**



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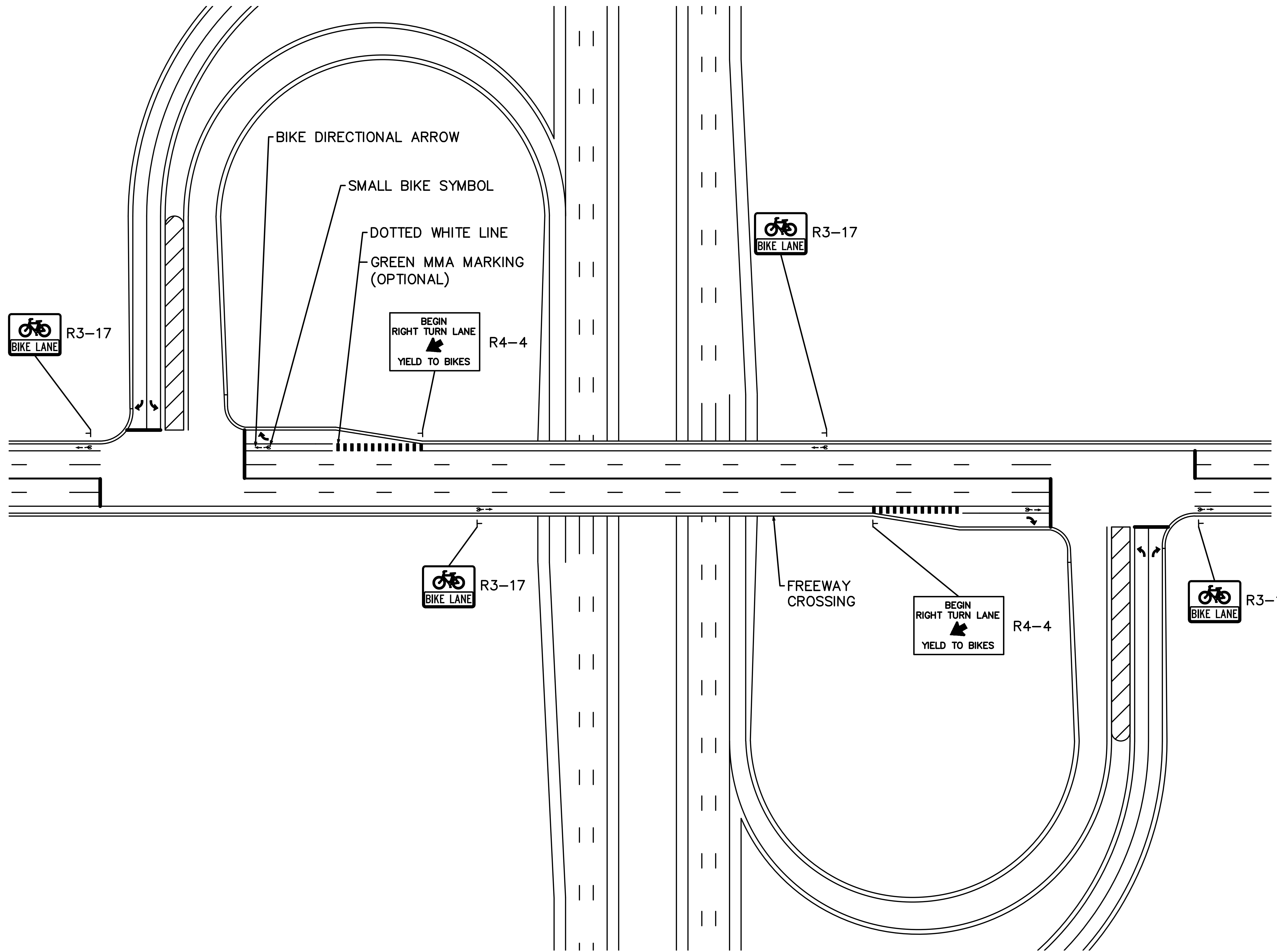


DATE	ADDITIONS AND/OR REVISIONS
DESIGNED	NBN
DRAWN	NBN
CHECKED	
APPROVED	

**WASHTENAW AREA TRANSPORTATION STUDY**  
**FREWAY CROSSING**  
**NON-MOTORIZED**  
**RETROFIT**

INTERMEDIATE  
 AND LONG-TERM  
 TREATMENTS

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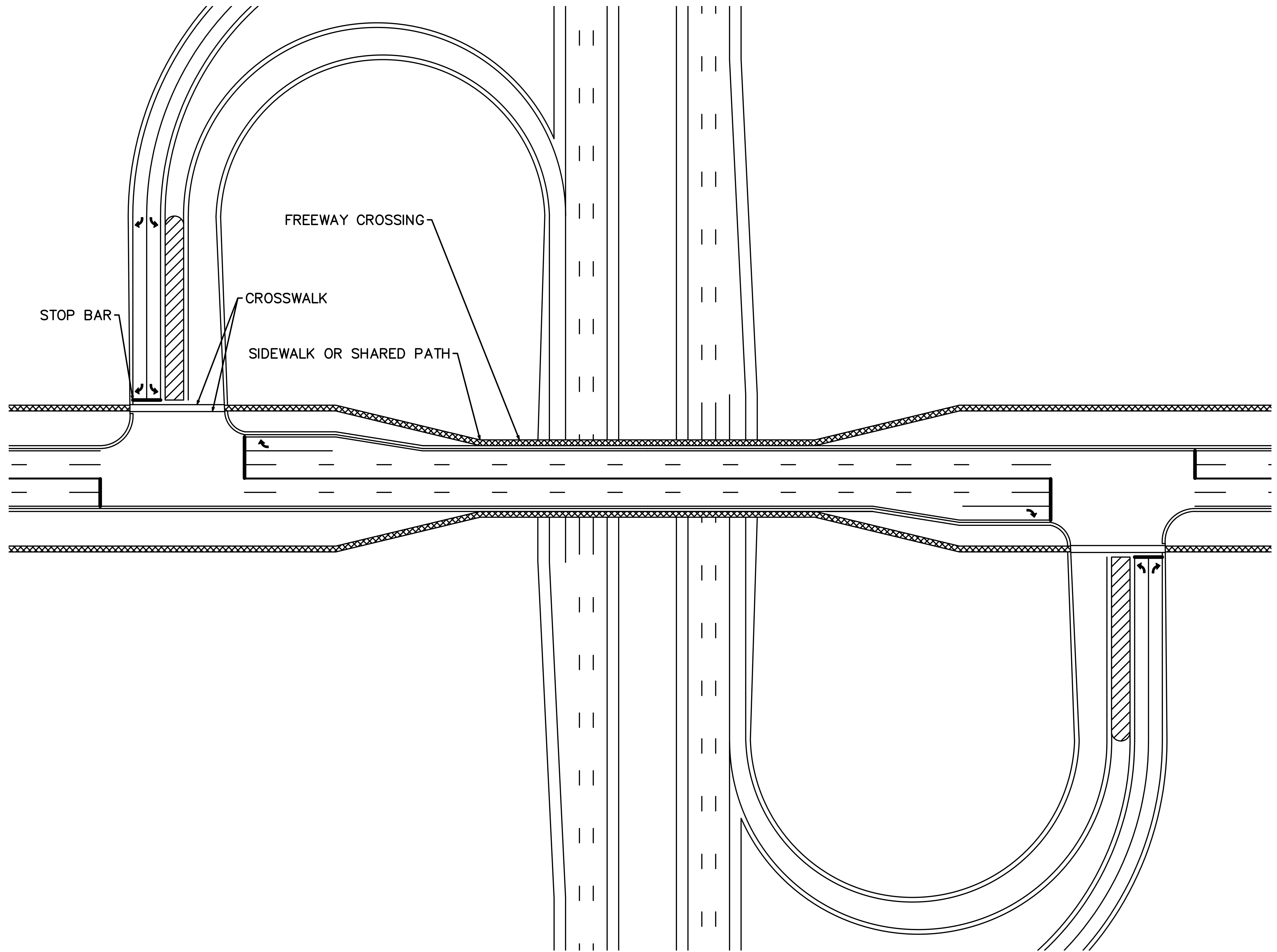


