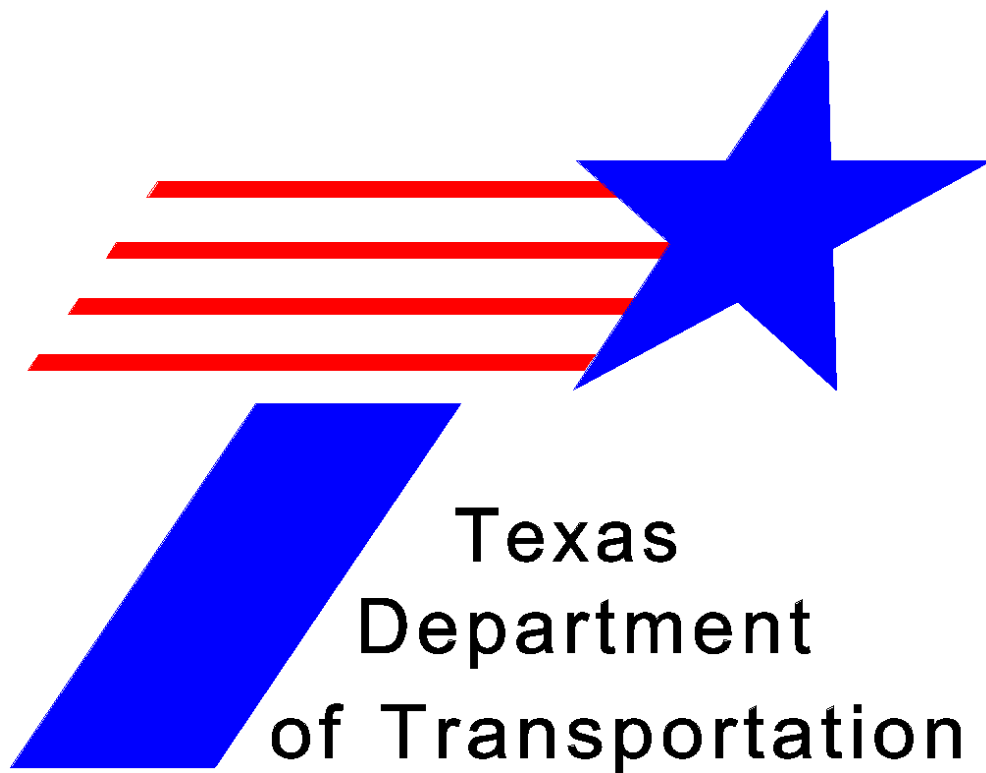


Roadway Design Manual



Texas
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Manual Notice 2022-1

From: Marisabel Ramthun, P.E

Manual: *Roadway Design Manual*

Effective Date: May 11, 2022

Purpose

The *Roadway Design Manual* has been revised to update roadway policy in accordance with FHWA guidelines and with comments received from Design Division, other Divisions, and TxDOT's 25 Districts. As a result, revisions were made to Chapters 1-8 and Appendices A, B, C, D and E. Likewise, all metric units were removed and minor errata type corrections and edits were made throughout the manual.

Contents

Chapter 1

Section 1: Minor errata type updates.

Section 2: Clarified FHWA role with respect to Design Exception policy.

Section 2: Design Exception, Design Waiver and other associated criteria information has been updated to a tabularized form for ease of use and reference.

Section 2: Table 1-1 was updated to include Bridge Rail requirements.

Section 2: Bicycle facility Design Exception and Design Waiver guidance has been updated and provided in Tables 1-3, and 1-8.

Section 2: Other errata type updates.

Section 3: Changed name of section to Schematic Development.

Section 3: Updated list of items included in Schematic Layout.

Section 3: Updated section on Schematic Approval.

Section 4: Minor errata type updates.

Section 5: Updated list of items included in Preliminary Design process.

Section 6: Minor errata type updates.

Chapter 2

General: Minor errata type edits to Table 2-2, 2-7, and 2-14.

General: Added new Tables 2-10 (Minimum K and L as a Function of A) and 2-11 (Vertical Clearance Requirements).

General: Updated Figure 2-1, 2-2, 2-4, and 2-6 thru 2-10 for better resolution.

General: Added new Figures 2-3 (Diagram Illustrating Components for Determining Horizontal Sight Distance) and 2-5 (Types of Vertical Curves).

Section 1: Changed section 1 Overview to an introduction.

Section 2: Changed section 2 to Functional Classifications.

Section 2: Added Freeways to Functional Classification and added reference to Statewide Planning Map.

Section 3: Changed section 3 to Traffic Characteristics.

Section 3: Added guidance on Traffic Forecast.

Section 3: Added guidance on Computation of DHV and DDHV.

Section 3: Added verbiage on Design Speed.

Section 3: Added guidance on Terrain.

Section 3: Added guidance on Turning Roadways and Intersection Corner Radii.

Section 3: Added guidance on Older Drivers and Older Pedestrians.

Section 4: Added verbiage on Stopping Sight Distance.

Section 4: Changed title of Table 2-1 and some minor errata type edits.

Section 4: Added verbiage for Sight Distance at Under Crossings.

Section 5: Changed section 5 to Horizontal Alignment.

Section 5: Added verbiage for General Considerations for Horizontal Alignment.

Section 5: Added verbiage for Curve Radius.

Section 5: Added verbiage for Superelevation Rate.

Section 5: Changed title of Table 2-3, 2-4, and 2-5, updated values in table and revised footnotes.

Section 5: Updated Table 2-6 by changing values in table.

Section 5: Updated footnote to Table 2-8.

Section 5: Added verbiage for Superelevation Transition Placement.

Section 5: Added verbiage for Superelevation Transition Type.

Section 5: Added verbiage for Sight Distance on Horizontal Curves.

Section 6: Changed section 6 to Vertical Alignment.

Section 6: Added verbiage on Grades.

Section 6: Updated Table 2-9 by changing values in table and revising footnote.

Section 6: Added verbiage on Grade Change without Vertical Curves.

Section 6: Added guidance on Vertical Alignment at Railroad Crossings.

Section 6: Added guidance on Vertical Alignment at Intersections.

Section 6: Added guidance on Vertical Clearance.

Section 7: Changed section 7 to Cross-Sectional Elements.

Section 7: Added verbiage on Pavement Cross Slope.

Section 7: Added verbiage on Median Design.

Section 7: Added guidance on Pavement Taper Lengths.

Section 7: Added verbiage for Curb and Curb with Gutters.

Section 7: Added verbiage for Lateral Offset to Obstructions.

Section 7: Change title of Table 2-12, minor errata type edits, and revised footnotes.

Section 8: Changed section 8 to Drainage Facility Placement.

Section 8: Updated values in Table 2-13.

Section 8: Updated Table 2-15, minor errata type edits and added footnote.

Section 9: Changed section 9 to Roadways Intersecting Department Projects and added verbiage.

Chapter 3

General: Updated Figure 3-1, 3-3 thru 3-5, 3-7, 3-10 thru 3-12, 3-15, 3-20 thru 3-23, 3-25 thru 3-28, for better resolution.

Section 1: Added verbiage in Introduction.

Section 2: Updated Table 3-1 by updating references to other criteria tables and figures and adjusted urban roadway design criteria. Also, revised several footnotes.

Section 2: Added guidance on Raised Medians.

Section 2: Updated Table 3-2 by updating width of TWLTL in table and adding footnote 1.

Section 2: Added guidance on Median Openings.

Section 2: Added new Figure 3-2 on Examples of Left-Turn Lanes with Negative, Zero, and Positive Offset.

Section 2: Added guidance on Berms.

Section 2: Added verbiage on Grade Separations and Interchanges.

Section 2: Added verbiage on Intersections.

Section 2: Added guidance on Speed Change Lanes.

Section 2: Updated Table 3-3 by combining two tables into one table.

Section 2: Updated Table 3-4 by updating values for deceleration length in table, adding footnotes and changing title to include left and right turns lanes.

Section 2: Added new Figure 3-6 on Types of Right Turn Treatments at Intersections.

Section 3: Updated Table 3-5 by updating references to other criteria tables and figures and adjusted suburban roadway design criteria. Also, made updates to footnotes in table.

Section 3: Added verbiage on Right-of-Way Width.

Section 3: Added guidance on Speed Change Lanes.

Section 4: Added verbiage in Overview.

Section 4: Updated Table 3-6 by updating references to other criteria tables and figures for two-lane rural highways.

Section 4: Updated Table 3-7 by updating ADT values in table.

Section 4: Updated Table 3-8 by updating criteria values for travel lanes and shoulders for rural two-lane highways. Also, updated footnotes in table.

Section 4: Added guidance on Passing Sight Distances.

Section 4: Updated Table 3-9 by updating passing sight distance and K values and footnote in table.

Section 4: Added verbiage on Speed Change Lanes.

Section 4: Added new Table 3-10 on Guide for Left-Turn Lane Warrants on Two-Lane Highways in Rural Areas.

Section 4: Added new Figure 3-8 on Suggested Left-Turn Warrants Based on Results from Benefit-Cost Evaluations for Intersections on Two-Lane Highways in Rural Areas.

Section 4: Updated Figure 3-9 by updating guidance on Typical Two-Lane Highway Intersection with Left-Turn Lanes.

Section 5: Added verbiage in Overview.

Section 5: Updated Table 3-11 by updating references to other criteria tables and adjusted multi-lane rural highway design criteria. Also, made updates to footnotes in table.

Section 5: Added guidance on Medians.

Section 5: Added new Figure 3-13 on Left Turn Lanes on Multilane Rural Highways.

Section 5: Updated Table 3-12 by updating deceleration values and removing design turning ADT & storage values. Also, updated footnotes in table.

Section 5: Added new Figure 3-14 on Examples of Tapered and Parallel Acceleration Lanes.

Section 5: Added new Table 3-13 on Minimum Acceleration Lane Lengths for Entrance Terminals with Flat Grades of Less Than 3%.

Section 5: Updated Table 3-14 by updating speed change lane adjustment factors as a function of grade. Also, updated footnote in table.

Section 5: Added verbiage on Intersections.

Section 5: Updated Figure 3-16 by updating guidance on Typical Transitions from Two-Lane to Four-Lane Divided Highways.

Section 6: Added verbiage in Overview.

Section 6: Updated Table 3-15 by updating references to other criteria tables and figures for freeways design criteria.

Section 6: Updated guidance and reorganized section on Access Control.

Section 6: Updated content of Figures 3-17 and 3-18 on access control at entrance and exit ramps with frontage road.

