FOREWORD

The development of the Model Inventory of Roadway Elements (MIRE) comes at a key point in time. Safety data are critical to making sound decisions about the design and operation of roadways. Critical safety data include not only crash data, but also roadway inventory data, traffic data, and other files. State DOT’s need accurate and detailed roadway data as they develop and implement their Strategic Highway Safety Plans and look toward making safety investments that are more data driven.

As the need for roadway inventory information has increased, new and more efficient technologies to collect roadway inventory information have emerged. However, the collected data still need a framework for the common sharing of the information. As with the Model Minimum Uniform Crash Criteria (MMUCC) effort that established a set of uniform crash data elements, definitions, and attributes that States are encouraged to adopt and has become a de facto standard, the MIRE provides an inventory of roadway data elements that addresses a similar need. The MIRE provides a structure for roadway inventory data elements through the use of common consistent definitions and attributes. Consistency is essential for making sense of aggregated data. Without consistency, it would not be possible to effectively compare results across jurisdictions and time regarding the application of safety treatments. Also, inconsistent information can result in safety efforts that are misguided, wasteful, or ineffective.

One of MIRE’s intended functions has been to serve multiple roadway applications and user needs. The roadway data elements identified in MIRE were widely vetted across various user groups to ensure it met the data needs for multiple disciplines. The creation and application of this inventory will benefit not only safety but other disciplines such as operations, asset management and maintenance.

The benefits of MIRE — improved safety through the use of analytic tools and improved asset management, operations, and maintenance through the creation of a comprehensive inventory — will be realized only to the degree that transportation agencies use the resource. While the MIRE affords agencies a common framework in which to populate their roadway inventories, the task of completing these inventories still rests with the agencies responsible for building and maintaining the roads. We encourage the widespread adoption of the MIRE by these agencies as the framework for their roadway inventories.

Michael S. Griffith
Director, Office of Safety Integration

Monique R. Evans
Director, Office of Safety Research and Development
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The project team would also like to thank the many attendees who participated in the four MIRE Webinars held from November 2008 to April 2009.
### Abstract

Safety data are the key to sound decisions on the design and operation of roadways. Critical safety data include not only crash data, but also roadway inventory data, traffic data, driver history data, citation/adjudication information, and other files. The need for improved and more robust safety data is increasing due to the development of a new generation of safety data analysis tools and methods. The Model Inventory of Roadway Elements (MIRE) Version 1.0 is a listing and accompanying data dictionary of roadway and traffic data elements critical to safety management. It builds upon the initial minimum MIRE listing released in 2007. A MIRE website has been developed to provide additional background information, resources, and discussion Forums. The website is available at [http://www.mireinfo.org/](http://www.mireinfo.org/).
**SI* (MODERN METRIC) CONVERSION FACTORS**

### APPROXIMATE CONVERSIONS TO SI UNITS

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<th>When You Know</th>
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**NOTE:** volumes greater than 1000 L shall be shown in m³

| **VOLUME** |
| fl oz   | fluid ounces  | 29.57       | milliliters | mL |
| gal     | gallons       | 3.785       | liters      | L  |
| ft³     | cubic feet    | 0.028       | cubic meters | m³ |
| yd³     | cubic yards   | 0.765       | cubic meters | m³ |

| **MASS** |
| 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") |

| **TEMPERATURE (exact degrees)** |
| Fahrenheit | (F-32)/9 | Celsius | °C |
| or (F-32)/1.8 |

| **ILLUMINATION** |
| fc      | foot-candles | 10.76    | lux | lx |
| fl      | foot-Lamberts | 3.426   | candelas/m² | cd/m² |

| **FORCE and PRESSURE or STRESS** |
| lb      | poundforce   | 4.45    | newtons | N  |
| lb/in² | poundforce per square inch | 6.89 | kilopascals | kPa |

### APPROXIMATE CONVERSIONS FROM SI UNITS

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<td>0.386</td>
<td>square miles</td>
<td>mi²</td>
</tr>
</tbody>
</table>

| **VOLUME** |
| mL      | milliliters   | 0.034       | fluid ounces | fl oz |
| L       | liters        | 0.264       | gallons      | gal |
| m³      | cubic meters  | 35.314      | cubic feet   | ft³ |
| m³      | cubic meters  | 1.307       | cubic yards  | yd³ |

| **MASS** |
| 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 |

| **TEMPERATURE (exact degrees)** |
| Celsius | 1.8°C+32 | Fahrenheit | °F |

| **ILLUMINATION** |
| lx      | lux        | 0.0929     | foot-candles | fc |
| cd/m²   | candelas/m²| 0.2919    | foot-Lamberts | fl |

| **FORCE and PRESSURE or STRESS** |
| N       | newtons     | 0.225      | poundforce   | lbf |
| kPa     | kilopascals | 0.145      | poundforce per square inch | lbf/in² |

*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)*
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<table>
<thead>
<tr>
<th>ACRONYMS</th>
<th>Definition</th>
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<tbody>
<tr>
<td>AADT</td>
<td>Annual Average Daily Traffic</td>
</tr>
<tr>
<td>AC</td>
<td>Asphalt-Concrete</td>
</tr>
<tr>
<td>CRCP</td>
<td>Continuously Reinforced Concrete Pavement</td>
</tr>
<tr>
<td>DOT</td>
<td>Department of Transportation</td>
</tr>
<tr>
<td>FHWA</td>
<td>Federal Highway Administration</td>
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<tr>
<td>FIPS</td>
<td>Federal Information Processing System</td>
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<tr>
<td>FRA</td>
<td>Federal Railroad Administration</td>
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<td>Geographic Information System</td>
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<td>GLC</td>
<td>Geographic Locator Codes</td>
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<td>GSA</td>
<td>General Services Administration</td>
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<td>HOT</td>
<td>High-occupancy Toll</td>
</tr>
<tr>
<td>HOV</td>
<td>High-occupancy Vehicle</td>
</tr>
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<td>HPMS</td>
<td>Highway Performance Monitoring System</td>
</tr>
<tr>
<td>HSM</td>
<td>Highway Safety Manual</td>
</tr>
<tr>
<td>IHSDM</td>
<td>Interactive Highway Safety Design Model</td>
</tr>
<tr>
<td>IRI</td>
<td>International Roughness Index</td>
</tr>
<tr>
<td>JPCP</td>
<td>Jointed Plain Concrete Pavement</td>
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<tr>
<td>JRCP</td>
<td>Jointed Reinforced Concrete Pavement</td>
</tr>
<tr>
<td>LRS</td>
<td>Linear Referencing System</td>
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<td>MIRE</td>
<td>Model Inventory of Roadway Elements</td>
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<td>MMIRE</td>
<td>Model Minimum Inventory of Roadway Elements</td>
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<tr>
<td>MMUCC</td>
<td>Model Minimum Uniform Crash Criteria</td>
</tr>
<tr>
<td>MPH (mph)</td>
<td>Miles per hour</td>
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<tr>
<td>MUTCD</td>
<td>Manual Uniform Traffic Control Devices</td>
</tr>
<tr>
<td>NBI</td>
<td>National Bridge Inventory</td>
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<tr>
<td>NCHRP</td>
<td>National Cooperative Highway Research Program</td>
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<td>National Highway System</td>
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<tr>
<td>PCC</td>
<td>Portland Cement Concrete</td>
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<td>Present Serviceability Rating</td>
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<tr>
<td>RR</td>
<td>Railroad</td>
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<tr>
<td>RTOR</td>
<td>Right Turn-On-Red</td>
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<tr>
<td>SOV</td>
<td>Single-occupancy Vehicle</td>
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<tr>
<td>SPI</td>
<td>Single point interchange</td>
</tr>
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<td>U.S.</td>
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</table>
Introduction

Background

Safety data are the key to sound decisions on the design and operation of roadways. Critical safety data include not only crash data, but also roadway inventory data, traffic data, driver history data, citation/adjudication information, and other files. The need for improved and more robust safety data is increasing due to the development of a new generation of safety data analysis tools and methods. The Federal Highway Administration’s (FHWA) Interactive Highway Safety Design Model (IHSDM) (1) and Safety Analyst (2), the 2010 release of the Highway Safety Manual (HSM) (3), as well as the National Cooperative Highway Research Program (NCHRP) Series 500 Data and Analysis Guide (4), all require crash, roadway, and traffic data to achieve the most accurate results. More detailed roadway data are also needed by State Departments of Transportation (DOT) and local agencies as they implement their strategic highway safety plans and make safety assessments of various roadway treatments. The Model Inventory of Roadway Elements (MIRE) Version 1.0 is a listing and accompanying data dictionary of roadway and traffic data elements critical to safety management.

In August 2007, the FHWA released a report entitled Model Minimum Inventory of Roadway Elements — MMIRE (5). The report presented a list of roadway inventory and traffic elements critical to safety management and proposed standardized coding for each. Since the initial report was released in 2007, the MIRE listing has been revised and now includes over 200 elements. The MIRE listing has become more of a comprehensive listing of elements necessary for safety rather than a minimum listing. Therefore, the minimum has been dropped from the title, and has become the Model Inventory of Roadway Elements (MIRE). This change was made to reflect comments by user-reviewers concerning the number of elements and the fact that “minimum” might imply that all elements are “mandatory.” The new title better reflects the “model” nature of the element listing containing both critical and value-added elements.

The current MIRE effort to revise the initially-proposed MIRE elements, definitions, and attributes has resulted in MIRE Version 1.0. In order to refine the proposed MIRE elements, the project team:

- Compared the proposed MIRE elements to several State databases to determine which elements States are already collecting and how the attributes and codings compare.
- Compared the proposed MIRE elements to other databases, safety analysis tools, and guidance documents to identify common elements and to ensure as much consistency as possible between MIRE and the other datasets. These databases included the Highway Performance Monitoring System (HPMS), Model Minimum Uniform Crash Criteria (MMUCC), IHSDM, HSM, Safety Analyst, and the Manual on Uniform Traffic Control Devices (MUTCD).
Hosted webconferences to obtain additional input from eventual end users.

Coordinated with an Executive Steering Committee designed to provide technical input and serve as liaisons to potential users.

Compiled all input into refined attributes and codings for the MIRE elements.

MIRE will serve as the companion to MMUCC, which was developed as a minimum set of crash data elements. MMUCC has become the de-facto standard for crash data elements used by State and local jurisdictions when improving their crash data systems (6). A MIRE website has been developed to provide additional background information, resources, and discussion forums. The website is available at http://www.mireinfo.org/.

MIRE is Safety Related

It is important to note that while MIRE is an extensive list of elements, it does not include all elements that a State DOT would collect for all operational and design purposes; the MIRE elements are geared towards safety management. In addition, when selecting MIRE elements, an attempt was made to only retain those elements that were needed by SafetyAnalyst or other safety tools, in analyses conducted by a majority of State and local DOTs or analyses they are expected to conduct in the future (e.g., additional pedestrian safety analyses). There are additional elements that can clearly be added by an individual State or local DOT. For example, at least one state DOT captures “Operational Class” in its inventory where the actual operating class of the roadway differs from the official Functional Class.

In summary, MIRE 1.0 provides elements and attributes that are or will be needed when State and local DOTs make safety management decisions.

Using MIRE

There are a total of 202 elements that comprise MIRE Version 1.0. The MIRE elements are divided among three broad categories: roadway segments, roadway alignment, and roadway junctions. A breakdown of categories and subcategories are shown in Table 1.
Table 1. Categories and Subcategories of MIRE Elements.

<table>
<thead>
<tr>
<th>I. Roadway Segment Descriptors</th>
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<tr>
<td>I.a. Segment Location/Linkage Elements</td>
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<tr>
<td>I.b. Segment Roadway Classification</td>
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<tr>
<td>I.c. Segment Cross Section</td>
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<td>I.c.1. Surface Descriptors</td>
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<td>I.g. Segment Traffic Operations/Control Data</td>
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<td>I.h. Other Supplemental Segment Descriptors</td>
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<td>II. Roadway Alignment Descriptors</td>
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<td>II.a. Horizontal Curve Data</td>
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<td>II.b. Vertical Grade Data</td>
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<td>III.a.1. At-Grade Intersection/Junction General Descriptors</td>
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<td>III.b. Interchange and Ramp Descriptors</td>
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The listing of MIRE elements presented later in this report is broken down into three main sections based on these categories. At the beginning of each section is a listing of the elements. Following that listing of elements is the detailed information for each element in that section. Appendix A shows an alphabetical listing of the 202 MIRE elements and their corresponding page number.
For each element that is included, there is a definition, a list of attributes (coding), a priority rating, a reference indicating how the element relates to elements in HPMS and new safety tools, and when necessary, an illustration that provides supplemental information on the element. Unless otherwise noted, all illustrations were developed by the University of North Carolina Highway Safety Research Center. The attribute lists contain the suggested coding for each of the elements. There is not a separate code for “unknown” or “not applicable” under each element. In these cases, each agency should develop their own standardized means of recording this information through additional codes or the use of blank fields. Each element also contains a priority rating. The priority ratings are broken down into two major categories: “critical” and “value added”. Elements ranked as “critical” are those elements that are necessary for States to conduct basic safety management and/or are contained in safety analysis tools such as SafetyAnalyst. Elements ranked as “value added” are those elements that would be beneficial but are not crucial to using current versions of safety analysis tools. In addition, there are some elements that capture similar information. These elements are further categorized as “preferred” or “alternative”. As the name suggests, the preferred element better captures the intended data. However, if that element is not available, States can collect the alternative in its place. The alternative option always follows directly after its preferred counterparts in the MIRE listing. An example is truck AADT elements. Collecting both elements 82. Percent Single Unit Trucks, or Single Truck AADT and 83. Percent Combination Trucks or Combination Truck AADT, is designated as Critical Preferred, with collecting only element 84. Percentage Trucks or Truck AADT as the Critical Alternative.

