

Federal Highway Administration

# Highway Performance Monitoring System Travel Time Based Metric Data Validation

*May 2018*



U.S. Department  
of Transportation

**Federal Highway  
Administration**

## Revision Log

Date	Page/Revision Description	Original Text	Revised Text																														
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May 16, 2019	Page 11	<table border="1"> <thead> <tr> <th>Data Field</th> <th>If</th> </tr> </thead> <tbody> <tr> <td>[Travel_Time_Metrics]:LOTTR_AMP</td> <td>TT_AMP50PCT &gt; 1 AND TT_AMP50PCT IS NOT NULL AND TT_AMP80PCT &gt; 1</td> </tr> <tr> <td>[Travel_Time_Metrics]:LOTTR_MIDD</td> <td>TT_MIDD50PCT &gt;1 AND TT_MIDD50PCT IS NOT NULL AND TT_MIDD80PCT &gt;1</td> </tr> <tr> <td>[Travel_Time_Metrics]:LOTTR_PMP</td> <td>TT_PMP50PCT &gt;1 AND TT_PMP50PCT IS NOT NULL AND TT_PMP80PCT &gt;1</td> </tr> </tbody> </table>	Data Field	If	[Travel_Time_Metrics]:LOTTR_AMP	TT_AMP50PCT > 1 AND TT_AMP50PCT IS NOT NULL AND TT_AMP80PCT > 1	[Travel_Time_Metrics]:LOTTR_MIDD	TT_MIDD50PCT >1 AND TT_MIDD50PCT IS NOT NULL AND TT_MIDD80PCT >1	[Travel_Time_Metrics]:LOTTR_PMP	TT_PMP50PCT >1 AND TT_PMP50PCT IS NOT NULL AND TT_PMP80PCT >1	<table border="1"> <thead> <tr> <th>Data Field</th> <th>If</th> </tr> </thead> <tbody> <tr> <td>[Travel_Time_Metrics]:LOTTR_AMP</td> <td>TT_AMP50PCT &gt; 1 AND TT_AMP50PCT IS NOT NULL AND TT_AMP80PCT &gt; 1 <b>AND TT_AMP80PCT IS NOT NULL</b></td> </tr> <tr> <td>[Travel_Time_Metrics]:LOTTR_MIDD</td> <td>TT_MIDD50PCT &gt;1 AND TT_MIDD50PCT IS NOT NULL AND TT_MIDD80PCT &gt;1 <b>AND TT_MIDD80PCT IS NOT NULL</b></td> </tr> <tr> <td>[Travel_Time_Metrics]:LOTTR_PMP</td> <td>TT_PMP50PCT &gt;1 AND TT_PMP50PCT IS NOT NULL AND TT_PMP80PCT &gt;1 <b>AND TT_PMP80PCT IS NOT NULL</b></td> </tr> </tbody> </table>	Data Field	If	[Travel_Time_Metrics]:LOTTR_AMP	TT_AMP50PCT > 1 AND TT_AMP50PCT IS NOT NULL AND TT_AMP80PCT > 1 <b>AND TT_AMP80PCT IS NOT NULL</b>	[Travel_Time_Metrics]:LOTTR_MIDD	TT_MIDD50PCT >1 AND TT_MIDD50PCT IS NOT NULL AND TT_MIDD80PCT >1 <b>AND TT_MIDD80PCT IS NOT NULL</b>	[Travel_Time_Metrics]:LOTTR_PMP	TT_PMP50PCT >1 AND TT_PMP50PCT IS NOT NULL AND TT_PMP80PCT >1 <b>AND TT_PMP80PCT IS NOT NULL</b>
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May 16, 2019	Page 12	<table border="1"> <thead> <tr> <th>Data Field</th> <th>If</th> </tr> </thead> <tbody> <tr> <td>[Travel_Time_Metrics]:LOTTR_WE</td> <td>TT_WE50PCT &gt;1 AND TT_WE50PCT IS NOT NULL AND TT_WE80PCT &gt;1</td> </tr> <tr> <td>[Travel_Time_Metrics]:TTTR_AMP</td> <td>TTT_AMP50PCT &gt;1 AND TTT_AMP50PCT IS NOT NULL</td> </tr> <tr> <td>[Travel_Time_Metrics]:TTTR_MIDD</td> <td>TTT_MIDD50PCT &gt;1 AND TTT_MIDD50PCT IS NOT NULL</td> </tr> </tbody> </table>	Data Field	If	[Travel_Time_Metrics]:LOTTR_WE	TT_WE50PCT >1 AND TT_WE50PCT IS NOT NULL AND TT_WE80PCT >1	[Travel_Time_Metrics]:TTTR_AMP	TTT_AMP50PCT >1 AND TTT_AMP50PCT IS NOT NULL	[Travel_Time_Metrics]:TTTR_MIDD	TTT_MIDD50PCT >1 AND TTT_MIDD50PCT IS NOT NULL	<table border="1"> <thead> <tr> <th>Data Field</th> <th>If</th> </tr> </thead> <tbody> <tr> <td>[Travel_Time_Metrics]:LOTTR_WE</td> <td>TT_WE50PCT &gt;1 AND TT_WE50PCT IS NOT NULL AND TT_WE80PCT &gt;1 <b>AND TT_WE80PCT IS NOT NULL</b></td> </tr> <tr> <td>[Travel_Time_Metrics]:TTTR_AMP</td> <td>TTT_AMP50PCT &gt;1 AND TTT_AMP50PCT IS NOT NULL <b>AND TTT_AMP95PCT &gt;1 AND TTT_AMP95PCT IS NOT NULL</b></td> </tr> <tr> <td>[Travel_Time_Metrics]:TTTR_MIDD</td> <td>TTT_MIDD50PCT &gt;1 AND TTT_MIDD50PCT IS NOT NULL <b>AND TTT_MIDD95PCT &gt;1 AND TTT_MIDD95PCT IS NOT NULL</b></td> </tr> </tbody> </table>	Data Field	If	[Travel_Time_Metrics]:LOTTR_WE	TT_WE50PCT >1 AND TT_WE50PCT IS NOT NULL AND TT_WE80PCT >1 <b>AND TT_WE80PCT IS NOT NULL</b>	[Travel_Time_Metrics]:TTTR_AMP	TTT_AMP50PCT >1 AND TTT_AMP50PCT IS NOT NULL <b>AND TTT_AMP95PCT &gt;1 AND TTT_AMP95PCT IS NOT NULL</b>	[Travel_Time_Metrics]:TTTR_MIDD	TTT_MIDD50PCT >1 AND TTT_MIDD50PCT IS NOT NULL <b>AND TTT_MIDD95PCT &gt;1 AND TTT_MIDD95PCT IS NOT NULL</b>
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May 16, 2019	Page 13	<table border="1"> <thead> <tr> <th>Data Field</th> <th>If</th> </tr> </thead> <tbody> <tr> <td>[Travel_Time_Metrics]:TTTR_PMP</td> <td>TTT_PMP50PCT &gt;1 AND TTT_PMP50PCT IS NOT NULL</td> </tr> <tr> <td>[Travel_Time_Metrics]:TTTR_OVN</td> <td>TTT_OVN50PCT &gt;1 AND TTT_OVN50PCT IS NOT NULL</td> </tr> <tr> <td>[Travel_Time_Metrics]:TTTR_WE</td> <td>TTT_WE50PCT &gt;1 AND TTT_WE50PCT IS NOT NULL</td> </tr> </tbody> </table>	Data Field	If	[Travel_Time_Metrics]:TTTR_PMP	TTT_PMP50PCT >1 AND TTT_PMP50PCT IS NOT NULL	[Travel_Time_Metrics]:TTTR_OVN	TTT_OVN50PCT >1 AND TTT_OVN50PCT IS NOT NULL	[Travel_Time_Metrics]:TTTR_WE	TTT_WE50PCT >1 AND TTT_WE50PCT IS NOT NULL	<table border="1"> <thead> <tr> <th>Data Field</th> <th>If</th> </tr> </thead> <tbody> <tr> <td>[Travel_Time_Metrics]:TTTR_PMP</td> <td>TTT_PMP50PCT &gt;1 AND TTT_PMP50PCT IS NOT NULL <b>AND TTT_PMP95PCT &gt;1 AND TTT_PMP95PCT IS NOT NULL</b></td> </tr> <tr> <td>[Travel_Time_Metrics]:TTTR_OVN</td> <td>TTT_OVN50PCT &gt;1 AND TTT_OVN50PCT IS NOT NULL <b>AND TTT_OVN95PCT &gt;1 AND TTT_OVN95PCT IS NOT NULL</b></td> </tr> <tr> <td>[Travel_Time_Metrics]:TTTR_WE</td> <td>TTT_WE50PCT &gt;1 AND TTT_WE50PCT IS NOT NULL <b>AND TTT_WE95PCT &gt;1 AND TTT_WE95PCT IS NOT NULL</b></td> </tr> </tbody> </table>	Data Field	If	[Travel_Time_Metrics]:TTTR_PMP	TTT_PMP50PCT >1 AND TTT_PMP50PCT IS NOT NULL <b>AND TTT_PMP95PCT &gt;1 AND TTT_PMP95PCT IS NOT NULL</b>	[Travel_Time_Metrics]:TTTR_OVN	TTT_OVN50PCT >1 AND TTT_OVN50PCT IS NOT NULL <b>AND TTT_OVN95PCT &gt;1 AND TTT_OVN95PCT IS NOT NULL</b>	[Travel_Time_Metrics]:TTTR_WE	TTT_WE50PCT >1 AND TTT_WE50PCT IS NOT NULL <b>AND TTT_WE95PCT &gt;1 AND TTT_WE95PCT IS NOT NULL</b>
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Date	Page/Revision Description	Text Revision					
May 16, 2019	Page 33	<b>Original Text</b>					
		Data Field	If	Then	Message	[Travel_Time_Metrics]:Segment_Length	[Travel_Time_Metrics]:METRIC_SOURCE = 1  WHERE([Travel_Time_Metrics]:Travel_Time_Code = [Travel_Message_Channel_Identification]:tmc
Data Field	If	Then	Message				
[Travel_Time_Metrics]:Segment_Length	[Travel_Time_Metrics]:METRIC_SOURCE = 1  WHERE([Travel_Time_Metrics]:Travel_Time_Code = [Travel_Message_Channel_Identification]:tmc	round([Travel_Time_Metrics]:Segment_Length, 1 decimal place) = round([Travel_Message_Channel_Identification]:miles X [Travel_Message_Channel_Identification]:nhs_pct / 100, 1 decimal place)	Segment_Length of Travel_Time_Metrics Must = miles of Travel_Message_Channel_Identification in an accuracy of one decimal Where METRIC_SOURCE = 1 AND Travel_Time_Code of Travel_Time_Metrics = Travel_Message_Channel of Travel_Message_Channel_Identification				
May 16, 2019	Page 34	<b>Original Text</b>					
		Data Field	If	Then	Message	[Travel_Time_Metrics]:DIR_AADT	[Travel_Time_Metrics]:METRIC_SOURCE = 1 AND Item 71 Unreported  WHERE([Travel_Time_Metrics]:Travel_Time_Code = [Travel_Message_Channel_Identification]:tmc)
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[Travel_Time_Metrics]:DIR_AADT	[Travel_Time_Metrics]:METRIC_SOURCE = 1 AND Item 71 Unreported  WHERE([Travel_Time_Metrics]:Travel_Time_Code = [Travel_Message_Channel_Identification]:tmc)	[Travel_Time_Metrics]: DIR_AADT = [Travel_Message_Channel_Identification]:aadt	DIR_AADT of Travel_Time_Metrics Must <= aadt of Travel_Message_Channel_Identification Where METRIC_SOURCE = 1 AND Travel_Time_Code of Travel_Time_Metrics = Travel_Message_Channel of Travel_Message_Channel_Identification AND Travel_Time_Code as a Travel_Time_Code Section Is Not Reported.				