DATE	ADDITIONS AND/OR REVISIONS
DESIGNED	NBN
DRAWN	NBN
CHECKED	
APPROVED	

**WASHTENAW AREA TRANSPORTATION STUDY**  
**FREEWAY CROSSING**  
**NON-MOTORIZED**  
**RETROFIT**

**BIKE LANES**  
**AT**  
**FREEWAY RAMPS**

HRC JOB NO. 20191021	SCALE NTS
DATE June 2020	SHEET NO. 5



**HRC**  
**HUBBELL, ROTH & CLARK, INC**  
 CONSULTING ENGINEERS SINCE 1915  
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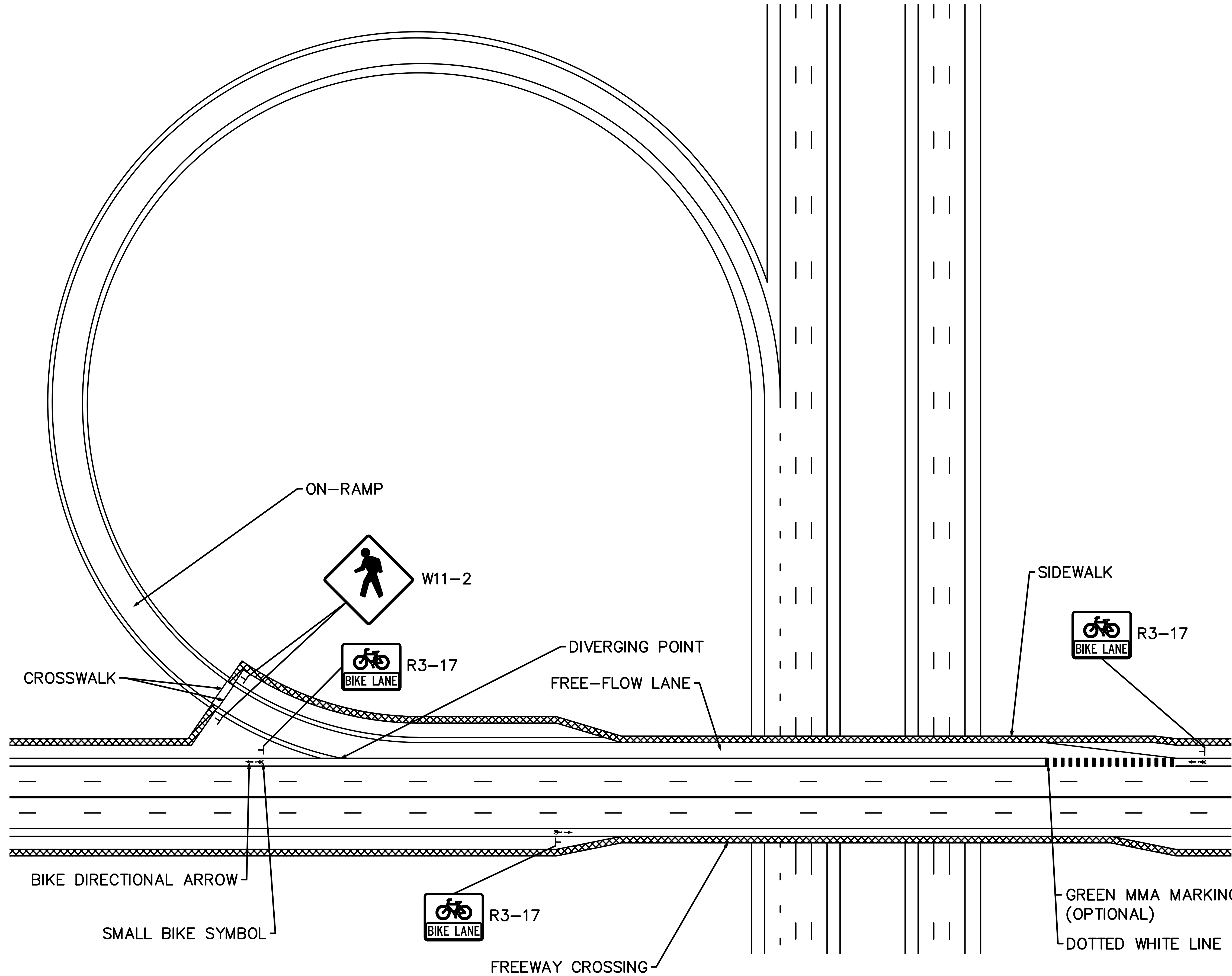
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**WASHTENAW AREA TRANSPORTATION STUDY**  
**FREEWAY CROSSING**  
**NON-MOTORIZED**  
**RETROFIT**

SIDEWALK OR SHARED PATH  
 AT  
 FREEWAY RAMPS

HRC JOB NO. 20191021	SCALE NTS
DATE June 2020	SHEET NO. 6





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**WASHTENAW AREA TRANSPORTATION STUDY**  
**FREEWAY CROSSING**  
**NON-MOTORIZED**  
**RETROFIT**

