

# Model Inventory of Roadway Elements MIRE 2.0



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## **Foreword**

The MIRE 2.0 comes at a time when more States are expanding their roadway inventories to accommodate the Fundamental Data Element (FDE) requirements legislated in the MAP-21 and the FAST Acts. Aside from legislation, many States are interested in expanding their roadway inventories to better enable them to use the analytic methods in the AASHTO Highway Safety Manual. As more States and local transportation agencies adopt these MIRE data elements, their capabilities will be enhanced for improved evaluation of the safety effectiveness of highway improvements and will support more data driven decisions about safety investments.

A reassessment of MIRE resulted in MIRE 2.0. As part of the reassessment process MIRE 1.0 was examined relative to other databases used by FHWA. This examination led to minor changes to MIRE 2.0 to make it more consistent with databases such as the Highway Performance Monitoring System (HPMS), Long-Term Pavement Performance (LTPP) program, and 2nd Strategic Highway Research Program Roadway Information Database (SHRP2 RID).

The MIRE 2.0 continues to provide a structure for roadway inventory data that will allow State and local transportation agencies to use analysis tools with their own data rather than relying on default values that may not reflect local conditions. This document is intended for safety engineers and practitioners at State and local agencies who are involved in the widespread adoption of the MIRE as the framework for their roadway inventories.

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<b>SI* (MODERN METRIC) CONVERSION FACTORS</b>				
<b>APPROXIMATE CONVERSIONS TO SI UNITS</b>				
<b>Symbol</b>	<b>When You Know</b>	<b>Multiply By</b>	<b>To Find</b>	<b>Symbol</b>
<b>LENGTH</b>				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
<b>AREA</b>				
in <sup>2</sup>	square inches	645.2	square millimeters	mm <sup>2</sup>
ft <sup>2</sup>	square feet	0.093	square meters	m <sup>2</sup>
yd <sup>2</sup>	square yard	0.836	square meters	m <sup>2</sup>
ac	acres	0.405	hectares	ha
mi <sup>2</sup>	square miles	2.59	square kilometers	km <sup>2</sup>
<b>VOLUME</b>				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft <sup>3</sup>	cubic feet	0.028	cubic meters	m <sup>3</sup>
yd <sup>3</sup>	cubic yards	0.765	cubic meters	m <sup>3</sup>
NOTE: volumes greater than 1000 L shall be shown in m <sup>3</sup>				
<b>MASS</b>				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
<b>TEMPERATURE (exact degrees)</b>				
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C
<b>ILLUMINATION</b>				
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m <sup>2</sup>	cd/m <sup>2</sup>
<b>FORCE and PRESSURE or STRESS</b>				
lbf	poundforce	4.45	newtons	N
lbf/in <sup>2</sup>	poundforce per square inch	6.89	kilopascals	kPa
<b>APPROXIMATE CONVERSIONS FROM SI UNITS</b>				
<b>Symbol</b>	<b>When You Know</b>	<b>Multiply By</b>	<b>To Find</b>	<b>Symbol</b>
<b>LENGTH</b>				
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
<b>AREA</b>				
mm <sup>2</sup>	square millimeters	0.0016	square inches	in <sup>2</sup>
m <sup>2</sup>	square meters	10.764	square feet	ft <sup>2</sup>
m <sup>2</sup>	square meters	1.195	square yards	yd <sup>2</sup>
ha	hectares	2.47	acres	ac
km <sup>2</sup>	square kilometers	0.386	square miles	mi <sup>2</sup>
<b>VOLUME</b>				
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m <sup>3</sup>	cubic meters	35.314	cubic feet	ft <sup>3</sup>
m <sup>3</sup>	cubic meters	1.307	cubic yards	yd <sup>3</sup>
<b>MASS</b>				
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
<b>TEMPERATURE (exact degrees)</b>				
°C	Celsius	1.8C+32	Fahrenheit	°F
<b>ILLUMINATION</b>				
lx	lux	0.0929	foot-candles	fc
cd/m <sup>2</sup>	candela/m <sup>2</sup>	0.2919	foot-Lamberts	fl
<b>FORCE and PRESSURE or STRESS</b>				
N	newtons	0.225	poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in <sup>2</sup>

\*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380. (Revised March 2003)

## TABLE OF CONTENTS

<b>INTRODUCTION .....</b>	<b>1</b>
<b>BACKGROUND .....</b>	<b>1</b>
<b>MAP-21/FAST Act requirements.....</b>	<b>2</b>
<b>Fundamental Data Elements / HSIP Rulemaking .....</b>	<b>2</b>
<b>IMPORTANCE OF GEO-SPATIAL LOCATION / ARNOLD REQUIREMENT ....</b>	<b>5</b>
<b>DATA INTEGRATION .....</b>	<b>5</b>
<b>LINKAGE TO MMUCC .....</b>	<b>6</b>
<b>CRITERIA FOR INCLUSION/EXCLUSION.....</b>	<b>6</b>
<b>HOW TO USE MIRE .....</b>	<b>7</b>
<b>RESOURCES.....</b>	<b>9</b>
<b>MIRE ELEMENTS .....</b>	<b>11</b>
<b>I. ROADWAY SEGMENT .....</b>	<b>12</b>
<b>II. AT-GRADE INTERSECTION/JUNCTIONS .....</b>	<b>87</b>
<b>III. INTERSECTION LEG (EACH APPROACH) .....</b>	<b>106</b>
<b>IV. INTERCHANGE/RAMP.....</b>	<b>132</b>
<b>V. HORIZONTAL CURVE.....</b>	<b>153</b>
<b>VI. VERTICAL GRADE.....</b>	<b>159</b>
<b>APPENDIX A: SUPPLEMENTAL DATABASES.....</b>	<b>163</b>
<b>APPENDIX B: CROSSWALK TABLE FOR MIRE FDE .....</b>	<b>167</b>
<b>REFERENCES .....</b>	<b>169</b>
<b>INDEX .....</b>	<b>171</b>

## LIST OF TABLES

Table 1. MIRE Fundamental Data Elements (MIRE 1.0 Element Number) for Non-Local Paved Roads Based on Functional Classification. ....	3
Table 2. MIRE Fundamental Data Elements (MIRE 1.0 Element Number) for Local Paved Roads Based on Functional Classification. ....	4
Table 3. MIRE Fundamental Data Elements for Unpaved Roads. ....	5
Table 4. MIRE-Related Resources.....	9
Table 5. Crosswalk Table for MIRE FDE.....	167

## LIST OF FIGURES

Figure 1. Illustration of Number of Through Lanes.....	34
Figure 2. Illustration of Cross Section, Two-Lane Roadway.....	36
Figure 3. Illustration of Cross Section, Multilane Divided Roadway Inventoried in Two Directions (each direction inventoried separately). ....	37
Figure 4. Illustration of Cross Section, Multilane Divided Roadway Inventoried in One Direction (both directions inventoried together). ....	38
Figure 5. Illustration of Presence/Types of Bicycle Facilities.....	43
Figure 6. An Example for Measuring Median Width. ....	54
Figure 7. Illustration of Types of Median Crossover/Left-Turn Lanes.....	57
Figure 8. Illustration of Roadside Ratings. ....	62
Figure 9. Illustration of Roadside Ratings (continued). ....	63
Figure 10. Illustration of Tapered Edge. ....	64
Figure 11. Illustration of Types of Intersection/Junction Geometry.....	93
Figure 12. Illustration of Types of Intersection/Junction Geometry (continued)....	94
Figure 13. Illustration of Intersecting Angle.....	97
Figure 14. Illustration of Intersection/Junction Offset Distance.....	99

**Figure 15. Illustration of Circular Intersection..... 102**

**Figure 16. Illustration of Types of Bicycle Facilities at Circular Intersections. .... 105**

**Figure 17. Illustration of Left-Turn Lane Types..... 110**

**Figure 18. Illustration of Left-Turn Lane Types (continued)..... 111**

**Figure 19. Illustration of Positive, Negative, and Zero Offset Distance..... 113**

**Figure 20. Illustration of Exclusive Left-Turn Lane Length. .... 116**

**Figure 21. Illustration of Exclusive Right-Turn Lane Length. .... 117**

**Figure 22. Illustration of Crosswalk Types..... 121**

**Figure 23. Illustration of Pedestrian Signal Types. .... 123**

**Figure 24. Illustration of Circular Intersection Exit and Entry Lanes..... 127**

**Figure 25. Illustration of Circulatory Intersection Exclusive Right-Turn Lanes.... 129**

**Figure 26. Illustration of Ramp Configurations. .... 134**

**Figure 27. Illustration of Types of Interchanges..... 137**

**Figure 28. Illustration of Types of Interchanges (continued)..... 138**

**Figure 29. Illustration of Ramp Tapers. .... 141**

**Figure 30. Illustration of Acceleration Lane Length for Tapered and Parallel Designs..... 143**

**Figure 31. Illustration of Deceleration Lane Length for Tapered and Parallel Designs..... 144**

**Figure 32. Illustration of Locations of Beginning Ramp Terminal Relative to Mainline Flow. .... 149**

**Figure 33. Illustration of Locations of Ending Ramp Terminal Relative to Mainline Flow. .... 152**

**Figure 34. Illustration of Types of Horizontal Curve Features. .... 154**

**Figure 35. Illustration of Types of Vertical Curve Features. .... 161**





## ACRONYMS

AADT	Annual average daily traffic
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
AC	Asphalt-Concrete
ARNOLD	All Road Network of Linear Referenced Data
CFI	Continuous Flow Intersection
CRCP	Continuously Reinforced Concrete Pavement
DCD	Double-Crossover Diamond
DDI	Diverging Diamond Interchange
DLT	Displaced Left-turn
DOT	Department of Transportation
FAST Act	Fixing America's Surface Transportation Act
FDE	Fundamental Data Elements
FHWA	Federal Highway Administration
FIPS	Federal Information Processing Standard
FMIS	Financial Management Information Systems
FRA	Federal Railroad Administration
GLC	Geographic Locator Codes
GSA	General Service Administration
HAWK	High-Intensity Activated Crosswalk
HOT	High-occupancy Toll
HOV	High-occupancy Vehicle
HPMS	Highway Performance Monitoring System
HSIP	Highway Safety Improvement Program
HSIS	Highway Safety Information System
HSM	Highway Safety Manual
IRI	International Roughness Index
ITS	Intelligent transportation systems
JPCP	Jointed Plain Concrete Pavement
JRCP	Jointed Reinforced Concrete Pavement
LRS	Linear Referencing System
LTPP	Long-Term Pavement Performance
MAP-21	Moving Ahead for Progress in the 21st Century
MIRE	Model Inventory of Roadway Elements
MIS	Management Information System

MMUCC	Model Minimum Uniform Crash Criteria
mph	Miles per hour
MUT	Median U-turn
NBI	National Bridge Inventory
NHS	National Highway System
NHTSA	National Highway Traffic Safety Administration
NPS	National Park Service
PCC	Portland Cement Concrete
PHB	Pedestrian Hybrid Beacon
PSR	Present Serviceability Rating
RCUT	Restricted crossing U-turn
RID	Roadway Information Database
RIP	Road Inventory Program
RSDP	Roadway Safety Data Program
RTOR	Right Turns-On-Red
Safety PM	Safety Performance Management Measures
SHRP	Strategic Highway Research Program
SOV	Single-occupancy Vehicle
SPI	Single Point Interchange
TMG	Traffic Monitoring Guide
U.S.	United States

## EXECUTIVE SUMMARY

Data are key to making sound decisions on the safety performance of roadways. Critical data include not only crash, but roadway and traffic data as well. In 2010, the Federal Highway Administration (FHWA) published the Model Inventory of Roadway Elements - MIRE, Version 1.0 (MIRE 1.0) (1). MIRE provides a comprehensive listing of roadway and traffic data elements and accompanying data dictionary that serves as a model of a robust inventory to support data-driven safety decision making. MIRE is a recommended guideline of data elements that States could collect to develop a comprehensive roadway and traffic data inventory for safety management.

Since FHWA released MIRE 1.0, safety analysis techniques have advanced, and both the safety and data communities have developed an increased awareness of the importance of quality data in safety analysis. Additionally, there are new Federal requirements for related data, including the MIRE Fundamental Data Elements (FDE) and the Highway Performance Monitoring System (HPMS) All Road Network of Linear Referenced Data (ARNOLD). The HPMS ARNOLD requirement expanded State obligation to include all public roads into a State's linear referencing system (LRS) base map. This LRS requirement provides at least one means to geospatially locate MIRE data elements. In response to these changes, FHWA initiated a reassessment of MIRE 1.0. The reassessment has resulted in MIRE 2.0.

MIRE 2.0 features a revised format to reflect agencies' transitions to modern database environments away from siloed datasets. MIRE 2.0 aligns with other Federal datasets/requirements, including the HPMS, across FHWA. The updates in MIRE 2.0 include additional operations and design elements that have become more widely implemented since FHWA released the previous iteration of MIRE. The total number of elements in MIRE 2.0 is 205, a net increase of 3 from MIRE 1.0.

MIRE is intended as a guideline to help transportation agencies improve their roadway and traffic data inventories supporting safety analyses. A State does not need to collect every MIRE element or have all their element names and attributes match to MIRE exactly. Rather, States can take what is useful in MIRE and apply it in a way that helps them improve their inventories, and ultimately lead to better data-driven decision making.

## INTRODUCTION

### BACKGROUND

Data are key to making sound decisions on the safety performance of roadways. Critical data include not only crash, but roadway and traffic data as well. In 2010, the FHWA published the Model Inventory of Roadway Elements - MIRE, Version 1.0 (MIRE 1.0) (1). MIRE provides a comprehensive listing of roadway and traffic data elements and accompanying data dictionary that serves as a model of a robust inventory to support data-driven safety decision making. MIRE is a recommended guideline of data elements that States could collect to develop a comprehensive roadway and traffic data inventory for safety management.

Since FHWA released MIRE 1.0, safety analysis techniques have advanced, and both the safety and data communities have developed an increased awareness of the importance of quality data in safety analysis. Additionally, there are new Federal requirements for related data, including the MIRE FDE and the HPMS ARNOLD. The HPMS ARNOLD requirement expanded State obligation to include all public roads into a State's LRS base map. This LRS requirement provides at least one means to geospatially locate MIRE data elements.

In response to these changes, FHWA initiated a reassessment of MIRE 1.0. The reassessment has resulted in MIRE 2.0.

Reassessing MIRE included the following tasks:

- Compared the MIRE 1.0 elements to other roadway related datasets, data standards, and data dictionaries maintained or supported by FHWA and non-FHWA organizations. The *Model Inventory of Roadway Elements (MIRE) Reassessment Report* (3) summarized the findings of this internal assessment. The internal assessment included reviewing the following data dictionaries and datasets:
  - HPMS – *Highway Performance Monitoring System Field Manual*, 2014 (4)
  - TMG – *Traffic Monitoring Guide*, 2013 (5)
  - FMIS – *Financial Management Information System Users' Guide*, 2003 (6)
  - NBI – *National Bridge Inventory, Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges*, 1995 (7)
  - LTPP – *Long-Term Pavement Performance Inventory Data Collection Guide*, 2006(8)

- NPS RIP – National Park Service Road Inventory Program Cycle 4 and Cycle 5 Data Dictionary
- SHRP 2 RID – Second Strategic Highway Research Program, *Naturalistic Driving Study: Development of the Roadway Information Database*, 2014 (9)
- HSM – *Highway Safety Manual*, 2010 (2)
- Vetted the internal assessment findings externally with practitioners and users of MIRE to further refine the recommended revisions to MIRE 1.0. The project team hosted four vetting sections with practitioners from both local and State agencies.
- Conducted a vetting section with a FHWA panel to further refine the recommended revisions based upon the previous four vetting sessions.

This effort resulted in MIRE 2.0.

### MAP-21/FAST Act requirements

In December 2015, the President signed into law the Fixing America’s Surface Transportation Act (FAST Act) (10). The FAST Act continued the State safety data system requirements established in the 2012 Moving Ahead for Progress in the 21<sup>st</sup> Century Act (MAP-21), with an added provision that States may elect not to collect the MIRE FDE on gravel or otherwise unpaved road. MAP-21 called for advancing the capabilities of States for safety data collection, integration, and analysis to support program planning and performance management and continues to support data improvement activities as an eligible Highway Safety Improvement Program (HSIP) expense [23 USC 148 (a)(4)(B)(xiv)]. MAP-21 also further identified safety data as crash, roadway, and traffic data on a public road and includes, in the case of a railway-highway grade crossing, the characteristics of highway and train traffic, licensing, and vehicle data [23 USC 148 (a)(9)] (11). MIRE can help States meet these requirements by providing a guideline for what could be included in a robust roadway and traffic data inventory as part of a State’s safety data system.

### Fundamental Data Elements / HSIP Rulemaking

MAP-21 required the Secretary to establish a subset of the MIRE and ensure that States adopt and use the subset for improved data collection [23 U.S.C. 148(f)(2)] (11). The FAST Act continued this requirement. FHWA published the HSIP and Safety Performance Management Measures (Safety PM) Final Rules in the Federal Register on March 15, 2016, with an effective date of April 14, 2016. The HSIP Final Rule updates the existing HSIP requirements under 23 CFR 924 to be consistent with MAP-21 and the FAST Act, and clarifies the existing program

requirements. Specifically, the HSIP Final Rule defines the subset of the MIRE, known as the MIRE FDE) or the FDE.

The MIRE FDE is comprised of 37 data elements. Recognizing the challenges States would face in collecting all 37 elements on all public roads, FHWA tiered the FDE based on functional class and surface type. This tiered system has three categories: non-local paved roads, local paved roads, and unpaved roads. The States must have access to all 37 FDE for non-local paved roads, a smaller subset of nine of the FDE for paved local roads, and an even smaller subset of five FDE for unpaved roads. Under certain conditions, States may elect not to collect the FDE on gravel or otherwise unpaved roads. The FDE for non-local paved roads are further categorized into data elements for roadway segments, intersections and interchanges/ramps.

The MIRE FDE are provided in Table 1 through Table 3:

**Table 1. MIRE Fundamental Data Elements (MIRE 1.0 Element Number) for Non-Local Paved Roads Based on Functional Classification.**

Roadway Segment	Intersection	Interchange/Ramp
Segment Identifier (12)	Unique Junction Identifier (120)	Unique Interchange Identifier (178)
Route Number (8)	Location Identifier for Road 1 Crossing Point (122)	Location Identifier for Roadway at Beginning Ramp Terminal (197)
Route/street Name (9)	Location Identifier for Road 2 Crossing Point (123)	Location Identifier for Roadway at Ending Ramp Terminal (201)
Federal Aid/ Route Type (21)	Intersection/Junction Geometry (126)	Ramp Length (187)
Rural/Urban Designation (20)	Intersection/Junction Traffic Control (131)	Roadway Type at Beginning Ramp Terminal (195)
Surface Type (23)	AADT (79) [for Each Intersecting Road]	Roadway Type at Ending Ramp Terminal (199)
Begin Point Segment Descriptor (10)*	AADT Year (80) [for Each Intersecting Road]	Interchange Type (182)
End Point Segment Descriptor (11)*	Unique Approach Identifier (139)	Ramp AADT (191)
Segment Length (13)		Year of Ramp AADT (192)
Direction of Inventory (18)		Functional Class (19)
Functional Class (19)		Type of Governmental Ownership (4)
Median Type (54)		
Access Control (22)		
One/Two-Way Operations (91)		
Number of Through Lanes (31)		
AADT (79)		
AADT Year (80)		

Type of Governmental Ownership (4)		
Unique Junction Identifier (120)		
Location Identifier for Road 1 Crossing Point (122)		
Location Identifier for Road 2 Crossing Point (123)		
Intersection/Junction Geometry (126)		
Intersection/Junction Traffic Control (131)		
AADT (79) [for Each Intersecting Road]		
AADT Year (80) [for Each Intersecting Road]		
Unique Approach Identifier (139)		

Note: AADT = Annual average daily traffic

**Table 2. MIRE Fundamental Data Elements (MIRE 1.0 Element Number) for Local Paved Roads Based on Functional Classification.**

Roadway Segment
Segment Identifier (12)
Functional Class (19)
Surface Type (23)
Type of Governmental Ownership (4)
Number of Through Lanes (31)
Annual Average Daily Traffic (79)
Begin Point Segment Descriptor (10)
End Point Segment Descriptor (11)
Rural/Urban Designation (20)

**Table 3. MIRE Fundamental Data Elements for Unpaved Roads.**

Roadway Segment
Segment Identifier (12)
Functional Class (19)
Type of Governmental Ownership (4)
Begin Point Segment Descriptor (10)
End Point Segment Descriptor (11)

The number in “( )” refers to the MIRE number in MIRE 1.0. The MIRE project team aimed to keep the FDE as consistent as possible between 1.0 and 2.0. Where there have been revisions, they have been minor, and are indicated in the documentation for the element.

Additional information on the FDE is available in the FHWA Guidance on State Safety Data Systems, [https://safety.fhwa.dot.gov/legislationandpolicy/fast/ssds\\_guidance.cfm](https://safety.fhwa.dot.gov/legislationandpolicy/fast/ssds_guidance.cfm) (10).

### IMPORTANCE OF GEO-SPATIAL LOCATION / ARNOLD REQUIREMENT

Having data with consistent geospatial location across data sets and systems allows agencies to combine diverse data for advanced highway safety analysis. Location information facilitates the integration of multiple roadway-related data sets including roadway, traffic, crash, roadside hardware, intelligent transportation systems (ITS), weather, and more.

The FHWA Office of Highway Policy Information and Office of Planning, Environment, and Realty issued the Memorandum on *Geospatial Network for All Public Roads* on August 7, 2012, that requires each State to update their LRS to include all public roadways. (11) FHWA refers to this requirement as ARNOLD. This LRS is a means to geolocate all safety data on a common highway basemap that includes all public roads.

The location of crashes, roadway elements, and traffic data should be consistent with the current highway basemap. These linkages will support States’ safety analysis and evaluation capabilities.

### DATA INTEGRATION

Integration of various types of data is vital and beneficial. Data integration results in a new resource capable of supporting analyses that are not possible when the individual data sources stand alone. Additionally, data integration avoids duplicating efforts in data collection and data management. Agencies do not need to collect the same data element for each individual database. Furthermore, data integration can improve data quality because it tends to uncover errors and inconsistencies in the source data. Data integration requires a common, or linking, variable in each of the to-be-integrated data files. Integration fails when locations cannot be uniquely matched among the data source.



MIRE 2.0 focuses on safety-related roadway data elements. To create data resources, agencies can choose to integrate crash data, roadside features, sign inventory, or other existing databases with MIRE elements based on agency's safety analysis needs. For example, agencies can use the MIRE elements segment identifier, begin point segment descriptor, and endpoint segment descriptor to link variables along roadway segments.

### LINKAGE TO MMUCC

MIRE is intended as a companion to the Model Minimum Uniform Crash Criteria Guideline (MMUCC) (13). MMUCC is a minimum set of crash data elements, including involved vehicles, persons and environment. MMUCC provides a set of uniform crash data elements, definitions, and attributes. MMUCC has become the de-facto standard for crash data elements used by State and local jurisdictions when improving their crash data systems.

### CRITERIA FOR INCLUSION/EXCLUSION

The goal of MIRE is to provide a model for a comprehensive roadway and traffic data inventory that a State could use to support data-driven decision making. For the MIRE 2.0 revision, as well as the two previous iterations of MIRE—MMIRE (2007) and MIRE 1.0 (2010)—the FHWA MIRE team selected elements needed for analyses agencies typically conduct, or analyses agencies may conduct in the future (e.g., additional pedestrian safety analyses). These elements include data needed for the advanced highway safety analysis methods recommended in the American Association of State Highway and Transportation Officials (AASHTO) HSM (2).

*When selecting MIRE elements, the MIRE team included elements needed for analyses that agencies typically conduct or may conduct in the future.*

It is important to note not every State will collect every element included in MIRE. Additionally, while MIRE is an extensive list of elements, it does not include all elements that a State Department of Transportation (DOT) would collect for all operational and design purposes; the MIRE elements are geared towards what an agency would need for safety management. There are additional potential types of data or databases that a State may want to consider collecting and integrating into their analyses that are not included in MIRE. Examples of some of these “supplemental databases” include:

- Roadside fixed objects
- Signs
- Speed data

- Automated enforcement devices
- Land use elements related to safety
- Bridge descriptors
- Railroad grade-crossing descriptors
- Pavement data
- Safety improvements
- Americans with Disabilities Act (ADA) compliant improvements (e.g. sidewalks, curb ramps, pedestrian signals, crosswalks, etc.)

Additional information on the potential supplemental databases is available in Appendix A.

As agencies make advancements in design, safety, and operations, they may be interested in conducting further study in emerging areas. Examples include alternative intersection or interchange designs or new or innovative pedestrian and bicycle treatments. While MIRE 2.0 aimed to capture emerging treatments as of 2016, agencies should consider updating their inventories as these innovative treatments become more widely used. Agencies should also consider adding new elements to their inventories as AASHTO updates the HSM.

### HOW TO USE MIRE

FHWA revised the format of MIRE in MIRE 2.0 to reflect agencies' transitions to modern database formats away from siloed datasets. The FHWA MIRE project team condensed the categories and subcategories of elements from MIRE 1.0 into six simplified data types to better reflect how an agency would manage MIRE data in a modern database environment. These six data types include:

- Segment
- Intersection
- Intersection Leg
- Interchange/Ramp
- Horizontal Curve
- Vertical Grade

Each MIRE element contains:

- Name
- Indicator if an FDE
- Definition
- Recommended attributes
- Illustration (if needed)
- Crosswalk table (if applicable)

The crosswalk table identifies the elements from other relevant databases such as HPMS (database, elements name, number) that correspond to the MIRE element. It also indicates when an element is required in the HSM. If there is no correspondence between MIRE and the other databases, no crosswalk table is presented for that element.

*Because MIRE is a guideline, it is not expected that a State will collect every MIRE element, nor have all their element names and attributes match to MIRE exactly. Rather, States should take what is useful in MIRE and apply it in a way that helps improve their inventory, and ultimately lead to better data-driven decision making.*

There are several examples in which a State could use MIRE to improve their roadway inventory:

- **Meeting the FDE Requirements:** Regulation requires that States submit a Traffic Records Strategic Plan incorporating specific, quantifiable, and measurable improvements in MIRE FDE data collection plan by July 1, 2017. The regulation also requires that States have access to complete collection of the MIRE FDE elements for all public roads by September 30, 2026. FHWA guidance (11) suggests that in planning for these improvements, States perform a gap analysis of what elements they currently collect and what they might still need to collect. Although many States have an existing road inventory for their roadway segments on State maintained roadways, many States lack elements, particularly intersection and traffic count data, on locally maintained roadways.
- **Improving overall roadway data inventory:** MIRE provides a framework for the development of a robust roadway data inventory. A State can review the MIRE elements and attributes to gain additional insight into what data elements might be missing or what attributes can be refined in their inventory to better support safety management.
- **Improving or adding a category of elements:** States may choose to add or expand a specific category of data elements to enhance their safety data analysis capabilities. This might include developing an intersection inventory, or expanding the pedestrian and bicycle related elements a State maintains. MIRE is a good resource to provide a State a starting place for the types of elements to include and the potential attributes to capture.
- **Improving single elements:** A State can use MIRE as a resource if they are looking to improve or add a specific element into their inventory, such as tapered edge. MIRE can provide the potential definition and attributes the State could use for that element.

States are encouraged to refine MIRE elements and attributes to best meet their needs. The MIRE team revised the attributes to be more consistent with other Federal datasets, such as HPMS. If a State is adopting analysis software, either commercially or in-house, they are encouraged to adopt the attributes needed for that software or other analysis needs.

## RESOURCES

FHWA has developed many resources to help agencies better understand and use MIRE, including informational guides on a MIRE Management Information System (MIS). Additionally, the FHWA maintains a “Roadway Safety Data and Analysis Toolbox” as a searchable, centralized source of information about the safety data and analysis tools. Table 4 provides a list of these resources.

**Table 4. MIRE-Related Resources.**

Resource	Description	Link
<b>MIRE Version 1.0 Report</b>	Provides a list of MIRE Version 1.0 recommended elements and attitudes.	<a href="https://safety.fhwa.dot.gov/tools/data_tools/mirereport/">https://safety.fhwa.dot.gov/tools/data_tools/mirereport/</a>
<b>MIRE Data Collection Guidebook</b>	Builds upon MIRE 1.0 and discusses methods of collecting the MIRE elements and potential limitations of those methods.	<a href="https://safety.fhwa.dot.gov/rsdp/downloads/datacollectionguidebook.pdf">https://safety.fhwa.dot.gov/rsdp/downloads/datacollectionguidebook.pdf</a>
<b>MIRE Element Collection Mechanisms and Gap Analysis</b>	Presents the findings of an effort to 1) explore existing and emerging data collection technologies, and 2) to narrow the gaps between the elements in the MIRE listing and the current data available from transportation agencies' inventories and supplemental databases.	<a href="https://safety.fhwa.dot.gov/rsdp/downloads/elementcollectionmechanism.pdf">https://safety.fhwa.dot.gov/rsdp/downloads/elementcollectionmechanism.pdf</a>
<b>MIRE Management Information System Lead Agency Data Collection Report</b>	Presents the findings from an effort to assist two States to expand their roadway inventory data collection to include MIRE intersection data elements. Documents two different methods of data extraction used by the two pilot states.	<a href="https://safety.fhwa.dot.gov/rsdp/downloads/leadagencydatacollection.pdf">https://safety.fhwa.dot.gov/rsdp/downloads/leadagencydatacollection.pdf</a>
<b>The Exploration of the Application of Collective Information to Transportation Data for Safety White Paper</b>	Explores the technique of collective information as a means of gathering data needed for transportation safety.	<a href="https://safety.fhwa.dot.gov/rsdp/whitepaper.cfm">https://safety.fhwa.dot.gov/rsdp/whitepaper.cfm</a>
<b>Development of a Structure for a MIRE Management Information System</b>	Presents a conceptual model that identifies the business functions a state is likely to need from a safety management system.	<a href="https://safety.fhwa.dot.gov/rsdp/mire_mis_structure.cfm">https://safety.fhwa.dot.gov/rsdp/mire_mis_structure.cfm</a>

Resource	Description	Link
<p><b>Performance Measures for Roadway Inventory Data</b></p>	<p>Builds on National Highway Traffic Safety Administration (NHTSA) defined performance measures for timeliness, accuracy, completeness, uniformity, integration, and accessibility. Provides a detailed review of each of the measures proposed for roadway data and suggesting modifications of and possible additions to that original list.</p>	<p><a href="https://safety.fhwa.dot.gov/rsdp/downloads/performanceasures.pdf">https://safety.fhwa.dot.gov/rsdp/downloads/performanceasures.pdf</a></p>
<p><b>Priorities in Roadway Safety Data Guide</b></p>	<p>Provides safety engineers and analysts with information about data needs in planning, programming, and developing projects under all highway programs.</p>	<p><a href="https://safety.fhwa.dot.gov/newsletter/safetycompass/2017/spring/index.cfm#s5">https://safety.fhwa.dot.gov/newsletter/safetycompass/2017/spring/index.cfm#s5</a></p>
<p><b>Roadway Safety Data Program (RSDP) MIRE Webpage</b></p>	<p>Provides a list of MIRE-related resources, including reports of MIRE MIS efforts and safety management tools.</p>	<p><a href="https://safety.fhwa.dot.gov/rsdp/mire.aspx">https://safety.fhwa.dot.gov/rsdp/mire.aspx</a></p>
<p><b>RSDP Toolbox</b></p>	<p>Contains resources to help agencies build a new or strengthen an existing roadway safety data program, including manage, analyze, collect and research.</p>	<p><a href="https://safety.fhwa.dot.gov/rsdp/">https://safety.fhwa.dot.gov/rsdp/</a></p>
<p><b>Safety Data Case Studies</b></p>	<p>Case studies of State and local agencies around roadway safety data collection, management, and analysis issues.</p>	<p><a href="https://safety.fhwa.dot.gov/rsdp/safety_casestudies.aspx">https://safety.fhwa.dot.gov/rsdp/safety_casestudies.aspx</a></p>
<p><b>Roadway Safety Noteworthy Practices</b></p>	<p>Examples of how State and local agencies implementing data-driven practices to successfully address roadway safety planning, implementation, and evaluation challenges.</p>	<p><a href="https://rspcb.safety.fhwa.dot.gov/noteworthy/default.aspx?topic=3">https://rspcb.safety.fhwa.dot.gov/noteworthy/default.aspx?topic=3</a></p>

## MIRE ELEMENTS

This section presents a listing of the MIRE elements. The elements are broken down into six main sections:

- I. Segment
- II. Intersection
- III. Intersection Leg
- IV. Interchange/ramp
- V. Horizontal Curve
- VI. Vertical Grade

At the beginning of each section is a listing of the elements in that section, followed by detailed information for each element. The information includes an element name, definition, recommended attributes, and a crosswalk table (if applicable) showing the comparison between MIRE and other national datasets.