Date	Page/Revision Description	Text Revision														
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May 16, 2019	Page 35	Inserted Row														
		<table border="1"> <thead> <tr> <th data-bbox="425 828 913 963">Data Field</th> <th data-bbox="913 828 1541 963">If</th> <th data-bbox="1541 828 2178 963">Then</th> <th data-bbox="2178 828 2784 963">Warning Message</th> <th data-bbox="2784 828 2933 963">Cross Validation Criteria No.</th> </tr> </thead> <tbody> <tr> <td data-bbox="425 963 913 1340">[Travel_Time_Metrics]:DIR_AADT</td> <td data-bbox="913 963 1541 1340">           [Travel_Time_Metrics]:METRIC_SOURCE = 1  <b>AND</b> Item 71 Unreported <b>AND</b>  <b>[Travel_Time_Metrics]:Facility_Type IN (2,6)</b>   <b>WHERE([Travel_Time_Metrics]:Travel_Time_Code =</b>  <b>[Travel_Message_Channel_Identification]:tmc</b>  <b>)</b> </td> <td data-bbox="1541 963 2178 1340">[Travel_Time_Metrics]: DIR_AADT &lt; [Travel_Message_Channel_Identification]:aadt</td> <td data-bbox="2178 963 2784 1340">           DIR_AADT of two-way roadway or non-            inventory direction roadway in            Travel_Time_Metrics Must &lt;            bidirectional aadt in            Travel_Message_Channel_Identification            Where METRIC_SOURCE = 1 AND            Travel_Time_Code of            Travel_Time_Metrics =            Travel_Message_Channel of            Travel_Message_Channel_Identification            AND Travel_Time_Code as a            Travel_Time_Code Section Is Not            Reported.         </td> <td data-bbox="2784 963 2933 1340">34</td> </tr> </tbody> </table>	Data Field	If	Then	Warning Message	Cross Validation Criteria No.	[Travel_Time_Metrics]:DIR_AADT	[Travel_Time_Metrics]:METRIC_SOURCE = 1 <b>AND</b> Item 71 Unreported <b>AND</b> <b>[Travel_Time_Metrics]:Facility_Type IN (2,6)</b>  <b>WHERE([Travel_Time_Metrics]:Travel_Time_Code =</b> <b>[Travel_Message_Channel_Identification]:tmc</b> <b>)</b>	[Travel_Time_Metrics]: DIR_AADT < [Travel_Message_Channel_Identification]:aadt	DIR_AADT of two-way roadway or non- inventory direction roadway in Travel_Time_Metrics Must < bidirectional aadt in Travel_Message_Channel_Identification Where METRIC_SOURCE = 1 AND Travel_Time_Code of Travel_Time_Metrics = Travel_Message_Channel of Travel_Message_Channel_Identification AND Travel_Time_Code as a Travel_Time_Code Section Is Not Reported.	34				
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# Highway Performance Monitoring System (HPMS) Travel Time Based Metric Data Validation