The final descriptor of each element is a notation of its relationship to HPMS, HSM/IHSDM, and SafetyAnalyst. As noted earlier, MIRE is designed to include safety elements that are found in HPMS and/or are needed by one of the two new safety tools. (Note that the elements needed in the HSM and IHSDM are the same; thus the combinations of the two into one category.) In addition, the formatting of element attributes in MIRE (i.e., the coding) follows formatting in HPMS and MUTCD to a significant extent. The relationship of a MIRE element to these safety tools is presented in the following format under each variable:

- HPMS/Tool Requirements: HPMS (Full Extent), SafetyAnalyst (Required Conditionally), HSM/IHSDM (Required).

The reference to HPMS will be included if the MIRE element is either a “Sample” or a “Full Extent” element. The data items reported for all public roads are now known as Full Extent data items in HPMS. Additionally for HPMS, an asterisk (*) indicates that data collection requirements differ based on functional class. The reference to HSM/IHSDM will be included if the element is “Required” by those tools. The reference to SafetyAnalyst will be included if the element is either “Required,” “Required Conditionally” or “Optional.” Appendix B includes a matrix showing a summary of this information – a listing of each MIRE element showing its
relationship to each of the three tools. Appendix C includes a second matrix where more information is provided on the three different codes used for Safety Analyst.

As previously stated, the MIRE elements are divided among three broad categories: roadway segments, roadway alignment, and roadway junctions. A roadway segment is a “homogenous” section of roadway where some set of crucial elements remain constant. It is up to individual States to determine how they define homogeneous. When the value for one of these elements changes (e.g., a shoulder becomes wider, the number of lanes increases), a new homogeneous segment begins. Each segment should be defined by a beginning and ending “address” along a route. The address can be a milepoint or a set of coordinates. In link/node systems, the begin and end points might be defined by assigned node numbers. In urban systems, the begin and end points might be defined by intersection codes or street addresses.

There will be cases when some elements for which data are collected are not designated as crucial by the user – they can change within a given homogeneous segment without starting a new segment. For such elements that are categorical in nature (e.g., HOV Lane Type), it is recommended that the predominant value (i.e., the value for the greatest length within the segment) be used. For numeric elements, either use the predominant value or a length-weighted value. For the latter, a 0.3 mile section with a value of 10 for 0.2 miles and 20 for 0.1 miles would be assigned a value of \[(0.2 \times 10) + 0.1 \times 20\]/0.3 = 13.3.

While the difference among the three broad categories would appear to be very straight-forward, there are some complicating factors. For example, segments are often defined to run from intersection to intersection on a route, with the end points being the crossing point of the centerlines of the crossing roadways. Therefore, left-turn lanes at the intersection would be included in the lengths of the segments approaching and departing from the intersection. However, for the purpose of safety analyses and programs, turn lanes are most often associated with intersections and most current State and local files would begin and end segments at the center point of intersections and would not include descriptors of turn lanes on segments. Given these facts, the MIRE elements have been categorized such that elements normally associated with intersections or other junctions (e.g., pedestrian crossings) are included in the junction (intersection) category, and elements normally associated with sections of roadway between intersections are in the segment category. There are a few items which appear to be exceptions. For example, because there may be left turn lanes or turning bays in medians of divided highways which are not associated with intersections, these elements are included under “median descriptors”. However, even on divided highways, left-turn lanes associated with an intersection should be coded in the junction elements.

The second issue is how junction is defined in MIRE. As will be seen under “Junction Type”, MIRE includes not only intersections of two or more roadways, but also locations where a roadway intersects with a pedestrian crossing, bicycle path or railroad grade crossing. What are
not included in this element are locations where a roadway intersects with a driveway. Indeed, counts of driveways by type are included as a segment descriptor.

While the HPMS 2010+ Reassessment, Data Specifications (7) repeatedly refers to intersection, there is no definition of the term. Indeed, when defining elements related to counts of intersections in an HPMS section, HPMS says to “Include at-grade intersections at entrances to shopping centers, industrial parks, and other large traffic generating enterprises.” No definition is given of how large the traffic generated should be. MIRE is in agreement with HPMS in this regard in that it does not prescribe a clear definition of driveway or intersection, leaving it to the user to make this determination. The user would employ the same decision criteria used in collecting the HPMS data when making this decision.

**Date of Changes**

Several of the MIRE elements are followed by an element to document the year or posting date. These are for elements that either can change significantly in a one-year period (e.g., surface friction) or elements which require a date based on the definition (e.g., Annual Average Daily Traffic (AADT) Year, Future AADT Year). While a date element is not currently included with all MIRE elements, the MIRE project team recommends that States track the posting date or date of change for each MIRE element in the file. Knowing when a change has occurred is important in order to know the current state of inventory assets at any point in time, and in order to link the correct inventory with crashes. It would be preferable for States to establish a data system that can be set up to capture the date of change for each element. However, if that is not feasible, an alternative is to make changes as they occur, and then capture and retain an “end-of-year” file each year. Comparison of year-to-year files can then give some indication of attribute changes between years. This alternative is only feasible because, generally, only a small proportion of the inventory file would be changed in a given year.

**Supplemental Databases**

MIRE is envisioned as the primary standard for 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 in order to readily access these crucial 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.

They are explained below.

**Roadside Fixed Objects**

This database would include an inventory of fixed objects on the roadside – both roadside hardware such as barriers 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 1.0 of MIRE has not detailed the list of objects needed, leaving that to future versions. However, the needed elements would be those that can cause harm to vehicle occupants in a collision (e.g., trees trunks over 4” in diameter but not small shrubs). The minimum needed characteristics would include the address 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).

This inventory will require effort and resources. However, it is not without precedent. The Washington State DOT is currently involved in a roadside inventory effort which is collecting data on over 35 objects including guardrail, mailboxes, trees, utility poles, sign supports, crash cushions and rock outcroppings. Sideslopes are being estimated by the data collectors. The data are being captured in a spatial database that will allow linkage to the roadway centerline and calculation of the distance-from-edgeline for each object. Currently, their district-based teams have completed collection of data for approximately 2,200 miles of roads, collecting information on over 300,000 objects. (See [http://www.wsdot.wa.gov/mapsdata/tdo/rfip/RFIP_Resources.htm](http://www.wsdot.wa.gov/mapsdata/tdo/rfip/RFIP_Resources.htm).)

**Signs**

This database would include an inventory of all signs on the roadway. Descriptors would include at least sign type (MUTCD 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 Version 1.0 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.

Specific topics related to the future of speed data collection were identified at the Speed Monitoring Data Collection Summit held in 2009, sponsored by FHWA Office of Policy and Management, including the need for additional speed data collection sites within each State. There is an interest in standardizing speed data collection procedures and developing a national speed database. Once this database is in place, it will be relatively easy to link these data with the MIRE elements.

Automated Enforcement Devices

MIRE Version 1.0 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) have been shown to be effective treatments and 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 version of IHSDM and 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 Version 1.0 as individual elements, the 2010 version of IHSDM and the HSM require 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 and Railroad Grade-Crossing Descriptors

Bridge and railroad grade-crossing data are already collected on a regular basis by State DOTs. The bridge data are submitted to FHWA for the National Bridge Inventory (NBI) (8) and the railroad grade crossing data to the Federal Railroad Administration (FRA) (9). There are numerous safety-related elements in each file.

Just as for other supplemental files, critical to use of these elements in safety decisions is 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 “address” of the bridge or grade crossing (e.g., route/milepost, spatial coordinates) could be entered on the State’s bridge and grade crossing files using the same address system as in the basic inventory files. Second, linkage elements on these two files (e.g., bridge number, 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, the MIRE junction file includes the grade crossing number as a key attribute (see Element 128). Linkage of the NBI data to the MIRE segment file could be accomplished with a supplemental file which includes the current address for each bridge number. (It is noted that if a route/milepost address system is used, the bridge address 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.)

Safety Improvements Information

Supplemental data are also needed on an agency’s safety projects (i.e. a safety project history file). This file would document for each safety project conducted what was done (i.e., the details of the safety improvement), where it was done (i.e., the linear referencing system (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). Somewhat surprisingly, 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.
Summary

As described above, safety inventory information is critical to sound safety decisions. MIRE Version 1.0 is designed to enumerate, prioritize and provide proposed attributes of the large number of inventory elements either currently used by State and local DOTs in their safety analyses or needed in new safety-analysis tools now available or being developed. This report provides this listing of elements in the following sections. The goal of this report is to establish MIRE Version 1.0 and to begin its voluntary adoption by State and local DOTs. It is expected that this will be modified through use and that subsequent versions will follow. As noted in the initial MIRE report (5), the adoption of MIRE by a State or local agency will not be easy – it will require commitment, adequate resources, and a staging plan. However, the results of this effort will be the foundation for one of the most important tasks conducted by any transportation agency – the development and use of a safety management system that reduces the crashes, deaths and injuries involving the agency’s primary customer, the road user.
MIRE Elements

This section presents a listing of the MIRE elements. The elements are broken down into three main sections: I. Roadway Segment Descriptors, II. Roadway Alignment Descriptors and III. Roadway Junction Descriptors. At the beginning of each section is a listing of the elements in that section, followed by detailed information for each element. Appendix A shows an alphabetical listing of the 202 MIRE elements and their corresponding page number.

I. Roadway Segment Descriptors

I.a. Segment Location/Linkage Elements
   1. County Name
   2. County Code
   3. Highway District
   4. Type of Governmental Ownership
   5. Specific Governmental Ownership
   6. City/Local Jurisdiction Name
   7. City/Local Jurisdiction Urban Code
   8. Route Number
   9. Route/Street Name
   10. Begin Point Segment Descriptor
   11. End point Segment Descriptor
   12. Segment Identifier
   13. Segment Length
   14. Route Signing
   15. Route Signing Qualifier
   16. Coinciding Route Indicator
   17. Coinciding Route – Minor Route Information
   18. Direction of Inventory

I.b. Segment Classification
   19. Functional Class
   20. Rural/Urban Designation
   21. Federal Aid/Route Type
   22. Access Control
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<th>Description</th>
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<td>Segment Cross Section</td>
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<td>Surface Type</td>
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<td>Total Paved Surface Width</td>
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<td>Surface Friction</td>
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<tr>
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<td>Surface Friction Date</td>
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<td>27</td>
<td>Pavement Roughness/Condition</td>
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<tr>
<td>28</td>
<td>Pavement Roughness Date</td>
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<td>Pavement Condition (PSR) Date</td>
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<td>31</td>
<td>Number of Through Lanes</td>
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<td>Auxiliary Lane Presence/Type</td>
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<td>Auxiliary Lane Length</td>
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<td>Number of Peak Period Through Lanes</td>
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<td>Right Shoulder Type</td>
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<td>Right Shoulder Total Width</td>
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<td>Right Paved Shoulder Width</td>
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<td>Right Shoulder Rumble Strip Presence/Type</td>
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<td>Left Shoulder Type</td>
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<td>Left Shoulder Total Width</td>
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<td>Left Paved Shoulder Width</td>
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<td>Left Shoulder Rumble Strip Presence/Type</td>
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<td>Sidewalk Presence</td>
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<td>Curb Presence</td>
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<td>53</td>
<td>Curb Type</td>
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54. Median Type
55. Median Width
56. Median Barrier Presence/Type
57. Median (Inner) Paved Shoulder Width
58. Median Shoulder Rumble Strip Presence/Type
59. Median Sideslope
60. Median Sideslope Width
61. Median Crossover/Left Turn Lane Type

I.d. Segment Roadside Descriptors
62. Roadside Clearzone Width
63. Right Sideslope
64. Right Sideslope Width
65. Left Sideslope
66. Left Sideslope Width
67. Roadside Rating
68. Major Commercial Driveway Count
69. Minor Commercial Driveway Count
70. Major Residential Driveway Count
71. Minor Residential Driveway Count
72. Major Industrial/Institutional Driveway Count
73. Minor Industrial/Institutional Driveway Count
74. Other Driveway Count

I.e. Other Segment Descriptors
75. Terrain Type
76. Number of Signalized Intersections in Segment
77. Number of Stop-Controlled Intersections in Segment
78. Number of Uncontrolled/Other Intersections in Segment

I.f. Segment Traffic Flow Data
79. Annual Average Daily Traffic (AADT)
80. AADT Year
81. AADT Annual Escalation Percentage
82. Percent Single Unit Trucks or Single Truck AADT  
83. Percent Combination Trucks or Combination Truck AADT  
84. Percentage Trucks or Truck AADT  
85. Total Daily Two-Way Pedestrian Count/Exposure  
86. Bicycle Count/Exposure  
87. Motorcycle Count or Percentage  
88. Hourly Traffic Volumes (or Peak and Offpeak AADT)  
89. K-Factor  
90. Directional Factor  

I.g. Segment Traffic Operations/Control Data  
91. One/Two-Way Operations  
92. Speed Limit  
93. Truck Speed Limit  
94. Nighttime Speed Limit  
95. 85th Percentile Speed  
96. Mean Speed  
97. School Zone Indicator  
98. On-Street Parking Presence  
99. On-Street Parking Type  
100. Roadway Lighting  
101. Toll Facility  
102. Edgeline Presence/Width  
103. Centerline Presence/Width  
104. Centerline Rumble Strip Presence/Type  
105. Passing Zone Percentage  

I.h. Other Supplemental Segment Descriptors  
106. Bridge Numbers for Bridges in Segment
I. Roadway Segment Descriptors

I.a. Segment Location/Linkage Elements

1. County Name

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

Attributes:
   - County name or equivalent entity name.

