

Marion County Engineering Standards Update Final Annotated Outline

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To: Max Hepburn, Marion County
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Subject: Marion County Engineering Standards Update – Final Annotated Outline

This memorandum documents the Final Annotated Outline for the Marion County Engineering Standards Update. The Annotated Outline is based on the table of contents (TOC) and discussions with Marion County staff, the Technical Advisory Committee (TAC), Board of Commissioners, and Public Open House attendees. In addition, the outline is informed by preliminary reviews of existing County standards and planning documents, reviews of other local agency standards documents, as well as a survey of stakeholders. The Annotated Outline will become the basis for developing the Engineering Standards Update in Phase 2.

The Final Annotated Outline includes the following primary chapters, and each topic is further expanded in the subsequent pages:

1. Introduction
2. General Policies and Standards
3. Plan Development and Submittals
4. Geometric Design
5. Multimodal Design
6. Traffic Engineering
7. Roadside Design
8. Pavement Design
9. Stormwater
10. Utilities
11. Right-of-Way Development
12. Structures
- Appendices

Introduction pages at the beginning of the Standards will include:

- Title page
- Directive
- Preface and Acknowledgements
- Update Process and Timeline
- Table of Contents

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1.0 INTRODUCTION

1.1 Purpose and Intended Use

The following content is from the Marion County Public Works Engineering Standards webpage ([EngineeringStandards \(marion.or.us\)](http://EngineeringStandards.marion.or.us)) and may be updated and modified based on the development of the chapters and final approval of the Standards. This introduction section will include a note about this being an update to the 1990 Engineering Standards and that it incorporates the 2021 ADA Design Standards and Requirements and the 2022 Stormwater Quality Treatment Standards. A statement about when projects are expected to adopt the updated Standards will be included in the introduction or as part of the introduction pages prior to Chapter 1.

- The Engineering Standards establish the general criteria and detailed standards used for work both within and affecting public rights-of-way and dedicated easements of the County.
- Projects within the Urban Growth Boundary and within the limits of a City shall use the City standards, unless determined not appropriate by the County Engineer.
 - *This statement will need to be refined to consider stormwater, which may not fall within a specific Urban Growth Boundary (UGB) or City limits.*
- The Engineering Standards shall govern:
 - The design of roads and appurtenances in unincorporated areas within County rights-of-way and roads in incorporated cities under County jurisdiction where, at the discretion of the County Engineer, City standards are not appropriate or not established.
 - The design of drainage facilities associated with public rights-of-way, roads, accesses (commonly referred to as “driveways”), and parking and loading areas on private property discharging stormwater to public rights-of-way and easements under County jurisdiction, as well as stormwater quality treatment facilities in the Stormwater Management Area (Chapter 9: Stormwater).
 - The use of public rights-of-way and easements benefitting the public for other purposes and facilities to ensure that such other uses do not adversely affect the integrity, use and maintenance of the road, and drainage facilities.
 - Where improvements to public roads and drainage facilities are required under the authority of the Marion County Urban Zoning Code, Title 16, and the Marion County Rural Zoning Code, Title 17, such improvements shall conform to these standards.
- Interpretation and enforcement of the Engineering Standards shall be the responsibility of the Marion County Department of Public Works.
- The Engineering Standards shall apply to new and reconstructed facilities. Existing facilities will be monitored to identify opportunities for improvements to align with the Standards based on available funding.

- The Engineering Standards are intended to be a working document to provide a common understanding for design affecting Marion County roads and public rights-of-way. As such, they will be revised and updated periodically. Proposed modifications to these standards will be presented to the Board of Commissioners for consideration. Additional information on the review and update process is available at the beginning of the Standards document.

1.2 County Mission and Values

The County mission and Public Works Values information will be described in this chapter. Links to the website will also be included.

- County Mission
 - “We serve the public to protect, promote, and enhance a positive quality of life in Marion County.”
 - Add link to webpage: [Our Mission \(marion.or.us\)](http://marion.or.us)
- Public Works Values
 - Safety
 - Integrity
 - Respect
 - Communication
 - Customer Focus
 - Add link to the webpage: [Public Works \(marion.or.us\)](http://marion.or.us)
 - Add graphic of Public Works Values

1.3 Performance-Based Design

- Performance-based design is a decision-making approach for guiding and documenting planning and design decisions. This approach:
 - Emphasizes the outcomes of planning and design decisions as the primary measure for design effectiveness and project success.
 - Provides guidance for clearly outlining intended project outcomes and selecting performance measures that align with those outcomes.
 - Creates a method for documenting planning and design choices to allow the County to make informed design decisions.
 - Supports risk management and tort liability by providing a decision-making framework for documenting planning and design decisions and solutions.
- The performance-based design approach includes frameworks that can help evaluate the trade-offs of various design decisions. Making decisions based on the context and road users can help verify that project outcomes align with the current and/or future land use vision.
- *This section can include a graphic of the Performance-Based Design Framework and include additional general information on the decision-making process. This section will connect to the County decision-making process and documentation.*

1.4 Relevant Resources

The Engineering Standards are supported by and may be used in conjunction with other associated County, Oregon Department of Transportation (ODOT), and national resources and publications. The primary County, State, and national resources are below.

The list of resources for each group will be refined during the chapter development. Links to the resources can also be included for easy navigation.

- County
 - Standard Details
 - County Code
 - Zoning Code
 - City of Salem Traffic Signal Standards and Specifications
 - Transportation System Plan (TSP)
 - Comprehensive Plan
 - County Safety Action Plan
 - Corridor and Sub-Area Plans
 - Cordon Road Master Plan
 - Others
 - County Americans with Disability (ADA) Standards
 - County Stormwater Quality Treatment Standards
 - County Construction Erosion & Sediment Control Code Chapter 15.10 (Ordinance 1307)
 - County Stormwater Discharge Quality Control Code Chapter 15.15 (Ordinance 1311)
 - County Post-Construction Runoff Control Code Chapter 15.20 (Ordinance 1324)
 - County Total Maximum Daily Load (TMDL) Implementation Plan
 - County Stormwater Management Plan
 - County General Conditions for Construction
- State (Current Editions)
 - *ODOT Highway Design Manual*
 - *ODOT Standard Specifications for Construction and Boilerplate Special Provisions*
 - *ODOT Standard Drawings*
 - *ODOT Sign Policy and/or Sign Design Manual*
 - *ODOT Traffic Control Plan Design Manual*
 - *Oregon Temporary Traffic Control Handbook*
 - *ODOT Bicycle and Pedestrian Design Guide (ODOT HDM Appendix L)*
 - *ODOT Bulletin RD21-01(B), Location of Crosswalks on State Highways*
 - *ODOT Traffic Manual*
 - *ODOT Traffic Line Manual*
 - *ODOT Bridge Design Manual*
 - *ODOT Speed Zone Manual*

- *ODOT Analysis Procedures Manual*
- *ODOT Traffic Signal Design Manual*
- *ODOT Traffic Signal Policy and Guidelines*
- Oregon Department of Environmental Quality (DEQ) – Resources and Links
- DEQ National Pollutant Discharge Elimination System MS4 Phase II General Permit
- Willamette Basin TMDL Program
- Oregon Drainage Law
- National (Current Editions)
 - American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets* (Green Book)
 - Federal Highway Administration (FHWA) *Manual on Uniform Traffic Control Devices* (MUTCD), including Oregon Supplements
 - *AASHTO Roadside Design Guide*
 - *AASHTO Guidelines for Geometric Design of Low-Volume Roads*
 - *Public Right-of-Way Accessibility Guidelines (PROWAG)*
 - National Cooperative Highway Research Program (NCHRP) research reports
 - Endangered Species Act
 - Clean Water Act
 - Others

2.0 GENERAL POLICIES AND STANDARDS

2.1 Project Types

This section will describe the following project types and how the Engineering Standards may apply based on the type of project. The intent is to develop Engineering Standards that are consistent with all types of projects within the County; however, some of the plan preparation, as well as the submittal and review processes may change depending on the project. Any variances to Engineering Standards based on project type will be clearly identified in the respective sections:

- Private Development Projects
- County Capital Improvement Projects (CIP)
- Local Municipality Capital Improvement Projects
 - Projects along or near County jurisdiction roads
(e.g., County road project within the City limits of another agency)
- Public Works Maintenance Projects
- Utility Projects
- Local Improvement Districts
- Federal Projects
- ODOT Projects
- County Service District Projects

2.2 Context and Functional Classifications

This section will outline the context classifications and functional classifications that apply within Marion County. The AASHTO Urban Core context classification and freeway functional classification are not applicable to the County.

- **Context Classifications:** Four land use contexts (Rural, Rural Town, Suburban, and Urban) broadly identify the various built environments along Marion County roads based on existing or future land use characteristics, development patterns, and road connectivity.
 - **Rural** - Areas with a low amount of development, including few houses or structures (widely dispersed or no residential, commercial, and industrial uses), and typically large distances between the buildings and roads.
 - **Rural Town** – A small city or town surrounded by rural area that may include a commercial main street, potential for on-street parking and sidewalks, and small distances between the buildings and the road.
 - **Suburban** - Areas with a medium amount of mixed development such as mixed-use town centers, commercial corridors, and residential areas, and varied distances between buildings and the road.
 - **Urban** - Areas with high amounts of development, mixed land uses, prominent destinations, potential for some on-street parking and sidewalks, and distances between the buildings and roads may be smaller.

