Presentation overview

- Project Purpose and Overview
- Access Management Connections
- Chapter Review
- Applications to Other Manuals and Projects
Presentation overview

• **Project Purpose and Overview**
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Project Overview

• Purpose
  – To develop an updated Road Design Manual (RDM), Geometric Design Standards, and Design Exception Template

• Montana Department of Transportation (MDT)
  – Road Design, Consultant Design, Training, Traffic Engineering and Safety, Hydraulics

• Project Schedule
  – Phase II: Develop the Manual – April 2015 – August 2016
Project Approach

• Work collaboratively to generate design material that reflects current design research, updated project development processes, and best practices for road design
  – Performance Based Design
• Establish an annotated outline upfront (Phase I) to gain consensus on structure and initial content.
  – Resulted in 14 new/reorganized chapters
• Consistent communication and collaboration with MDT staff.
  – Conference calls, video workshops, and in-person workshops
• Bundled chapters to provide smaller, more reasonable deliverables for reviews
  – Six bundles total
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Access Management Connections

- Coordination with State DOTs and local agencies
- Road design principles to access management
  - Focus on performance vs. dimensions
- Using performance based-design approach to make informed decisions and understand tradeoffs
  - Balance safety, design, and operations
- Working collaboratively to generate ideas and solutions
  - Apply principles to accomplish the goal
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Chapter Review

- Chapter 1 – Road Design Guidelines and Procedures
- Chapter 2 – Basic Design Controls
- Chapter 3 – Horizontal Alignment
- Chapter 4 – Vertical Alignment
- Chapter 5 – Cross Section Elements
- Chapter 6 – Intersections and Interchanges
- Chapter 7 – Multimodal Design Considerations
- Chapter 8 – Urban Design Considerations
- Chapter 9 – Roadside Safety
- Chapter 10 – Work Zone Traffic Control
- Chapter 11 – Drainage and Irrigation Design
- Chapter 12 – Plan Preparation
- Chapter 13 – Quantity Summaries
- Chapter 14 – Specifications/Special Provisions/ Detailed Drawings
- Geometric Design Standards
- Design Exception Template
Chapter 1 – Road Design Guidelines and Procedures

- Comparing the MDT design process with the US nationally recognized project development process
- Understanding the MDT internal structure and process for completing design projects
- Integrating a performance based design approach
Chapter 2 – Basic Design Controls

• Design controls and associated criteria provide a platform
  – Evaluations of the project needs and context
• Design decisions may result in changing various design criteria
  – Achieve the overall purpose of the project
  – Serve the various users of the facility
• The design exception process
  – Document the design decisions
  – Provide a framework for balancing the importance of geometrics, safety, and operations, as well as considering tradeoffs
Chapter 3 – Horizontal Alignment

• Updated information to match national standards
  – AASHTO A Policy on Geometric Design of Highways and Streets (Green Book)
• Clarified MDT’s recommended method for superelevation axis of rotation
  – Method A rotates the traveled way about the centerline profile of the traveled way.
Chapter 4 – Vertical Alignment

- Updated information to match national standards
  - AASHTO A Policy on Geometric Design of Highways and Streets (Green Book)
- Provided a discussion on the coordination of horizontal and vertical alignment that should be integrated to enhance safety and improve operations
Chapter 5 – Cross Section Elements

- Integrated new, enhanced cross sections on key design elements
  - Dedicated bicycle facilities
  - Pedestrian facilities
  - Speed reduction treatments
Chapter 6 – Intersections and Interchanges

- Intersection and interchange design requires close coordination between disciplines
  - Road Design Section
  - Traffic and Safety Bureau

- MDT Traffic and Safety Bureau is responsible for the operational and safety analyses
  - Maintain communication
  - Encourage consistency
Chapter 7 – Multimodal Design Considerations

• New chapter to the RDM
• Provided a toolbox of multimodal design treatments
  – Bicycles
  – Pedestrian
  – Transit
  – Crossings
• Each treatment described, provides different levels of separation
  – Level of separation that appeals to a wide variety of users
Chapter 8 – Urban Design Considerations

- New chapter in the RDM that highlights unique urban design features
- Considerations for applying geometric design in urban environments
  - Urban cross sections
  - Traffic calming
  - Drainage design
  - Balancing tradeoffs
Chapter 9 – Roadside Safety

- Updated information to match national standards
  - AASHTO Roadside Design Guide
- Integrated new information
  - Roadside clear zone
  - Roadside barriers
  - End treatments
Chapter 10 – Work Zone Traffic Control

• Relied heavily on referencing the other chapters for specific design information
  – Applying design guidance within the work zone
• Clarified the design coordination that takes place and confirming this process with MDT’s current practice
Chapter 11 – Drainage and Irrigation Design

• Presents principles and criteria for the design and consideration of drainage facilities in collaboration with the roadway design; including:
  – culverts, special-purpose large culverts, storm drains,
  – roadside drainage, miscellaneous drainage facilities,
  – irrigation facilities, and encasement pipes.

• Closely coordinated with the MDT Hydraulics Section
Chapter 12 – Plan Preparation

• Guidelines for the uniform preparation of contract plans including recommended plan sequence, drafting guidelines, plan sheet content, and sample plan sheets.

• Received input from the MDT personnel that conduct the plan reviews and work with the designers on the final development of plan preparation.
Chapter 13 – Quantity Summaries

• Presents detailed information on estimating quantities for highway construction projects
• Most critical chapter for the RDM
  – most often used and referenced by designers

The key objective was to update this chapter to be user/designer-friendly and provide useful guidance
Chapter 14 – Specifications/Special Provisions/Detailed Drawings

• Describes the purpose of the specifications, special provisions, and detailed drawings
• Presents the guidelines for preparing Special Provisions
• Outlines the additional design information that is required and consistently referenced during a design project
Additional Documents

• Appendices
  – Additional supplemental chapter content
  – Example calculations

• Geometric Design Standards
  – Stand alone document that summarizes MDT design criteria: can be regularly updated, if needed

• Design Exception Template
  – Provides guidance for the designer when developing design exceptions
    • Balancing design, operations and safety
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Applications to Other Manuals and Projects

• Continual communication
  – Conference calls
  – Video workshops
  – In-person workshops

• Annotated outline prior to content development
  – Lay the foundation

• Collaboration with multiple department staff
  – Designers, training, plan review, managers, consultant design, hydraulics, traffic engineers and more
Questions

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