Priority: Critical

HPMS/Tool Requirements: HPMS (Full Extent), HSM/IHSDM (Required), SafetyAnalyst (Required Conditionally)

2. County Code

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

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.

Priority: Critical

HPMS/Tool Requirements: HPMS (Full Extent)

3. Highway District

Definition: The highway district where the segment is located.

Attributes:
   - Numeric district number (as defined by the state).

Priority: Critical

HPMS/Tool Requirements: SafetyAnalyst (Optional)
4. **Type of Governmental Ownership**

**Definition:** Type of governmental ownership.

**Attributes:**
- State Highway Agency
- County Highway Agency
- Town or Township Highway Agency
- City or Municipal Highway Agency
- State Park, Forest, or Reservation Agency
- Local Park, Forest, or Reservation Agency
- Other State Agency
- Other Local Agency
- Private (other than Railroad)
- Railroad
- State Toll Authority
- Local Toll Authority
- Other Public Instrumentality (e.g. Airport, School, University)
- Indian Tribe Nation
- Other Federal Agency
- Bureau of Indian Affairs
- Bureau of Fish and Wildlife
- U.S. Forest Service
- National Park Service
- Tennessee Valley Authority
- Bureau of Land Management
- Bureau of Reclamation
- Corps of Engineers
- Air Force
- Navy/Marines
- Army
- Other

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent)
5. **Specific Governmental Ownership**

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

**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](http://www.gsa.gov/portal/content/104507). If state-assigned codes are used, they should be convertible to the GSA/FIPS format.

**Priority:** Critical

**HPMS/Tool Requirements:** None

6. **City/Local Jurisdiction Name**

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

**Attributes:**
- The city name or equivalent entity (e.g., tribal jurisdiction).

**Priority:** Critical

**HPMS/Tool Requirements:** SafetyAnalyst (Optional)

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.

**Attributes:**
- The Census urban code.

Note: See Census Website: [http://www.census.gov/geo/www/ua/ua_2k.html](http://www.census.gov/geo/www/ua/ua_2k.html).

**Priority:** Critical

**HPMS/Tool Requirements:** None
8. Route Number

**Definition:** The signed route number.

**Attributes:**
- Signed numeric value for the roadway segment.

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

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent), HSM/IHSDM (Required), SafetyAnalyst (Required)

9. Route/Street Name

**Definition:** The route or street name, where different from route number (Element 8).

**Attributes:**
- The alphanumeric route or street name.

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent), SafetyAnalyst (Required Conditionally)

10. Begin Point Segment Descriptor

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

**Attributes:**
- Begin point will be defined by the user agency (e.g., based on homogeneity of chosen attributes throughout the segment). Begin point segment descriptors can be either related 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.

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent), HSM/IHSDM (Required), SafetyAnalyst (Required)
11. End Point Segment Descriptor

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

**Attributes:**
- End point will be defined by the user agency (e.g., based on homogeneity of chosen attributes throughout the segment). End point segment descriptors can be either related 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.

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent), HSM/IHSDM (Required), Safety Analyst (Required)

12. Segment Identifier

**Definition:** Unique segment identifier

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

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent), HSM/IHSDM (Required), Safety Analyst (Required)

13. Segment Length

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

**Attributes:**
- Miles

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent), HSM/IHSDM (Required), Safety Analyst (Required)
14. Route Signing

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

**Attributes:**
- Not signed
- Interstate
- U.S.
- State
- Off-interstate business marker
- County
- Township
- Municipal
- Parkway marker or forest route marker
- None of the above

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent), SafetyAnalyst (Required)

15. Route Signing Qualifier

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

**Attributes:**
- No qualifier or not signed
- Alternate
- Business route
- Bypass
- Spur
- Loop
- Proposed
- Temporary
- Truck route
- None of the above

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent)
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.)

**Attributes:**
- Segment does not contain coinciding routes.
- Coinciding route – Primary (i.e., crashes linked to this route and attributes included for segment).
- Coinciding route – Minor (i.e., crashes not linked to this route).

**Priority:** Critical

**HPMS/Tool Requirements:** None

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.

**Attributes:**
- Signed coinciding minor route number.

**Priority:** Value Added

**HPMS/Tool Requirements:** SafetyAnalyst (Required)
18. **Direction of Inventory**

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

**Attributes:**
- Reference compass direction if divided roads are inventoried in each direction usually due to different characteristics on each roadway.
- Both if inventoried in only one direction.

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Required Conditionally)
1.9. Segment Classification

19. Functional Class

**Definition:** The functional class of the segment.

**Attributes:**
- Interstate
- Principal arterial other freeways and expressways
- Principal arterial other
- Minor arterial
- Major collector
- Minor collector
- Local

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent and Ramps), HSM/IHSDM (Required), SafetyAnalyst (Required)

20. Rural/Urban Designation

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

**Attributes:**
- Rural
- Urban (population ≥ 5,000)

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent and Ramps), HSM/IHSDM (Required), SafetyAnalyst (Required)
21. Federal Aid/Route Type

**Definition:** Federal-aid/National Highway System (NHS) route type.

**Attributes:**
- Route is non Federal-aid
- Route is Federal-aid, but not on 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)
- Route is on NHS
- NHS connector to Major Airport
- NHS connector to Major Port Facility
- NHS connector to Major Amtrak Station
- NHS connector to Major Rail/Truck Terminal
- NHS connector to Major Inter City Bus Terminal
- NHS connector to Major Public Transportation or Multi-Modal Passenger Terminal
- NHS connector to Major Pipeline Terminal
- NHS connector to Major Ferry Terminal

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent and Ramps)
22. Access Control

**Definition:** The degree of access control.

**Attributes:**

- **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).

- **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.

- **No access control** - No degree of access control exists (i.e., full access to the facility is permitted).

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent and Ramps*, Sample*), SafetyAnalyst (Required)
I.c. Segment Cross Section

I.c.1. Surface Descriptors

23. Surface Type

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

**Attributes:**
- Unpaved
- Bituminous
- JPCP – Jointed Plain Concrete Pavement
- JRCP – Jointed Reinforced Concrete Pavement
- CRCP – Continuously Reinforced Concrete Pavement
- Asphalt-Concrete (AC) Overlay over Existing AC Pavement
- AC Overlay over Existing Jointed Concrete Pavement
- AC (Bi Overlay over Existing CRCP)
- Unbonded Jointed Concrete Overlay on Portland Cement Concrete (PCC) Pavements
- Unbonded CRCP Overlay on PCC Pavements
- Bonded PCC Overlays on PCC Pavements
- Other

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Sample), HSM/IHSDM (Required)

24. 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.

**Attributes:**
- Feet

**Priority:** Critical

**HPMS/Tool Requirements:** None
25. Surface Friction

Definition: The surface friction indicator for the segment.

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.

Priority: Critical

HPMS/Tool Requirements: None

26. Surface Friction Date

Definition: Date surface friction was last measured or assigned.

Attributes:
- mm/dd/yyyy

Priority: Critical

HPMS/Tool Requirements: None

27. Pavement Roughness/Condition

Definition: The numeric value used to indicate pavement roughness.

Attributes:
- International Roughness Index (IRI), reported as an integer to the nearest inch per mile.

Priority: Value Added Preferred

HPMS/Tool Requirements: HPMS (Full Extent and Ramps*, Sample*)
28. Pavement Roughness Date

Definition: Date pavement roughness (IRI) was collected.

Attributes:
- mm/dd/yyyy

Priority: Value Added Preferred

HPMS/Tool Requirements: HPMS (Full Extent and Ramps*, Sample*)
**29. Pavement Condition (Present Serviceability Rating)**

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

**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.
  - 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.
  - 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.
  - 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.
  - 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.
  - 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.

**Priority:** Value Added Alternative

**HPMS/Tool Requirements:** HPMS (Sample)
30. *Pavement Condition (PSR) Date*

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

**Attributes:**
- mm/dd/yyyy

**Priority:** Value Added Alternative

**HPMS/Tool Requirements:** HPMS (Sample)
I.c.2. Lane Descriptors

31. **Number of Through Lanes**

**Definition:** The total number of through lanes on the segment. This excludes auxiliary lanes, such as collector-distributor lanes, weaving lanes, frontage road lanes, parking and turning lanes, acceleration/deceleration lanes, toll collection lanes, shoulders, and truck climbing lanes.

**Attributes:**
- Numeric

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent and Ramps), HSM/IHSDM (Required), SafetyAnalyst (Required)

32. **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.

**Attributes:**
- Feet

See Figures 1a-1c depending on number of lanes and direction of inventory.

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Optional)
33. Inside Through Lane Width

Definition: Predominant lane width of all inside through lanes, not including outside through lane (see Element 32. Outside Through Lane Width). For a two-lane road, leave this element blank.

Attributes:
- Feet

See Figures 1b-1c depending on number of lanes and direction of inventory.

Priority: Critical

HPMS/Tool Requirements: HSM/IHSDM (Required), SafetyAnalyst (Optional)
Figure 1a. Illustration of Cross Section, Two-Lane Roadway.
Figure 1b. Illustration of Cross Section, Multilane Divided Roadway Inventoried in Two Directions (each direction inventoried separately).
Figure 1.c. Illustration of Cross Section, Multilane Divided Roadway Inventoried in One Direction (both directions inventoried together).
34. 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.

**Attributes:**  
- Sign (+ or -) and percent

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required)

35. 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 54. *Median Type* and Elements 37. *HOV Lane Types* and 38. *HOV Lanes* respectively.

**Attributes:**  
- Climbing lane  
- Passing lane  
- Exclusive continuous right turn lane  
- Other

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Required)

36. Auxiliary Lane Length

**Definition:** Length of auxiliary lane (noted in Element 35. *Auxiliary Lane Presence/Type*) if not full segment length. Length does not include taper.

**Attributes:**  
- Feet

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required)
37. **HOV Lane Presence/Type**

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

**Attributes:**
- No HOV lanes
- Has exclusive HOV lanes
- Normal through lanes used as HOV at specified times
- Shoulder/parking lanes used as HOV at specified times

**Priority:** Value Added

**HPMS/Tool Requirements:** HPMS (Full Extent)

38. **HOV Lanes**

**Definition:** The maximum number of HOV lanes in both directions on the segment.

**Attributes:**
- Numeric

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent)

39. **Reversible Lanes**

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

**Attributes:**
- No reversible lanes
- One reversible lane
- Two reversible lanes
- More than two reversible lanes

**Priority:** Value Added

**HPMS/Tool Requirements:** None
40. **Presence/Type of Bicycle Facility**

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

**Attributes:**
- None
- Wide curb lane with no bicycle markings
- Wide curb lane with bicycle markings (e.g., sharrows)
- Marked bicycle lane
- Separate parallel bicycle path
- Signed bicycle route only (no designated bicycle facility)
- Other

See Figure 2 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** SafetyAnalyst (Optional)
Figure 2. Illustration of Presence/Types of Bicycle Facilities.

41. **Width of Bicycle Facility**

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

**Attributes:**
- Feet

**Priority:** Critical

**HPMS/Tool Requirements:** None

42. **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.

**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.

**Priority:** Value Added

**HPMS/Tool Requirements:** HPMS (Sample)
I.c.3. Shoulder Descriptors

43. Right Shoulder Type

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

**Attributes:**
- None
- Surfaced shoulder exists - bituminous concrete (AC)
- Surfaced shoulder exists - Portland Cement Concrete surface (PCC)
- Stabilized shoulder exists (stabilized gravel or other granular material with or without admixture)
- 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)
- Earth shoulder exists

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Sample), HSM/IHSDM (Required), SafetyAnalyst (Optional)

44. 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.