- **Functional Classifications:** Represents a road facility category that performs a role in a road network or multimodal transportation system. The County TSP provides additional information on the functional classification system. Projects within the UGB or within the limits of a City will defer to the respective City TSP or functional classification, unless determined not appropriate by the County Engineer. Marion County focuses on local, collector, and arterial roads.
 - **Local** - A road with low traffic volume that typically provides access to individual properties, such as homes, businesses, and institutions.
 - **Collector** - A road with medium traffic volume that collects traffic from local roads and directs it towards larger roads (i.e., arterials). They are usually located within residential or commercial areas. Collectors may be further categorized as “minor” or “major.”
 - **Arterial** - A major road with higher volumes that typically run through urban and suburban areas. Some arterials may be further categorized as a “principal arterial.”

2.3 Americans with Disabilities Act

This section will outline principles and policies for integrating accessibility into Marion County projects. The March 2021 County ADA Standards will be incorporated and refined to verify alignment with best practices, County policies, and current national ADA and Public Right-of-Way Accessibility Guidelines (PROWAG). The intent of this section is to outline key policies and standards with additional design details provided in other sections, particularly Chapter 4: Geometric Design and Chapter 5: Multimodal Design. Additional ODOT standards related to ADA may be incorporated.

- General Principles and Policies
- PROWAG
 - *Information based on the 2023 Final Rule on PROWAG*
- Incorporate Existing County ADA Standards

Information will be reviewed for compliance with the 2023 Final Rule on PROWAG.

Information may get split between chapters or become its own chapter based on further discussions.

- Section I – Introduction
- Section II - Definitions
- Section III - When ADA Improvements are Required
- Section IV - Curb Ramp Design Standards
 - *Potential to include references to ODOT standard curb ramp drawings.*
- Section V - Pedestrian Street Crossings
- Section VI - Pedestrian Activated Signal/Beacon Pushbuttons
- Section VII – ADA Design Plan Requirements
- Section VIII - ADA Design Exception Process
- Section IX - Crosswalk Closure Process
- Section X - Temporary Pedestrian Access Route (TPAR)

- *This will primarily refer to detailed standards and guidance provided by ODOT and also refer to Section 6.9.*
 - [Oregon Department of Transportation : Traffic Control Plan Design Manual : Engineering : State of Oregon](#)
 - *Additional ODOT Guidance: [TPAR-Overview.pdf \(oregon.gov\)](#)*
 - *Oregon Temporary Traffic Control Handbook (OTTCH): www.oregon.gov/ODOT/Engineering/Pages/OTTCH.aspx*
 - Section XI - ADA Construction Inspection
 - Section XII - Guidance and Resources

2.4 Project Coordination

This section will include information on coordination within the County and with others outside of the County.

2.4.1 Coordination within Marion County

This section is intended for internal Marion County staff and will note coordination between various divisions and groups within Marion County, including:

- Engineering
- Planning
- Building Inspection
- Operations
- Environmental Services
- Public Involvement
- County Service Districts

2.4.2 Coordination with Others

This section will note the importance of coordinating with other agencies and groups based on the project type and specific project needs. This information will include considerations for coordinating with each agency and could include links to agency resource websites or publications. The respective sections can include references or notes about intergovernmental agreements (IGAs) and discuss the hierarchy and interpretation of the standards between various agencies and the County.

Additional public outreach is covered through planning approvals and other County processes.

Lists are not intended to be all inclusive. Such agencies include, but are not limited to:

- State Agencies
 - Oregon Department of Transportation (ODOT)
 - Department of Environmental Quality (DEQ)
 - Department of State Lands (DSL)

- Oregon Department of Fish and Wildlife (ODFW)
- State Historical Preservation Office (SHPO)
- Oregon Department of Agriculture (ODA)
- Oregon Health Authority (OHA)
- Local Agencies
 - Adjacent Counties
 - Cities within and Adjacent to the County
- Federal Agencies
 - Federal Highway Administration (FHWA)
 - Federal Aviation Administration (FAA)
 - Army Corps of Engineers (USACE)
- Additional Stakeholders
 - Freight
 - Railroad
 - Transit Providers
 - Fire Districts
 - Water Control Districts
 - Utilities
 - Emergency Services
 - Neighborhood and Business Associations
 - Environmental Groups
 - Tribal Areas
 - School Districts
 - Other

2.5 Affordable Housing Policies

This section will describe how the Engineering Standards support affordable housing policies within the State and include specific County requirements related to affordable housing. State requirements and Oregon Revised Statutes (ORS) and Oregon Administrative Rules (OAR) will be referenced.

- Oregon State Requirements
 - ORS 92.031 – Middle Housing Land Divisions
 - ORS 197.758 – Development of middle housing; local regulations
 - OAR 660-046 - Middle Housing in Medium and Large Cities
 - DLCDC HB 2001 Interpretation and Implementation FAQ (08/2021)
 - Cottage Clusters
 - Transit Layer (increased density)
- County Requirements
 - Specific design standard information, if applicable.
 - References to County Code and Planning, as applicable

2.6 Design Decisions and Exceptions

This section will summarize the various processes for documenting design decisions throughout the project, including:

- Design Criteria Worksheet
 - Process and requirements
- Design Exceptions
 - Approach and requirements
 - Capital improvement projects (CIP)
 - Private development projects
- ADA Exceptions
- Crosswalk Closure Request Process
- Additional Project Documentation (if needed)
 - Potholing for utilities, etc.

Examples, forms, worksheets can be included in the appendix. Links to the webpage for forms can be included.

2.7 Permit Requirements

This section will summarize relevant information related to permitting. The section will primarily focus on permitting for private development and utilities but also include internal coordination for capital improvement projects. This will include a note to verify previous related planning permits.

- General Requirements for Various Projects
 - Private development projects
 - Conditions of approval
 - Capital improvement projects
- Permit Requirements
 - Roles and responsibility
 - Application submittal process
 - Performance security requirements
 - Insurance requirements
 - Contractor
 - Property owner
 - Review and approval process
 - Exceptions to permit requirements
- Types of Engineering Permits
 - Major Construction Permit
 - Access Permit
 - Work in the Right-of-Way Permit
 - Annual Blanket Work in the Right-of-Way Permit
 - Utility Work in the Right of Way Permit
 - Stormwater Discharge Permit

- Construction Erosion Prevention and Sedimentation Control Permit
- Event in the Right-of-Way Permit
- Road Closure Permit

2.8 Construction Inspection

This section will include general requirements based on the project types and details on the requirements and processes related to construction inspection. This includes requirements about providing access to inspect the work, roles of the applicant and inspectors, and the overall process for requesting, executing, and reporting the inspection.

- General Requirements
 - Roles and responsibilities
 - Inspector requirements
 - Private development projects
 - Capital improvement projects
- Types and Frequency of Inspections
- Inspection Process
 - Requesting
 - Inspection
 - Reporting
- Utility Coordination (references to Chapter 10: Utilities)

2.9 Access Management

This section includes information on access management. Specific spacing criteria and additional details and standards related to designing accesses and intersections will be included in Chapter 4: Geometric Design. This will include notes about coordinating with applicable local agencies regarding other spacing standards.

This section will require coordination with the County TSP updates to verify location and consistency of this information.

This section should also consider local agency (e.g., City of Salem) access standards. Projects within the UGB or within the limits of a City should use City access management standards, unless deemed not appropriate by the County Engineer.

2.9.1 Types of Access

Types of accesses will be discussed to provide specific considerations and standards, as appropriate.

- Agriculture and Field Maintenance Access
- Logging Access (temporary or permanent)
- Commercial/Industrial Access
- Residential Access
- Emergency-Only Access

- Temporary Construction Access
- Utility Access

2.9.2 Access Management Practices

- Closure Requirements
- Secondary Access Criteria
- Appeal Process of Permit Requirements

2.10 Survey and Monumentation

This section will outline the process for identifying and coordinating existing survey monuments and establishing new survey monuments. The information will primarily refer to the County Survey webpage: [Surveyor's Office \(marion.or.us\)](http://Surveyor's Office (marion.or.us)). This information can refer to ORS and other state requirements, as applicable.

- Existing Survey Monuments
- New Survey Monuments

2.11 Dedication of Public Right-of-Way and Easements

This section will include requirements related to dedicating public right-of-way and public easements. References to County Code information will be included.

- Requirement for Right-of-Way, Special Setbacks (County Code 17.112.020 and 16.27.210), and Public Easements
 - Title research
 - Environmental assessment
 - Overlapping and existing easements
 - Dedication and recording process
 - Road naming convention (County Code Title 11.55)
 - Encroachments
- Minimum Width Requirements
 - Including intersecting radius
- Public Utility Easements
 - *Refer to tariff and rate information in other sources.*
- Right-of-Way Vacations
- Vacating Easements (Easement Quit Claims)
- Other Easements (e.g., drainage, access, sight distance, and slope easements)
- Annexations
 - *The County does not typically annex. This information will include the County's involvement with City annexations.*

2.12 Future and Other Road Development

This section will include other road development standards related to future extension, connectivity, and road established as part of private development projects. Information related to private roads will also be included.