Section 6: Reformatted Table 3-16 on Desirable Spacing between Exit Ramps and Driveways, Side Streets, or Cross Streets.

Section 6: Updated Table 3-17 by updating design speed values for controlled access facilities.

Section 6: Added guidance on Lane Width and Number.

Section 6: Added new Figure 3-19 on Typical Examples of Lane Balance.

Section 6: Updated Table 3-18 by updating values for shoulder width and travel lane width for speed change lanes. Also, updated footnotes in table.

Section 6: Added verbiage on Medians.

Section 6: Added verbiage on Vertical and Clear Zones at Structures.

Section 6: Minor errata type edits to Table 3-19 and footnotes on Design Criteria for Rural Frontage Roads.

Section 6: Added verbiage on Conversion of Frontage Roads from Two-Way to One-Way Operation.

Section 6: Added verbiage on Grade Separations and Interchanges.

Section 6: Updated Figure 3-24 by updating content on Common Diamond Interchanges.

Section 6: Added guidance on Interchange Spacing.

Section 6: Added new Figure 3-33 on Interchange Spacing as Measured between Successive Cross Streets.

Section 6: Added guidance on Auxiliary Lanes.

Section 6: Added verbiage on Ramps and Direct Connectors.

Section 6: Added guidance on Design Speed.

Section 6: Updated Table 3-20 by updating ramp/connector design speed values. Also, updated footnotes in table.

Section 6: Added guidance on Ramp Geometrics.

Section 6: Added guidance on Ramp Gores.

Section 6: Added new Figure 3-34 on Typical Gore Area Characteristics.

Section 6: Added Table 3-21 on Desirable Maximum Grades for Ramps.

Section 6: Added new Figure 3-35 on Typical Ramp Profile Characteristics.

Section 6: Added new Figure 3-36 on Warped Neutral Area for ramps.

Section 6: Added guidance on Cross Section and Cross Slopes.

Section 6: Added guidance on Sight Distance.

Section 6: Added guidance on Ramp Terminal Design.

Section 6: Added new Figure 3-37 on Single-Lane Entrance Ramp Terminals on a Tangent.

Section 6: Added new Figure 3-38 on Entrance Ramp to a Freeway Curving in the Direction of the Ramp.

Section 6: Added new Figure 3-39 on Entrance Ramp to a Freeway Curving Away from the Direction of the Ramp.

Section 6: Added new Figure 3-40 on Entrance Ramp to a Superelevated Freeway Curving Away from the Ramp.

Section 6: Added new Figure 3-41 on Typical Single-Lane Exit Ramp Terminals.

Section 6: Added new Table 3-23 on Minimum Deceleration Lane Lengths for Exit Ramps with Flat Grades of Less Than 3 Percent.

Section 6: Added new Figure 3-42 on Taper-Type Entrance Ramp from a One-Way Frontage Road.

Section 6: Added new Figure 3-43 on Taper-Type Entrance Ramp from a Two-Way Frontage Road.

Section 6: Added guidance on Exit Ramps to Frontage Roads.

Section 6: Added guidance on Ramp Spacing.

Section 6: Added new Figure 3-44 on Arrangements for Successive Ramps.

Section 6: Added guidance on Collector-Distributor Roads.

Section 6: Added guidance on Frontage Road Turnarounds and Intersection Approaches.

Section 6: Added new Figure 3-45 on Typical Diamond Interchange with Frontage Road.

Section 7: Added verbiage on Freeways with High Occupancy Vehicle Treatments.

Section 7: Added Guidance on Peak Hour Lanes.

Section 7: Added Guidance on Tolloed Express Lanes.

Chapter 4

General: Updated Figure 4-1, 4-3, 4-4, & 4-5 by updating striping and better resolution.

General: Updated Figure 4-2 for better resolution.

Section 1: Updated Overview.

Section 1: Added guidance that 3R projects must be assessed to determine if bicycle accommodations are required per Chapter 6, Section 4 Bicycle Facilities.

Section 2: Updated Table 4-1 by updating titles to headings, changing a value in the table, and updating footnotes.

Section 2: Updated Table 4-2 by updating titles to headings, adjusting ADT values to prevent overlap, and updating footnotes and superscripts.

Section 2: Updated Table 4-3 by updating descriptions for the design elements and updating footnotes.

Section 2: Added guidance for Design Speed.

Section 2: Added guidance for Lane Widths.

Section 3: Changed title of Section to Designing for Safety.

Section 3: Updated Overview.

Section 3: Added guidance for Safety Design.

Section 3: Added guidance for Guard Fence.

Section 3: Updated guidance for Headwalls.

Section 3: Added guidance for Other Safety Improvements.

Section 4: Updated Table 4-4 by updating titles to headings, adjusting ADT values to prevent overlap, and updating footnotes.

Section 4: Updated Table 4-5 by updating titles to headings, adding design guidance to table for urban frontage roads, and updating footnotes.

Section 5: Updated Overview.

Section 6: Updated Overview.

Section 6: Updated Table 4-6 by adding guidance on design criteria for super 2 highways and updating footnotes.

Section 7: Added new section 7, 3R Project Documentation.

Chapter 5

Section 1: Changed title of Section 1 to Criteria.

Section 1: Added Overview Section.

Section 1: Updated Guidelines section.

Section 1: Added guidance that for 2R projects if bicycle accommodations are provided they must meet Chapter 6, Section 4 Bicycle Facilities.

Section 1: Added guidance for Crash Analysis.

Chapter 6

Section 1: Added verbiage to Overview.

Section 1: Updated guidance on Minimum Structure Widths.

Section 2: Minor errata type edits.

Section 3: Minor errata type edits.

Section 4: Provides updated comprehensive Bicycle Facilities Guidance. This guidance includes General Background, Planning and Context, Elements of Design, Bicycle Facility Types, Intersections and Crossings, and Maintenance and Operations.

The selection of the desired facility type is primarily a function of context (Urbanized, or Rural), vehicular volumes, and vehicular speed. The available Facility Types include: Shared Use Paths (sidepaths), separated bike lanes, buffered bike lanes, bike lanes, bike accessible shoulders, and shared wide outside lanes. The respective design criteria is provided for each of the facility types.

Updated “yield to pedestrians” guidance to “stop and yield to pedestrians” per action of the 2021 State of Texas legislative session.

Updated Off-system bridge guidance.

Provides updated guidance on projects that may be excepted from Bicycle facilities, as well as Design Exception and Design Waiver conditions.

Chapter 7

Section 1: Added verbiage to Overview.

Section 1: Added verbiage to Guardrail.

Section 1: Added guidance on Attenuators in temporary work zone applications.

Section 2: Added verbiage to Overview.

Section 2: Updated Table 7-1 on Type of Fence.

Section 3: Provides updated comprehensive Pedestrian Facilities Guidance. This guidance includes General Background, Elements of Design, Linear Pedestrian Facilities, Curb Ramp Design, Driveway Design Considerations, Intersections and Crossings, Overcrossings and Underpasses, Work Zone Ped. Accommodations, Lightings, On-street parking, Transit Access, Railings Adjacent to Steep Slopes, and additional considerations.

Updated “yield to pedestrians” guidance to “stop and yield to pedestrians” per action of the 2021 State of Texas legislative session.

Section 4: Added verbiage to Overview.

Section 4: Minor errata type edits.

Section 5: Minor errata type edits.

Section 6: Changed title of Section 6 from Emergency Median Openings on Freeways to Emergency Crossovers.

Section 6: Updated Overview by removing references to guidance on Median Openings.

Section 6: Added guidance on Emergency Crossovers under Location.

Section 7: Removed turning templates for design vehicles and added a reference to AASHTO’s Green Book for information on turning paths and turning radii of design vehicles.

Section 7: Updated Table 7-2 by adding guidance for WB-62 & WB-67 design vehicles.

Section 7: Added new Figure 7-46 on Example Pavement Edge Geometry WB-62, 90 Degree Turn.

Section 7: Added guidance on Median U-Turn Movements.

Section 7: Added new Figure 7-47 on AASHTO Minimum Median Widths for U-Turn Crossovers.

Chapter 8

General: Updated Tables 8-2, 8-7, and 8-8 by changing title.

Section 1: Added guidance that 5R projects must be assessed to determine if bicycle accommodations are required per Chapter 6, Section 4 Bicycle Facilities.

Section 2: Re-organized and added verbiage to Overview.

Section 2: Under Shoulders, changed “should” to “must”.

Section 2: Under Pavement Cross Slope, added guidance on highways with three or more lanes inclined in the same direction.

Section 2: Updated Table 8-1 by changing title, updating Brake Reaction Distance, and Stopping Sight Distance.

Section 2: Added guidance on Horizontal Alignment.

Section 2: Updated Table 8-3 by adding Maximum Allowable Friction Factor to title of column.

Section 2: Added guidance on Superelevation.

Section 2: Updated Table 8-4 by updating values and footnotes in table.

Section 2: Updated Table 8-5 by updating values and footnotes in table.

Section 2: Updated Table 8-6 by updating values in table.

Section 3: Updated Table 8-9 by updating titles of headings and updating the footnote.

Section 4: Added guidance on Design Speed.

Section 4: Updated Table 8-10 by changing title of headings, adding guidance on the Lower Range (50%) of Design Speed, and updating footnotes.

Section 4: Updated Table 8-11 by adding a title to the heading of a column and adding values to the table.

Section 4: Added new Table 8-12 to completely replace old table with new values and new formatting.

Section 4: Added new Table 8-13 to completely replace old table with new values and new formatting.

Section 4: Updated Table 8-14 by reformatting, adding values to table and updating footnote.

Appendix A – Longitudinal Barriers

General: “Accident” was replaced with “Crash”.

General: The abbreviation cz means clear zone.

General: Updated Figures A-1, A-4 thru A-7, A-9 thru A-19 for better resolution.

General: Updated Table A-4 for better resolution.

Section 2: Changed deflection range for Semi-rigid barriers from 18-60 inches to 26-60 inches.

Section 2: Added guidance on Barrier Transitions.

Section 2: Added guidance on Special Barrier Applications.

Section 2: Updated Roadside Features, Applications and added footnote #3 to Table A-1.

Section 2: Added clear zone guidance on Gateway Monuments.

Section 2: Added guidance on the removal of metal beam guard fence.

Section 3: Updated Figure A-3 to show projected cross slope/side slope hinge point.

Section 6: Defined equation A-1, $L(\text{total})=L(u) + L(p) + L(d)$.

Section 6: Updated Figure A-8 by removing table.

Section 6: Updated Table A-2 by labeling the equations.

Section 9: Added reference to chapter 7 section 6 for guidance on Emergency Crossovers.