**Attributes:**
- Feet

See Figures 1a-1c on pages 33-35 depending on number of lanes and direction of inventory.

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Sample), HSM/IHSDM (Required), SafetyAnalyst (Optional)
45. 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.

**Attributes:**
- Feet

See Figures 1a-1c on pages 33-35 depending on number of lanes and direction of inventory.

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required)

46. Right Shoulder Rumble Strip Presence/Type

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

**Attributes:**
- None
- Milled beyond edgeline
- Rolled beyond edgeline
- Milled or rolled on/under edgeline (e.g., rumble stripes)
- Edgeline-rumble strip combination (e.g., raised/inverted thermoplastic profile marker)

**Priority:** Critical

**HPMS/Tool Requirements:** None
47. **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 49. *Left Paved Shoulder Width*).

**Attributes:**
- None
- Surfaced shoulder exists - bituminous concrete (AC)
- Surfaced shoulder exists - Portland Cement Concrete surface (PCC)
- Stabilized shoulder exists (stabilized gravel or other granular material with or without admixture)
- 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)
- Earth shoulder exists

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Optional)

48. **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 47. *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.

**Attributes:**
- Feet

See Figures 1a-1c on pages 33-35 depending on number of lanes and direction of inventory.

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Sample), HSM/IHSDM (Required), SafetyAnalyst (Optional)
49. **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.

**Attributes:**
- Feet

See Figures 1a-1c on pages 33-35 depending on number of lanes and direction of inventory.

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required)

50. **Left Shoulder Rumble Strip Presence And Type**

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

**Attributes:**
- None
- Milled beyond edgeline
- Rolled beyond edgeline
- Milled or rolled on/under edgeline (e.g., rumble stripes)
- Edgeline-rumble strip combination (e.g., raised/inverted thermoplastic profile marker)

**Priority:** Critical

**HPMS/Tool Requirements:** None
51. Sidewalk Presence

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

**Attributes:**
- None
- Continuous left-side
- Discontinuous left-side
- Continuous right-side
- Discontinuous right-side
- Continuous both sides
- Discontinuous both sides

**Priority:** Critical

**HPMS/Tool Requirements:** None

52. Curb Presence

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

**Attributes:**
- No curb
- Curb on left
- Curb on right
- Curb on both sides

**Priority:** Critical

**HPMS/Tool Requirements:** None
53. Curb Type

Definition: The type of curb present on the segment.

Attributes:
- No curb
- 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).
- Vertical (barrier) curb - A curb that is steeper or taller than the ranges given for a sloping curb.

Priority: Value Added

HPMS/Tool Requirements: None
I.c.4. Median Descriptors

54. Median Type

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

**Attributes:**
- Undivided
- Flush paved median (at least 4 ft in width)
- Raised median
- Depressed median
- Two-way left turn lane
- Railroad or rapid transit
- Divided, separate grades without retaining wall
- Divided, separate grades with retaining wall
- Other divided

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Sample), HSM/IHSDM (Required), SafetyAnalyst (Required)

55. 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).

**Attributes:**
- Feet

See Figures 1b-1c on pages 34-35 depending on number of lanes and direction of inventory.

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Sample), HSM/IHSDM (Required), SafetyAnalyst (Optional)
56. **Median Barrier Presence/Type**

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

**Attributes:**
- None
- Unprotected
- Curbed
- Rigid barrier system (i.e., concrete)
- Semi-rigid barrier system (i.e., box beam, W-beam strong post, etc.)
- Flexible barrier system (i.e., cable, W-beam weak post, etc.)
- Rigidity unspecified

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Sample)

57. **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 in section I.c.3. Shoulder Descriptors (See Element 47. *Left Shoulder Type*). If the roadway is divided AND inventoried in two directions, this is already captured under Element 49. *Left Shoulder Paved Width*.

**Attributes:**
- Feet

See Figure 1c on page 35 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** SafetyAnalyst (Optional)
58. 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 50. *Left Shoulder Rumble Strip Presence/Type.*

Attributes:
- None
- Milled beyond edgeline
- Rolled beyond edgeline
- Milled or rolled on/under edgeline (e.g., rumble stripes)
- Edgeline-rumble strip combination (e.g., raised/inverted thermoplastic profile marker)

Priority: Critical

HPMS/Tool Requirements: None

59. 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 65. *Left Sideslope.*

Attributes:
- Numeric percent of the sideslope

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

Priority: Critical Preferred

HPMS/Tool Requirements: None
60. 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 66. *Left Sideslope Width.*

**Attributes:**
- Feet

See Figure 1c on page 35 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** None

61. 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.

**Attributes:**
- None
- Median crossover, no left turn bay
- Median crossover, left turn bay
- Median crossover, directional left turn lane bays (to prevent crossing traffic from driveways)
- Two-way left turn lane

See Figure 3 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** None
Figure 3. Illustration of Types of Median Crossover/Left Turn Lanes.
I.d. Segment Roadside Descriptors

62. Roadside Clearzone Width

**Definition:** Predominate or average roadside clearzone width. Clear zone 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.

**Attributes:**
- Feet

**Priority:** Critical Preferred

**HPMS/Tool Requirements:** None

63. 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 predominant sideslope.

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

**Priority:** Critical Preferred

**HPMS/Tool Requirements:** HSM/IHSDM (Required)
64. **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.

**Attributes:**
- Feet

See Figures 1a-1c on pages 33-35 depending on number of lanes and direction of inventory.

**Priority:** Critical Preferred

**HPMS/Tool Requirements:** None

65. **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.

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

**Priority:** Critical Preferred

**HPMS/Tool Requirements:** HSM/IHSDM (Required)
66. **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.

**Attributes:**
- Feet

See Figures 1a-1c on pages 33-35 depending on number of lanes and direction of inventory.

**Priority:** Critical Preferred

**HPMS/Tool Requirements:** None
67. Roadside Rating

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

Attributes:

- **Rating = 1**
  - Wide clear zones greater than or equal to 30 ft from the pavement edgeline.
  - Sideslope flatter than 1:4.
  - Recoverable.

- **Rating = 2**
  - Clear zone between 20 and 25 ft from pavement edgeline.
  - Sideslope about 1:4.
  - Recoverable.

- **Rating = 3**
  - Clear zone about 10 ft from pavement edgeline.
  - Sideslope about 1:3 or 1:4.
  - Rough roadside surface.
  - Marginally recoverable.

- **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.

- **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.

- **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.
**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 4 for additional detail.

**Priority:** Critical Alternative

**HPMS/Tool Requirements:** HSM/IHSDM (Required)
Figure 4. Illustration of Roadside Ratings.
Figure 4. 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.
68. **Major Commercial Driveway Count**

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

**Attributes:**
- Numeric

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Optional)

69. **Minor Commercial Driveway Count**

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

**Attributes:**
- Numeric

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Optional)

70. **Major Residential Driveway Count**

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

**Attributes:**
- Numeric

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Optional)
71. Minor Residential Driveway Count

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

**Attributes:**
- Numeric

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Optional)

72. Major Industrial/Institutional Driveway Count

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

**Attributes:**
- Numeric

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Optional)

73. Minor Industrial/Institutional Driveway Count

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

**Attributes:**
- Numeric

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Optional)
74. **Other Driveway Count**

**Definition:** Count of “other” driveways in segment.

**Attributes:**
- Numeric

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Optional)
I.e. Other Segment Descriptors

75. 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.

**Attributes:**
- Mountainous - Any combination of grades and horizontal or vertical alignment that causes heavy vehicles to operate at crawl speeds for significant distances or at frequent intervals.
- 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.
- 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.

**Priority:** Critical Alternative

**HPMS/Tool Requirements:** HPMS (Sample), SafetyAnalyst (Optional)

76. 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.

**Attributes:**
- Numeric

**Priority:** Critical (only if no intersection file exists; can be derived if intersection file exists)

**HPMS/Tool Requirements:** HPMS (Sample)
77. **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.

**Attributes:**
- Numeric

**Priority:** Critical (only if no intersection exists; can be derived if intersection file exists)

**HPMS/Tool Requirements:** HPMS (Sample)

78. **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.

**Attributes:**
- Numeric

**Priority:** Critical (only if no intersection file exists; can be derived if intersection file exists)

**HPMS/Tool Requirements:** HPMS (Sample)
I. Segment Traffic Flow Data

79. Annual Average Daily Traffic (AADT)

**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.

**Attributes:**
- Vehicles per day

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent and Ramps), HSM/IHSDM (Required), SafetyAnalyst (Required)

80. AADT Year

**Definition:** Year of AADT.

**Attributes:**
- Year

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent and Ramps), HSM/IHSDM (Required), SafetyAnalyst (Required)
81. **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.

**Attributes:**
- Percent

**Priority:** Value Added

**HPMS/Tool Requirements:** SafetyAnalyst (Optional)

82. **Percent Single Unit Trucks Or Single Truck AADT**

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

**Attributes:**
- Percent or numeric count

**Priority:** Critical Preferred

**HPMS/Tool Requirements:** HPMS (Full Extent and Ramps*, Sample*)

83. **Percent Combination Trucks Or Combination Truck AADT**

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

**Attributes:**
- Percent or numeric count

**Priority:** Critical Preferred

**HPMS/Tool Requirements:** HPMS (Full Extent and Ramps*, Sample*)
84. 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 82. Percent Single Unit Trucks Or Single Truck AADT and Element 83. Percent Combination Trucks Or Combination Truck AADT are captured.

**Attributes:**
- Percent or numeric count

**Priority:** Critical Alternative

**HPMS/Tool Requirements:** SafetyAnalyst (Optional)

85. 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.

**Attributes:**
- Average daily count (numeric)

**Priority:** Value Added (Collect only if crossing counts are unavailable for intersection/ junction approaches.)

**HPMS/Tool Requirements:** None

86. Bicycle Count/Exposure

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

**Attributes:**
- Average daily count (numeric)

**Priority:** Value Added

**HPMS/Tool Requirements:** None
87. Motorcycle Count/ Percentage

Definition: Motorcycle daily count or percentage of AADT.

Attributes:
- Percent or numeric count

Priority: Critical

HPMS/Tool Requirements: HPMS (Full Extent)

88. Hourly Traffic Volumes (Or Peak And Offpeak AADT)

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

Attributes:
- Numeric count

Priority: Value Added

HPMS/Tool Requirements: SafetyAnalyst (Optional)

89. 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.

Attributes:
- Percent

Priority: Value Added

HPMS/Tool Requirements: HPMS (Sample)
90. Directional Factor

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

**Attributes:**
- Numeric

**Priority:** Value Added

**HPMS/Tool Requirements:** HPMS (Sample)
I.g. Segment Traffic Operations/Control Data

91. One/Two-Way Operations

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

Attributes:
- One-way
- Two-way
- One direction of travel for divided roadways

Priority: Critical

HPMS/Tool Requirements: HPMS (Full Extent and Ramps), HSM/IHSDM (Required), SafetyAnalyst (Required)

92. Speed Limit

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

Attributes:
- mph
- No posted or legally mandated speed limit

Priority: Critical

HPMS/Tool Requirements: HPMS (Sample), HSM/IHSDM (Required), SafetyAnalyst (Optional)
93. **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).

**Attributes:**
- mph

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

**Priority:** Value Added

**HPMS/Tool Requirements:** None

94. **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).

**Attributes:**
- mph

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

**Priority:** Value Added

**HPMS/Tool Requirements:** None

95. **85th Percentile Speed**

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

**Attributes:**
- mph

**Priority:** Value Added (Difficult to collect for all sections; see discussion in Introduction)

**HPMS/Tool Requirements:** None
96. **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).

**Attributes:**
- mph

**Priority:** Value added (Difficult to collect for all sections; see discussion in Introduction)

**HPMS/Tool Requirements:** None

97. **School Zone Indicator**

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

**Attributes:**
- Yes
- No

**Priority:** Critical

**HPMS/Tool Requirements:** None

98. **On-Street Parking Presence**

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

**Attributes:**
- Permitted 24 hrs/day
- Prohibited 24 hrs/day
- Permitted during specified times

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required)
99. **On-Street Parking Type**

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

**Attributes:**
- No parking allowed or none available
- Head-in/back-out angle parking on one side
- Head-in/back-out angle parking on both sides
- Back-in/head-out angle parking on one side
- Back-in/head-out angle parking on both sides
- Parallel parking on one side
- Parallel parking on both sides

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Sample), HSM/IHSDM (Required)

100. **Roadway Lighting**

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

**Attributes:**
- None
- Spot on one side
- Spot on both sides
- Continuous on one side
- Continuous on both sides

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required)
101. Toll Facility

**Definition:** Presence and typed of toll facility on the segment.

**Attributes:**
- No toll
- Toll paid in one direction only, non-high-occupancy toll (non-HOT) lanes
- Toll paid in both directions, non-HOT lanes
- Toll paid in one direction, HOT lanes
- Toll paid in both directions, HOT lanes

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Full Extent)

102. Edgeline Presence/Width

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

**Attributes:**
- No marked edgeline
- 4 inch marked edgeline
- 6 inch marked edgeline
- 8 inch marked edgeline
- Greater than 8 inch marked edgeline

**Priority:** Critical

**HPMS/Tool Requirements:** None
103. Centerline Presence/Width

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

**Attributes:**
- No marked centerline
- 4 inch marked centerline
- 6 inch marked centerline
- 8 inch marked centerline
- Greater than 8 inch marked centerline

**Priority:** Critical

**HPMS/Tool Requirements:** None

104. Centerline Rumble Strip Presence/Type

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

**Attributes:**
- None
- Milled adjacent to centerline
- Rolled adjacent to centerline
- Milled or rolled on/under centerline (e.g., rumble stripes)
- Centerline-rumble strip combination (e.g., raised/inverted thermoplastic profile marker)

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required)
105. Passing Zone Percentage

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

**Attributes:**
- Percent

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

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required)
I.h. Other Supplemental Segment Descriptors

106. Bridge Numbers For Bridges In Segment

Definition: Bridge numbers from bridge file for bridges in segment (See discussion in Introduction).