BIKE LANE AND SIDEWALK  
 AT  
 FREE-FLOW ON-RAMP

HRC JOB NO. 20191021	SCALE NTS
DATE June 2020	SHEET NO. 8



*Appendix C — Non-Motorized Facilities Recommendations Log*

**Freeway Crossing Non-Motorized Facilities Recommendations Log**

Name	Width Available (11' Lanes)	Width Available (12' Lanes)	Category	Non-Motorized Facilities	Adjacent Non-Motorized Facilities	Lighting	Barrier	Fencing	Short-Term Improvement (Signs/Pavt Mrkgs)	Short-Term Improvement Cost	Intermediate Improvement (Rehabilitation)	Intermediate Improvement Cost	Long-Term Improvement (Reconstruction)	Long-Term Improvement Cost (Reconstruct)	Long-Term Improvement Cost (Widening)	Comments
Ann Arbor-Saline Rd & I-94	9.3	3.3	4+ Lanes, Width Available	NEB Sidewalk; Bike Lanes	NEB Sidewalk; Bike Lanes	Yes	Yes	Yes	-	-	-	-	-	-	-	Recently Constructed
Baker Rd & I-94	21	16	4+ Lanes, Width Available	None	None	No	No	No	6' Bike Lanes	\$3,000	Shared Path with Barrier, Fencing, Lighting	\$389,100	-	-	-	Remove Center Lane for Shared Path with Barrier
Bemis Rd & US-23	2	0	2 Lanes, Width Constrained	None	None	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Lighting	\$46,543	Shared Paths with Barrier; Fencing; Lighting	\$3,453,214	\$1,105,029	
Carpenter Rd & I-94	16	12	4+ Lanes, Width Available	Sidewalk	SB Sidewalk; Bike Lanes South of Crossing	No	Yes	Yes	6' Bike Lanes	\$3,000	6' Bike Lanes; Lighting	\$60,891	-	-	-	Remove Center Lane for Bike Lanes
Carpenter Rd & US-23	4	1	3 Lanes, Width Constrained	None	None	No	No	No	SB Shared Lane	\$2,500	SB Shared Lane; Lighting	\$39,827	SB Shared Path with Barrier; Fencing; Lighting	\$3,303,424	\$895,844	
Curtis Rd & M-14	16	14	2 Lanes, Width Available	None	None	No	No	No	6' Bike Lanes	\$3,000	6' Bike Lanes or Sidewalk with Barrier & Fencing; Lighting	\$71,771; \$447,014	Shared Paths with Barrier; Fencing; Lighting	\$5,157,857	\$1,650,514	
Dexter Rd/Dexter-Ann Arbor Rd & M-14	7.9	5.9	2 Lanes, Width Constrained	Sidewalk	EB Sidewalk	No	No	No	Shared Lanes	\$2,500	Shared Lanes; Fencing; Lighting	\$111,112	Shared Paths with Barrier; Fencing; Lighting	\$5,430,602	\$1,737,793	
Dixboro Rd & M-14	6	4	2 Lanes, Width Constrained	None	None	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Lighting	\$61,371	Shared Paths with Barrier; Fencing; Lighting	\$4,565,357	\$1,460,914	
Earhart Rd & US-23	0.8	0	2 Lanes, Width Constrained	None	None	No	No	No	Shared Lanes	\$2,500	Shared Lanes; Lighting	\$75,575	Shared Paths with Barrier; Fencing; Lighting	\$5,480,597	\$1,753,791	
Eight Mile Rd & US-23	12	10	2 Lanes, Width Available	Sidewalk	None	No	No	Yes	5' Bike Lanes	\$3,000	5' Bike Lanes; Lighting	\$51,835	-	-	-	Roundabouts at Ramps
Ellsworth Rd & I-94	16	12	4 Lanes, Width Available	Bike Lanes	Bike Lanes	No	No	No	Bike Lane Pavt Mrkgs & Signage	\$500	Bike Lane Pavt Mrkgs & Signage; Lighting	\$120,356	Shared Paths with Barrier; Fencing; Lighting	\$12,225,338	\$2,876,550	
Ellsworth Rd & US-23	13	9	4 Lanes, Width Available	Bike Lanes	Bike Lanes	No	No	No	Bike Lane Pavt Mrkgs & Signage	\$500	Bike Lane Pavt Mrkgs & Signage; Lighting	\$61,428	Shared Paths with Barrier; Fencing; Lighting	\$6,214,643	\$1,462,269	
Freer Rd & I-94	2.5	0.5	2 Lanes, Width Constrained	None	None	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Lighting	\$48,605	Shared Paths with Barrier; Fencing; Lighting	\$3,607,895	\$1,154,526	
Geddes Rd & US-23	6	4	2 Lanes, Width Constrained	Sidewalk; EB Shared Path Bridge	EB Shared Path	No	Yes	Yes	-	-	Lighting	\$63,879	-	-	-	Recently Constructed
Gottfredson Rd & M-14	15.7	13.7	2 Lanes, Width Available	None	None	No	No	No	6' Bike Lanes	\$3,000	6' Bike Lanes or Sidewalk with Barrier & Fencing; Lighting	\$64,511; \$399,820	Shared Paths with Barrier; Fencing; Lighting	\$4,613,309	\$1,476,259	ADT from MDOT AADT Maps
Grove St & I-94	19	16	3 Lanes, Width Available	Sidewalk; Bike Lanes	Sidewalk; Bike Lanes	Yes	No	No	Bike Lane Signage	\$500	Bike Lane Signage; Fencing	\$45,831	-	-	-	
Harris Rd & I-94	11.8	9.8	2 Lanes, Width Available	Sidewalk	Sidewalk	Yes	No	No	5.9' Bike Lanes	\$3,000	5.9' Bike Lanes; Fencing	\$56,476	Shared Paths with Barrier; Fencing; Lighting	\$8,021,450	\$2,566,864	Reduce Lanes to 11' for Bike Lanes
Huron River Dr & M-14 (Underpass)	-	-	2 Lanes, Width Available	None	None	No	No	No	-	-	-	-	-	-	-	Underpass
Huron River Dr & US-23 (Underpass)	-	-	2 Lanes, Width Available	None	None	No	No	No	-	-	-	-	-	-	-	Underpass
Huron St/Hamilton St & I-94	12.5	7.5	4+ Lanes, Width Available	None	SB Sidewalk	No	No	No	-	-	-	-	-	-	-	Ongoing Planning Effort
Joy Rd & M-14	10.5	8.5	2 Lanes, Width Available	None	None	No	No	No	5' Bike Lanes	\$3,000	5' Bike Lanes; Lighting	\$74,726	Shared Paths with Barrier; Fencing; Lighting	\$5,379,452	\$1,721,425	Reduce Lanes to 11' for Bike Lanes
Joy Rd & US-23	1.1	0	2 Lanes, Width Constrained	None	None	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Lighting	\$42,434	Shared Paths with Barrier; Fencing; Lighting	\$3,145,018	\$1,006,406	
Kalmbach Rd & I-94	2.5	0.5	2 Lanes, Width Constrained	None	None	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Lighting	\$55,026	Shared Paths with Barrier; Fencing; Lighting	\$4,089,474	\$1,308,632	
Liberty Rd & I-94	1.9	0	2 Lanes, Width Constrained	EB Sidewalk	Sidewalk; Bike Lanes	No	Yes	Yes	Shared Lanes	\$2,500	Shared Lanes; Lighting	\$47,704	Shared Paths with Barrier; Fencing; Lighting	\$3,390,323	\$1,084,903	EB Sidewalk May Be Salvagable for Shared Path
Main St/Chelsea Manchester Rd & I-94	19.8	16.8	3 Lanes, Width Available	None	None	No	No	No	6' Bike Lanes	\$3,000	6' Bike Lanes or Sidewalk with Barrier & Fencing; Lighting	\$52,993; \$324,954	Shared Paths with Barrier; Fencing; Lighting	\$4,424,377	\$1,199,831	
Milan Oakville Rd/County St & US-23	5.9	3.9	2 Lanes, Width Constrained	WB Sidewalk	WB Sidewalk	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; WB Fencing; Lighting	\$26,715	Shared Paths with Barrier; Fencing; Lighting	\$2,621,505	\$838,882	
Miller Rd & M-14	6.5	4.5	2 Lanes, Width Constrained	Sidewalk	SEB Sidewalk	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Fencing; Lighting	\$98,016	Shared Paths with Barrier; Fencing; Lighting	\$4,875,789	\$1,560,253	Clear Road from Field Measurements
Napier Rd & M-14	18.3	16.3	2 Lanes, Width Available	None	None	No	No	No	6' Bike Lanes	\$3,000	6' Bike Lanes or Sidewalk with Barrier & Fencing; Lighting	\$68,914; \$428,442	Shared Paths with Barrier; Fencing; Lighting	\$4,943,567	\$1,581,941	ADT from MDOT AADT Maps
Newport Rd & M-14	4	2	2 Lanes, Width Constrained	Sidewalk; NB Bicycle Warning Sign with Share the Road Plaque	SB Sidewalk; SB Shared Lane South of Crossing; NB Bike Lane	No	No	Yes	Shared Lanes	\$2,500	Shared Lanes; Lighting	\$65,415	Shared Paths with Barrier; Fencing; Lighting	\$4,718,654	\$1,509,969	
Nixon Rd & US-23	3.5	1.5	2 Lanes, Width Constrained	None	None	No	No	No	Shared Lanes	\$2,500	Shared Lanes; Lighting	\$49,198	Shared Paths with Barrier; Fencing; Lighting	\$3,502,373	\$1,120,759	