This document provides FHWA data validation method in the HPMS Software for the travel time based metric data, described in the document “Travel Time Metric Data Reporting Requirements & Specifications (February 2018).”<sup>1</sup>

The Dataset “**Travel\_Time\_Metrics**” Table (noted as [**Travel\_Time\_Metrics**]) in this document refers to the state submitted travel time metric dataset, described in Table 1 of the document “Travel Time Metric Data Reporting Requirements & Specifications (February 2018).”<sup>2</sup>

“**Item\_71**” Dataset (noted as [**Item\_71**]) in this document refers to the sections data for the HPMS Data Item 71 - “Travel\_Time\_Code (Travel Time Reporting Segment)”, described in the document “Travel Time Metric Data Reporting Requirements & Specifications (February 2018).”<sup>3</sup>

The Dataset “**Travel\_Message\_Channel\_Identification**” Table (noted as [**Travel\_Message\_Channel\_Identification**]) in this document refers to the Travel Messaging Code (TMC) Identification Table (excluding the overlapping<sup>4</sup> segments), provided in the National Performance Management Research Dataset (NPMRDS).

Field names in this document is denoted as *[Table Name]:Field Name* format.

For example, [**Travel\_Time\_Metrics**]:**METRIC\_SOURCE** indicates **METRIC\_SOURCE** Field in “**Travel\_Time\_Metrics**” Table. Similarly, [**Travel\_Message\_Channel\_Identification**]:**tmc** indicates **tmc** Field in Travel Messaging Code Identification Table in NPMRDS. Also for HPMS data value is noted such as [**Item\_71**]:**Value\_Text** which indicates **Value\_Text** Field for **Item\_71**.

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<sup>1</sup> [https://www.fhwa.dot.gov/tpm/guidance/pm3\\_hpms.pdf](https://www.fhwa.dot.gov/tpm/guidance/pm3_hpms.pdf)

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.

<sup>4</sup> Overlapping TMCs – TMC segments with “**IsPrimary**” attribute field value equal to zero. <https://npmrds.ritis.org/analytics/help/#npmrds> - NPMRDS FAQs – “What are overlapping TMCs?” The “**IsPrimary**” Field is provided in the NPMRDS Coverage Map: <https://npmrds.ritis.org/analytics/coverage-map/>. Please note a Regional Integrated Transportation Information System (RITIS) account is required to access NPMRDS Coverage Map.



**Table A - Data Coverage**

Submittal Type	If	Then	Warning Message	Coverage Validation Criteria No.
<p><b>Reporting segments from NPMRDS without Item 71</b></p>	<p>All records in <b>Travel_Time_Metrics</b> Table are from NPMRDS (i.e., <b>[Travel_Time_Metrics]:METRIC_SOURCE = 1</b> for all records)</p> <p><b>AND</b></p> <p>Item 71 has not been submitted (i.e., there is no <b>Data_ITEM = "Travel_Time_Code"</b>) in HPMS Sections data</p>	<p>All TMC values with valid "nhs" Field values<sup>5</sup> in "<b>TMC Identification Table</b>" from the NPMRDS (<b>[Travel_Message_Channel_Identification]:tmc</b>) for a State should be included in <b>[Travel_Time_Metrics]:Travel_Time_Code</b> submitted by that state. Only the TMC values in "TMC Identification Table" from the NPMRDS should be included in <b>Travel_Time_Metrics</b> Table. Note, there may be cases where combined segments (with concatenated names) may be reported (please see the document "Travel Time Metric Data Reporting Requirements &amp; Specifications (February 2018)).</p>	<p>If a segment in <b>Travel_Time_Metrics</b> Table is from NPMRDS, submitted <b>Travel_Time_Code</b> must match TMC in NPMRDS.</p>	<p>1</p>

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<sup>5</sup> Valid values for **[Travel\_Message\_Channel\_Identification]:nhs** are 1, 2, 3, 4, 5, 6, 7, 8, and 9.

Submittal Type	If	Then	Warning Message	Coverage Validation Criteria No.
<b>Reporting segments from NPMRDS with Item 71</b>	<p>All records in <b>Travel_Time_Metrics_Table</b> are from NPMRDS (i.e., <b>[Travel_Time_Metrics]:METRIC_SOURCE = 1</b> for all records)</p> <p><b>AND</b></p> <p>Item 71 has been submitted (i.e., there are sections records with <b>Data_ITEM = "Travel_Time_Code"</b>).</p> <p>(Please note Item 71 is all or nothing for NPMRDS based reporting segments)</p>	<p>All TMC values in with valid "nhs" Field values<sup>6</sup> "<b>TMC Identification Table</b>" from the NPMRDS (<b>[Travel_Message_Channel_Identification]:tmc</b>) for a state should be included in <b>[Travel_Time_Metrics]:Travel_Time_Code</b> submitted by that state. Only the TMC values in "TMC Identification Table" from the NPMRDS should be included in <b>Travel_Time_Metrics_Table</b>. Note, there may be cases where combined segments (with concatenated names) may be reported (the document "Travel Time Metric Data Reporting Requirements &amp; Specifications (February 2018)).</p>	<p>If all reporting segments in <b>Travel_Time_Metrics_Table</b> are from NPMRDS, all TMC in NPMRDS must be included in <b>Travel_Time_Metrics_Table</b> as TTC.</p>	2
		<p>Item 71 must be submitted (i.e., there are sections records with <b>Data_Item = "Travel_Time_Code"</b>) for <u>all records</u> in <b>Travel_Time_Metrics_Table</b>. The Value_Text of Item 71 (<b>[Item_71]:Value_Text</b>) should have 1:1 match with reporting segment ID in <b>Travel_Time_Metrics_Table</b> (<b>[Travel_Time_Metrics]:Travel_Time_Code</b>).</p>	<p>If all reporting segments in <b>Travel_Time_Metrics_Table</b> are from NPMRDS, all TMC must be submitted as Data Item 71 or not submitted at all.</p>	3

<sup>6</sup> Ibid.