- Road Cut Moratorium and Pavement Management
 - Refer to Chapter 8 for additional details.
- Future Extensions and Connectivity
- Road Requirements Related to Development
 - Boundary streets
 - Internal streets
 - “Linking” streets
 - *This may include future discussions with County Planning regarding code updates.*
 - County road acceptance criteria/policy
- Termination of Roads/Dead-End Streets
- Local Access Roads (Non-County Roads)
 - Refer to Section 4.6.
- Unopened Right-of-Way
 - *This includes undeveloped areas of the right-of-way, such as vegetation and fields, and are legally assigned as local access roads.*
- Private Roads
- Other Road Elements
 - Gates
 - Fences
 - Cattleguards
 - Guardrail (*refer to Section 7.2*)
 - Transit shelters (*refer to Section 5.6*)
 - Tourist-oriented directional signs
 - Fire and emergency services standards (*refer to Section 4.11*)

3.0 PLAN DEVELOPMENT AND SUBMITTALS

This section is primarily separated by private development and capital improvement projects based on the different requirements.

3.1 Private Development Projects

- General Requirements
 - Roles and responsibilities
- Traffic Impact Analysis Requirements (*See section below*)
- Plan Development
 - Plan sets
 - Specifications
 - Standard details
- Submittals and Associated Documents
 - When engineer stamped plans are required
 - Validity of engineer’s stamp on plans
 - Utility coordination and documentation that confirms communication and verification.
- Review Process
 - Types of reviews
 - Fees
 - Based on current board adoption
 - Timeline expectations
 - County plan approval
- As-Builts
- Construction warranty period
- Surety requirements
- Outside Agency Approvals

3.1.1 Traffic Impact Analysis Requirements

The intent is to incorporate the existing County Traffic Impact Analysis (TIA) Requirements into this chapter and reference the webpage: [Traffic Impact Analysis Requirements \(marion.or.us\)](http://marion.or.us). Operational thresholds will reference the County TSP and Chapter 6: Traffic Engineering. The TIA requirements will be reviewed during the development of this chapter to update as needed based on collaboration with the County.

Based on the existing requirements, this section will include the following subsections:

- General Requirements
 - When shall a TIA be required
 - When may a TIA be required
 - Trip Thresholds/TIA triggers by functional classifications
 - County roles and responsibilities

- Note coordination with local agencies
- Calculation of Trip Generation and Distribution
- Determination of the Area for which Analysis is Required
- TIA Report Requirements
- Additional Study Requirements
- Methodologies and Analysis Parameters
- TIA Checklist
 - The checklist can be a reference with a link to the webpage and also included in the appendix.

3.2 Capital Improvement Projects

- General Requirements
 - Roles and responsibilities
 - Operational analysis and/or safety analysis requirements
 - Safety and capacity analyses will be completed based on the requirements in the County TSP.
 - The analysis approach will be project specific and based on collaboration between road design and traffic engineering County staff.
 - The following considerations can be integrated into the approach decision-making:
 - Project goals and original intent,
 - Project type, and;
 - Review of existing conditions (operational capacity and crash history)
- Plan Development
 - Plan sets
 - Specifications
 - Standard details
- Submittals and Associated Documents
- Review Process
 - Types of reviews
 - Fees
 - Based on current County Board adoption
 - Timeline expectations
- As-Builts

3.3 Other Project Types

- Specifics related to other projects outside of private and capital improvement projects.

3.4 Checklists

- Subdivision Plan Checklist
- Survey Checklist

- Utility Checklist
 - Horizontal and vertical clearance checks
- ADA Curb Ramp Design Checklist
- Erosion Prevention and Sedimentation Control Checklist
- Stormwater Quality Treatment Submittal Checklist
- Other

4.0 GEOMETRIC DESIGN

4.1 Design Speed

This will include design speed standards for various facility types and context areas. This will include a discussion of target speed and selecting a design speed.

- General Guidance and Policies
 - Speed definitions (posted, design, target, operating)
- Target Speed and Design Speed by Context and Functional Classification
- Selecting a Design Speed

Design Speed: The AASHTO Green Book describes “the selected design speed should be a logical one with respect to the anticipated operating speed, topography, the adjacent land use, modal mix, and the functional classification of the road. In selection of design speed, every effort should be made to attain a desired combination of safety, mobility, and efficiency within the constraints of environmental quality, economics, aesthetics, and social or political impacts.”

Target Speed: The AASHTO Green Book defines target speed as “the highest speed at which vehicles should operate on a thoroughfare in a specific context, consistent with the level of multimodal activity generated by adjacent land uses, to provide both mobility for motor vehicles and a desirable environment for pedestrians, bicyclists, and public transit users.”

An example target speed/design speed table layout is shown below and continued discussions with the County can help define the appropriate approach to use in this section.

Example Table: Target Speed/Design Speed by Functional Class and Context Area

| Functional Class | Rural | Rural Town | Suburban | Urban |
|------------------|-----------|------------|-----------|-----------|
| Arterials | ≥40 mph | 25-35 mph | 30-40 mph | 25-40 mph |
| Collectors | 20-50 mph | 20-35 mph | 25-35 mph | 25-35 mph |
| Local Roads | 20-45 mph | 20-25 mph | 20-30 mph | 20-30 mph |

Example values to be further discussed.

4.1.1 Existing Speed Zone Orders (County Database)

The County currently uses ODOT’s database and is in the process of developing a County-specific database. A link to the appropriate database will be included.

4.1.2 Speed Limit Setting and Changing Speed

- Overview of Process
- Speed Study Criteria
- County Speed Limit Setting Process
- Requests to County Traffic Engineer

4.2 Cross Section

This section will focus on the road cross section for various facility types within varying context areas. The following design elements will be discussed. Notes about utility coordination can be included as appropriate and refer to Chapter 9: Stormwater for additional information.

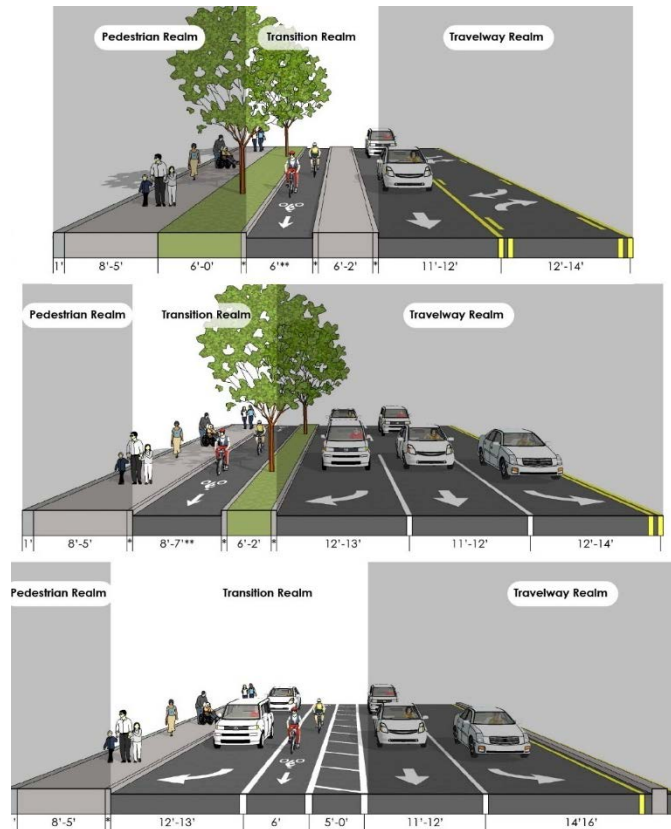
- Design Elements
 - Travelway (lanes and shoulders)
 - Median
 - Parking
 - Bicycle facilities
 - Curb and gutter
 - Landscaping
 - Sidewalks
 - Shared-use paths
 - Right-of-way and easements

Standards for the design elements can be presented in tables and associated cross section graphics. An example table layout and example graphics for a Suburban context is shown below. The intent would be to create tables for each of the context areas (urban, suburban, rural town, and rural). The information presented in the tables and graphics will require close coordination with the Engineering Standard Details developed and updated as part of Phase 2 to verify consistency.

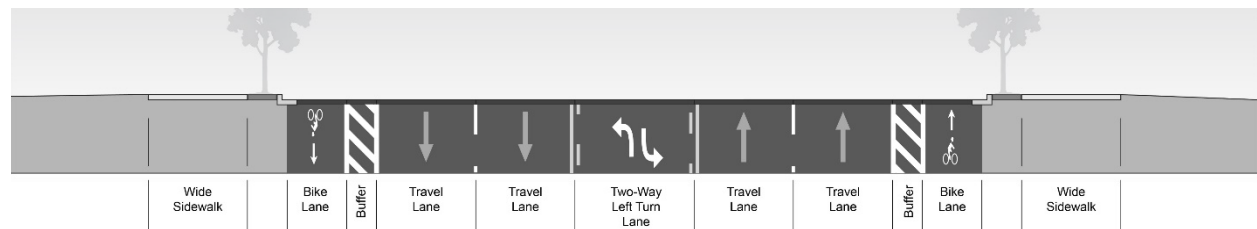
Example Table: Design Criteria for Suburban Context Area

| Design Element | Local | Collector | Arterial |
|------------------------------|-------|-----------|----------|
| Travelway Area | | | |
| Travel Lane Width | | | |
| Right Turn Lane Width | | | |
| Left Turn Lane Width | | | |
| Two-Way Left-Turn Lane Width | | | |
| Left Side Shoulder (paved) | | | |
| Right Side Shoulder (paved) | | | |
| Shy Distance | | | |
| Median | | | |
| Transition Area | | | |
| Bicycle Facility Type | | | |
| Bicycle Facility Width | | | |
| Separation | | | |
| Buffer | | | |
| On-Street Parking | | | |
| Curb/Gutter | | | |
| Pedestrian Area | | | |
| Frontage Zone | | | |
| Pedestrian Facility Type | | | |
| Walkway Width | | | |
| Buffer Zone | | | |
| Shared Use Path | | | |

Graphics are shown as examples only and will be further discussed.