Attributes:
- Bridge number for each bridge in the segment.

Priority: Critical (unless addresses in Bridge File provide linkage to other inventory files – See discussion in Introduction)

HPMS/Tool Requirements: None
II. Roadway Alignment Descriptors

II.a. Horizontal Curve Data

107. Curve Identifiers and Linkage Elements
108. Curve Feature Type
109. Horizontal Curve Degree or Radius
110. Horizontal Curve Length
111. Curve Superelevation
112. Horizontal Transition/Spiral Curve Presence
113. Horizontal Curve Intersection/Deflection Angle
114. Horizontal Curve Direction

II.b. Vertical Grade Data

115. Grade Identifiers and Linkage Elements
116. Vertical Alignment Feature Type
117. Percent of Gradient
118. Grade Length
119. Vertical Curve Length
II. ROADWAY ALIGNMENT DESCRIPTORS

II.a. Horizontal Curve Data

107. Curve Identifiers And Linkage Elements

Definition: All elements needed to define location of each curve record and all elements necessary to link with other safety files.

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.

Priority: Critical

HPMS/Tool Requirements: HSM/IHSDM (Required)

108. Curve Feature Type

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

Attributes:
- Horizontal angle point (i.e., joining of two tangents without a horizontal curve)
- Independent horizontal curve
- Component of compound curve (i.e., one curve in compound curve)
- Component of reverse curve (i.e., one curve in a reverse curve)

See Figure 5 for additional detail.

Priority: Critical

HPMS/Tool Requirements: HSM/IHSDM (Required)
Figure 5. Illustration of Types of Curve Features.
109. **Horizontal Curve Degree or Radius**

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

**Attributes:**
- Numeric, feet if radius

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Sample*), HSM/IHSDM (Required)

110. **Horizontal Curve Length**

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

**Attributes:**
- Feet

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required)

111. **Curve Superelevation**

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

**Attributes:**
- Rate/percent

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required)
112. Horizontal Transition/Spiral Curve Presence

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

**Attributes:**
- No transition
- Spiral transition
- Other transition

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required)

113. 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.

**Attributes:**
- Degrees (absolute value)

**Priority:** Critical (only for Horizontal Angle Points)

**HPMS/Tool Requirements:** None

114. Horizontal Curve Direction

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

**Attributes:**
- Right
- Left

**Priority:** Critical

**HPMS/Tool Requirements:** None
II.b. Vertical Grade Data

115. 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.

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.

Priority: Critical

HPMS/Tool Requirements: HSM/IHSDM (Required)

116. Vertical Alignment Feature Type

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

Attributes:
- Vertical angle point (i.e., joining of two vertical gradients without a verticle curve)
- Vertical gradient
- Sag vertical curve (i.e., vertical curve that connects a segment of roadway with a segment of roadway that has a more positive grade)
- Crest vertical curve (i.e., vertical curve that connects a segment of roadway with a segment of roadway that has a more negative grade)

Priority: Critical

HPMS/Tool Requirements: HSM/IHSDM (Required)
117. Percent of Gradient

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

**Attributes:**
- Percent

**Priority:** Critical

**HPMS/Tool Requirements:** HPMS (Sample*), HSM/IHSDM (Required)

118. Grade Length

**Definition:** Grade length if 116. *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.

**Attributes:**
- Feet

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required)

119. Vertical Curve Length

**Definition:** Vertical curve length if 116. *Vertical Alignment Feature Type* is “Sag vertical curve” or Crest vertical curve.”

**Attributes:**
- Feet

**Priority:** Critical

**HPMS/Tool Requirements:** None
III. Roadway Junction Descriptors

III.a. At-Grade Intersection/Junctions

*General Descriptors*

120. Unique Junction Identifier

121. Type of Intersection/Junction

122. Location Identifier for Road 1 Crossing Point

123. Location Identifier for Road 2 Crossing Point

124. Location Identifier for Additional Road Crossing Points

125. Intersection/Junction Number of Legs

126. Intersection/Junction Geometry

127. School Zone Indicator

128. Railroad Crossing Number

129. Intersecting Angle

130. Intersection/Junction Offset Distance

131. Intersection/Junction Traffic Control

132. Signalization Presence/Type

133. Intersection/Junction Lighting

134. Circular Intersection - Number of Circulatory Lanes

135. Circular Intersection - Circulatory Lane Width

136. Circular Intersection - Inscribed Diameter

137. Circular Intersection - Bicycle Facility

*Approach Descriptors (Each Approach)*

138. Intersection Identifier for this Approach

139. Unique Approach Identifier

140. Approach AADT

141. Approach AADT Year
142. Approach Mode
143. Approach Directional Flow
144. Number of Approach Through Lanes
145. Left Turn Lane Type
146. Number of Exclusive Left Turn Lanes
147. Amount of Left turn Lane Offset
148. Right Turn Channelization
149. Traffic Control of Exclusive Right Turn Lanes
150. Number of Exclusive Right Turn Lanes
151. Length of Exclusive Left Turn Lanes
152. Length of Exclusive Right Turn Lanes
153. Median Type at Intersection
154. Approach Traffic Control
155. Approach Left Turn Protection
156. Signal Progression
157. Crosswalk Presence/Type
158. Pedestrian Signalization Type
159. Pedestrian Signal Special Features
160. Crossing Pedestrian Count/Exposure
161. Left/Right Turn Prohibitions
162. Right Turn-On-Red Prohibitions
163. Left Turn Counts/Percent
164. Year of Left Turn Counts/Percent
165. Right Turn Counts/Percent
166. Year of Right Turn Counts/Percent
167. Transverse Rumble Strip Presence
168. Circular Intersection - Entry Width
169. Circular Intersection - Number of Entry Lanes
170. Circular Intersection – Presence/Type of Exclusive Right Turn Lane
171. Circular Intersection - Entry Radius
172. Circular Intersection - Exit Width
173. Circular Intersection - Number of Exit Lanes
174. Circular Intersection - Exit Radius
175. Circular Intersection - Pedestrian Facility
176. Circular Intersection - Crosswalk Location
177. Circular Intersection – Island Width

III.b. Interchange and Ramp Descriptors

178. Unique Interchange Identifier
179. Location Identifier for Road 1 Crossing Point
180. Location Identifier for Road 2 Crossing Point
181. Location Identifier for Additional Road Crossing Points
182. Interchange Type
183. Interchange Lighting
184. Interchange Entering Volume
185. Interchange Identifier for this Ramp
186. Unique Ramp Identifier
187. Ramp Length
188. Ramp Acceleration Lane Length
189. Ramp Deceleration Lane Length
190. Ramp Number of Lanes
191. Ramp AADT
192. Year of Ramp AADT
193. Ramp Metering
194. Ramp Advisory Speed Limit
195. Roadway Type at Beginning Ramp Terminal
196. Roadway Feature at Beginning Ramp Terminal
197. Location Identifier for Roadway at Beginning Ramp Terminal
198. Location of Beginning Ramp Terminal Relative to Mainline Flow
199. Roadway Type at Ending Ramp Terminal
200. Roadway Feature at Ending Ramp Terminal
201. Location Identifier for Roadway at Ending Ramp Terminal
202. Location of Ending Ramp Terminal Relative to Mainline Flow
III. Roadway Junction Descriptors

III.a. At-Grade Intersection/Junctions

III.a.1. General Descriptors

120. Unique Junction Identifier

**Definition:** A unique junction identifier.

**Attributes:**
- User defined (e.g., node number, LRS of primary route, etc.)

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Required)

121. Type of Intersection/Junction

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

**Attributes:**
- Roadway/roadway (not interchange related)
- Roadway/roadway (interchange ramp terminal)
- Roadway/pedestrian crossing (e.g., midblock crossing, pedestrian path or trail)
- Roadway/bicycle path or trail
- Roadway/railroad grade crossing
- Other

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Required)
122. Location Identifier for Road 1 Crossing Point

**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.

**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.

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Required)

123. Location Identifier for Road 2 Crossing Point

**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 122. Location Identifier For Road 1 Crossing Point. Not applicable if intersecting route is not an inventoried road (i.e., a railroad or bicycle path).

**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.

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Required Conditionally)
124. **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 122. *Location Identifier For Road 1 Crossing Point*. Not applicable if intersecting route is not an inventoried road (i.e., a railroad or bicycle path).

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

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Required Conditionally)

---

125. **Intersection/Junction Number of Legs**

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

**Attributes:**
- Numeric

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required)
126. Intersection/Junction Geometry

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

**Attributes:**
- T-Intersection
- Y-Intersection
- Cross-Intersection (four legs)
- Five or more legs and not circular
- Roundabout
- Other circular intersection (e.g., rotaries, neighborhood traffic circles)
- Non-conventional intersection (e.g. superstreet, median U-turn, displaced left turn)
- Midblock pedestrian crossing

See Figure 6 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Required)
Figure 6. Illustration of Types of Intersection/Junction Geometry.
127. School Zone Indicator

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

Attributes:
- Yes
- No

Priority: Critical

HPMS/Tool Requirements: None

128. Railroad Crossing Number

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

Attributes:
- Numeric

Priority: Critical

HPMS/Tool Requirements: None
129. 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).

**Attributes:**
- Degrees

See Figure 7 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required)

![Figure 7. Illustration of Intersecting Angle.](image-url)
130. 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.

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

See Figure 8 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** SafetyAnalyst (Optional)

---

**Figure 8. Illustration of Intersection/Junction Offset Distance.**
131. Intersection/Junction Traffic Control

Definition: Traffic control present at intersection/junction.

Attributes:
- Uncontrolled
- Two-way stop
- All-way stop
- Yield sign
- Signalized (with ped signal)
- Signalized (w/o ped signal)
- Railroad crossing, gates and flashing lights
- Railroad crossing, flashing lights only
- Railroad crossing, stop-sign controlled
- Railroad crossing, crossbucks only
- Other

Priority: Critical

HPMS/Tool Requirements: HSM/IHSDM (Required), SafetyAnalyst (Required)

132. Signalization Presence/Type

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

Attributes:
- No signal
- Uncoordinated fixed time
- Uncoordinated traffic actuated
- Progressive coordination (with several signals along either road)
- System coordination (e.g., real-time adaptive systemwide)
- Railroad crossing signal (includes signal-only and signal and gates)
- Other

Priority: Value added

HPMS/Tool Requirements: SafetyAnalyst (Required)
133. Intersection/Junction Lighting

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

**Attributes:**
- Yes
- No

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required)

134. Circular Intersection - Number of Circulatory Lanes

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

**Attributes:**
- Numeric

See Figure 9 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** None

135. 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.

**Attributes:**
- Feet

See Figure 9 for additional detail.

**Priority:** Value added

**HPMS/Tool Requirements:** None
136. Circular Intersection - Inscribed Diameter

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

**Attributes:**
- Feet

See Figure 9 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** None
Figure 9. Illustration of Circular Intersection.
137. Circular Intersection - Bicycle Facility

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

**Attributes:**
- None
- Separate cycle path
- Circulatory bike lane

See Figure 10 for additional detail.

**Priority:** Value added

**HPMS/Tool Requirements:** None
Figure 10. Illustration of Types of Bicycle Facilities at Circular Intersections.

III.a.2. At-Grade Intersection/Junction Approach Descriptors (Each Approach)

138. Intersection Identifier for this Approach

**Definition:** The unique numeric identifier assigned to the intersection that includes this approach (see Element 120. Unique Junction Identifier). This element provides linkage to the basic intersection information and to all other approaches.