Submittal Type	If	Then	Warning Message	Coverage Validation Criteria No.
<b>Reporting segments from Equivalent Dataset or a combination of Equivalent/NPMRDS</b>	All records in <b>Travel_Time_Metrics</b> Table are from equivalent dataset (i.e., <b>[Travel_Time_Metrics]:METRIC_SOURCE = 2</b> )  OR  Some records in Table 1 are from NPMRDS (i.e., <b>[Travel_Time_Metrics]:METRIC_SOURCE = 1</b> OR <b>[Travel_Time_Metrics]:METRIC_SOURCE = 2</b> )	Item 71 must be submitted (i.e., there are sections records with <b>Data_Item = "Travel_Time_Code"</b> ) for <u>all records</u> in <b>Travel_Time_Metrics</b> Table. The <b>[Item_71]:Value_Text</b> values should have 1:1 match with reporting segment ID in <b>Travel_Time_Metrics</b> Table ( <b>[Travel_Time_Metrics]:Travel_Time_Code</b> ).	If any reporting segment in <b>Travel_Time_Metrics</b> Table is from an equivalent data set, all TMC in <b>Travel_Time_Metrics</b> Table must be reported as Data Item 71.	4
		Item 71 must fully cover the entire NHS.	If the <b>Travel_Time_Code</b> (Data Item 71) is reported, Data Item 71 must fully cover the NHS.	5
		For the records with <b>[Travel_Time_Metrics]:METRIC_SOURCE = 1</b> in <b>Travel_Time_Metrics</b> Table, TMC values with valid "nhs" Field values <sup>7</sup> in "TMC Identification Table" from the NPMRDS ( <b>[Travel_Message_Channel_Identification]:tmc</b> ) for a state should be included in <b>[Travel_Time_Metrics]:Travel_Time_Code</b> . Note, there may be cases where combined segments (with concatenated names) may be reported (please see the document "Travel Time Metric Data Reporting Requirements & Specifications (February 2018)").	If a segment in <b>Travel_Time_Metrics</b> Table is from NPMRDS, submitted <b>Travel_Time_Code</b> must match TMC in NPMRDS	1

<sup>7</sup> Ibid.

**Table B - Field Validation Check for Each Record in “Travel\_Time\_Metrics” Table and Item 71**

Data Field	Validation	Warning Message	Field Validation Criteria No.
[Travel_Time_Metrics]:Year_Record	Must not be NULL. Data year		
[Travel_Time_Metrics]:State_Code	Must not be NULL. Appendix C of HPMS Field Manual		
[Travel_Time_Metrics]:Travel_Time_Code	Must not be NULL AND Must be alpha-numeric and unique (reject any record, if invalid)	Travel_Time_Code Must Not Be NULL and Must Be Alpha-numeric and Unique	1
[Travel_Time_Metrics]: F_System	Must not be NULL AND Must be IN (1,2,3,4,5,6,7) (reject any record, if invalid)	F_System Must Be in (1,2,3,4,5,6,7)	2
[Travel_Time_Metrics]:Urban_Code	Must not be NULL. Appendix I of HPMS Field Manual (reject any record, if invalid)	Urban_Code Must Be a Valid Urban Code of the state	3
[Travel_Time_Metrics]:Facility_Type	Must not be NULL AND Must be mainline NHS (IN (1,2,3,4,5,6,7)) (reject any record, if invalid)	Facility_Type Must Be in (1,2,3,4,5,6,7)	4
[Travel_Time_Metrics]:NHS	Must not be NULL AND Must be IN (-1,1,2,3,4,5,6,7,8,9) (reject any record, if invalid)	NHS Must Be (-1,1,2,3,4,5,6,7,8,9)	5
[Travel_Time_Metrics]:Segment_Length	Must not be NULL.	Segment_Length Must Not Be NULL	6
[Travel_Time_Metrics]:Directionality	Must be IN (1,2,3,4,5) (reject any record, if invalid)	Directionality Must Be (1,2,3,4,5)	7
[Travel_Time_Metrics]:DIR_AADT	Must not be NULL AND Must be > 0	DIR_AADT Must Be >0	8
[Travel_Time_Metrics]:LOTTR_AMP	Must not be NULL AND Must be >= 1.00 (reject any record, if < 1.00)	LOTTR_AMP Must Not Be < 1.00	9
[Travel_Time_Metrics]:TT_AMP50PCT	Must not be NULL AND Must be >= 0	TT_AMP50PCT Must be >= 0	10
[Travel_Time_Metrics]:TT_AMP80PCT	Must not be NULL AND Must be >= 0	TT_AMP80PCT Must be >= 0	11
[Travel_Time_Metrics]:LOTTR_MIDD	Must not be NULL AND Must be >= 1.00 (reject any record, if < 1.00)	LOTTR_MIDD Must Not be < 1.00	12
[Travel_Time_Metrics]:TT_MIDD50PCT	Must not be NULL AND Must be >= 0	TT_MIDD50PCT Must be >= 0	13
[Travel_Time_Metrics]:TT_MIDD80PCT	Must not be NULL AND Must be >= 0	TT_MIDD80PCT Must be >= 0	14
[Travel_Time_Metrics]:LOTTR_PMP	Must not be NULL AND Must be >= 1.00 (reject any record, if < 1.00)	LOTTR_PMP Must Not be < 1.00	15
[Travel_Time_Metrics]:TT_PMP50PCT	Must not be NULL AND Must be >= 0	TT_PMP50PCT Must be >= 0	16

Data Field	Validation	Warning Message	Field Validation Criteria No.
<b>[Travel_Time_Metrics]:TT_PMP80PCT</b>	Must not be NULL AND Must be $\geq 0$	TT_PMP80PCT Must be $\geq 0$	17
<b>[Travel_Time_Metrics]:LOTTR_WE</b>	Must not be NULL AND Must be $\geq 1.00$ (reject any record, if $< 1.00$ )	LOTTR_WE Must Not be $< 1.00$	18
<b>[Travel_Time_Metrics]:TT_WE50PCT</b>	Must not be NULL AND Must be $\geq 0$	TT_WE50PCT Must be $\geq 0$	19
<b>[Travel_Time_Metrics]:TT_WE80PCT</b>	Must not be NULL AND Must be $\geq 0$	TT_WE80PCT Must be $\geq 0$	20
<b>[Travel_Time_Metrics]:TTTR_AMP</b>	Must be $\geq 1.00$ . May be NULL for non-Interstate NHS (please see Cross-data Item Check Table) (reject record, if $< 1.00$ AND F_System = 1)	TTTR_AMP, TTTR_MIDD, TTTR_PMP, TTTR_OVN, TTTR_WE Must be $\geq 1$ OR NULL for Non- Interstate NHS, Must Not Be $< 1.00$ for Interstate	21
<b>[Travel_Time_Metrics]:TTT_AMP50PCT</b>	Must be $\geq 0$ . May be NULL for non-Interstate NHS (please see Cross-data Item Check Table)	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be $\geq 0$ OR NULL for Non- Interstate NHS, Must Be $\geq 0$ for all other sections	22
<b>[Travel_Time_Metrics]:TTT_AMP95PCT</b>	Must be $\geq 0$ . May be NULL for non-Interstate NHS (please see Cross-data Item Check Table)	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be $\geq 0$ OR NULL for Non- Interstate NHS, Must Be $\geq 0$ for all other sections	22
<b>[Travel_Time_Metrics]:TTTR_MIDD</b>	Must be $\geq 1.00$ . May be NULL for non-Interstate NHS (please see Cross-data Item Check Table) (reject record, if $< 1.00$ AND F_System = 1)	TTTR_AMP, TTTR_MIDD, TTTR_PMP, TTTR_OVN, TTTR_WE Must be $\geq 1$ OR NULL for Non- Interstate NHS, Must Not Be $< 1.00$ for Interstate	21
<b>[Travel_Time_Metrics]:TTT_MIDD50PCT</b>	Must be $\geq 0$ . May be NULL for non-Interstate NHS (please see Cross-data Item Check Table)	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be $\geq 0$ OR NULL for Non- Interstate NHS, Must Be $\geq 0$ for all other sections	22