**Freeway Crossing Non-Motorized Facilities Recommendations Log**

Name	Width Available (11' Lanes)	Width Available (12' Lanes)	Category	Non-Motorized Facilities	Adjacent Non-Motorized Facilities	Lighting	Barrier	Fencing	Short-Term Improvement (Signs/Pavt Mrkgs)	Short-Term Improvement Cost	Intermediate Improvement (Rehabilitation)	Intermediate Improvement Cost	Long-Term Improvement (Reconstruction)	Long-Term Improvement Cost (Reconstruct)	Long-Term Improvement Cost (Widening)	Comments
North Territorial Rd & US-23	18	16	2 Lanes, Width Available	None	None	No	No	No	6' Bike Lanes	\$3,000	6' Bike Lanes or Sidewalk with Barrier & Fencing; Lighting	\$40,986; \$246,911	Shared Paths with Barrier; Fencing; Lighting	\$2,848,977	\$911,673	Roundabouts at Ramps
Old US-12/Jackson Rd & I-94	3.2	1.2	2 Lanes, Width Constrained	None	None	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Lighting	\$53,979	Shared Paths with Barrier; Fencing; Lighting	\$4,010,959	\$1,283,507	
Packard St & US-23 (Underpass)	-	-	4 Lanes, Width Available	Sidewalk	Sidewalk	No	Yes	Yes	-	-	-	-	-	-	-	Underpass
Parker Rd & I-94	3.2	1.2	2 Lanes, Width Constrained	None	None	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Lighting	\$57,178	Shared Paths with Barrier; Fencing; Lighting	\$4,250,856	\$1,360,274	
Platt Rd & I-94	11	4	4+ Lanes, Width Available	Sidewalk; 5.5' Bike Lanes	Sidewalk; 5.5' Bike Lanes	No	No	No	-	-	Fencing; Lighting	\$94,688	-	-	-	Center Lane Assumed to be 9 feet
Plymouth Rd & US-23	8.3	4.3	4 Lanes, Width Constrained	Sidewalk	EB Sidewalk	No	No	No	Bicycle Warning Sign with SHARE THE ROAD Plaque	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Fencing; Lighting	\$105,053	Shared Paths with Barrier; Fencing; Lighting	\$7,109,576	\$1,672,841	Reduce Lanes to 11' for 4' Shoulders
Pontiac Tr & EB US-23/M-14	5.8	3.8	2 Lanes, Width Constrained	None	Bike Lanes	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Lighting	\$39,657	Shared Paths with Barrier; Fencing; Lighting	\$2,936,792	\$939,774	
Pontiac Tr & WB US-23/M-14	5.8	3.8	2 Lanes, Width Constrained	None	None	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Lighting	\$30,425	Shared Paths with Barrier; Fencing; Lighting	\$2,244,340	\$718,189	
Rawsonville Rd & I-94	21.9	17.9	4 Lanes, Width Available	None	None	No	No	No	6' Bike Lanes	\$3,000	6' Bike Lanes or Sidewalk with Barrier & Fencing; Lighting	\$65,552; \$406,589	Shared Paths with Barrier; Fencing; Lighting	\$6,380,326	\$1,501,253	
Scio Church Rd & I-94	2.2	0.2	2 Lanes, Width Constrained	EB Sidewalk	Sidewalk	No	Yes	Yes	Shared Lanes	\$2,500	Shared Lanes; Lighting	\$61,096	Shared Paths with Barrier; Fencing; Lighting	\$4,394,681	\$1,406,298	
Six Mile Rd & US-23	12	10	2 Lanes, Width Available	Sidewalk; Bike Lanes	NWB Bike Lane; Paved Area Southeast of Crossing	No	No	Yes	Bike Lane Pavt Mrkgs & Signage	\$3,000	Bike Lane Pavt Mrkgs & Signage; Lighting	\$58,006	-	-	-	
State St & I-94	47.8	41.8	4+ Lanes, Width Available	None	Sidewalk	Yes	No	No	-	-	-	-	-	-	-	Ongoing Planning Effort
Stone School Rd & I-94	0	0	2 Lanes, Width Constrained	NB Shared Path Bridge	NB Shared Path	No	Yes	Yes	-	-	Lighting	\$41,653	-	-	-	
Stony Creek Rd & US-23	4.5	2.5	2 Lanes, Width Constrained	None	None	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Lighting	\$53,215	Shared Paths with Barrier; Fencing; Lighting	\$3,953,607	\$1,265,154	
US-12 & I-94	21.9	15.9	4+ Lanes, Width Available	None	None	No	No	No	6' NEB Bike Lane	\$3,000	NEB Shared Path with Barrier; NEB Fencing; Lighting	\$285,555	-	-	-	
US-12 & US-23	8.5	6.5	2 Lanes, Width Constrained	None	None	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Lighting	\$58,100	Shared Paths with Barrier; Fencing; Lighting	\$4,320,000	\$1,382,400	
Vorhies Rd & M-14	3.9	1.9	2 Lanes, Width Constrained	Sidewalk	None	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Fencing; Lighting	\$95,585	Shared Paths with Barrier; Fencing; Lighting	\$4,754,247	\$1,521,359	
Wagner Rd & I-94	3.2	1.2	2 Lanes, Width Constrained	None	None	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Lighting	\$39,767	Shared Paths with Barrier; Fencing; Lighting	\$2,945,034	\$942,411	
Wagner Rd & M-14	3.9	1.9	2 Lanes, Width Constrained	Sidewalk	None	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Fencing; Lighting	\$113,249	Shared Paths with Barrier; Fencing; Lighting	\$5,637,452	\$1,803,985	
Warren Rd & US-23	1.1	0	2 Lanes, Width Constrained	None	None	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Lighting	\$42,618	Shared Paths with Barrier; Fencing; Lighting	\$3,158,856	\$1,010,834	
Willis Rd & US-23	7.1	5.1	2 Lanes, Width Constrained	None	None	No	No	Yes	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$250	Bicycle Warning Signs with SHARE THE ROAD Plaques; Lighting	\$26,745	Shared Paths with Barrier; Fencing; Lighting	\$1,987,160	\$635,891	
Willow Rd & US-23	2	0	2 Lanes, Width Constrained	None	None	No	No	No	Bicycle Warning Signs with SHARE THE ROAD Plaques	\$500	Bicycle Warning Signs with SHARE THE ROAD Plaques; Lighting	\$46,986	Shared Paths with Barrier; Fencing; Lighting	\$3,486,429	\$1,115,657	
Zeeb Rd & I-94	19.4	14.4	4+ Lanes, Width Available	SB Sidewalk	Sidewalk	No	No	No	6' Bike Lanes	\$3,000	6' Bike Lanes or SB Sidewalk Barrier & NB Sidewalk with Barrier or SB Shared Path with Barrier; Fencing; Lighting	\$72,385; \$451,001; \$263,193	Shared Paths with Barrier; Fencing; Lighting	\$7,077,251	\$1,665,236	Reduce Lanes to 11' for SB Shared Path with Barrier

*Appendix D — Conceptual Plans for Recommendations*

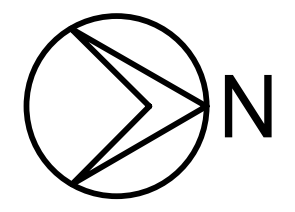
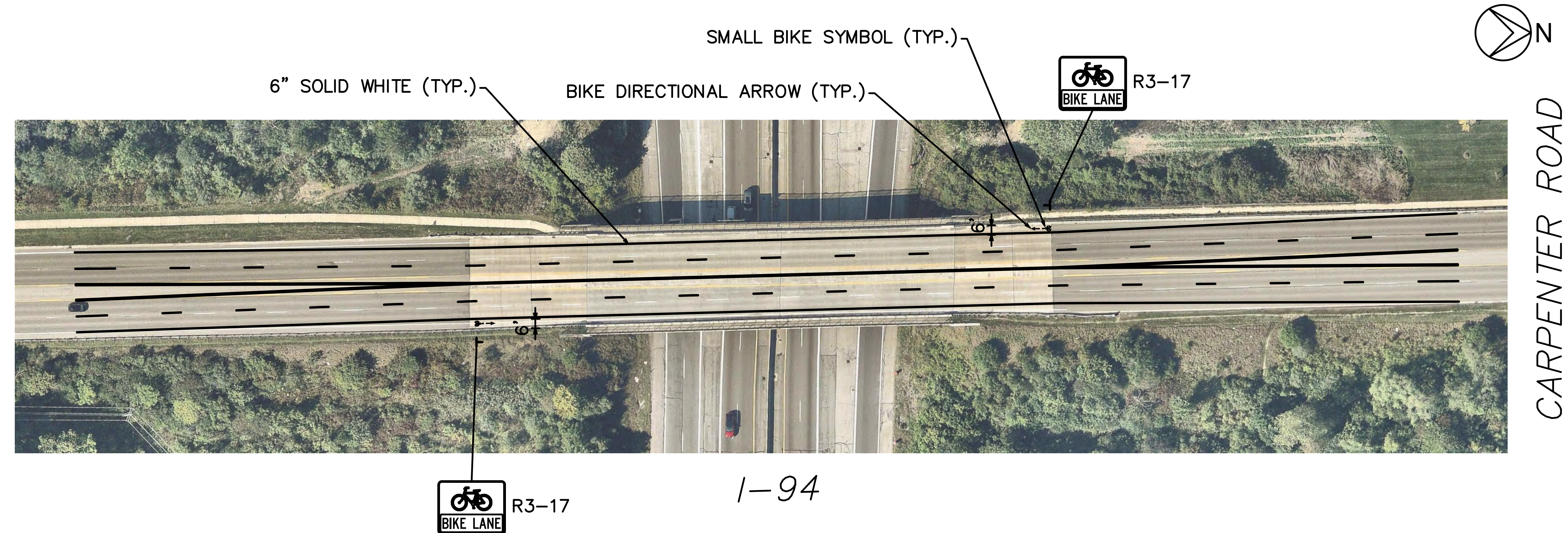