**Attributes:**
- The intersection identifier entered in Element 120. Unique Junction Identifier.

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required)

139. Unique Approach Identifier

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

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

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Required)

140. Approach AADT

**Definition:** The Annual Average Daily Traffic (AADT) on the approach leg of the intersection/junction.

**Attributes:**
- Vehicles per day

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Required Conditionally)

141. Approach AADT Year
**Definition:** The year of the Annual Average Daily Traffic (AADT) on the approach leg of the intersection/junction.

**Attributes:**
- Year

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Required Conditionally)

### 142. Approach Mode

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

**Attributes:**
- Vehicles only or shared use (e.g., vehicles, peds, bikes)
- Pedestrians only
- Bicycles only
- Pedestrians and bicycles
- Railroad
- Other

**Priority:** Critical

**HPMS/Tool Requirements:** None

### 143. Approach Directional Flow

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

**Attributes:**
- One-way
- Two-way

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Optional)

### 144. Number Of Approach Through Lanes
**Definition:** Total number of through lanes on approach (both directions if two-way, one direction if one-way).

**Attributes:**
- Numeric

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Optional)

### 145. Left Turn Lane Type

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

**Attributes:**
- No left turn lanes
- Conventional left turn lane(s)
- U-turn followed by right turn
- Right turn followed by U-turn
- Right turn followed by left turn (e.g., jughandle near side)
- Right turn followed by right turn (e.g., jughandle far side)
- Left turn crossover prior to intersection (e.g., displaced left turn)
- Other

See Figure 11 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** None
Figure 11. Illustration of Left Turn Lane Types.
Figure 11. Illustration of Left Turn Lane Types.
**146. Number of Exclusive Left Turn Lanes**

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

**Attributes:**
- Numeric

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Optional)

---

**147. 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”.

**Attributes:**
- Sign (+ or -) and distance (feet)

See Figure 12 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** None
Figure 12. Illustration of Positive, Negative, and Zero Offset Distance.
148. Right Turn Channelization

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

**Attributes:**
- None
- Painted island with receiving lane
- Painted island without receiving lane
- Raised island with receiving lane
- Raised island without receiving lane

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required)

149. Traffic Control of Exclusive Right Turn Lanes

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

**Attributes:**
- Signal
- Yield sign
- Stop sign
- No control (e.g., free flow)

**Priority:** Critical

**HPMS/Tool Requirements:** None

150. Number of Exclusive Right Turn Lanes

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

**Attributes:**
- Numeric

**Priority:** Critical

**HPMS/Tool Requirements:** HSM/IHSDM (Required), SafetyAnalyst (Optional)
151. Length of Exclusive Left Turn Lanes

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

Attributes:
- Feet

See Figure 13 for additional detail.

Priority: Value added

HPMS/Tool Requirements: None

Figure 13. Illustration of Exclusive Left Turn Lane Length.
152. Length of Exclusive Right Turn Lanes

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

**Attributes:**
- Feet

See Figure 14 for additional detail.

**Priority:** Value added

**HPMS/Tool Requirements:** None

---

**Figure 14. Illustration of Exclusive Right Turn Lane Length.**
153. Median Type at Intersection

**Definition:** Median type at intersection separating opposing traffic lanes on this approach. Pedestrian refuge islands are also captured in Element 157. *Crosswalk Presence/Type.*

**Attributes:**
- Undivided
- Flush paved median (at least 4 ft in width)
- Raised median with curb
- Depressed median
- Two-way left turn lane
- Railroad or rapid transit
- Other divided

**Priority:** Critical

**HPMS/Tool Requirements:** SafetyAnalyst (Optional)

154. Approach Traffic Control

**Definition:** Traffic control present on approach. Pedestrian signalization is captured in Element 158. *Pedestrian Signalization Type.*

**Attributes:**
- Uncontrolled
- Stop sign
- Yield sign
- Signalized
- Railroad crossing, gates and flashing lights
- Railroad crossing, flashing lights only
- Railroad crossing, stop-sign controlled
- Railroad crossing, crossbucks only
- Other

**Priority:** Critical

**HPMS/Tool Requirements:** None
155. Approach Left Turn Protection

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

Attributes:
- Unsignalized
- Signalized with no left turn protection (i.e., permissive)
- Protected, all day
- Protected, peak hour only
- Protected permissive, all day
- Protected permissive, peak hour only
- Other

Priority: Critical

HPMS/Tool Requirements: HSM/IHSDM (Required), SafetyAnalyst (Required)

156. Signal Progression

Definition: Signal progression on approach.

Attributes:
- No signal
- Uncoordinated fixed time
- Uncoordinated traffic actuated
- Progressive coordination (with several signals along either road)
- System coordination (e.g., real-time adaptive systemwide)
- Railroad crossing signal (includes signal-only and signal and gates)
- Other

Priority: Critical

HPMS/Tool Requirements: None
157. Crosswalk Presence/Type

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

Attributes:
- Unmarked crosswalk
- Marked crosswalk
- Marked crosswalk with supplemental devices (e.g., in-street yield signs, in-pavement warning lights, pedestrian bulb outs, etc.)
- Marked crosswalk with refuge island
- Marked with refuge island and supplemental devices (e.g., in-street yield signs, in-pavement warning lights, pedestrian bulb outs, etc.)
- Pedestrian crossing prohibited at this approach
- Other

Priority: Critical

HPMS/Tool Requirements: None

158. Pedestrian Signalization Type

Definition: Type of pedestrian signalization for crossing this approach.

Attributes:
- None
- Activated by traffic signal (e.g., recall)
- Pushbutton actuated
- Other

Priority: Critical

HPMS/Tool Requirements: None
159. *Pedestrian Signal Special Features*

**Definition:** Special features for pedestrian signals for crossing this approach.

**Attributes:**
- None
- Accessible pedestrian signal (i.e., audible tones/messages for blind or low-vision pedestrians)
- Countdown pedestrian signal
- Both accessible and countdown features
- Other

**Priority:** Value added

**HPMS/Tool Requirements:** None

160. *Crossing Pedestrian Count/Exposure*

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

**Attributes:**
- Numeric

**Priority:** Critical

**HPMS/Tool Requirements:** None
161. Left/Right Turn Prohibitions

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

Attributes:
- No left turns permitted at any time
- No left turn permitted during certain portions of the day
- No right turns permitted at any time
- No right turns permitted during certain portions of the day
- No right or left turns permitted at any time
- No right or left turns permitted during certain portions of the day
- No U-turns

Priority: Critical

HPMS/Tool Requirements: SafetyAnalyst (Optional)

162. Right Turn-On-Red Prohibitions

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

Attributes:
- RTOR allowed at all times
- RTOR prohibited at all times
- RTOR prohibited during certain portions of the day

Priority: Critical

HPMS/Tool Requirements: HSM/IHSDM (Required)
163. 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.)

**Attributes:**
- Count or percent

**Priority:** Value added

**HPMS/Tool Requirements:** SafetyAnalyst (Optional)

164. 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.

**Attributes:**
- Year

**Priority:** Value added

**HPMS/Tool Requirements:** SafetyAnalyst (Optional)

165. 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.)

**Attributes:**
- Count or percent

**Priority:** Value added

**HPMS/Tool Requirements:** SafetyAnalyst (Optional)
166. 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.

**Attributes:**
- Year

**Priority:** Value added

**HPMS/Tool Requirements:** SafetyAnalyst (Optional)

167. Transverse Rumble Strip Presence

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

**Attributes:**
- Yes
- No

**Priority:** Value added

**HPMS/Tool Requirements:** None

168. Circular Intersection - Entry Width

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

**Attributes:**
- Feet

See Figure 9 on page 99 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** None
**169. 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.

**Attributes:**
- Numeric

See Figure 15 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** None
Figure 15. Illustration of Circular Intersection Exit and Entry Lanes.
170. Circular Intersection – Presence/Type of Exclusive Right Turn Lane

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

**Attributes:**
- None
- Exclusive right turn bypass/slip lane with separating island
- Exclusive right turn bypass/slip lane without separating island

See Figure 16 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** None
Figure 16. Illustration of Circulatory Intersection Exclusive Right Turn Lanes.
171. Circular Intersection - Entry Radius

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

**Attributes:**
- Feet

See Figure 9 on page 99 for additional detail.

**Priority:** Value added

**HPMS/Tool Requirements:** None

172. Circular Intersection - Exit Width

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

**Attributes:**
- Feet

See Figure 9 on page 99 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** None

173. Circular Intersection - Number of Exit Lanes

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

**Attributes:**
- Numeric

See Figure 15 on page 120 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** None
174. Circular Intersection - Exit Radius

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

**Attributes:**
- Feet

See Figure 9 on page 99 for additional detail.

**Priority:** Value added

**HPMS/Tool Requirements:** None

175. Circular Intersection - Pedestrian Facility

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

**Attributes:**
- Marked crosswalk with raised island
- Marked crosswalk with flush island
- Marked crosswalk with no island
- Unmarked crosswalk with raised island
- Unmarked crosswalk with flush island
- Unmarked crosswalk with no island
- Pedestrian crossing prohibited at this approach
- Other

**Priority:** Critical

**HPMS/Tool Requirements:** None
176. 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).

**Attributes:**
- Feet

See Figure 9 on page 99 for additional detail.

**Priority:** Value added

**HPMS/Tool Requirements:** None

177. 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.

**Attributes:**
- Feet

See Figure 9 on page 99 for additional detail.

**Priority:** Value added

**HPMS/Tool Requirements:** None
III.b. Interchange and Ramp Descriptors

III.b.1. General Interchange Descriptors

178. Unique Interchange Identifier

Definition: A unique identifier for each interchange.

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

Priority: Critical

HPMS/Tool Requirements: None

179. Location Identifier for Road 1 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.

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 17 for additional detail.

Priority: Critical

HPMS/Tool Requirements: None
180. 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 179. Location Identifier For Road 1 Crossing Point, the previous element.

**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 17 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** None
Figure 17. 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).
181. 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 180 for all additional routes.

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

**Priority:** Critical

**HPMS/Tool Requirements:** None

182. Interchange Type

**Definition:** Type of interchange.

**Attributes:**
- Diamond
- Full cloverleaf
- Partial cloverleaf
- Trumpet
- Three-leg directional
- Four-leg all-directional
- Semi-directional
- Single entrances and/or exits (partial interchange)
- Single point interchange (SPI)
- Other (e.g., double crossover diamond, displaced left turn, diverging diamond)

See Figure 18 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** SafetyAnalyst (Required)
Figure 18. Illustration of Types of Interchanges.
183. Interchange Lighting

**Definition:** Type of interchange lighting.

**Attributes:**
- None
- Full interchange-area lighting (high mast)
- Full interchange-area lighting (other)
- Partial interchange lighting
- Other

**Priority:** Critical

**HPMS/Tool Requirements:** None

184. 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.

**Attributes:**
- Average daily volume

**Priority:** Critical

**HPMS/Tool Requirements:** None
III.b.2. Interchange Ramp Descriptors

185. Interchange Identifier for this Ramp

**Definition:** The unique numeric identifier assigned to the interchange that this ramp is part of. See Element 178. *Unique Interchange Identifier* above. This provides linkage to the basic interchange information and to all other ramps.

**Attributes:**
- The interchange identifier entered in Element 178. *Unique Interchange Identifier*.

**Priority:** Critical

**HPMS/Tool Requirements:** None

186. 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.

**Attributes:**
- Alphanumeric (e.g., each set of interchange ramps could begin with “I” or “A”, each ramp could be identified by it’s route and exit number, etc.).

**Priority:** Critical

**HPMS/Tool Requirements:** SafetyAnalyst (Required)
**187. Ramp Length**

**Definition:** Length of ramp. In the case of ramp connecting to an at-grade intersection, this would be measured from painted nose of gore to intersection curb line. In the case of ramp connecting to another ramp or a freeway, this would be measured from painted nose of gore to painted nose of gore.

**Attributes:**
- Feet

See Figure 19 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** SafetyAnalyst (Required)

---

*Figure 19. Illustration of Ramp Length for Freeway and Intersection Ramp Connections.*
188. 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.

**Attributes:**
- Feet

See Figure 20 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** None

Figure 20. Illustration of Acceleration Lane Length for Tapered and Parallel Designs.
189. **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.

**Attributes:**
- Feet

See Figure 21 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** None

---

**Figure 21. Illustration of Deceleration Lane Length for Tapered and Parallel Designs.**
190. Ramp Number Of Lanes

**Definition:** Maximum number of lanes on ramp.

**Attributes:**
- Numeric

**Priority:** Critical

**HPMS/Tool Requirements:** SafetyAnalyst (Optional)

191. Ramp AADT

**Definition:** AADT on ramp.

**Attributes:**
- Numeric

**Priority:** Critical

**HPMS/Tool Requirements:** SafetyAnalyst (Required)

192. Year Of Ramp AADT

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

**Attributes:**
- Year

**Priority:** Critical

**HPMS/Tool Requirements:** SafetyAnalyst (Required)
193. Ramp Metering

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

Attributes:
- Pretimed
- Traffic actuated
- No metering
- Not applicable (i.e., ramp does not feed into mainline)

Priority: Critical

HPMS/Tool Requirements: None

194. Ramp Advisory Speed Limit

Definition: The advisory speed limit on the ramp.

