

CHANGE LOG

PROJECT DEVELOPMENT AND DESIGN GUIDE



CHAPTER NO./TITLE 3. Basic Design Controls

EFFECTIVE DATE October 21, 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	Hyperlinks to external resources have been added.
General	Changed all Exhibit numbers to separate Table and Figure numbers.
General	Updated AASHTO 2004 Green Book references to AASHTO 2018 Green Book
3.1 Introduction	Added brief explanation distinguishing design controls from design criteria.
3.2 Roadway Context	Area Types: Added sentence regarding urbanized areas and urban clusters as defined by the latest version of the "MassDOT Urban Boundaries" map.

SECTION	CHANGE
3.3 Roadway Users	<p>Updated introductory text to include reference to designing for all ages and abilities, FHWA's Safe System principles, desired paths of travel for each user, and references and statistics regarding trip lengths.</p> <p>People Walking (Pedestrians): Updated section title from "The Pedestrian." Removed "Pedestrian Body Ellipse" figure. Updated description of pedestrians and list of pedestrian facilities. Update language to integrate the Safe System principles. Added content on the influence of age and disability on pedestrian needs. Removed paragraph about typical walking trip lengths. Removed reference to Highway Capacity Manual for pedestrian space requirements. Added Figure 3-7: Typical Dimensions of Various Pedestrian Types. Removed sub-section "Pedestrian Level-of-Service Measures."</p> <p>People Biking (Bicyclists): Updated section title from "The Bicyclist." Removed "Shared-Use Path Users" image. Substantially updated introduction to include why people may bike and the three types of bicyclists, added reference to FHWA Bikeway Selection Guide, and added Figure 3-8: Types of Bicyclists and Their Stress Tolerance. Substantially revised sub-section "Spatial Needs of Bicyclists" to include new guidance from NACTO on space needed for cargo bikes and passing maneuvers. Added Figure 3-9, Table 3-2, Table 3-3, and Table 3-4. Added references to Engineering Directive E-20-001 and MassDOT Separated Bike Lane Planning & Design Guide. Moved content on influence of surface quality on bicyclists into its own sub-section. Removed sub-section "Bicycle Level-of-Service Measures."</p> <p>People Driving (Drivers/Motorists): Updated section title from "The Driver." Added reference to Safe Systems approach and updated reference to AASHTO Green Book. Added definitions for design vehicle and control vehicle. Updated Table 3-5: Design Vehicle Dimensions. Added reference to MassDOT's Guidelines for the Planning and Design of Roundabouts. Added language about level of service being one input to the design process. Removed reference to LOS levels and Highway Capacity Manual.</p> <p>Public Transit Vehicles and Passengers: Updated section title from "Public Transit." Updated "Articulated Transit Bus" image. Added references to MBTA Transit Priority Plan, MBTA Transit Priority Toolkit, MBTA Bus Stop Planning & Design Guide, NACTO Transit Street Design Guide, Controlling Criteria for Transit Provisions (Engineering Directive E-20-001), and the Transit Capacity and Quality of Service Manual.</p>

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3.4 Transportation Demand	<p>Design Year: Added reference to local Transportation Plans or Master Plans in the context of selecting a design year.</p> <p>Volume and Composition of Demand: Relocated information on determining appropriate estimates of activity levels to sub-sections.</p> <p>Added links to resources for estimating potential walking and biking demand.</p> <p>Added reference to Massachusetts Bicycle Transportation Plan.</p> <p>Added guidance for selecting locations to conduct pedestrian and bicyclist counts.</p> <p>Section title "Motor Vehicle Design Volumes and Traffic Composition" updated from "Design Volumes and Traffic Composition."</p> <p>Added section "Transit Frequency and Volume" and referenced MBTA's Bus Stop Planning & Design Guide and Controlling Criteria for Transit provision (Engineering Directive E-20-001).</p>
3.5 Measures of Effectiveness	<p>Removed reference to Appendix 2-A-2 in introduction.</p> <p>Combined the "Transportation Measures of Effectiveness" and "Contextual Measures of Effectiveness" sections into single set of measures: Safety, System Preservation, Mobility and Connectivity, Social Equity, Economic Impacts, Environmental Effects, and Policy Support.</p> <p>Integrated "Mode Choice," "Network Connectivity," and "Level of Service" measures into "Mobility and Connectivity" measure.</p> <p>Broadened "Environmental Justice" measure into "Social Equity" measure.</p> <p>Integrated "Impact Mitigation" and "Aesthetics and Community Enhancement" into "Community Enhancement" measure.</p> <p>Added "Policy Support" measure and removed "Accessibility" measures, as all MassDOT projects must be accessible.</p>