## I. ROADWAY SEGMENT

1. County Name
2. County Code
3. Highway District
4. Type of Governmental Ownership <sup>FDE</sup>
5. Specific Governmental Ownership
6. City/Local Jurisdiction Name
7. City/Local Jurisdiction Urban Code
8. Route Number <sup>FDE</sup>
9. Route/Street Name <sup>FDE</sup>
10. Begin Point Segment Descriptor <sup>FDE</sup>
11. End Point Segment Descriptor <sup>FDE</sup>
12. Segment Identifier <sup>FDE</sup>
13. Segment Length <sup>FDE</sup>
14. Route Signing
15. Route Signing Qualifier
16. Coinciding Route Indicator
17. Coinciding Route – Minor Route Information
18. Direction of Inventory <sup>FDE</sup>
19. Functional Class <sup>FDE</sup>
20. Rural/Urban Designation <sup>FDE</sup>
21. Federal Aid <sup>FDE</sup>
22. Route Type <sup>FDE</sup>
23. Access Control <sup>FDE</sup>
24. Surface Type <sup>FDE</sup>
25. Total Paved Surface Width
26. Surface Friction
27. Surface Friction Date
28. International Roughness Index (IRI)
29. International Roughness Index (IRI) Date
30. Pavement Condition (Present Serviceability Rating [PSR])
31. Pavement Condition (PSR) Date
32. Number of Through Lanes <sup>FDE</sup>
33. Outside Through Lane Width
34. Inside Through Lane Width
35. Cross Slope
36. Auxiliary Lane Presence/Type
37. Auxiliary Lane Length
38. High-occupancy Vehicle (HOV) Lane Presence/Type

39. HOV Lanes
40. Reversible Lanes
41. Presence/Type of Bicycle Facility
42. Width of Bicycle Facility
43. Number of Peak Period Through Lanes
44. Right Shoulder Type
45. Right Shoulder Total Width
46. Right Paved Shoulder Width
47. Right Shoulder Rumble Strip Presence/Type
48. Left Shoulder Type
49. Left Shoulder Total Width
50. Left Paved Shoulder Width
51. Left Shoulder Rumble Strip Presence/Type
52. Sidewalk Presence
53. Curb Presence
54. Curb Type
55. Median Type <sup>FDE</sup>
56. Median Width
57. Median Barrier Presence/Type
58. Median (Inner) Paved Shoulder Width
59. Median Shoulder Rumble Strip Presence/Type
60. Median Sideslope
61. Median Sideslope Width
62. Median Crossover/Left-Turn Lane Type
63. Roadside Clearzone Width
64. Right Sideslope
65. Right Sideslope Width
66. Left Sideslope
67. Left Sideslope Width
68. Roadside Rating
69. Tapered Edge
70. Major Commercial Driveway Count
71. Minor Commercial Driveway Count
72. Major Residential Driveway Count
73. Minor Residential Driveway Count
74. Major Industrial/Institutional Driveway Count
75. Minor Industrial/Institutional Driveway Count
76. Other Driveway Count
77. Terrain Type
78. Number of Signalized Intersections in Segment



79. Number of Stop-Controlled Intersections in Segment
80. Number of Uncontrolled/Other Intersections in Segment
81. Annual Average Daily Traffic (AADT) <sup>FDE</sup>
82. AADT Year <sup>FDE</sup>
83. AADT Annual Escalation Percentage
84. Percent Single Unit Trucks or Single Truck AADT
85. Percent Combination Trucks or Combination Truck AADT
86. Percentage Trucks or Truck AADT
87. Total Daily Two-Way Pedestrian Count/Exposure
88. Bicycle Count/Exposure
89. Motorcycle Count or Percentage
90. Hourly Traffic Volumes (or Peak and Off peak AADT)
91. K-Factor
92. Peak Hour Directional Factor
93. One/Two-Way Operations <sup>FDE</sup>
94. Speed Limit
95. Truck Speed Limit
96. Nighttime Speed Limit
97. 85th Percentile Speed
98. Mean Speed
99. School Zone Indicator
100. On-Street Parking Presence
101. On-Street Parking Type
102. Roadway Lighting
103. Toll Charged
104. Toll Type
105. Edgeline Presence/Width
106. Centerline Presence/Width
107. Centerline Rumble Strip Presence/Type
108. Passing Zone Percentage
109. Bridge Numbers for Bridges in Segment

## I. County Name

---

**Definition:** The name of the county or equivalent entity where the segment is located.

**Recommended Attributes:**

County name or equivalent entity name.

## 2. County Code

---

**Definition:** Census defined County Federal Information Processing Standard (FIPS) code or equivalent entity where the segment is located.

**Recommended Attributes:**

The Census defined County FIPS code or equivalent entity where the roadway segment is located. If state-assigned codes are used, they should be convertible to the General Service Administration (GSA)/FIPS format.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	County Code	FIPS County Code	--	County Code	County (Parish) Code	County or Parish	--	--
Element Number	63	31	--	54	3	3	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

### 3. Highway District

---

**Definition:** The highway district where the segment is located.

**Recommended Attributes:**

Numeric district number (as defined by the state).

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	Highway Agency District	--	--	--
Element Number	--	--	--	--	2	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

### 4. Type of Governmental Ownership <sup>FDE</sup>

---

**Definition:** The entity that has legal ownership of a roadway.

**Recommended Attributes:**

1. State Highway Agency
2. County Highway Agency
3. Town or Township Highway Agency
4. City or Municipal Highway Agency
5. State Park, Forest, or Reservation Agency
6. Local Park, Forest, or Reservation Agency
7. Other State Agency
8. Other Local Agency
9. Private (other than Railroad)
10. Railroad
11. State Toll Authority
12. Local Toll Authority
13. Other Public Instrumentality (e.g. Airport)
14. Indian Tribe Nation
15. Other Federal Agency
16. Bureau of Indian Affairs
17. Bureau of Fish and Wildlife

- 18. U.S. Forest Service
- 19. National Park Service
- 20. Tennessee Valley Authority
- 21. Bureau of Land Management
- 22. Bureau of Reclamation
- 23. Corps of Engineers
- 24. Air Force
- 25. Navy/Marines
- 26. Army
- 27. Other

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Ownership	--	--	--	--	--	--	--
Element Number	6	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 5. Specific Governmental Ownership

**Definition:** The specific governmental owner of the segment.

**Recommended Attributes:**

City name or equivalent entity (e.g., tribal jurisdiction) name.

Note: If codes are used instead of name, use the GSA Geographic Locator Codes (GLC) that can be found on the Internet at: <http://www.gsa.gov/portal/content/104507>. If state-assigned codes are used, they should be convertible to the GSA/FIPS format.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	Owner	--	--	--
Element Number	--	--	--	--	22	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 6. City/Local Jurisdiction Name

---

**Definition:** The name of the city or local jurisdiction/agency where the segment is located if applicable.

**Recommended Attributes:**

The city name or equivalent entity (e.g., tribal jurisdiction).

## 7. City/Local Jurisdiction Urban Code

---

**Definition:** The applicable Census urban area code of the city or local jurisdiction/agency where the segment is located.

**Recommended Attributes:**

The Census urban code.

Note: See Census Website: <http://www.census.gov/en.html>.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Urban Code	--	--	--	Place Code	--	--	--
Element Number	2	--	--	--	4	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 8. Route Number <sup>FDE</sup>

**Definition:** The signed route number

**Recommended Attributes:**

Signed numeric value for the roadway segment.

Note: Descriptive route name information should be included in *Element 9. Route/Street Name*.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Route Number	Posted Signed Route Number	Route ID	Inventory Route Number	Route Number	Route Number	RTE_NO	--
Element Number	17	36	--	13	5D	6	5	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 9. Route/Street Name <sup>FDE</sup>

**Definition:** The route or street name, where different from *Element 8. Route Number*.

**Recommended Attributes:**

The alphanumeric route or street name.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Alternative Route Name	--	Route Name	--	--	--	RTE_NAME	--
Element Number	20	--	--	--	--	--	6	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 10. Begin Point Segment Descriptor <sup>FDE</sup>

**Definition:** Location information defining the beginning of the segment.

**Recommended Attributes:**

Begin point will be defined by the user agency. Generally, this will be based on homogeneity of chosen attributes throughout the segment. Begin point segment descriptors can be either linked to a Linear Reference System (e.g., Route-beginning milepoint, Route-ending milepoint) or to a spatial data system (i.e., longitude/latitude for begin and end points). Street address could also possibly be used for urban areas. The descriptor types used must be common across all MIRE files and compatible with crash data location coding.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Begin Point	--	--	Beginning Milepoint	--	Section Location Starting Point - Mileposts	BEG_M P	--
Element Number	Field 4	--	--	14	--	10	22	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 11. End Point Segment Descriptor<sup>FDE</sup>

**Definition:** Location information defining the end of the segment.

**Recommended Attributes:**

End point will be defined by the user agency. Generally, this will be based on homogeneity of chosen attributes throughout the segment). End point segment descriptors can be either linked to a Linear Reference System (e.g., Route-beginning milepoint, Route-ending milepoint) or to a spatial data system (i.e., longitude/latitude for begin and end points). Street address could also possibly be used for urban areas. The descriptor types used must be common across all MIRE files and compatible with crash data location coding.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	End Point	--	--	Ending Milepoint	--	--	--	--
Element Number	Field 5	--	--	15	--	--	23	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 12. Segment Identifier<sup>FDE</sup>

**Definition:** Unique segment identifier

**Recommended Attributes:**

Derived from other elements (e.g., combination of route number, county location and beginning and ending milepoints).

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Route ID	--	--	--	--	--	Section	--
Element Number	Field 3	--	--	--	--	--	19	--

Note: "--" indicates that the dataset does not include this specific MIRE element.



### 13. Segment Length<sup>FDE</sup>

**Definition:** The length of the segment.

**Recommended Attributes:**

Miles.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Section Length	--	Length	--	--	--	RTE_LENGTH	Length of Roadway Segment
Element Number	Field 7	--	--	--	--	--		--

Note: "--" indicates that the dataset does not include this specific MIRE element.

### 14. Route Signing

**Definition:** The type of route signing on the segment.

**Recommended Attributes:**

1. Not signed
2. Interstate
3. U.S.
4. State
5. Off-interstate business marker
6. County
7. Township
8. Municipal
9. Parkway marker or forest route marker
10. None of the above

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Route Signing	Posted Route Signing	--	--	Route Signing Prefix	Route Signing	--	--
Element Number	18	35	--	--	5B	5	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 15. Route Signing Qualifier

**Definition:** The descriptive qualifier for the route sign.

**Recommended Attributes:**

1. No qualifier or not signed
2. Alternate
3. Business route
4. Bypass Business
5. Spur
6. Loop
7. Proposed
8. Temporary
9. Truck route
10. None of the above

Note: This element has been changed since MIRE 1.0.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Route Qualifier	--	--	--	Designated Level of Service	--	--	Presence /Type of Median
Element Number	19	--	--	--	5C	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 16. Coinciding Route Indicator

---

**Definition:** Indication of whether the route segment is a "primary" coinciding route (i.e., the route to which crashes are referenced and which carries the attribute data) or a "minor" coinciding route which is not linked to crashes and does not include attribute data. (Note that minor-route segments might not appear in the inventory since the primary route inventory information is the same for both routes.)

**Recommended Attributes:**

1. Segment does not contain coinciding routes.
2. Coinciding route – Primary (i.e., crashes linked to this route and attributes included for segment).
3. Coinciding route – Minor (i.e., crashes not linked to this route).

## 17. Coinciding Route – Minor Route Information

---

**Definition:** If this segment is a primary coinciding route segment, enter the route number for the minor route.

Note: Additional elements may be needed to handle instances of more than one coinciding minor route.

**Recommended Attributes:**

Signed coinciding minor route number.

## 18. Direction of Inventory <sup>FDE</sup>

**Definition:** Direction of inventory if divided roads are inventoried in each direction.

**Recommended Attributes:**

1. Predominate compass direction (e.g. North, South, East, West) – if roads are inventoried in each direction usually due to different characteristics on each roadway.
2. Both – if inventoried in only one direction (e.g. the inventory applies to both directions of a single-carriageway roadway).

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	Direction of Travel Code	--	--	--	Direction of Travel	COMP_DIR	--
Element Number	--	10	--	--	--	9	16	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 19. Functional Class <sup>FDE</sup>

**Definition:** The FHWA approved Functional Classification System.

**Recommended Attributes:**

1. Interstate
2. Principal arterial other freeways and expressways
3. Principal arterial other
4. Minor arterial
5. Major collector
6. Minor collector
7. Local

Note: This element has been changed since MIRE 1.0.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Functional System	Functional Classification	Functional classification	Functional System	Functional Classification of Inventory Route	Functional Class	FUNCT_CLASS	--
Element Number	1	7	--	58	26	4	7	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 20. Rural/Urban Designation <sup>FDE</sup>

**Definition:** The rural or urban designation based on Census urban boundary and population.

**Recommended Attributes:**

1. Rural
2. Urban (population > 5,000)

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	Rural/Urban	--	--	--	Area Type
Element Number	--	--	--	57	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 21. Federal Aid <sup>FDE</sup>

**Definition:** Indicate the system on which the route is located.

**Recommended Attributes:**

1. Route is non Federal-aid.
2. Route is Federal-aid, but not on National Highway System (NHS) (i.e., all non-NHS routes functionally classified as Interstate, Other Freeways & Expressways, Other Principal Arterials, Minor Arterials, Major Collectors, and Urban Minor Collectors).
3. Route is on NHS.

Note: This element has been changed since MIRE 1.0. In MIRE 1.0, elements 21 *Federal Aid* and 22 *Route Type* were a single combined element. In MIRE 2.0, they are separate elements.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	National Highway System	--	Federal-aid System	Highway System of the Inventory Route	--	--	--
Element Number	--	34	--	59	104	--	--	--

Note: “--” indicates that the dataset does not include this specific MIRE element.

## 22. Route Type <sup>FDE</sup>

---

**Definition:** Federal-aid/NHS route type.

**Recommended Attributes:**

1. Non Connector NHS.
2. Major Airport.
3. Major Port Facility.
4. Major Amtrak Station.
5. Major Rail/Truck Terminal.
6. Major Inter City Bus Terminal.
7. Major Public Transportation or Multi-Modal Passenger Terminal.
8. Major Pipeline Terminal.
9. Major Ferry Terminal.

Note: This element has been changed since MIRE 1.0. In MIRE 1.0, elements 21 *Federal Aid* and 22 *Route Type* were a single combined element. In MIRE 2.0, they are separate elements.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	NHS	--	--	--	--	--	--	--
Element Number	64	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 23. Access Control <sup>FDE</sup>

**Definition:** The degree of access control for a given section of road.

**Recommended Attributes:**

1. Full access control – Preference given to through traffic movements by providing interchanges with selected public roads, and by prohibiting crossing at-grade and direct driveway connections (i.e., limited access to the facility).
2. Partial access control - Preference given to through traffic movement. In addition to interchanges, there may be some crossings at-grade with public roads, but, direct private driveway connections have been minimized through the use of frontage roads or other local access restrictions. Control of curb cuts is not access control.
3. No access control - No degree of access control exists (i.e., full access to the facility is permitted).

Note: The definition of this element has been changed since MIRE 1.0.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Access Control	--	Access/ Access Control	--	--	--	--	--
Element Number	5	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 24. Surface Type <sup>FDE</sup>

**Definition:** The surface type of the segment.

**Recommended Attributes:**

1. Unpaved
  - a. Dirt
  - b. Gravel
  - c. Other
2. Bituminous
3. JPCP – Jointed Plain Concrete Pavement
4. JRCP – Jointed Reinforced Concrete Pavement
5. CRCP – Continuously Reinforced Concrete Pavement
6. Asphalt-Concrete (AC) Overlay over Existing AC Pavement
7. AC Overlay over Existing Jointed Concrete Pavement
8. AC (Bi Overlay over Existing CRCP)
9. Unbonded Jointed Concrete Overlay on Portland Cement Concrete (PCC) Pavements
10. Unbonded CRCP Overlay on PCC Pavements
11. Bonded PCC Overlays on PCC Pavements
12. Other

Note: This element has been changed since MIRE 1.0. To facilitate safety analyses, it is recommended that the type of surface for unpaved roads be more specifically identified.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTTP	NPS RIP	HSM
Element Name	Surface Type	--	Pavement Surface Type	--	--	Type of Pavement	SURF_TYPE	--
Element Number	49	--	--	--	--	7	15	--

Note: “--” indicates that the dataset does not include this specific MIRE element.



## 25. Total Paved Surface Width

**Definition:** The total paved surface width.

Note: This element could be derived if all paved lane and paved shoulder widths are captured.

**Recommended Attributes:**

Feet

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	Pave_Width	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 26. Surface Friction

**Definition:** The surface friction indicator for the segment.

**Recommended Attributes:**

Measured skid number on the segment or general indication of wet-surface friction (e.g., high, medium, low).

Note: Agencies will decide how to code segments with no measured number or multiple skid numbers and whether one number is indicative of friction on entire segment.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	Friction	--	--	Skid Number	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 27. Surface Friction Date

---

**Definition:** Date surface friction was last measured or assigned.

**Recommended Attributes:**

mm/dd/yyyy

## 28. International Roughness Index (IRI)

---

**Definition:** The numeric value used to indicate pavement roughness.

**Recommended Attributes:**

IRI, reported as an integer to the nearest inch per mile.

Note: This element has been changed since MIRE 1.0.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	International Roughness Index	--	Pavement Condition	--	--	International Roughness Index (IRI)	RCI	--
Element Number	47	--	--	--	--	--	25	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 29. International Roughness Index (IRI) Date

**Definition:** Date pavement roughness (IRI) was collected.

**Recommended Attributes:**

mm/dd/yyyy

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	International Roughness Index/ Value_Date	--	--	--	--	--	--	--
Element Number	47	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 30. Pavement Condition (Present Serviceability Rating)

**Definition:** Present Serviceability Rating (PSR) (descriptive scale).

**Recommended Attributes:**

Code a PSR or equivalent value, to the nearest tenth (x.x), for all paved segments where IRI is not reported. Code "0.0" for unpaved facilities. User full range of values.

1. 4.0 – 5.0: Only new (or nearly new) superior pavements are likely to be smooth enough and distress free (sufficiently free of cracks and patches) to qualify for this category. Most pavements constructed or resurfaced during the data year would normally be rated in this category.
2. 3.0 – 4.0: Pavements in this category, although not quite as smooth as those described above, give a first class ride and exhibit few, if any, visible signs of surface deterioration. Flexible pavements may be beginning to show evidence of rutting and fine random cracks. Rigid pavements may be beginning to show evidence of slight surface deterioration, such as minor cracks and spalling.
3. 2.0 – 3.0: The riding qualities of pavements in this category are noticeably inferior to those of new pavements, and may be barely tolerable for high-speed traffic. Surface defects of flexible pavements may include rutting, map cracking, and extensive patching. Rigid pavements in this group may have a few joint failures, faulting and/or cracking, and some pumping.
4. 1.0 – 2.0: Pavements in this category have deteriorated to such an extent that they affect the speed of free-flow traffic. Flexible pavement may have large

potholes and deep cracks. Distress includes raveling, cracking, rutting and occurs over 50 percent of the surface. Rigid pavement distress includes joint spalling, patching, cracking, scaling, and may include pumping and faulting.

- 5. 0.1 – 1.0: Pavements in this category are in an extremely deteriorated condition. The facility is passable only at reduced speeds, and with considerable ride discomfort. Large potholes and deep cracks exist. Distress occurs over 75 percent or more of the surface.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Present Serviceability Rating	--	--	--	--	--	--	--
Element Number	48	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

### 31. Pavement Condition (PSR) Date

---

**Definition:** Date PSR was last assigned.

**Recommended Attributes:**

mm/dd/yyyy

### 32. Number of Through Lanes <sup>FDE</sup>

---

**Definition:** The total number of through lanes on the segment. It is the number of through lanes in the direction of inventory. If the road is inventoried in both directions together, this would be the number of through lanes in both directions. If the road is inventoried separately for each direction, this would be the number of through lanes in one single direction.

This excludes auxiliary lanes, such as collector-distributor lanes, weaving lanes, frontage road lanes, parking and turning lanes, acceleration/deceleration lanes, toll collection lanes, HOV lanes, High-occupancy Toll (HOT) lanes, transit lanes, shoulders, and truck climbing lanes. These types of auxiliary lanes are captured in separate elements.

**Recommended Attributes:**

Numeric

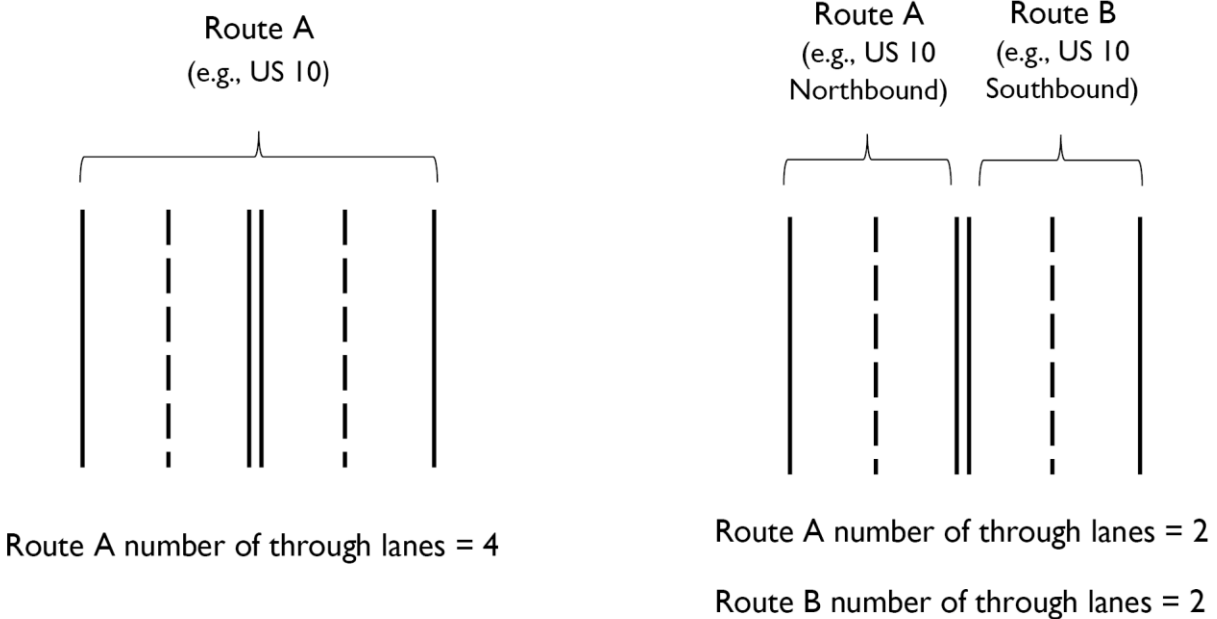
See Figure I below for additional details.

Note: This element has been changed since MIRE 1.0.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Through Lanes	Number of Lanes in Direction Indicated	Through Lanes	--	Lanes On and Under the Structure	Number of Through Lanes	NO_LANES	Number of Through Lanes
Element Number	7	8	--	--	28	8	14	--

Note: "--" indicates that the dataset does not include this specific MIRE element.



**Figure I. Illustration of Number of Through Lanes.**

### 33. Outside Through Lane Width

**Definition:** Width of the outside (curb) through lane (not including parking area, bicycle lanes, gutter pan, etc.). Lane width is measured from center of edgeline to center of centerline or to the center of the lane line (if multilane). If edgeline striping is placed inside the edge of the pavement (within approximately one foot) to keep traffic from breaking the pavement edge,

ignore the striping and measure from the pavement edge to the center of a single (or double) centerline stripe or to the center of the lane line (if multilane) If there is no edgeline or centerline, estimate a reasonable split between the actual width used by traffic and the shoulder or parking lane based on State/local design guides.

**Recommended Attributes:**

Feet

See Figure 2 through Figure 4 (Item 33) on pages 36–38 for outside through lane width, depending on number of lanes and direction of inventory.