Attributes:
- Numeric
- No advisory limit (i.e., limit will be the same as on the connecting roadways)

Priority: Critical

HPMS/Tool Requirements: None
195. Roadway Type at Beginning Ramp Terminal

**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.

**Attributes:**
- Freeway
- Non-freeway (surface street)
- Other Ramp
- Frontage road
- Other

See point B in Figure 17 on page 128 for additional detail. For Ramp 005 P5 12754, Roadway Type at Beginning Ramp Terminal = Freeway.

**Priority:** Critical

**HPMS/Tool Requirements:** SafetyAnalyst (Required)

196. Roadway Feature at Beginning Ramp Terminal

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

**Attributes:**
- Acceleration Lane
- Deceleration Lane
- Weaving lane (e.g., the weaving area joining two ramps under an overpass in a cloverleaf interchange)
- Signalized intersection
- Stop/yield controlled intersection
- Uncontrolled intersection
- Another ramp
- Other

See point B in Figure 17 on page 128 for additional detail. For Ramp 005 P5 12754, Roadway Feature at Beginning Ramp Terminal = Weaving Lane.

**Priority:** Critical

**HPMS/Tool Requirements:** SafetyAnalyst (Required)
197. Location Identifier for Roadway at Beginning Ramp Terminal

**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.

**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 17 on page 128 for additional detail. In this example the Location Identifier for Roadway at Beginning Ramp Terminal = MP 128.06.

**Priority:** Critical

**HPMS/Tool Requirements:** SafetyAnalyst (Required)

198. 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.

**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 22 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** None
Figure 22. Illustration of Locations of Beginning Ramp Terminal Relative to Mainline Flow.
199. Roadway Type at Ending Ramp Terminal

**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.

**Attributes:**
- Freeway
- Non-freeway (surface street)
- Other Ramp
- Frontage road
- Other

See point C in Figure 17 on page 128 for additional detail. For Ramp 005 R1 12806, Roadway Type at Ending Ramp Terminal = Non-freeway.

**Priority:** Critical

**HPMS/Tool Requirements:** SafetyAnalyst (Required)

200. Roadway Feature at Ending Ramp Terminal

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

**Attributes:**
- Acceleration Lane
- Deceleration Lane
- Weaving lane (e.g., the weaving area joining two ramps under an overpass in a cloverleaf interchange)
- Signalized intersection
- Stop/yield controlled intersection
- Uncontrolled intersection
- Another ramp
- Other

See point C in Figure 17 on page 128 for additional detail. For Ramp 005 R1 12806, Roadway Feature at Ending Ramp Terminal = Signalized Intersection.

**Priority:** Critical

**HPMS/Tool Requirements:** SafetyAnalyst (Required)
201. Location Identifier for Roadway at Ending Ramp Terminal

**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.

**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 17 on page 128 for additional detail. In this example the Location Identifier for Roadway at Ending Ramp Terminal = MP 126.77.

**Priority:** Critical

**HPMS/Tool Requirements:** SafetyAnalyst (Required Conditionally)

202. 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.

**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 23 for additional detail.

**Priority:** Critical

**HPMS/Tool Requirements:** None
Figure 23. Illustration of Locations of Ending Ramp Terminal Relative to Mainline Flow.
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119. Vertical Curve Length, 83
41. Width of Bicycle Facility, 40
164. Year of Left Turn Counts/Percent, 117
192. Year of Ramp AADT, 136
166. Year of Right Turn Counts/Percent, 118
### APPENDIX B: HPMS and Tools Matrix by MIRE Elements

<table>
<thead>
<tr>
<th>MIRE Version 1.0 Element</th>
<th>Highway Performance Monitoring System (HPMS)</th>
<th>Highway Safety Manual (HSM)/Interactive Highway Safety Design Model (IHSDM)</th>
<th>SafetyAnalyst</th>
</tr>
</thead>
</table>

#### 1. ROADWAY SEGMENT DESCRIPTORS

**I.a. Segment Location/Linkage Elements**

1. County Name  
   - Full Extent  
   - Required  
   - Conditionally

2. County Code
   - Full Extent

3. Highway District
   - Optional

4. Type of Governmental Ownership
   - Full Extent

5. Specific Governmental Ownership

6. City/Local Jurisdiction Name
   - Optional

7. City/Local Jurisdiction Urban Code

8. Route Number
   - Full Extent  
   - Required  
   - Required

9. Route/Street Name
   - Full Extent  
   - Required  
   - Conditionally

10. Begin Point Segment Descriptor
    - Full Extent  
    - Required  
    - Required

11. End Point Segment Descriptor
    - Full Extent  
    - Required  
    - Required

12. Segment Identifier
    - Full Extent  
    - Required  
    - Required

13. Segment Length
    - Full Extent  
    - Required  
    - Required

14. Route Signing
    - Full Extent  
    - Required  
    - Required

15. Route Signing Qualifier
    - Full Extent

16. Coinciding Route Indicator

17. Coinciding Route - Minor Route Information
    - Required

18. Direction of Inventory
    - Required  
    - Required  
    - Conditionally

**I.b. Segment Classification**

19. Functional Class
    - Full Extent and Ramps  
    - Required  
    - Required

20. Rural/Urban Designation
    - Full Extent and Ramps  
    - Required  
    - Required

21. Federal Aid/ Route Type
    - Full Extent and Ramps

22. Access Control
    - Full Extent and Ramps*, Sample*
    - Required

**I.c. Segment Cross Section**

**I.c.1. Surface Descriptors**

23. Surface Type
    - Sample  
    - Required

24. Total Paved Surface Width

25. Surface Friction

26. Surface Friction Date
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<th>Highway Performance Monitoring System (HPMS)</th>
<th>Highway Safety Manual (HSM)/Interactive Highway Safety Design Model (IHSDM)</th>
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<td>30. Pavement Condition (PSR) Date</td>
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<td>61. Median Crossover/Left Turn Lane Type</td>
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**I.d. Segment Roadside Descriptors**

| Roadside Clear zone Width | Required |
| Right Sideslope | Required |
| Right Sideslope Width | Required |
| Left Sideslope | Required |
| Left Sideslope Width | Required |
| Roadside Rating | Required |
| Major Commercial Driveway Count | Required | Optional |
| Minor Commercial Driveway Count | Required | Optional |
| Major Residential Driveway Count | Required | Optional |
| Minor Residential Driveway Count | Required | Optional |
| Major Industrial/Institutional Driveway Count | Required | Optional |
| Minor Industrial/Institutional Driveway Count | Required | Optional |
| Other Driveway Count | Required | Optional |

**I.e. Other Segment Descriptors**

| Terrain Type | Sample | Optional |
| Number of Signalized Intersections in Segment | Sample |
| Number of Stop-Controlled Intersections in Segment | Sample |
| Number of Uncontrolled/Other Intersections in Segment | Sample |

**I.f. Segment Traffic Flow Data**

<p>| Annual Average Daily Traffic (AADT) | Full Extent and Ramps | Required | Required |
| AADT Year | Full Extent and Ramps | Required | Required |
| AADT Annual Escalation Percentage | | | Optional |</p>
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<th>MIRE Version 1.0 Element</th>
<th>Highway Performance Monitoring System (HPMS)</th>
<th>Highway Safety Manual (HSM)/Interactive Highway Safety Design Model (IHSDM)</th>
<th>SafetyAnalyst</th>
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<tr>
<td>82. Percent Single Unit Trucks or Single Truck AADT</td>
<td>Full Extent and Ramps*, Sample*</td>
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<td>83. Percent Combination Trucks or Combination Truck AADT</td>
<td>Full Extent and Ramps*, Sample*</td>
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<td>84. Percentage Trucks or Truck AADT</td>
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<td>85. Total Daily Two-Way Pedestrian Count/Exposure</td>
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<td>88. Hourly Traffic Volumes (or Peak and Off-Peak AADT)</td>
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<td>89. K-Factor</td>
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<td>90. Directional Factor</td>
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**l.g. Segment Traffic Operations/Control Data**

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<th>Highway Safety Manual (HSM)/Interactive Highway Safety Design Model (IHSDM)</th>
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<td>91. One/Two-Way Operations</td>
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<td>93. Truck Speed Limit</td>
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<td>94. Nighttime Speed Limit</td>
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<td>95. 85th Percentile Speed</td>
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<td>96. Mean Speed</td>
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<td>97. School Zone Indicator</td>
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<td>98. On-Street Parking Presence</td>
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<td>99. On-Street Parking Type</td>
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<td>101. Toll Facility</td>
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**l.h. Other Supplemental Segment Descriptor**

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<td>106. Bridge Numbers for Bridges in Segment</td>
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**II. Roadway Alignment Descriptors**

**II.a. Horizontal Curve Data**

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<td>109. Horizontal Curve Degree or Radius</td>
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<td><strong>III. Roadway Junction Descriptors</strong></td>
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<td><strong>III.a. At-Grade Intersection/Junctions</strong></td>
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<td>162. Right Turn-On-Red Prohibitions</td>
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<td>163. Left Turn Counts/Percent</td>
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<td>170. Circular Intersection—Presence/Type of Exclusive Right Turn Lane</td>
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<td>171. Circular Intersection—Entry Radius</td>
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<td>172. Circular Intersection—Exit Width</td>
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<td>173. Circular Intersection—Number of Exit Lanes</td>
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<td>174. Circular Intersection—Exit Radius</td>
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<td>175. Circular Intersection—Pedestrian Facility</td>
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<td>176. Circular Intersection—Crosswalk Location (Distance From Yield Line)</td>
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<td>177. Circular Intersection—Island Width</td>
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**III.b. Interchange and Ramp Descriptors**

**III.b.1. General Interchange Descriptors**

<p>| 178. Unique Interchange Identifier | | | |
| 179. Location Identifier for Road 1 Crossing Point | | | |
| 180. Location Identifier for Road 2 Crossing Point | | | |
| 181. Location Identifier for Additional Road Crossing Points | | | |
| 182. Interchange Type | | Required |
| 183. Interchange Lighting | | | |
| 184. Interchange Entering Volume | | | |</p>
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<th>Highway Safety Manual (HSM)/Interactive Highway Safety Design Model (IHSDM)</th>
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<td>188. Ramp Acceleration Lane Length</td>
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<td>189. Ramp Deceleration Lane Length</td>
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<td>190. Ramp Number of Lanes</td>
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<td>191. Ramp AADT</td>
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<td>192. Year of Ramp AADT</td>
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<td>193. Ramp Metering</td>
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<td>194. Ramp Advisory Speed Limit</td>
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<td>196. Roadway Feature at Beginning Ramp Terminal</td>
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<td>197. Location Identifier For Roadway at Beginning Ramp Terminal</td>
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<td>198. Location of Beginning Ramp Terminal Relative to Mainline Flow</td>
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<td>199. Roadway Type at Ending Ramp Terminal</td>
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<td>200. Roadway Feature at Ending Ramp Terminal</td>
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<td>201. Location Identifier for Roadway at Ending Ramp Terminal</td>
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<td>202. Location of Ending Ramp Terminal Relative to Mainline Flow</td>
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*Collection requirements differ based on functional class.*
APPENDIX C: Supplementary SafetyAnalyst Matrix

THE FOLLOWING MATRIX PROVIDES INFORMATION LINKING MIRE VARIABLES TO REQUIRED, REQUIRED CONDITIONALLY, AND OPTIONAL VARIABLES IN SAFETYANALYST. THE COMMENTS ARE PARTICULARLY RELEVANT TO THE REQUIRED CONDITIONALLY VARIABLES.