Source: ODOT Blueprint for Urban Design



Source: Adapted from NCHRP Web-Only Document 320, Aligning Geometric Design with Roadway Context

4.2.1 Constrained Road Section

This will include additional guidance for constrained road sections, provide potential applications/scenarios, and outline a process for documenting decisions. The intent is not to have separate standards for constrained road sections. This may include an approach such as:

- Potential Application/Scenarios
- Design Elements and Tradeoffs
- Documenting Justification
 - When the typical cross section standard is not met

4.3 Horizontal Alignment

This section will note that all road designs shall comply with the guidance in the current edition of the AASHTO Green Book, except as modified by this section. We can continue discussions on referencing other information (such as the ODOT HDM) and/or include appropriate details in this section. This section will note that the preference and default for roadway centerline is the center of the right-of-way.

- Horizontal Curves
- Horizontal Clearance
- Exceptions for Low-Volume Roads
- Road and Marking Transitions
- Centerline to Crown Offset

4.4 Vertical Alignment

This section will note that all road designs shall comply with the guidance in the current edition of the AASHTO Green Book, except as modified by this section. We can continue discussions on referencing other information (such as the ODOT HDM) and/or include appropriate details in this section.

- Vertical Curves
 - *This can include information on the use of point of vertical intersection on profile, accesses, and curb returns.*
- Vertical Clearance
 - *This will include considerations for utility, traffic signal, and street light pole & mast arm/fixture clearances.*
- Minimum and Maximum Road Grade
- Cross Slope
- Superelevation

4.5 Intersection Design

This will provide standards for intersection design including design vehicle information, specific geometric design criteria for intersections, and general principles for roundabouts.

4.5.1 Design Vehicle

- **Design vehicle:** Frequently uses a facility and must be designed without encroaching into adjacent and opposing traffic lanes (e.g., turning lane to lane).
 - *This discussion will note the County’s requirements for design vehicles and any specific design vehicles that should also be considered in various contexts.*
- **Check vehicle:** Infrequently uses a facility, but encroachment into opposing traffic lanes, multiple-point turns, or minor encroachment into the roadside is acceptable (e.g., using available pavement).
 - *This will include guidance for agricultural vehicles.*
- *Include graphics of example design vehicle and control vehicle paths.*

4.5.2 Intersection Geometry

This can include graphics and tables for geometric design elements, as appropriate. This will include guidance on how the geometry will vary based on control type, context, functional classification, and other factors.

- Curb Radii
- Tangent Approach
- Intersection Angle
- Vertical Geometry
- Turn Lanes
- Curb Ramps
- Pedestrian Treatments
- Bicycle Features
- Refuge Islands
- Curb Extension
- Midblock Crossings

4.5.3 Roundabouts

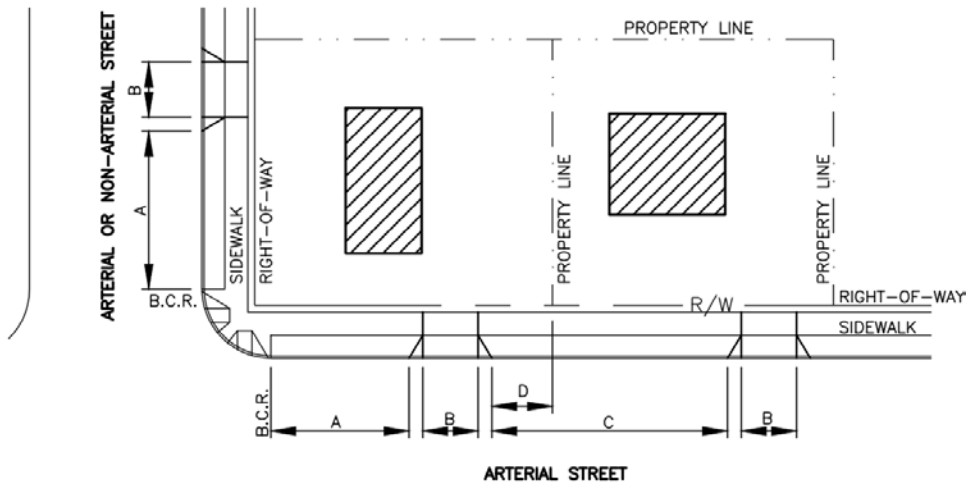
- General Principles
 - Applications and considerations (e.g., when to consider roundabouts)
- County-specific Design Criteria
- *Reference NCHRP Research Report 1043: Guide for Roundabouts*

4.6 Access and Intersection Spacing Standards

The TSP currently notes that the access spacing standards are typically applied:

- When a new access is constructed,
- When an existing access is substantially modified,
- When the use of an existing access changes and increases the potential traffic, or
- As part of a construction project to improve the road.

This section will include graphics to illustrate access and intersection spacing and tables with corresponding access spacing standards for private and public intersections. Examples from the City of Vancouver (T04 Series Transportation Development Review and Capital Standard Plans) are shown below and will be updated/refined to include the specific County standards.



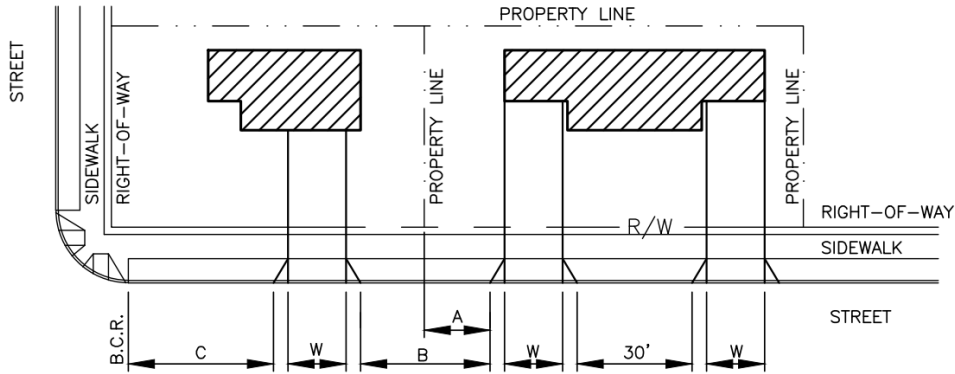
| TYPE OF ARTERIAL | A | B ^③ | C | D ^② |
|------------------|------|----------------|------|----------------|
| PRINCIPAL | 115' | 30'(1) | 115' | 20' |
| MINOR | 75' | 30' | 75' | 15' |
| COLLECTOR | 50' | 25' | 50' | 10' |

LEGEND:

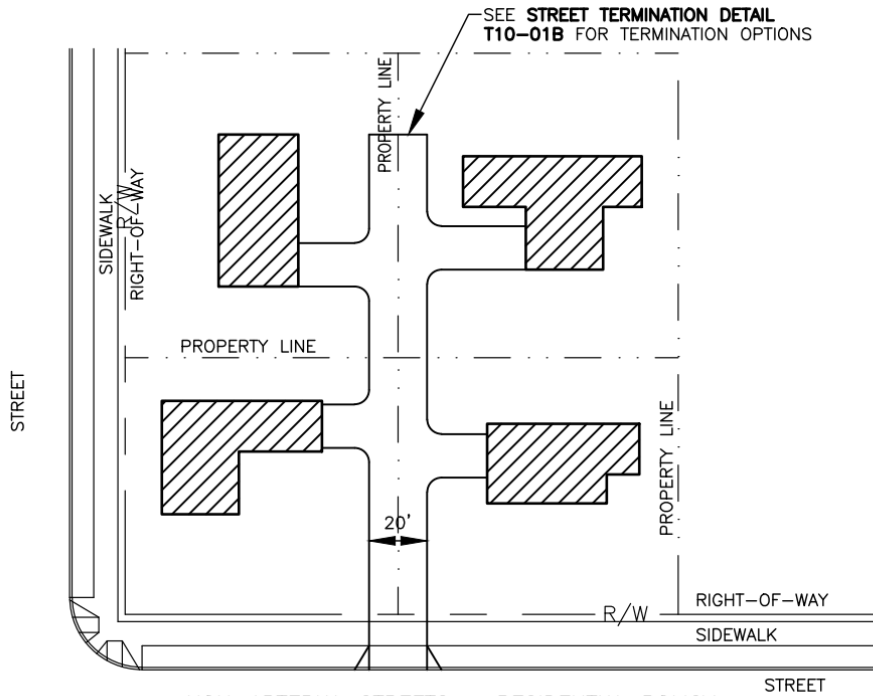
- ① IF 3 LANES ARE PROPOSED, DRIVEWAY WIDTH MAY BE 40'.
 - ② SHARED DRIVEWAYS AT PROPERTY LINES ARE ENCOURAGED.
 - ③ SEE VMC 11.90.110.A FOR ADDITIONAL INFORMATION.
- A = DISTANCE FROM CORNER BACK-OF-CURB-RETURN TO DRIVEWAY.
 B = DRIVEWAY WIDTH. DISTANCE BETWEEN DRIVEWAYS.
 C = DISTANCE BETWEEN DRIVEWAYS.
 D = DISTANCE FROM PROPERTY LINE.