Appendix B – Treatment of Pavement Drop-offs in Work Zones

General: Minor errata updates.

General: Updated Figure B-3 for better resolution.

Section 1: Updated Figure B-1 to show edge of travel lane, Z distance, and edge of dropoff.

Section 1: Added guidance on other factors in the guidelines for construction zone drop-off situations such as Driveways and access, Safety impacts and crash history, and Illumination.

Section 1: Updated Table B-2 for better resolution and made updates to edge condition III to read more clearly.

Section 1: Added guidance on Edge drop-offs greater than 2 inches.

Section 1: Added guidance on 1-2 inch vertical longitudinal joints.

Section 1: Added new Figure B-2.

Section 1: Added reference to the Construction Divisions technical advisory report on *Use of Tapered Longitudinal Joints such as the Notched Wedge Joint* for additional information.

Appendix C – Driveway Design Guidelines

General: Updated Figures C-1 thru C-11 for better resolution.

General: Deleted old Figures C-12 and C-13 and moved them to Chapter 7.

General: Deleted Figure C-14.

Section 1: Updated Overview.

Section 2: Added definition for Access Connection.

Section 2: Simplified Commercial Driveway definition.

Section 2: Changed “Apron” to “Driveway Apron”.

Section 2: Clarified definition for Effective Turning Radius.

Section 2: Clarified definition for Farm/Ranch Driveway.

Section 2: Clarified definition for Field Driveway.

Section 2: Clarified definitions of Public and Private Driveways.

Section 2: Changed Residential Driveway definition to Private Residential Driveway and clarified definition.

Section 2: Changed Radial Return or Flare Drop Curb definition to Radial Return or Flared Taper Return and clarified definition.

Section 2: Clarified definition for Service Driveway.

Section 2: Removed Shared Driveway definition.

Section 3: Added guidance for General Guidelines for Driveway Design Principles.

Section 3: Updated Table C-1 and added Note.

Section 3: Updated Table C-2 to fix superscripts and added footnotes #3 & #4.

Section 3: Guidance was added for driveways being reconstructed on existing roadway reconstruction projects.

Section 3: Updated Table C-3 to fix superscripts and added footnotes #2 & #3.

Section 4: A reference was added to refer to AASHTO's *A Policy on Geometric Design of Highways and Streets* and NCHRP Report 659 *Guide for the Geometric Design of Driveways* for additional information.

Section 4: Guidance was added for Driveway Grades.

Section 4: Updated Table C-4 by adding “Maximum” to title.

Section 4: Updated Table C-5 by removing notes.

Section 5: Added guidance on Two-Way Driveways.

Section 5: Added guidance on One-Way Driveways.

Section 6: Changed title from “Pedestrian Considerations” to “Bicycle and Pedestrian Considerations”.

Section 7: Added guidance on Visibility.

Section 8: Updated References.

Appendix D – Right-Turn Slip Lane Design Guidelines

General: Updated “yield to pedestrians” guidance to “stop and yield to pedestrians” per action of the 2021 State of Texas legislative session.

Section 1: Updated Introduction.

Section 2: Added guidance for Acceleration Lane.

Section 2: Added guidance for Signage and Pavement Markings.

Section 2: Under Rural Design, added guidance for Radius.

Section 3: Added guidance for Yielding to Crossing Pedestrians.

Section 3: Added guidance for Crosswalk Location.

Section 3: Added guidance for Enhancing Visibility of Crossing Pedestrians.

Appendix E – Alternative Intersections and Interchanges

General: Updated “yield to pedestrians” guidance to “stop and yield to pedestrians” per action of the 2021 State of Texas legislative session.

General: Updated Figures E-1 thru E-55 for better resolution.

Section 1: Added guidance for Pedestrian Considerations for Alternative Intersections in Overview.

Section 2: Added guidance on Deflection under Geometric Design.

Section 2: Added guidance on Pedestrian Considerations.

Section 2: Added guidance on Truck Aprons under Considerations.

Section 2: Added guidance on Single-Lane Roundabouts.

Section 2: Added guidance on Multilane Roundabouts.

Section 3: Under Sight Distance, changed “should” to “must”.

Section 4: Deleted old Figure E-31 and moved it to Chapter 7 and renumbered figures accordingly.

Section 7: Updated References.

Instructions

This manual, and all revisions, applies to all transportation project development (all modes), whether developed by the department or by other entities. Due to projects that may be further along in development with current criteria, this manual, and all revisions, will be effective for all projects beginning with the September 2023 Letting, and if project schematic or 30% plans have not been approved by November 1st, 2022. The Districts have the options to use these revisions prior to these dates.

Contact

Contact the Roadway Design Section Director of the Design Division at (512) 416-2678 with any questions or comments.

Archives

Past manual notices are available in a [pdf archive](#).

Manual Notice 2020-1

From: Camille Thomason, P.E

Manual: *Roadway Design Manual*

Effective Date: July 01, 2020

Purpose

The *Roadway Design Manual* has been revised to update roadway policy in accordance with FHWA guidelines and with comments received from Design Division, other Divisions, and TxDOT's 25 Districts. As a result, revisions were made to Chapters 1-8 and Appendices A, B and C. Also, new Appendices D, and E were added to the manual, that is, Right Turn Slip Lane Design Guidelines and Alternative Intersections and Interchanges, respectively. Likewise, minor errata type corrections and edits were made throughout the manual.

Contents

Chapter 1

Section 1:

- ◆ Revised Roadway Design Manual Format for chapters 7, 8, Appendix C, and to include the addition of Appendices D, and E.
- ◆ Under External Reference Documents, updated references.

Section 2:

- ◆ Revised controlling criteria per FHWA guidance for Design Exceptions, Waivers, and Variances. Reduced controlling criteria from 13 to 10.
- ◆ Under Design Exceptions, added guidance that 4' minimum width is required for new bike lanes. Widths less than 4' will require a design exception.
- ◆ Under Design Exceptions, added guidance that design exceptions for bridge rails shall be sent to Bridge Division.
- ◆ Under Design Waivers, removed "non-controlling criteria for the" from introductory sentence.
- ◆ Under Design Waivers, removed requirement for copy of documentation being furnished to Design Division.
- ◆ Under Design Waivers, added "Shared Use Paths (if this is the chosen Bicycle/Ped facility)" to 4R.

- ◆ Under Special Facilities, moved sentence "Design waivers are not applicable..." to the bottom of the section.
- ◆ Revised Design Exceptions and Design Waivers for Bicycle Facilities.
- ◆ Revised section on Design Variances for design documentation for PROWAG.
- ◆ Under THFN, provided link to Design Division's Roadway and Hydraulics website.

Section 3:

- ◆ Revised entire section of Schematic Layouts to include additional items for proper review and evaluation.
- ◆ Added "Location of wildlife crossing structures" to list.

Section 4:

- ◆ (IAJR) was revised to incorporate: FHWA Updated Policy on Access to the Interstate System, May 22, 2017 and Current TxDOT IAJR Policy Memo, October 2018.
- ◆ Removed reference to 23 CFR 630 and replaced it with reference to United States Code (USC)-Title 23 Section 111.
- ◆ Added reference to the TxDOT IAJR SOP.

Section 5:

- ◆ Replaced the Preliminary Design Submission Table with a list of preliminary design processes that affect/influence decisions and a list of reference material for the various submittal processes.

Section 6:

- ◆ Added verbiage for twin bridge structures providing 10' distance to facilitate access for inspections.

Chapter 2

Section 2:

- ◆ Under Speed, added guidance on "Speed, Design Speed, Operating Speed, Posted Speed, and Running Speed".
- ◆ Added guidance and discussion on "Terrain".
- ◆ Added content to emphasize Crash Data, Highway Safety and Safety Analysis.
- ◆ Updated Table 2-2. Defined variable (t) as time in seconds.

Section 3:

- ◆ Under Intersection Sight Distance, added guidance that intersections should be free of conflict points to the extent allowable to promote safety.
- ◆ Under Intersection Sight Distance, added reference to AASHTO for intersection control guidance.
- ◆ Added new Figure 2-1.

Section 4:

- ◆ Updated Table 2-3. Changed title of table and changed footnote 2.
- ◆ Updated Table 2-4. Changed title of table and deleted footnote 1.
- ◆ Updated Table 2-6. Changed title of table.
- ◆ Updated Table 2-7. Changed title of table.
- ◆ Specified that the calculated transition length, LCT, can be calculated using adjustment factors as shown in Table 2-9.
- ◆ Under Super Elevation Transition Type, specified that linear superelevation transition may be used.

Section 5:

- ◆ Clarified that the "roadway" grade should seldom be less than 0.5 percent for unpaved ditches and 0.25 percent for lined channels.
- ◆ Combined content for Crest and Sag Vertical Curves into one section named "Vertical Curves".
- ◆ Added guidance on Sag Vertical Curves discussing the 4 different criteria, light beam distance, and stopping site distance.
- ◆ Replaced Figure 2-6.
- ◆ Replaced Figure 2-7.

Section 6:

- ◆ Added cross slope guidance stating that the cross slope should not exceed 3 percent on a tangent alignment unless there are 3 or more lanes in one direction of travel.
- ◆ Under Pavement Cross Slope changed guidance for the algebraic difference of cross slope between the traveled way and the shoulder grades should not exceed 6 percent. (Previously 6 to 7 percent)
- ◆ Clarified the width of flush or curbed medians for pedestrian refuge is 6' from BOC to BOC preferred and 6' from FOC to FOC minimum.
- ◆ Under Medians, added content for Design Guidance to Reduce Consequences of Median Encroachments, Design Guidance to Reduce likelihood of Median Encroachments, and Countermeasures to Reduce Likelihood of Median Encroachments.