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CARPENTER ROAD

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WASHTENAW AREA TRANSPORTATION STUDY  
**FREWAY CROSSING  
 NON-MOTORIZED  
 RETROFIT**

PROPOSED BIKE LANES AND  
 NEW LANE GEOMETRY  
 CARPENTER RD  
 CROSSING I-94

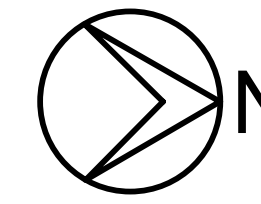
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DATE June 2020	SHEET NO. 12





SMALL BIKE SYMBOL

SHARED LANE MARKING



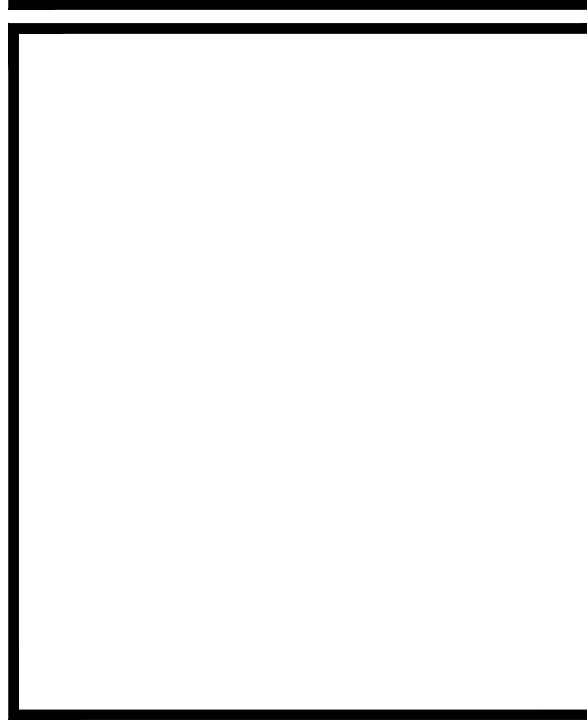
US-23

CARPENTER ROAD



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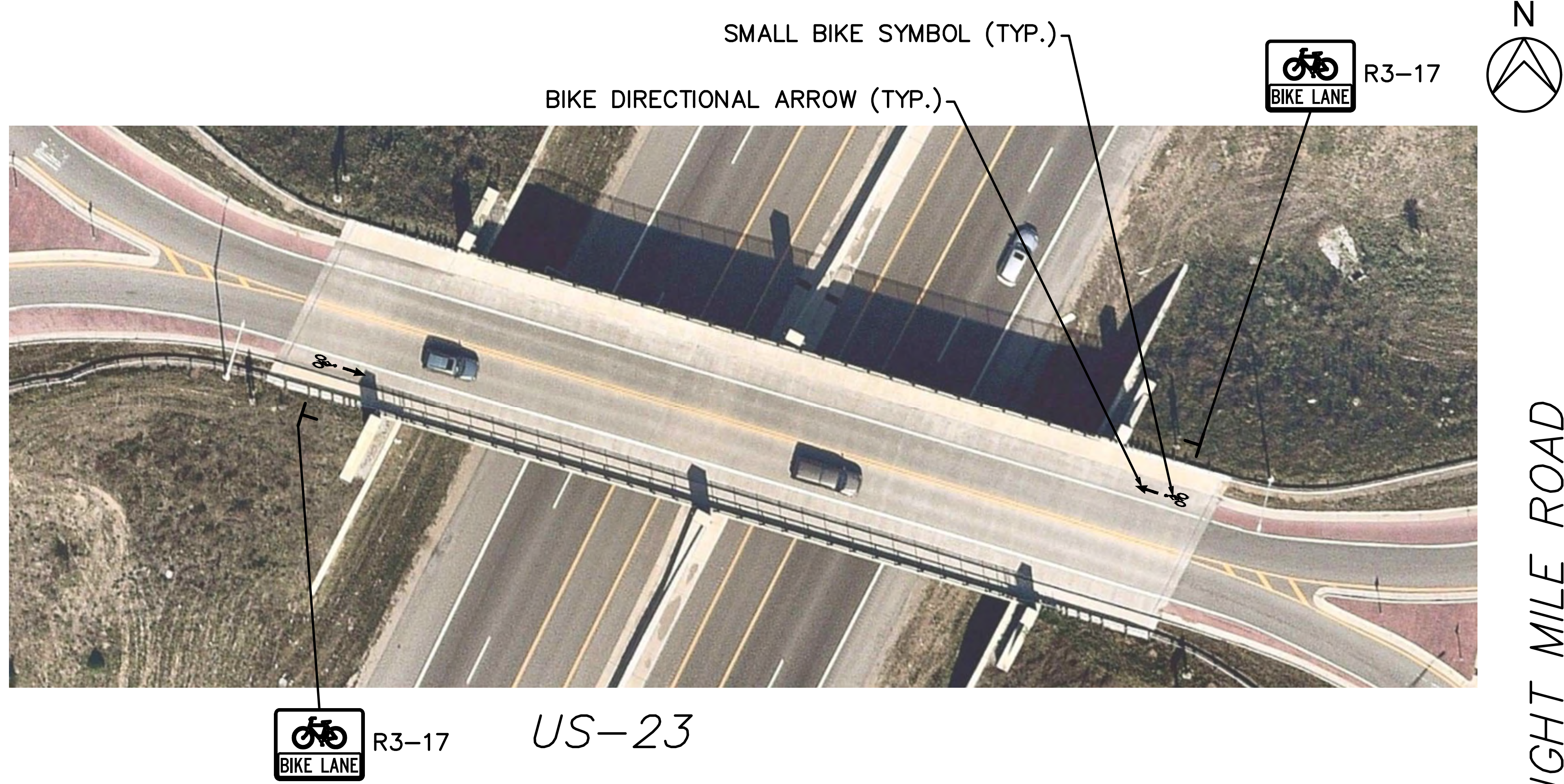


**WASHTENAW AREA TRANSPORTATION STUDY**  
**FREEWAY CROSSING**  
**NON-MOTORIZED**  
**RETROFIT**

PROPOSED SHARED LANE  
 CARPENTER RD  
 CROSSING US-23

HRC JOB NO. 20191021	SCALE 1" = 20'
DATE June 2020	SHEET NO. 13

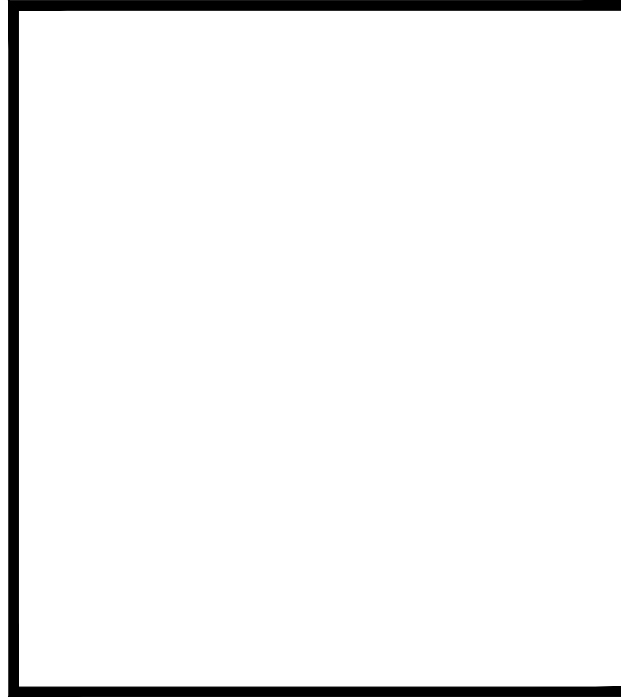




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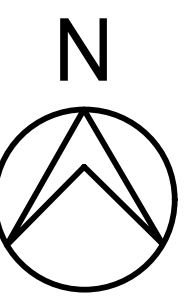
**WASHTENAW AREA TRANSPORTATION STUDY**  
**FREEWAY CROSSING**  
**NON-MOTORIZED**  
**RETROFIT**