RESIDENTIAL/COMMERCIAL DRIVEWAY WIDTHS FOR ARTERIAL STREETS

Source: City of Vancouver Transportation Development Review and Capital Standard Plans



**NON-ARTERIAL STREETS – RESIDENTIAL POLICY
 REGULATIONS FOR CURB OPENING AND DRIVEWAYS**



**NON-ARTERIAL STREETS – RESIDENTIAL POLICY
 FLAG-STEM AND SHARED DRIVEWAYS**

Source: City of Vancouver Transportation Development Review and Capital Standard Plans

4.7 Access Design

This section will provide the geometric criteria for accesses and refer to Chapter 2: General Policies and Standards for access spacing standards.

- Widths
 - Consider separating by context area.
 - Include considerations for design vehicles.
- Grade
 - Beyond sidewalk
 - Specifically in rural areas (cross reference to 4.10 Fire Standards)
- ADA Requirements
 - This is covered in PROWAG; therefore, we can discuss and assess anything that may need to be included here or just reference that resource.

4.8 Low-Volume Roads

This section will reference the AASHTO Guidelines for Geometric Design of Low-Volume Roads and include specific criteria for this type of road compared to other road standards in the County. This will include criteria for classifying a low-volume road. Local access road standards for existing facilities in the County will also be outlined.

- Design Considerations and Principles
- Local Access Roads
- Reference and connect to Section 4.3 on Exceptions for Low Volume Roads

4.9 Gravel Roads

This section will include design guidance and standards for gravel roads within the County. The following topics may be included:

- Design requirements for gravel roads
- Typical section for gravel roads
- Dust abatement
- Guidance for when gravel roads should be paved

4.10 Sight Distance

This section will include tables and graphics associated with the various types of sight distance. The AASHTO Green Book will be referenced, but general principles and criteria will be included.

- Intersection and Access Sight Distance
 - Include graphics to illustrate measurements.
 - Include cross references to vision clearance area requirements in County Code, County Rural (17.110.770) and Urban (16.27.200) Zone Codes.
 - Consider requirements to limit vegetation and parking near intersections to maintain vision clearance.

- *Include references to Standard Details (Vision Clearance Area - Urban, Vision Clearance Area - Rural).*
- *Include considerations and requirements related to uncontrolled intersections.*
- Stopping Sight Distance
- Passing Sight Distance
- Decision Sight Distance

4.11 Parking (On-Street)

This will include on-street parking only and primarily reference County Code documents for parking restrictions and policies.

- General Requirements
- Policies
 - Types of parking
 - Allowable locations/context (cross reference Section 4.7 for vision clearance areas)
 - ADA on-street parking requirements – per PROWAG
- *Include cross references to County Code 10.10 Parking on Rights-of-Way, which includes large vehicle parking code information.*

4.12 Fire Standards

This section will primarily refer to the Fire Code information and Fire Applications Guide. Design criteria for the following will be discussed:

- Road Cross Section for Fire Access (private access)
- Fire Access Slope
 - *This will include discussion on the County Code related to fire access slopes, as appropriate.*
- Dead-End Roads and Turnouts/Turnarounds
 - Consider parking restrictions associated with these areas/roads.

This can include ORS information related to fire code and local agency authority.

5.0 MULTIMODAL DESIGN

Information will be coordinated closely with Chapter 4: Geometric Design to verify design standards and guidance are not duplicated. This information can also reference and be supported by the County Comprehensive Plan that has a section on bicycle, pedestrian, and transit policies.

5.1 Pedestrian Design

This section will build from the information in Chapter 4: Geometric Design and provide additional design principles and standards related to pedestrian design, including the types of pedestrian facilities and crossings. The information from the existing ADA Standards, noted in Chapter 2: General Policies and Standards, will be coordinated to eliminate duplication. PROWAG references can also be included.

- ADA Standards
 - Color, type, size, and style
 - Include existing County ADA Standards.
- Pedestrian Facility Type and Design
 - Sidewalks
 - Road shoulders
 - Shared streets
 - Shared-use paths
- Pedestrian Crossings
 - Intersection
 - Design elements
 - Mid-Block
 - Design elements
 - *Refer to Section 2.6 for Crosswalk Closure Request Process*

5.2 Bicycle Design

This section will provide additional design principles and standards related to bicycle design including the type of bicycle facility and design elements for the various facility types. This section will refer to the County TSP for additional information related to bicycle facility types and applications.

- Bicycle Facility Type and Design
 - Separated bicycle lanes
 - One-way (both side of the road)
 - Two-way (also referred to as cycle tracks)
 - Buffered bicycle lanes
 - *Include information about various types of buffers*
 - Conventional bicycle lanes (no separation or buffer)
 - Paved shoulders
 - Shared streets
 - Shared-use paths
- Constrained Locations
- Parallel Routes

5.3 Pedestrian and Bicycle Toolbox

This section can draw from other agencies and national research to identify various pedestrian and bicycle strategies and treatments. The information will be coordinated closely with the County to include strategies that would be reasonable for County roads and contexts.

- Strategies and Treatments
- Design Considerations
- *ODOT Bicycle and Pedestrian Design Guide (HDM Appendix L)*

5.4 Micromobility

This section will provide general considerations for micromobility users and how they may interact with other users on the road.

The FHWA defines micromobility as “any small, low-speed, human- or electric-powered transportation device, including bicycles, scooters, electric-assist bicycles (e-bikes), electric scooters (e-scooters), and other small, lightweight, wheeled conveyances.” Micromobility is an emerging trend in transportation with limited examples in the County.

- General Considerations
- Scooters, Electric Bicycles, and Others

5.5 Shared-Use Paths

This section will describe applications and design elements for shared-use paths.

A shared-use path is a combined pedestrian and bicycle facility located within an independent right-of-way or the road right-of-way and physically separated from motor vehicle traffic by an open space or barrier. Most shared-use paths are designated for two-way travel and are designed for both daily commuters and recreational purposes. Some paths may be long and serve to connect communities, parks or natural areas, and popular destinations, while others may serve a short and discrete purpose. They may be located along rivers or roads in various contexts.

- Applications
 - Urban pathways
 - Rural trails (within public right-of-way)
- Facility Design
 - Route selection
 - Mixing users
 - ADA accessibility
 - *Include ramp design per PROWAG*

5.6 Public Transit

This section will provide information related to specific transit standards within the County and how to coordinate with the transit providers within the County on other design elements. This section can

provide links and references to Cherriots Transit Provider. This can include any requirements for transit providers related to design elements.

- General Requirements
 - Vision clearance
 - Accessibility
 - ADA Standards
 - Boarding area
 - Route
 - Clear space
- Coordination with Transit Providers
 - Transit routes
 - Landing areas
 - Transit stops
 - Far-side
 - Near-side
 - Mid-block
 - In-Lane
 - Pull-Out
 - Interaction with bicycle facility
 - Transit shelters - Placement and orientation

5.7 Freight

This will include information about the range of trucks typically seen on County roads and include design considerations for this type of user. This will provide information and links to County and State freight routes. Information about hazardous material routes may also be included.

- Freight Routes
- Hazardous Material Routes
- Policies and Requirements
 - Include cross reference to County Code 11.35 for Transportation Permits

5.8 Electric, Connected, and Automated Vehicles

This section will include general considerations for these types of users. This section will include information about electric vehicle infrastructure (charging stations) for transit and private vehicles.

Example information for connected and automated vehicles is provided below.

Connected and automated vehicles (CAVs) are vehicles able to communicate with each other and roadside infrastructure to make driving decisions automatically. This type of vehicle is currently under development and has the potential to change how vehicles interact with each other, the road, and other users. CAVs may require certain design features to operate effectively, such as specific lane and shoulder widths, pavement markings, separation from pedestrians and bicyclists, or enhanced lighting.

6.0 TRAFFIC ENGINEERING

6.1 Operational Thresholds

This section will refer to the County TSP for operational thresholds and also reference the County TIA requirements. This information will note that for projects within the UGB or within the limits of a City, coordination with the City facility thresholds may be required. For state facilities, the Oregon Highway Plan and ODOT HDM Chapter 1200 will be referenced.

6.2 Standard Intersection Types

This section will discuss the various intersection control types. An example table of how to display the information is described below. This section will refer to intersection geometry information previously discussed in Chapter 4: Geometric Design. This will note the County requirement to use a standard intersection type unless otherwise identified in the plan and verified with the County Engineer.

- Uncontrolled
- Yield
- Stop
- Signal
- Roundabout

Example Table: Typical Intersection Control Types

| Traffic Control/Intersection Form | Definitions |
|-----------------------------------|--|
| Uncontrolled | Intersections with no control, typically seen only in low volume, low speed residential areas. |
| Two-Way Stop-Control (TWSC) | At TWSC intersections, the stop-controlled approaches are on the minor road, and the free-flowing approaches are on the major road. At TWSC intersections, drivers must find gaps in the major road traffic to make a turning or through movement. |
| All-Way Stop-Control (AWSC) | AWSC intersections require every vehicle to stop at the intersection before making a turning or through movement. If other vehicles are present at the intersection, a driver may only proceed after determining that there are no other vehicles in the intersection and that it is their turn. |
| Yield | A yield-controlled intersection requires vehicles to slow down and give way to all other traffic going through the intersection. If no other traffic is present at the intersection, a driver may slow down but not stop before entering the intersection. |
| Traffic signal | Traffic signals are electrically operated traffic control devices that indicate to road users when they may advance through the intersection. Traffic signals allow the shared use of road space by separating conflicting movements. |
| Roundabout | A roundabout is a generally circular intersection form that uses yield-controlled approaches for all legs of the intersection. Drivers must slow down prior to entering the roundabout and give way to vehicles that are in the roundabout. |

6.3 Stop Signs

This section will describe the locations where the following types of stop-controlled intersections are allowed within the County and any specific design standards or considerations for this type of intersection control.