- ◆ Guidance was added for bicycle accommodation for urban streets and rural projects.
- ◆ Guidance was added for measurement of shoulder widths on bridge structures.
- ◆ Under Shoulder Widths, adjusted language and guidance for Shoulder Widths.
- ◆ A clarification was made for shoulder widths to accommodate bicycle facilities across bridges being replaced or rehabilitated to be 5' minimum unless it's on the off-system and less than 400 ADT.
- ◆ Under Sidewalk and Pedestrian Elements, requirements under PROWAG and TAS was added.
- ◆ Under Sidewalk Location, removed the guidance for roadways classified as rural, the shoulder may be used to accommodate pedestrian and bicycle traffic. Also, removed guidance for where a shoulder serves as part of the pedestrian access route, it must meet PROWAG requirements.
- ◆ Under Sidewalk Width, added guidance that where there is a 4' sidewalk for short distances, a 5' width is required just after a pedestrian ramp for wheel chair maneuverability.
- ◆ Under Walking Speeds, added "or near schools" for a location of walking speed of 3.0 ft/s.
- ◆ Under Street Crossings, added guidance for when push buttons are required for crossings.
- ◆ Updated Figure 2-8. Changed Figure to black & white.
- ◆ Updated Figure 2-10. Changed Figure to black & white.
- ◆ Under Curb Ramps and Landings, changed "should" to "shall" for guidance on curb ramps and landings
- ◆ Under Curb Ramps and Landings, added "Curb inlets" to list of obstructions that should not be located within the curb ramp, maneuvering area, or landing.
- ◆ Under Street Furniture, added guidance with PROWAG & TAS.
- ◆ Under Front Slope, added guidance for slopes greater than 1V:2.5H.
- ◆ Under Clear Zone, deleted sentence "For fill slopes steeper than 1V:4H, errant vehicles have a reduced chance of recovery and the lateral extent of each roadside encroachment increases."
- ◆ Table 2-12 was updated. Changed clear zone criteria for minimum and desirable for Rural Arterial.

Section 7:

- ◆ Under Bridge Class Drainage Culverts, clarified language for bridge class culvert protection.
- ◆ Updated Table 2-14. Added verbiage to table under "Treatment".
- ◆ Updated Table 2-14 to include Note to refer to Bridge Division for further guidance.
- ◆ Updated Figure 2-11. Changed "Note" on Figure.
- ◆ Under Side Ditches, changed "horizontal clearance" to clear zone. Also, made this change for the entire RDM.

Section 8:

- ◆ Clarified and expanded on requirements for a non-state intersecting roadway's need to adapt its alignment to a TxDOT road. Also, added guidance for an intersecting road that is modified and changed to tie into a TxDOT facility due to the request of the county or city.

Chapter 3

Section 2:

- ◆ Table 3-1, Maximum Gradient link was corrected to Table 2-11.
- ◆ Table 3-1, footnote 11 was changed to "A 5' minimum clear space for bicycles should be provided on bridges being replaced or rehabilitated except on off-system facilities with less than 400 ADT."
- ◆ Table 3-1 footnote 12 was added giving guidance on vertical clearance requirements for roadways on the THFN.
- ◆ Under Raised Medians, guidance was added stating "A median width of 18' is required if pedestrian refuge area is needed, see Figure 2-10."
- ◆ Under Raised Medians, changed guidance to 6 feet for a pedestrian divider.
- ◆ Under Left-Turn Deceleration Lanes, guidance was added stating "Where pedestrians may be present, the divider must be a minimum of 6', see Figure 2-10."
- ◆ Updated Table 3-3. Changed footnote 5.
- ◆ Updated Table 3-4. Added more "Speeds" to the table.
- ◆ Added guidance for Right-Turn Acceleration Lanes stating "Acceleration lanes typically are not used on urban streets. See Section 5, Figure 3-10 for acceleration distances and taper lengths, if an acceleration lane may be necessary."

Section 3:

- ◆ Updated Table 3-5. Added footnotes 7 & 8 to table and fixed reference links.
- ◆ Under Clear Zones, link for Clear Zones was corrected to Table 2-12.

Section 4:

- ◆ Updated Table 3-6. Changed footnotes 1 & 2 and corrected superscripts on table.
- ◆ Updated Table 3-7. Corrected footnote 2 and reference links.
- ◆ Updated Table 3-8. Added footnote 7 and corrected superscripts on table.
- ◆ Updated Table 3-9. Footnote 1 was adjusted to add guidance on the Clear Width on bridge structures.
- ◆ Updated Table 3-10. Table was reformatted.

- ◆ Updated reference to Table 3-11.
- ◆ Under Left-Turn Deceleration Lanes, corrected table references stating "Lengths of left-turn deceleration lanes are provided in Table 3-11 for Two-Lane Highways and Table 3-13 for Multi-Lane Rural Highways."
- ◆ Under Right-Turn Deceleration Lanes, added guidance stating "Where the right turn deceleration or acceleration lane is being constructed adjacent to the through lanes, the minimum land width is 10' with a 2' surfaced shoulder."
- ◆ Under Right-Turn Acceleration Lanes, corrected table reference to Table 3-3 for acceleration distances and taper lengths.
- ◆ Under Intersections, added guidance stating that "Desirably, the roadways should intersect at approximately right angles, and should not intersect less than 75 degrees. Where crossroad skew is flatter than 75 degrees to the highway, the crossroad should be re-aligned to provide for a near perpendicular crossing."

Section 5:

- ◆ Table 3-12, for Design Speed (Arterials) changed footnote to 1.
- ◆ Table 3-12, added guidance for Vertical Clearance for new structures.
- ◆ Table 3-12, footnotes 2 & 3 clarified what heavy betterment and unusual circumstances means.
- ◆ Table 3-12, added footnote 5 for guidance on roadways on the THFN.
- ◆ Table 3-12, added footnote 6 for design guidance on vertical clearance.
- ◆ Table 3-12, re-wrote footnotes 2 & 3 to include "documented through design exception" and deleted example.
- ◆ Table 3-12, changed "flat" to "level".
- ◆ Table 3-12, added 3 columns of 12' for Lane Width. Updated Metric.
- ◆ Table 3-12, clarified language for bridge clear width in footnote 7.
- ◆ Under Four-Lane Undivided Highways, revised paragraph for better understanding of previous verbiage of "betterment projects".
- ◆ Corrected link to Figure 2-2, Determination of Length of Superelevation Transition.
- ◆ Corrected link to Table 2-11, Maximum Grades.
- ◆ Corrected link to Table 8-11, Earth Fill Slope Rates.
- ◆ Updated Table 3-14. Table was reformatted.

Section 6:

- ◆ Table 3-15, corrected links to Clear Zone Table 2-12 and Maximum Grades Table 2-11.
- ◆ Table 3-15, added row for Lane and Shoulder Widths.

- ◆ Under Level of Service, added guidance for other Measure of Effectiveness (MOE's) may include travel time, speed and queue lengths in heavily congested areas.
- ◆ Under Lane Width and Number, corrected reference to Figure 3-15, Typical Freeway Sections.
- ◆ Under Shoulders, corrected reference to Figure 3-15, Typical Freeway Sections.
- ◆ Under Medians, corrected reference to Figure 3-15, Typical Freeway Sections.
- ◆ Under Vertical and Clear Zone at Structures, added guidance for roadways on the THFN.
- ◆ Under Vertical and Clear Zone at Structures, added guidance to refer to specific railroad company guidelines for additional vertical clearance requirements.
- ◆ Under Vertical and Clear Zone at Structures, added railroad guidance.
- ◆ Under Vertical and Clear Zone at Structures, removed sentence on the exceedance of 3 inches which was obsolete due to the requirements of the THFN.
- ◆ Removed Figure 3-16, Typical Highway Railway Overpass and all its references.
- ◆ Under Horizontal, corrected link to Table 2-12, Clear Zones.
- ◆ Updated Table 3-18. Corrected superscripts on table.
- ◆ Under Frontage Road Design Criteria, corrected link to Table 2-12, Clear Zones.
- ◆ Updated Table 3-19. Table was reformatted.
- ◆ Under Design Speed, added guidance for design speed for where a ramp joins a frontage road.
- ◆ Under Horizontal Geometrics, corrected links to Figures 3-28, 3-29, 3-30, 3-31, 3-32, 3-33, and 3-34.
- ◆ Updated Figure 3-36. Changed weaving distance to be from nose of gore to nose of gore.
- ◆ Updated Table 3-21. Table was reformatted.
- ◆ Under Grades and Profiles, guidance was added for ramp grades stating "For special circumstances and topography conditions, the following grades may be used: Ramp Design Speed 25-30 mph-7% max, 35-40 mph-6% max, and 45 mph or greater-5% max."

Section 8:

- ◆ Corrected title of Section 8 to read Texas Highway Freight Network (THFN).

Chapter 4

Section 2:

- ◆ Under Geometric Design, added language for Bridge Width for clarification.
- ◆ Updated Table 4-1. Added footnote "e", changed Horizontal Clearance to Clear Zone, and changed title of table.

- ◆ Updated Table 4-2. Changed title of table, changed Horizontal Clearance to Clear Zone, and added footnote f.
- ◆ Table 4-2, changed 16' clear zone to 10' clear zone for consistency with 4R clear zone table.
- ◆ Updated Table 4-3. Changed title of table and changed Horizontal Clearance to Clear Zone.
- ◆ Under Alignment, added guidance on what is considered a 3R project and a 4R project.
- ◆ Under Alignment, added guidance on Design Exceptions for 3R projects.

Section 3:

- ◆ Under Safety Design, replaced "accident" with "crash".
- ◆ Under Safety Design added guidance and bullet item for Crash Analysis.
- ◆ Under Safety Design, added language for wildlife crashes to section.
- ◆ Under Safety Design, added guidance for High Friction Surface Treatment (HFST) to address deficiencies in curve radius or superelevation.
- ◆ Under Safety Design, added reference to consult with Design Division's Traffic Simulation and Safety Analysis Section for guidance.
- ◆ Under Basic Safety Improvements, added reference to the Traffic Safety Division's Traffic Engineering Standard Sheets.

Section 4:

- ◆ Updated Table 4-4. Corrected Bridge Width to be retained from 22' to 24'.
- ◆ Updated Table 4-4. Corrected superscript on table.

Chapter 6

Section 3:

- ◆ Under Working Agreements, added guidance stating that "TxDOT design standards are used on Park Roads (PR) that lead or enter a state park and are designated on the State Highway System. Parks and Wildlife Roads (PW) will use the standards of Texas Parks and Wildlife Department standards."

Section 4:

- ◆ Under Guidance for Bicycle Facilities, changed "bicycle paths" to "shared use paths".
- ◆ Under Guidance for Bicycle Facilities, added guidance for what is a bicycle lane, shared lane, and shared use path.
- ◆ Under Guidance for Bicycle Facilities, guidance was added for the preferred order for design is to have a shared use path, then a bike lane, then a shared lane.

- ◆ Under Guidance for Bicycle Facilities, added guidance that shared lanes are not appropriate on high speed facilities and should be avoided.
- ◆ Under Guidance for Bicycle Facilities, added guidance for a striped bicycle lane the clear width is 4' minimum and 5' desirable.
- ◆ Under Design Exceptions and Design Waivers for Bicycle Facilities added new guidance for design exceptions and design waivers for bicycle lanes, shared lanes and shared use paths.