- 33 Outside Through Lane Width
- 45 Right S houlder Total Width
- 46 Right Paved S houlder Width
- 49 L eft S houlder Total Width
- 50 L eft P aved S houlder Width
- 65 R ight S ideslope Width
- 67 L eft S ideslope Width

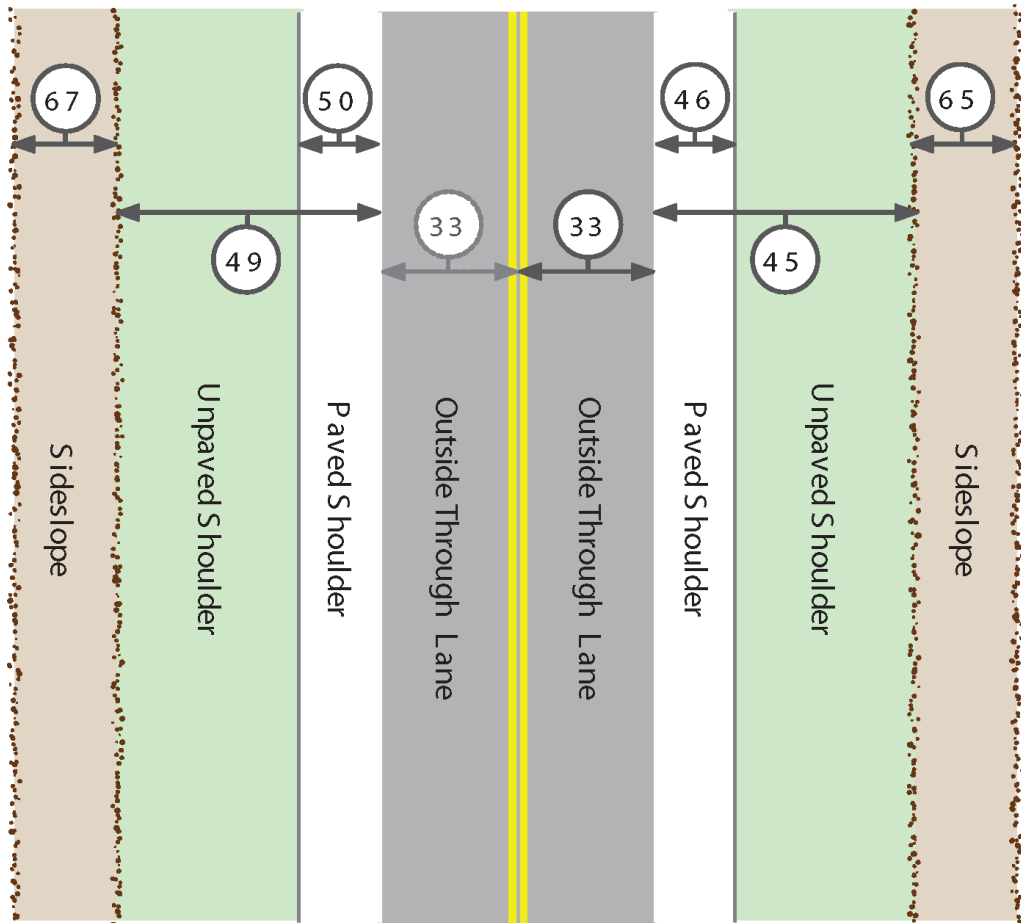
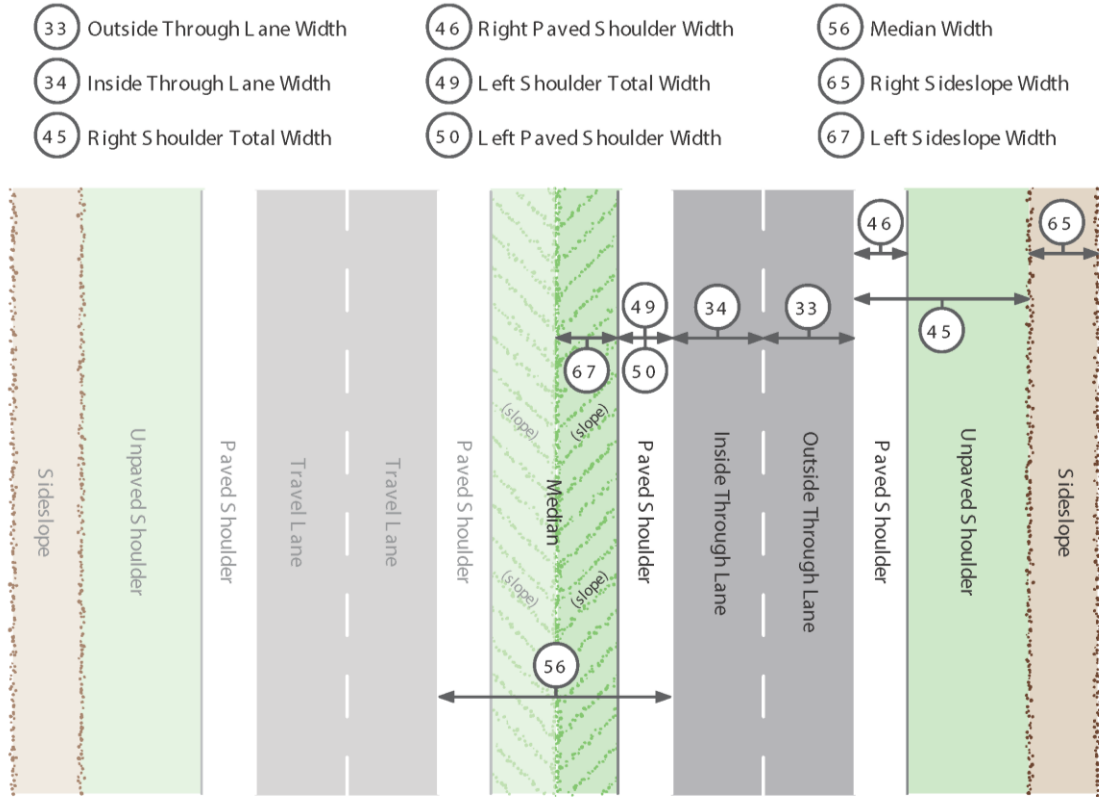
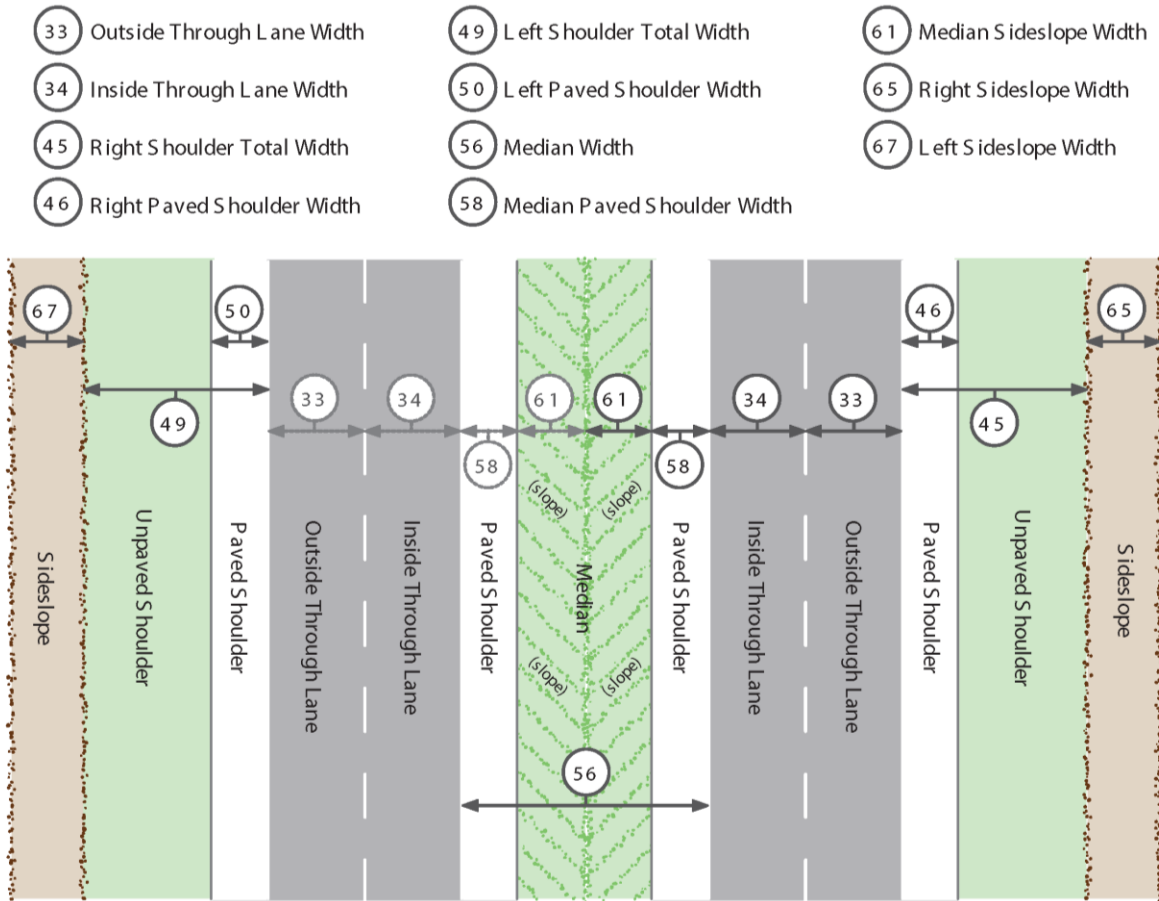


Figure 2. Illustration of Cross Section, Two-Lane Roadway.



**Figure 3. Illustration of Cross Section, Multilane Divided Roadway Inventoried in Two Directions (each direction inventoried separately).**





**Figure 4. Illustration of Cross Section, Multilane Divided Roadway Inventoried in One Direction (both directions inventoried together).**

### 34. Inside Through Lane Width

**Definition:** Predominant lane width of all inside through lanes, not including outside through lane (see *Element 33. Outside Through Lane Width*). For a two-lane road, leave this element blank.

**Recommended Attributes:**

Feet

### 35. Cross Slope

**Definition:** The cross slope for each lane starting with the leftmost lane according to direction of inventory.

Note: Cross slope needs to be captured for each lane individually, thus multiple elements will be needed.

**Recommended Attributes:**

Sign (+ or -) and percent

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	Cross-slope/ Superelevation	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

### 36. Auxiliary Lane Presence/Type

**Definition:** The presence and type of auxiliary lane present on the segment. Center two-way left-turn lanes and HOV lanes are not included here. They are included under Element 55. *Median Type* and Elements 38. *HOV Lane Presence/Type* and 39. *HOV Lanes* respectively.

**Recommended Attributes:**

1. Climbing lane
2. Passing lane
3. Exclusive continuous right turn lane
4. Part-time shoulder use
5. Part-time lane use
6. Special use lane
7. Other

Note: This element has been changed since MIRE 1.0. In MIRE 1.0, this element had four attributes, In MIRE 2.0, this element has seven attributes.

### 37. Auxiliary Lane Length

**Definition:** Length of auxiliary lane (noted in Element 36. *Auxiliary Lane Presence/Type*) if not full segment length. Length does not include taper.

**Recommended Attributes:**

Feet

### 38. HOV Lane Presence/Type

**Definition:** Presence and type of HOV lane(s) on the segment.

**Recommended Attributes:**

1. No HOV lanes
2. Has exclusive HOV lanes
3. Normal through lanes used as HOV at specified times
4. Shoulder/parking lanes used as HOV at specified times

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	High Occupancy Vehicle Operations Type	--	--	--	--	--	--	--
Element Number	8	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

### 39. HOV Lanes

**Definition:** Maximum number of lanes in both directions designated for HOV operations on the segment.

**Recommended Attributes:**

Numeric

Note: This element has been changed since MIRE 1.0.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	High Occupancy Vehicle Lanes	--	--	--	--	--	--	--
Element Number	9	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

### 40. Reversible Lanes

**Definition:** Number of reversible lanes on the segment.

**Recommended Attributes:**

1. No reversible lanes
2. One reversible lane
3. Two reversible lanes
4. More than two reversible lanes

## 41. Presence/Type of Bicycle Facility

**Definition:** The presence and type of bicycle facility on the segment.

**Recommended Attributes:**

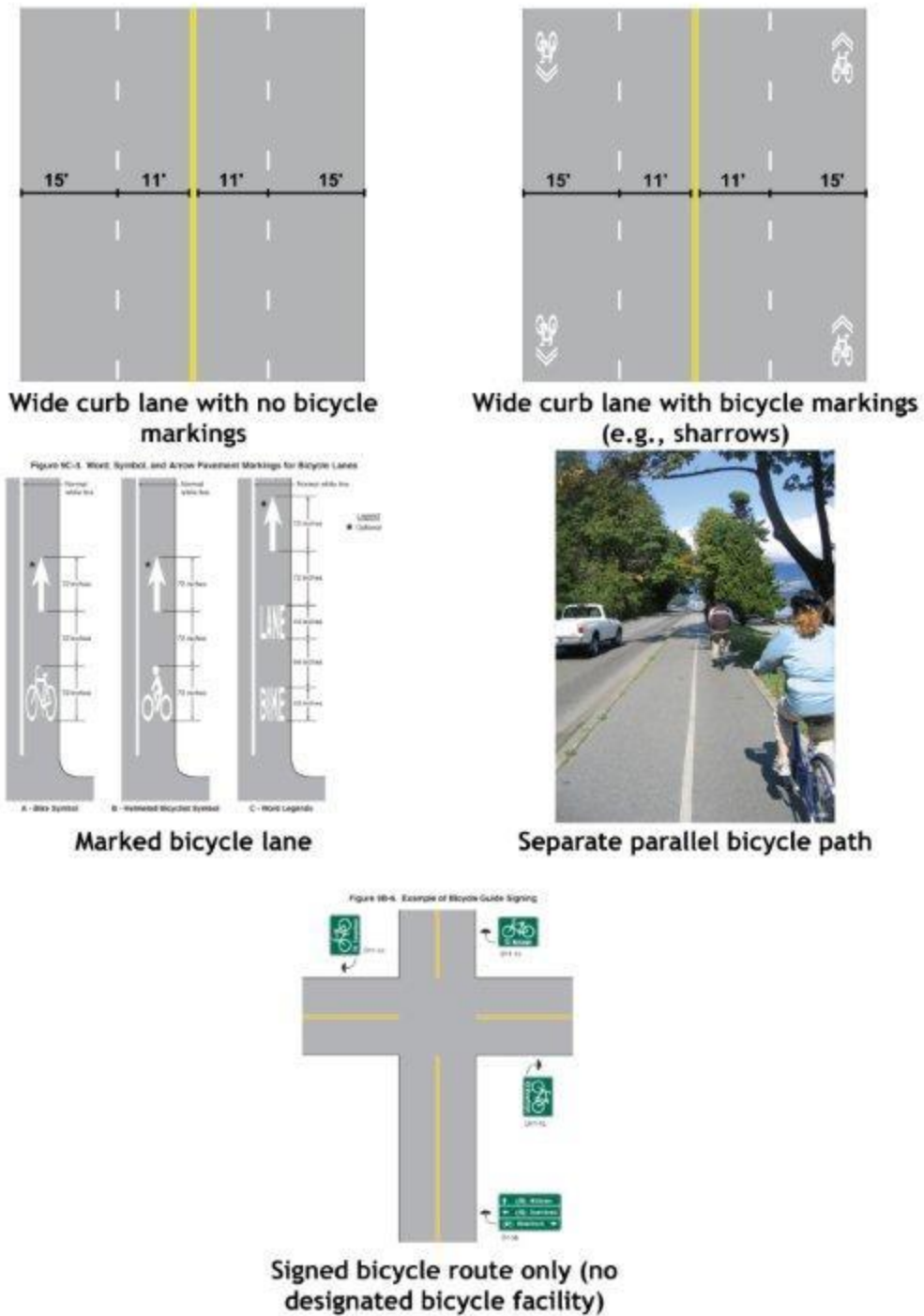
1. None
2. Wide curb lane with no bicycle markings
3. Wide curb lane with bicycle markings (e.g., sharrows)
4. Marked bicycle lane
5. Separate parallel bicycle path
6. Signed bicycle route only (no designated bicycle facility)
7. Other

See Figure 5 on page 43 for additional detail.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	BikeLane	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.



**Figure 5. Illustration of Presence/Types of Bicycle Facilities.**

Source (Marked bicycle lane and Signed bicycle route only): *Manual Uniform Traffic Control Devices for Streets and Highways*, 2009 edition. Federal Highway Administration, Washington DC, 2009.

## 42. Width of Bicycle Facility

**Definition:** The width of the bicycle facility; either the width of the marked bicycle lane or bicycle path.

**Recommended Attributes:**

Feet

## 43. Number of Peak Period Through Lanes

**Definition:** The number of through lanes used in peak period in the peak direction. This includes reversible lanes, parking lanes, or shoulders that legally are used for through traffic whether for single-occupancy vehicle (SOV) or HOV operation.

**Recommended Attributes:**

Numeric

Note: For inventory covering both directions, code total number of through lanes. For directional inventory, code total number of lanes for this inventory direction.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Peak Lanes	--	--	--	--	--	--	--
Element Number	10	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 44. Right Shoulder Type

**Definition:** The predominant shoulder type on the right side of road in the direction of inventory.

**Recommended Attributes:**

1. None
2. Surfaced shoulder exists - bituminous concrete (AC)
3. Surfaced shoulder exists – PCC surface
4. Stabilized shoulder exists (stabilized gravel or other granular material with or without admixture)
5. Combination shoulder exists (shoulder width has two or more surface types; e.g., part of the shoulder width is surfaced and part of the width is earth)
6. Barrier curb exists; no shoulder in front of curb
7. Earth shoulder exists

Note: This element has been changed since MIRE 1.0.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Shoulder Type	--	Shoulder Type	--	--	Shoulder Surface Type	--	Shoulder Type
Element Number	37	--	--	--	--	5	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 45. Right Shoulder Total Width

**Definition:** The total width of the right shoulder including both paved and unpaved parts measured from the center of the edgeline outward. Do not include parking or bicycle lanes in the shoulder width measurement; code the predominant width where it changes back and forth along the roadway section; ensure that the total width of combination shoulders is reported. Include gutter pans on outside of shoulder in shoulder width.



**Recommended Attributes:**

Feet

See Figure 2 through Figure 4 (Item 45) on pages 36–38 for right shoulder total width, depending on number of lanes and direction of inventory.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Right Shoulder Width	--	--	--	--	Total Width	SHLD_WIDTH_R	Shoulder Width
Element Number	38	--	--	--	--	6	18	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

**46. Right Paved Shoulder Width**

**Definition:** The width of paved portion of right shoulder measured from the center of the edgeline outward. Do not include parking or bicycle lanes in the paved shoulder width measurement; code the predominant width if it changes back and forth along the roadway section. Include gutter pans on outside of shoulder in paved shoulder width.

**Recommended Attributes:**

Feet

See Figure 2 through Figure 4 (Item 46) on pages 36–38 for right paved shoulder width, depending on number of lanes and direction of inventory.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	Shoulder Width	--	--	Paved Width	--	Outside Shoulder Width
Element Number	--	--	--	--	--	7	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 47. Right Shoulder Rumble Strip Presence/Type

**Definition:** Presence and type of rumble strips on the right shoulder.

**Recommended Attributes:**

1. None
2. Milled beyond edgeline
3. Rolled beyond edgeline
4. Milled or rolled on/under edgeline (e.g., rumble stripes)
5. Edgeline-rumble strip combination (e.g., raised/inverted thermoplastic profile marker)

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	Rumble Strip Presence/Location	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 48. Left Shoulder Type

**Definition:** Shoulder type on left side of roadway in direction of inventory. For undivided roads and divided roads with one direction of inventory, this will be the outside shoulder on the opposing side. Note that information on paved width of the inner (left) shoulder is included under median descriptors (see Element 50. *Left Paved Shoulder Width*).

**Recommended Attributes:**

1. None
2. Surfaced shoulder exists - bituminous concrete (AC)
3. Surfaced shoulder exists – PCC surface
4. Stabilized shoulder exists (stabilized gravel or other granular material with or without admixture)
5. Combination shoulder exists (shoulder width has two or more surface types; e.g., part of the shoulder width is surfaced and part of the width is earth)
6. Barrier curb exists; no shoulder in front of curb
7. Earth shoulder exists

Note: This element has been changed since MIRE 1.0.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Shoulder Type	--	Shoulder Type	--	--	Shoulder Surface Type	--	Shoulder Type
Element Number	37	--	--	--	--	5	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 49. Left Shoulder Total Width

**Definition:** Width of left (outside) shoulder, including both paved and unpaved parts measured from the center of the edgeline outward. See definition of Element 48. *Left Shoulder Type* above. Do not include parking or bicycle lanes in the shoulder width measurement; code the predominant width where it changes back and forth along the roadway section; ensure that the total width of combination shoulders is reported. Include gutter pans on outside of shoulder in shoulder width.

**Recommended Attributes:**

Feet

See Figure 2 through Figure 4 (Item 49) on pages 36–38 for left shoulder total width, depending on number of lanes and direction of inventory.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Left Shoulder Width	--	--	--	--	Total Width	SHLD_WIDTH_L	--
Element Number	39	--	--	--	--	6	19	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 50. Left Paved Shoulder Width

**Definition:** The width of the paved portion of left (outside) shoulder measured from the center of the edgeline outward. Do not include parking or bicycle lanes in the paved shoulder width measurement; code the predominant width where it changes back and forth along the roadway section. Include gutter pans on outside of shoulder in paved shoulder width.

**Recommended Attributes:**

Feet

See Figure 2 through Figure 4 (Item 50) on pages 36–38 for left paved shoulder width, depending on number of lanes and direction of inventory.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	Shoulder Width	--	--	Paved Width	--	Inside Shoulder Width
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 51. Left Shoulder Rumble Strip Presence/Type

**Definition:** Presence and type of rumble strips on the left shoulder.

**Recommended Attributes:**

1. None
2. Milled beyond edgeline
3. Rolled beyond edgeline
4. Milled or rolled on/under edgeline (e.g., rumble stripes)
5. Edgeline-rumble strip combination (e.g., raised/inverted thermoplastic profile marker)

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	Rumble Strip Presence/Location	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 52. Sidewalk Presence

---

**Definition:** The presence of a paved sidewalk along the segment.

**Recommended Attributes:**

1. None
2. Continuous left-side
3. Discontinuous left-side
4. Continuous right-side
5. Discontinuous right-side
6. Continuous both sides
7. Discontinuous both sides

## 53. Curb Presence

---

**Definition:** The presence of curb along the segment.

**Recommended Attributes:**

1. No curb
2. Curb on left
3. Curb on right
4. Curb on both sides

## 54. Curb Type

---

**Definition:** The type of curb present on the segment.

**Recommended Attributes:**

1. No curb
2. Sloping curb - A curb that does not exceed a 4-inch height (for a slope steeper than 1V:1H) or a 6-inch height (for a slope equal to or flatter than 1V:1H).
3. Vertical (barrier) curb - A curb that is steeper or taller than the ranges given for a sloping curb.

## 55. Median Type <sup>FDE</sup>

---

**Definition:** The type of median present on the segment.

**Recommended Attributes:**

1. Undivided
2. Flush paved median (at least 4 ft in width)
3. Raised median
4. Depressed median
5. Two-way left-turn lane
6. Railroad or rapid transit
7. Divided, separate grades without retaining wall
8. Divided, separate grades with retaining wall
9. Other divided

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Median Type	--	Median Type	--	--	--	--	Presence/Type of Median
Element Number	35	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 56. Median Width

**Definition:** The width of the median, including inside shoulders (i.e., measured from center of edgeline to center of edgeline on inside edges of opposing through lanes).

**Recommended Attributes:**

Feet

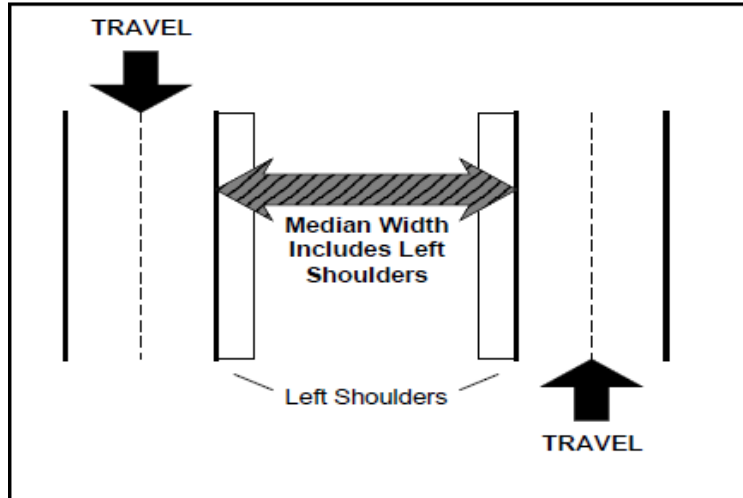
See Figure 6 on page 54 for additional detail.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Median Width	--	--	--	--	--	--	Median Width
Element Number	36	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.





**Figure 6. An Example for Measuring Median Width.**

Source: *Highway Performance Monitoring System Field Manual*. Federal Highway Administration, Washington DC, 2014.

## 57. Median Barrier Presence/Type

**Definition:** The presence and type of median barrier on the segment.

**Recommended Attributes:**

1. None.
2. Unprotected.
3. Curbed.
4. Positive Barrier- unspecified.
5. Positive Barrier flexible.
6. Positive Barrier semi-rigid.
7. Positive Barrier rigid.

Note: This element has been changed since MIRE 1.0.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Median Type	--	Barrier Type	--	--	--	--	Presence of Concrete Median Barrier
Element Number	35	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 58. Median (Inner) Paved Shoulder Width

**Definition:** The width of the paved shoulder on the median (inner) side of the roadway on a divided roadway measured from the center of the edgeline outward. Note that information on type, width and paved width of non-median shoulders is included under Element 48. *Left Shoulder Type*. If the roadway is divided AND inventoried in two directions, this is already captured under Element 50. *Left Paved Shoulder Width*.

**Recommended Attributes:**

Feet

See Figure 4 (Item 58) on page 38 for additional detail.

## 59. Median Shoulder Rumble Strip Presence/Type

**Definition:** Presence and type of median shoulder rumble strip. If the roadway is divided AND inventoried in two directions, this is already captured under Element 51. *Left Shoulder Rumble Strip Presence/Type*.

**Recommended Attributes:**

1. None
2. Milled beyond edgeline
3. Rolled beyond edgeline

4. Milled or rolled on/under edgeline (e.g., rumble stripes)
5. Edgeline-rumble strip combination (e.g., raised/inverted thermoplastic profile marker)

## 60. Median Sideslope

---

**Definition:** The sideslope in the median adjacent to the median shoulder or travel lane. If the sideslope varies along the segment, code the predominant sideslope. If the roadway is divided AND inventoried in two directions, this is already captured under Element 66. *Left Sideslope*.

### Recommended Attributes:

Numeric percent of the sideslope

Note: This can be positive (if backslope) or negative (if foreslope).

## 61. Median Sideslope Width

---

**Definition:** The width of the median sideslope adjacent to the median shoulder or travel lane. If width varies along the segment, code the predominant width. If the roadway is divided AND inventoried in two directions, this is already captured under Element 67. *Left Sideslope Width*.

### Recommended Attributes:

Feet

See Figure 4 (Item 61) on page 38 for additional detail.

## 62. Median Crossover/Left-Turn Lane Type

---

**Definition:** The presence and type of crossover/left-turn bay in the median along the segment. Note: This element is intended to capture the typical median characteristic along the segment at non-intersection locations. Information on intersection-related turn lanes will be coded in the Junction File.

### Recommended Attributes:

1. None
2. Median crossover, no left-turn bay
3. Median crossover, left-turn bay
4. Median crossover, directional left-turn lane bays (to prevent crossing traffic from driveways)

5. Two-way left-turn lane

See Figure 7 below for additional detail.

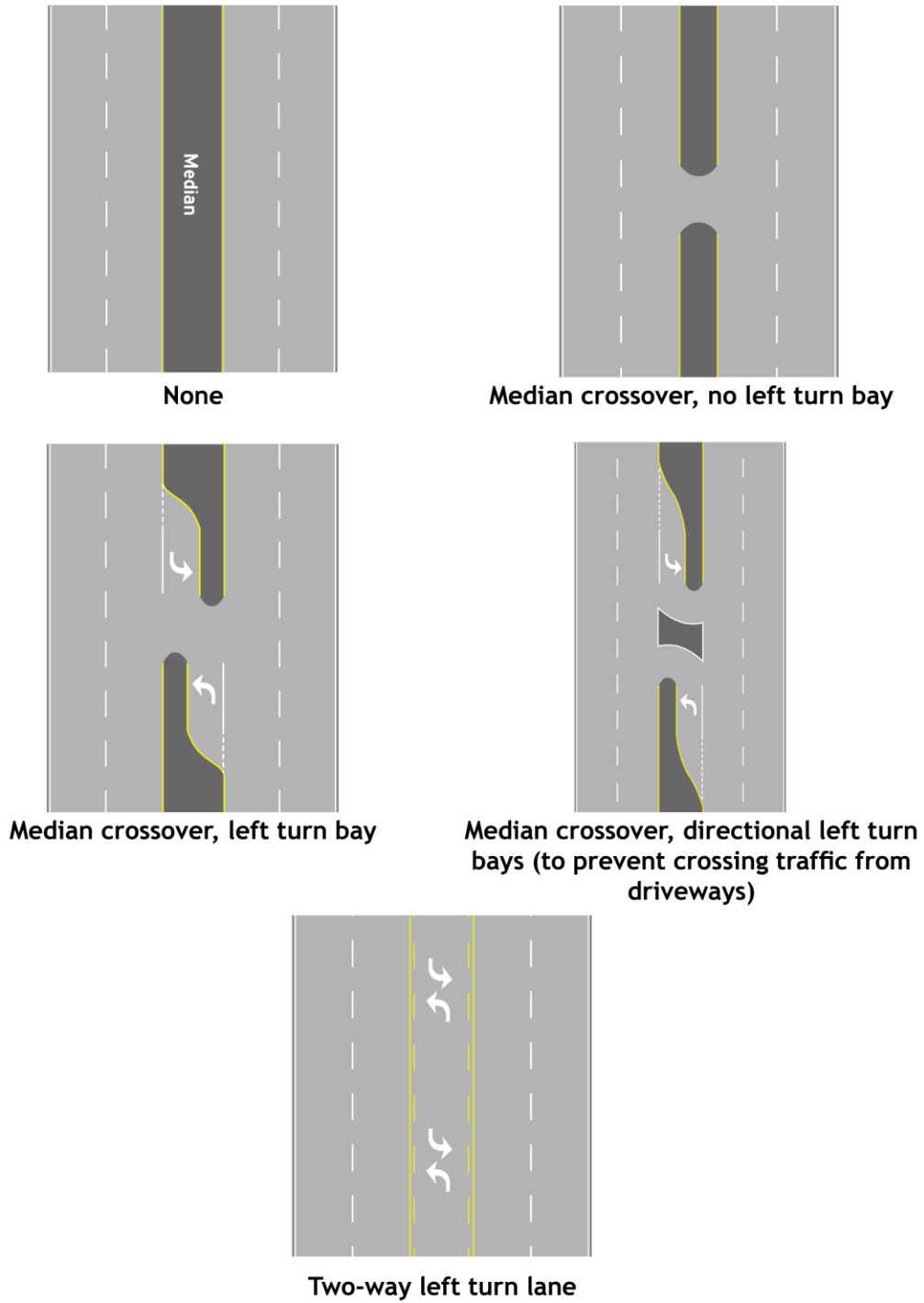


Figure 7. Illustration of Types of Median Crossover/Left-Turn Lanes.

## 63. Roadside Clearzone Width

**Definition:** Predominate or average roadside clearzone width. Clearzone is the total roadside border area, starting at the edge of the traveled way, available for safe use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a non-recoverable slope, and/or a clear run-out area.

**Recommended Attributes:**

Feet

## 64. Right Sideslope

**Definition:** The sideslope (foreslope or backslope) on right side of roadway immediately adjacent to the travel lane, shoulder edge or drainage ditch in direction of inventory. If sideslope varies within the section, code the predominant sideslope.

**Recommended Attributes:**

1. Numeric percent (Note: This can be positive (if backslope) or negative (if foreslope))
2. Not applicable – protected by roadside barrier
3. Not applicable – other (e.g., city center street)

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Roadside Slope
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 65. Right Sideslope Width

**Definition:** The width of the sideslope on right side of roadway immediately adjacent to the travel lane, shoulder edge or drainage ditch in direction of inventory. If the width varies along the segment, code the predominant width.

**Recommended Attributes:**

Feet

See Figure 2 through Figure 4 (Item 65) on pages 36–38 for right sideslope width, depending on number of lanes and direction of inventory.

## 66. Left Sideslope

**Definition:** The sideslope (foreslope or backslope) on left side of roadway immediately adjacent to the travel lane, shoulder edge or drainage ditch in direction of inventory. If sideslope varies within the section, code the predominant sideslope. For undivided roads and divided roads with one direction of inventory, this will be the outside shoulder on the opposing side.

**Recommended Attributes:**

1. Numeric percent of the sideslope. (Note: This can be positive (if backslope) or negative (if foreslope))
2. Not applicable – protected by roadside barrier
3. Not applicable – other (e.g., city center street)

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Roadside Slope
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 67. Left Sideslope Width

---

**Definition:** The width of the sideslope on left side of roadway immediately adjacent to the travel lane, shoulder edge or drainage ditch in direction of inventory. If the width varies along the segment, code the predominant width.

**Recommended Attributes:**

Feet

See Figure 2 through Figure 4 (Item 67) on pages 36–38 for left sideslope width, depending on number of lanes and direction of inventory.

## 68. Roadside Rating

---

**Definition:** A rating of the safety of the roadside, ranked on a seven-point categorical scale from 1 (best) to 7 (worst).

**Recommended Attributes:**

1. **Rating = 1**
  - Wide clear zones greater than or equal to 30 ft from the pavement edgeline.
  - Sideslope flatter than 1:4.
  - Recoverable.
2. **Rating = 2**
  - Clear zone between 20 and 25 ft from pavement edgeline.
  - Sideslope about 1:4.
  - Recoverable.
3. **Rating = 3**
  - Clear zone about 10 ft from pavement edgeline.
  - Sideslope about 1:3 or 1:4.
  - Rough roadside surface.
  - Marginally recoverable.
4. **Rating = 4**
  - Clear zone between 5 to 10 ft from pavement edgeline.
  - Sideslope about 1:3 or 1:4.
  - May have guardrail (5 to 6.5 ft from pavement edgeline).
  - May have exposed trees, poles, or other objects (about 10 ft from pavement edgeline).

- Marginally forgiving, but increased chance of a reportable roadside collision.

**5. Rating = 5**

- Clear zone between 5 to 10 ft from pavement edgeline.
- Sideslope about 1:3.
- May have guardrail (0 to 5 ft from pavement edgeline).
- May have rigid obstacles or embankment within 6.5 to 10 ft of pavement edgeline.
- Virtually non-recoverable.