- Two-Way Stop Signs (Reference MUTCD)
- All-Way Stop Signs (Reference MUTCD)
- Uncontrolled locations without Stop Signs (Reference MUTCD)
- Right Turn Permitted without Stopping
 - *Requires additional discussion for County standards and appropriate applications.*
- Public Requests for Stop Signs
 - Guidance for appropriate applications and request process

6.4 Traffic Signals and Beacons

This section will primarily refer to the City of Salem and ODOT traffic signal standards, depending on the project type and context. Specific County standards that are different than the City of Salem and ODOT will be integrated into this section.

- General Requirements
 - *The City of Salem requirements should be used for projects within the City of Salem UGB or immediately adjacent. Subject to County Engineer approval.*
 - *ODOT requirements should be used for all projects outside of or immediately adjacent to the City of Salem UGB.*
 - Additional County standards
- Types and Applications
 - Traffic signals
 - Pedestrian signals
 - Pedestrian hybrid beacons (PHBs)
 - Rectangular rapid-flashing beacons (RRFBs)
 - Speed feedback signs
 - Flashing beacons accompanying warning signs (e.g., intersection ahead)
- Warrants/Justification
 - References to MUTCD
 - References to NCHRP Reports (e.g., NCHRP Report 562: Improving Pedestrian Safety at Unsignalized Intersections)
- Detection
- Equipment and Power Source
 - Foundation designs and geotechnical requirements
 - Reference to Chapter 12: Structures
 - Construction inspection (references to Chapter 1: Introduction)
 - Service coordination with power supply
 - RRFBs and speed feedback assemblies may be solar powered

- Signal Interconnect
- Intelligent Transportation Systems (ITS)
 - CCTV (traffic monitoring)
 - Speed radar and video cameras on signal poles
- Maintenance
 - Cabinet prints
 - *This could include link to ODOT templates here: [Oregon Department of Transportation : Signals : Engineering : State of Oregon](#)*

6.5 Signing

This section will primarily refer to the City of Salem and ODOT signing standards, depending on the project type and context. Specific County standards that are different than the City of Salem and ODOT will be integrated into this section.

- Design and Construction Requirements
 - MUTCD
 - County Standards and Standard Details
 - References to City of Salem and ODOT
- Placement
- Mounting
- Sign Media (plywood vs. sheet aluminum)
- Post Types (wood, round pipe, perforated square tube, etc.), sizes, and foundations
- Types
 - Guide signs
 - Historical landmark signs
 - Temporary signs (e.g., garage sales, not for profit advertising)

6.6 Pavement Markings

This section will primarily refer to the City of Salem and ODOT pavement marking standards, depending on the project type and context. Specific County standards that are different than the City of Salem and ODOT will be integrated into this section.

- Design and Construction Requirements
 - MUTCD
 - County Standards and Standard Details
 - References to City of Salem and ODOT
- Allowable Materials
 - Paint (water based and methyl methacrylate [MMA])
 - Thermoplastic (heated and non-heated)
 - *Temporary markings discussed in Section 6.9.*
- Types of Markings
 - Crosswalks

- Stop bars
- Turn lanes
- Bicycle lane markings
- Transverse markings
- Longitudinal markings
- Reflective pavement markings
- Temporary pavement markings
- Curb painting (colors)
- Legends (e.g., railroad crossings, curves)

6.7 Speed Management Strategies

This section will tie to the speed discussions in Chapter 4: Geometric Design and outline general principles for applying speed management strategies on various facility types and in various contexts.

- General Principles
- Types and Considerations
- Transition Areas
- Public requests for traffic calming (e.g., speed humps)
 - Guidance for appropriate applications and request process

Tables can be included to summarize the allowable speed management strategies in various contexts, as shown below.

Example Table: Speed Management Strategies by Context

| | Allowable Speed Management Strategies |
|------------|---|
| Urban | Roundabouts, lane narrowing, speed feedback signs, on-street parking, median islands, curb extensions, chicanes, textured surface, coordinated signal timing, speed tables. |
| Suburban | Roundabouts, transverse pavement markings, lane narrowing, speed feedback signs,. |
| Rural Town | Roundabouts, lane narrowing, speed feedback signs, on-street parking, median islands, curb extensions, chicanes, speed tables, |
| Rural | Roundabouts, speed feedback signs, transverse pavement markings. |

Considerations and standards by facility type can also be integrated.

This section can refer to other national guidance and resources, as applicable. Such as:

- FHWA Speed Management Toolkit
- NCHRP Report 737: Design Guidance for High-Speed to Low-Speed Transitions Zones for Rural Highways (2012)
- FHWA Traffic Calming E-Primer—Module 3 (2017)

6.8 Transportation Demand Management

This section will reference the County TSP for information regarding traffic demand management. The 2005 TSP notes that the County will pursue and implement TDM and Transportation System Management strategies whenever feasible as an alternative to building new transportation facilities.

6.9 Construction and Special Event Traffic Control

This section will note ODOT and the MUTCD for standards and specification information. This section can also refer to additional guidelines for preparing traffic control plans and identifying traffic control plan strategies, such as:

- ODOT Sign Policy and Guidelines
- FHWA Standard Highway Signs
- Oregon Standard Specifications for Construction and Oregon Standard Drawings TM800 series
- Oregon Temporary Traffic Control Handbook for Operations of Three Days or Less
- Oregon Traffic Control Plans Design Manual
- County TSP – Section 10.2.8 Construction Zone Management

Specific County standards related to the following topics will be included:

- General Requirements
 - Control of the site
 - Plans and submittals
 - Permitting requirements – References to Chapter 2
 - Transportation Management Plan (TMP) Requirements
 - When it is required – types of projects, at the discretion of the County Engineer
- Decision Process and Approvals
 - Project type considerations
 - Speed limit changes
 - Lane closure
 - Road closure
 - Restrictions and timeframe
 - *Include cross reference to County Code 11.05 Temporary Closure of Public Roads*
- Pedestrians and Bicycles
 - TPAR
 - *Refer to ODOT standards and details.*
- Impacts to Traffic Signals
- Temporary Traffic Control Devices
 - Allowable materials (e.g., temporary raised pavement markers)
- Freight and Design Vehicle Considerations

- Detour Routes
 - County roads
 - Other local or state roads
- Flagging Operations
 - Types and applications
 - Automated flagging assistance devices (AFAD)

6.10 Street Lighting

This section will summarize the typical applications for lighting on County roads and intersections. Design details and standards related to County lighting will be provided and references to other sources will be included. The information will not repeat specific design standards from utility companies (e.g., Portland General Electric) but will note the needed coordination and references to obtain that information. City of Salem Street Lighting Prescriptive Standard may be used as a resource for developing content for this section.

- Typical Applications
 - Signals
 - Pedestrian crossings
 - Intersection safety projects
 - Residential neighborhoods
 - Rural areas
 - Based on requests
 - Private installations
 - Coordination with power utility companies
 - County lighting district
 - East Salem Lighting District
 - Ilah Hills Street Lighting District
- General Requirements
 - This section will likely reference specific utility and power company standards to allow for updates to those to be made without requiring updates to this chapter.*
 - Lighting design criteria
 - Light levels for road lighting
 - Criteria for intersections and pedestrian crossings
 - Street light equipment and placement
 - Typical Portland General Electric (PGE – Option A, B, or C)
 - County typically uses “Type C”
 - Other Utility and Power Companies
 - Pacific Power
 - Consumer Power
 - Salem Electric
 - Others
 - Decorative (to be approved by County)

- Power supply
- Construction requirements and inspection (references to Chapter 1: Introduction)
- Submittal Requirements and Process for Obtaining Approval
 - City of Salem Street Lighting Prescriptive Standards
 - Design Options
 - Photometric data
 - Line loss calculations
 - AGI32 analysis files
 - Documentation
- Coordination with Utilities
 - Pacific Power, Salem Electric, and PGE, and County agreements
 - PGE-related design
 - Non-PGE related design

7.0 ROADSIDE DESIGN

7.1 Clear Zones

Based on the *AASHTO Roadside Design Guide*, 4th Edition, the clear zone is defined as “the unobstructed, traversable area provided beyond the edge of the through traveled way for the recovery of errant vehicles. The clear zone includes shoulders, bicycle lanes, and auxiliary lanes, except those auxiliary lanes that function like through lanes.” The desired minimum clear zone width is dependent upon the context area, facility type, speed, and the roadside geometry.

This section will include standards and criteria related to clear zones, based on facility type and context considerations. Information will reference the AASHTO Roadside Design Guide, MUTCD, and FHWA Clear Zones and Horizontal Clearance FAQ.