SECTION	CHANGE
3.6 Speed	<p>Significant restructuring of content and addition of expanded guidance on target speed.</p> <p>Added definition of "safer speeds" and reference to Safe Systems approach.</p> <p>Added Figure 3-10: Relationship Between Speed, Safety, and Driver's Cone of Vision.</p> <p>Removed "Speed Limits" sub-section.</p> <p>Added the following sub-sections: "Speed Concepts and Definitions," "Purpose of Target Speed and Design Speed," "Overview Process for Identifying Target and Design Speed," "Identifying Target and Design Speed Range," "Achieving Target Speed with Speed Management," and "The Role of Speed Limits and Speed Zoning in Speed Management."</p> <p>Added Figure 3-11: Process, Documentation, and Reviews for Identifying Target and Design Speed and description of how identification of target and design speed fits into the design process.</p> <p>Replaced 2006 Exhibit 3-7 with Table 3-6: Target and Design Speed Ranges by Area Type and Roadway Type. Revised minimum and maximum speeds to support MassDOT's safety and speed management goals. Removed "Freeways" column from Table 3-6 and added note that target speed process does not apply to limited access roadways and freeways.</p> <p>Retitled and added content to "Establishing Target Speed" (formerly "Target Speed for Motor Vehicles"). Added Table 3-7.</p> <p>Retitled and added content to "Establishing Design Speed" (formerly "Design Speed for Motor Vehicles"). Added sub-sections "Design Speed and Design Exceptions" and "Design Speed for Limited Access Roadways/Freeways/Interstates."</p> <p>Added "Achieving Target Speed with Speed Management" with Table 3-8 and sub-section "Potential Effect on Operating Speeds."</p> <p>Added guidance on when posted speed limits are determined to new section "The Role of Speed Limits and Speed Zoning in Speed Management."</p> <p>Updated section title "Selecting Bicycle Design Speed" to "Bicycle Speed Considerations" and updated content to define bicycle operating speed and bicycle design speed.</p> <p>Updated section title "Selecting Pedestrian Design Speed" to "Pedestrian Speed Considerations" and updated content to discuss the use of pedestrian walking speed instead of pedestrian design speed.</p>

SECTION	CHANGE
3.7 Sight Distance	<p>Most updates in this section are to replace 2004 AASHTO Green Book references with 2018 AASHTO Green Book references, to split exhibits in to separate figures and tables, and to reformat tables for accessibility.</p> <p>Stopping Sight Distance: Updated Table 3-9: Motor Vehicle Stopping Sign Distances (feet) by Percent Grade (formerly "Motor Vehicle Stopping Sight Distances). Table includes 15 mph design speed.</p> <p>Updated section title "Bicycle Stopping Sight Distance" to "Sight Distance for Bicyclists" and added reference to MassDOT Separated Bicycle Planning and Design Guide.</p> <p>Decision Sight Distance: Updated Table 3-10: Decision Sight Distances (feet) by Avoidance Maneuver (2006 Exhibit 3-9 "Decision Sight Distances").</p> <p>Intersection Sight Distance: Added sight distances between bicyclists, motorists, and pedestrians as a consideration.</p> <p>Case A – Intersections with No Control on Any Approach: 2006 Exhibit 3-10 broken up into Figure 3-12, Table 3-11, and Table 3-12.</p> <p>Case B – Stop Control on Minor Street: 2006 Exhibit 3-11 broken up into Figure 3-13 and Table 3-14.</p> <p>Case C – Yield Control: 2006 Exhibit 3-12 broken up into Figure 3-14 and Table 3-15.</p> <p>Case C – Yield Control at Roundabouts: 2006 Exhibit 3-13 updated as Table 3-16 based on NCHRP Research Report 1043: Guide for Roundabouts</p>
3.8 Controlling Criteria	Added section to refer to controlling design criteria in accordance with Engineering Directive E-20-001.
3.9 For Further Information	References and links updated.