**6. Rating = 6**

- Clear zone less than or equal to 5 ft.
- Sideslope about 1:2.
- No guardrail.
- Exposed rigid obstacles within 0 to 6.5 ft of the pavement edgeline.
- Non-recoverable.

**7. Rating = 7**

- Clear zone less than or equal to 5 ft.
- Sideslope 1:2 or steeper.
- Cliff or vertical rock cut.
- No guardrail.
- Non-recoverable with high likelihood of severe injuries from roadside collision.

See Figure 8 and Figure 9 on pages 62–63 for additional detail.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Roadside Hazard Rating
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.





Typical Roadway with Roadside Hazard Rating Equal to 1.



Typical Roadway with Roadside Hazard Rating Equal to 2.



Typical Roadway with Roadside Hazard Rating Equal to 3.



Typical Roadway with Roadside Hazard Rating Equal to 4.

**Figure 8. Illustration of Roadside Ratings.**

Source: Zegeer, C.V., J. Hummer; D. Reinfurt; L. Herf; and W. Hunter (1986). Safety Effects of Cross-Section Design for Two-Lane Roads, FHWA-RD-87-008, Federal Highway Administration, Washington, DC.



Typical Roadway with Roadside Hazard Rating Equal to 5.



Typical Roadway with Roadside Hazard Rating Equal to 6.



Typical Roadway with Roadside Hazard Rating Equal to 7.

**Figure 9. Illustration of Roadside Ratings (continued).**

Source: Zegeer, C.V., J. Hummer; D. Reinfurt; L. Herf; and W. Hunter (1986). Safety Effects of Cross-Section Design for Two-Lane Roads, FHWA-RD-87-008, Federal Highway Administration, Washington, DC.

## 69. Tapered Edge

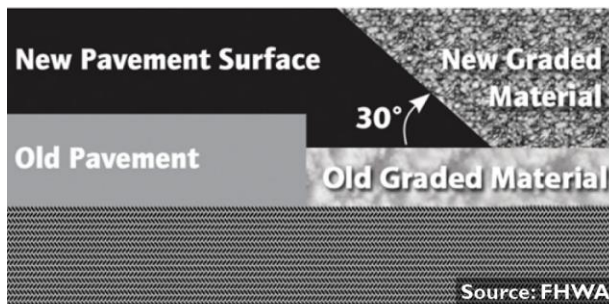
**Definition:** A pavement edge treatment that provides a tapered transition from the edge of the paved roadway surface to the unpaved shoulder.

**Recommended Attributes:**

1. Yes
2. No

See Figure 10 below for additional detail.

Note: This element is new in MIRE 2.0.



**Cross-section of tapered edge**



**Photo of tapered edge**

**Figure 10. Illustration of Tapered Edge.**

## 70. Major Commercial Driveway Count

**Definition:** Count of commercial driveways in segment serving 50 or more parking spaces.

**Recommended Attributes:**

Numeric

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Number of Major Commercial Driveways
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 71. Minor Commercial Driveway Count

**Definition:** Count of commercial driveways in segment serving fewer than 50 parking spaces.

**Recommended Attributes:**

Numeric

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Number of minor commercial driveways
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 72. Major Residential Driveway Count

**Definition:** Count of residential driveways in segment serving 50 or more parking spaces.

**Recommended Attributes:**

Numeric

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Number of major residential driveways
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 73. Minor Residential Driveway Count

**Definition:** Count of residential driveways in segment serving fewer than 50 parking spaces.

**Recommended Attributes:**

Numeric

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Number of Minor Residential Driveways
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 74. Major Industrial/Institutional Driveway Count

**Definition:** Count of industrial/institutional driveways in segment serving 50 or more parking spaces.

**Recommended Attributes:**

Numeric

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Number of major industrial/institutional driveways
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 75. Minor Industrial/Institutional Driveway Count

**Definition:** Count of industrial/institutional driveways in segment serving fewer than 50 parking spaces.

**Recommended Attributes:**

Numeric

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Number of minor industrial/institutional driveways
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 76. Other Driveway Count

**Definition:** Count of "other" driveways in segment.

**Recommended Attributes:**

Numeric

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Number of Other Driveways
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 77. Terrain Type

**Definition:** The basic terrain type for the segment. This is a (less than desirable) surrogate for detailed data on curvature, grade and the nature of the roadside, and would be collected only in the absence of those elements. See roadside descriptors above and alignment elements below.

**Recommended Attributes:**

1. Level - Any combination of grades and horizontal or vertical alignment that permits heavy vehicles to maintain the same speed as passenger cars; this generally includes short grades of no more than 2 percent.
2. Rolling - Any combination of grades and horizontal or vertical alignment that causes heavy vehicles to reduce their speeds substantially below those of passenger cars but that does not cause heavy vehicles to operate at crawl speeds for any significant length of time.
3. Mountainous - Any combination of grades and horizontal or vertical alignment that causes heavy vehicles to operate at extremely low speeds for significant distances or at frequent intervals.

Note: This element has been changed since MIRE 1.0.



**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Terrain Type	--	Terrain	--	--	--	--	Terrain
Element Number	44	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 78. Number of Signalized Intersections in Segment

**Definition:** The number of at-grade intersections with a signal controlling traffic on the inventory route within the segment. A signal that cycles through red, yellow, and green for all or a portion of the day should be counted as a signalized intersection. Include at-grade intersections at entrances to shopping centers, industrial parks, and other large traffic generating enterprises.

**Recommended Attributes:**

Numeric

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Number of Signalized Intersections	--	Median Type	--	--	--	TRAFLIGHT_CNT	--
Element Number	31	--	--	--	--	--	64	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 79. Number of Stop-Controlled Intersections in Segment

**Definition:** The number of at-grade intersections with a stop sign controlling traffic on the inventory route within the segment. A continuously operating, flashing red signal should be counted as a stop sign control. Include at-grade intersections at entrances to shopping centers, industrial parks, and other large traffic generating enterprises.

**Recommended Attributes:**

Numeric

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Number of Stop-Sign Controlled Intersections	--	--	--	--	--	--	--
Element Number	32	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 80. Number of Uncontrolled/Other Intersections in Segment

**Definition:** Number of at-grade intersections where traffic on the inventory route is not controlled by either a signal or a stop sign; or is controlled by other types of signing; or has no controls within the segment. A continuously operating, flashing yellow signal should be considered as “other or no control.” Include at-grade intersections at entrances to shopping centers, industrial parks, and other large traffic generating enterprises.

**Recommended Attributes:**

Numeric

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTTP	NPS RIP	HSM
Element Name	Number of Intersections, Type -Other	--	--	--	--	--	--	--
Element Number	33	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 81. Annual Average Daily Traffic (AADT) <sup>FDE</sup>

**Definition:** AADT value to represent the current data year. For two-way facilities, provide the AADT for both directions; provide the directional AADT if part of a one-way couplet or for one-way streets.

**Recommended Attributes:**

Vehicles per day

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Annual Average Daily Traffic (AADT)	--	Annual Average Daily Traffic (AADT)	--	Average Daily Traffic	--	AADT	Annual Average Daily Traffic (AADT)
Element Number	21	--	--	--	29	--	48	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

**82. AADT Year<sup>FDE</sup>**

**Definition:** Year of AADT.

**Recommended Attributes:**

Year

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	Year of Data	AADT by Year	--	Year of Average Daily Traffic	--	ADT Date	--
Element Number	--	6	--	--	30	--	50	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

### 83. AADT Annual Escalation Percentage

**Definition:** Expected annual percent growth in AADT, with “AADT YEAR” as base year. This will allow calculation of current year’s AADT if “AADT YEAR” differs from current year.

**Recommended Attributes:**

Percent

### 84. Percent Single Unit Trucks or Single Truck AADT

**Definition:** Percentage single unit truck or single truck AADT (Classes 4-7).

**Recommended Attributes:**

Percent or numeric count

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Single-Unit Truck and Bus AADT	--	--	--	--	--	--	--
Element Number	22	--	--	--	--	--	--	--

Note: “--” indicates that the dataset does not include this specific MIRE element.

### 85. Percent Combination Trucks or Combination Truck AADT

**Definition:** Percentage combination truck or combination truck AADT (Classes 8-13).

**Recommended Attributes:**

Percent or numeric count

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Combination Truck AADT	--	--	--	Average Daily Truck Traffic	--	--	--
Element Number	24	--	--	--	109	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 86. Percentage Trucks or Truck AADT

**Definition:** Percentage truck or truck AADT (includes tractor-semis and trucks with 6+ wheels). Note that this can be derived if both Element 84. *Percent Single Unit Trucks or Single Truck AADT* and Element 85. *Percent Combination Trucks or Combination Truck AADT* are captured.

**Recommended Attributes:**

Percent or numeric count

## 87. Total Daily Two-Way Pedestrian Count/Exposure

**Definition:** Total daily pedestrian flow along roadway in both directions (unless directional segment). This is a (less than desirable) surrogate for crossing pedestrian counts.

**Recommended Attributes:**

Average daily count (numeric)

## 88. Bicycle Count/Exposure

**Definition:** The total daily bicycle flow in both directions along the roadway (unless directional segment).

**Recommended Attributes:**

Average daily count (numeric)

## 89. Motorcycle Count or Percentage

**Definition:** Motorcycle daily count or percentage of AADT.

**Recommended Attributes:**

Percent or numeric count

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Pct_MC	--	--	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 90. Hourly Traffic Volumes (or Peak and Off peak AADT)

**Definition:** Hourly traffic volumes (or peak and off peak AADT).

**Recommended Attributes:**

Numeric count

## 91. K-Factor

---

**Definition:** The K-factor is the 30th highest hourly volume (i.e., the design hour volume) for a year, as a percentage of the annual average daily traffic.

**Recommended Attributes:**

Percent

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	K- Factor	--	--	--	--	--	--	--
Element Number	26	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 92. Peak Hour Directional Factor

---

**Definition:** Proportion of peak hour traffic in the predominant direction of flow.

**Recommended Attributes:**

Numeric

Note: This element name has been changed since MIRE 1.0.



**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Directional Factor	--	--	--	--	--	--	--
Element Number	27	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

### 93. One/Two-Way Operations <sup>FDE</sup>

**Definition:** Indication of whether the segment operates as a one- or two-way roadway.

**Recommended Attributes:**

1. One-way
2. Two-way
3. One direction of travel for divided roadways

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Facility Type	--	--	--	Direction of Traffic	--	--	--
Element Number	3	--	--	--	102	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 94. Speed Limit

**Definition:** The daytime regulatory speed limit for automobiles posted or legally mandated on the greater part of the section.

**Recommended Attributes:**

1. Miles per hour (mph)
2. No posted or legally mandated speed limit

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Speed Limit	--	Posted Speed Limit	--	--	--	--	Speed Category
Element Number	14	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 95. Truck Speed Limit

**Definition:** The regulatory speed limit for trucks posted or legally mandated on the greater part of the section (i.e., differential speed limit).

**Recommended Attributes:**

mph

Note: Only code if the speed limit for trucks is different than the limit for automobiles.

## 96. Nighttime Speed Limit

---

**Definition:** The regulatory speed limit for vehicles at night posted or legally mandated on the greater part of the section (i.e., differential speed limit).

**Recommended Attributes:**

mph

Note: Only code if the speed limit is different at night than during the day.

## 97. 85th Percentile Speed

---

**Definition:** Traffic speed exceeded by 15 percent of the vehicles in the flow for this section.

**Recommended Attributes:**

mph

## 98. Mean Speed

---

**Definition:** The arithmetic mean (average) of all observed vehicle speeds in the segment (i.e., the sum of all spot speeds divided by the number of recorded speeds).

**Recommended Attributes:**

mph

## 99. School Zone Indicator

---

**Definition:** Indication of whether the segment contains a school zone.

**Recommended Attributes:**

1. Yes
2. No

## 100. On-Street Parking Presence

---

**Definition:** Time-based parking restrictions.

**Recommended Attributes:**

1. Permitted 24 hrs/day
2. Prohibited 24 hrs/day
3. Permitted during specified times

## 101. On-Street Parking Type

---

**Definition:** Type of on-street parking present on the segment.

**Recommended Attributes:**

1. No parking allowed or none available
2. Head-in/back-out angle parking on one side
3. Head-in/back-out angle parking on both sides
4. Back-in/head-out angle parking on one side
5. Back-in/head-out angle parking on both sides
6. Parallel parking on one side
7. Parallel parking on both sides

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Type of On- street Parking
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 102. Roadway Lighting

**Definition:** The type of roadway lighting present on the segment.

**Recommended Attributes:**

1. None
2. Spot on one side
3. Spot on both sides
4. Continuous on one side
5. Continuous on both sides

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Presence of Lighting
Element Number	--	--	--	--	--	--	--	--

Note: “--” indicates that the dataset does not include this specific MIRE element.

## 103. Toll Charged

**Definition:** Presence and type of toll facility on the segment. If tolls are charged in both directions, but only one direction at a given time, then use Code ‘1’. Include HOT lanes and other special toll lanes. Use Code ‘3’ for subsections of a toll facility that do not have tolls.

**Recommended Attributes:**

1. Toll charged in one direction only.
2. Toll charged in both directions.
3. No toll charged.

Note: This is a new element in MIRE 2.0. In MIRE 2.0, elements 103 *Toll Charged* and 104 *Toll Type* replace MIRE 1.0 element 101 *Toll Facility*.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Toll Charged	--	--	Toll Road?	Toll	--	--	--
Element Number	15	--	--	62	20	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## I04. Toll Type

**Definition:** Presence of special tolls (i.e., HOT lane(s) or other managed lanes). HOT lanes are HOV lanes where a fee is charged, sometimes based on occupancy of the vehicle or the type of vehicle.

**Recommended Attributes:**

1. Has toll lanes but no special tolls (e.g., HOT lanes)
2. Has HOT lanes
3. Has other special tolls

Note: This is a new element in MIRE 2.0. In MIRE 2.0, elements I03 and I04 replace MIRE 1.0 element I01.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Toll Type	--	--	--	--	--	--	--
Element Number	16	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 105. Edgeline Presence/Width

---

**Definition:** Presence and width of edgeline.

**Recommended Attributes:**

1. No marked edgeline
2. 4 inch marked edgeline
3. 6 inch marked edgeline
4. 8 inch marked edgeline
5. Greater than 8 inch marked edgeline

## 106. Centerline Presence/Width

---

**Definition:** Presence and width of centerline.

**Recommended Attributes:**

1. No marked centerline
2. 4 inch marked centerline
3. 6 inch marked centerline
4. 8 inch marked centerline
5. Greater than 8 inch marked centerline

## 107. Centerline Rumble Strip Presence/Type

**Definition:** Presence and type of centerline rumble strips on the segment.

**Recommended Attributes:**

1. None
2. Milled adjacent to centerline
3. Rolled adjacent to centerline
4. Milled or rolled on/under centerline (e.g., rumble stripes)
5. Centerline-rumble strip combination (e.g., raised/inverted thermoplastic profile marker)

## 108. Passing Zone Percentage

**Definition:** Percent of segment length striped for passing.

**Recommended Attributes:**

Percent

Note: Where there is a discernible directional difference, code the more restrictive direction.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Percent Passing Sight Distance	--	--	--	--	--	--	Presence of Passing Lane
Element Number	46	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.



## 109. Bridge Numbers for Bridges in Segment

**Definition:** The official structure number from bridge file for bridges in segment (See discussion in Appendix A).

**Recommended Attributes:**

Bridge number for each bridge in the segment.

Note: This element has been changed since MIRE 1.0. In MIRE 2.0, there is a minor change in definition from MIRE 1.0.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	Bridge Number	NBI #	Structure Number	--	STR_NUMBER	--
Element Number	--	--	--	28	8	--	22	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## II. AT-GRADE INTERSECTION/JUNCTIONS

- I10. Unique Junction Identifier <sup>FDE</sup>
- I11. Type of Intersection/Junction
- I12. Location Identifier for Road 1 Crossing Point <sup>FDE</sup>
- I13. Location Identifier for Road 2 Crossing Point <sup>FDE</sup>
- I14. Location Identifier for Additional Road Crossing Points
- I15. Intersection/Junction Number of Legs
- I16. Intersection/Junction Geometry <sup>FDE</sup>
- I17. School Zone Indicator
- I18. Railroad Crossing Number
- I19. Intersecting Angle
- I20. Intersection/Junction Offset Distance
- I21. Intersection/Junction Traffic Control <sup>FDE</sup>
- I22. Signalization Presence/Type
- I23. Intersection/Junction Lighting
- I24. Circular Intersection - Number of Circulatory Lanes
- I25. Circular Intersection - Circulatory Lane Width
- I26. Circular Intersection - Inscribed Diameter
- I27. Circular Intersection - Bicycle Facility

## 110. Unique Junction Identifier <sup>FDE</sup>

**Definition:** A unique junction identifier.

**Recommended Attributes:**

User defined (e.g., node number, LRS of primary route, etc.)

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	IntersectionID	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 111. Type of Intersection/Junction

**Definition:** Type of junction being described in the data record.

**Recommended Attributes:**

1. Roadway/roadway (not interchange related)
2. Roadway/roadway (interchange ramp terminal)
3. Roadway/pedestrian crossing (e.g., midblock crossing, pedestrian path or trail)
4. Roadway/bicycle path or trail
5. Roadway/railroad grade crossing
6. Other

## 112. Location Identifier for Road 1 Crossing Point <sup>FDE</sup>

**Definition:** Location of the center of the junction on the first intersecting route (e.g. route-milepost). Note that if the Junction File is a spatial data file, this would be the coordinates and would be the same for all crossing roads.

**Recommended Attributes:**

Route and location descriptors (e.g., route and milepoint or route and spatial coordinates).

Note: Must be consistent with other MIRE files for linkage.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	RouteID FrMeasure ToMeasure	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 113. Location Identifier for Road 2 Crossing Point <sup>FDE</sup>

**Definition:** Location of the center of the junction on the second intersecting route (e.g. route-milepost). Note that in a spatial data system, this would be the same as Element 112. *Location Identifier for Road 1 Crossing Point*. Not applicable if intersecting route is not an inventoried road (i.e., a railroad or bicycle path).

**Recommended Attributes:**

Route and location descriptors (e.g., route and milepoint or route and spatial coordinates).

Note: Must be consistent with other MIRE files for linkage.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	RoutelD FrMeasure ToMeasure	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 114. Location Identifier for Additional Road Crossing Points

**Definition:** Location of the center of the junction on the third and subsequent intersecting route (e.g. route-milepost). Note that in a spatial data system, this would be the same as Element 112. *Location Identifier for Road 1 Crossing Point*. Not applicable if intersecting route is not an inventoried road (i.e., a railroad or bicycle path).

**Recommended Attributes:**

Route and location descriptors (e.g., route and milepoint or route and spatial coordinates).

Must be consistent with other MIRE files for linkage.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	RoutelD FrMeasure ToMeasure	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 115. Intersection/Junction Number of Legs

**Definition:** The number of legs entering an at-grade intersection/junction.

**Recommended Attributes:**

Numeric

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	Approaches	--	--	--	--	Number of Intersection Legs
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 116. Intersection/Junction Geometry <sup>FDE</sup>

---

**Definition:** The type of geometric configuration that best describes the intersection/junction.

**Recommended Attributes:**

1. T-Intersection
2. Y-Intersection
3. Cross-Intersection (four legs)
4. Five or more legs and not circular
5. Roundabout
6. Other circular intersection (e.g., rotaries, neighborhood traffic circles)
7. Midblock pedestrian crossing
8. Restricted crossing U-turn (i.e., RCUT, J-turn, Superstreet) intersection
9. Median U-turn (i.e., MUT, Michigan Left, Thru-turn) intersection
10. Displaced left-turn (i.e., DLT, continuous flow, CFI) intersection
11. Jughandle (i.e., New Jersey jughandle) intersection
12. Continuous green T intersection
13. Quadrant (i.e., quadrant roadway) intersection
14. Other

See Figure 11 and Figure 12 on pages 93–94 for additional detail.

Note: This element has been changed since MIRE 1.0. In MIRE 1.0, this element has 8 attributes. In MIRE 2.0 this element has 14 attributes.

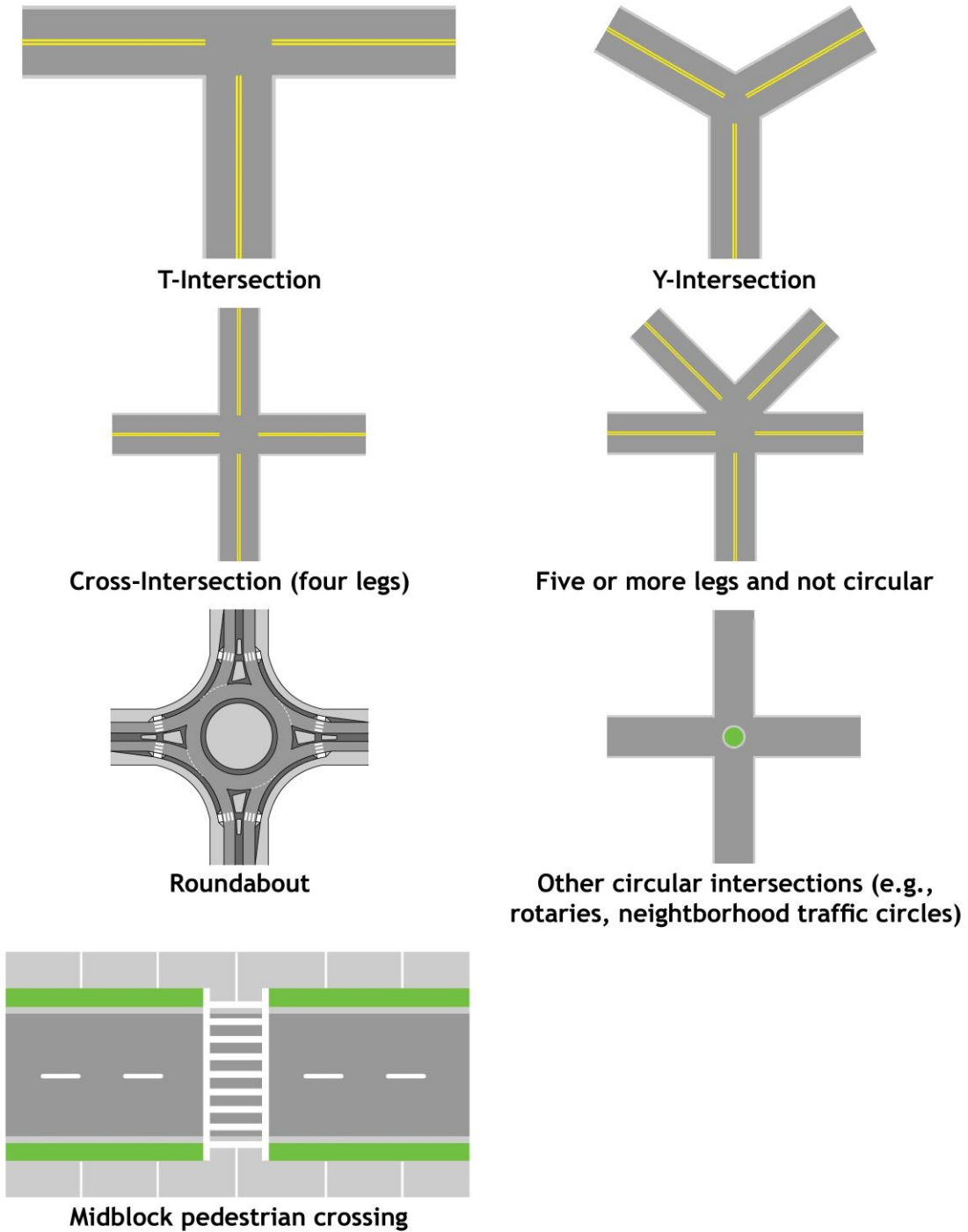
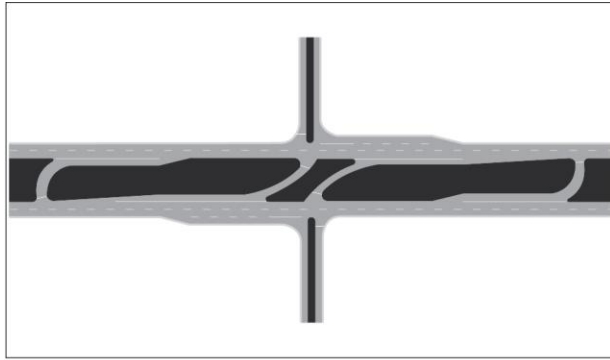
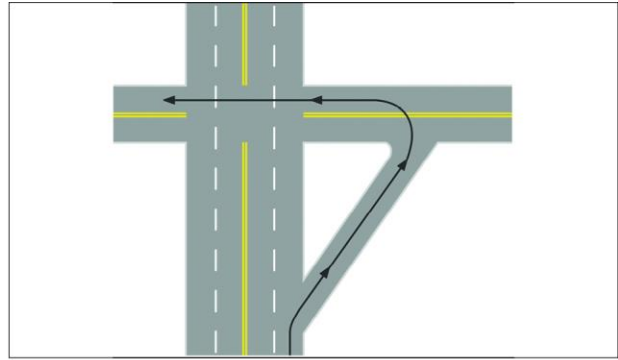


Figure 11. Illustration of Types of Intersection/Junction Geometry.

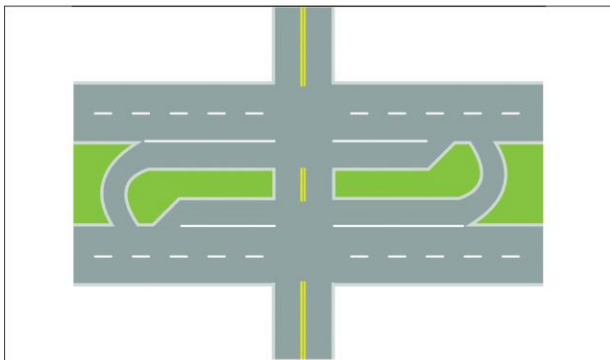




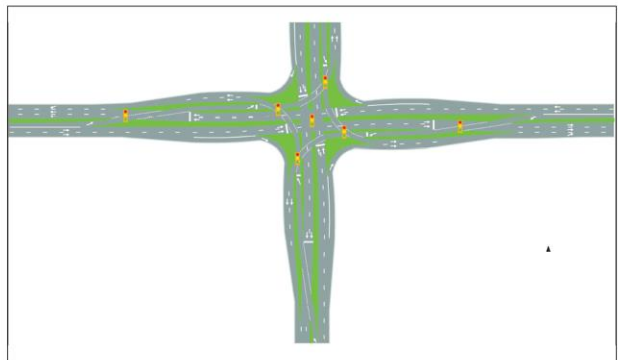
**Restricted Crossing U-Turn**



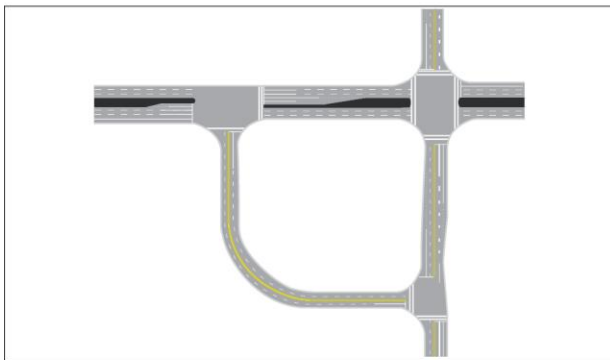
**Jughandle intersection**



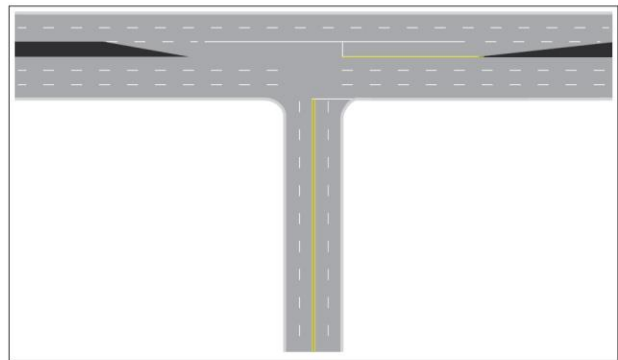
**Median U-Turn**



**Four-legged Displaced Left Turn intersection  
with displaced lefts on a major street**



**Quadrant Roadway intersection**



**Continuous Green T intersection**

**Figure 12. Illustration of Types of Intersection/Junction Geometry (continued).**

## I 17. School Zone Indicator

---

**Definition:** An indication of whether the intersection/junction is in a school zone.

**Recommended Attributes:**

1. Yes
2. No

## I 18. Railroad Crossing Number

---

**Definition:** Railroad crossing number if a railroad grade crossing (for linkage to National Highway-Rail Crossing Inventory).

**Recommended Attributes:**

Numeric

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	Railroad Crossing Number	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 119. Intersecting Angle

**Definition:** The measurement in degrees of the smallest angle between any two legs of the intersection. This value will always be within a range of 0 to 90 degrees (i.e., for non-zero angles, always measure the acute rather than the obtuse angle).