Chapter 7

Section 1:

- ◆ Renamed Section 1 to Longitudinal Barriers and Roadside Safety Hardware Criteria.
- ◆ Under Guardrail, added guidance stating that "Guardrail should be offset at least 4.0' and desirably 5' or more from the nearest edge of fixed objects."
- ◆ Under Crash Cushion Categories, added additional guidance on crash cushions.
- ◆ Under Roadside Safety Hardware Criteria, added language on MASH criteria and guidance.

Section 3:

- ◆ Under Undercrossings, added guidance to provide ample drainage.

Section 5:

- ◆ Removed "Shoulder Texturing" from title and replaced it with "Rumble Strips" in Section 5, and updated guidance on rumble strips to make consistent with Traffic Safety Division RS standards, and FHWA guidance.

Section 7:

- ◆ Updated Table 7-2 and changed Radii for 3-Centered Compound Curve, Symmetric for a 75 degree angle/Passenger vehicle (P) to 100-25-100.

Chapter 8

Section 2:

- ◆ Updated Table 8-1. Table was reformatted.
- ◆ Updated Table 8-2. Table was reformatted.
- ◆ Updated Table 8-3. Table was reformatted.
- ◆ Updated Table 8-5. Table was reformatted.
- ◆ Updated Table 8-6. Table was reformatted.
- ◆ Updated Table 8-7. Table was reformatted.

- ◆ Under Superelevation, added guidance for superelevation on bridge structures to begin/end superelevation transition at bridge bent line.
- ◆ Updated Table 8-8. Table was reformatted.
- ◆ Updated Table 8-9. Table was reformatted.

Section 3:

- ◆ Changed "Horizontal Clearance to Clear Zone".
- ◆ Updated Table 8-10. Changed title of table and reformatted table.
- ◆ Updated Table 8-11. Table was reformatted.

Section 4:

- ◆ Updated Table 8-12. Table was reformatted.
- ◆ Updated Table 8-13. Table was reformatted.

Appendix A – Longitudinal Barriers

Section 2:

- ◆ Added verbiage giving an overview of Types of Barrier. Added verbiage with illustration defining Working width.

Section 3:

- ◆ Under Rail Element and Blockouts paragraph, added verbiage clarifying rail height and block-out applications.

Section 4:

- ◆ Updated deflection considerations for guard fence; updated Fig.A-6 accordingly.

Section 6:

- ◆ Updated Length of Need Fig-A-8 for additional clarity; added verbiage for the required protection of bridge class culverts.
- ◆ Updated Table A-2.

Section 8:

- ◆ Under Application, for Width of the median, added "(measured from edge of pavement to edge of pavement)."
- ◆ Added additional Cable Median Barrier guidance with respect to placement and appropriate applications. New Fig.A-16.

Section 9:

- ◆ Updated Fig. A-17 & A-18 to provide additional overlap for MBGF and cable barrier applications.

Appendix B – Treatment of Pavement Drop-offs in Work Zones

General:

- ◆ Minor errata updates.

Section 1:

- ◆ Table for Treatment Guidelines for Pavement Drop-offs in Construction Work Zones, update Note 3.

Appendix C – Driveway Design Guidelines

Section 1:

- ◆ Added guidance for support documentation in the form of traffic operations and safety analysis.

Section 2:

- ◆ Clarified definition of driveway and commercial driveway.

Section 3:

- ◆ Clarified pedestrian application guidance at a driveway. Updated Table C-2 and Table C-3 to clarify guidance on divider width in cases of a pedestrian refuge.
- ◆ Updated Table C-1. Changed title of table and added 15' Min. to table.
- ◆ Updated Table C-2. Changed footnotes 1 & 2 and added "Min." to table under Radius.
- ◆ Updated Table C-3 footnote 2.
- ◆ Under Divided Driveways, added "...and 6 feet for a Ped. Refuge." For a minimum width of a slightly raised divider.

Section 6:

- ◆ Under General Guidelines, changed the minimum refuge area to 5 x 6 feet.

Section 8:

- ◆ Updated references.

Appendix D – Right-Turn Slip Lane Design Guidelines

New Appendix providing guidance on the design of right-turn slip lanes.

Appendix E – Alternative Intersections and Interchanges

New Appendix providing guidance on the alternative intersection and interchange forms.

Instructions

This manual, and all revisions, applies to all highway and street project development, whether developed by the department or with consultant staff. Due to projects that may be further along in development with current criteria, this manual, and all revisions, will be effective for all projects beginning with the January 2021 letting. Project development using this manual and its revisions prior to that date is at the option of the district.

Contact

Contact the Roadway Design Section Director of the Design Division at (512) 416-2678 with any questions or comments.

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Manual Notice 2018-1

From: Camille Thomason, P.E

Manual: *Roadway Design Manual*

Effective Date: April 26, 2018

Purpose

Roadway Design Manual updates to provide vertical clearance guidance for roadways on the Texas Highway Freight Network (THFN):

- ◆ To provide guidance for the THFN Design Deviation Process;
- ◆ To provide an explanation and guidance for which projects on the THFN are affected by the new policy;
- ◆ To provide vertical clearance criteria for applicable projects on the THFN.

Contents

Table of Contents

The addition of the Texas Highway Freight Network (THFN) Design Deviation process to Chapter 1, Section 2. The new addition of Section 8 to Chapter 3.

Chapter 1

Contents: The addition of the Texas Highway Freight Network (THFN) Design Deviation process.

Section 2: The addition of a new subsection that defines the Texas Highway Freight Network (THFN) Design Deviation process.

Chapter 3

Contents:

- ◆ Addition of the Texas Highway Freight Network (THFN) to the Contents.

Section 1:

- ◆ Addition of the Texas Highway Freight Network (THFN) to list of roadway classes, and cross references to Chapter 3, Section 8, and Chapter 1.
- ◆ Addition of reference to the THFN Design Deviation process.

Section 8: New Section that explains the application of the Texas Highway Freight Network (THFN) policy. This includes the following:

- ◆ The policy is effective for applicable bridge construction and reconstruction projects on the THFN, Let on September 1, 2020 or later,
- ◆ Designation of a roadway as being on the latest THFN map maintained by the Transportation Planning and Programming Division (TP&P),
- ◆ The specific vertical clearance design criteria:
 - 18.5' for applicable bridge structures;
 - 19.5' for pedestrian crossover structures;
 - 19.5' for overhead signs;
 - 19' for traffic signals on a designated THFN.

Chapter 4

Section 5: Addition of a cross reference to Chapter 3, Section 8.

Chapter 6

Section 1: Under the Project Conditions, Addition of a cross reference to Chapter 3, Section 8.

Chapter 8

Section 1: In the last paragraph, the addition of a reference to the THFN Design Deviation process.

Section 2: Under Vertical Clearance at Structures, the addition of a reference to Chapter 3, Section 8.

Contact

Contact the Roadway Design Section of the Design Division at (512) 416-2678 with any questions or comments.

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Manual Notice 2014-1

From: Rene Garcia, P.E

Manual: *Roadway Design Manual*

Effective Date: October 01, 2014

Purpose

Appendix A and Appendix C are being revised:

- ◆ To update guidance for 31 inch guard fence;
- ◆ To add guidance on median barriers;
- ◆ To reflect terminology changes in a previous revision to Chapter 2;
- ◆ To update the definition of **Throat Length** in Appendix C; and
- ◆ To make editorial and technical corrections.

Contents

Appendix A

Changed "guardrail" to "guard fence" throughout.

Changed "horizontal clearance" to "clear zone" throughout.

Added linked text to metric versions of Figures, Tables, and Example Problems.

Title: changed from Metal Beam Guardrails to Longitudinal Barriers.

Section 1, first paragraph: added "median" traffic barrier to objectives of Appendix A.

Section 2,

- ◆ **first paragraph**: updated wording for clarity,
- ◆ **fourth paragraph**: moved to Section 6,
- ◆ **fifth paragraph**: added "10 feet" to the area free of obstructions,
- ◆ **Figure A-2 (M)**: removed and combined with Figure A-1. Subsequent Figures renumbered.

Section 3,

- ◆ **title**: changed from "Structural Considerations" to "Structural Considerations of Guard Fence,"

- ◆ **first paragraph:** added "location" to important factors,
- ◆ subsection *Rail Element*, **second paragraph:** changed rail mount from 21 inches to 25 inches high, added "The rail element shall be spliced midspan between the posts,"
- ◆ **third paragraph:** specified allowable tolerances for 31" and 27" systems,
- ◆ **fourth paragraph:** completely revised to accommodate 31" system, if existing 27" system is raised,
- ◆ subsection *Blockouts*: new subsection.

Section 4, Subsection *Lateral Placement at Shoulder Edge or Curb Face*, **second paragraph:** changed post bolt from 21 inches to 25 inches above the gutter pan or roadway surface.

Section 5, **second paragraph:** updated "end terminal anchor" to "Downstream Anchor Terminal (DAT)."

Section 6,

- ◆ Subsection *Variables*, **third paragraph:** added discussion on L_u , upstream, and L_d ,
- ◆ **Figure A-7**, *Variable Involved in Barrier Layout*: redrawn to add design speed, upstream, and downstream options,
- ◆ Subsection **Design Equations**: reformatted to include upstream and downstream equations which are referenced in the Section 7, removed metric from text and placed it in a linked document. Added discussion and equation for "length of need."

Section 7: updated example problems to reflect changes in appendix.

Section 8: Median Barrier, new section.

Section 9: Emergency Crossovers, new section.

Appendix C

Updated "Throat Length" definition.

Contact

Contact the Roadway Design Section of the Design Division at (512) 416-2678 with any questions or comments.

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Manual Notice 2013-1

From: Mark A. Marek, P.E

Manual: *Roadway Design Manual*

Effective Date: December 11, 2013

Purpose

This revision is intended to update the *Roadway Design Manual*, specifically Chapter 2, Basic Design Criteria, based on 2011 American Association of State Highway and Transportation Officials (AASHTO) *Geometric Design of Highways and Streets* revisions.

Contents

The following changes have been made:

Chapter 1, Preface

- ◆ Added non-discrimination statement.

Chapter 1, Section 2, Design Exceptions, Design Waivers and Design Variances

- ◆ Subsection "New Location and Reconstruction Projects (4R)" - Added "Lateral offset to Obstructions" to list of controlling criteria that require a design exception.

Chapter 2, Basic Design Criteria

- ◆ General renumbering of Tables and Figures throughout the chapter,
- ◆ Updated English and Metric tables to current AASHTO values, and
- ◆ Metric Versions are no longer shown but may be viewed in PDF format by accessing link.