PROPOSED BIKE LANES  
 EIGHT MILE RD  
 CROSSING US-23


HRC JOB NO. 20191021	SCALE 1" = 20'
DATE June 2020	SHEET NO. 15



 R3-17



I-94


 R3-17

GROVE STREET



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WASHTENAW AREA TRANSPORTATION STUDY  
**FREWAY CROSSING  
 NON-MOTORIZED  
 RETROFIT**

PROPOSED BIKE SIGNS  
 GROVE ST  
 CROSSING I-94

HRC JOB NO. 20191021	SCALE 1" = 40'
DATE June 2020	SHEET NO. 17

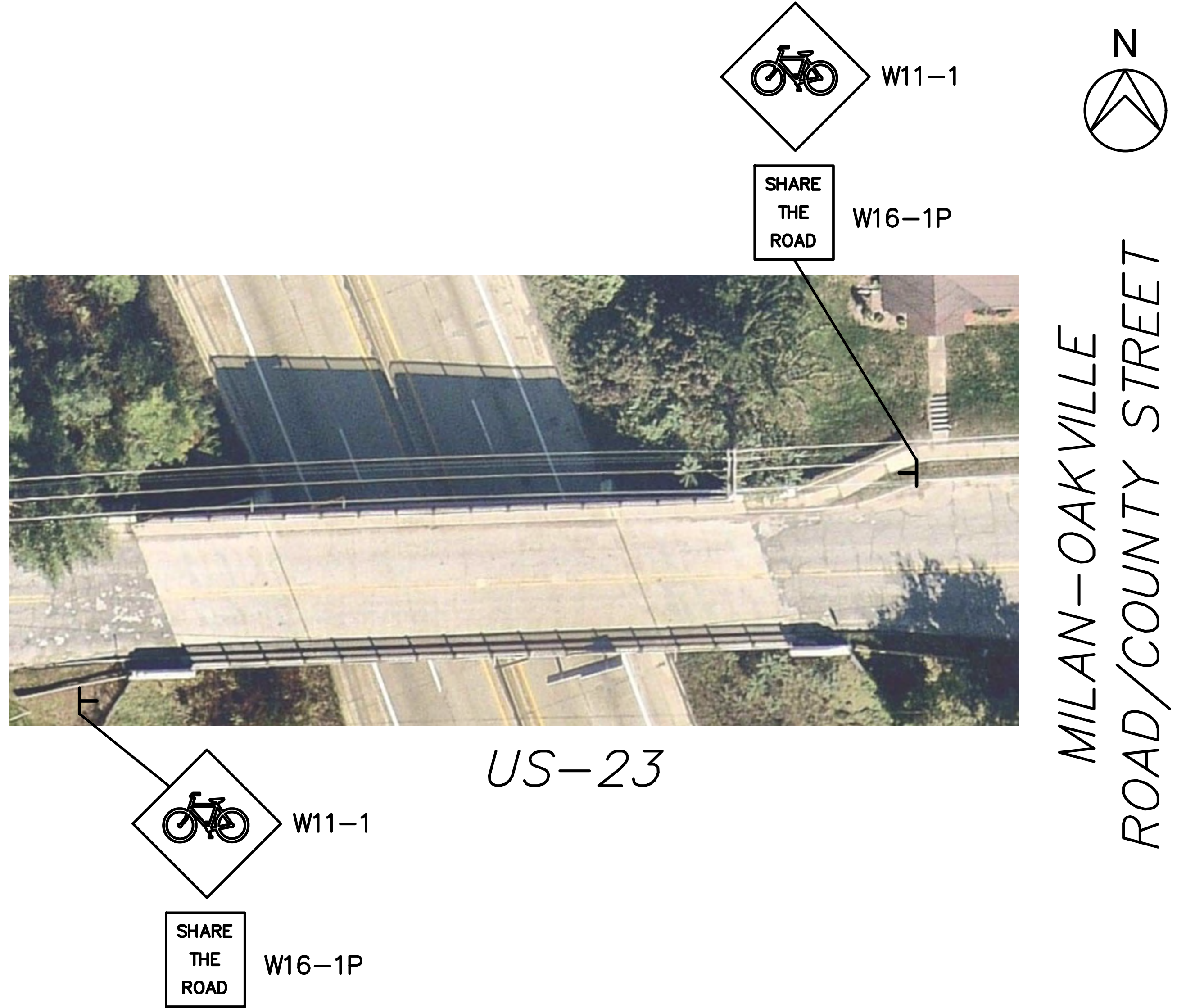












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DATE	ADDITIONS AND/OR REVISIONS
DESIGNED	NBN
DRAWN	NBN
CHECKED	
APPROVED	

**WASHTENAW AREA TRANSPORTATION STUDY**  
**FREEWAY CROSSING**  
**NON-MOTORIZED**  
**RETROFIT**

PROP. BIKE SIGNS & PLAQUES  
 MILAN-OAKVILLE/COUNTY ST  
 CROSSING US-23

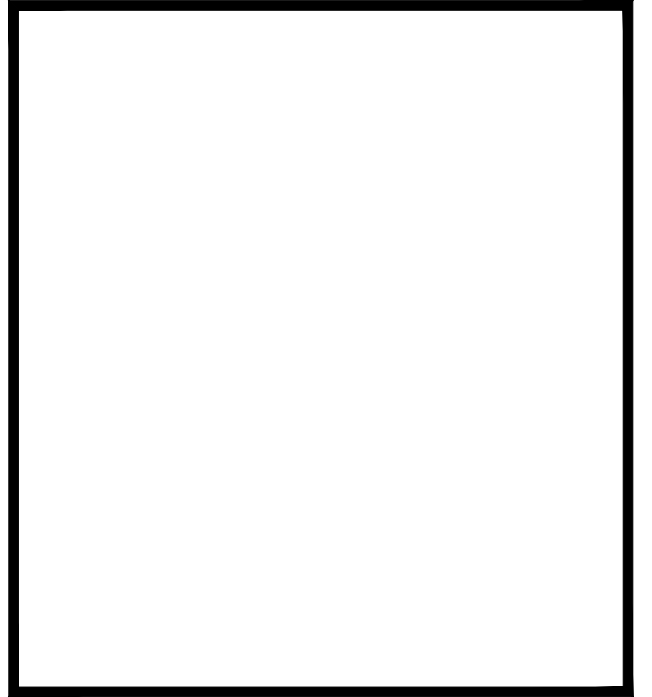
HRC JOB NO. 20191021	SCALE 1" = 20'
DATE June 2020	SHEET NO. 22



**HRC**  
**HUBBELL, ROTH & CLARK, INC**  
 CONSULTING ENGINEERS SINCE 1915  
 555 HULET DRIVE P.O. BOX 824  
 BLOOMFIELD HILLS, MICH. 48303 - 0824  
 PHONE: (248) 454-6300  
 FAX (1st. Floor): (248) 454-6312  
 FAX (2nd. Floor): (248) 454-6359  
 WEB SITE: [http:// www.hrcengr.com](http://www.hrcengr.com)

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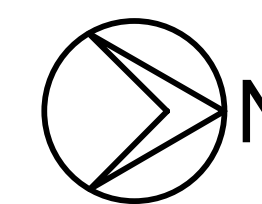
**WASHTENAW AREA TRANSPORTATION STUDY**  
**FREEWAY CROSSING**  
**NON-MOTORIZED**  
**RETROFIT**

PROP. BIKE SIGNS & PLAQUES  
 MILLER RD  
 CROSSING M-14

HRC JOB NO. 20191021	SCALE 1" = 20'
DATE June 2020	SHEET NO. 23



M-14



SMALL BIKE SYMBOL (TYP.)

BIKE DIRECTIONAL ARROW (TYP.)