**Recommended Attributes:**

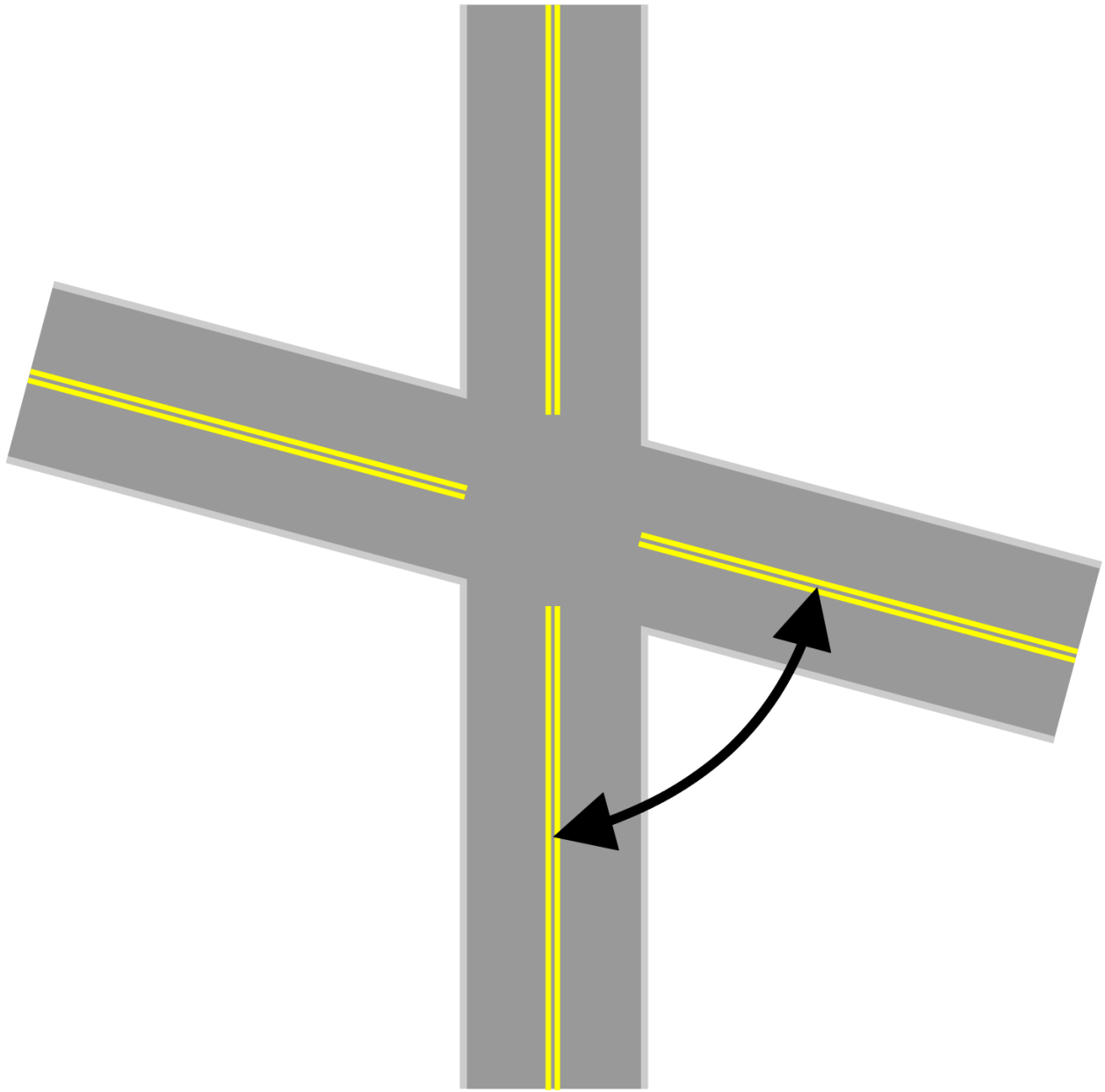
Degrees

See Figure 13 on page 97 for additional detail.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Intersection Skew Angle
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.



**Figure 13. Illustration of Intersecting Angle.**

## I 20. Intersection/Junction Offset Distance

**Definition:** Offset distance between the centerlines of the intersecting legs (minor road) at the intersection. When the intersection legs are not offset, the value of this data item should be zero.

**Recommended Attributes:**

Numeric (Note that “zero” should be entered if crossing road centerlines are not offset).

See Figure 14 on page 99 for additional detail.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	OffsetDistance	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: “--” indicates that the dataset does not include this specific MIRE element.

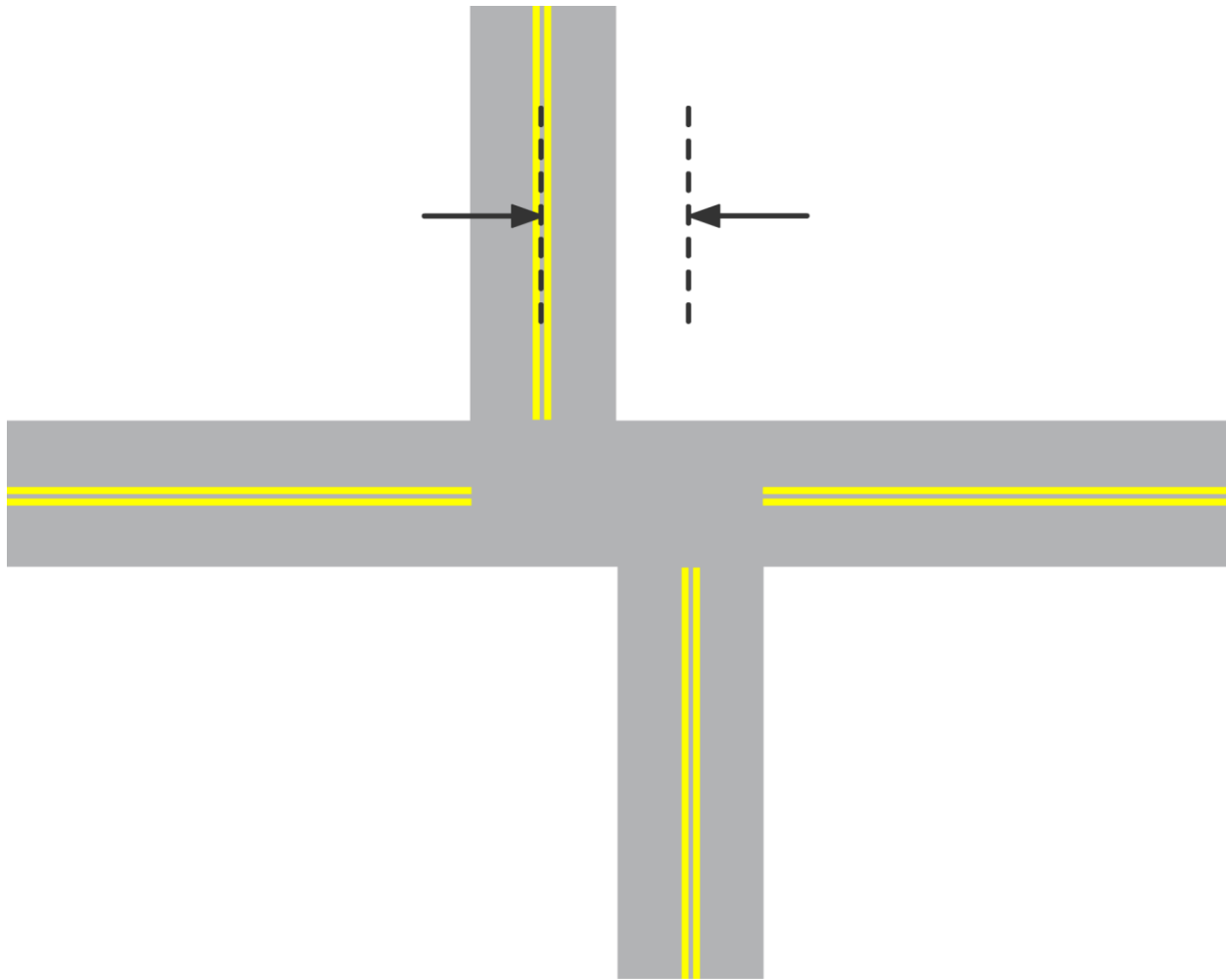


Figure 14. Illustration of Intersection/Junction Offset Distance.

## 121. Intersection/Junction Traffic Control <sup>FDE</sup>

**Definition:** Traffic control present at intersection/junction.

**Recommended Attributes:**

1. Uncontrolled
2. Two-way stop
3. All-way stop
4. Yield sign
5. Signalized
6. Pedestrian Hybrid Beacon (PHB or High-Intensity Activated Crosswalk [HAWK])
7. Flash Beacon (include Rectangular Rapid Flash Beacon)

- 8. Railroad crossing, gates and flashing lights
- 9. Railroad crossing, flashing lights only
- 10. Railroad crossing, stop-sign controlled
- 11. Railroad crossing, crossbucks only
- 12. Other

Note: This element has been changed since MIRE 1.0. In MIRE 1.0, there are 11 attributes. In MIRE 2.0, there are 12 attributes with more detail regarding type of signalization.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	Intersection Control Type	--	--	--	--	Type of Intersection Traffic Control
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 122. Signalization Presence/Type

**Definition:** Presence and type of signalization at intersection/junction.

**Recommended Attributes:**

- 1. Uncoordinated fixed time
- 2. Uncoordinated traffic actuated
- 3. Progressive coordination (with several signals along either road)
- 4. System coordination (e.g., real-time adaptive systemwide)
- 5. Unsignalized
- 6. Railroad crossing signal (signal, gates, bells)
- 7. Other

Note: This element has been changed since MIRE 1.0. Railroad crossing signal (includes signal-only and signal and gates) in MIRE 1.0 was changed to Railroad crossing signal (signal, gates, bells) in MIRE 2.0.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Signal Type	--	--	--	--	--	--	--
Element Number	29	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

### 123. Intersection/Junction Lighting

**Definition:** Presence of lighting at intersection/junction.

**Recommended Attributes:**

1. Yes
2. No

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	Lighting presence	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.



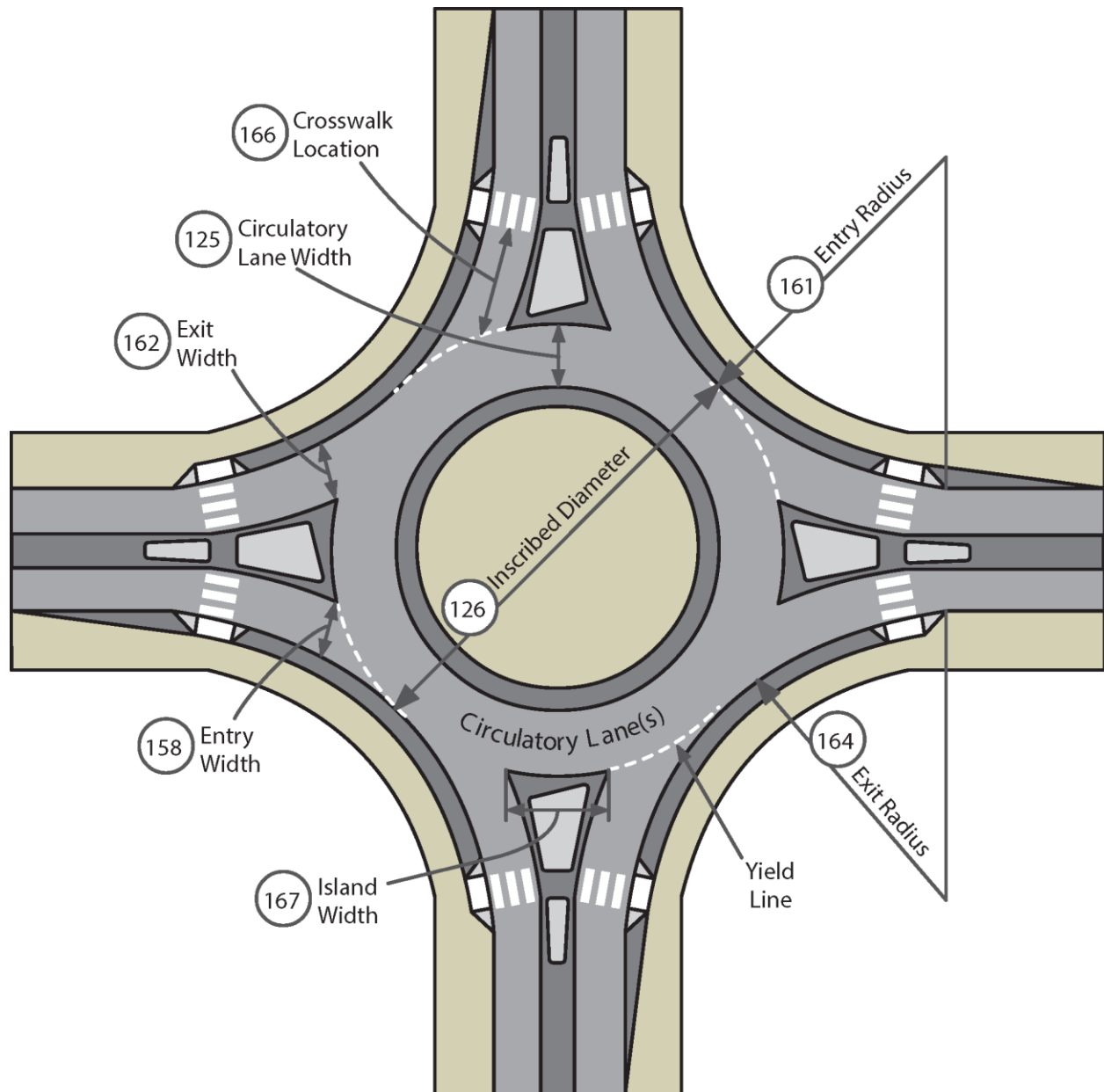
## 124. Circular Intersection - Number of Circulatory Lanes

**Definition:** Number of circulatory lanes in circular intersection.

**Recommended Attributes:**

Numeric

See Figure 15 below for additional detail.



**Figure 15. Illustration of Circular Intersection.**

## I25. Circular Intersection - Circulatory Lane Width

**Definition:** Width of the roadway between the central island and outer edge of the circulatory lane in a circular intersection.

**Recommended Attributes:**

Feet

See Figure 15 (Item I25) on page 102 for additional detail.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## I26. Circular Intersection - Inscribed Diameter

**Definition:** Distance between the outer edges of the circulatory roadway of a circular intersection.

**Recommended Attributes:**

Feet

See Figure 15 (Item I26) on page 102 for additional detail.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 127. Circular Intersection - Bicycle Facility

**Definition:** Presence and type of bicycle facility at circular intersection.

**Recommended Attributes:**

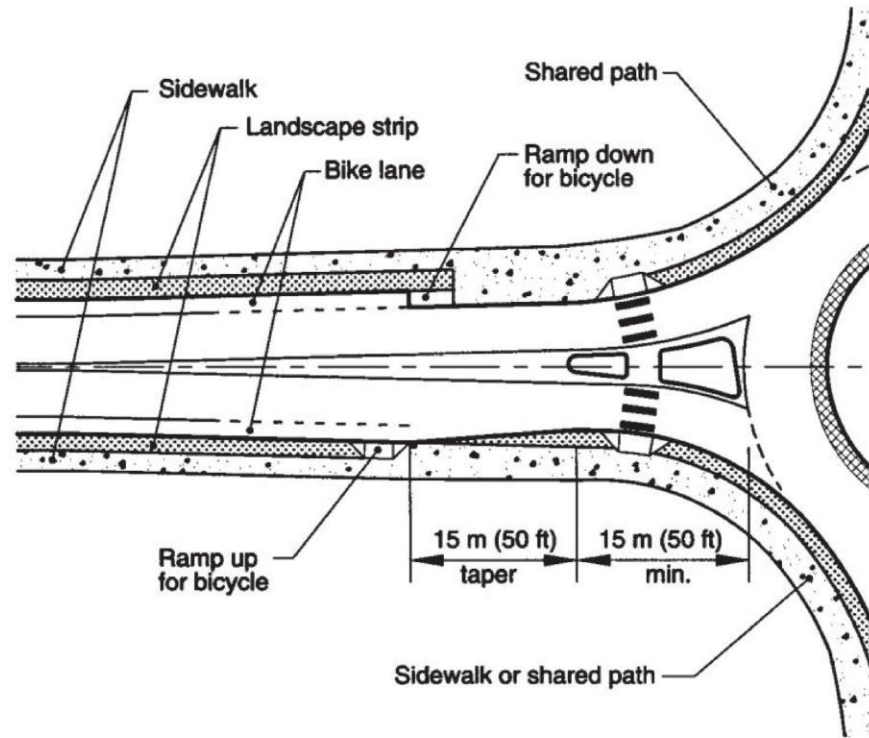
1. None
2. Separate cycle path
3. Circulatory bike lane

See Figure 16 on page 105 for additional detail.

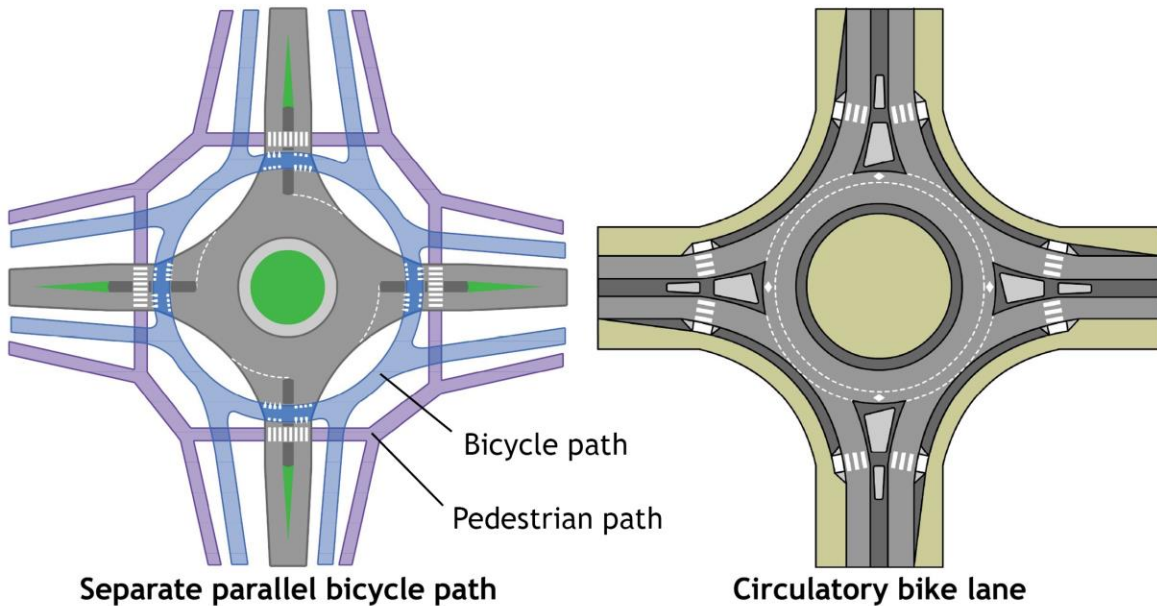
**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.



None



**Figure 16. Illustration of Types of Bicycle Facilities at Circular Intersections.**

Source : Robinson, Bruce; L. Rodegerdts; W. Scarborough; W. Kittleston; R. Troutbeck; W. Brilon; L. Bondizo; K. Courage; M. Kyte; J. Mason; A. Flannery; E. Myers; J. Bunker; G. Jacquemart. *Roundabouts, An Informational Guide*. Report No. FHWA-RD-00-067, Federal Highway Administration, McLean, VA, 2000.

### III. INTERSECTION LEG (EACH APPROACH)

- I28. Intersection Identifier for this Approach
- I29. Unique Approach Identifier <sup>FDE</sup>
- I30. Approach AADT
- I31. Approach AADT Year
- I32. Approach Mode
- I33. Approach Directional Flow
- I34. Number of Approach Through Lanes
- I35. Left-Turn Lane Type
- I36. Number of Exclusive Left-Turn Lanes
- I37. Amount of Left-Turn Lane Offset
- I38. Right-Turn Channelization
- I39. Traffic Control of Exclusive Right-Turn Lanes
- I40. Number of Exclusive Right-Turn Lanes
- I41. Length of Exclusive Left-Turn Lanes
- I42. Length of Exclusive Right-Turn Lanes
- I43. Median Type at Intersection
- I44. Approach Traffic Control
- I45. Approach Left Turn Protection
- I46. Signal Progression
- I47. Crosswalk Presence/Type
- I48. Pedestrian Signal Activation Type
- I49. Pedestrian Signal Presence/Type
- I50. Crossing Pedestrian Count/Exposure
- I51. Left/Right Turn Prohibitions
- I52. Right Turn-On-Red Prohibitions
- I53. Left Turn Counts/Percent
- I54. Year of Left Turn Counts/Percent
- I55. Right Turn Counts/Percent
- I56. Year of Right Turn Counts/Percent
- I57. Transverse Rumble Strip Presence
- I58. Circular Intersection – Entry Width
- I59. Circular Intersection – Number of Entry Lanes
- I60. Circular Intersection – Presence/Type of Exclusive Right-Turn Lane
- I61. Circular Intersection – Entry Radius
- I62. Circular Intersection – Exit Width
- I63. Circular Intersection – Number of Exit Lanes
- I64. Circular Intersection – Exit Radius
- I65. Circular Intersection – Pedestrian Facility

I66. Circular Intersection – Crosswalk Location

I67. Circular Intersection – Island Width

## I28. Intersection Identifier for this Approach

---

**Definition:** The unique numeric identifier assigned to the intersection that includes this approach (see Element I10. *Unique Junction Identifier*). This element provides linkage to the basic intersection information and to all other approaches.

**Recommended Attributes:**

The intersection identifier entered in Element I10. *Unique Junction Identifier*.

## I29. Unique Approach Identifier <sup>FDE</sup>

---

**Definition:** A unique identifier for each approach of an intersection.

**Recommended Attributes:**

Any identifier that is unique for each approach within a single intersection (e.g., sequential numbers or letters, compass directions, “clock hours”).

## I30. Approach AADT

---

**Definition:** The AADT on the approach leg of the intersection/junction.

**Recommended Attributes:**

Vehicles per day

## I31. Approach AADT Year

---

**Definition:** The year of the AADT on the approach leg of the intersection/junction.

**Recommended Attributes:**

Year

## I32. Approach Mode

---

**Definition:** Intended modes for the approach.

**Recommended Attributes:**

1. Vehicles only or shared use (e.g., vehicles, peds, bikes)
2. Pedestrians only
3. Bicycles only
4. Pedestrians and bicycles
5. Railroad
6. Other

## I33. Approach Directional Flow

---

**Definition:** Indication of one-way or two-way flow on approach.

**Recommended Attributes:**

1. One-way
2. Two-way

## I34. Number of Approach Through Lanes

---

**Definition:** Total number of through lanes on approach (both directions if two-way, one direction if one-way).

**Recommended Attributes:**

Numeric

## I35. Left-Turn Lane Type

---

**Definition:** Type of left-turn lane(s) that accommodate left turns from this approach.

**Recommended Attributes:**

1. No left-turn lanes
2. Conventional left-turn lane(s)
3. U-turn followed by right turn



4. Right turn followed by U-turn
5. Right turn followed by left turn (e.g., jughandle near side)
6. Right turn followed by right turn (e.g., jughandle far side)
7. Left-turn crossover prior to intersection (e.g., displaced left turn)
8. Other

See Figure 17 and Figure 18 on pages 110–111 for additional detail.

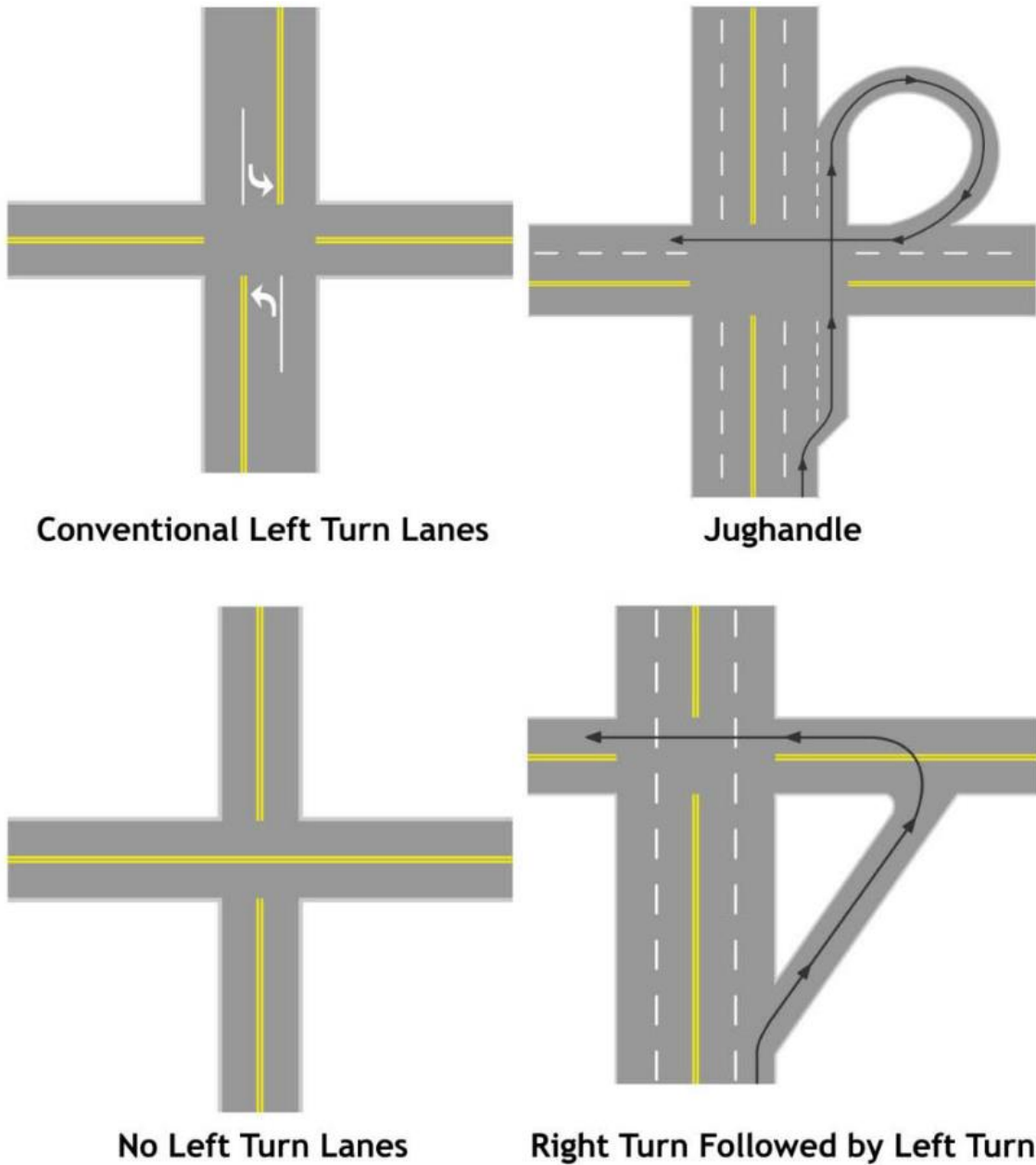
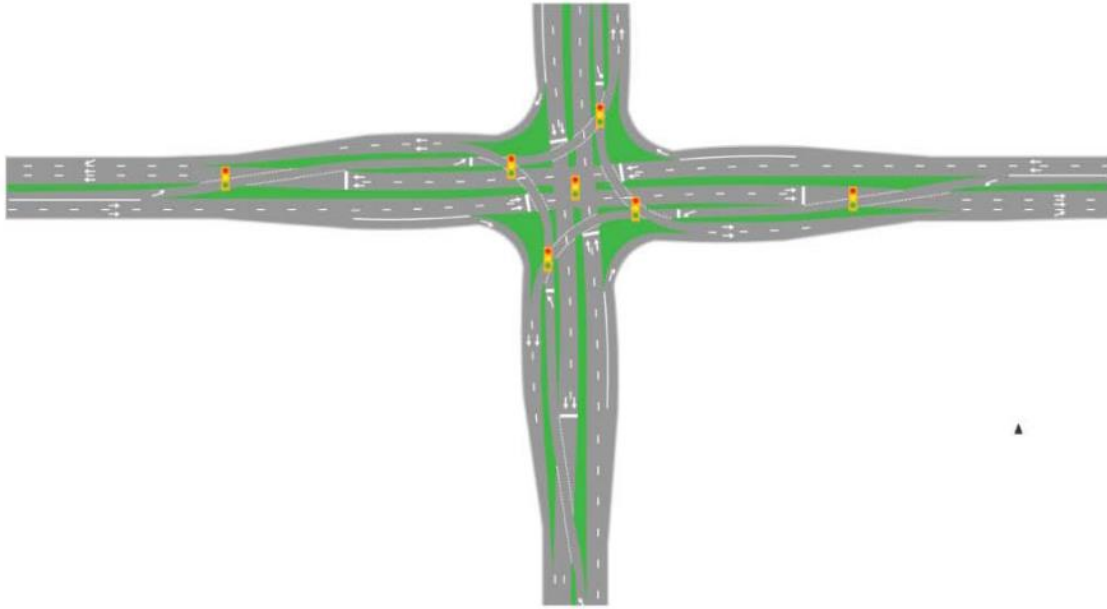
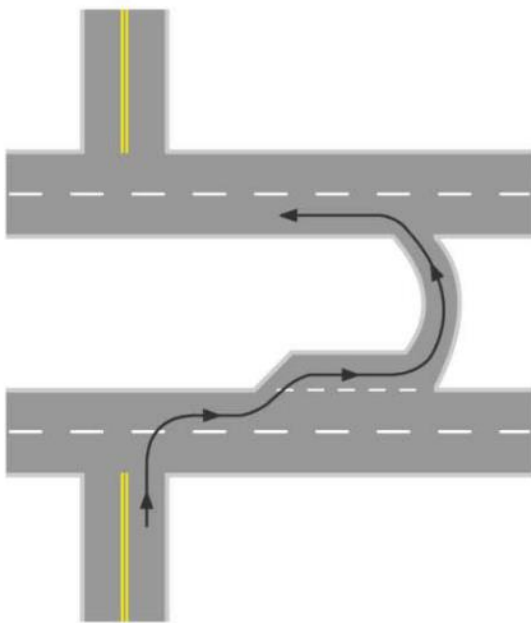


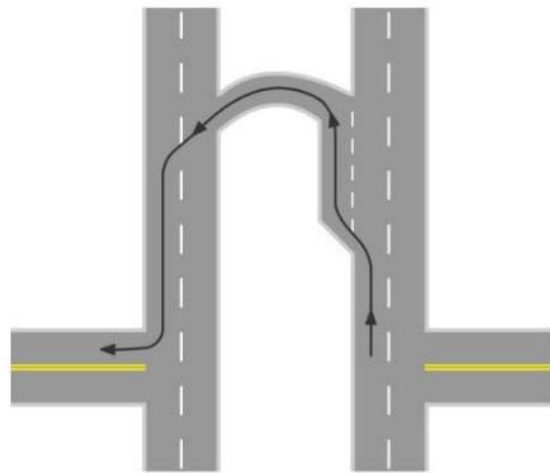
Figure 17. Illustration of Left-Turn Lane Types.



Left Turn Prior to Intersection



Right Turn Followed by U-turn



U-turn Followed by Right Turn

Figure 18. Illustration of Left-Turn Lane Types (continued).