Data Field	Validation	Warning Message	Field Validation Criteria No.
<b>[Travel_Time_Metrics]:TTT_MIDD95PCT</b>	Must be >= 0. May be NULL for non-Interstate NHS (please see Cross-data Item Check Table)	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be >= 0 OR NULL for Non-Interstate NHS, Must Be >= 0 for all other sections	22
<b>[Travel_Time_Metrics]:TTTR_PMP</b>	Must be >= 1.00. May be NULL for non-Interstate NHS (please see Cross-data Item Check Table) (reject record, if < 1.00 AND F_System = 1)	TTTR_AMP, TTTR_MIDD, TTTR_PMP, TTTR_OVN, TTTR_WE Must be >= 1 OR NULL for Non-Interstate NHS, Must Not Be < 1.00 for Interstate	21
<b>[Travel_Time_Metrics]:TTT_PMP50PCT</b>	Must be >= 0. May be NULL for non-Interstate NHS (please see Cross-data Item Check Table)	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be >= 0 OR NULL for Non-Interstate NHS, Must Be >= 0 for all other sections	22
<b>[Travel_Time_Metrics]:TTT_PMP95PCT</b>	Must be >= 0. May be NULL for non-Interstate NHS (please see Cross-data Item Check Table)	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be >= 0 OR NULL for Non-Interstate NHS, Must Be >= 0 for all other sections	22
<b>[Travel_Time_Metrics]:TTTR_OVN</b>	Must be >= 1.00. May be NULL for non-Interstate NHS (please see Cross-data Item Check Table) (reject record, if < 1.00 AND F_System = 1)	TTTR_AMP, TTTR_MIDD, TTTR_PMP, TTTR_OVN, TTTR_WE Must be >= 1 OR NULL for Non-Interstate NHS, Must Not Be < 1.00 for Interstate	21
<b>[Travel_Time_Metrics]:TTT_OVN50PCT</b>	Must be >= 0. May be NULL for non-Interstate NHS (please see Cross-data Item Check Table)	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be >= 0 OR NULL for Non-Interstate NHS, Must Be >= 0 for all other sections	22

Data Field	Validation	Warning Message	Field Validation Criteria No.
<b>[Travel_Time_Metrics]:TTT_OVN95PCT</b>	Must be >= 0. May be NULL for non-Interstate NHS (please see Cross-data Item Check Table)	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be >= 0 OR NULL for Non-Interstate NHS, Must Be >= 0 for all other sections	22
<b>[Travel_Time_Metrics]:TTTR_WE</b>	Must be >= 1.00. May be NULL for non-Interstate NHS (please see Cross-data Item Check Table) (reject record, if < 1.00 AND F_System = 1)	TTTR_AMP, TTTR_MIDD, TTTR_PMP, TTTR_OVN, TTTR_WE Must be >= 1 OR NULL for Non-Interstate NHS, Must Not Be < 1.00 for Interstate	21
<b>[Travel_Time_Metrics]:TTT_WE50PCT</b>	Must be >= 0. May be NULL for non-Interstate NHS (please see Cross-data Item Check Table)	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be >= 0 OR NULL for Non-Interstate NHS, Must Be >= 0 for all other sections	22
<b>[Travel_Time_Metrics]:TTT_WE95PCT</b>	Must be >= 0. May be NULL for non-Interstate NHS (please see Cross-data Item Check Table)	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be >= 0 OR NULL for Non-Interstate NHS, Must Be >= 0 for all other sections	22
<b>[Travel_Time_Metrics]:PHED</b>	Must be >= 0 and cannot be NULL for applicable urbanized areas.	PHED Must be >= 0 for Urban_Code IN (3817, 4843, 9271, 15670, 16264, 16885, 17668, 19234, 22042, 23527, 23824, 40429, 41212, 47995, 51445, 56116, 57466, 57628, 63217, 69076, 69184, 69697, 71317, 75340, 77068, 77770, 78499, 78661, 78904, 79039, 79093, 80389, 92242) or May be NULL otherwise	23
<b>[Travel_Time_Metrics]:OCC_FAC</b>	Must be >= 1. May be NULL	OCC_FAC Must Be >= 1 If Not NULL.	24
<b>[Travel_Time_Metrics]:METRIC_SOURCE</b>	Must not be NULL AND Must be IN (1,2) (reject any record, if invalid)	METRIC_SOURCE Must be IN (1,2)	25
<b>[Item_71]:Value_Text</b>	Must be unique and not NULL	Value_Text of Travel_Time_Code Section Must Be Unique	33

**Table C - Cross-Data Item Check for Each Record within “Travel\_Time\_Metrics” Table**

Data Field	If	Then	Warning Message	Cross Validation Criteria No.
[Travel_Time_Metrics]:LOTTR_AMP	TT_AMP50PCT > 1 AND TT_AMP50PCT IS NOT NULL AND TT_AMP80PCT > 1 AND TT_AMP80PCT IS NOT NULL	Must be between $\text{round} \left( \frac{\text{TT\_AMP80PCT} - 1}{\text{TT\_AMP50PCT} + 1}, 2 \text{ decimals} \right)$ and $\text{round} \left( \frac{\text{TT\_AMP80PCT} + 1}{\text{TT\_AMP50PCT} - 1}, 2 \text{ decimals} \right)$	Submitted LOTTR_AMP value is not compatible with submitted TT_AMP50PCT and TT_AMP80PCT values.	1
[Travel_Time_Metrics]:TT_AMP50PCT		Must be <= TT_AMP80PCT	TT_AMP50PCT Must Be <= TT_AMP80PCT	2
[Travel_Time_Metrics]:TT_AMP80PCT		Must be >= TT_AMP50PCT	TT_AMP80PCT Must Be >= TT_AMP50PCT	3
[Travel_Time_Metrics]:LOTTR_MIDD	TT_MIDD50PCT >1 AND TT_MIDD50PCT IS NOT NULL AND TT_MIDD80PCT >1 AND TT_MIDD80PCT IS NOT NULL	Must be between $\text{round} \left( \frac{\text{TT\_MIDD80PCT} - 1}{\text{TT\_MIDD50PCT} + 1}, 2 \text{ decimals} \right)$ and $\text{round} \left( \frac{\text{TT\_MIDD80PCT} + 1}{\text{TT\_MIDD50PCT} - 1}, 2 \text{ decimals} \right)$	Submitted LOTTR_MIDD value is not compatible with submitted TT_MIDD50PCT and TT_MIDD80PCT values.	4
[Travel_Time_Metrics]:TT_MIDD50PCT		Must be <= TT_MIDD80PCT	TT_MIDD50PCT Must Be <= TT_MIDD80PCT	5
[Travel_Time_Metrics]:TT_MIDD80PCT		Must be >= TT_MIDD50PCT	TT_MIDD80PCT Must Be >= TT_MIDD50PCT	6
[Travel_Time_Metrics]:LOTTR_PMP	TT_PMP50PCT >1 AND TT_PMP50PCT IS NOT NULL AND TT_PMP80PCT >1 AND TT_PMP80PCT IS NOT NULL	Must be between $\text{round} \left( \frac{\text{TT\_PMP80PCT} - 1}{\text{TT\_PMP50PCT} + 1}, 2 \text{ decimals} \right)$ and $\text{round} \left( \frac{\text{TT\_PMP80PCT} + 1}{\text{TT\_PMP50PCT} - 1}, 2 \text{ decimals} \right)$	Submitted LOTTR_PMP value is not compatible with submitted TT_PMP50PCT and TT_PMP80PCT values.	7
[Travel_Time_Metrics]:TT_PMP50PCT		Must be <= TT_PMP80PCT	TT_PMP50PCT Must Be <= TT_PMP80PCT	8



