

CHANGE LOG



PROJECT DEVELOPMENT AND DESIGN GUIDE

CHAPTER NO./TITLE 7. Interchanges

EFFECTIVE DATE March 11, 2024

SECTION	CHANGE
General	Agency name has been updated to MassDOT throughout.
General	Various minor grammatical changes and nomenclature changes for consistency within this chapter and throughout the Guide.
General	Added hyperlinks to external resources.
General	Changed all Exhibit numbers to separate Table and Figure numbers.
General	Updated figures, tables and their sources based on the 2018 AASHTO Green Book.
7.2 Warrants and Planning Considerations	<p>Warrants: Updated warrants based on the 2018 AASHTO Green Book, Section 10.2. Renamed the Safety warrant to "Reduction of Crash Frequency and Severity." Renamed the Congestion warrant to "Reduction of Bottlenecks or Spot Congestion."</p> <p>Interchange Spacing: Updated spacing guidance for interstate highway interchanges in rural areas.</p> <p>Interchange Justification/Modification Reports: Substituted FHWA's policy for preparing an IJR/IMR with a link to the FHWA's website containing the policy.</p>
7.3 Interchange Types	<p>Diamond Interchanges: Added content on roundabout interchanges based on the 2018 AASHTO Green Book Section 10.9.3.3.</p> <p>Diverging Diamond Interchanges: Added section describing Diverging Diamond Interchanges with content from the 2018 AASHTO Green Book Section 10.9.3.5. Added Figure 7-6: Diverging Diamond Interchange.</p>
7.4 General Design Considerations	No major changes
7.5 Traffic Lane Principles	<p>Basic Number of Lanes: Retitled "Basic Number of Lanes and Freeway Lane Drops" to "Basic Number of Lanes." Added content based on the 2018 AASHTO Green Book Section 10.9.5.8. Added Figure 7-11: Schematic of Basic Number of Lanes.</p> <p>Freeway Lane Drops: Moved content to its own subsection.</p> <p>Lane Balance: Added content based on the 2018 AASHTO Green Book Section 10.9.5.8.</p> <p>Distance Between Successive Ramp Terminals: Split Exhibit 7-12 into Figure 7-14: Ramp-Pair Combinations and Table 7-1: Recommended Minimum Ramp Terminal Spacing.</p>

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<p>7.6 Freeway/Ramp Junctions:</p>	<p>Exit Ramps: Split Exhibit 7-13 into Table 7-2: Minimum Deceleration Lengths for Exit Terminals with Flat Grade of 3% or Less and Figure 7-15: Deceleration Lengths for Parallel and Taper Type Exit Terminals with Flat Grades of 3" or Less.</p> <p>Entrance Ramps: Split Exhibit 7-14 into Table 7-3: Minimum Acceleration Lengths for Entrance Terminals with Flat Grades of 3% or Less and Figure 7-16: Minimum Acceleration Lengths for Parallel and Taper Type Entrance Terminals with Flat Grades of 3% or Less. Split Exhibit 7-5 into Table 7-4: Deceleration Lane Ratio of Length on Grade to Length on Level by Grade for All Design Speeds, Table 7-5: Acceleration Lane Ratio of Length on Grade to Length on Level for 3 to 4% Upgrades, Table 7-6: Acceleration Lane Ratio of Length on Grade to Length on Level for 5 to 6% Upgrades, and Table 7-7: Acceleration Lane Ratio of Length on Grade to Length on Level for All Speeds.</p> <p>Capacity and Level of Service: Split Exhibit 7-18 into Figure 7-19: Capacity of Ramp Configuations and two separate tables, Tables 7-8: Capacity of Upstream or Downstream Ramp-Freeway Junctions (Passenger Cars per Hour, pc/h) by Free-Flow Speed (mph) and Table 7-9: Capacity of High-Speed Ramp Junctions on Multilane Highways and Collector-Distributor Roadways (Passenger Cars per Hour, pc/h) by Free-Flow Speed (mph). Tables 7-8 and 7-9 are sourced from the 2022 Highway Capacity Manual and replace the level-of-service criteria table originally part of Exhibit 7-18.</p> <p>Major Forks and Branch Connections: Added description of why inside merges should be avoided.</p>
<p>7.7 Ramp Design</p>	<p>Geometric Design: Updated Table 7-10: Guide Values for Ramp Design Speed (mph) by Highway Design Speed (HDS) and Speed Range (former Exhibit 7-21). Replaced minimum radius values in Exhibit 7-21 with a cross-reference to Table 4-2. Added new content from 2018 AASHTO Green Book Section 10.9.6.2.4: Loop Ramps. Added new content from 2018 AASHTO Green Book Section 10.9.6.2.5: Two Lane Loop Ramps and removed a 2006 guideline for a desirable minimum radius of 1,000 feet. Replaced Exhibit 7-26 with Table 7-12: Ramp Gradient Guidelines, adapted from the 2018 AASHTO Green Book Table 10-2.</p> <p>Capacity: Replaced Exhibit 7-27 with Table 7-13: Approximate Service Volumes For Single-Lane Ramps based on the 2022 Highway Capacity Manual Exhibit 14-12. Deleted original text and added text clarifying the use of the new table.</p>

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7.9 Ramp/Minor Road Intersections	<p>Expanded the Access Restrictions to justify the use of access control. Updated minimum distance of no-access layout line in urban and rural areas. Added Figure 7-25: Factors Influencing Length of Access Control Along an Interchange. Added note that additional distance may be needed to provide adequate and safe intersection operations. Reduced the minimum no-access distance from 500 feet generally to 100 feet in urban areas and 300 feet in rural areas.</p> <p>Organized content on bicycle lane crossings at ramps under its own subsection. Removed Exhibit 7-28: Bicycle Lane Crossing of Diverging Ramp. Updated text regarding both merging and diverging ramp crossing based on the 2012 AASHTO Guide for the Development of Bicycle Facilities. Split Exhibit 7-29: Bicycle Lane Crossing of Merging Ramp into two figures—Figures 7-26: Bicycle Lane Crossing of Merging Ramp - Option 1 and Figure 7-27: Bicycle Lane Crossing of Merging Ramp - Option 2.</p>
7.10 For Further Information	Updated references and links.