Chapter 2, Section 3, Sight Distance

- ◆ Subsection "Decision Sight Distance" - paragraph added at the end of subsection regarding a reduced decision zone,
- ◆ Subsection "Passing Sight Distance" - added reference to Super 2 Highways for further discussion, and
- ◆ Subsection "Intersection Sight Distance" - the second bullet describing the types of intersection controls has been rewritten.

Chapter 2, Section 4, Horizontal Alignment. This section has been completely reorganized for better flow and revisions are as follows:

- ◆ Table 2-3, "Horizontal Curvature of High-Speed Highways and Connecting Roadways with Superelevation", updated to current AASHTO values.
- ◆ Table 2-4, "Horizontal Curvature of Highways without Superelevation", updated to current AASHTO values. Values for 6% superelevation were added to table.
- ◆ Table 2-5, "Minimum Radii and Superelevation for Low-Speed Urban Streets", updated to current AASHTO values.
- ◆ Table 2-6, "Minimum Radii for Design Superelevation Rates, Design Speeds", and $e_{\max} = 6\%$, updated to current AASHTO values.
- ◆ Table 2-7, "Minimum Radii for Design Superelevation Rates", Design Speeds, and $e_{\max} = 8\%$, updated to current AASHTO values.
- ◆ Subsection "Superelevation Transition Length" - The first two paragraphs and Table 2-8 were relocated from the discussion on Superelevation in the current version of the manual. The last paragraph of this subsection and Table 2-9 "Multilane Adjustment Factor" were added.
- ◆ Subsection "Superelevation Transition Placement" - This is a new section and provides updated guidance on placement of the transition, and Table 2-10, "Portion of Superelevation Transition Located on the Tangent", were added from the current AASHTO "Green Book".
- ◆ Subsection "Superelevation Transition Type" - This section is new and references the AASHTO "Green Book" for additional methods.
- ◆ Subsection "Sight Distance on Horizontal Curves" - The last paragraph in the section was added regarding methods to mitigate barrier obstructions.

Chapter 2, Section 5, Vertical Alignment

- ◆ Subsection "Crest Vertical Curves" - A sentence was added to the 3rd paragraph regarding successive vertical curves.
- ◆ Subsection "Combination of Vertical and Horizontal Alignment" - The last bullet was modified to include reference to Super 2 Highways.

Chapter 2, Section 6, Cross Sectional Elements

- ◆ The term "horizontal clearance" was replaced with "clear zone" throughout this section.
- ◆ Updated this section to current Americans with Disabilities Act Public Accessibility Guideline for Pedestrian Facilities in the Public Right of Way (PROWAG) and Texas Accessibility Standards (TAS).
- ◆ Subsection "Overview"
 - Added "Lateral Offset to Obstructions".
 - Changed "Horizontal Clearances to Obstructions" to "Clear Zone".
 - Moved "Slopes and Ditches" section down after "Roadside Design".

- ◆ Subsection "Pavement Cross Slope" - The last paragraph was modified to delete reference to design exception.
- ◆ Subsection "Lane Widths" - Added last paragraph discussing Bicycle Accommodations.
- ◆ Subsection "Shoulder Widths" - Added 2nd paragraph regarding bicycle accommodations and offset to barriers.
- ◆ Subsection "Sidewalks and Pedestrian Elements" - 1st paragraph was modified and factors when sidewalks should be included were added.
- ◆ Subsection "Sidewalk Location" - The buffer space between back of curb and sidewalk was modified. Additional discussion was added at the end of paragraph.
- ◆ Subsection "Sidewalk Width" - minor wording modifications to the two paragraphs.
- ◆ Subsection "Street Crossing" - Dimensions for refuge islands and cut throughs were modified. Last line of paragraph was added.
- ◆ Subsection "Curb Ramps and Landings" - modified 1st bullet to include reconstruction and rehabilitation. Added preferred width of curb ramps.
- ◆ Subsection "Cross Slope" - added sentence to end of paragraph regarding the running slope of sidewalks across driveways.
- ◆ Subsection "Street Furniture" - added a sentence to last paragraph discussing pedestrian push buttons.
- ◆ Subsection "Slopes and Ditches" - relocated discussion. Deleted Table 2-10.
- ◆ Subsection "Lateral Offset to Obstruction" - New section added.
- ◆ Subsection "Clear Zone" - Changed section title from "Horizontal Clearances to Obstructions" to "Clear Zone" and discussion on definition.
- ◆ Table 2-12 - The clear zone width changed from 1.5 ft to 4 ft minimum, and 3 ft to 6 ft desirable for "Urban, curbed, < 45 mph".

Chapter 2, Section 7, Drainage Facility Placement

- ◆ The term "horizontal clearance" was replaced with "clear zone" throughout this section.
- ◆ Subsection "Overview" - added "Side Ditches".
- ◆ Subsection "Design Treatment of Cross Drainage Culvert Ends" - Bullets removed from first paragraph. Discussed in subsequent sections.
- ◆ Subsection "Small Pipe Culverts" - combined paragraphs 3 and 4.
- ◆ Subsection "Intermediate Size Single Box Culverts and (Single and Multiple) Pipe Culverts" - 2nd recommended safety treatment option not applicable to bridge class culverts.
- ◆ Subsection "Multiple Box Culverts and Large single Pipes or Boxes": - 2nd recommended safety treatment option not applicable to bridge class culverts.

- ◆ Subsection "Bridge Class Drainage Culverts" - added recommended treatment options to 2nd paragraph. Modified Table 2-14 and its title.
- ◆ Figure 2-10, "Use of Guardrail at Bridge Class Culverts", depth of cover changed to ">9" to < 36".
- ◆ Figure 2-11, "Use of Sloping Pipe Ends Without Cross Pipes", replaced the term Grates with Cross Pipes.
- ◆ Figure 2-12, "Use of Sloping Pipe Ends with Cross Pipes", replaced the term Grates with Cross Pipes.
- ◆ Subsection "Side Ditches" - added wording in the last paragraph regarding rock filter dam.

Instructions

This revision will be distributed online only.

This manual, and all revisions, applies to all highway and street project development, whether developed by the department or with consultant staff. Due to projects that may be further along in development with current superelevation criteria, this manual, and all revisions, will be effective for all projects beginning with the December 2014 letting. Project development using this manual and its revisions prior to that date is at the option of the district.

Contact

For general comments and suggestions for future revisions of this manual, contact the Design Division, Roadway Design Section.

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Manual Notice 2010-1

From: Mark A. Marek, P.E
Manual: Roadway Design Manual
Effective Date: May 01, 2010

Purpose

This revision is intended to update the Roadway Design Manual and, specifically, Chapter 1, Section 2; Chapter 4, Section 6; and Chapter 5, Section 1.

Contents

The following changes have been made:

- ◆ Chapter 1, Section 2. This section has been revised to delegate roadway design exception approval procedures to the district level.
- ◆ Chapter 4, Section 6. This section has been completely revised to expand the guidance on the use of Super 2 highways.
- ◆ Chapter 5, Section 1. This section has been revised to extend the application of 2R guidelines to roadways not on the National Highway System (NHS) with an ADT of 2500 per lane or less.

Instructions

This revision will be distributed online only.

This manual, and all revisions, applies to all highway and street project development, whether developed by the department or with consultant staff. This manual, and all revisions, will be effective for all projects beginning with the August 2010 letting. Project development using this manual and its revisions prior to that date is at the option of the district.

Contact

For general comments and suggestions for future revisions of this manual, contact the Design Division, Roadway Design Section.

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Manual Notice 2009-1

From: Mark A. Marek, P.E
Manual: Roadway Design Manual
Effective Date: March 01, 2009

Purpose

This revision is intended to update the *Roadway Design Manual*, specifically to include TxDOT's Nondiscrimination Policy.

Contact

Address questions concerning the information contained in this manual to the Roadway Design Section in the Design Division.

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Manual Notice 2006-2

From: Mark A. Marek, P.E
Manual: Roadway Design Manual
Effective Date: October 01, 2006

Purpose

This revision is intended to update the Roadway Design Manual and, specifically, add a new Chapter 8, Mobility Corridor (5R) Design Criteria.

Contents

Chapter 8, Mobility Corridor (5 R) Design Criteria, is being added to the Roadway Design Manual to provide geometric design criteria for design speeds of 85 mph to 100 mph. Since higher allowable operating speeds are possible in the future, higher design speeds should be considered when planning new facilities or reconstructing existing applicable corridors. While a higher operating speed may not be safe or appropriate in all instances (such as densely developed urban areas), higher design speeds should be considered whenever prudent.

With respect to facilities that one day could be part of the Trans-Texas Corridor (TTC), particularly new location routes, it is strongly recommended that these facilities be initially designed to accommodate a 100 mph design speed. Even though the facility may initially be posted for an 85 mph speed, the higher design criteria will allow the greatest flexibility, both in the roadway portion as well as for other transportation modes within the right of way, in terms of maximizing the future use of the corridor.

This does not mean that all projects should be over-designed. If, through the project development process it is determined that substantial, adverse and unavoidable social, economic and environmental impacts will occur, then different design criteria may be appropriate. Contact the Environmental Affairs Division and the Right of Way Division as questions arise about environmental and right of way impacts while planning for higher design speeds.

Instructions

This revision will be distributed online only.

This manual, and all revisions, applies to all highway and street project development, whether developed by the department or with consultant staff. This manual, and all revisions, will be effective for all projects beginning with the April 2007 letting. Project development using this manual and its revisions prior to that date is at the option of the district.

Contact

For general comments and suggestions for future revisions of this manual, contact the Design Division, Roadway Design Section.

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Manual Notice 2006-1

To: Districts and Divisions
From: Mark A. Marek, P.E.
Subject: Manual Revision
Manual: *Roadway Design Manual*
Date: July 1, 2006

Purpose

This revision is intended to update the Roadway Design Manual and, specifically, add Section 6, Super 2 Highways, to Chapter 4.

Contents

The following addition has been made.

- ◆ Chapter 4, Section 6. This section has been added to give design guidance in developing passing opportunities on two lane roadways. This section discusses appropriate lengths and spacing of the passing lane sections, and the design criteria applicable for these roadways.

Instructions

This revision will be distributed online only.

This manual, and all revisions, applies to all highway and street project development, whether developed by the department or with consultant staff. This manual, and all revisions, will be effective for all projects beginning with the January 2007 letting. Project development using this manual and its revisions prior to that date is at the option of the district.

Contact

For general comments and suggestions for future revisions of this manual, contact the Design Division, Roadway Design Section.