Data Field	If	Then	Warning Message	Cross Validation Criteria No.
[Travel_Time_Metrics]:TT_PMP80PCT		Must be >= TT_PMP50PCT	TT_PMP80PCT Must Be >= TT_PMP50PCT	9
[Travel_Time_Metrics]:LOTTR_WE	TT_WE50PCT >1 AND TT_WE50PCT IS NOT NULL AND TT_WE80PCT >1 AND TT_WE80PCT IS NOT NULL	Must be between $\text{round} \left( \frac{\text{TT\_WE80PCT} - 1}{\text{TT\_WE50PCT} + 1}, 2 \text{ decimals} \right)$ and $\text{round} \left( \frac{\text{TT\_WE80PCT} + 1}{\text{TT\_WE50PCT} - 1}, 2 \text{ decimals} \right)$	Submitted LOTTR_WE value is not compatible with submitted TT_WE50PCT and TT_WE80PCT values.	10
[Travel_Time_Metrics]:TT_WE50PCT		Must be <= TT_WE80PCT	TT_WE50PCT Must Be <= TT WE80PCT	11
[Travel_Time_Metrics]:TT_WE80PCT		Must be >= TT_WE50PCT	TT_WE80PCT Must Be >= TT WE50PCT	12
[Travel_Time_Metrics]:TTTR_AMP	TTT_AMP50PCT >1 AND TTT_AMP50PCT IS NOT NULL AND TTT_AMP95PCT >1 AND TTT_AMP95PCT IS NOT NULL	Must be between $\text{round} \left( \frac{\text{TTT\_AMP95PCT} - 1}{\text{TTT\_AMP50PCT} + 1}, 2 \text{ decimals} \right)$ and $\text{round} \left( \frac{\text{TTT\_AMP95PCT} + 1}{\text{TTT\_AMP50PCT} - 1}, 2 \text{ decimals} \right)$	Submitted TTTR_AMP value is not compatible with submitted TTT_AMP50PCT and TTT_AMP95PCT values.	13
[Travel_Time_Metrics]:TTT_AMP50PCT		Must be <= TTT_AMP95PCT	TTT_AMP50PCT Must Be <= TTT AMP95PCT	14
[Travel_Time_Metrics]:TTT_AMP95PCT		Must be >= TTT_AMP50PCT	TTT_AMP95PCT Must Be >= TTT AMP50PCT	15
[Travel_Time_Metrics]:TTTR_MIDD	TTT_MIDD50PCT >1 AND TTT_MIDD50PCT IS NOT NULL AND TTT_MIDD95PCT >1 AND TTT_MIDD95PCT IS NOT NULL	Must be between $\text{round} \left( \frac{\text{TTT\_MIDD95PCT} - 1}{\text{TTT\_MIDD50PCT} + 1}, 2 \text{ decimals} \right)$ and $\text{round} \left( \frac{\text{TTT\_MIDD95PCT} + 1}{\text{TTT\_MIDD50PCT} - 1}, 2 \text{ decimals} \right)$	Submitted TTTR_MIDD value is not compatible with submitted TTT_MIDD50PCT and TTT_MIDD95PCT values.	16
[Travel_Time_Metrics]:TTT_MIDD50PCT		Must be <= TTT_MIDD95PCT	TTT_MIDD50PCT Must Be <= TTT MIDD95PCT	17
[Travel_Time_Metrics]:TTT_MIDD95PCT		Must be >= TTT_MIDD50PCT	TTT_MIDD95PCT Must Be >= TTT MIDD50PCT	18

Data Field	If	Then	Warning Message	Cross Validation Criteria No.
[Travel_Time_Metrics]:TTTR_PMP	TTT_PMP50PCT >1 AND TTT_PMP50PCT IS NOT NULL AND TTT_PMP95PCT >1 AND TTT_PMP95PCT IS NOT NULL	Must be between $\text{round} \left( \frac{\text{TTT\_PMP95PCT} - 1}{\text{TTT\_PMP50PCT} + 1}, 2 \text{ decimals} \right)$ and $\text{round} \left( \frac{\text{TTT\_PMP95PCT} + 1}{\text{TTT\_PMP50PCT} - 1}, 2 \text{ decimals} \right)$	Submitted TTTR_PMP value is not compatible with submitted TTT_PMP50PCT and TTT_PMP95PCT values.	19
[Travel_Time_Metrics]:TTT_PMP50PCT		Must be <= TTT_PMP95PCT	TTT_PMP50PCT Must Be <= TTT_PMP95PCT	20
[Travel_Time_Metrics]:TTT_PMP95PCT		Must be >= TTT_PMP50PCT	TTT_PMP95PCT Must Be >= TTT_PMP50PCT	21
[Travel_Time_Metrics]:TTTR_OVN	TTT_OVN50PCT >1 AND TTT_OVN50PCT IS NOT NULL AND TTT_OVN95PCT >1 AND TTT_OVN95PCT IS NOT NULL	Must be between $\text{round} \left( \frac{\text{TTT\_OVN95PCT} - 1}{\text{TTT\_OVN50PCT} + 1}, 2 \text{ decimals} \right)$ and $\text{round} \left( \frac{\text{TTT\_OVN95PCT} + 1}{\text{TTT\_OVN50PCT} - 1}, 2 \text{ decimals} \right)$	Submitted TTTR_OVN value is not compatible with submitted TTT_OVN50PCT and TTT_OVN95PCT values.	22
[Travel_Time_Metrics]:TTT_OVN50PCT		Must be <= TTT_OVN95PCT	TTT_OVN50PCT Must Be <= TTT_OVN95PCT	23
[Travel_Time_Metrics]:TTT_OVN95PCT		Must be >= TTT_OVN50PCT	TTT_OVN95PCT Must Be >= TTT_OVN50PCT	24
[Travel_Time_Metrics]:TTTR_WE	TTT_WE50PCT >1 AND TTT_WE50PCT IS NOT NULL AND TTT_WE95PCT >1 AND TTT_WE95PCT IS NOT NULL	Must be between $\text{round} \left( \frac{\text{TTT\_WE95PCT} - 1}{\text{TTT\_WE50PCT} + 1}, 2 \text{ decimals} \right)$ and $\text{round} \left( \frac{\text{TTT\_WE95PCT} + 1}{\text{TTT\_WE50PCT} - 1}, 2 \text{ decimals} \right)$	Submitted TTTR_WE value is not compatible with submitted TTT_WE50PCT and TTT_WE95PCT values.	25
[Travel_Time_Metrics]:TTT_WE50PCT		Must be <= TTT_WE95PCT	TTT_WE50PCT Must Be <= TTT_WE95PCT	26
[Travel_Time_Metrics]:TTT_WE95PCT		Must be >= TTT_WE50PCT	TTT_WE95PCT Must Be >= TTT_WE50PCT	27