This section will include a discussion on the following either in the introduction or as part of Section 7.1.4:

- *Coordination with utility companies.*
- *Evaluating design flexibility and options when clear zone criteria cannot be met*
 - *Design exception process*
 - *Guardrails, other barriers, curb and gutter, and lower speeds*
 - *References to hazard mitigation information in the AASHTO Roadside Design Guide*
- *Emergency repair exceptions and processes*

7.1.1 Criteria and Measurement

This will include specific criteria and define the clear zone measurement. The table below presents an example of clear zone criteria from Clackamas County. A similar approach may be used for Marion County and include the various context areas (rural, rural town, suburban, and urban). We can also compare with AASHTO Roadside Design Guide to identify the best approach.

Example Table: Example Clear Zone Criteria Table

| Functional Classification | INSIDE THE UGB | | | | | OUTSIDE THE UGB | | | | |
|---------------------------|------------------------------------|-------|-------|-----|--------------|------------------------------------|-------|-------|-----|--------------|
| | Posted Speed or Design Speed (MPH) | | | | | Posted Speed or Design Speed (MPH) | | | | |
| | 55 | 45-50 | 35-40 | 30 | 25 and under | 55 or Basic Rule | 45-50 | 35-40 | 30 | 25 and under |
| Major Arterial | 15' | 15' | 10' | 10' | 10' | 15' | 15' | 10' | 10' | 10' |
| Minor Arterial | N/A | 15' | 10' | 10' | 7' | 15' | 15' | 10' | 10' | 10' |
| Collector | N/A | N/A | 10' | 7' | 7' | 15' | 10' | 10' | 7' | 7' |
| Connector | N/A | N/A | 10' | 7' | 7' | 10' | 10' | 10' | 7' | 7' |
| Local | N/A | N/A | N/A | 7' | 18" | 10' | 10' | 7' | 7' | 18" |

Source: Clackamas County Roadway Standards

National Highway System (NHS) considerations will be noted, such as the FHWA requirement for breakaway supports within the clear zone on NHS routes.

7.1.2 Objects Within the Clear Zone

- Potentially Allowable Fixed Objects (within right-of-way) – With County approval
 - Street trees
 - Mailboxes
 - Fences
 - Walls (depending on height)
 - Street lighting
 - Street furniture
 - Gates
 - Other
- Breakaway Objects
- Above Ground Appurtenances
 - *This can note that component parts associated with utilities should be outside of the clear zone when practical.*
- Vegetation
- Allowable Protection Techniques
- Utility Coordination
- Liability: Owner of fixed object within the clear zone is held 100% liable for object.

7.1.3 Embankment, Ditches, Shoulders

This can include general requirements and refer to standard details for additional information. We can coordinate with material from the County TSP, Section 10.2.5 Shoulder and Roadside Maintenance. This will include information about recoverable slopes.

7.1.4 Exceptions

This can include information about the process for protecting or delineating objects that cannot be moved outside of the clear zone. This will include emergency repairs and processes. This will be closely coordinated with the introduction information for this section to remove repetitiveness but verify clarity up front.

7.2 Roadside Barriers

This section will provide guardrail and concrete barrier standards based on facility type and context area. Information will include references to AASHTO Roadside Design Guide, MUTCD, and FHWA Clear Zones and Horizontal Clearance FAQ, ODOT Standard Drawings RD400 (Guardrail) and RD500 Series (Concrete Barriers), and NCHRP Report 350: Recommended Procedures for the Safety Performance Evaluation of Highway Features. This section will include information about median barriers and refer to Chapter 4 for additional information regarding median design.

Roadside barriers include, but are not limited to, the following (subject to approval by the County Engineer):

7.2.1 Guardrail

This includes transitions to bridge rail, longitudinal runs of guardrail, and guardrail end terminals.

7.2.2 Concrete Barriers

This can include general standards and principles for this type of barrier.

7.3 Mailboxes

This section will include general requirements for mailboxes in the County and include:

- ADA Requirements
 - Chapter 4: “Accessible Routes” of the ADA for mailboxes installed in areas with sidewalks, especially section 403.5.1 – “Clear Width.”
- Types
 - Central box units
 - Individual mailboxes
- Standards by Context
 - *This section will include key design criteria and reference standard details. Requirements may vary based on urban, suburban, rural, or rural town areas.*
 - *Existing standard detail will be included and may be modified based on revised policies and practices.*
 - City of Salem Mailbox in Sidewalk Detail (No. 311)
 - *Below are examples from other Counties that have specific mailbox standards. Similar information could be developed for Marion County, if desired.*
 - [Clackamas County “Standards for Installing a Mailbox on County Roads”](#)
 - [Jefferson County, Washington, Mailbox Standards](#)
- Coordination with Others
 - Neighborhood associations
 - Local postmaster
- Permit Requirements
 - Installation of new and relocation; permit exemption for abutting owner
 - Replacement of existing in same location; no permit required
- Additional Resources
 - *This section will refer to other resources, including:*
 - Mailbox Installation Guidelines – USPS [How to Install a Mailbox | USPS](#)
 - Chapter 11: “Erecting Mailboxes on Streets and Highways,” of the *AASHTO Roadside Design Guide*.

8.0 PAVEMENT DESIGN

8.1 General Requirements

This will include an introduction to pavement design and an overview of general requirements for the following:

- Asphalt Concrete Pavement (ACP)
- Portland Cement Concrete (PCC)
 - Only within roundabouts
 - Consider specific standard details as needed.
 - Subsurface utility protection (i.e. gas lines)
- T-cuts and grinding

This will include notes about compliance with other standards and specifications, as needed, such as:

- 1993 AASHTO Guide for Design of Pavement Structures (AASHTO Pavement Guide)
- 1998 AASHTO Supplement for Rigid Pavement Design (AASHTO Supplement)
- ODOT Pavement Design Guide (ODOT Pavement Guide)
- Pavementdesigner.org (Concrete)

8.1.1 Design Life

This will outline the design life requirements for pavement design. This may include a summary table of the requirements varied by project type. Considerations for perpetual pavement designs will continue to be discussed.

Example Table: Pavement Design Period

| Project Type | Design Period |
|--------------|---------------|
| | |
| | |
| | |

8.1.2 Design Considerations and Design Inputs

- Equivalent Single Axel Load (ESAL)
 - Defaults per facility type
 - Arterial
 - Collector
 - Local
 - Alley
 - ESAL calculation requirements
- Subgrade Evaluation
 - Default values
 - Evaluation options
 - Dynamic cone penetrometer (DCP)
 - California bearing ratio (CBR)

- Resilient modulus
- Falling weight deflectometer
- K-value (concrete)
- Flexible Design
 - Default design sections
 - AASHTO design inputs
 - Minimum thicknesses
- Concrete Design
 - Default design sections
 - Pavementdesigner.org recommendations
 - Concrete design requirements
 - Jointing
 - Materials
- Pervious Pavement

Note that this is only allowed on private properties and not within County right-of-way unless a design exception is approved. Stormwater information should be referenced in this section.

 - Concrete
 - Asphalt
- Rehabilitation Design
 - Widening design considerations
 - Minimum thicknesses

8.1.3 Pavement Materials and Specifications

This will include recommended specifications for pavement materials and specifications.

- Subgrade Preparation
- Asphalt Concrete
 - Mix design type
 - Binder specification
- Portland Cement Concrete
 - Materials
 - Jointing
- Aggregate Base
- Pervious Pavement
 - *Only in private areas and should reference stormwater information.*
- Full Depth Reclamation
- Cement Treated Subgrade

8.2 Design Requirements

Design requirements will vary by the following project types:

- Maintenance
- Rehabilitation
- Reconstruction
- New Construction
- Local Improvements Districts
- Utility Projects

Within this section, the following topics will be discussed and may be included as subsections:

- Field Investigation
- Geometric Considerations
- Road Cut Moratorium and Pavement Management
- Frontage Improvements
 - Quarter street
 - Half-street
 - Three-quarter street
 - Full street
 - Boundary
 - *This will include specific guidance related to seams outside the wheel path.*
- Coordination with and Protection of Survey Monuments

8.3 Traffic Loading

- Field Data
- Data Analysis

8.4 Flexible Pavement Design Criteria

- Design Considerations
- Thickness Design
- Materials

8.5 Rigid Pavement Design Criteria (Roundabouts Only)

- Design Considerations
- Thickness Design
- Jointing Design
- Materials

8.6 Rehabilitation Design Criteria

- Field Investigation
- Existing Conditions
- Rehabilitation Options

- Design Criteria
- Rehabilitation Design
- Materials

8.7 Default Pavement Sections

This will include default pavement sections for asphalt concrete and rigid pavement.

Example Table: Default Asphalt Concrete (AC) Pavement Section

| Functional Classification | Thickness | | | | AC Mix Design Level |
|-----------------------------|-------------------|----------------|-------------------------------|-----------------------|---------------------|
| | AC Wearing Course | AC Base Course | ¾-inch – 0 Leveling Aggregate | Aggregate Base Course | |
| Arterial | | | | | |
| Collector | | | | | |
| Local Commercial/Industrial | | | | | |
| Local Residential | | | | | |
| Alley | | | | | |
| Shared-Use Path | | | | | |

9.0 STORMWATER

This section assumes that information currently in the existing Marion County Stormwater Quality Treatment (SWQT) Standards will be brought into this overall Engineering Standards and potentially enhanced/expanded depending on the content needs. Additional stormwater topics that were not included in the existing standards were also added. We will continue to coordinate with the County on how to integrate the existing standard information. This chapter will consider stormwater structures and how to reference additional structure information in Chapter 12.