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Manual Notice 2005-1

To: Districts and Divisions
From: Mark A. Marek, P.E.
Subject: Manual Revision
Manual: *Roadway Design Manual*
Date: October 1, 2005

Purpose

This revision is intended to update the Roadway Design Manual and, specifically, add Appendix C, Driveway Design Guidelines to be used in conjunction with the Access Management Manual and the Maintenance Division's Regulations for Access Driveways to State Highways.

Contents

The following addition has been made.

- ◆ Appendix C. This appendix as a whole has been added on areas related to Driveway Design. All revisions are contained in Appendix C. It includes sections discussing Driveway Design Principles, Profiles, Driveway Angle, Pedestrian Considerations, Visibility and References.

Instructions

This revision will be distributed online only.

This manual, and all revisions, applies to all highway and street project development, whether developed by the department or with consultant staff. This manual, and all revisions, will be effective for all projects beginning with the June 2006 letting. Project development using this manual and its revisions prior to that date is at the option of the district.

Contact

For general comments and suggestions for future revisions of this manual, contact the Design Division, Roadway Design Section.

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Manual Notice 2004-1

To: Districts and Divisions
From: Ken Bohuslav, P.E.
Subject: Manual Revision
Manual: *Roadway Design Manual*
Date: February 2, 2004

Purpose

This revision is intended to update the *Roadway Design Manual* and, specifically, update Chapter 3 on areas related to access management to compliment the recently released *Access Management Manual*.

Contents

The following updates and additions have been made.

- ◆ Chapter 3. This chapter as a whole has been updated on areas related to access management. All revisions are contained in Chapter 3. Some figures have been added that have resulted in the renumbering of all figures in this chapter.
- ◆ Figure 3-1: Types of Directional Openings. This figure was added.
- ◆ Figure 3-2: This figure was added.
- ◆ Section 2 Urban Streets, Subheading Speed Change Lanes. Significant changes have been made to this area of discussion:
 - The components of a speed change lane have been changed to include the taper as part of the deceleration length.
 - Left Turn Deceleration Lanes paragraph has been revised to show the geometric dimensions of single and dual left turn lanes.
 - Figure 3-3 illustrates single and dual left-turn deceleration lanes.
 - Tables 3-3 & 3-4, Lengths of Single & Dual Left-Turn Lanes. Deceleration, taper and storage lengths have been revised. Discussions on deceleration and storage lengths determinations have been added for further clarification.
 - Right-Turn Acceleration & Deceleration Lanes paragraphs have been added.
 - Figure 3-4 illustrates a right-turn deceleration lane.
- ◆ Section 2 Urban Streets, Subheading Auxiliary Lanes on Crest Vertical Curves. A discussion has been added concerning the location of auxiliary lanes in relation to crest vertical curves.
- ◆ Section 3 Suburban Roadways, Subheading Access Control. The last paragraph has been revised to reference the *Access Management Manual*.

- ◆ Section 3 Suburban Roadways, Subheading Median Openings. The median opening spacing has been removed and reference is made to Section 2, Urban Streets for median information. This change allows the design more flexibility in determining appropriate median opening locations.
- ◆ Section 3 Suburban Roadways, Subheading Speed Change Lanes. Reference is now made to Section 2, Urban Streets for speed change information.
- ◆ Section 4 Two-Lane Rural Highways, Subheading Speed Change Lanes.
 - Left-Turn Deceleration Lanes. The third paragraph has been added directing designers to the table in Section 5, Multi-Lane Rural Highways for left turn lanes lengths.
 - Right-Turn Deceleration Lanes. The third paragraph makes reference to a figure in Section 2, Urban Streets that illustrates a right turn lane. The fourth paragraph was added directing designers to the table in Section 5, Multi-Lane Rural Highways for right-turn lane lengths.
 - Right-Turn Acceleration Lanes. This discussion has been added to direct designers to a figure in Section 5, Multi-Lane Rural Highways for acceleration lengths.
- ◆ Section 5 Multi-Lane Rural Highways, Subheading Turn Lanes.
 - Table 3-13. The deceleration and taper lengths have been revised.
 - Right-Turn Deceleration Lane. Table 3-13 is referenced for right-turn lengths.
 - Acceleration Lanes. This discussion and Figure 3-10 have been added. (Note: This figure is the bottom portion of previous Figure 3-4 prior to these revisions.)
- ◆ Section 6 Freeways, Subheading Conversion of Frontage Roads from Two-Way to One-Way Operation. Guidance on the conversion of the frontage roads was previously sent out by memorandum and is now included in the manual.
- ◆ Section 6 Freeways, Subheading Horizontal Geometrics. Figure 3-36 was added. (Note: This figure was previous Figure 3-4 prior to these revisions.)

Instructions

This revision will be distributed online only.

This manual, and all revisions, applies to all highway and street project development, whether developed by the department or with consultant staff. This manual, and all revisions, will be effective for all projects beginning with the November 2004 letting. Project development using this manual and its revisions prior to that date is at the option of the district.

Contact

For general comments and suggestions for future revisions of this manual, contact the Design Division, Roadway Design Section.

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Manual Notice 2002-2

To: All Districts and Divisions

From: Ken Bohuslav, P.E.

Subject: Manual Revision

Manual: *Roadway Design Manual*

Effective Date: October 1, 2002

Purpose

This revision is intended to update the Roadway Design Manual. This revision will complete presentation of the Roadway Design Manual in dual units (US Customary and Metric).

Contents

The following updates and additions have been made.

- ◆ Chapter 3, Table 3-3, Table 3-4, Table 3-13 and Figure 3-4. The note in these tables and figure referring to "...moderate amount of deceleration..." has been changed to define "moderate" as 10 mph [15 km/h].
- ◆ Chapter 3, Table 3-13. The deceleration length was updated in accordance with the values shown in the 2001 Green Book. The minimum storage length was updated to correct a conversion error.
- ◆ Chapter 5, Section 1, First Paragraph. The application of the guidelines in this chapter has been updated. The current average daily traffic (ADT) has been changed from less than 1500 to 3000 and less to provide additional flexibility for 2R projects. These guidelines apply to projects which are not on the National Highway System (NHS) routes.
- ◆ Chapter 7 and Appendix A. This chapter and appendix have been converted to dual units to show both US Customary and Metric values, and, where appropriate, updated in accordance with the 2001 Edition of the AASHTO publication, "A Policy on Geometric Design of Highways and Streets" (Green Book).

Instructions

This revision will be distributed online only.

It should be recalled that Manual Notice 2001-2 allowed projects to be designed using the old or new stopping sight distance values through December 2003. Projects let in January 2004 or after must meet the new stopping sight distance criteria or have an approved design exception.

With that caveat, the balance of this manual, and all revisions, will be effective for all projects beginning with the July 2003 letting. This manual, and all revisions, applies to all highway and street project development, whether developed by the department or with consultant staff. Project development using this manual and its revisions prior to those dates are at the option of the district.

Contact

For general comments and suggestions for future revisions of this manual, contact the Design Division, Roadway Design Section.

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Manual Notice 2002-1

To: All Districts and Divisions

From: Ken Bohuslav, P.E.

Subject: Manual Revision

Manual: Roadway Design Manual

Effective Date: April 1, 2002

Purpose

This revision is intended to update the Roadway Design Manual.

Contents

The following updates and additions have been made.

- ◆ Chapters 3, 4 and 6. These chapters have been converted to dual units to show both US Customary and Metric values, and, where appropriate, updated in accordance with the 2001 Edition of the AASHTO publication, "A Policy on Geometric Design of Highways and Streets" (Green Book).
- ◆ Chapter 2, Tables 2-6 and 2-7, Superelevation Rates from Horizontal Curves on High-Speed Highways. The previous editions of these tables were taken directly from the 2001 AASHTO Green Book. However, AASHTO chooses to reverse the crown in the superelevation tables beginning at a superelevation rate of 1.5 percent. Since TxDOT uses a normal cross slope of 2 percent, this put the AASHTO tables at a slight variation from the Roadway Design Manual, Table 2-4, Horizontal Curvature of Highways Without Superelevation. Table 2-4 is based on a normal crown of 2 percent. Tables 2-6 and 2-7 have been modified to retain the normal crown until a superelevation rate of 2 percent is reached to be compatible with Table 2-4. Though not necessary, reversing the crown at 1.5 percent would be acceptable.
- ◆ Chapter 2, Section 4, Horizontal Alignment, Subheading Superelevation. Near the end of this subhead section, the equations for L_{AP} , the transition length for appearance and profiles, are given. Both the US Customary and the Metric equation used the coefficient 2.93. The US Customary equation is correct. The Metric equation should be:
$$L_{AP} = 0.56 V_D \text{ (Metric)}$$
- ◆ Chapter 2, Figure 2-7, Design Controls for Crest Vertical Curves (US Customary).
Chapter 2, Figure 2-8, Design Controls for Crest Vertical Curves (Metric).
Chapter 2, Figure 2-9, Design Controls for Sag Vertical Curves (US Customary).
NOTE: These three figures were incorrectly titled in the caption below the figure and showed the old figure titles. The correct figure title appeared inside the figure and should have matched the captioned title. The captioned title below the figure has been corrected.

- ◆ Chapter 2, Section 6, Cross Sectional Elements, Subheading Pavement Cross Slope. A sentence has been added to clarify that pavement cross slopes of less than 1 percent require design exception documentation.
- ◆ Chapter 2, Section 7, Drainage Facility Placement. Table 2-13, Use of Guardrail for Bridge Class Culverts, and Figure 2-15, Use of Guardrail on Bridge Class Culverts, have been updated to reflect the change in post depth of embedment dimensions needed with the recently revised guardrail standard details. The old details had a post embedment depth of 38 inches and the new details provide an embedment depth of 44 inches for new construction projects.
- ◆ Chapter 3, Section 2, Urban Streets, Subheading Medians.
Chapter 3, Section 3, Suburban Streets, Subheading Medians.
NOTE: Based on preliminary work in TxDOT research project 0-4141, "Development of Access Management Classifications and Guidelines," the threshold value for consideration of a raised median application has been established at 20,000 vehicles per day. The old value of 25,000 vehicles per day has been revised to reflect this new threshold value.
- ◆ Chapter 3, Table 3-5, Geometric Design Criteria for Suburban Roadways. The desirable and minimum offsets to face of curb has been revised to make these offsets consistent with those given for urban streets in Table 3-1.
- ◆ Chapter 3, Table 3-12, Design Criteria For Multilane Rural Highways,
Chapter 3, Table 3-17, Design Speed for Controlled Access Facilities.
NOTE: Previously, these two tables showed a desirable design speed. This desirable design speed was based on the maximum design speed offered in the AASHTO Green Book. Since the 2001 AASHTO Green Book has provided design speed ranges up to 80 mph [130 km/h] and these higher design speeds may not be desirable in all cases, the desirable design speed for these two tables has been eliminated. These tables now show minimum design speeds only.
- ◆ Chapter 3, Section 5, Multi-Lane Rural Highways, Subheading Converting Existing Two-Lane Roadways to Four-Lane Divided Facilities. This is a new subheading added after the subheading, "Transitions to Four-Lane Divided Highways". This new subheading explains the Federal Highway Administration's allowance for the existing roadway alignments to remain in place when a two-lane roadway is converted to a four-lane divided facility.
- ◆ Chapter 5, Non-Freeway Resurfacing or Restoration Projects (2R). This chapter has been revised to allow restoration (2R) guidelines to apply to non-freeway resurfacing or restoration projects that have current average daily traffic (ADT) volumes of less than 1500 and are not on National Highway System (NHS) routes.
- ◆ Chapter 6, Section 2, Historically Significant Bridge Projects. The minimum criteria previously given in this section has been deleted from the Roadway Design Manual and included in the recently released Historic Bridge Manual.