R3-17

NAPIER ROAD



**HRC**  
**HUBBELL, ROTH & CLARK, INC**  
 CONSULTING ENGINEERS SINCE 1915  
 555 HULET DRIVE P.O. BOX 824  
 BLOOMFIELD HILLS, MICH. 48303 - 0824  
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**WASHTENAW AREA TRANSPORTATION STUDY**  
**FREEWAY CROSSING**  
**NON-MOTORIZED**  
**RETROFIT**

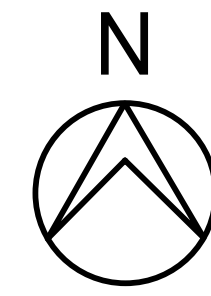
PROPOSED BIKE LANES  
 NAPIER RD  
 CROSSING M-14

HRC JOB NO. 20191021	SCALE 1" = 20'
DATE June 2020	SHEET NO. 24



SMALL BIKE SYMBOL (TYP.)

SHARED LANE MARKING (TYP.)



NEWPORT ROAD

M-14



**HRC**  
**HUBBELL, ROTH & CLARK, INC**  
 CONSULTING ENGINEERS SINCE 1915  
 555 HULET DRIVE P.O. BOX 824  
 BLOOMFIELD HILLS, MICH. 48303 - 0824  
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APPROVED	

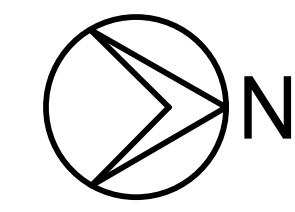
**WASHTENAW AREA TRANSPORTATION STUDY**  
**FREWAY CROSSING**  
**NON-MOTORIZED**  
**RETROFIT**

PROPOSED SHARED LANES  
 NEWPORT RD  
 CROSSING M-14

HRC JOB NO. 20191021	SCALE 1" = 20'
DATE June 2020	SHEET NO. 25



SMALL BIKE SYMBOL (TYP.)  
 SHARED LANE MARKING (TYP.)



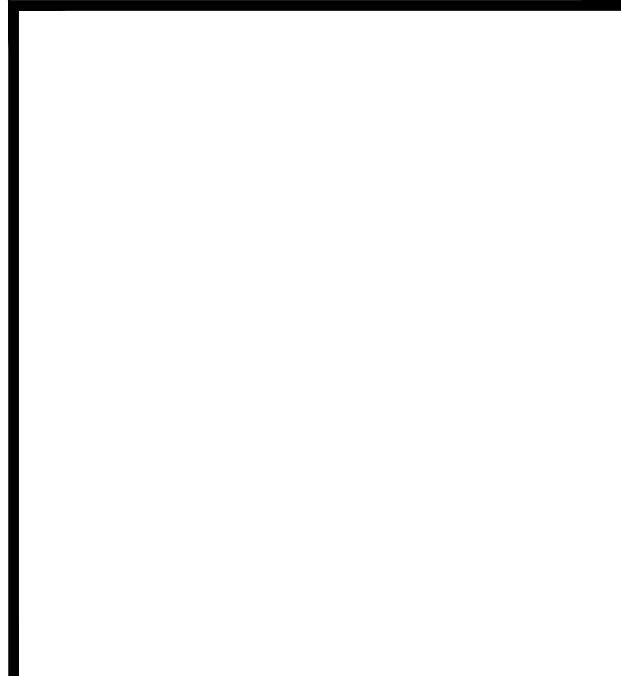
NIXON ROAD

US-23



**HRC**  
**HUBBELL, ROTH & CLARK, INC**  
 CONSULTING ENGINEERS SINCE 1915  
 555 HULET DRIVE P.O. BOX 824  
 BLOOMFIELD HILLS, MICH. 48303 - 0824  
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APPROVED	



**WASHTENAW AREA TRANSPORTATION STUDY**  
**FREEWAY CROSSING**  
**NON-MOTORIZED**  
**RETROFIT**

PROPOSED SHARED LANES  
 NIXON RD  
 CROSSING US-23

HRC JOB NO. 20191021	SCALE 1" = 20'
DATE June 2020	SHEET NO. 26



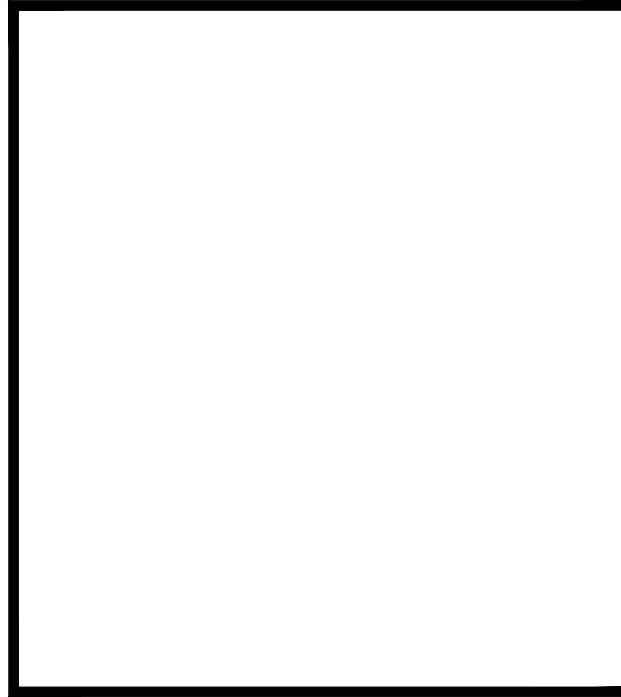


**HRC**  
**HUBBELL, ROTH & CLARK, INC**  
 CONSULTING ENGINEERS SINCE 1915  
 555 HULET DRIVE P.O. BOX 824  
 BLOOMFIELD HILLS, MICH. 48303 - 0824  
 PHONE: (248) 454-6300  
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APPROVED	



**WASHTENAW AREA TRANSPORTATION STUDY**  
**FREWAY CROSSING**  
**NON-MOTORIZED**  
**RETROFIT**

PROP. BIKE SIGNS & PLAQUES  
 PONTIAC TRAIL  
 CROSSING WB US-23/M-14

HRC JOB NO. 20191021	SCALE 1" = 20'
DATE June 2020	SHEET NO. 28







SMALL BIKE SYMBOL (TYP.)

SHARED LANE MARKING



SCIO CHURCH ROAD

I-94



**HRC**  
**HUBBELL, ROTH & CLARK, INC**  
 CONSULTING ENGINEERS SINCE 1915  
 555 HULET DRIVE P.O. BOX 824  
 BLOOMFIELD HILLS, MICH. 48303 - 0824  
 PHONE: (248) 454-6300  
 FAX (1st. Floor): (248) 454-6312  
 FAX (2nd. Floor): (248) 454-6359  
 WEB SITE: [http:// www.hrcengr.com](http://www.hrcengr.com)