## I36. Number of Exclusive Left-Turn Lanes

---

**Definition:** Number of exclusive left-turn lanes that accommodate left turns from this approach.

**Recommended Attributes:**

Numeric

## I37. Amount of Left-Turn Lane Offset

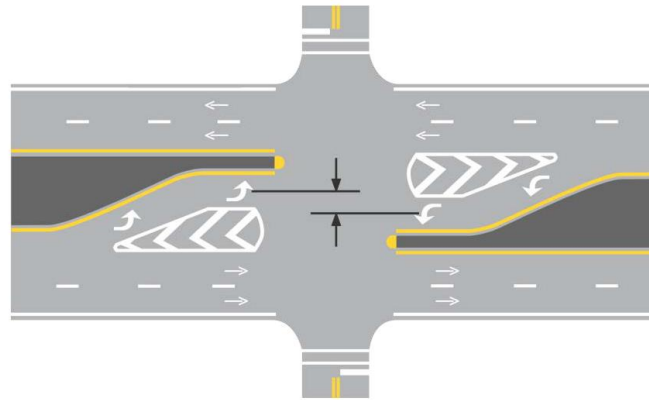
---

**Definition:** Amount of offset between conventional left-turn lane(s) on this approach and opposing approach. Offset refers to direction (plus or minus) and distance between the centerline of the left-turn lane on this approach and the centerline of the left-turn lane on the opposing approach. The direction is positive if the left-turn lane on this approach is to the left of the opposing left-turn lane and negative if vice versa. If the opposing left-turn lanes are aligned, enter “0”.

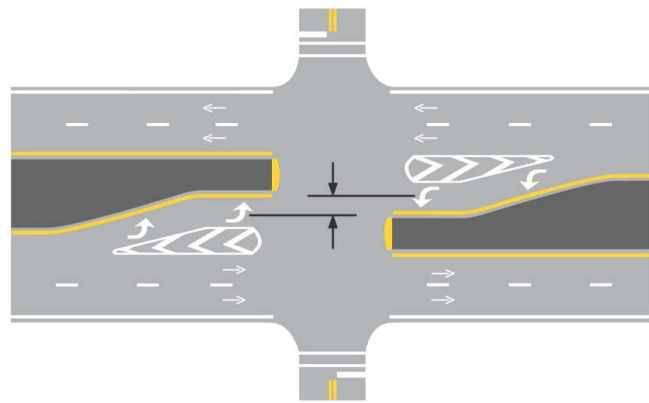
**Recommended Attributes:**

Sign (+ or -) and distance (feet)

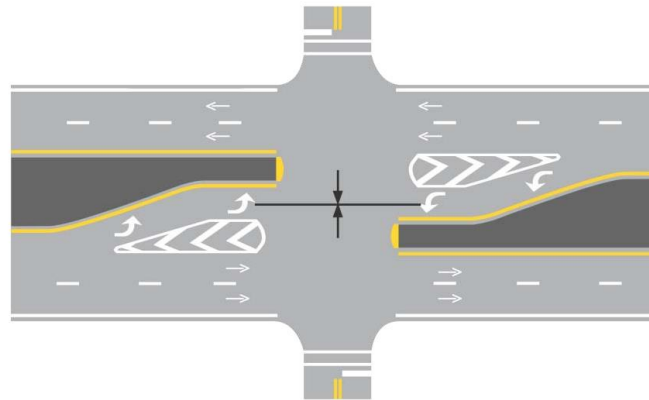
See Figure 19 on page 113 for additional detail.



Positive Offset



Negative Offset



Zero Offset

Figure 19. Illustration of Positive, Negative, and Zero Offset Distance.

## 138. Right-Turn Channelization

**Definition:** Right-turn channelization on approach.

**Recommended Attributes:**

1. None
2. Painted island with receiving lane
3. Painted island without receiving lane
4. Raised island with receiving lane
5. Raised island without receiving lane

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Presence of right-turn Channelization
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 139. Traffic Control of Exclusive Right-Turn Lanes

**Definition:** Traffic control of exclusive right-turn lanes on approach.

**Recommended Attributes:**

1. Unsignalized
2. Permissive signal
3. Protected all day (s)
4. Protected, peak hour only
5. Protected - permissive with green arrow/green ball (all day)
6. Protected - permissive with green arrow/green ball (peak hour only)
7. Protected - permissive with flashing yellow arrow (all day)

8. Protected - permissive with flashing yellow arrow (peak hour only)
9. Yield sign
10. Stop sign
11. No control (e.g., free flow)

Note: This element has been changed since MIRE 1.0. In MIRE 1.0, this element had four attributes. MIRE 2.0 has 11 attributes for this element.

## 140. Number of Exclusive Right-Turn Lanes

---

**Definition:** Number of exclusive right-turn lanes on approach.

**Recommended Attributes:**

Numeric

## 141. Length of Exclusive Left-Turn Lanes

---

**Definition:** Storage length of exclusive left-turn lane(s) (not including taper).

**Recommended Attributes:**

Feet

See Figure 20 on page 116 for additional detail.

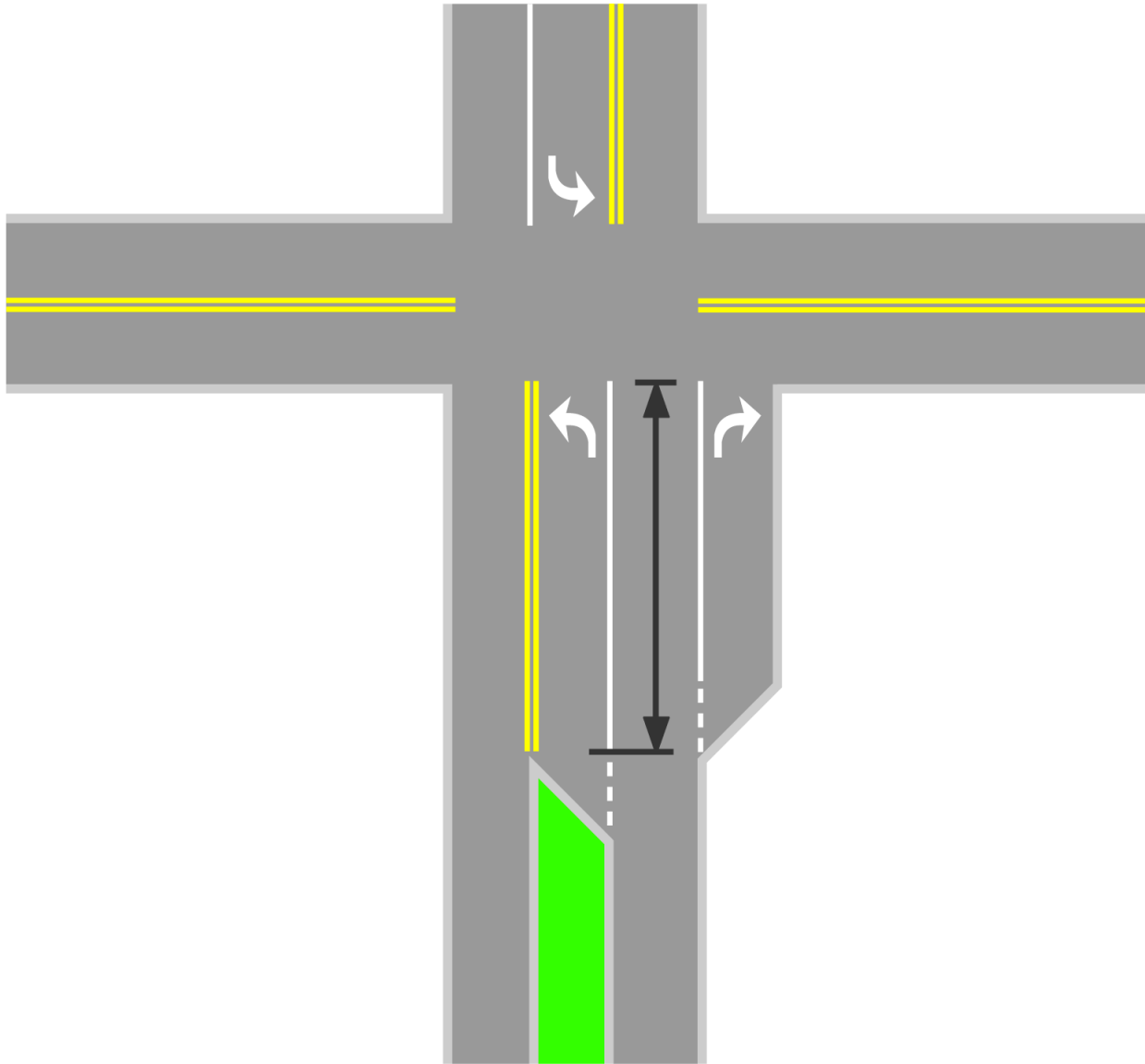


Figure 20. Illustration of Exclusive Left-Turn Lane Length.

## 142. Length of Exclusive Right-Turn Lanes

**Definition:** Storage length of exclusive right-turn lane(s) (not including taper).

**Recommended Attributes:**

Feet

See for Figure 21 on page 117 for additional detail.

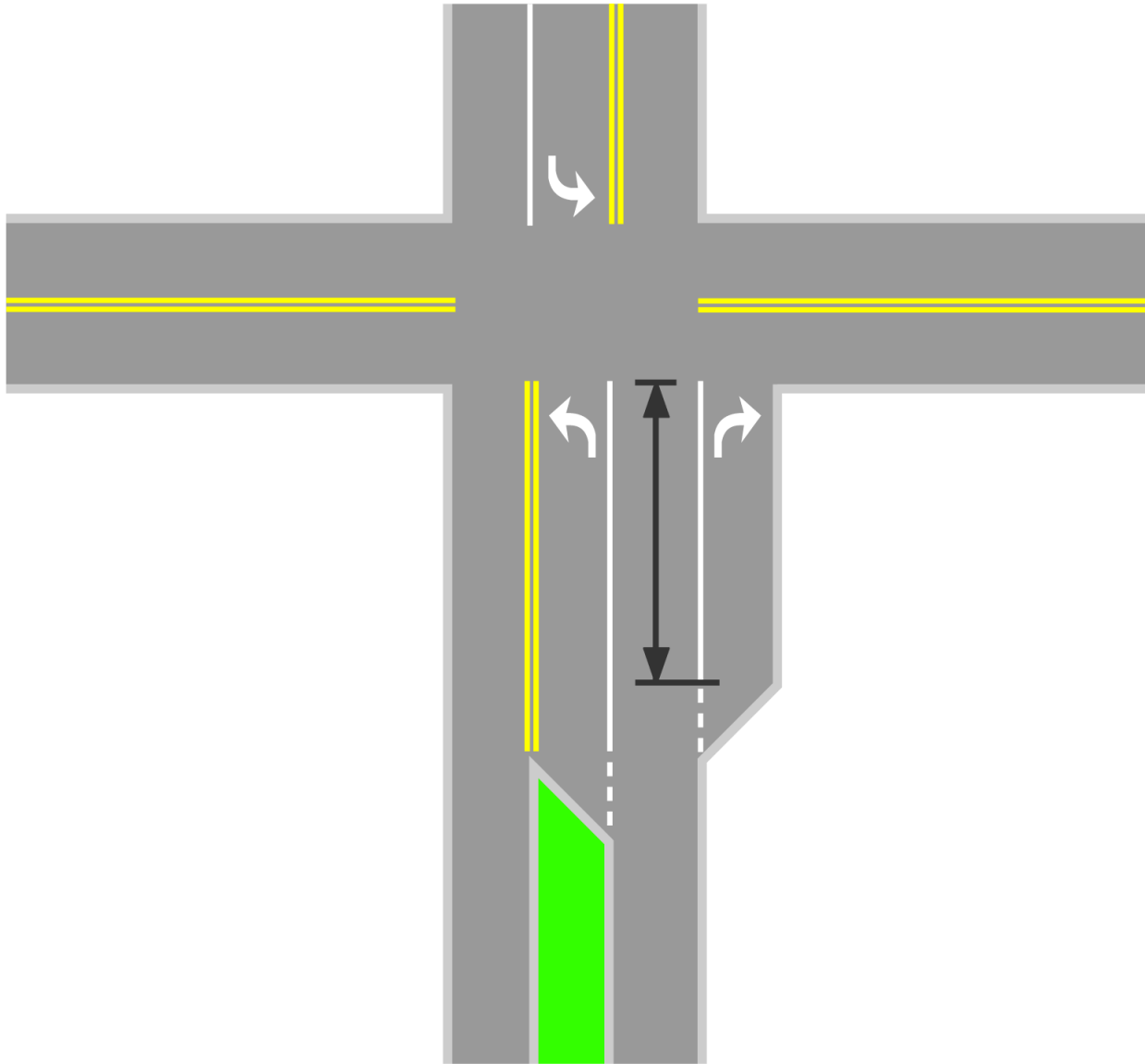


Figure 21. Illustration of Exclusive Right-Turn Lane Length.

### I43. Median Type at Intersection

**Definition:** Median type at intersection separating opposing traffic lanes on this approach. Pedestrian refuge islands are also captured in Element I47. *Crosswalk Presence/Type.*

**Recommended Attributes:**

1. Undivided
2. Flush paved median (at least 4 ft in width)
3. Raised median with curb



4. Depressed median
5. Two-way left-turn lane
6. Railroad or rapid transit
7. Other divided

## 144. Approach Traffic Control

**Definition:** Traffic control present on approach. Pedestrian signalization is captured in Element 148. *Pedestrian Signal Activation Type*.

**Recommended Attributes:**

1. Uncontrolled
2. Stop sign
3. Yield sign
4. Signalized
5. Railroad crossing, gates and flashing lights
6. Railroad crossing, flashing lights only
7. Railroad crossing, stop-sign controlled
8. Railroad crossing, crossbucks only
9. Other

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Ramp Terminal Control Type
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## I45. Approach Left-Turn Protection

**Definition:** Presence and type of left-turn protection on the approach

**Recommended Attributes:**

1. Unsignalized
2. Permissive signal
3. Protected all day (s)
4. Protected, peak hour only
5. Protected - permissive with green arrow/green ball (all day)
6. Protected - permissive with green arrow/green ball (peak hour only)
7. Protected - permissive with flashing yellow arrow (all day)
8. Protected - permissive with flashing yellow arrow (peak hour only)
9. Other

Note: This element has been changed since MIRE 1.0. In MIRE 1.0, this element has seven attributes. MIRE 2.0 has nine attributes.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Presence of Protected Left-turn Operation
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## I46. Signal Progression

---

**Definition:** Signal progression on approach.

**Recommended Attributes:**

1. Unsignalized
2. Uncoordinated fixed time
3. Uncoordinated traffic actuated
4. System coordination (time of day, traffic responsive and traffic adaptive)
5. Railroad crossing signal (includes signal-only and signal and gates)
6. Other

Note: This element has been changed since MIRE 1.0. In MIRE 2.0, the attribute “progressive coordination (with several signals along either road)” was removed.

## I47. Crosswalk Presence/Type

---

**Definition:** Presence and type of crosswalk crossing this approach leg.

**Recommended Attributes:**

1. Unmarked crosswalk
2. Marked crosswalk
3. Marked crosswalk with supplemental devices (e.g., in-street yield signs, in-pavement warning lights, pedestrian bulb outs, etc.)
4. Marked crosswalk with refuge island
5. Marked with refuge island and supplemental devices (e.g., in-street yield signs, in-pavement warning lights, pedestrian bulb outs, etc.)
6. Raised crosswalk
7. Pedestrian crossing prohibited at this approach
8. Other

See Figure 22 on page 121 for additional detail.

Note: This element has been changed since MIRE 1.0. The attribute “raised crosswalk” was added in MIRE 2.0.



**Unmarked crosswalk**



**Marked crosswalk**



**Marked crosswalk with supplemental devices**



**Marked crosswalk with refuge island**



**Marked crosswalk with refuge and supplemental devices**



**Raised crosswalk**

Sources: 1. City of Portland, OR, 2. [www.pedbikeimages.org](http://www.pedbikeimages.org/) / Dan Burden, 3. [www.pedbikeimages.org](http://www.pedbikeimages.org/) / Tom Harned, 4. [www.pedbikeimages.org](http://www.pedbikeimages.org/) / Adam Fukushima, 5. [www.pedbikeimages.org](http://www.pedbikeimages.org/) / Lyubov Zuyeva, 6. [www.pedbikeimages.org](http://www.pedbikeimages.org/) / Dan Burden

**Figure 22. Illustration of Crosswalk Types.**

## I48. Pedestrian Signal Activation Type

---

**Definition:** Type of pedestrian signalization activation for crossing this approach.

**Recommended Attributes:**

1. None
2. Constant activation by traffic signal (e.g., ped recall)
3. Pushbutton actuated
4. Other

Note: This element has been changed since MIRE 1.0. The MIRE 1.0 element name “Pedestrian Signalization Type” and attribute “Activated by traffic signal (e.g., recall)” has been change to “Constant activation by traffic signal (e.g., ped recall) in MIRE 2.0.

## I49. Pedestrian Signal Presence/Type

---

**Definition:** Presence and type of pedestrian signal for crossing this approach.

**Recommended Attributes:**

1. None.
2. Pedestrian Signal with countdown indicator (with Accessible Pedestrian Signal [APS])
3. Pedestrian Signal with countdown indicator (w/o APS)
4. Pedestrian Signal without countdown indicator (with APS)
5. Pedestrian Signal without countdown indicator (w/o APS)

See Figure 23 on page 123 for additional detail.

Note: This is a new element in MIRE 2.0.



Source: FHWA

Countdown pedestrian signal



Source: NCHRP Web Only Document 150

Accessible pedestrian signals

Figure 23. Illustration of Pedestrian Signal Types.

## 150. Crossing Pedestrian Count/Exposure

**Definition:** Count or estimate of average daily pedestrian flow crossing this approach (Note: only applicable to approaches with vehicular traffic).

**Recommended Attributes:**

Numeric

## 151. Left/Right Turn Prohibitions

**Definition:** Signed left or right turn prohibitions on this approach.

**Recommended Attributes:**

1. No left turns permitted at any time
2. No left turn permitted during certain portions of the day
3. No right turns permitted at any time
4. No right turns permitted during certain portions of the day
5. No right or left turns permitted at any time
6. No right or left turns permitted during certain portions of the day
7. No U-turns

## 152. Right Turn-On-Red Prohibitions

**Definition:** Prohibition of right turns-on-red (RTOR) from this approach.

**Recommended Attributes:**

1. RTOR allowed at all times
2. RTOR prohibited at all times
3. RTOR prohibited during certain portions of the day

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Presence of Right Turn on Red (if signalized)
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## I53. Left Turn Counts/Percent

---

**Definition:** Count or estimate of average daily left turns, or percent of total approach traffic turning left. (Note: This could also be captured for peak-periods only or by hour of day.)

**Recommended Attributes:**

Count or percent

## I54. Year of Left Turn Counts/Percent

---

**Definition:** Year of count or estimate of average daily left turns or percent of total approach traffic turning left.

**Recommended Attributes:**

Year

## I55. Right Turn Counts/Percent

---

**Definition:** Count or estimate of average daily right turns, or percent of total approach traffic turning right. (Note: This could also be captured for peak-periods only or by hour of day.)

**Recommended Attributes:**

Count or percent

## I56. Year of Right Turn Counts/Percent

---

**Definition:** Year of count or estimate of average daily right turns or percent of total approach traffic turning right.

**Recommended Attributes:**

Year



## 157. Transverse Rumble Strip Presence

---

**Definition:** Presence of transverse rumble strips on approach.

**Recommended Attributes:**

1. Yes
2. No

## 158. Circular Intersection - Entry Width

---

**Definition:** Full width of entry on this approach where it meets the inscribed circle.

**Recommended Attributes:**

Feet

See Figure 15 (Item 158) on page 102 for additional detail.

## 159. Circular Intersection - Number of Entry Lanes

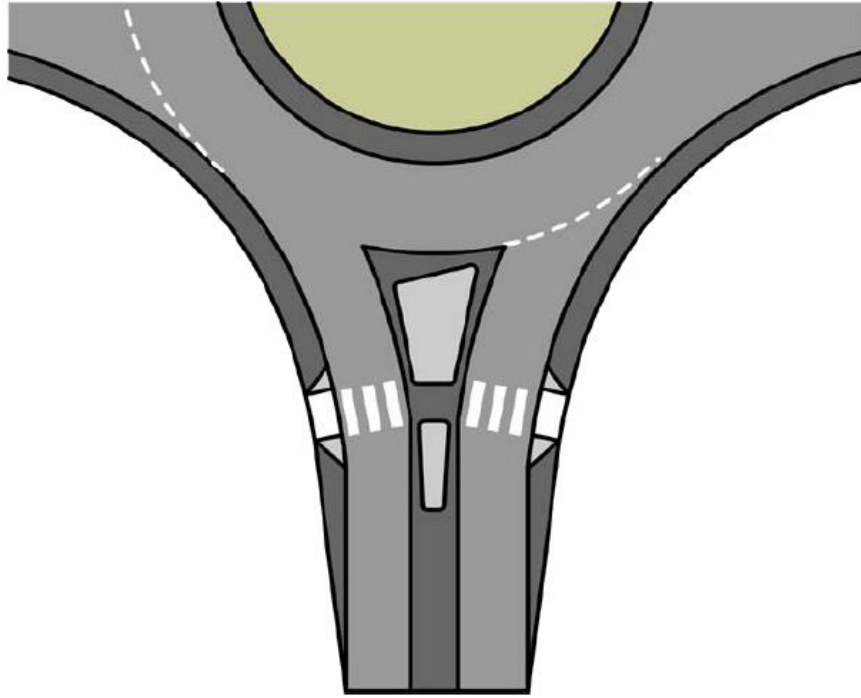
---

**Definition:** Number of entry lanes into circular intersection on this approach, not including right turn only or auxiliary lanes.

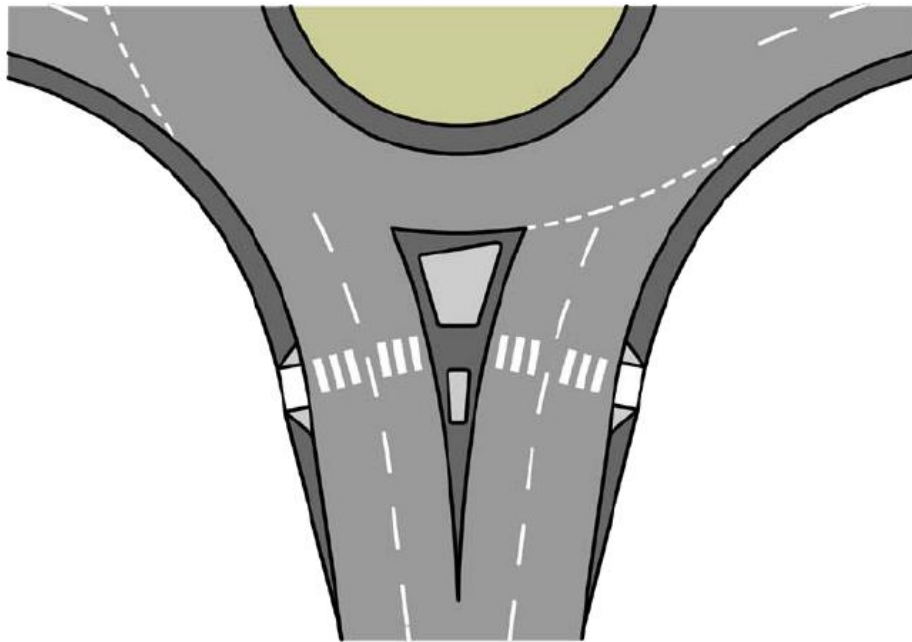
**Recommended Attributes:**

Numeric

See Figure 24 on page 127 for additional detail.



One Lane



Two Lanes

Figure 24. Illustration of Circular Intersection Exit and Entry Lanes.

## 160. Circular Intersection – Presence/Type of Exclusive Right Turn Lane

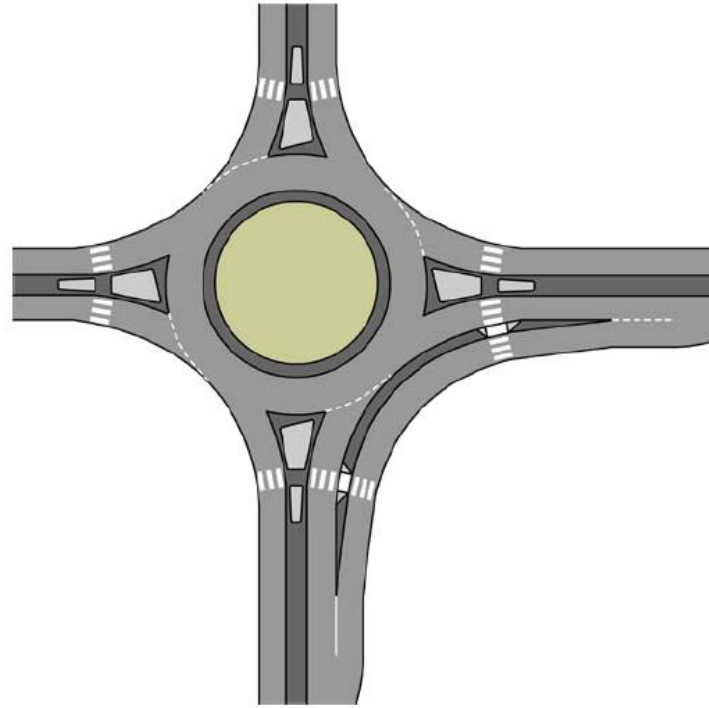
---

**Definition:** Presence and type of exclusive right turn lane(s) on this approach.

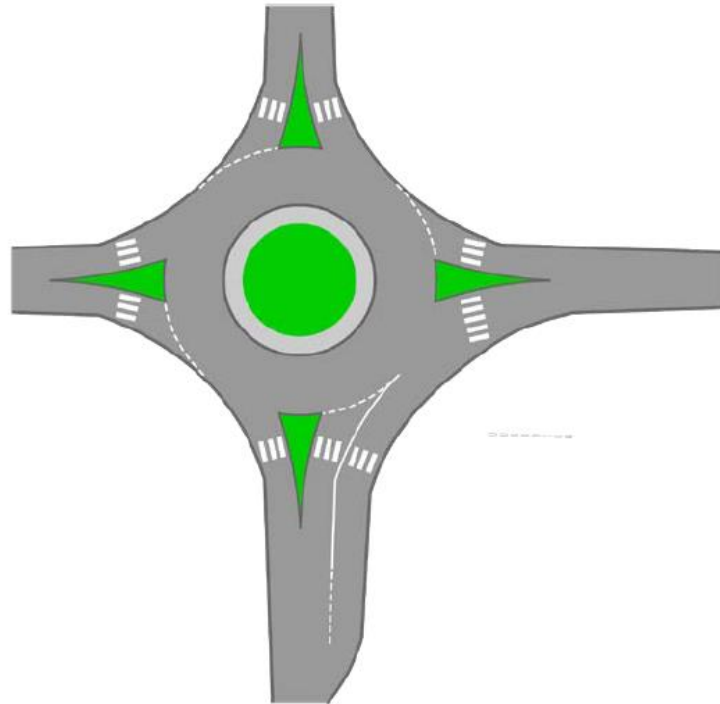
**Recommended Attributes:**

1. None
2. Exclusive right turn bypass/slip lane with separating island
3. Exclusive right turn bypass/slip lane without separating island

See Figure 25 on page 129 for additional detail.



**With Island**



**Without Island**

**Figure 25. Illustration of Circulatory Intersection Exclusive Right-Turn Lanes.**

## 161. Circular Intersection - Entry Radius

---

**Definition:** Minimum radius of curvature of the curb on the right side of the entry.

**Recommended Attributes:**

Feet

See Figure 15 (Item 161) on page 102 for additional detail.

## 162. Circular Intersection - Exit Width

---

**Definition:** Full width of exit on this approach where it meets the inscribed circle.

**Recommended Attributes:**

Feet

See Figure 15 (Item 162) on page 102 for additional detail.

## 163. Circular Intersection - Number of Exit Lanes

---

**Definition:** Number of exit lanes from roundabout on this approach leg.

**Recommended Attributes:**

Numeric

See Figure 24 on page 127 for additional detail.

## 164. Circular Intersection - Exit Radius

---

**Definition:** Minimum radius of curvature of the curb on the left side of the approach, when facing the intersection.

**Recommended Attributes:**

Feet

See Figure 15 (Item 164) on page 102 for additional detail.

## 165. Circular Intersection - Pedestrian Facility

---

**Definition:** Type of facility for pedestrians crossing this approach.

**Recommended Attributes:**

1. Marked crosswalk with raised island
2. Marked crosswalk with flush island
3. Marked crosswalk with no island
4. Unmarked crosswalk with raised island
5. Unmarked crosswalk with flush island
6. Unmarked crosswalk with no island
7. Pedestrian crossing prohibited at this approach
8. Other

## 166. Circular Intersection - Crosswalk Location

---

**Definition:** Location of marked pedestrian crosswalk line (measured as the distance between the yield line and crosswalk markings closest to the intersection).

**Recommended Attributes:**

Feet

See Figure 15 (Item 166) on page 102 for additional detail.

## 167. Circular Intersection – Island Width

---

**Definition:** Width of raised or painted island separating entry and exit legs (measured at the inscribed circle). If no island is present, record width as zero.

**Recommended Attributes:**

Feet

See Figure 15 (Item 167) on page 102 for additional detail.

#### IV. INTERCHANGE/RAMP

- 168. Unique Interchange Identifier <sup>FDE</sup>
- 169. Location Identifier for Road 1 Crossing Point
- 170. Location Identifier for Road 2 Crossing Point
- 171. Location Identifier for Additional Road Crossing Points
- 172. Interchange Type <sup>FDE</sup>
- 173. Interchange Lighting
- 174. Interchange Entering Volume
- 175. Interchange Identifier for this Ramp
- 176. Unique Ramp Identifier
- 177. Ramp Length <sup>FDE</sup>
- 178. Ramp Acceleration Lane Length
- 179. Ramp Deceleration Lane Length
- 180. Ramp Number of Lanes
- 181. Ramp AADT <sup>FDE</sup>
- 182. Year of Ramp AADT <sup>FDE</sup>
- 183. Ramp Metering
- 184. Ramp Advisory Speed Limit
- 185. Roadway Type at Beginning Ramp Terminal <sup>FDE</sup>
- 186. Roadway Feature at Beginning Ramp Terminal
- 187. Location Identifier for Roadway at Beginning Ramp Terminal <sup>FDE</sup>
- 188. Location of Beginning Ramp Terminal Relative to Mainline Flow
- 189. Roadway Type at Ending Ramp Terminal <sup>FDE</sup>
- 190. Roadway Feature at Ending Ramp Terminal
- 191. Location Identifier for Roadway at Ending Ramp Terminal <sup>FDE</sup>
- 192. Location of Ending Ramp Terminal Relative to Mainline Flow

## 168. Unique Interchange Identifier <sup>FDE</sup>

**Definition:** unique identifier for each interchange.

**Recommended Attributes:**

User defined (e.g., node number, LRS of primary route, exit numbers, etc.)

## 169. Location Identifier for Road I Crossing Point

**Definition:** Location of midpoint of interchange (e.g., crossing route) on the first intersecting route (e.g. route-milepost, spatial coordinates). Note that if the Junction File is a spatial data file, this would be the coordinates and would be the same for all crossing roads.