9.1 General Requirements

- General Principles
- Jurisdiction and Applicability
 - Roles and responsibilities
- Stormwater Management Area (SMA) and Requirements
 - Overview of impacts and requirements
 - Phase II MS4 Permit
- Total Maximum Daily Loads (TMDL)
- Environmental
 - DEQ MS4 Permit Cycle
- Submittal Requirements
- Exceptions

9.2 Site Assessment and Development

- Site Assessment
- Site Development Considerations
- Downstream Analysis
- Upstream Impacts
- Impervious Area Reduction Approaches
- Green Stormwater Infrastructure (GSI) and Low Impact Development (LID) Opportunities

9.3 Grading, Fill, and Excavation

This will include general information for these topics (grading, fill, and excavation) and note the need to coordinate with others.

9.4 Hydrology

- Runoff Calculations
- Hydrograph Methods
 - Simplified method for certain size

9.5 Drainage Requirements

- Conveyance Design Storm(s)
- Pipes and Culverts

- Catch Basins and Inlets
- Manhole Sizing and Configuration
- Open Channels and Ditches
 - *Include considerations for various settings (e.g., East Salem, rural areas)*
 - *Consider proximity to utilities.*
- Drain cover patterns and bicycle considerations

9.6 Stormwater Quality Treatment

- Requirements within and outside SMA
- Construction and Maintenance Considerations
- Stormwater Quality Design Storm
- Requirement Hierarchy
- Retention Performance Standards
- Treatment Standards
- Stormwater Management Facility Design Standards
- Reference County Code Title 15.15 Stormwater Discharge Quality Control
- Flow-through Considerations (Upstream Flows)

9.7 Detention, Retention, and Flow Control

This section will be coordinated with potential updates to DEQ standards regarding treatment.

- Requirements within and Outside SMA
- Construction and Maintenance Considerations
- Detention/Flow Control Design Storm(s)
- Detention Facility Design Standards
- Retention Performance Standards
- Flow Control Standards
 - *Consider breaking this out into multiple orifices.*
- Flow-through Considerations (Upstream Flows)
- Combined Stormwater and Fire Pond

9.8 Landscaping for Stormwater Facilities

This section will incorporate Section 3.6 of the County SWQT Standards.

- Growing Media Specifications
- Approved Plant Lists for Publicly Maintained Facilities
- Approved Plant Lists for Stormwater Treatment Facilities
- Irrigation Requirements
- Warranty Period Requirements for Plant Viability
- Vegetation Maintenance Considerations

9.9 Erosion Prevention and Sediment Control

This section will incorporate Section 8 of the County SWQT Standards. The team will continue to consider whether this section becomes a separate chapter as content is developed in Phase 2.

- General Principles
 - Reference County Code Title 15.10: Construction Erosion and Sediment Control
 - Erosion Prevention and Sediment Control Permit Requirements & Applicability
 - DEQ 1200-CN Requirements & Applicability (Stormwater Management Area, for example)
 - DEQ 1200-C Applicability
 - DEQ 1200-CA Applicability
 - Minimum thresholds near waterways
 - Minimum thresholds in other areas
- Permits
- Best Management Practices

9.10 Operations and Maintenance

Information in this section will be coordinated with the County ESSD and other operations.

- Submittals
- Roles and Responsibilities
 - Environmental Services
 - Road Maintenance
 - Service Districts
- Inspections
- Warranty Periods
- Continued Maintenance Agreements for Private Systems

10.0 UTILITIES

This section will provide design standards and criteria related to publicly owned and private utilities. The information will emphasize the importance of utility coordination early and consistently through the project to verify coordination and eliminate conflicts. This information will note to verify ADA compliance for utility placement. This will include references to previous permitting information in Chapter 2. This chapter will reference the pavement moratorium that was previously discussed in Chapter 8.

This chapter will note how to resolve utility conflicts and reference other coordination, permitting and general policies in Chapter 2.

This chapter will consider how to integrate requirements for verifying vertical and horizontal clearance and conflicts (i.e. VVH). This could be included in the checklist described in Chapter 3 and referenced here.

10.1 Public Utilities and Telecommunications

This will include general requirements for the following utilities.:

- Water
- Sewer
- Electric
- Gas
- Telecommunications

Minimum distances and depths between various utilities will also be included. OAR information and references can be included, as applicable.

10.2 Private Utilities in Public Right-of-Way

- Existing Facilities
- New Facilities
- Revocable Licenses
- Special Setbacks
- Oregon Utility Notification Center (O.U.N.C.) Registration Requirement

10.3 Public Utility Easements

This information will be coordinated with Chapter 2: General Policies and Standards to verify and eliminate any repetition. This will focus on more design details, whereas Chapter 2 focuses on general guidance and requirements.

- Public Utility Easements
- County-Owned Easements
- Municipal-Owned Easements (e.g., the cross-county Salem waterlines)
- Utility-Owned Easements

10.4 Underground Requirements

- Type of Underground Utilities
- Minimum Depth and Spacing Requirements
- Underground Locating Requirements
 - *Refer to Oregon Public Utility Commission/OAR 952-001-0070*
- Identify Underground Utility Corridors Throughout the County
- *Reference utility tariff information in other sources.*

10.5 Aboveground & Aerial Requirements

- Types of Aboveground Utilities
- Coordination with Other Equipment
 - Traffic signals
 - Lighting
 - Railroad arms
- Vegetation Maintenance and Clearing Around Structures and Lines
- *Reference utility tariff information in other sources.*

11.0 RIGHT-OF-WAY DEVELOPMENT

This will be a brief chapter to discuss right-of-way development including planter strips, vegetation, and other non-paved areas. The County does not anticipate developing a list of approved street trees or other types of landscaping for County roads. This information is meant to describe requirements associated with vegetation and landscaping that may be installed as part of private development or other local agency projects that impact County roads. Landscaping associated with stormwater is included in Chapter 9: Stormwater. Information will be verified with stormwater permitting requirements and other stormwater information (e.g., MS4 and TMDL).

11.1 Planter Strips

- General Requirements
 - Minimum/maximum widths
 - Storm treatment/flow control allowed
 - Paved planter strips allowed

11.2 Vegetation

- Example Applications
 - Planter strips, medians, along curb-tight sidewalks
- General Requirements
 - Trees and other vegetation
 - Placement and clearance distances
- Sight Distance
- Irrigation Requirements
 - *Include information about agreements and removal upon agreement expiration.*
- Permit Exemption for Abutting Owner Planting Approved Vegetation
- *Include considerations and references from County TSP, Section 10.2.3 Vegetation Management Policies.*

11.3 Median Designs

- Vegetation Requirements
- Sight Distance
- Paved Medians Allowed

11.4 Other Non-Paved Areas

This will include additional information related to right-of-way development, as needed, and will continue to be discussed during the chapter development.

This may include other features that may be present in the right-of-way such as public art, monuments, billboards or other advertisements, and memorials. This will include requirements for placement, allowed timeline and removal.

12.0 STRUCTURES

12.1 General Requirements

Chapter 12: Structures will establish criteria and requirements associated with structures within the County right-of-way. This section will primarily reference other resources such as the Oregon Structural Specialty Code (OSSC), AASHTO, and ODOT. Information will include general design and permitting requirements and considerations for various types of structures.

12.2 Types

- Walls
 - *This section can include approved wall types and allowable locations for cut walls and fill walls (within right-of-way, on private property, within a designated wall easement, etc.).*
 - *Definition of engineered versus non-engineered walls.*
 - *Fall protection requirements for walls exceeding 2.5-ft height (Reference to OSSC).*
 - *Maintenance easement requirements for fill walls.*
 - *Accommodations for future buried utilities.*
 - *References to AASHTO Load and Resistant Factor Design (LRFD) Bridge Design Specifications, OSSC, and ODOT Geotechnical Design Manual, Chapter 16.*
 - *References to utility coordination will be included for pre-engineered walls for transformers.*
- Bridges
 - *This section will largely reference the AASHTO LRFD Bridge Design Specifications and ODOT Bridge Design & Drafting Manual (BDDM).*
 - *The ODOT BDDM includes allowance for specific design deviations on local agency bridges. These local agency exception criteria may be highlighted, specifically disallowed, and/or remain silent in the County standards.*
- Culverts
 - *Culvert design criteria will be largely identified in the hydraulic/drainage section of the Standards. This section will include the types of culverts allowed, design vehicle loading, and code references. References may include:*
 - *AASHTO LRFD Bridge Design Specifications.*
 - *ASTM standards for various culvert types (corrugated metal, precast box, etc.).*
- Stairs
 - *Detailed standards will not be included. This will note that projects that include stairs should refer to the most current edition of the Oregon Structural Specialty Code.*
 - *Include guidance and standards related to stairs adjacent to right-of-way and ADA accessibility requirements. This may include notes about easements for stairs.*
- Bollards
 - *This section will include general principles and guidance related to bollards.*

12.3 References to Other Resources and Standards

References to other resources and standards may be covered in the section above; therefore, this section may no longer be needed once the content for this chapter is developed.

APPENDICES

Additional appendices will be identified during the development of chapter content.

- Acronyms and Glossary
- List of Resources with Links
- Design Exception Documentation and Checklists (Chapter 2)
- Plan Development and Submittal Checklists (Chapter 3)
- Transportation Impact Analysis Checklists (Chapter 3)
- Stormwater Details, Checklists, and Calculations (Chapter 9)