Data Field	If	Then	Warning Message	Cross Validation Criteria No.
<b>[Travel_Time_Metrics]:TTTR_AMP</b>	[Travel_Time_Metrics]: F_System = 1	[Travel_Time_Metrics]:TTTR_AMP must not be NULL	TTTR_AMP, TTTR_MIDD, TTTR_PMP, TTTR_OVN, TTTR_WE Must be >= 1 OR NULL for Non-Interstate NHS, Must Be >=1 for all other sections	Field Validation Criteria Number 21 (see Table B)
<b>[Travel_Time_Metrics]:TTT_AMP50PCT</b>	[Travel_Time_Metrics]: F_System = 1	[Travel_Time_Metrics]:TTT_AMP50PCT must not be NULL	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be >= 0 OR NULL for Non-Interstate NHS, Must Be >= 0 for all other sections	Field Validation Criteria Number 22 (see Table B)
<b>[Travel_Time_Metrics]:TTT_AMP95PCT</b>	[Travel_Time_Metrics]: F_System = 1	[Travel_Time_Metrics]:TTT_AMP95PCT must not be NULL	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be >= 0 OR NULL for Non-Interstate NHS, Must Be >= 0 for all other sections	Field Validation Criteria Number 22 (see Table B)
<b>[Travel_Time_Metrics]:TTTR_MIDD</b>	[Travel_Time_Metrics]: F_System = 1	[Travel_Time_Metrics]:TTTR_MIDD must not be NULL	TTTR_AMP, TTTR_MIDD, TTTR_PMP, TTTR_OVN, TTTR_WE Must be >= 1 OR NULL for Non-Interstate NHS, Must Be >=1 for all other sections	Field Validation Criteria Number 21 (see Table B)

Data Field	If	Then	Warning Message	Cross Validation Criteria No.
<b>[Travel_Time_Metrics]:TTT_MIDD50PCT</b>	[Travel_Time_Metrics]: F_System = 1	[Travel_Time_Metrics]:TTT_MIDD50PCT must not be NULL	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be >= 0 OR NULL for Non-Interstate NHS, Must Be >= 0 for all other sections	Field Validation Criteria Number 22 (see Table B)
<b>[Travel_Time_Metrics]:TTT_MIDD95PCT</b>	[Travel_Time_Metrics]: F_System = 1	[Travel_Time_Metrics]:TTT_MIDD95PCT must not be NULL	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be >= 0 OR NULL for Non-Interstate NHS, Must Be >= 0 for all other sections	Field Validation Criteria Number 22 (see Table B)
<b>[Travel_Time_Metrics]:TTTR_PMP</b>	[Travel_Time_Metrics]: F_System = 1	[Travel_Time_Metrics]:TTTR_PMP must not be NULL	TTTR_AMP, TTTR_MIDD, TTTR_PMP, TTTR_OVN, TTTR_WE Must be >= 1 OR NULL for Non-Interstate NHS, Must Be >=1 for all other sections	Field Validation Criteria Number 21 (see Table B)
<b>[Travel_Time_Metrics]:TTT_PMP50PCT</b>	[Travel_Time_Metrics]: F_System = 1	[Travel_Time_Metrics]:TTT_PMP50PCT must not be NULL	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be >= 0 OR NULL for Non-Interstate NHS, Must Be >= 0 for all other sections	Field Validation Criteria Number 22 (see Table B)

Data Field	If	Then	Warning Message	Cross Validation Criteria No.
<b>[Travel_Time_Metrics]:TTT_PMP95PCT</b>	[Travel_Time_Metrics]: F_System = 1	[Travel_Time_Metrics]:TTT_PMP95PCT must not be NULL	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be >= 0 OR NULL for Non-Interstate NHS, Must Be >= 0 for all other sections	Field Validation Criteria Number 22 (see Table B)
<b>[Travel_Time_Metrics]:TTTR_OVN</b>	[Travel_Time_Metrics]: F_System = 1	[Travel_Time_Metrics]:TTTR_OVN must not be NULL	TTTR_AMP, TTTR_MIDD, TTTR_PMP, TTTR_OVN, TTTR_WE Must be >= 1 OR NULL for Non-Interstate NHS, Must Be >=1 for all other sections	Field Validation Criteria Number 21 (see Table B)
<b>[Travel_Time_Metrics]:TTT_OVN50PCT</b>	[Travel_Time_Metrics]: F_System = 1	[Travel_Time_Metrics]:TTT_OVN50PCT must not be NULL	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be >= 0 OR NULL for Non-Interstate NHS, Must Be >= 0 for all other sections	Field Validation Criteria Number 22 (see Table B)
<b>[Travel_Time_Metrics]:TTT_OVN95PCT</b>	[Travel_Time_Metrics]: F_System = 1	[Travel_Time_Metrics]:TTT_OVN95PCT must not be NULL	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be >= 0 OR NULL for Non-Interstate NHS, Must Be >= 0 for all other sections	Field Validation Criteria Number 22 (see Table B)

Data Field	If	Then	Warning Message	Cross Validation Criteria No.
[Travel_Time_Metrics]:TTTR_WE	[Travel_Time_Metrics]: F_System = 1	[Travel_Time_Metrics]:TTTR_WE must not be NULL	TTTR_AMP, TTTR_MIDD, TTTR_PMP, TTTR_OVN, TTTR_WE Must be >= 1 OR NULL for Non-Interstate NHS, Must Be >=1 for all other sections	Field Validation Criteria Number 21 (see Table B)
[Travel_Time_Metrics]:TTT_WE50PCT	[Travel_Time_Metrics]: F_System = 1	[Travel_Time_Metrics]:TTT_WE50PCT must not be NULL	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be >= 0 OR NULL for Non-Interstate NHS, Must Be >= 0 for all other sections	Field Validation Criteria Number 22 (see Table B)
[Travel_Time_Metrics]:TTT_WE95PCT	[Travel_Time_Metrics]: F_System = 1	[Travel_Time_Metrics]:TTT_WE95PCT must not be NULL	TTT_AMP50PCT, TTT_AMP95PCT, TTT_MIDD50PCT, TTT_MIDD95PCT, TTT_PMP50PCT, TTT_PMP95PCT, TTT_OVN50PCT, TTT_OVN95PCT, TTT_WE50PCT, TTT_WE95PCT Must be >= 0 OR NULL for Non-Interstate NHS, Must Be >= 0 for all other sections	Field Validation Criteria Number 22 (see Table B)