**Recommended Attributes:**

Route and location descriptors (e.g., route and milepoint or spatial coordinates). Must be consistent with other MIRE files for linkage.

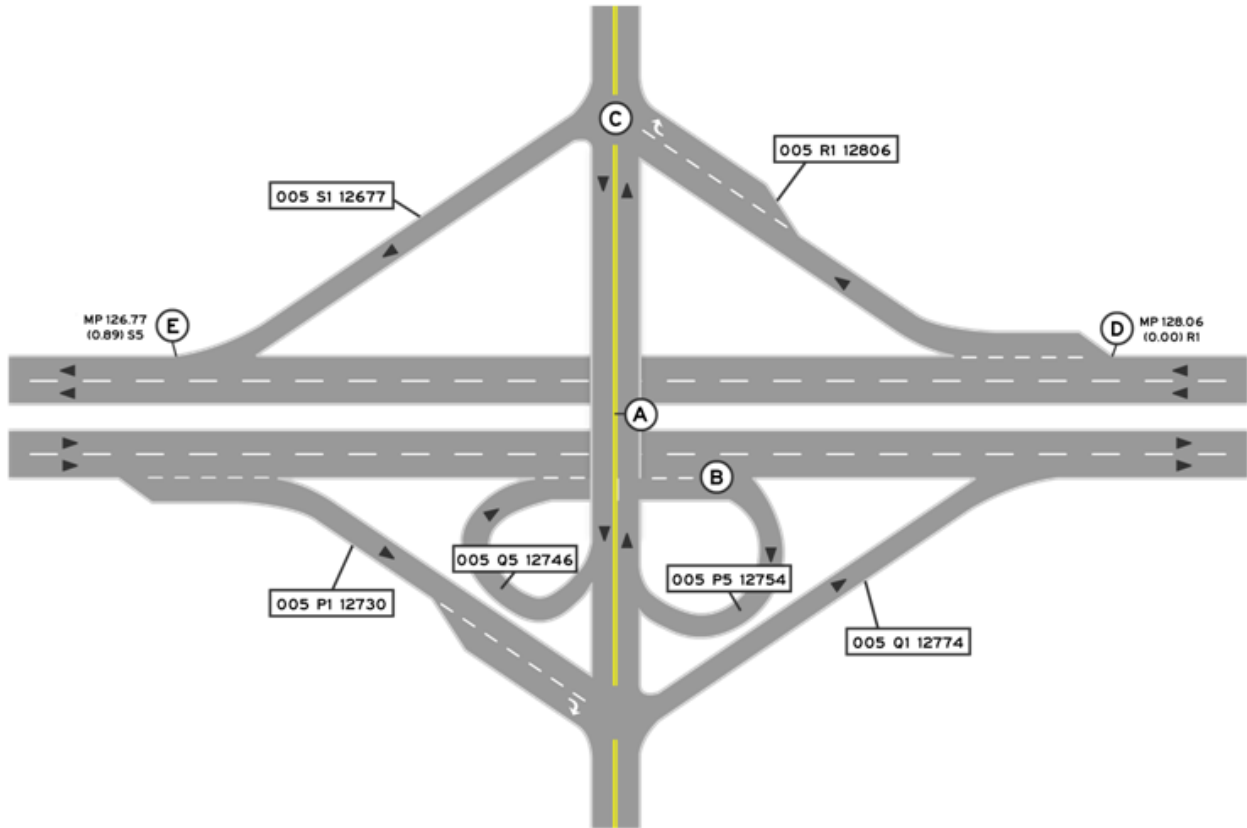
See point A in Figure 26 on page 134 for additional detail.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	RouteID FrMeasure ToMeasure	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.





**Figure 26. Illustration of Ramp Configurations.**

Note: “Beginning” and “ending” of ramp is based on ramp traffic flow direction in this illustration. Agencies may choose to use another naming convention (e.g. direction of inventory).

## 170. Location Identifier for Road 2 Crossing Point

**Definition:** Location of midpoint of interchange (e.g., crossing route) on the second intersecting route (e.g. route-milepost). Note that if the Interchange File is a spatial data file, this would be the same coordinates as in 169. *Location Identifier for Road 1 Crossing Point*, the previous element.

### Recommended Attributes:

Route and location descriptors (e.g., route and milepoint or spatial coordinates). Must be consistent with other MIRE files for linkage.

See point A in Figure 26 on page 134 for additional detail.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	RouteID FrMeasure ToMeasure	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 171. Location Identifier for Additional Road Crossing Points

**Definition:** Location on the third and subsequent intersecting route (e.g. route-milepost).

Note that if the Interchange File is a spatial data file, this would be the same coordinates as in Element 170. *Location Identifier for Road 2 Crossing Point* for all additional routes.

**Recommended Attributes:**

Route and location descriptors (e.g., route and milepoint or spatial coordinates). Must be consistent with other MIRE files for linkage.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	RoutelD FrMeasure ToMeasure	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 172. Interchange Type <sup>FDE</sup>

**Definition:** Type of interchange.

**Recommended Attributes:**

1. Diamond
2. Full cloverleaf
3. Partial cloverleaf
4. Trumpet
5. Three-leg directional
6. Four-leg all-directional
7. Semi-directional
8. Single entrances and/or exits (partial interchange)
9. Single point interchange (SPI)
10. Diverging diamond (i.e., DDI, double-crossover diamond, DCD) interchange
11. Double roundabout (i.e., double raindrop) interchange
12. Single roundabout (i.e., single raindrop) interchange
13. Quadrant
14. Other

See Figure 27 and Figure 28 on page 137–138 for additional detail.

Note: This element has been changed since MIRE 1.0. Additional interchange types have been added to the attributes in MIRE 2.0.

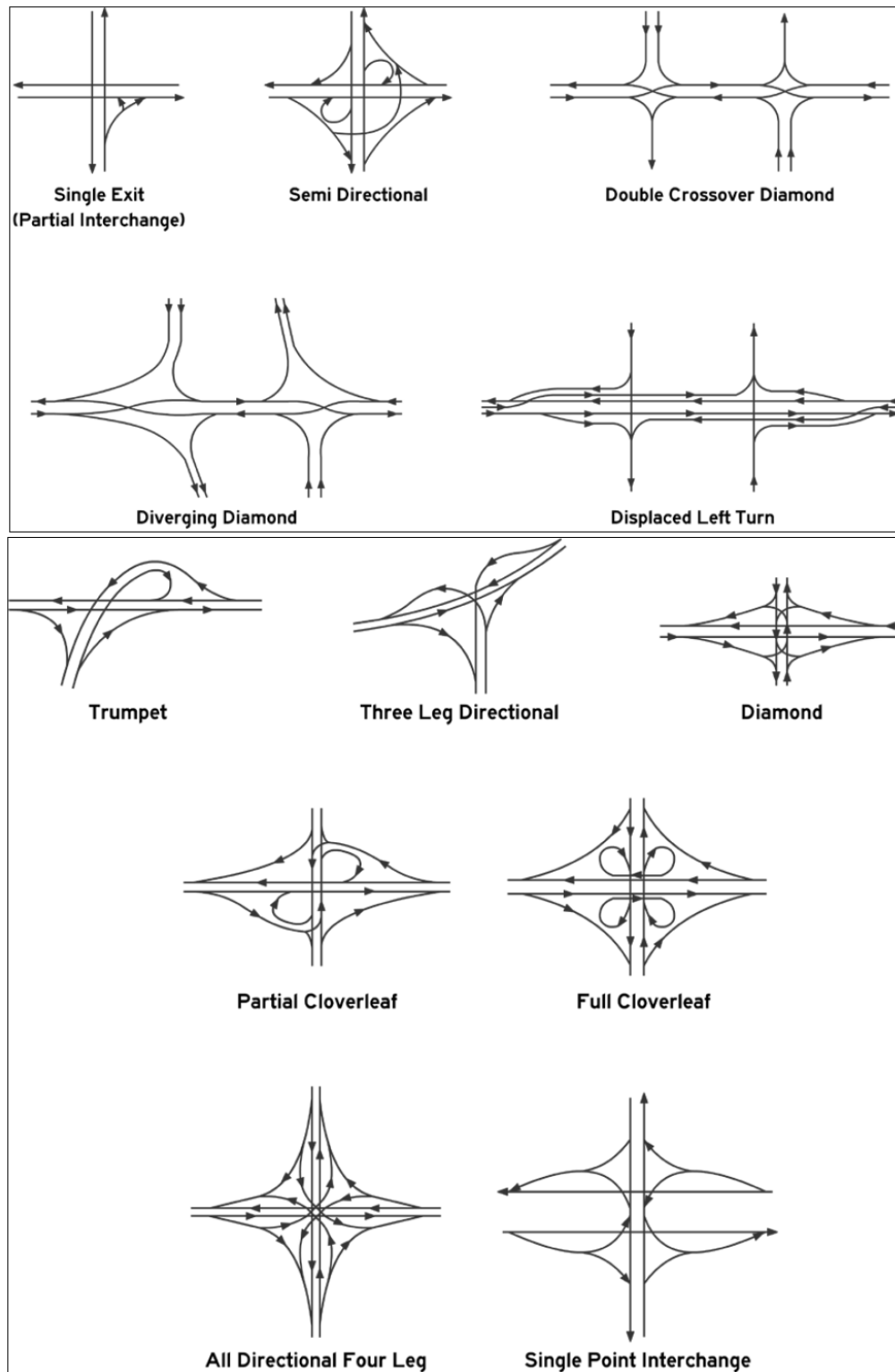
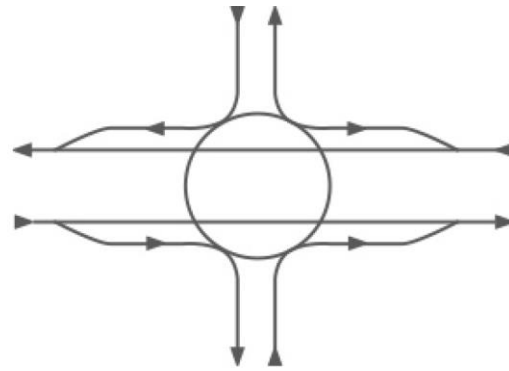
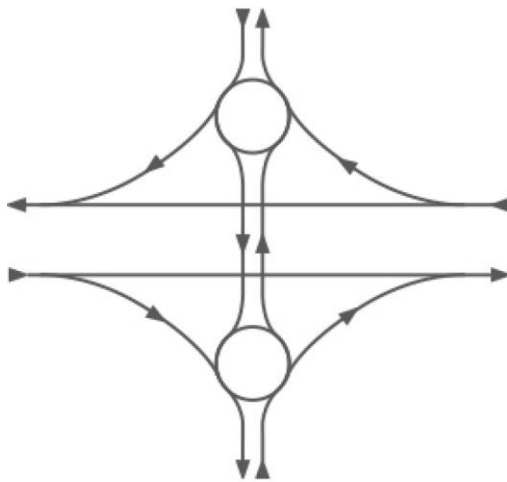


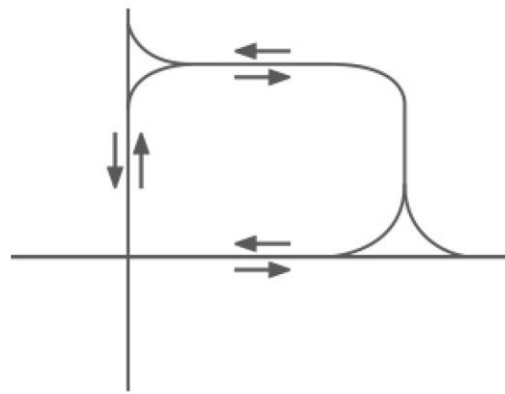
Figure 27. Illustration of Types of Interchanges.



**Single Roundabout Interchange**



**Double Roundabout Interchange**



**One-Quadrant Interchange**

**Figure 28. Illustration of Types of Interchanges (continued).**

## 173. Interchange Lighting

**Definition:** Type of interchange lighting.

**Recommended Attributes:**

1. None
2. Full interchange-area lighting (high mast)
3. Full interchange-area lighting (other)
4. Partial interchange lighting
5. Other

## I74. Interchange Entering Volume

---

**Definition:** Sum of entering volumes for all routes entering interchange. For each entering route, this would be counted at a point prior to the first exit ramp.

**Recommended Attributes:**

Average daily volume

## I75. Interchange Identifier for this Ramp

---

**Definition:** The unique numeric identifier assigned to the interchange that this ramp is part of. See Element I68. *Unique Interchange Identifier* above. This provides linkage to the basic interchange information and to all other ramps.

**Recommended Attributes:**

The interchange identifier entered in Element I68. *Unique Interchange Identifier*.

## I76. Unique Ramp Identifier

---

**Definition:** An identifier for each ramp that is part of a given interchange. This defines which ramp the following elements are describing.

**Recommended Attributes:**

Alphanumeric (e.g., each set of interchange ramps could begin with “I” or “A”, each ramp could be identified by its route and exit number, etc.).

## I77. Ramp Length <sup>FDE</sup>

---

**Definition:** Length of ramp. The length should be measured from taper to taper.

**Recommended Attributes:**

Feet

See Figure 29 on page 141 for additional detail.

Note: This element has been changed since MIRE 1.0.

**Crosswalk Table:**

<b>Dataset</b>	<b>HPMS</b>	<b>TMG</b>	<b>SHRP 2 RID</b>	<b>FMIS</b>	<b>NBI</b>	<b>LTPP</b>	<b>NPS RIP</b>	<b>HSM</b>
Element Name	Section Length	--	--	--	--	--	--	Ramp Length
Element Number	Field 7	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.



**Begin Taper Point**



**End Taper Point**

**Figure 29. Illustration of Ramp Tapers.**

Source: USDOT, Highway Performance Monitoring System Field Manual (2014).



## 178. Ramp Acceleration Lane Length

**Definition:** Length of acceleration lane, not including taper. For tapered ramps, this would be measured from point of tangency of the last ramp curve to the point where the ramp lane width becomes less than 12 feet. For parallel ramps, this would be measured from nose of painted gore to beginning of taper.

**Recommended Attributes:**

Feet

See Figure 30 on page 143 for additional detail.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Entrance Ramp Length
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

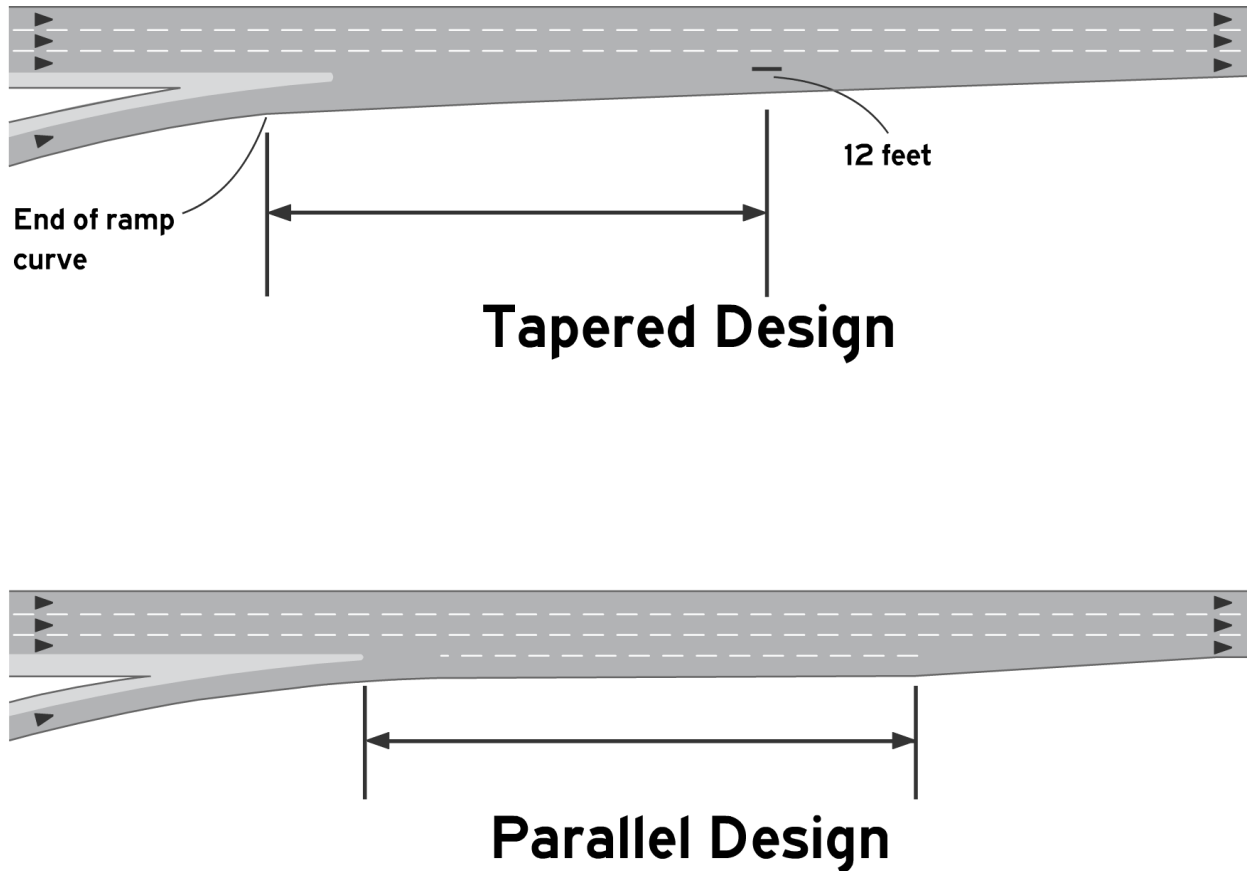


Figure 30. Illustration of Acceleration Lane Length for Tapered and Parallel Designs.

## 179. Ramp Deceleration Lane Length

**Definition:** Length of deceleration lane, not including taper. For tapered ramps, this would be measured from the point where the ramp lane width becomes 12 feet to the point of curvature of the initial ramp curve. For parallel ramps, this would be measured from end of taper to nose of painted gore.

**Recommended Attributes:**

Feet

See Figure 31 on page 144 for additional detail.

Crosswalk Table:

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Exit Ramp Length
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

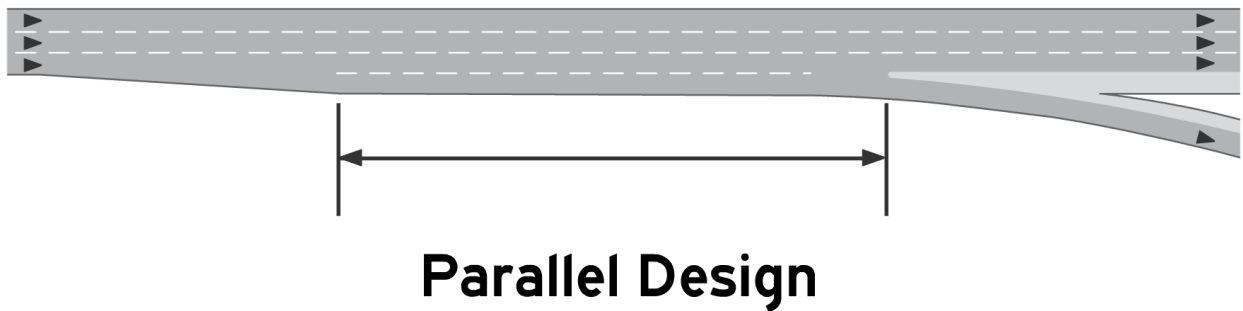
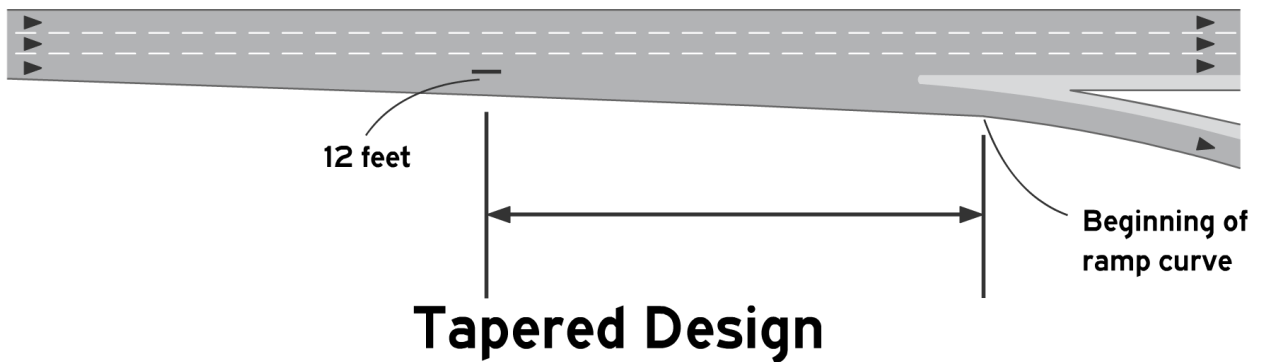


Figure 31. Illustration of Deceleration Lane Length for Tapered and Parallel Designs.

## 180. Ramp Number of Lanes

**Definition:** Maximum number of lanes on ramp. Include the predominant number of (through) lanes on the ramp. Do not include turn lanes (exclusive or combined) at the termini unless they are continuous (turn) lanes over the entire length of the ramp.

**Recommended Attributes:**

Numeric

Note: This element has been changed since MIRE 1.0.

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Through Lanes	--	--	--	--	--	--	Number of Lanes on the Exit Ramp
Element Number	7	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 181. Ramp AADT <sup>FDE</sup>

**Definition:** AADT on ramp.

**Recommended Attributes:**

Numeric

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Annual Average Daily Traffic	--	--	--	--	--	--	Ramp AADT
Element Number	21	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 182. Year of Ramp AADT <sup>FDE</sup>

---

**Definition:** Year of AADT on ramp.

**Recommended Attributes:**

Year

## 183. Ramp Metering

---

**Definition:** The presence and type of any metering of traffic entering mainline.

**Recommended Attributes:**

1. Pre-timed
2. Traffic actuated
3. No metering
4. Not applicable (i.e., ramp does not feed into mainline)

## 184. Ramp Advisory Speed Limit

---

**Definition:** The advisory speed limit on the ramp.

**Recommended Attributes:**

1. Numeric
2. No advisory limit (i.e., limit will be the same as on the connecting roadways)

## 185. Roadway Type at Beginning Ramp Terminal <sup>FDE</sup>

---

**Definition:** A ramp is described by a beginning and ending ramp terminal in the direction of ramp traffic flow or the direction of inventory. This element describes the type of roadway intersecting with the ramp at the beginning terminal.

**Recommended Attributes:**

1. Freeway
2. Non-freeway (surface street)
3. Other Ramp
4. Frontage road
5. Other

See point B in Figure 26 on page 134 for additional detail. For Ramp 005 P5 12754, Roadway Type at Beginning Ramp Terminal = Freeway.

## 186. Roadway Feature at Beginning Ramp Terminal

---

**Definition:** The feature found at the beginning terminal of the ramp.

**Recommended Attributes:**

1. Acceleration Lane
2. Deceleration Lane
3. Weaving lane (e.g., the weaving area joining two ramps under an overpass in a cloverleaf interchange)
4. Signalized intersection
5. Stop/yield controlled intersection
6. Uncontrolled intersection
7. Another ramp
8. Other

See point B in Figure 26 on page 134 for additional detail. For Ramp 005 P5 12754, Roadway Feature at Beginning Ramp Terminal = Weaving Lane.

## **I87. Location Identifier for Roadway at Beginning Ramp Terminal** <sup>FDE</sup>

---

**Definition:** Location on the roadway at the beginning ramp terminal (e.g. route-milepost for that roadway) if the ramp connects with a roadway at that point.

### **Recommended Attributes:**

Route and location descriptors (e.g., route and milepoint or spatial coordinates) for the roadway intersected at the beginning ramp terminal. Must be consistent with other MIRE files for linkage.

See point D in Figure 26 on page 134 for additional detail. In this example the Location Identifier for Roadway at Beginning Ramp Terminal = MP 128.06.

## **I88. Location of Beginning Ramp Terminal Relative to Mainline Flow**

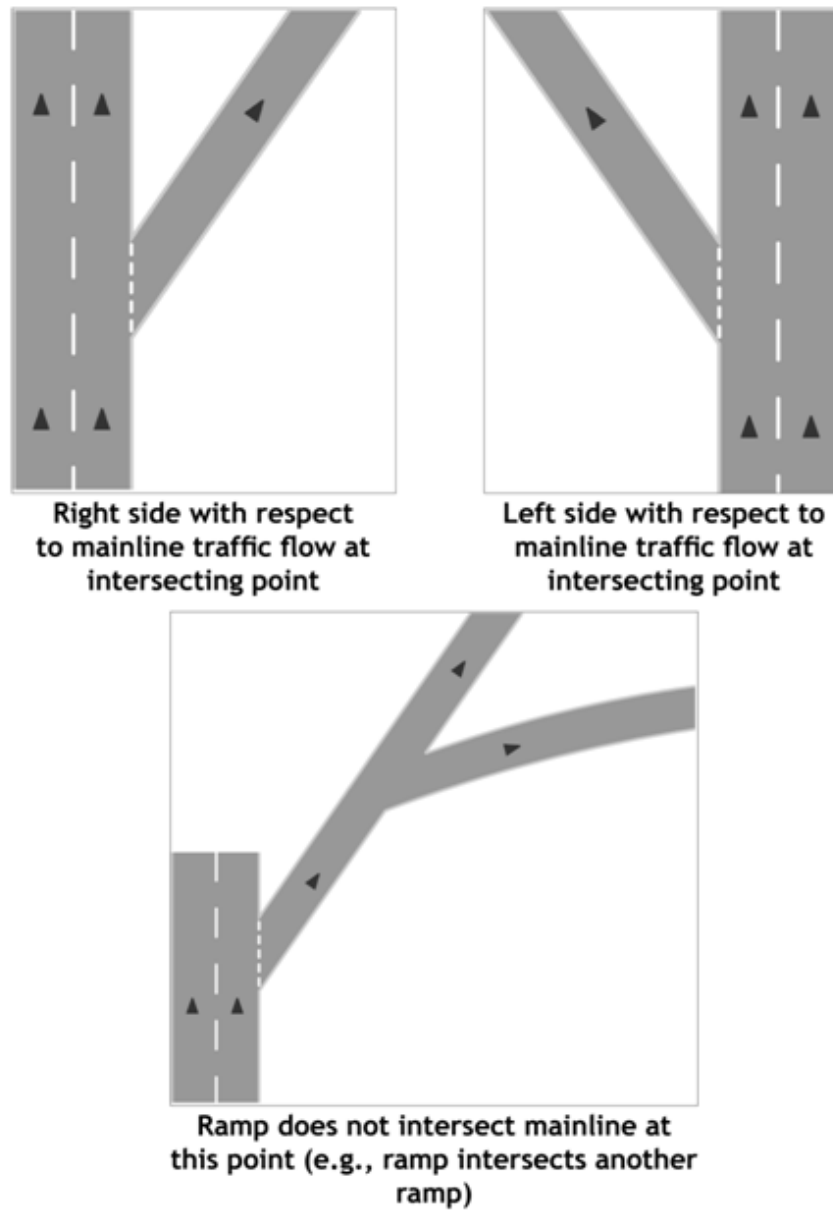
---

**Definition:** Ramps can intersect with the traffic flow of a divided or undivided roadway on either of two sides. This defines the side of the roadway flow intersected by the ramp.

### **Recommended Attributes:**

1. Right side with respect to mainline traffic flow at intersecting point.
2. Left side with respect to mainline traffic flow at intersection point.
3. Ramp does not intersect mainline at this point (e.g., ramp intersects another ramp).

See Figure 32 on page 149 for additional detail.



**Figure 32. Illustration of Locations of Beginning Ramp Terminal Relative to Mainline Flow.**



## 189. Roadway Type at Ending Ramp Terminal <sup>FDE</sup>

---

**Definition:** A ramp is described by a beginning and ending ramp terminal in the direction of inventory. This element describes the type of roadway intersecting with the ramp at the ending terminal.

**Recommended Attributes:**

1. Freeway
2. Non-freeway (surface street)
3. Other Ramp
4. Frontage road
5. Other

See point C in Figure 26 on page 134 for additional detail. For Ramp 005 RI 12806, Roadway Type at Ending Ramp Terminal = Non-freeway.

## 190. Roadway Feature at Ending Ramp Terminal

---

**Definition:** The feature found at the ending terminal of the ramp.

**Recommended Attributes:**

1. Acceleration Lane
2. Deceleration Lane
3. Weaving lane (e.g., the weaving area joining two ramps under an overpass in a cloverleaf interchange)
4. Signalized intersection
5. Stop/yield controlled intersection
6. Uncontrolled intersection
7. Another ramp
8. Other

See point C in Figure 26 on page 134 for additional detail. For Ramp 005 RI 12806, Roadway Feature at Ending Ramp Terminal = Signalized Intersection.

## 191. Location Identifier for Roadway at Ending Ramp Terminal<sup>FDE</sup>

---

**Definition:** Location on the roadway at the ending ramp terminal (e.g. route-milepost for that roadway) if the ramp connects with a roadway at that point.

**Recommended Attributes:**

Route and location descriptors (e.g., route and milepoint or spatial coordinates) for the roadway intersected at the ending ramp terminal. Must be consistent with other MIRE files for linkage.

See point E in Figure 26 on page 134 for additional detail. In this example the Location Identifier for Roadway at Ending Ramp Terminal = MP 126.77.