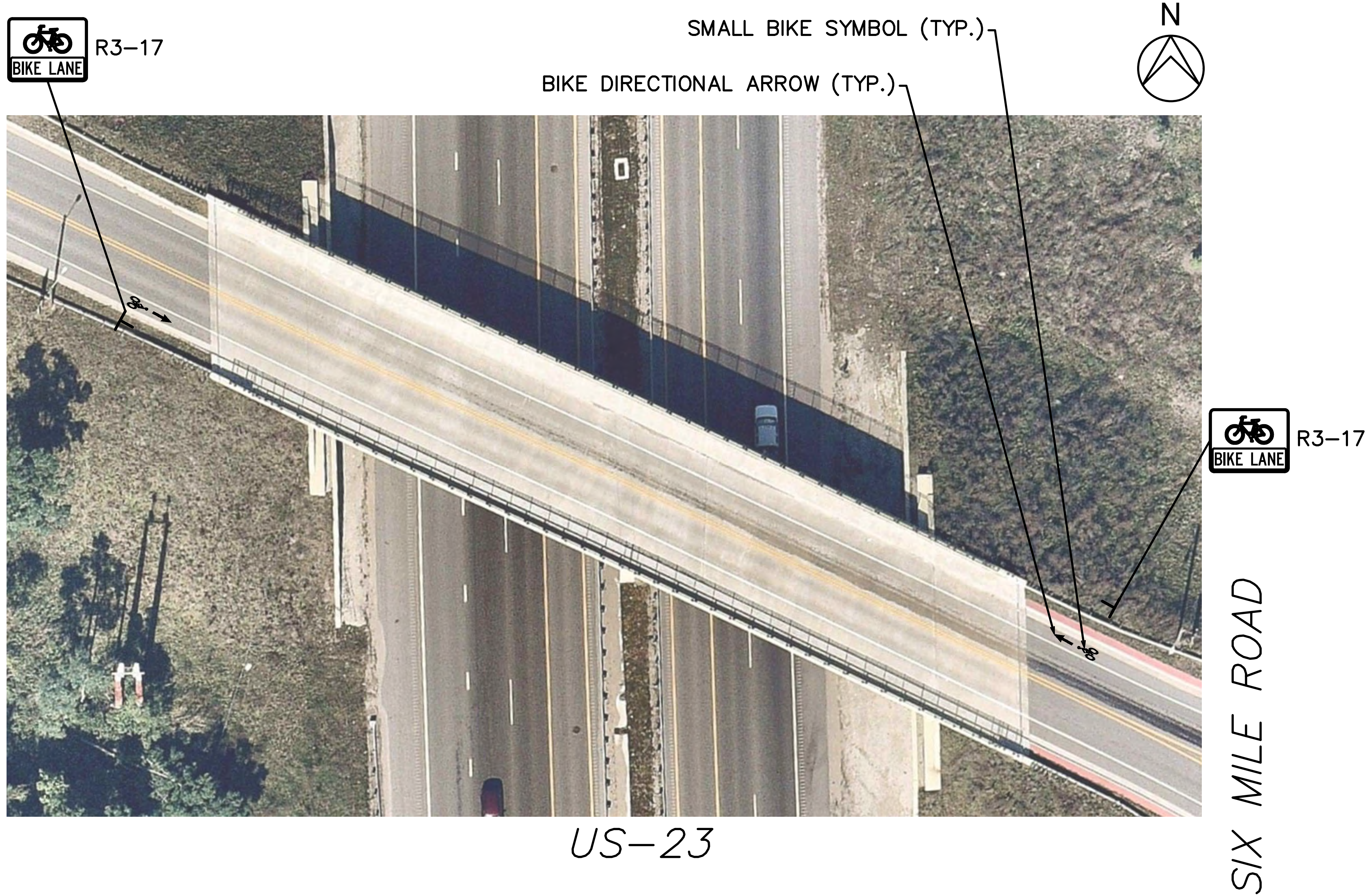

DATE	ADDITIONS AND/OR REVISIONS
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DRAWN	NBN
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APPROVED	



**WASHTENAW AREA TRANSPORTATION STUDY**  
**FREEWAY CROSSING**  
**NON-MOTORIZED**  
**RETROFIT**

PROPOSED SHARED LANES  
 SCIO CHURCH RD  
 CROSSING I-94

HRC JOB NO. 20191021	SCALE 1" = 20'
DATE June 2020	SHEET NO. 30



**HRC**  
**HUBBELL, ROTH & CLARK, INC**  
 CONSULTING ENGINEERS SINCE 1915  
 555 HULET DRIVE P.O. BOX 824  
 BLOOMFIELD HILLS, MICH. 48303 - 0824  
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**WASHTENAW AREA TRANSPORTATION STUDY**  
**FREEWAY CROSSING**  
**NON-MOTORIZED**  
**RETROFIT**

PROP. BIKE SIGNS & MRKGS.  
 SIX MILE RD  
 CROSSING US-23

HRC JOB NO. 20191021	SCALE 1" = 20'
DATE June 2020	SHEET NO. 31

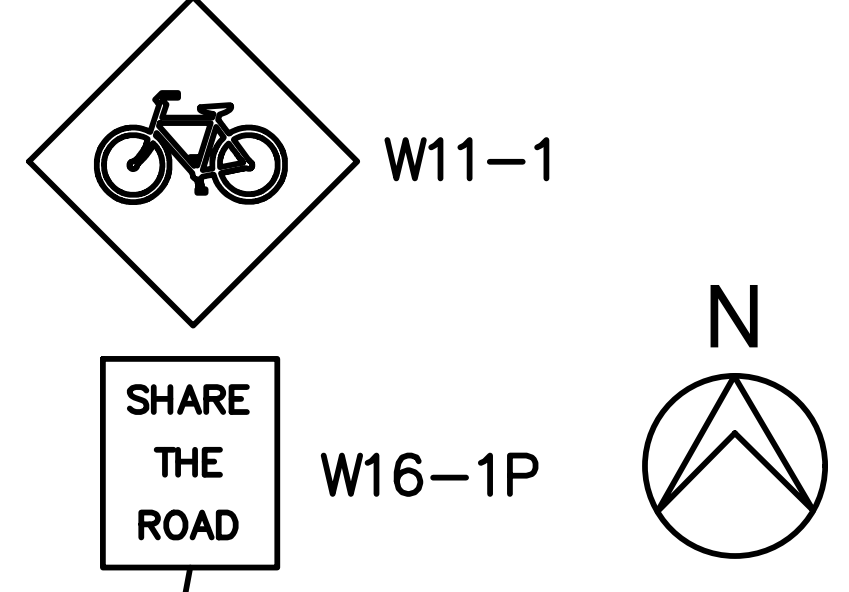






US-23

WILLIS ROAD




**HRC**  
**HUBBELL, ROTH & CLARK, INC**  
 CONSULTING ENGINEERS SINCE 1915

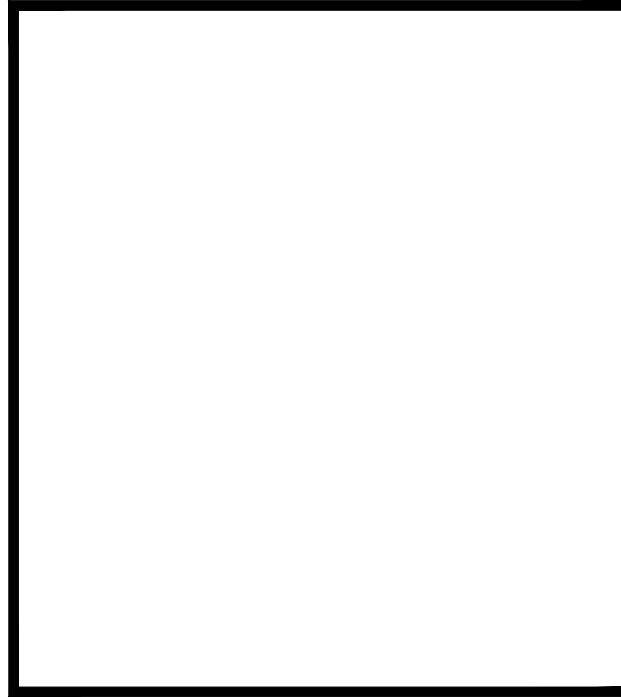
555 HULET DRIVE P.O. BOX 824  
 BLOOMFIELD HILLS, MICH. 48303 - 0824

PHONE: (248) 454-6300  
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**WASHTENAW AREA TRANSPORTATION STUDY**  
**FREEWAY CROSSING**  
**NON-MOTORIZED**  
**RETROFIT**

PROP. BIKE SIGNS & PLAQUES  
 WILLIS RD  
 CROSSING US-23

HRC JOB NO. 20191021	SCALE 1" = 20'
DATE June 2020	SHEET NO. 34





## HRC OFFICE LOCATIONS

- ≡ **Bloomfield Hills**  
555 Hulet Drive  
Bloomfield Hills, MI 48302  
(248) 454-6300 | Fax: (248) 454-6312
- ≡ **Detroit**  
Buhl Building, Suite 1650  
535 Griswold Street | Detroit, MI 48226  
(313) 965-3330
- ≡ **Howell**  
105 West Grand River  
Howell, MI 48843  
(517) 552-9199
- ≡ **Kalamazoo**  
834 King Highway, Suite 107  
Kalamazoo, MI 49001  
(269) 665-2005
- ≡ **Delhi Township**  
2101 Aurelius Road, Suite 2  
Holt, MI 48842  
(517) 694-7760
- ≡ **Grand Rapids**  
801 Broadway NW, Suite 215  
Grand Rapids, MI 49504  
(616) 454-4286
- ≡ **Jackson**  
401 S. Mechanic Street, Suite B  
Jackson, MI 49201  
(517) 292-1295
- ≡ **Lansing**  
215 South Washington Square  
Lansing, MI 48933  
(517) 292-1488