Instructions

This revision will be distributed online only.

It should be recalled that Manual Notice 2001-2 allowed projects to be designed using the old or new stopping sight distance values through December 2003. Projects let in January 2004 or after must meet the new stopping sight distance criteria or have an approved design exception.

With that caveat, the balance of this manual, and all revisions, will be effective for all projects beginning with the January 2003 letting. This manual, and all revisions, applies to all highway and street project development, whether developed by the department or with consultant staff. Project development using this manual and its revisions prior to those dates are at the option of the district.

Contact

For general comments and suggestions for future revisions of this manual, contact the Design Division, Roadway Design Section.

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Manual Notice 2001-2

To: All Districts and Divisions

From: Robert L. Wilson, P.E.

Subject: Manual Revision

Manual: *Roadway Design Manual*

Date: July 2, 2001

Purpose

This revision is intended to update the Roadway Design Manual and, specifically, update and convert Chapter 2 to US Customary and Metric (dual) units in accordance with the new 2001 Edition of the AASHTO publication, "A Policy on Geometric Design of Highways and Streets" (Green Book).

Contents

The following updates and additions have been made.

- ◆ Chapter 2. The chapter as a whole has been updated in accordance with the 2001 Edition of the AASHTO Green Book. The chapter has been converted to dual units to show both US Customary and Metric values. AASHTO has continued to use a hard conversion for their dual unit publication. However, recognizing that the speed conversions were not directly correlated, tables based on speed have been provided in both US Customary and Metric units. In addition to the general update of the chapter to reflect the new 2001 Edition of the Green Book, two specific areas of change in Chapter 2 are noted below.
- ◆ Chapter 2, Table 2-1. AASHTO has modified the stopping sight distance model and the stopping sight distance values. The modification has resulted in an increase in stopping sight distance values as shown in the following partial table. Because this change in the stopping sight distance model has an effect on long term planning, project design, and right of way acquisition, projects may be designed to the old or new stopping sight distance values through December, 2003. Projects let in January, 2004 or after must meet the new stopping sight distance criteria or have an approved design exception.

STOPPING SIGHT DISTANCE (SSD) VALUES				
Speed (mph)	Old SSD Value (ft)	New SSD Value (ft)	Difference (ft)	Percent Change
30	200	200	(+) 0	(+) 0%
40	275	305	(+) 30	(+) 11%
50	400	425	(+) 25	(+) 7%
60	525	570	(+) 45	(+) 9%
70	625	730	(+) 105	(+) 17%

- ◆ Chapter 2, Section 6, Sidewalks and Pedestrian Elements. This section is a complete rewrite of the old Sidewalk section. This rewrite is to accomplish the expected changes to the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and the Texas Accessibility Standards (TAS).
- ◆ Chapter 1, Section 2, Design Exceptions, Design Waivers, and Design Variances. In the first paragraph under Design Exceptions, the references to the Roadway Design Exception Committee and the Bridge Design Exception Committee have been replaced with a link to the Project Development and Policy Manual for procedures to handle design exception requests.
- ◆ Chapter 1, Section 2, Design Exceptions, Design Waivers, and Design Variances. Superelevation (high volume roadways) and Grades (high volume roadways) have been called out specifically as design exceptions for 3R projects. Border width has been deleted as a design waiver for 4R projects. Superelevation (low volume roadways) and Grades (low volume roadways) have been called out specifically as design waivers for 3R projects.
- ◆ Chapter 1, Section 4, Additional Access to the Interstate System. This section has been added to the manual to give the requirements for additional access requests to the interstate system.
- ◆ Chapter 3, Section 2, Table 3-1. The table has been revised to increase border widths to better accommodate pedestrian facilities and utilities. Also, in accordance with the changes in Chapter 2 to Sidewalks and Pedestrian Elements, the old footnote 11 has been deleted to now indicate that the minimum sidewalk width is 5 ft [1.5 m].
- ◆ Chapter 3, Section 2, Medians. The last paragraph under Raised Medians has been revised to indicate divider widths to accommodate maintenance and pedestrian considerations.
- ◆ Chapter 3, Section 2, Median Openings. The last paragraph under Dual Left-Turn Lanes was revised to indicate divider widths to accommodate maintenance and pedestrian considerations.
- ◆ Chapter 3, Section 3, Table 3-5. The table has been revised to increase border widths to better accommodate pedestrian facilities and utilities. Also, in accordance with the changes in Chapter 2 to Sidewalks and Pedestrian Elements, the old footnote 8 has been deleted to now indicate that the minimum sidewalk width is 5 ft [1.5 m]. The old footnote 3 concerning an ADT threshold for shoulder consideration has been deleted.

- ◆ Chapter 3, Section 6, Table 3-19. The table has been expanded to specifically show frontage road shoulder widths for two-way operations and inside/outside shoulder widths for one-way operations.
- ◆ Chapter 3, Section 6, Ramps and Direct Connections. A discussion and reference has been added concerning suggested ramp design techniques to accommodate ramp metering.
- ◆ Chapter 4, Section 4, Table 4-4. The table has been expanded to specifically show frontage road shoulder widths for two-way operations and inside/outside shoulder widths for one-way operations.
- ◆ Chapter 5, Section 1, First Paragraph. A sentence has been added to indicate that structural components within 2R projects should be coordinated with the Bridge Division.

Instructions

This revision will be distributed online only. This manual, and all revisions, applies to all highway and street project development, whether developed by the department or with consultant staff. The dates previously given in Manual Notice 2001-1 and Manual Notice 2000-1 for implementation of the Roadway Design Manual are rescinded. With the exception of the stopping sight distance values given in Table 2-1, this manual, and all revisions, will be effective for all projects beginning with the March, 2002 letting. Project development using this manual and its revisions prior to that date is at the option of the district. As the additional chapters are converted to dual units, they will be released on an individual chapter basis.

Contact

For general comments and suggestions for future revisions of this manual, contact the Design Division.

Manual Notice 2001-1

To: Districts and Divisions

From: Kirby W. Pickett, P.E.

Functional Manual: Roadway Design Manual

Date: January 23, 2001

Purpose

This revision is intended to correct errors contained in the original release of the manual. This update also adds Appendix B to the Roadway Design Manual.

Contents

The following corrections or additions have been made.

- ◆ Table 2-5: Minimum Radii and Superelevation Transitions Lengths for Limiting Values of e and f for Low-Speed Urban Streets. Under the column, Superelevation Transition Length, the "Transition Length Not Required" is applicable to 30, 40, 50, 60 km/h for all max. e values of (-0.02).
- ◆ Figure 2-11: Sidewalks at Driveway Aprons. This figure has been reoriented on the page.
- ◆ Figure 3-2: Cross Sections for Arterial and Collector Two-Lane Rural Highways. This figure has been redone to enhance the legibility of the PDF version.
- ◆ Figure 3-11: Recommended Access Control at Entrance Ramp Junction with Frontage Road. The location of note 1 in the figure was incorrectly placed and has been relocated. Also, the text of note 1 should indicate 30 m in two places as opposed to the incorrectly shown 45 m.
- ◆ Chapter 3, Section 6, Subheading Driveways and Side Streets. Four references in the fifth paragraph were changed from 45 m to 30 m to agree with Figure 3-11.
- ◆ Figure 3-30: Typical Exit Ramps Without Frontage Roads. Added to this figure is a reference in the title to the PDF format.
- ◆ Appendix A, Section 7, Example Problems. This section referred to incorrect figure numbers both in the text and on the drawing themselves. The figure numbers in this section, both in the text and on the drawings, have been changed.
- ◆ Appendix B, Treatment of Pavement Drop-offs in Work Zones. This appendix is added to the Roadway Design Manual. This appendix replaces correspondence entitled, Guidelines for Pavement Dropoffs, sent to the districts by the Highway Design Division on November 30, 1987.

Instructions

This revision will be distributed online only. This manual, and all revisions, applies to all highway and street project development, whether developed by the department or with consultant staff. This manual, and all revisions, will be effective for all projects beginning with the September, 2001 letting. Project development using this manual and its revisions prior to that date is at the option of the district.

Contact

For general comments and suggestions for future revisions of this manual, contact the Design Division.

Manual Notice 2000-1

To: All Districts and Divisions

From: Kirby W. Pickett, P.E.

Functional Manual: *Roadway Design Manual*

Date: December 1, 2000

Purpose

This manual is intended to provide guidance in the selection of geometric design criteria for highway and street project development. This manual represents a synthesis of current information and operating practices related to the geometric design of different classifications of roadway facilities.

Contents

The manual contains geometric design information including chapters on - General Design, Basic Design Criteria, New Location and Reconstruction (4R) Criteria, Non-Freeway Rehabilitation (3R) Criteria, Non-Freeway Resurfacing or Restoration Projects (2R), Special Facilities, and Miscellaneous Design Elements. It contains online links to procedural manuals currently available online as well as those under development.

This release of the manual presents units in metric notation. The manual will receive future updates on a chapter by chapter basis in which the notation will be changed to dual units representing both United States customary and metric units in accordance with unit relationships expressed in publications of the American Association of State Highway and Transportation Officials (AASHTO).

Action Required

This manual applies to all highway and street project development, whether developed by the department or with consultant staff. This manual will be effective for all projects beginning with the September, 2001 letting. Project development using this manual prior to that date is at the option of the district.

Contact

For general comments and suggestions for future revisions of this manual, contact the Design Division.