<table>
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<tr>
<th>MIRE Element</th>
<th>SafetyAnalyst Category</th>
<th>SafetyAnalyst Variable</th>
<th>SafetyAnalyst Description</th>
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<tr>
<td>1. County Name</td>
<td>Geographic Description</td>
<td>county</td>
<td>County</td>
<td>Required conditionally</td>
<td>Required when location system is Route/County/Milepost</td>
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<tr>
<td>3. Highway District</td>
<td>Geographic Description</td>
<td>district</td>
<td>District</td>
<td>Optional</td>
<td>When available, can be used in site list query</td>
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<tr>
<td>6. City/Local Jurisdiction Name</td>
<td>Geographic Description</td>
<td>city</td>
<td>City/Town</td>
<td>Optional</td>
<td>When available, can be used in site list query</td>
</tr>
<tr>
<td>7. City/Local Jurisdiction Name</td>
<td>Geographic Description</td>
<td>jurisdiction</td>
<td>Jurisdiction</td>
<td>Optional</td>
<td>When available, can be used in site list query</td>
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<td>8. Route Number</td>
<td>Roadway Segment</td>
<td>routeDisplayName</td>
<td>Route Number Display Value</td>
<td>Optional</td>
<td>Used for display/information only</td>
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<td>8. Route Number</td>
<td>Geographic Description</td>
<td>routeName</td>
<td>Route Name</td>
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<td>Required during data import</td>
</tr>
<tr>
<td>8. Route Number</td>
<td>Intersection</td>
<td>routeDisplayName</td>
<td>Route Number Display Value</td>
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<td>9. Route/Street Name</td>
<td>Geographic Description</td>
<td>majorRoadName</td>
<td>Major Road Name</td>
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<td>Used for display/information only</td>
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<tr>
<td>9. Route/Street Name</td>
<td>Intersection</td>
<td>minorRoadName</td>
<td>Minor Road Name</td>
<td>Required conditionally</td>
<td>Required unless user assigns Segment ID to each crash</td>
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<tr>
<td>10. Begin Point Segment Descriptor</td>
<td>Roadway Segment</td>
<td>location</td>
<td>Start Location</td>
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<td>11. End Point Segment Descriptor</td>
<td>Roadway Segment</td>
<td>end</td>
<td>End Location</td>
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<tr>
<td>12. Segment Identifier</td>
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<td>12. Segment Identifier</td>
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<td>17. Coinciding Route - Minor Route Information</td>
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<td>18. Direction of Inventory</td>
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<td>travelDirection</td>
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<td>Required unless user assigns Segment ID to each crash</td>
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<td>19. Functional Class</td>
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<td>20. Rural/Urban Designation</td>
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<td>31. Number of Through Lanes</td>
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<tr>
<td>32. Outside Through Lane Width</td>
<td>Directional Attributes</td>
<td>avgLaneWidth</td>
<td>Average Lane Width</td>
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<td>When available, will be used by some AMFs in Module 3</td>
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<tr>
<td>33. Inside Through Lane Width</td>
<td>Directional Attributes</td>
<td>avgLaneWidth - Out</td>
<td>Average Shoulder Width - Outside</td>
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<td>35. Auxiliary Lane Presence/Type</td>
<td>Auxiliary Lane</td>
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<td>bikeway</td>
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<td>Directional Attributes</td>
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<td>47. Left Shoulder Type</td>
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<td>avgShoulderWidthOut</td>
<td>Average Shoulder Width - Outside</td>
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<td>44. Right Shoulder Total Width</td>
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<td>avgShoulderWidthOut</td>
<td>Average Shoulder Width - Outside</td>
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<td>54. Median Type</td>
<td>Roadway Segment</td>
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<td>drivewayDensity</td>
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<td>81. AADT Annual Escalation Percentage</td>
<td>Roadway Segment</td>
<td>growthFactor</td>
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<td>84. Percentage Trucks or Truck AADT</td>
<td>Annual Traffic</td>
<td>percentHeavyVehicles</td>
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<td>88. Hourly Traffic Volumes (or Peak and Off-Peak AADT)</td>
<td>Annual Traffic</td>
<td>peakHourlyVolume</td>
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<td>Roadway Segment</td>
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<td>92. Speed Limit</td>
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<td>121. Type of Intersection/ Junction</td>
<td>MIRE &quot;Type of Junction/Intersection&quot; is required to identify roadway to roadway intersections for SafetyAnalyst</td>
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<td>122. Location Identifier for Road 1 Crossing Point</td>
<td>Intersection</td>
<td>location</td>
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<td>Required during data import</td>
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<td>122. Location Identifier for Road 1 Crossing Point</td>
<td>Intersection Leg</td>
<td>location</td>
<td>Leg Location</td>
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<tr>
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<td>minorLocation</td>
<td>Minor Road Location</td>
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<td>Required unless user assigns Segment ID to each crash</td>
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<td>126. Intersection/Junction Geometry</td>
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<td>Intersection</td>
<td>offsetDistance</td>
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<td>131. Intersection/Junction Traffic Control</td>
<td>Intersection</td>
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<td>Traffic Control Type at Intersection Level 1</td>
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<tr>
<td>132. Signalization Presence/Type</td>
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<td>155. Approach Left Turn Protection</td>
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<tr>
<td>131. Intersection/ Junction Traffic Control</td>
<td>Intersection</td>
<td>trafficControl2</td>
<td>Traffic Control Type at Intersection Level 2</td>
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<td>131. Intersection/ Junction Traffic Control</td>
<td>Intersection</td>
<td>trafficControl3</td>
<td>Traffic Control Type at Intersection Level 3</td>
<td>Optional</td>
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<tr>
<td>139. Unique Approach Identifier</td>
<td>Intersection Leg</td>
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<td>Leg ID</td>
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<tr>
<td>140. Approach AADT</td>
<td>Leg Annual Traffic</td>
<td>aadtVPD</td>
<td>AADT</td>
<td>Required</td>
<td>Required only if minor/major road AADT is missing</td>
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<tr>
<td>141. Approach AADT Year</td>
<td>Leg Annual Traffic</td>
<td>calendarYear</td>
<td>Year</td>
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<td>Required only if minor/major road AADT is missing</td>
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<tr>
<td>143. Approach Directional Flow</td>
<td>Intersection Leg</td>
<td>operationWay</td>
<td>Operation</td>
<td>Optional</td>
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<tr>
<td>144. Number of Approach Through Lanes</td>
<td>Intersection Leg</td>
<td>legNumThruLane</td>
<td>Thru Lanes</td>
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<td>When available, will be used in collision diagram viewer</td>
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<tr>
<td>146. Number of Exclusive Left Turn Lanes</td>
<td>Intersection Leg</td>
<td>legNumLeftTurnLane</td>
<td>Lt-Turn Lanes</td>
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<td>150. Number of Exclusive Right Turn Lanes</td>
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<td>legNumRightTurnLane</td>
<td>Rt-Turn Lanes</td>
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<td>SafetyAnalyst Variable</td>
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<tr>
<td>153. Median Type at Intersection</td>
<td>Intersection Leg</td>
<td>legMedianType</td>
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<tr>
<td>155. Approach Left Turn Protection</td>
<td>Intersection Leg</td>
<td>leftTurnPhasing</td>
<td>Left-Turn Phasing</td>
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<tr>
<td>161. Left/Right Turn Prohibitions</td>
<td>Intersection Leg</td>
<td>turnProhibitions</td>
<td>Turn Prohibitions</td>
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<tr>
<td>163. Left Turn Counts/ Percent</td>
<td>Leg Vehicle Movements</td>
<td>leftTurnVolume</td>
<td>Lt-Turn Volume</td>
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<td>164. Year of Left Turn Counts/ Percent</td>
<td>Leg Vehicle Movements</td>
<td>calendarYear</td>
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<tr>
<td>166. Year of Right Turn Counts/ Percent</td>
<td>Leg Vehicle Movements</td>
<td>rightTurnVolume</td>
<td>Rt-Turn Volume</td>
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<tr>
<td>182. Interchange Type</td>
<td>Ramp</td>
<td>rampConfiguration</td>
<td>Ramp Configuration</td>
<td>Required</td>
<td>Required for post-processing site subtype assignment</td>
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<tr>
<td>186. Unique Ramp Identifier</td>
<td>Ramp</td>
<td>agencyID</td>
<td>Ramp ID</td>
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<td>187. Ramp Length</td>
<td>Ramp</td>
<td>rampLength</td>
<td>Ramp Length</td>
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<td>190. Ramp Number of Lanes</td>
<td>Ramp</td>
<td>numOfLanes</td>
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<td>191. Ramp AADT</td>
<td>Ramp Annual Traffic</td>
<td>aadtVPD</td>
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<tr>
<td>192. Year of Ramp AADT</td>
<td>Ramp Annual Traffic</td>
<td>calendarYear</td>
<td>Year</td>
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<td>Required during data import</td>
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<tr>
<td>195. Roadway Type at Beginning Ramp Terminal</td>
<td>Ramp</td>
<td>rampType</td>
<td>Ramp Type</td>
<td>Required</td>
<td>Required for post-processing site subtype assignment</td>
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<tr>
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<tr>
<td>196. Roadway Feature at Beginning Ramp Terminal</td>
<td>Ramp</td>
<td>rampFreewayConnection</td>
<td>Type of Connection (At Freeway)</td>
<td>Optional</td>
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<tr>
<td>197. Location Identifier for Roadway at Beginning Ramp Terminal</td>
<td>Ramp</td>
<td>location</td>
<td>Start Location</td>
<td>Required</td>
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<tr>
<td>200. Roadway Feature at Ending Ramp Terminal</td>
<td>Ramp</td>
<td>rampCrossroadConnection</td>
<td>Type of Connection (At Crossroad)</td>
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<tr>
<td>201. Location Identifier for Roadway at Ending Ramp Terminal</td>
<td>Ramp</td>
<td>endLocation</td>
<td>End Location</td>
<td>Required conditionally</td>
<td>Required for post-processing if ramp length is not specified</td>
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<tr>
<td>201. Location Identifier for Roadway at Ending Ramp Terminal</td>
<td>Ramp</td>
<td>rampToID</td>
<td>To Segment</td>
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</table>
The following SafetyAnalyst variables are either defined by (and thus known to) the user agency or can be calculated using MIRE variables.

<table>
<thead>
<tr>
<th>SafetyAnalyst Category</th>
<th>SafetyAnalyst Variable</th>
<th>SafetyAnalyst Description</th>
<th>Required</th>
<th>Known/Calculated</th>
<th>Comment</th>
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<tr>
<td>Roadway Segment</td>
<td>increasingMileposts</td>
<td>Direction of Increasing Mileposts or Distances</td>
<td>Optional</td>
<td>Known</td>
<td>When available, will be used in collision diagram viewer</td>
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<td>Roadway Segment</td>
<td>discontinuity</td>
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<td>Calculated</td>
<td>Required for use with sliding window and in forming longer homogeneous sections</td>
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<td>Roadway Segment</td>
<td>interchangeInfluence</td>
<td>Interchange Influence Area on Mainline Freeway</td>
<td>Required</td>
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<td>Required for post-processing site subtype assignment</td>
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<tr>
<td>Directional Attributes</td>
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<td>Calculated</td>
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<td>Major Road Direction</td>
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<td>Required unless user assigns Segment ID to each crash</td>
</tr>
<tr>
<td>Intersection</td>
<td>majBeginInfluenceZone</td>
<td>Begin Influence Zone - Major Road</td>
<td>Required conditionally</td>
<td>Calculated</td>
<td>Required unless user assigns Segment ID to each crash</td>
</tr>
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<td>Intersection</td>
<td>majEndInfluenceZone</td>
<td>End Influence Zone - Major Road</td>
<td>Required conditionally</td>
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<td>Required unless user assigns Segment ID to each crash</td>
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<tr>
<td>Intersection</td>
<td>minBeginInfluenceZone</td>
<td>Begin Influence Zone - Minor Road</td>
<td>Required conditionally</td>
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<td>Required unless user assigns Segment ID to each crash</td>
</tr>
<tr>
<td>Intersection</td>
<td>minEndInfluenceZone</td>
<td>End Influence Zone - Minor Road</td>
<td>Required conditionally</td>
<td>Calculated</td>
<td>Required unless user assigns Segment ID to each crash</td>
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<td>Safety Analyst Category</td>
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<td>Intersection Leg</td>
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<td>Calculated</td>
<td>If available, used in post processing for accident site assignment</td>
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<tr>
<td>Leg Vehicle Movements</td>
<td>throughVolume</td>
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</table>
The following SafetyAnalyst variables are not in MIRE Version 1.0. They may be added in later versions.

<table>
<thead>
<tr>
<th>SafetyAnalyst Category</th>
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<tr>
<td>Roadway Segment</td>
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<td>GIS Identifier</td>
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<td>When available, used by GIS interface</td>
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<td>Roadway Segment</td>
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<td>Growth Factor Source</td>
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<td>Required for sections opened after first accident/ADT year</td>
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<tr>
<td>Geographic Description</td>
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<td>Optional</td>
<td>If available, used in Module 1 corridor screening</td>
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<tr>
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<td>Required for sections opened after first accident/ADT year</td>
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<tr>
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<td>Intersection</td>
<td>gisID</td>
<td>GIS Identifier</td>
<td>Optional</td>
<td>When available, used by GIS interface</td>
</tr>
<tr>
<td>Intersection</td>
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<td>Growth Factor Source</td>
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<td>Intersection Leg</td>
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<td>Only required for collision diagram (Collision Diagram Viewer)</td>
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<tr>
<td>Ramp</td>
<td>gisID</td>
<td>GIS Identifier</td>
<td>Optional</td>
<td>When available, used by GIS interface</td>
</tr>
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<tr>
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<td>growthSource</td>
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<td>Optional</td>
<td>If available, used in post processing to estimate missing traffic volume</td>
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<tr>
<td>Ramp</td>
<td>openedToTraffic</td>
<td>Date Opened to Traffic</td>
<td>Required conditionally</td>
<td>Required for ramps opened after first accident/ADT year</td>
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<td>Ramp</td>
<td>routeDisplayName</td>
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