**Table D – Cross-Tabular Data Item Checks**

Data Field	If	Then	Message	Cross Validation Criteria No.
[Travel_Time_Metrics]:F_System	[Travel_Time_Metrics]:METRIC_SOURCE = 1 AND Item 71 Unreported AND ([Travel_Time_Metrics]:F_System IN (1,2,3,4,5,6,7))  WHERE([Travel_Time_Metrics]:Travel_Time_Code = [Travel_Message_Channel_Identification]:tmc)	[Travel_Time_Metrics]:F_System = [Travel_Message_Channel_Identification]:f_system	F_System, Urban_Code, Facility_Type and NHS of Travel_Time_Metrics Must Match f_system, urban_code, faciltytype and nhs of Travel_Message_Channel_ Identification, respectively, Where METRIC_SOURCE = 1 AND Travel_Time_Code of Travel_Time_Metrics = Travel_Message_Channel of Travel_Message_Channel_ Identification AND Travel_Time_Code Is Not Reported as a Data Item Section	30

Data Field	If	Then	Message	Cross Validation Criteria No.
[Travel_Time_Metrics]:Urban_Code	[Travel_Time_Metrics]:METRIC_SOURCE = 1 AND Item 71 Unreported AND ([Travel_Time_Metrics]:Urban_Code IS NOT NULL AND [Travel_Time_Metrics]:Urban_Code ≠0)  WHERE([Travel_Time_Metrics]:Travel_Time_Code = [Travel_Message_Channel_Identification]:tmc)	[Travel_Time_Metrics]:Urban_Code = [Travel_Message_Channel_Identification]:urban_code	F_System, Urban_Code, Facility_Type and NHS of Travel_Time_Metrics Must Match f_system, urban_code, faciltytype and nhs of Travel_Message_Channel_ Identification, respectively, Where METRIC_SOURCE = 1 AND Travel_Time_Code of Travel_Time_Metrics = Travel_Message_Channel of Travel_Message_Channel_ Identification AND Travel_Time_Code Is Not Reported as a Data Item Section	30



Data Field	If	Then	Message	Cross Validation Criteria No.
[Travel_Time_Metrics]:Facility_Type	[Travel_Time_Metrics]:METRIC_SOURCE = 1 AND Item 71 Unreported AND ([Travel_Time_Metrics]:Facility_Type IS NOT NULL AND [Travel_Time_Metrics]:Facility_Type ≠ 0)  WHERE([Travel_Time_Metrics]:Travel_Time_Code = [Travel_Message_Channel_Identification]:tmc)	[Travel_Time_Metrics]:Facility_Type = [Travel_Message_Channel_Identification]:faciltype	F_System, Urban_Code, Facility_Type and NHS of Travel_Time_Metrics Must Match f_system, urban_code, faciltype and nhs of Travel_Message_Channel_ Identification, respectively, Where METRIC_SOURCE = 1 AND Travel_Time_Code of Travel_Time_Metrics = Travel_Message_Channel of Travel_Message_Channel_ Identification AND Travel_Time_Code Is Not Reported as a Data Item Section	30

Data Field	If	Then	Message	Cross Validation Criteria No.
[Travel_Time_Metrics]:NHS	[Travel_Time_Metrics]:METRIC_SOURCE = 1 AND Item 71 Unreported AND ([Travel_Time_Metrics]:NHS IS NOT NULL AND [Travel_Time_Metrics]:NHS ≠0)  WHERE([Travel_Time_Metrics]:Travel_Time_Code = [Travel_Message_Channel_Identification]:tmc)	[Travel_Time_Metrics]:NHS = [Travel_Message_Channel_Identification]:nhs	F_System, Urban_Code, Facility_Type and NHS of Travel_Time_Metrics Must Match f_system, urban_code, faciltytype and nhs of Travel_Message_Channel_ Identification, respectively, Where METRIC_SOURCE = 1 AND Travel_Time_Code of Travel_Time_Metrics = Travel_Message_Channel of Travel_Message_Channel_ Identification AND Travel_Time_Code Is Not Reported as a Data Item Section	30
[Travel_Time_Metrics]:Segment_Length	[Travel_Time_Metrics]:METRIC_SOURCE = 1  WHERE([Travel_Time_Metrics]:Travel_Time_Code = [Travel_Message_Channel_Identification]:tmc and [Travel_Message_Channel_Identification]:nhs_pct < 100)	round([Travel_Time_Metrics]:Segment_Length, 3 decimal places) < round([Travel_Message_Channel_Identification]:mile, 3 decimal places)	Segment_Length of Travel_Time_Metrics Must = product of miles and percent nhs in Travel_Message_Channel_ Identification divided by 100 in an accuracy of three decimal places Where METRIC_SOURCE = 1 AND Travel_Time_Code of Travel_Time_Metrics = Travel_Message_Channel of Travel_Message_Channel_ Identification	31

Data Field	If	Then	Message	Cross Validation Criteria No.
[Travel_Time_Metrics]:DIR_AADT	[Travel_Time_Metrics]:METRIC_SOURCE = 1 AND Item 71 Unreported AND [Travel_Time_Metrics]:Facility_Type = 1  WHERE([Travel_Time_Metrics]:Travel_Time_Code = [Travel_Message_Channel_Identification]:tmc)	[Travel_Time_Metrics]: DIR_AADT = [Travel_Message_Channel_Identification]:aadt	DIR_AADT of one-way roadway in Travel_Time_Metrics Must = directional aadt of Travel_Message_Channel_Identification Where METRIC_SOURCE = 1 AND Facility_Type = 1 AND Travel_Time_Code of Travel_Time_Metrics = Travel_Message_Channel of Travel_Message_Channel_Identification AND Travel_Time_Code as a Travel_Time_Code Section Is Not Reported.	32

Data Field	If	Then	Message	Cross Validation Criteria No.
[Travel_Time_Metrics]:DIR_AADT	[Travel_Time_Metrics]:METRIC_SOURCE = 1 AND Item 71 Unreported AND [Travel_Time_Metrics]:Facility_Type IN (2,6)  WHERE([Travel_Time_Metrics]:Travel_Time_Code = [Travel_Message_Channel_Identification]:tmc)	[Travel_Time_Metrics]: DIR_AADT < [Travel_Message_Channel_Identification]:aadt	DIR_AADT of two-way roadway or non- inventory direction roadway in Travel_Time_Metrics Must < bidirectional aadt in Travel_Message_Channel_ Identification Where METRIC_SOURCE = 1 AND Travel_Time_Code of Travel_Time_Metrics = Travel_Message_Channel of Travel_Message_Channel_ Identification AND Travel_Time_Code as a Travel_Time_Code Section Is Not Reported.	34