## 192. Location of Ending Ramp Terminal Relative to Mainline Flow

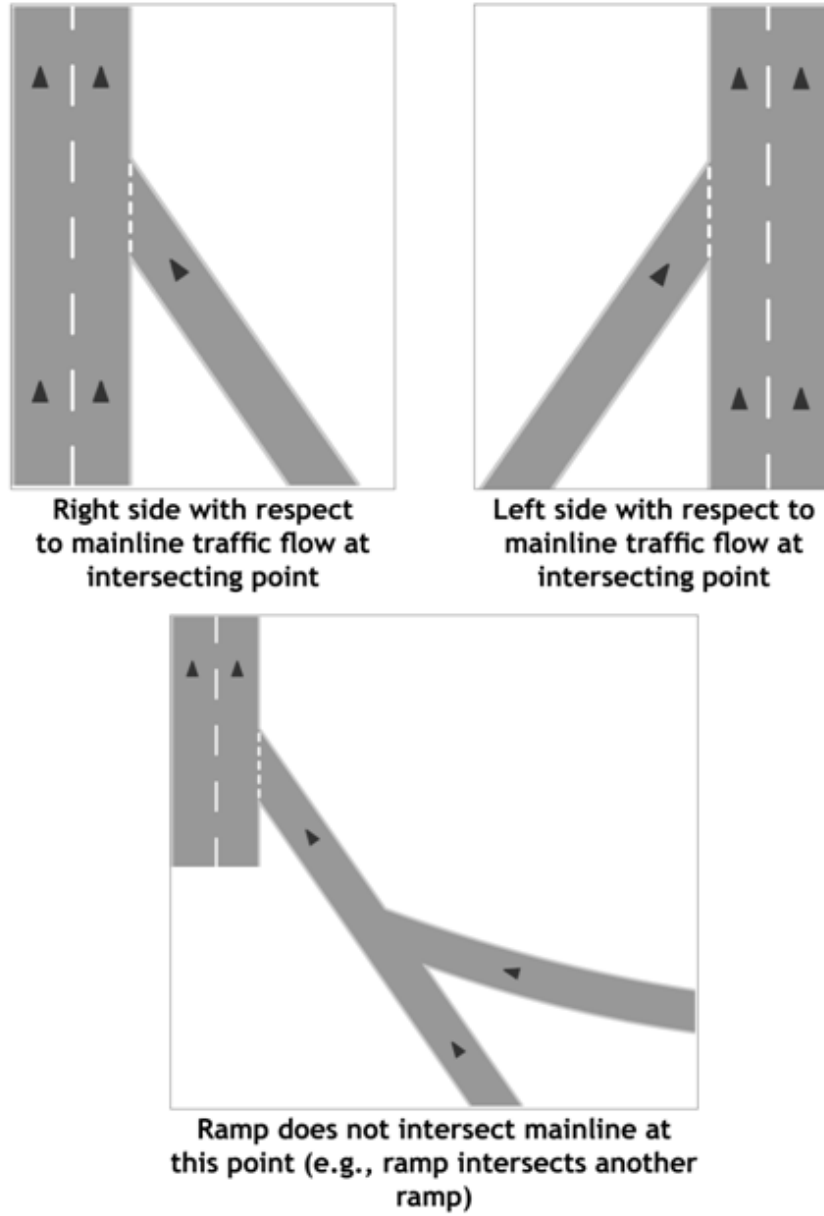
---

**Definition:** Ramps can intersect with the traffic flow of a divided or undivided roadway on either of two sides. This defines the side of the roadway flow intersected by the ramp.

**Recommended Attributes:**

Right side with respect to mainline traffic flow at intersecting point. Left side with respect to mainline traffic flow at intersection point. Ramp does not intersect mainline at this point (e.g., ramp intersects another ramp).

See Figure 33 on page 152 for additional detail.



**Figure 33. Illustration of Locations of Ending Ramp Terminal Relative to Mainline Flow.**

## V. HORIZONTAL CURVE

- 193. Curve Identifiers
- 194. Curve Feature Type
- 195. Horizontal Curve Degree or Radius
- 196. Horizontal Curve Length
- 197. Curve Superelevation
- 198. Horizontal Transition/Spiral Curve Presence
- 199. Horizontal Curve Intersection/Deflection Angle
- 200. Horizontal Curve Direction

## 193. Curve Identifiers

---

**Definition:** All elements needed to define location of each curve record.

**Recommended Attributes:**

Route and location descriptors (e.g., route and beginning and ending milepoints or route and beginning and ending spatial coordinates). Must be consistent with other MIRE files for linkage.

Note: This element has been changed since MIRE 1.0.

## 194. Curve Feature Type

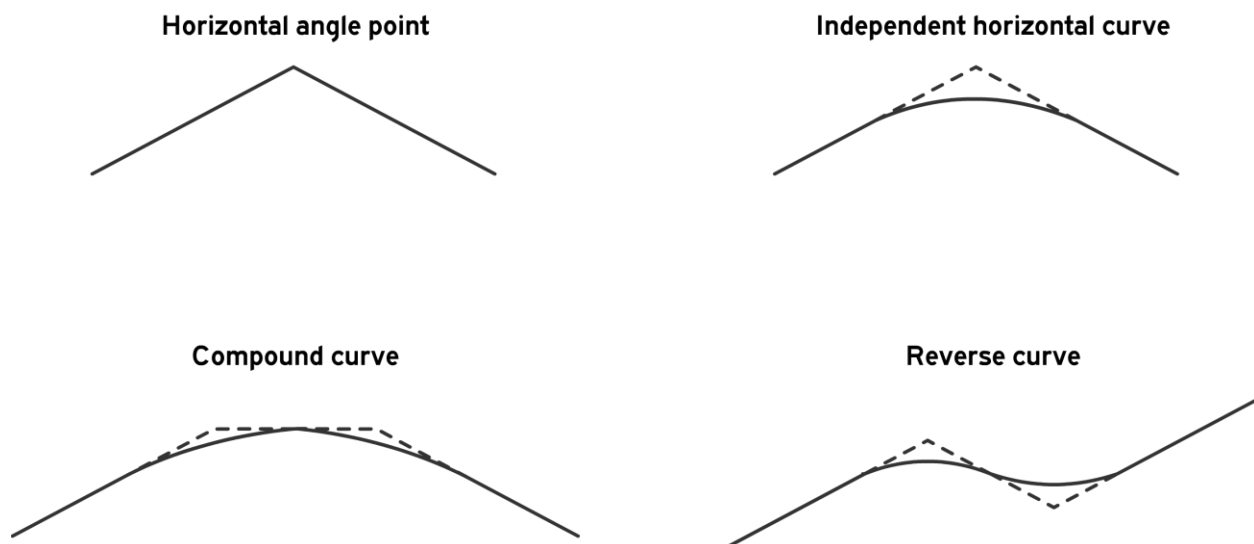
---

**Definition:** Type of horizontal alignment feature being described in the data record.

**Recommended Attributes:**

1. Horizontal angle point (i.e., joining of two tangents without a horizontal curve)
2. Independent horizontal curve
3. Component of compound curve (i.e., one curve in compound curve)
4. Component of reverse curve (i.e., one curve in a reverse curve)

See Figure 34. Illustration of Types of Horizontal Curve Features. Figure 34 below for additional detail.



**Figure 34. Illustration of Types of Horizontal Curve Features.**

## 195. Horizontal Curve Degree or Radius

**Definition:** Degree or radius of curve.

**Recommended Attributes:**

Numeric, feet if radius

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Curve Classification	--	Curvature Radius	--	--	--	--	Horizontal Curve Radius
Element Number	43	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 196. Horizontal Curve Length

**Definition:** Length of curve including spiral.

**Recommended Attributes:**

Feet

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	Curvature Length	--	--	--	--	Horizontal Curve Length
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 197. Curve Superelevation

**Definition:** Measured superelevation rate or percent.

**Recommended Attributes:**

Rate/percent

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	--	--	--	--	--	--	--	Horizontal Curve Superelevation
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 198. Horizontal Transition/Spiral Curve Presence

---

**Definition:** Presence and type of transition from tangent to curve and curve to tangent.

**Recommended Attributes:**

1. No transition
2. Spiral transition
3. Other transition

## 199. Horizontal Curve Intersection/Deflection Angle

---

**Definition:** The angle between the two intersecting tangents in the direction of inventory (sometimes called the "deflection angle"). Code only for Horizontal Angle Points; not applicable if there is a curve joining the tangents.

**Recommended Attributes:**

Degrees (absolute value)

## 200. Horizontal Curve Direction

---

**Definition:** Direction of curve in direction of inventory.

**Recommended Attributes:**

1. Right
2. Left



**Crosswalk Table:**

<b>Dataset</b>	<b>HPMS</b>	<b>TMG</b>	<b>SHRP 2 RID</b>	<b>FMIS</b>	<b>NBI</b>	<b>LTPP</b>	<b>NPS RIP</b>	<b>HSM</b>
Element Name	--	--	Direction of curve	--	--	--	--	--
Element Number	--	--	--	--	--	--	--	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## VI. VERTICAL GRADE

- 201. Grade Identifiers and Linkage Elements
- 202. Vertical Alignment Feature Type
- 203. Percent of Gradient
- 204. Grade Length
- 205. Vertical Curve Length

## 201. Grade Identifiers and Linkage Elements

---

**Definition:** All elements needed to define location of each vertical feature and all elements necessary to link with other safety files.

**Recommended Attributes:**

Route/linear reference system descriptors (e.g., route and beginning and ending milepoints or route and beginning and ending spatial coordinates). Must be consistent with other MIRE files for linkage.

## 202. Vertical Alignment Feature Type

---

**Definition:** Type of vertical alignment feature being described in the data record.

**Recommended Attributes:**

1. Vertical angle point (i.e., joining of two vertical gradients without a vertical curve)
2. Vertical gradient
3. Sag vertical curve (i.e., vertical curve that connects a segment of roadway with a segment of roadway that has a more positive grade)
4. Crest vertical curve (i.e., vertical curve that connects a segment of roadway with a segment of roadway that has a more negative grade)

See Figure 35 on page 161 for additional detail.

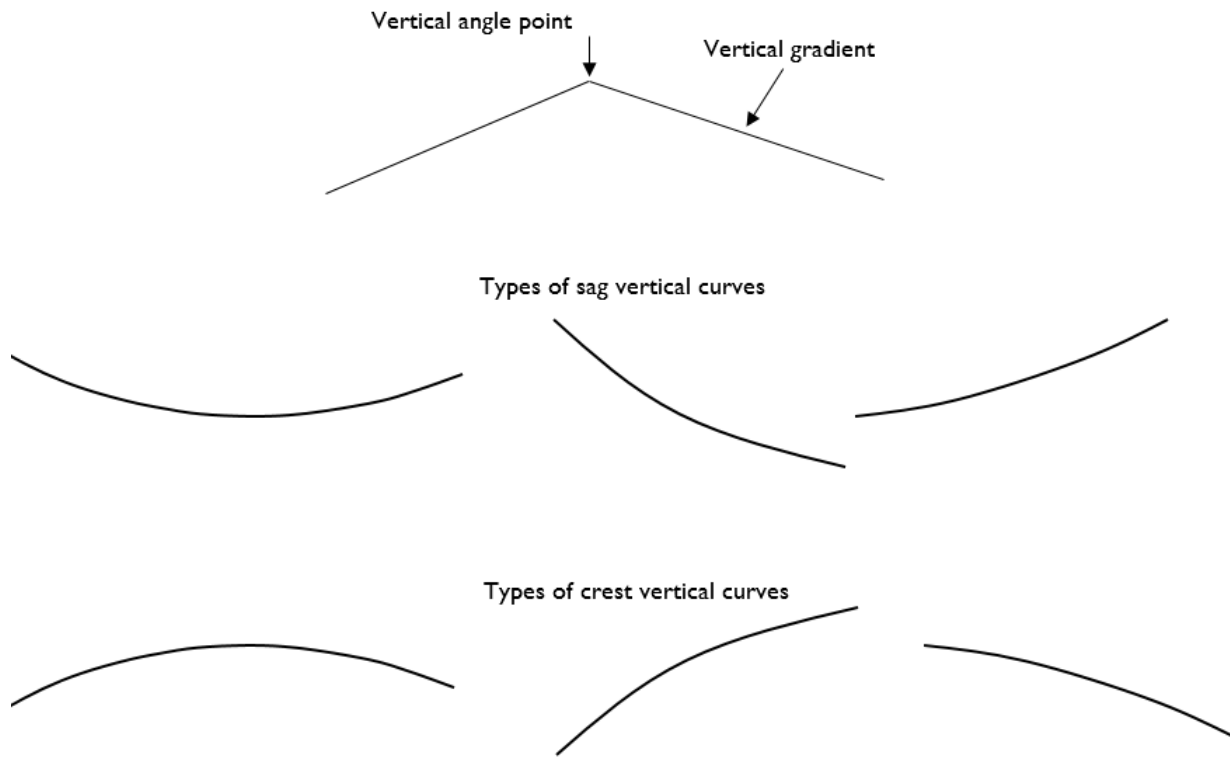


Figure 35. Illustration of Types of Vertical Curve Features.

## 203. Percent of Gradient

---

**Definition:** Percent of gradient. Leave blank if record concerns a sag or crest vertical curve.

**Recommended Attributes:**

Percent

**Crosswalk Table:**

Dataset	HPMS	TMG	SHRP 2 RID	FMIS	NBI	LTPP	NPS RIP	HSM
Element Name	Grade Classification	--	Grade	--	--	--	Grade	Grade
Element Number	45	--	--	--	--	--	40	--

Note: "--" indicates that the dataset does not include this specific MIRE element.

## 204. Grade Length

---

**Definition:** Grade length if 202. *Vertical Alignment Feature Type* is "Vertical gradient." Length does not include any portion of a vertical curve. Leave blank if record concerns a sag or crest vertical curve.

**Recommended Attributes:**

Feet

## 205. Vertical Curve Length

---

**Definition:** Vertical curve length if 202. *Vertical Alignment Feature Type* is "Sag vertical curve" or "Crest vertical curve."

**Recommended Attributes:**

Feet

## APPENDIX A: SUPPLEMENTAL DATABASES

MIRE focuses on roadway inventory and traffic data variables. However, it does not contain all inventory data elements needed for all safety decisions that must be made. Some of the other data needed are contained in existing files that are currently (or could be) collected by State DOTs. These databases should be linked to the MIRE database to readily access these supplemental databases. Examples of additional supplemental databases include:

- Roadside fixed objects
- Signs
- Speed data
- Automated enforcement devices
- Land use elements related to safety
- Bridge descriptors
- Railroad grade-crossing descriptors
- Safety improvements
- Pavement data related to safety

### *Roadside Fixed Objects*

This database would include an inventory of fixed objects on the roadside – both roadside hardware such as barriers and guard rail and natural objects such as trees. Data related to roadside hardware may be available in an agency’s asset management system or could be added to that system. Other items (e.g., trees) would likely have to be added through a separate inventory effort. Version 2.0 of MIRE has not detailed the list of objects needed, however, the needed elements would be those that can cause harm to vehicle occupants in a collision (e.g., trees trunks larger than a specified diameter but not small shrubs). The minimum needed characteristics would include the location of the object (e.g., route/milepoint), object type, side of the road, distance from the edge of the travel lane and the length of the object if linear (e.g., guardrail). The 2010 HSM requires data on roadside fixed-object density and roadside fixed-object offset to develop the safety prediction models.

### *Signs*

This database would include an inventory of all signs on the roadway. Descriptors would include at least sign type (Manual on Uniform Traffic Control Devices designation) and a location address (using a convention that allows linkage to the other MIRE elements), and could include other descriptors such as support type (shoulder single-post, overhead bridge), distance of sign support from edge of travel lane (if not captured in a roadside inventory), condition, retroreflectivity, and dimensions. Note that this information might exist in an agency’s asset management system.

### *Speed Data*

MIRE 2.0 includes segment elements concerning both mean and 85th percentile speed on the segment. Both are important predictors of safety. However, collection of these elements for each roadway segment is impossible with current procedures and the up-stream and down-stream extrapolation of speed data collected at one point would appear to be much more difficult than the extrapolation of traffic counts, since segment characteristics that affect speed change quite often. Speed data should be entered into these elements when collected through a special study on a specific segment. A supplemental file is needed that captures all of the speed data collected by any method with the same linkage elements as in MIRE for the other inventory databases. Speed data are collected in speed zoning studies and by some automated data collection systems used for other purposes (e.g., vehicle classification systems, freeway surveillance systems, weigh-in-motion systems). Consolidation of these data into a single database, which could be linked to the basic inventory files, would greatly increase the number of data points available.

### *Automated Enforcement Devices*

MIRE 2.0 has concentrated on the geometric, traffic, and traffic control characteristics of the roadway system. However, automated enforcement devices (i.e., red-light-running camera systems and automated speed enforcement systems) are usually somewhat permanently related to specific locations on the roadway system (as opposed to normal enforcement efforts which either move or are stationary for only short time periods). Knowledge of the presence of these devices is also needed by the 2010 HSM. This supplemental file would include at least the location (linkable to other parts of MIRE), type, and dates that the system is operational for each such device.

### *Land Use Elements Related to Safety*

While not included in MIRE 2.0 as individual elements, the HSM requires data on the number of transit stops, schools and alcohol-distribution establishments within 1,000 feet of each intersection. Such data would be difficult to collect in a manual fashion, but locations of such items are found in many spatial data systems. If the basic inventory system is also spatial, the development of variables such as these is not complicated. Other land use characteristics that might be related to safety such as generator of pedestrian exposure (e.g., parks, elderly care facilities) could also be added to the database.

### *Bridge Descriptors*

State DOTs collect bridge data on a regular basis. The bridge data are submitted to FHWA for the National Bridge Inventory (NBI) (14). There are numerous safety-related elements in the file.

Just as for other supplemental files, critical bridge data to use in safety decisions is dependent upon linkage to the primary roadway inventory file (i.e., MIRE), crash file and other safety databases. Unfortunately, such linkage is not always present. The linkage can be accomplished in two basic ways. First, the location of the bridge (e.g., route/milepost, spatial coordinates) could

be entered on the State's bridge files using the same location system as in the basic inventory files. Second, linkage elements on these two files (e.g., bridge number,) could be entered in the agency's primary inventory database or in a supplemental file used only for linkage purposes. Indeed, the MIRE roadway segment file includes the bridge number as a key attribute (see Element 109). Linkage of the NBI data to the MIRE segment file could be accomplished with a supplemental file which includes the current location for each bridge number. (It is noted that if a route/milepost location system is used, the bridge location would need to be verified each year, since some modifications to a route such as curve flattening can "shift" downstream milepoints so that the address of the same point differs from year to year.)

#### *Railroad Grade-Crossing Descriptors*

State DOTs collect railroad grade-crossing data on a regular basis. The Federal Railroad Administration (FRA) maintains an inventory of all grade crossings and information about each crossing (15).

Just as for other supplemental files, critical to the use of these elements in safety decisions is linkage to the primary roadway inventory file, crash file and other safety databases. The linkage can be accomplished in two basic ways. First, the location of the grade crossing (e.g., route/milepost, spatial coordinates) could be entered on the State's grade crossing files using the same location system as in the basic inventory files. Second, linkage elements on these two files (e.g., railroad grade crossing number) could be entered in the agency's primary inventory database or in a supplemental file used only for linkage purposes. Indeed, MIRE includes the grade crossing number as Element 118.

#### *Safety Improvements*

Supplemental data are also needed on an agency's safety projects (i.e., a safety project history file). For each project, this file would document what was done (i.e., the details of the safety improvement), where it was done (i.e., the LRS or spatial data beginning and ending milepoints/coordinates), and the date it was completed. These data would be used in evaluations of project effectiveness, as a history file of what has been tried in the past for a certain location, and as documentation of the agency's overall safety program (e.g., the number of a certain treatment type implemented by road class). Although state DOTs have been implementing safety improvements for decades, very few have developed such a file. If retained, historic safety project data are often found only in paper files retained by agency division offices and not in computerized files at headquarters.

#### *Pavement Data Related to Safety*

Many studies have been conducted to investigate the safety performance of pavements and identified factors associated with safety, such as pavement geometric design, paving materials, surface properties, and skid resistance. Some State DOTs may have a separate database for pavement condition data or have the pavement data stored in the asset management system. MIRE 2.0 includes several pavement related data elements, such as Element 28 *International Roughness Index (IRI)* and Element 30 *Pavement Condition (Present Serviceability Rating)*. Additional data elements might be obtained from the agency's pavement data files. Additionally, the Long-



Term Pavement Performance (LTPP) program (16), which is managed and funded by the FHWA, provides a comprehensive guide on pavement data needs and collection.

## APPENDIX B: CROSSWALK TABLE FOR MIRE FDE

Table 5 compares the element numbers of the individual MIRE FDE in MIRE 1.0 and MIRE 2.0.

**Table 5. Crosswalk Table for MIRE FDE.**

<b>MIRE FDE (MIRE 1.0 Number)</b>	<b>Corresponding Element Number in MIRE 2.0</b>
Type of Governmental Ownership (4)	4
Route Number (8)	8
Route/Street Name (9)	9
Begin Point Segment Descriptor (10)	10
End Point Segment Descriptor (11)	11
Segment Identifier (12)	12
Segment Length (13)	13
Direction of Inventory (18)	18
Functional Class (19)	19
Rural/Urban Designation (20)	20
Federal Aid (21)*	21
Route Type (21)*	22
Access Control (22)	23
Surface Type (23)	24
Number of Through Lanes (31)	32
Median Type (54)	55
Annual Average Daily Traffic (AADT) (79)	81
AADT Year (80)	82
One/Two-Way Operations (91)	93
Unique Junction Identifier (120)	110
Location Identifier for Road 1 Crossing Point (122)	112
Location Identifier for Road 2 Crossing Point (123)	113
Intersection/Junction Geometry (126)	116
Intersection/Junction Traffic Control (131)	121
Unique Approach Identifier (139)	129
Unique Interchange Identifier (178)	168
Interchange Type (182)	172
Ramp Length (187)	177
Ramp AADT (191)	181
Year of Ramp AADT (192)	182
Roadway Type at Beginning Ramp Terminal (195)	185
Location Identifier for Roadway at Beginning Ramp Terminal (197)	187
Roadway Type at Ending Ramp Terminal (199)	189
Location Identifier for Roadway at Ending Ramp Terminal (201)	191

Note: MIRE 1.0 element 21 Federal Aid/Route Type has been split into two separate elements 21 Federal Aid and 22 Route Type in MIRE 2.0.



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## INDEX

This Index provides an alphabetical listing of the MIRE Elements, along with the corresponding page number.

97. 85th Percentile Speed	80
83. AADT Annual Escalation Percentage	74
82. AADT Year <sup>FDE</sup>	73
23. Access Control <sup>FDE</sup>	28
137. Amount of Left-turn Lane Offset	112
81. Annual Average Daily Traffic (AADT) <sup>FDE</sup>	72
130. Approach AADT	108
131. Approach AADT Year	108
133. Approach Directional Flow	109
145. Approach Left Turn Protection	171
132. Approach Mode	109
144. Approach Traffic Control	118
37. Auxiliary Lane Length	40
36. Auxiliary Lane Presence/Type	39
10. Begin Point Segment Descriptor <sup>FDE</sup>	20
88. Bicycle Count/Exposure	76
109. Bridge Numbers for Bridges in Segment	86
106. Centerline Presence/Width	84
107. Centerline Rumble Strip Presence/Type	85
127. Circular Intersection - Bicycle Facility	104
125. Circular Intersection - Circulatory Lane Width	103
166. Circular Intersection - Crosswalk Location	131
161. Circular Intersection - Entry Radius	130
158. Circular Intersection - Entry Width	126
164. Circular Intersection - Exit Radius	130
162. Circular Intersection - Exit Width	130
126. Circular Intersection - Inscribed Diameter	103
167. Circular Intersection - Island Width	131
124. Circular Intersection - Number of Circulatory Lanes	102

159. Circular Intersection - Number of Entry Lanes	126
163. Circular Intersection - Number of Exit Lanes	130
165. Circular Intersection - Pedestrian Facility	131
160. Circular Intersection - Presence/Type of Exclusive Right Turn Lane	128
6. City/Local Jurisdiction Name	18
7. City/Local Jurisdiction Urban Code	18
17. Coinciding Route - Minor Route Information	24
16. Coinciding Route Indicator	24
2. County Code	15
1. County Name	15
35. Cross Slope	39
150. Crossing Pedestrian Count/Exposure	123
147. Crosswalk Presence/Type	120
53. Curb Presence	51
54. Curb Type	52
194. Curve Feature Type	154
193. Curve Identifiers	154
197. Curve Superelevation	156
18. Direction of Inventory <sup>FDE</sup>	25
105. Edgeline Presence/Width	84
11. End point Segment Descriptor <sup>FDE</sup>	21
21. Federal Aid <sup>FDE</sup>	26
19. Functional Class <sup>FDE</sup>	25
201. Grade Identifiers and Linkage Elements	160
204. Grade Length	162
3. Highway District	16
195. Horizontal Curve Degree or Radius	155
200. Horizontal Curve Direction	157
199. Horizontal Curve Intersection/Deflection Angle	157
196. Horizontal Curve Length	155
198. Horizontal Transition/Spiral Curve Presence	157
90. Hourly Traffic Volumes (or Peak and Off peak AADT)	76

38. HOV Lane Presence/Type	40
39. HOV Lanes	41
34. Inside Through Lane Width	38
174. Interchange Entering Volume	139
175. Interchange Identifier for this Ramp	139
173. Interchange Lighting	138
172. Interchange Type <sup>FDE</sup>	136
28. International Roughness Index (IRI)	31
29. International Roughness Index (IRI) Date	32
119. Intersecting Angle	96
128. Intersection Identifier for this Approach	108
116. Intersection/Junction Geometry <sup>FDE</sup>	92
123. Intersection/Junction Lighting	101
115. Intersection/Junction Number of Legs	91
120. Intersection/Junction Offset Distance	98
121. Intersection/Junction Traffic Control <sup>FDE</sup>	99
91. K-Factor	77
50. Left Paved Shoulder Width	49
51. Left Shoulder Rumble Strip Presence/Type	50
49. Left Shoulder Total Width	49
48. Left Shoulder Type	48
66. Left Sideslope	59
67. Left Sideslope Width	60
153. Left Turn Counts/Percent	125
135. Left-Turn Lane Type	109
151. Left/Right Turn Prohibitions	124
141. Length of Exclusive Left-Turn Lanes	115
142. Length of Exclusive Right-Turn Lanes	115
114. Location Identifier for Additional Road Crossing Points	90
171. Location Identifier for Additional Road Crossing Points	135
169. Location Identifier for Road I Crossing Point	133
112. Location Identifier for Road I Crossing Point <sup>FDE</sup>	89



170. Location Identifier for Road 2 Crossing Point	134
113. Location Identifier for Road 2 Crossing Point <sup>FDE</sup>	89
187. Location Identifier for Roadway at Beginning Ramp Terminal <sup>FDE</sup>	148
191. Location Identifier for Roadway at Ending Ramp Terminal <sup>FDE</sup>	151
188. Location of Beginning Ramp Terminal Relative to Mainline Flow	148
192. Location of Ending Ramp Terminal Relative to Mainline Flow	151
70. Major Commercial Driveway Count	64
74. Major Industrial/Institutional Driveway Count	67
72. Major Residential Driveway Count	66
98. Mean Speed	80
58. Median (Inner) Paved Shoulder Width	55
57. Median Barrier Presence/Type	54
62. Median Crossover/Left-Turn Lane Type	56
59. Median Shoulder Rumble Strip Presence/Type	55
60. Median Sideslope	56
61. Median Sideslope Width	56
143. Median Type at Intersection	117
55. Median Type <sup>FDE</sup>	52
56. Median Width	53
71. Minor Commercial Driveway Count	65
75. Minor Industrial/Institutional Driveway Count	68
73. Minor Residential Driveway Count	66
89. Motorcycle Count or Percentage	76
96. Nighttime Speed Limit	80
134. Number of Approach Through Lanes	109
136. Number of Exclusive Left-Turn Lanes	112
140. Number of Exclusive Right-Turn Lanes	115
43. Number of Peak Period Through Lanes	44
78. Number of Signalized Intersections in Segment	70
79. Number of Stop-Controlled Intersections in Segment	71
32. Number of Through Lanes <sup>FDE</sup>	33
80. Number of Uncontrolled/Other Intersections in Segment	71

93. One/Two-Way Operations <sup>FDE</sup>	78
100. On-Street Parking Presence	81
101. On-Street Parking Type	81
76. Other Driveway Count	68
33. Outside Through Lane Width	34
108. Passing Zone Percentage	85
30. Pavement Condition (Present Serviceability Rating)	32
31. Pavement Condition (PSR) Date	33
92. Peak Hour Directional Factor	77
149. Pedestrian Signal Presence/Type	122
148. Pedestrian Signal Activation Type	122
85. Percent Combination Trucks or Combination Truck AADT	74
203. Percent of Gradient	161
84. Percent Single Unit Trucks or Single Truck AADT	74
86. Percentage Trucks or Truck AADT	75
41. Presence/Type of Bicycle Facility	42
118. Railroad Crossing Number	95
181. Ramp AADT <sup>FDE</sup>	145
178. Ramp Acceleration Lane Length	142
184. Ramp Advisory Speed Limit	147
179. Ramp Deceleration Lane Length	143
177. Ramp Length <sup>FDE</sup>	139
183. Ramp Metering	146
180. Ramp Number of Lanes	145
40. Reversible Lanes	41
46. Right Paved Shoulder Width	46
47. Right Shoulder Rumble Strip Presence/Type	47
45. Right Shoulder Total Width	45
44. Right Shoulder Type	45
64. Right Sideslope	58
65. Right Sideslope Width	59
138. Right Turn Channelization	114

155. Right Turn Counts/Percent	125
152. Right Turn-On-Red Prohibitions	124
63. Roadside Clearzone Width	58
68. Roadside Rating	60
186. Roadway Feature at Beginning Ramp Terminal	147
190. Roadway Feature at Ending Ramp Terminal	150
102. Roadway Lighting	82
185. Roadway Type at Beginning Ramp Terminal <sup>FDE</sup>	147
189. Roadway Type at Ending Ramp Terminal <sup>FDE</sup>	150
8. Route Number <sup>FDE</sup>	19
14. Route Signing	22
15. Route Signing Qualifier	23
22. Route Type <sup>FDE</sup>	27
9. Route/Street Name <sup>FDE</sup>	19
20. Rural/Urban Designation <sup>FDE</sup>	26
99. School Zone Indicator	80
117. School Zone Indicator	95
12. Segment Identifier <sup>FDE</sup>	21
13. Segment Length <sup>FDE</sup>	22
52. Sidewalk Presence	51
146. Signal Progression	120
122. Signalization Presence/Type	100
5. Specific Governmental Ownership	17
94. Speed Limit	79
26. Surface Friction	30
27. Surface Friction Date	31
24. Surface Type <sup>FDE</sup>	29
69. Tapered Edge	64
77. Terrain Type	69
103. Toll Charged	82
104. Toll Type	83
87. Total Daily Two-Way Pedestrian Count/Exposure	75

25. Total Paved Surface Width	30
139. Traffic Control of Exclusive Right Turn Lanes	114
157. Transverse Rumble Strip Presence	126
95. Truck Speed Limit	79
4. Type of Governmental Ownership <sup>FDE</sup>	16
111. Type of Intersection/Junction	88
129. Unique Approach Identifier <sup>FDE</sup>	108
168. Unique Interchange Identifier <sup>FDE</sup>	133
110. Unique Junction Identifier <sup>FDE</sup>	88
176. Unique Ramp Identifier	139
202. Vertical Alignment Feature Type	160
205. Vertical Curve Length	162
42. Width of Bicycle Facility	44
154. Year of Left Turn Counts/Percent	125
182. Year of Ramp AADT <sup>FDE</sup>	146
156. Year of Right Turn Counts/Percent	125

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